Міністерство освіти і науки України

ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ АВТОМОБІЛЬНО-ДОРОЖНІЙ УНІВЕРСИТЕТ

СТУДЕНТСТВО. НАУКА. ІНОЗЕМНА МОВА

Збірник наукових праць

Випуск 11
Частина 1

Харків
ХНАДУ
2019

УДК 33+621+004+009+620.9+5+61+34
ББК 65

Студентство. Наука. Іноземна мова : збірник наукових праць студентів, аспірантів та молодих науковців. – Харків : ХНАДУ, 2019. – Вип. 11. – Частина 1. – 244 с.

У збірнику подано іноземними мовами результати наукових досліджень студентів, аспірантів та молодих науковців у різних галузях економіки, що можуть зацікавити світову наукову спільноту. Регулярні публікації робіт допоможуть виявити талановиту студентську молодь, здатну брати участь у міжнародному професійному, науковому та освітньому обміні та втілювати одержаний досвід у розвиток передових технологій.

Усі матеріали публікуються в авторській редакції.

ЗМІСТ

HUMANITIES

Bukhantsova A. N.

ZWEISPRACHIGER FREMDSPRACHENUNTERRICHT AN EINER FACHHOCHSCHULE

Belgorod Staatlichen Technologischen Universität. V.G. Shukhov, Belgorod

EIN ZUKUNFTSGEWANDTES FREMDSPRACHENKONZEPT Unsere Schülerinnen und Schüler leben in einer arbeitsteiligen Welt und in einem zusammenwachsenden Europa. Sie werden Bürger Europas und einer zukünftigen Weltgemeinschaft sein. Wirtschaftliche, technische und politische Entwicklungen wie die globale Vernetzung der Märkte und die weltweit arbeitsteilige Produktionsweise, neue Kommunikations- und Informationstechnologien sowie der fortschreitende europäische Einigungsprozess weisen den Fremdsprachen eine andere Bedeutung im Bildungsgang und im Berufsleben der Menschen zu. Jeder Einzelne muss zunehmend bereit, aber auch dazu fähig sein, sich in einer Fremdsprache auszutauschen und zu verständigen. In dem Maße, in dem in Europa und weltweit Grenzen fallen oder überwindbar werden, nimmt die Mobilität zu, müssen Fremdsprachen gleichsam zu Zweitsprachen werden, müssen Menschen bilingual denken und kommunizieren können. Auf unsere Schülerinnen und Schüler warten Herausforderungen, auf die ein zukunftsgewandtes Fremdsprachenkonzept Antworten geben muss [1].

INTERNATIONALES ABITUR BADEN-WÜRTTEMBERG UND INTERNATIONALE ZÜGE Die Einführung der Internationalen Abiturprüfung Baden-Württemberg ist Teil der Weiterentwicklung der bilingualen Abteilungen deutsch-englisch an Gymnasien zu internationalen Zügen. Schülerinnen und Schüler eines internationalen Zuges wählen auf der Kursstufe Biologie als vierstündiges bilinguales Fach, in dem dann die Abiturprüfung in englischer Sprache abzulegen ist. Internationale Züge ermöglichen auch Schülerinnen und Schülern ohne Deutschkenntnisse den Besuch eines öffentlichen Gymnasiums in Baden-Württemberg; sie unterstützen diese dabei, die deutsche Sprache zu lernen und bieten dazu besondere schulische Unterstützungsangebote.

Die pädagogische Konzeption eines internationalen Zuges beruht auf den drei Säulen scholarship, citizenship, leadership. Von den Schülerinnen und Schülern eines internationalen Zuges wird eine hohe Bereitschaft erwartet, die Fremdsprache Englisch bzw. die Fremdsprache Deutsch so zu erlernen, dass bis zum Ende der Mittelstufe Bilingualität erreicht ist (scholarship). Erwartet wird ebenfalls die Bereitschaft, sich in besonderer Weise in das schulische Leben einzubringen (citizenship) und Verantwortung in der Schulgemeinschaft zu übernehmen (leadership).

Internationale Züge richten sich an sprachlich besonders begabte und motivierte deutsche Schülerinnen und Schüler, aber auch an Schülerinnen und Schüler mit internationalem Hintergrund, die in einem altersgerechten schulischen

Umfeld die deutsche Sprache erlernen und sich mit der deutschen und europäischen Kultur auseinandersetzen möchten [1].

DER BILINGUALE SACHFACHUNTERRICHT In den deutsch-englischen Abteilungen ist der bilinguale Unterricht grundsätzlich in seinen Anforderungen, Zielen, Inhalten und Methoden an den für das Gymnasium geltenden Bildungsplan gebunden. Im bilingualen Unterricht stehen die fachlichen, methodischen sowie sozial-personalen Kompetenzen des Sachfachs im Vordergrund.

Zwar ist die Fremdsprache Lern- und Arbeitssprache, doch sollen die Schülerinnen und Schüler sowohl in der Fremdsprache als auch in der Muttersprache über die Ergebnisse des fachlichen Lernens verfügen und die fachspezifischen Kompetenzen erwerben. Bilingualer Unterricht ist deshalb Sachfachunterricht, der weitgehend in der Fremdsprache erteilt wird, in dem aber auch die deutsche Sprache ihren Platz hat.

Die Bildungsstandards gelten für den deutschsprachig und den fremdsprachig erteilten Sachfachunterricht in gleicher Weise. Sie fordern, dass die deutschsprachigen Fachbegriffe den Schülerinnen und Schüler geläufig sind. Folglich muss die jeweilige Fachsprache in der Muttersprache und in der Fremdsprache vermittelt und gelernt werden [2].

Die Lernprozesse finden im bilingualen Unterricht in der Regel in der Fremdsprache statt, doch müssen auch hier die höheren Lernziel- und Anforderungsebenen des Sachfachs erreicht werden; dies kann einen Rückgriff auf die deutsche Sprache erforderlich machen.

Bilingualer Sachfachunterricht muss sich daran messen lassen, dass er die Bildungsstandards des Sachfachs in vollem Umfang erreicht.

Nicht nur an Schülerinnen und Schüler, sondern auch an Lehrerinnen und Lehrer stellt der bilinguale Unterricht besondere Anforderungen. Im Folgenden sollen sowohl die formalen Voraussetzungen für Lehrerinnen und Lehrer im bilingualen Bildungsgang kurz skizziert werden als auch die Anforderungen bezüglich der Planung und Umsetzung des bilingualen Unterrichts. Zunächst zu den formalen Voraussetzungen: Bilinguale Lehrkräfte müssen über eine ausreichende Sprachkompetenz in der jeweiligen Zielsprache verfügen und die fachlichen Voraussetzungen für den Unterricht im jeweiligen Sachfach erfüllen. Das bedeutet, dass Lehrerinnen und Lehrer in bilingualen Zügen in der Regel ein abgeschlossenes Studium sowohl in der Fremdsprache als auch im Sachfach absolviert haben. Dadurch wird sowohl die sprachliche Korrektheit als auch die sachfachliche Qualität des bilingualen Unterrichts sichergestellt [2].

In Ausnahmefällen kann von diesen Vorgaben abgewichen werden: Wenn die Lehrkraft die Sprachkompetenz entweder als Muttersprachlerin oder Muttersprachler oder durch einen längeren Auslandsaufenthalt mitbringt, ist kein Fremdsprachenstudium erforderlich. Neben diesen formalen Anforderungen an bilinguale Lehrerinnen und Lehrer stellt der bilinguale Unterricht auch in der Umsetzung eine besondere Herausforderung dar und setzt ein hohes Maß an Motivation und überdurchschnittlicher Leistungsbereitschaft voraus. Dies zeigt sich zum Beispiel bei der Vorbereitung bilingualer Unterrichtsstunden: Meist muss sich

die Lehrkraft erst selbst mit der spezifischen Fachterminologie eines neuen Themas in der Fremdsprache vertraut machen.

Während in naturwissenschaftlichen Fächern durch die lateinischen Fachbegriffe die Nähe zum Terminus in der deutschen Sprache oft gegeben ist, müssen in geisteswissenschaftlichen Fächern die Begriffe oft regelrecht neu gelernt werden, da sie häufig von ihrem deutschen Äquivalent abweichen. Eine weitere Schwierigkeit bei der Vorbereitung stellt die oft dürftige Materialsituation dar: in den seltensten Fällen gibt es Schulbücher oder Unterrichtsmaterialien, die eins zu eins übernommen werden können [3].

Englischsprachige Schulbücher aus dem Ausland stellen andere Anforderungen und setzen oft andere Schwerpunkte als der baden-württembergische Bildungsplan. Orientiert an den Kompetenzvorgaben des Bildungsplans muss die bilinguale Lehrkraft zunächst die in Frage kommenden Lehr- und Lernmaterialien aus verschiedensten Bezugsquellen zusammenstellen. Dies können sowohl englischsprachige Lehrwerke aus dem Ausland sein, als auch spezielle, für den bilingualen Unterricht entwickelte Unterrichtsmaterialien auf dem deutschen Schulbuchmarkt. Eine weitere bedeutende Fundgrube auf der Suche nach geeigneten Texten, Bildern, Graphiken, Cartoons, Tabellen oder Schaubildern ist das World Wide Web. Allerdings gilt auch hier, dass jegliches Material erst auf den sinnvollen Einsatz im Unterricht geprüft und gegebenenfalls verändert werden muss. So müssen die Materialien für die bilinguale Unterrichtssituation dem erforderlichen inhaltlichen Niveau entsprechen wie auch dem Sprachvermögen der jeweiligen Lerngruppe angepasst werden. Texte müssen beispielsweise gekürzt oder zumindest adaptiert und durch Wortangaben ergänzt werden. Zusammenfassend lässt sich festhalten, dass Lehrkräfte bei ihrer Planung, Vorbereitung und Umsetzung von bilingualen Unterrichtsstunden häufig wertvolle Pionierarbeit leisten und ein deutliches Maß an Mehrarbeit aufbringen [3].

Nicht selten besteht deshalb eine enge Kooperation zwischen bilingualen Kolleginnen und Kollegen – sowohl innerhalb einer Schule als auch über Schulen hinweg: Man tauscht Materialien aus, stimmt das Vorgehen ab oder thematisiert Schwierigkeiten und Besonderheiten der bilingualen Unterrichtssituation.

Literatur

1. Amini-Renken A. Fremdsprachlicher Sachfachunterricht: Stand der Forschung und Erwartungen, Implementierungsversuche und Zukunftsperspektiven. Stuttgart, 1999. 80 S.

2. Johannes-Peter T. Bilingualer Sachfachunterricht revisited': Fremdsprachenlernen in einem ‚integrierten Sachfach- und Fremdsprachen-unterricht'. *Praxis des Neusprachlichen Unterrichts.* 49/1. 2002, S. 12–16.

3. Klaus-Peter/Trenz H., Günter/Waidelich K. Bilingualer Unterricht Englisch. *Dokumentation zum Stand im Jahr 2001*. Stuttgart, 2001. 55 S.

Gavrikova M.G., Bagrintseva O.B., Krivykh L.D.

THE NON-LINGUISTIC STUDENTS ENGLISH LANGUAGE TRAINING BY USING THE PROJECTS ABOUT CULTURAL AND HISTORICAL INSTITUTIONS

ARFSPEI «Astrakhan colledge of culture and art»
HE FSBEI «Astrakhan State University»

In modern world, every educated person should not only be fluently speak any foreign language, but also have a certain aesthetic and cultural level of individual development. Often we face different situations when students, arriving abroad and representing our country at various professional events, cannot speak to representatives of another linguistic groups about the place where they were born and brought up, as well as about their famous countrymen. Unfortunately, the issues of the local history are not given special importance in the course of a foreign language mastering either at the secondary educational level, and at the professional educational stage, or at the higher educational level [1].

For this problem solution, the English Language and Technical Translation Department of HE FSBEE "Astrakhan State University" in cooperation with the AR SBPEE "Astrakhan College of Culture and Arts" offered to the college and to the university students the following types of work: to visit the Astrakhan region museums. This type of work was carried out as an experiment in the framework of CDIO project methodology application to the educational process.

It should be noted that this concept is a worldwide educational project for the qualitatively new specialists preparation. In modern labor market development conditions, each specialist must have practical knowledge of a foreign language and to be able to use it in everyday and professional communication conditions. Thus, within the project framework, the research group applied the standard 8 of the World CDIO Concept [2]. This standard presents active learning methods that include project training, business case modeling, case study methods, discussion in pairs and work in small groups, etc. The educational program of the "Foreign Language" discipline at the college and at the university gives a certain hours, 8 and 16 for classroom work and 16 and 32 of individual work, correspondingly to the native land history and culture study. The work in the frame of the project was divided into several following stages and structured. At the first stage, the groups of students determined the museum that they would like to visit. This survey was conducted by the department members by secret voting. The survey was carried out for the mathematics and information technology department first-year students and the Physics and Technology Faculty, as well as the first-year students of the specialties " Dance Art ", "Instrumental Performance", "Solo and Choir Folk Singing", "Ballet Art ", "Acting Art "," Library Science ". Students were offered a choice of three museums in the Astrakhan city: the City History Museum, located at bld. 9, Ulyanov street, Astrakhan; Astrakhan Art Gallery named after P.M. Dogadin: bld. 14, Saratovskaya st., Astrakhan; "Merchant G.V. Tetyushinov's house" Museum Cultural Center: bld. 26, Kommunisticheskaya st., Astrakhan. The

Astrakhan Museum Reserve and the Astrakhan Culture Museum were not included in the list, as their visit is planned as the “Acquaintance with Astrakhan” school program part.

As a result, 170 students took part in the voting, the voting results are presented in the table 1.

Table 1. The students voting results for museums visiting

City History Museum	Astrakhan picture gallery named after P.M. Dogadin	"Merchant G.V. Tetyushinov’s house” Museum Cultural Center
35	52	83

Thus, it was determined that the place of visit at the highest priority is the The merchant G.V. Tetyushinov’s house. Also carrying out the survey, students were asked to justify their choice. After analyzing the personal data, it was found that the main reason why students would like to visit this museum is its interactivity, i.e. the house unusual design, as well as the fact that the mansion itself was abandoned for a long time, and the final work on its restoration was completed only in 2010.

After the museum identification during the foreign language class, students were offered a case presenting this museum cultural and historical background, and also it contained information about the exposition showed in the museum. According to the work results, the students had to make a presentation before visiting the museum how the museum they’ll visit, looks like, what is its expositions, why it is interesting to visit it, and what they would like to visit in the museum first of all. The museum staff is invited to the project presentation, because in addition to the quality of speaking English, it is also necessary to evaluate the material content itself. During the work, teachers use various active learning methods, including the following in this project: a case-based method with the project elements introduction, a problem-based training method, group work, the use of ICT in the training process.

Working with the case includes the following stages:

- getting acquainted with the case materials;
- case materials analysis;
- team work on the problem definition presented in the case;
- search for a solution to the problem posed in the case;
- the most effective solution choosing;
- project activity results presentation.

During the problems discussion presented in the stated topic framework, the brainstorming method is used, it is based on the following principles: the comments, suggestions and ideas submission; critical judgments exclusion; drawing up a possible solutions list by taking into account the each team member views; the idea justification within 1-2 minutes.

After the work with the case is completed and possible options for the museum and the exposition visiting are presented, a discussion with the museum staff is organized, where the role of an interpreter is offered to the students. This role is given not only to strong students who are fluent in English, but to all the other students who participated in the project. This type of work, in our opinion, will allow them to develop the translation activity skills, which are one of the main in their future professional activity.

To sum everything up, it should be noted that this work seems to us to be an interdisciplinary project, in the frame of which not only the student language competence is increased, but also the linguocultural competence is developed, which in modern programs is represented only by texts about English-speaking countries. This approach will also allow students to master the culture and traditions of his/her native land not only in their own language, but also in the foreign language.

References

1. Макаровских А. В., Овчинникова Е. С. Опыт применения методов активного обучения в преподавании иностранного языка студентам технического вуза в рамках реализации CDIO-концепции в Томском политехническом университете // Молодой ученый. — 2015. — №7. — С. 819-822. — URL https://moluch.ru/archive/87/16579/ (дата обращения: 17.11.2018).
2. Долгоруков А. М. Метод case-study как современная технология профессионально-ориентированного обучения, 2002. [Электронный ресурс]. URL: http://www.evolkov.net/case/case.study.html (Дата обращения: 28.01.2015)

Gerasymchuk T. V.

CLIP THINKING

Kharkiv National Automobile and Highway University

Clip thinking What is it? More often we hear that clip thinking is the main problem of youth today. Let's try to find out what is it?

The word “clip” means in English “a short part of a film or television programme; at a fast/good clip; clipping (from newspaper); the act of cutting something." The term “clip thinking” or CTH more correlates with the last meaning and refers to the principles of creating short music videos, films, news on TV and in social networks. More precisely, they correlate to those of their varieties, where the video series is a collection of different weakly interrelated images. When the teenager has clip thinking, the world around turns into a mosaic of completely different facts. A person gets used to the fact that they constantly replace each other and constantly demands new ones. If you look at the analysis of information, the person with CTH uses only fixed-length meanings and cannot work with complex

structures. We can see this in the fact that a person cannot focus on any information for a long time, and his ability to analyze is reduced. It is produced by long-term consumption of information in a mosaic form via television / internet channels and media. Clip thinking is not fatal, but not harmless. First of all, it affects the success of studies. For a modern teenager, to read something from classic literature of the XIX century is already a super task, since the coefficient of learning has dramatically decreased. The other side of clip thinking is the weakening of empathy and responsibility. Two or three minutes are given to a person to understand a situation, but no more. And then forget everything, because something completely different begins. Other information is waiting for its turn to merge with you and flow through your brains. This clip thinking ultimately prevents a person from being holistic. The danger also lies in the fact that a reverse effect appeared, and the media, television themselves began to adapt to the audience they had brought up. For example, the text in articles becomes highly fragmented, broken into intermittent semantic blocks of small volume. It is filled with a large number of short phrases, and its main task is to create not a logical, but an emotional attitude to what is happening. As a result, the role of the reader is reduced to a simple consumption of information. This form of presentation of the material was very convenient for commerce. Focusing only on emotions, it is easier to force a person to be guided by the information received in everyday life. Films based on the principles of clip technology are being made. (The most vivid example is “The Matrix”). But success in life depends on the style of thinking.

If interaction from mass media, firstly digital, represents the key factor defining changes in informative processes development in the XXIh century, the quantity and quality of changes is to depend on intensity and substantial filling of this experience. Determination of features of respondents' information behavior which would reveal features of experience of interaction from mass media, application of psychological techniques to examine the level of informative processes development would allow establishing existence or lack of correlation between media behavior of individuals and features of the cognitive sphere.

University programs are much more complicated than school programs and require much more information to be perceived and processed. In modern business, without the ability to analyze, isolate the essence and make on the basis of this decision, it is generally impossible to become a successful manager. One of the main requirements in it is the ability to build a chain of a sequence of actions from the existing situation to the goal. And the creation of such chains implies the presence of "long-term" thinking. From here, there is emergence of quite real danger that CTH carriers will be forced out. How to deal with clip thinking? In some countries where they have become aware of its danger, special trainings were developed, where people are taught to focus on one subject and to keep the state of concentration for a long time. But the most accessible method is, after all, the reading of classical literature. Unlike TV, where controlled perception takes place, while reading a work of art, one has to build a figurative system himself. And the complete consolidation of what is read - discussion, note-taking, etc., contributes to

developing the ability to analyze, establish connections between phenomena, and ultimately leads to the destruction of a mosaic, fragmented picture of the world. In conclusion, I want to give an interesting example. One famous marketing expert, teaching at the university, makes his students read modern philosophers like: Baudrillard, Liotar, Foucault, Bart, Losev, Bakhtin, Mamardashvili. He believes that through their works students can learn to build a chain from the general to the particular and become successful marketers. Studying the works of these philosophers is much more difficult than reading classical literature.

Also it is necessary to make sure to continue doing things that do require attention for long periods. Great examples include writing, as well as reading books. In fact, reading books has a ton of great health benefits. And it's necessary try to stop looking for narratives in everything. Keep a clear definition between fantasy and reality and don't expect everything to play out in the movies. Sometimes you just need to get back to reality – how about taking a holiday and unplugging for a few weeks? Try leaving your phone behind – if you can do that without having a heart attack!

References

1. Clip thinking. URL: https://kpi.ua/en/node/10137 (дата звернення: 14.01.2019)
2. Clip thinking. URL: http://www.forlearningminds.com/article/clip_thinking (дата звернення: 14.01.2019)
3. Clip thinking. URL: https://pdfs.semanticscholar.org/a00a/33bcb094f0b590870808c5403e4e2a01029d.pdf (дата звернення: 14.01.2019)
4. Clip thinking. URL: https://www.youtube.com/watch?v=4lBcCmVAeBA (дата звернення: 14.01.2019)
5. Clip. URL: https://dictionary.cambridge.org/ru/%D1%81%D0%BB%D0%BE%D0%B2%D0% /clip (дата звернення: 14.01.2019)

Grokhovskaya I. A.

THE ROLE OF A SUBSTANDARD COMPONENT IN THE GENERAL LANGUAGE SYSTEM: TO THE STATEMENT OF A PROBLEM

Astrakhan State University

The beginning of the XX century was marked by emergence in foreign linguistics of a number of the outstanding scientific works devoted to a phenomenon of substandard lexicon. In 1937 there was a first edition "A Dictionary of Slang and Unconventional English" by Eric Partridge devoted to the English slang. This lexicographic source still plays the defining role when studying the British substandard. In the thirties of the 20th centuries the outstanding American linguist L. Bloomfield noted that it was necessary to create a strict and objective method of the analysis and description of language [1, 10]. The author paid close

attention to the social differentiation of the language, questions of a ratio of different social groups' language. So, the American researcher emphasizes that division of language by most of his contemporaries into the literary language (standard) and nonliterary (substandard) is very conditionally. Within the literary language there are certain distinctions connected with economic and educational levels which, in turn, are closely connected with division of people on professional, age signs, presence of certain hobbies, preferences, etc. [1, 61]. Within nonliterary language, in turn, there are even more language forms [1, 64]. Professional groups (seamen, fishermen, brewers, bakers) have their own speech forms, except, that, a big variety of the nonliterary speech is connected with geographical features of people accommodation and their belongings to a certain social class – the richer the man, the more his speech is brought closer to the literary standards of language [1, 63].

Outstanding foreign linguists E. Partridge, H. Menken, K. Ebl, R. Spears, J. Hotten, Van den Bark and others were engaged in issues of studying the language standard and substandard lexical units. The American linguist Julie Coleman studying history of a substandard lexicography in a series of the scientific publications "A history of Cant and Slang dictionaries" carries out the analysis of the published lexicographic sources since 1859. The author lights about two hundred dictionaries and thesauruses of slang, Cant, argot and jargon.

It becomes obvious that social differentiation of the society on each historical stage of humanity development finds reflection in a language picture of the world by formation of various forms of nonliterary language. In domestic linguistics of the XX century, especially in its second half, most of researchers anyway touched upon a subject of studying the reduced lexicon. In our opinion, the objective picture reflecting the place, a role and functions of the substandard in the language is represented by the analysis of scientific researches of the above-stated foreign scientists and also domestic linguists V.A. Homyakov, I.R. Galperin, L.P. Krysin, M.A. Grachev, V.P. Korovushkin, V.V. Himik, A.D. Schweitzer, etc.

It is necessary to take into account that the question of the terminological accuracy of definitions of the substandard language components always was and still remains debatable at the present stage of the scientific knowledge development. For an illustration of this phenomenon it is expedient to carry out the diakhronny analysis of scientific interpretations of components of substandard lexicon. As a historical discourse it is necessary to consider lexicographic sources from the middle of the 19th century when foreign linguists began to draw close attention to a substandard role in the general language system.

In this key we will note A Dictionary of Modern Slang, Cant and Vulgar words (John Camden Hotten, 1860) in which the author in detail describes the etymology and distinctive features of the components of nonliterary English considered in the dictionary. The author emphasizes that the main difference between Cant and slang is that slang is a modern, mobile, reacting to various external factors language component. While Cant is the "stiffened", secret language primary of the thieves and thuggish groups [7, 28].

When studying a substandard language component, it is expedient to consider A Modern Dictionary of the English Language (Macmillan, 1911). The author uses such concept as literary language and opposes it slang, colloquial or not polished English [8, 18].

The outstanding English lexicographer Eric Partridge, and after it the modern English linguist and professor of medicine John H. Dirckh allocate slang and jargon as the main components of the substandard. At the same time the slang is applied in the speech of all social groups and communities as the unconventional, some kind of eccentric or wrong dialect existing in parallel with a literary vocabulary [6, 14]. Slang, according to the researchers, is the specialized lexicon inherent in certain professional and social groups which is often used with the purpose to emphasize the professional or social accessory to some kind of a community [9, 362].

The modern researcher of the substandard Krassa S.I. fair claims that "domestic linguists investigated substandard language forms to some level of definiteness however reached level is not enough to direct efforts by new boundaries. It is so, in particular, because not structure of the subject outlined by terms argot, jargon, slang, popular speech is so obvious that it attracts attention of not only experts in sociolinguistics, but also the scientists who are engaged in the studying terms" [2, 13].

By the illustration of this fact we will note various options of the nomination of substandard elements which domestic linguists and sociolingvists use: colloquial lexeme (Grachev M.A.), language of mass communication (Schweitzer A.D.), connotive lexicon / culture-marked units (Svyatova M.I.), social dialect (Kulikova I.S.), etc.

In conclusion it is necessary to note that the substandard layer of language is some kind of a marker of the changes happening in various spheres of the society activity. Therefore "despecialization" of terms [5, 116], expansion of the sphere of their application, creation of expressional equivalents of neutral terms attracts keen interest at the present stage of development of linguistic researches.

References

1. Блумфилд Л. Язык. – М.: Прогресс, 1968. 608 с.
2. Красса С. И., Волкогонова А. В. Языковой субстандарт: структурирование понятийного поля // Филологические науки. Вопросы теории и практики. Тамбов: Грамота, 2016. С. 136-140.
3. Куликова И. С., Салмина Д. В. Введение в металингвистику (системный, лексикографический и коммуникативно-прагматический аспекты лингвистической терминологии). – СПб.: САГА, 2002. 352 с.
4. Рябичкина Г.В. Проблемы субстандартной лексикографии английского и русского языков: теоретический и прикладной аспекты: автореферат диссертации док. филолог. наук // Г.В. Рябичкина. – Пятигорск, 2009. – 42 с.

5. Швейцер А.Д. Социальная дифференциация английского языка в США. – М.: Наука, 1983. 216 с.

6. Dirckx John H. «Translation, please! Medical Slang and Jargon» // e-Perspectives. 2015. URL: http://www.hpisum.com/08.dirckx49.pdf (дата обращения 10.12.2018)

7. Hotten John Camden «A Dictionary of Slang, Cant and Vulgar Words». L., 1860. 324 c. URL: https://www.twirpx.com/file/2210833/ (дата обращения 15.12.2018)

8. Macmillan and Co. «A Modern Dictionary of the English Language». L., 1911. 784 c. URL: https://www.twirpx.com/file/2367307/ (дата обращения 16.12.2018)

9. Partridge Eric «Slang To-Day and Yesterday». L.: Routledge and Kegan Paul LTD, 1954. 496 c. URL: https://archive.org/details/in.ernet.dli.2015.58766 (дата обращения 11.12. 2018)

10. Spears Richard A. «Dictionary of American Slang». M.: Русский язык, 1991. 528 c.

Gromova N. V.

LEXICAL MEANING OF SUBSTANDARD UNITS: LINGUISTIC AND CULTURAL COMPONENT

Astrakhan State University

In every word there is the abyss of space, every word is immense…
N. V. Gogol

Studying the lexeme with the use of diachronic approach, linguists note that in the process of historical development of the language lexical meaning of the word is often supplemented by semantics, correlating with non-linguistic factors such as: environment of use, occupation of native speakers, historical and cultural events.

The multilevel character of the value of the lexeme was noted in the different time periods of its research by A. A. Potebnya, V. V. Vinogradov, E. I. Dibrova, A. A. Ufimtseva, M. L. Khokhlin. Fundamental studies of domestic and foreign linguists, such as A. V. Vinogradov, E. Sepira, B. L. Worf, allowed to structure the components of the lexical meaning of the word. Mandatory components of the semantics is the denotation and significant.

Along with these components, the meaning of the lexeme may contain references to the attitude of the speaker to certain phenomena, situations, objects. This type of meaning is called connotative or emotional-expressive. Connotative characteristics can be assigned to language units as general information for the whole language collective, they become part of the semantic structure of the language unit and acquire the appropriate registration in the dictionary in the form of various labels caressing., abusive. dismissive, derogatory. The fact that glossa needs labels, author's explanations, etymological and cultural references, insisted

the researcher in the field of lexicography G. V. Ryabichkina. In particular, the author notes the need for adequate lexicographic registration of lexical substandard in special and general explanatory, ideographic and translated dictionaries.

The origin and development of such a direction in linguistics as linguoculturology, comprehensively studying the relationship and interaction of culture and language, predetermined the study of the semantics of the lexeme for the manifestation of the cultural experience of the people in the language and the presence in the semantics of the lexical unit in addition to denotative-significative and connotative components of the linguistic and cultural component.

In the article, A.N. Pavlova notes that the vocabulary, which contains the national-cultural component, reflects a certain amount of historical, cultural information, without the knowledge of which it is impossible to adequately perceive the word and its correct use. The author summarizes that the study of vocabulary through the prism of the linguocultural aspect allows to "penetrate" into the linguistic picture of the world of a different linguocultural community and to learn how to use linguistic means with national and cultural specificity correctly."

As one of the effective methods to identify the cultural and specific semantic features of linguistic units that reflect the national-cultural fragment of the linguistic picture of the world, E. Maklakova offers a semantic analysis.

In this study, we refer to the vocabulary marked with sub-standard values. The terms of kinship in the English, German and Russian languages are taken as a material for the identification of national-cultural semes in the paradigm of lexical meaning.

In the dictionary of American slang, edited by Harold Wentworth, Stuart Berg Flexner fixed phrase containing a term of kinship uncle, Uncle Sam:

Uncle Sam 1. The United States of America; the government, power, or authority of the United States.

The question arises how uncle Sam became a paraphrase of the United States of America. Historical information is needed.

Uncle Sam's expression originated, presumably, as a paraphrase of the United States during the British-American war of 1812. American folklore says that the appearance of the phrase "Uncle Sam" is associated with the butcher Sam Wilson, who supplied provisions to the New York military base Troy (eng. Troy). Wilson signed the barrels of meat with the letters U. S., referring to the United States (eng. United States), and the soldiers jokingly said that the meat came from Uncle Sam (eng. Uncle Sam).

So Uncle Sam (eng. Uncle Sam) received the status of a personalized image of the United States of America. Uncle Sam is often portrayed as an elderly man with delicate features, an old-fashioned beard, in a cylinder of the colors of the American flag, a blue coat and striped pantaloons.

The Routledge Dictionary of Modern American Slang and Unconventional English captures the following vocabula.

Aunt Jemima noun a black woman who seeks approval from white people by

obsequious behavior: Ms.: a black woman who seeks the approval of" white " people through obsequious behavior.

Glossa contains labels and commentary: Ironically, singer/actor Ethel Ernestine Harper, who portrayed Aunt Jemima in pancake Commerce from 1948 until 1966, was by all accounts anything but the stereotypical subservient black woman.

The expression has a long history of appearance. To advertise the American flour and cereal company and its products, pancakes and other pastries, the owner of the Corporation attracted a black slave and a cook, who created the image of a helpful aunt Jemima.

Despite the unconditional love of order in everything and for higher education, the Germans allow themselves some deviations from Hochdeutsch and sometimes use sub-standard vocabulary. The term relationship die Tante in the phrase is found in the dictionary Deutsch-Russisches Wörterbuch der Umgangssprachlischen und Saloppen lexik.

Tante-Emma-Laden m-s, = / ...Läden small shop, small private shop. Im Tante-Emma-Laden kann man alles einkaufen und man spürt dabei im Gegensatz zu grossen Kaufhäusern ein bischen menschlicher Wärme. In aunt Emma's store, you can buy everything and feel, unlike large Department stores, a little human warmth.

In fact, twenty years ago in Germany, supermarkets almost completely replaced the cozy little shops of the villages. But in such shops-private shops, in which all ran some one aunt with a common name Emma-she played the role of the owner, and the seller, and the cleaner – it was possible not only to make the necessary purchase, but also to exchange a few words about this, feel not an anonymous buyer, dissolved in the human flow of supermarkets, and a pleasant companion. "Aunt Emma" is a collective image of a good sociable and sympathetic woman.

Years later, the Germans remembered similar shops with a family atmosphere, and" Auntie Emma's shops " are experiencing something like the Renaissance and modernized to better fit into the new reality. And the expression Tante-Emma-Laden gains forgotten popularity.

In the online dictionary Slovoborg – the people's dictionary of modern Russian language – we meet several examples of the presentation of the kinship terms subprime values that contain linguocultural component. E.g.:

Uncle Stepa: A very tall man (humorous name). E.g.: In our hospital, the surgeon one is – damn, this uncle Stepa! Meters two, probably, and even above.

In Russia, any student understands why uncle Step's expression correlates with the image of a man of incredible growth. After all, Uncle Stepa is a character of poetic pentalogy for children, created by the beloved Soviet writer Sergei Mikhalkov, whose growth the author described as follows:

Lived high citizen,
Nicknamed Tower…
From the regional giants

The most important giant.

This story and its hero became the reason for the metaphorization of Uncle Step's expression.

And here's another vivid example from the dictionary, Slovoborg when the lexical meaning of the lexeme sub-standard accommodates the linguistic and cultural aspect.

Hello, I am your aunt: 1. Exclamation at the sight of a man who suddenly came to visit 2. Exclamation in surprise, not a very pleasant surprise.

There are several reasons that led to the emergence of this phrase. All of them are connected with the events of our country. First, in the work of Mikhail Bulgakov "the Master and Margarita" the financial Director Rimsky says it in a conversation with the administrator Varenukha. Secondly, Faina Ranevskaya in the film "Easy life" (1964) exclaims: "Hello, I'm your aunt, I came from Kiev, and I will live with you." And, in fact, the well-known Comedy "Hello, I your aunt," 1975.

All these episodes brought a linguistic and cultural load to the lexical meaning of the phrase with the term of aunt's relationship.

The method of semantic analysis made it possible to detect the linguistic and cultural component in the structure of lexical meaning in lexical lexemes of the sub-standard Fund, in particular, in the lexical group of terms of kinship. Diverse extralinguistic factors can influence the presence of a linguistic and cultural component in semantics.

References

1. Maklakova E. A. linguistic and Cultural aspects of semantics of own name. Language and national consciousness. - 2011. Vol. 17. P. 104.

2. Pavlova. The value of background vocabulary in the socio-cultural aspect // Culture of communication and its formation. - 2013. Vol. 27. P. 118.

3. Ryabichkina G. V. English sub-standard lexicography (mid XVI – mid XIX C.) [Text]: monograph/ G. V. Ryabichkina. - Astrakhan: publishing house "Astrakhan University", 2009. - 272 p.

4. History of Russian vernacular lexicography of the post-revolutionary period: Monograph/ G. V. Ryabichkina. - Astrakhan: Publisher: Roman V. Sorokin, 2010. - 154 p.

5. Devkin V. Deutsch-Russisches wörterbuch der Umgangssprachlischen und Saloppen lexik. - Moskau.: Russkij Jazyk, 1994. – 768 S.

6. Flexner, S., Wentworth, H. Dictionary of American slang New York: 1967. - 736 p.

7. The Routledge Dictionary of Modern American Slang and Unconventional English // Edited by Tom Dalzell. Taylor & Francis e-Library, 2008. - 1120 p.

8. Slovoborg – dictionary of modern Russian language. Access: www. slovoborg.su (date accessed: 28.01.2019).

Khorunzhaya L. A.

INTERACTIVE TEACHING ACTIVITIES IN THE LEARNING PROCESS

Kharkiv National Automobile And Highway University

Interactive teaching is all about instructing the students in a way they are actively involved with their own learning process. There are different ways to create an involvement like this. Most of the time it's through

- teacher-student interaction
- student-student interaction
- the use of audio, visuals, video
- hands-on demonstrations and exercises

You encourage your students to be active members of your class, thinking on their own, using their own brains, resulting in long-term memory retention. Not only the students' knowledge will improve, but their interest, strength, knowledge, team spirit and freedom of expression will increase as well.

Interactive techniques have multiple benefits: the instructor can easily and quickly assess if students have really mastered the material (and plan to dedicate more time to it, if necessary), and the process of measuring student understanding in many cases is also practice for the material—often students do not actually learn the material until asked to make use of it in assessments such as these. Finally, the very nature of these assessments drives interactivity and brings several benefits. Students are revived from their passivity of merely listening to a lecture and instead become attentive and engaged, two prerequisites for effective learning. These techniques are often perceived as "fun", yet they are frequently more effective than lectures at enabling student learning.

Here are some examples:

Think, pair and share. Set a problem or a question around a certain topic, and pair up your students. Give each pair of students enough time so they can reach a proper conclusion, and permit the kids to share their conclusion in their personal voice. This way your students will be engaged, communicating, and remember more of the class than ever before.

Brainstorming. Interactive brainstorming is mostly performed in group sessions. The process is useful for generating creative thoughts and ideas. Brainstorming helps students learn to thoughts and ideas. Brainstorming helps students learn to work together, and above all, learn from each other. You'll be surprised of all the great ideas they come up with!

Buzz session. Participants come together in session groups that focus on a single topic. Within each group, every student contributes thoughts and ideas. Encourage discussion and collaboration among the students within each group. Everyone should learn from each other's input and experiences. As a teacher, you could give your students some keywords to spark the conversation.

Of course, there are many other interactive teaching ideas as well:

- Individual student activities
- Student pair activities

- Student group activities
- Interactive game activitie

Individual student activities:

Exit slips. These are best used at the end of the class session. You'll ask the students to write for one minute on a specific question. It might be generalized to *"what was the most important thing you learned today"*. Then, you can decide if you are going to open up a conversation about it in your next class. You can ask them if they still remember what they wrote down.

Misconception check. Discover students' misconceptions. See if students can identify what is the correct answer, when given a false fact. It's useful when going over a previous lesson. It encourages students to think deeply and wager all the possibilities.

Circle the questions. Make a worksheet or a survey that has a list of questions (make them specific) about your topic, and ask students to circle (or check) the ones they don't know the answers to. Then, let them turn in the paper. Create corners concerning different questions that were circled. Let your students work on the extra exercises and explanation in the corners, individually. As your students will all have circled different questions, you have to give each student a different and personilized order to visit the corners.

Student pair activities:

Pair-share-repeat. After a Think-pair-share experience, which I've written about in the first interactive learning lesson idea, you can also ask students to find a new partner and share the wisdom of the old partnership to this new partner.

Teacher and student:

Let students brainstorm the main points of the last lesson. Then, pair up your students and assign them 2 roles. One of them is the teacher, and the other the student. The teacher's job is to sketch the main points, while the student's job is to cross off points on his list as they are mentioned and come up with 2 to 3 points that the teacher missed.

Wisdom from another. After an individual brainstorm or creative activity, pair students to share their results with each other. Then, call for volunteers who found their partner's work to be interesting or exemplary. Students are often more willing to share the work of fellow students publicly than their own work. Of course, you can always encourage sharing their own objectives as well.

Forced debate. Let students debate in pairs. Students must defend the opposite side of their personal opinion. It encourages them to step away from their own beliefs and teaches them to look through a different coloured glass for once in a while.

Variation: one half of the class takes one position, the other half takes the other position. Students line up and face each other. Each student may only speak once, so that all students on both sides can engage the issue.

References

1. Van Gundy, Arthur. 101 Activities for Teaching Creativity and Problem Solving. San Francisco: Pfeiffer, 2005.
2. Watkins, Ryan. 75 e-Learning Activities: Making Online Learning Interactive. San Francisco: Pfeiffer, 2005.

Krivykh L. D.

MODERN METHODS OF ORGANIZING INDEPENDENT WORK OF STUDENTS OF NON-LINGUISTIC SPECIALTIES IN THE STUDY OF THE DISCIPLINE OF A FOREIGN LANGUAGE

Astrakhan State University

The main task of higher education is to form a creative personality of a specialist who is capable of self-development, self-education, and innovative activity. The solution to this problem is hardly possible only through the transfer of knowledge in finished form from teacher to student. It is necessary to transfer the student from the passive consumer of knowledge to their active creator who can formulate a problem, analyze ways to solve it, find the optimal result and prove its correctness [3].

We believe that in the study of a foreign language discipline independent work of students should represent the unity of three interrelated forms:

1. Non-auditory independent work;
2. Audit independent work, which is carried out under the direct supervision of a teacher;
3. Creative work including research work.

We use various types of extracurricular independent work with students: preparing and writing abstracts, reports, essays and other written works on given topics. Moreover, students are given the right to choose a topic, in particular, within the framework of the Festival of Science, an essay competition on the theme: “The Role of English in Professional Activities” is traditionally held at the Department of English Language and Technical Translation. Students of 1-4 courses of the Faculty of Physics and Technology ,Mathematics and Information Technology, Chemical and Biological Faculties take part in the competition . They had to demonstrate their knowledge of English and the ability to write an essay on a given topic.

Homework assignments of a diverse nature (translation and retelling of texts, abstract and full technical translation of articles and patents, etc.) are given, as well as the fulfillment of individual tasks aimed at developing students' independence and initiative.

Performing of term papers and presentations in English has become a good tradition at the department of English and technical translation. Preparation for participation in scientific-theoretical conferences, reviews, competitions, etc.

Auditorium independent work is realized during practical classes. (Business games, project defense, didactic material for individual work of each student, etc.)

You can realize the creative potential of students with the help of project

technology. Participation of students in design and research activities stimulates their development and interaction in several directions at once: information (information sharing), practical (joint research activities), emotional (joint experiences and impressions) and ethical (norms of interaction) [1].

The student, alone or under the guidance of a teacher, is looking for a solution to a problem. This requires him to possess a large amount of subject knowledge, possession of creative, communicative, intellectual skills, for example, to generate ideas, which require knowledge in different areas, the ability to find not one but several solutions to a problem, lead a discussion, listen to and hear the interlocutor, to defend his point of view, supported by arguments, to find a compromise with the interlocutor, to concisely express his thought. Therefore, it can be stated with confidence that a student develops creative competence as an indicator of communicative proficiency in a foreign language at a certain level. The project creates the maximum conditions for the manifestation and development of the creative possibilities of the student through independent activities as well [2].

Individual projects are considered by us as an additional form of independent work of students. The project methodology also provides a higher level of language training for students with good communication skills. On the other hand, this technique can be effectively used even when it is necessary to eliminate the lag of the student from the curriculum.

Currently, students from Ghana and Senegal are studying in our university at the Faculty of Mathematics and Information Technology. They have problems in learning due to lack of knowledge of the Russian language. Teachers and students of 2-3 years decided to help them and translate the lectures on computer science into English.

Type of the project - interdisciplinary.

Objective of the project:

- formation of sociolinguistic competence;
- formation of technical translation skills.
- the acquisition of knowledge from various sources.

Project tasks:

-to learn to independently search for the necessary information;

-to learn how to process information received from the teacher;

- to learn to find the correct terms in the translation, adequate to the original language;

-to learn to present the results of their work using information technology.

Subject areas

-a foreign language, information technology, mathematics.

Expected result

- the creation of presentations.

Participants

- students of 2-3 years (the direction of training "Information Technology")

Project duration is 1 semester.

As a result of the project, students:

- learn to apply basic knowledge of the translation of the text in practice.

-enhance knowledge of English, mathematics and information technology.

The interdisciplinary project, as a rule, is carried out after hours. It was quite voluminous, long-lasting, planning to solve a complex problem, significant for all project participants. This project required skilled coordination from the side of specialists, well-coordinated work of many creative groups of students with clearly defined tasks. It should be noted that the majority of participants reacted to the fulfillment of tasks in good faith and responsibly.

Case technology is an active problem-situational analysis method based on learning by solving specific problem situations (case studies). A special feature of this method is the creation of a problem situation based on real-life facts. The immediate goal of the method is to work together with the group to analyze the situation (case) that arises in a particular learning situation and develop a practical solution; the end of the process — evaluation of the proposed algorithms and selection of the best one in the context of the problem

The effectiveness of students 'independent work is largely determined by the presence of active methods for its control: - entrance control of students' knowledge and skills at the beginning of the study of a regular topic;

-current control, that is, regular monitoring of the level of learning material in practical classes;

- intermediate control at the end of the section or module of the course;

- self-control, carried out by the student in the process of studying the discipline in preparation for control measures;

- final control of the discipline in the form of tests or exam.

And also it should be noted rating system of control, which allows to achieve more rhythmic work of the student during the semester, as well as activates the cognitive activity of students by stimulating their creative activity.

In our opinion, the test control of students' knowledge and skills, which is distinguished by objectivity, saves the teacher’s time, greatly frees him from routine work and allows him to focus more on the creative part of teaching, has a high degree of differentiation of subjects by the level knowledge and skills and is very effective in the implementation of rating systems, makes it possible to largely individualize the learning process by selecting individual tasks for practical sessions of individual and independent work, allows to predict the speed and effectiveness of the training of each student.

References

1. Krivykh L.D. Project technology as a way to realize the creative potential of students. - Collected articles "The main problems of modern linguistics": Publishing House "Astrakhan University" .2018 . -100s.

2. Koryakovtseva N. F. Modern methods of organizing independent work of students of a foreign language. -M .: ARKTI, 2002.-176s.

3. Lednev V.S. The content of education: the essence, structure, prospects. - M .: High School, 1991. -224 s

Lelekina N. V.

ENGLISH SUMMER CAMP ORGANIZATION

Teacher of English
Kharkiv secondary school № 17

Without knowledge of foreign languages, there is neither modern science nor higher education. So the Ministry of Education and Science of Ukraine is approaching to the European standards in teaching foreign languages at school. One of the nonstandard approaches for providing high quality teaching children foreign languages is organization of summer language camps.

The basic principles of the summer language camp activities are:

- the principle of connection learning with life;
- the principle of communicative activity of students;
- the principle of the connection of extra-curricular work with foreign language lessons.

Thus, in the summer language camp students will be able to:

- get motivation for further improvement of the foreign language;
- improve language and linguistic competence;
- acquire the skills of oral communication, the experience of communicative communication;
- overcome the language barrier;
- learn how to respond appropriately in different social situations;
- apply critical thinking in non-standard situations;
- analyze information from different sources;
- master the skills of interpersonal interaction and teamwork;
- form multicultural competences (to be respectful of others, to take thoughts, rights and feelings of other people, to be tolerant);
- to communicate effectively).

The task of the language camp is to show the children another, different from the school style of teaching, where the emphasis is placed on the practical part and knowledge that can be applied later in other areas. Due to such activities, children essentially expand their horizons and learn a lot of new things.

As the children are more interested in a sense of success and enjoyment than overloading complex lexical and grammatical structures, such classes will form a successful creative personality that can overcome the language barrier and communicate fluently in English.

The students should be interested in studying foreign languages, helping to overcome psychological and linguistic barriers, which is why the organizers have chosen the tasks of entertaining and developing character: presentations, quests, culinary classes, games, songs, dances, excursions, interviews, viewing of the educational video and the creation of theatrical plays.

In camps, children will be able to communicate in foreign languages and apply them in various forms of activity (sports competitions, theatrical performances, design work). Participation in the language camp will help children

discover their talents and gain experience of communication in a foreign language. At the same time, the main emphasis is on “The child will perceive learning as a game”.

In order to improve skills and abilities of pupils in communicating in English, as well as to develop students` ability to represent their native culture, country, lifestyle in the process of foreign language cultural communication, on the basis of Kharkiv School 17 an English language camp was created.

The camp`s work lasted 14 days. All the days were thematic. Each day in the camp was fun and amusing: “Presentation of the Team”, “ Travelling around the World”,”A Contest of Drawings”, “ The School of My Dream”, “Smiling Day”, “Sports Day”, “ Healthy Eating Choices”, “Fruit Art”, “Water Challenge”, “Healthy Habits Day”, “Learning Amerecan English”, “Around Ukraine”, “Summer Camp Fest”. Students were able to acquire the necessary language skills, speaking in a foreign language in a relaxed atmosphere and deeping cultural knowledge of English-speaking countries. Camp daily routine included morning exercises, collective projects, getting around city interesting places and diverse quests.

To stick closer to the nature, we got out to various places in the city, to the Gorky Park and to a local botanic garden.

In addition, we combined interactive workshops with a variety of informal and formal debating opportunities. Students took part in energetic debates on exciting contemporary issue “Graffiti”. They learned valuable skills-including critical thinking and how to present your arguments effectively.

Campers chose projects in discussion groups witch made language – learning more interesting and personal. The Language Coordinator and team prepared projects from an innovative selection that the campers enjoyed. They chose something that simply interested them, a topic of the day or some element of the culture of their country. Each project offered different levels of difficulty and appropriate vocabulary in order to cater for the range of ability levels.

Throughout two weeks children were working towards their big performance “Summer Camp Fest” while taking part in an exciting mix of drama, singing and dance classes. Acting could help develop skills that will offer a boost in many areas of life.

On the second year of organizing summer language camps, even more students wanted to take part in it. A noticeable progress in English amongst my students is a good result in my opinion.

The experience I have gained as a tutor during leading the summer camps helped me to become more creative. I am glad to share my experience with ones who only start organizing such camps.

Children understand that English is not only a subject at school but also can be an everyday language for communication, making friends and diversifying one`s life experience.

References

1. Summer Language Camps [Electronic resource] – Mode of access: http://www.pearson.com.ua/summer-camps.html
2. "Strategy of Organizing Summer Language Camps in Ukraine", Ministry of Education and Science, 20th January, 2015.
3. Chu-Chu TV Nursery Rhymes and Kids Songs.
4. https://classroom.synonym.com/primary-school-teaching-methods-6325869.html.Primary School Teaching Methods.
5. Методичні рекомендації щодо проведення літніх мовних таборів [Electronic resource] – http://loippo.lviv.ua/metodyca/inozemna/ram/lmt/.
6. Літні мовні табори [Electronic resource] – http://zakinppo.org.ua/litni-movni-tabori.
7. Літні мовні табори – 2017 [Electronic resource] – htpp://osvita-yu.mk.ua/novini/1581-litni-movni-tabori-2017.

Ljubtschenko W. R.

KURZE ANALYSE DES BEGRIFFS „TRANSHUMANISMUS" IM RAUM HUMANITÄRER VISIONEN

Wissenschaftlicher Leiter – Doktor der Philosophie., Jarowitskaja N.A.
Sprachwissenschaftlicher Leiter – Kand. techn. W., Dozent Rachkovskiy A.W.
Charkower Nationale Universität für Bauwesen und Architektur

Wer aus dem Haus, wer ins Haus, wer über dem Kuckucksnest ist.
Abzählreim. Ken Kesey
Die Kante der Rasierklinge ist schwer zu begehen. Die Weisen sagen, dass der Weg zur Erlösung auch schwierig ist.
Catha Upanishady

Der Transhumanismus ist eine philosophische Richtung, die Modernisierung des Menschen unterstützt und stimuliert. Diese Modernisierung benutzt die Technologien, die dank dem technisch-wissenschaftlichen Fortschritt entstehen. Der Terminus „Transhumanismus" wurde noch von Dante in seiner „Göttlichen Komödie" gebraucht. Die ähnlichen Ideen waren seit einer langen menschlichen Geschichte bekannt und unmittelbar mit dem wissenschaftlich-technischen Fortschritt verbunden („Mythos von Ikarus", Die Ideen von Korsakow und Fjodorow, „Übermensch" von Nietzsche u.a.) [1].

1997 wurde die Weltassoziation der Transhumanisten von den Philosophen Nick Bostrem und David Pierce gegründet [2]. Diese Assoziation wird unter den sehr unterschiedlichen Bevölkerungsgruppen von Jahr zu Jahr immer populärer. Schon im dritten Jahrhundert entstanden transhumanitäre politische Parteien („Die Partei des Lebensfortsetzens", „Die Weltraumpartei"). Die moderne Entwicklung von Technologien sowie die Fortschritte in den Nano- und Biotechnologien, Informationswissenschaften und kognitiven Methoden, die die Veränderung des menschlichen Verhaltens und Wesens fördern, lassen uns über ewige

philosophische Fragen nachdenken, „Was ist der Mensch?“, „Was ist der Sinn des Lebens?“, „Was macht uns einzigartig?“ usw.

Der Hedonismus (Eudämonismus) ist eine philosophische Lehre, nach der die Freude das höchste Wohl ist, das anzustreben ist. Die anderen Werte sind gegenüber der Freude unterstellt und sind die Mittel für die Zielerreichung. Aristippus, der Zeitgenosse Sokrates, gilt als Begründer des Hedonismus. Und der berühmteste antike Hedonist ist Epicurus. Nach diesem Philosophen ist die Freude das Prinzip eines guten Lebens. Gerade Epicurus war der erste, wer die Freude als Abwesenheit von Leiden definierte.

Es ist auch erwähnenswert, dass kein anderer Philosoph bis zur Entstehung von Jeremiah Bentham im 18. Jahrhundert für seine hedonistischen Ansichten berühmt wurde. Der Utilitarismus ist eine ethische Lehre, die von Jeremiah Bentham gegründet wurde und an den Hedonismus anklingt. Nach den Prinzipien des Utilitarismus wird die Freude als höchster Wert anerkannt. Aber der Utilitarismus ist so zu verteilen, dass seine gemeinsame Menge in der Gesellschaft maximal wäre. Der Hauptunterschied zum Hedonismus ist die Betonung nicht auf dem persönlichen, sondern auf dem öffentlichen Glück. Der moralische Wert einer Handlung wird durch das allgemeine Glück abgeschätzt, das jedem, den es berührt, den Erfolg bringt.

Das Problem des Verhältnisses und der Interaktion von Moral einerseits und der Wissenschaft und Technologie andererseits erregt das Interesse der Wissenschaftler nach wie vor. Der technische und wissenschaftliche Fortschritt im 19. und 20. Jahrhundert machte eine Betonung auf die Verhältnisse zwischen der Wissenschaft und Kultur, der Zivilisation und Moral, des Materiellen und Geistigen.

Der englische Schriftsteller Aldous Huxley (1854 – 1963) ist der Autor des dystopischen Romans „Oh, die seltsame neue Welt“ (1932). In seinem Roman zeigt er die Entwicklung des Totalitarismus in der Gesellschaft der wissenschaftlichen und technischen Art. Als die Folge davon geht die Menschheit und Identität verloren. Nach der Meinung des Schriftstellers denken die Leute an jenen Kategorien und Konzepten, die der Macht einträglich sind. Die Macht, die sich äußerlich um das Wohlergehen der Menschen kümmert, manipuliert tatsächlich das Massenbewusstsein durch die Technik und Technologie. Für die wirtschaftliche Elite sind die Macht und das Geld die wichtigsten Ziele im Leben. Im Vorwort zur Arbeit „Die wunderbare neue Welt“ schreibt er: „In einem totalitären und wirklich effektiven Staat wird die Bevölkerung von einer allmächtigen Gruppe der Politiker mit der Armee von Verwaltern regiert, die Bevölkerung besteht dabei aus den Sklaven, die nicht gezwungen werden sollen, weil sie ihre Sklaverei lieben“.

„Die merkwürdige neue Welt“ ist eine Gesellschaft, wo alle Wünsche, Bedürfnisse und Motive programmiert sind. Die Frauen sind von gebärfähigen Funktionen befreit, die Empfängnis von Kindern erfolgt in speziellen Glasgefäßen, die sich in speziellen Laboratorien befinden. Dank der Genetik werden alle unerwünschten Fehler bis zur Geburt des Kindes vernichtet. Die Menschen in der neuen Welt sind daher glücklich, zufrieden, denken ähnlich und entsprechend

einem bestimmten Programm. Die von Huxley geschaffene Welt ist stabil, beständig, es gibt keine Unzufriedenheit und keine Revolutionäre.

Der Bruder von Aldous, Julian Huxley, ist der erste, der den Begriff „Transhumanismus“ gebrauchte. Die Grundlage des Transhumanismus von Julian Huxleys war die Eugenik. Das war kein Zufall, da er das Mitglied des britannischen Bundes der Eugeniker war. Die Verbindung der Eugenik mit dem Transhumanismus bestimmte die Merkmale des neuen Humanismus. Die britische Eugenik ist eng mit der Darwins Lehre über die Naturselektion verbunden, wonach der Stärkere aushält, der Schwache stirbt.

Es gibt verschiedene Arten von Transhumanismus. Der elitäre Transhumanismus ist im Wesentlichen eine Rassentheorie. Ihre Vertreter sprechen heuchlerisch über die Entwicklung der Menschheit und versuchen tatsächlich, eine kleine Klasse von Herren zu schaffen, den anderen ist der Status von Sklaven vorbereitet. Der strategische Plan dieses Transhumanismus ist der Kampf um die Weltherrschaft. Ethnische Gruppen, die Menschen sind nur die Bauern im Weltprozess.

Der Transhumanismus hat keinen Wunsch, die gesamte Menschheit physisch und geistlich zu entwickeln. Die hochentwickelte Medizin kann für die Mehrheit der Bevölkerung nicht zugänglich sein. Der Mangel an Arbeitsplätzen ist das richtige Werkzeug für seine Degradierung. Einen solchen strategischen Plan haben die Anhänger des sogenannten elitären Transhumanismus für die Zerstörung des kulturellen Raums der Persönlichkeit und der Entmenschlichung der Gesellschaftsbeziehungen.

Die höchste Wirtschaftselite, die die Projekte dieser Art geschaffen hatte, wurde ihr Opfer dabei, weil diese Elite seine moralische, ästhetische Form verliert, die jetzt an Frankensteins Bild erinnert, das von Mary Shelley (1797-1851) im 19. Jahrhundert geschaffen wurde.

Als Verallgemeinerung kann man sagen, dass hedonistischer Transhumanismus eine künstliche Veränderung der menschlichen Natur auf die Hauptstelle einstellt, um die glücklichste Gesellschaft aufzubauen sowie die Unterstützung der Evolution bei der Erfüllung ihrer universellen Mission, die Erreichung des Glück bzw. der Zufriedenheit der Menschen, die Aktualisierung und die Offenbarung der Vernunft im Universum. Der Transhumanismus unterstellt also die Benutzung des wissenschaftlichen und technologischen Fortschritts zur Entwicklung der menschlichen Fähigkeiten. Der Begriff des Transhumanismus fungiert nicht nur als ideologisches Paradigma, sondern auch als Projekt, das die Ziele vor der Menschheit bezüglich grundlegender Fragen des Seins stellt sowie bezüglich existentieller, axiologischer Überlegungen und braucht eine Tiefwürde und geistige Aufrichtigkeit bei der Antwort auf sie.

Literatur

1. «Трансгуманизм – древнейшая мечта человечества»: [электронный ресурс] – режим доступа: https://valerijapride.livejournal.com/28175.html

2. «Трансгуманизм и вспомогательные репродуктивные технологи»: [электронный ресурс]. – режим доступа: http://na-gore.ru/articles/aks_transgum.htm

3. О. Хаксли О дивный новый мир: [электронный ресурс] – режим доступа: http://loveread.ec/read_book.php?id=31690&p=1

Luneva K. Yu.

MOTIVATION AT THE LESSONS OF FOREIGN LANGUAGES

Grammar School No.6, Gubkin

Every teacher wants his subject to be interesting and useful. That's why the problem of raising students' motivation is relevant nowadays. The aim of the article is to show how a teacher can motivate students to learn foreign languages with great pleasure. The study material is based on linguistic researchers, the Internet and educational sources. In our opinion this topic will be interesting for creative teachers who are motivated to achieve good results themselves.

Motivation is a key element of class activity according to the learning standards in the Russian Federation where the personality of a student, his ability to self-knowledge, independence in decision-making is in the center of attention. Therefore the main task of the teacher following learning standards is increasing students' interest in foreign languages.

It is impossible to teach the student who does not want to study as he does not know what it is necessary for and how to use the gained knowledge in life. Therefore the motivation cannot be considered only as a separate stage of a lesson within leaning standards, it is a fundamental stage of all lesson.

Nowadays most schools face the problem of the absence of interest to study languages because many students consider foreign languages to be the most difficult subject. According to the statistics the reasons of the decrease of motivation are the following: the lack of interest to the subject, difficulties in pronunciation, grammar, the fear to communicate with foreigners, underestimated self-assessment, and students do not like to learn new words by heart and they do not really understand the importance of foreign languages in their future.

Any school subject has enough opportunities for motivation of cognitive activity of students, and English is not an exception. The aim of a teacher is to raise students' interest and to show all the secrets of the subject with the help of own experience, knowledge, human qualities and enthusiasm.

Nowadays there are a lot of ways and means of raising motivation at the lessons of foreign languages. One of the means of motivation is the Student's book. A teacher must use the opportunities of books, which contain a lot of relevant topics for discussion, colorful pictures, unusual tasks, ideas for team work and for projects, and give references to the video in the Internet.

One more means of "awakening" interest among students is creation of a problem situation. In this case we notice that research activity is combined with

inner motivation, the ability to learn and create something new. For example, while explaining the rule “The pronunciation of the ending “ed”, a teacher can create a problem situation, having written on a board three words with various options of reading the ending ed.

Evaluation of educational activity also serves to increase students’ motivation. When the mark is put down in the diary, the student either is proud of himself, or realizes that he has to work hard to get better marks. In order the student to be able to evaluate the level of the knowledge at each stage of a lesson and express the opinion, it is possible to use the certificate of success. This method allows maintaining the interest of school students in educational process throughout all lesson.

Role game is also one of the means of increasing motivation as during the game, students do not pay attention to the fact that they study new material. Any game is much more interesting and more fascinating, than plain theoretical material and always creates the success situation. The games "Crocodile", "Snowball", "I Trust — I Do Not Believe", "linguistic (mathematical) soccer" can serve as examples of such games.

The method of projects gives students some freedom, an opportunity to show their creativity and it promotes the competition where everyone tries to do the best. While making projects students use some extra information which can motivate students.

The important means of raising motivation is using the Internet. Modern students can’t live without gadgets and they will be interested in the material shown on the smart board. Besides, teachers can create web-quests where students have to do interactive tasks, watch videos, make podcasts or even investigations.

The success at the lesson of foreign languages greatly depends on the forms of work organization during the lesson. A special role is played by a collective form of work when pupils should discuss together problems and find ways of their decision. Such form of work unites pupils, even the weakest children can participate without any fear of being mistaken.

To make a conclusion, it is necessary to say that the high level of motivation serves as a success indicator in education that is why its achievement is one of the priority directions of learning standards. And the role of any teacher is very important – he has a great responsibility to make students learn the subject with pleasure and believe in their own abilities. And responsibility of the teacher is a intention for constant search, changes, flexibility in decision-making. Any bearing responsibility has to be rewarded, and an award for the teacher is motivated students.

References

1. Taylor, W. (2012). Studying & Understanding Motivation [PDF document]. Retrieved from Lecture Notes Online Web site: www.westpoint.edu/cfe.

2. Божович, Л.И. Изучение мотивации детей и подростков [Текст]/Л.И.Божович; подред. Л.И.Божович и Л.В.Благонадениной.-М.,1992.

3. Савёлова М. С. Формирование положительной мотивации на уроках английского языка в условиях ФГОС // Молодой ученый. — 2014. — №13. — С. 283-285.

4. Якиманская, С.И. Личностно ориентированное обучение в современной школе [Текст]/ И.С. Якиманская.-М.:Сентябрь, 2000.-112с

Makarova O. N., Vanyukov S. S., Makarova T. M.

PROJECT ACTIVITY AS AN INNOVATIVE TECHNOLOGY IN THE SYSTEM OF MODERN APPROACHES IN TRAINING STUDENTS AT FSFMPEE "THE 161TH SCHOOL OF RSMF TECHNICIANS " RF MINISTRY OF DEFENSE

Federal state fiscal military professional educational establishment "the 161th school of technicians of the Russian Strategic Missile Forces" of the Russian Federation Ministry of Defense
Federal State Budgetary Establishment of Higher Professional Education "Volgograd State Socio-Pedagogical University"

The implementation of the Federal state educational standards of secondary professional education (SPE FSES) involves an innovative approach to the students new professional competencies development, which fully complies with the Russian Federation State Program "Education Development" approved by the Russian Federation Government in December 26, 2017 No. 1642 " State Approval procedure for the Russian Federation program " Education Development".

SPE FSES requires cadets general (GC) and professional competencies (PC) training. And if we form the PC by the training content, then GC can rarely be formed by the content, mainly by teaching methods.

In such conditions, the necessity of student-oriented technologies variety became emergent. Among the prior technologies there are: traditional technologies; game technologies; collaborative learning; differentiated learning approach; test technology; information technology; project method. [4]

The project method is not a fundamentally new one in the world pedagogy. It was developed and became widespread in domestic and foreign pedagogy in the 1920s – 1930s, but then in our country it was changed by the systematic subject teaching method.

The project method fundamental is to stimulate students' interest to certain problems, the critical thinking development [1].

This is a comprehensive teaching method that allows to construct the learning process based on the students interests, enabling the learner to show independence in planning, organizing and controlling their learning and cognitive activities, the results of which should be “noticeable”. In the modern pedagogy, it is recommended to combine the project method with a systematic subject, using the

first for research work, during extracurricular activities.

Also, this method is organically combined with the learning method in collaboration, the problem and research learning method [2].

The project (from the Latin “Projectus” - put forward, speaking, outstanding forward) - the plot, idea, image, embodied in the form of description, calculations, drawings justification, revealing the idea contents and the practical implementation possibility.

An educational project is a complex of prospecting, research, computational, graphic, and other types of work performed by students themselves for a significant problem practical or theoretical solution. The educational project is the students cognitive activity organization main form in the project method framework.

Any project main goal is various key competences formation, which in modern pedagogy are understood as personality traits complex, including interrelated knowledge, skills, values, as well as the willingness to mobilize them in any necessary situation.

The project activity of students is a combined educational and cognitive, creative activity, with a common goal, agreed methods, ways of activity aimed to achieving a common activity result.

The project activity itself is able to make the learning process for a cadet individually meaningful, during which one can completely show his creative potential, his research abilities, activity, imagination, creativity, and independence. While using this approach, it is possible to combine the goals of education and professional activities, as well as to transfer the activity from knowledge reproduction to its practical application.

Project technology involves:

• the presence of a problem that requires integrated knowledge and a research search for its solution;

• the intended results practical, theoretical, cognitive significance;

• cadet independent activities;

• structuring the substantive part of the project with step-by-step results indication;

• information collection, final results execution, obtained product presentation, discussion and conclusions.

To obtain a result in project activities, it is necessary firstly to make sure that the cadets are interested in working on the project - to motivate them. Motivation is energy source for independent and creative activity. To achieve it, at the beginning stage it is pedagogically competent to make an immersion in the project, to interest the problem, the prospect of practical and social utility [3].

The project method allows to bring the learning process to practice as close as possible, which allows cadets to gradually prepare themselves for future professional activities. Cadets accumulate experience before being included in independent professional activities.

The project technology implementation process allows to develop independent thinking and to form innovative behavior, in parallel with the modern education goals and objectives.

References

1. Полат Е.С. Метод проектов [Электронный ресурс] / Е.С.Полат. - Режим доступа: http://distant.ioso.ru/project/

2. Реутова Е.А. Применение активных и интерактивных методов обучения в образовательном процессе вуза (методические рекомендации для преподавателей Новосибирского ГАУ). – Новосибирск: Изд-во, НГАУ, 2012. – 58 с.

3. Интернет-журнал «Науковедение» выпуск 2, март-апрель 2014.

4. Егоров Е.Е., Анисенко А.В., Бурлакова Ю.В., Быкова Н.С. Проектная деятельность как инновационная технология в системе современных подходов к обучению // Интернет-журнал «Мир науки» 2016, Том 4, номер 4 http:mir-nauki.com/PDF/13PDM416.pdf (доступ свободный).

Mukhanaliyeva A. A., Usoltsev M. A.

FEATURES OF THE TRANSLATION OF ENGLISH VETERINARY TERMINOLOGY INTO RUSSIAN

Federal State Budgetary Educational Institution of Higher Education "Astrakhan State University"

Translation of medical texts is considered one of the most difficult and crucial types of translation. In all its diversity - extracts from the history of the disease, instructions for the use of drugs, a description of the disease, treatment regimens, etc. - such texts are an area in which the ambiguity of thought and inaccuracy of formulations are unacceptable. Medical texts are governed by the norms of scientific and technical style, the distinctive characteristics of which are accuracy, consistency, abstract character, impersonality, objectivity, and standardization in the choice of language means. The syntax is characterized by the completeness of the design of thought, the prevalence of clichéd expressions and nominal constructions. The vocabulary of the scientific and technical style is presented, first of all, by general scientific and highly specialized terminology. Linguists identify a number of difficulties that can be encountered when translating medical texts. Thus, H. Li-Yanke speaks of the following categories: translation of terms, abbreviations and abbreviations, eponyms, the question of the admissibility of anglicisms and internationalisms, the compatibility of language elements. A key difficulty in working with medical texts is translation of terminology. According to I. S. Kvitko, the term is called “a word or a verbal complex that enters into systemic relations with other words and verbal complexes and forms together with them in each separate case and at a certain time a closed system that are highly informative, unambiguous, accurate and expressive neutrality ". M.P. Barsukova defines medical terminology as a macrosystem consisting of a number of subsystems. Each subsystem is a separate branch of medical knowledge with its own highly specialized terminology. A common element between the terminology of various subsystems is the general scientific vocabulary. Medical terms are

usually systematized by origin and structure. Depending on the origin, four categories of terms are distinguished: native Russian concepts, internationalism of Greek-Latin origin, Western European and Latin terms. By structure, medical terminology is also represented by 4 groups: monosyllabic terms, disyllabic terms that are written together or hyphenated, polysyllabic terms of three or more elements, and terminological phrases. The norms of scientific and technical style in English and Russian are not identical, so many translators make the following changes: the specification of general scientific English words when translated into Russian, the replacement of internationalism due to their wider range of meanings in English, the implication of implication, the neutralization of stylistically colored English general scientific vocabulary when translated into Russian . Consider the specific examples of the problem of translating veterinary terminology [1].

«It is also important to note that CA-125 is primarily a marker for epithelial ovarian carcinoma and is only raised in 50 % of early stage disease».

The term ovarian carcinoma can be translated into Russian in two ways: ovarian carcinoma and ovarian cancer. The concept of carcinoma is defined as a type of malignant tumor that is formed from the epithelial tissue of the organs. Thus, carcinoma is a type of disease. The word has an ancient greek root (καρκίνωμα — «crab»), since, according to the source, when this type of tumor was first examined by Hippocrates, he reminded him of a crab. The next version of the translation - ovarian cancer - is a tracing of the English word cancer. The term cancer is interpreted as “a malignant tumor of the external or internal organs of animal” . Thus, the terms cancer and carcinoma are related as a hyperonym and a hyponym. In this example, there is an adjective epithelial, which indicates that the tumor develops from epithelial tissues, which, in turn, indicates carcinoma. Therefore, to use both words - epithelial and carcinoma - seems redundant, so this fragment can be translated in the following ways: ovarian carcinoma or epithelial ovarian cancer [2].

During the work, the distinctive features of medical texts as a genre of scientific and technical style, as well as the specifics of the translation of such texts from English into Russian, are considered. The main difficulty in working with medical texts is the translation of terminology, the elements of which are often multivalued and require deep knowledge in the relevant field. In the course of the study, the author turned to bilingual, etymological and explanatory dictionaries, as well as medical encyclopedias [3].

References

1. Макушева Ж. Н., Ковалева М. Б. Специфика медицинского дискурса на материале аутентичных текстов по специальности // Филологические науки. Вопросы теории и практики. - 2014. - № 5 (часть 1). - С. 108–111.

2. Аросева Т.Е. и др. Пособие по научному стилю речи. Технический профиль. - М .: Русский, 1987. - 215 с.

3. Ли-Янке Х. L’enseignement de la traduction médicale: un double défi? // Meta: Journal des traducteurs. - Том 46. - № 1. - 2001.

Naidenko A. E.

METAPHORS IN POLITICAL SPEECHES

Language Advisor – Asst. Prof. Nikiforova S.M.
Kharkiv National University of Civil Engineering and Architecture

Metaphors, like other artistic paths in literature, an integral part of our speech, because they help us more accurately express their thoughts. Metaphors are used as in ordinary life and in science, art, and politics.

Metaphors are linguistic symbols which give concrete labels to abstract ideas. This is possible because of the perceived similarity between objects and concepts as regards particular features that one wants to convey. *The SUNSHINE of a smile* is an example of a metaphor, where it is understood that a smile brings out the same feelings of warmth and well-being as sunshine does.

Lakoff and Johnson (1980) hold that the conceptual system of human beings is metaphorical. Metaphors are not merely linguistic instruments. They actually permeate perception, thought and behavior (Lakoff & Johnson 1980: 3). Common metaphors in politics come from the domains of sports and war. Simultaneously, political campaigns can be seen as actions of war, although the military actions are in the shape of arguments. In Western societies, the two concepts 'argument' and 'war' are generally understood as being closely connected in spite of the fact that they are different types of matters (Lakoff & Johnson 1980: 5) [1, 23-24].

When talking about real war, however, there are a number of conventions that limit what can be said, hence the usage of language plays a decisive role (Lakoff 1991). Lakoff (1991) states that a whole system of metaphors was used to justify the first war in the Gulf. First and foremost, THE STATE AS A PERSON metaphor was at work, where the state was conceptualized as a person, the land-mass its home, economic wealth its well-being and strength its military force. In this sense, WAR can be presented as a fight between two people fitting the scenario of THE FAIRY TALE OF THE JUST WAR metaphor, including an evil villain, who has committed a crime, an innocent victim and an honorable hero. Lakoff (1991) argues that former President Bush used two variants of this FAIRY TALE structure to explain the situation in the Gulf. The first was a Self-Defence Setting, where Iraq was the villain and the US was the hero, the US and other industrialized nations were the victims and the crime was a death threat to the economic health of these nations. The second explanation was a Rescue Setting, where Iraq was the villain, the US the hero, Kuwait was the victim and the crime was kidnap and rape. The latter eventually became the government's moral justification of going to war, since the American people did not accept the first explanation, because it traded lives for oil (Lakoff 1991) [2, 340-341].

A metonymy is when an idea or a concept is replaced by a single word or feature that is connected to it. The foundation of metonymies is conceptual as is also the case with metaphors (Gibbs 1993: 259). They can be useful in political speeches as they reduce or increase responsibility. For instance, using the metonymy The White House instead of the President's name reduces the President's personal responsibility (Beard 2000: 26) [3, 68-69]. In contrast, the personal responsibility is increased by using a ruler of a state's name when referring to the government or all the citizens in a country. Subsequently, "[t]he boundary between leader and nation is removed so that the views of the leader become the voice of the nation" (Charteris- Black 2005: 175). During World War II, Churchill served as a metonymy for a righteous and heroic Britain (Charteris-Black 2005: 35). In both Gulf crises the name Saddam Hussein was often used to refer to Iraq. Lakoff (1991) calls this THE RULER STANDS FOR THE STATE metonymy, where one person gets the role of the villain fitting THE FAIRY TALE metaphor (Lakoff 1991). According to Charteris-Black (2005), when the government of George W. Bush formulated a response to the September 11 attacks, the THE RULER STANDS FOR THE STATE metonymy was used and contributed in justifying what eventually led to the invasion of Iraq in April 2003. This was rendered possible in part by connecting the abstract noun terrorism with the proper noun Iraq as "Iraq was specifically picked out as the prototype of a state that 'sponsored terrorism'" (Charteris-Black 2005: 175). Additional reinforcement was made by comparing Saddam Hussein with Adolf Hitler [4, 31].

References

1. Lakoff, G. (1991) Metaphor and War: The Metaphor System Used to Justify War in the Gulf. 23-24 p.
2. http://www2.iath.virginia.edu/sixties/HTML_docs/Texts/Scholarly/Lakoff_Gulf_Metaphor_1. html (viewed Dec. 10, 2008) 340-341 p.
3. Lakoff, G. (1995) *Metaphor, Morality, and Politics.* http://www.wwcd.org/issues/Lakoff.html (viewed Dec. 28, 2008)
4. Lakoff, G. & M. Johnson. (1980) *Metaphors We Live By.* Chicago: The University of Chicago Press. 68-69 p.
5. Salkie, R. (1995) *Text and Discourse Analysis.* London: Routledge. 31 p.

Nasikhanova A. Z.

THE ROLE OF PROJECT ACTIVITY IN FORMATION OF STUDENTS' FOREIGN-LANGUAGE COMPETENCE

Astrakhan state university

Increase in efficiency of formation of students' foreign-language competence of universities is impossible without their involvement in project activity. In project

activity the cognitive activity of students, vocational training, the practical application of skills and abilities will unite. In the course of educational project students acquire foreign-language skills and skills on the basis of the gained knowledge in the specialty and experience of creation of a new product as result of project activity.

The purpose of professional education is formation of the common cultural, all-professional and professional competences which are the identity of the specialist. Now creative personal development, formation of ability and readiness for acquisition of the competences necessary for independent identification of problems and creation of new products and services is put in the forefront [5].

There is a problem of optimization of educational process, inclusion of students in the vigorous cognitive activity promoting an intensification of educational activity. Project activity contributes to the development in students of abilities of the analysis and synthesis, that is mental separation of separate parts and the subsequent their association in a whole. Positive motivational installation on project activity gives a considerable impulse to all educational process. The motivation is defined on participation in project by the positive relation of students to all educational process [5].

It should be noted that innovative professional activity is based on project activity. Project activity is considered as one of components of professional activity. Now higher education institutions accumulated wide experience of use of the principles of project activity in educational process. Nevertheless theoretical reconsideration of the accumulated experience and development of new ways of improvement of quality of training of specialists to project activity is necessary.

Improvement of quality of training is not reached only by increase in amount of information, the teacher is faced by a task to reasonably select such foreign-language material which would promote creative activity of students and induced them to independence. Training of pupils of higher educational institutions assumes formation of the skills applicable in future professional activity. Now there are divergences in requirements for training in various types of educational institutions, knowledge of entrants not always conforms to requirements for a foreign language of a higher educational institution [2].

Formation of professional specifics of training is reached by means of selection of the foreign-language communicative situations corresponding to future professional activity. The maintenance of a training material has to correspond to those subject matters which are studied by students during vocational training. Besides creation of the atmosphere of psychological comfort a task of the teacher is modeling of conditions of professional communication in educational process. As training has to be directed to realization in speeches of communicative intentions, creation and use of speech situations on classes in a foreign language as the situation considerably defines speech behavior of communicants is very important for achievement of the specified purpose. Creation of similar situations in real communication is dictated by the life, in educational conditions really there is only one situation — educational when the teacher and the trainee communicate with the purpose to teach and learn something. In real life of people communicates

absolutely in other circumstances, need of creation of natural situations for educational process follows from here. As the situation has to reflect in educational process not only all inherent language features, but also extra linguistic means [1].

Now intensive methods of training enjoy the increasing popularity. Meanwhile it should be noted almost total absence of the intensive techniques directed to achievement of professional communicative competence. Intensive methods are under construction on the large volume of language material which is entered and fixed in a communication context. The intensification of training can be also reached by use in educational process of innovative technologies including information. Use of information technologies is an essential condition of improvement of quality of training of specialists [3].

Requirements of professional education essentially changed problems of a learning of foreign languages in all types of educational institutions. In traditional understanding was considered, the more knowledge, the quality of education is higher. But from a position of competence-based approach not the volume of the gained knowledge, but balance between knowledge and ignorance is important. Current situation demands from teachers to use most fully the bringing-up and developing possibilities of a subject (language of communication and culture, dialogue of cultures) that is dictated by a possibility of an exit of graduates in world educational space. Educational activity is directed to formation of those competences which will allow future experts to solve professionally and personally significant tasks. The success of formation of communicative competence depends on the purposeful and scientifically based organization of pedagogical communication between the teacher and educational group [5].

Formation of communicative competence difficult and labor-intensive process, from the graduate of biological faculty is expected sufficient level of proficiency in a foreign language which allowed them set of special foreign-language skills in all directions of the chosen specialty. In this connection it is necessary to emphasize importance of cross-disciplinary communications, impossibility of teaching a foreign language in a separation from special disciplines [4].

Educational communicative-project activity – a complex type of activity which integrates in itself(himself) the main characteristics, the subject maintenance and structure of three types of activity. Educational communicative-project activity is multi-purpose, uses ways and means of three listed types of activity. Both a newly created object, and new knowledge, skills, abilities, changes in personal, motivational spheres, the created significant competences can be its product. The ability and readiness of the personality for self-development and self-improvement in professional activity is result of educational communicative and project activity.

References

1. Белянина Л. А. Проектная деятельность как компонент инновационных процессов в образовании / Изменения в образовании в XXI веке: лучшие международные практики и российский опыт. Как сформировать новаторское мышление. Материалы V международной научно-

методической конференции.- 04. 2014. - г. Астрахань. - С. 69 – 72.

2. Давыдова Л. Н. Слагаемые качества образования / Л.Н. Давыдова // Вестник высшей школы – 2004. - №11. – С. 49-50.

3. Лазарев И. С. Новое в понимании метода проектов в образовании Педагогика. - 2011. - № 10. - С. 5-11.

4. Муханалиева А. А. О роли нормативного коммуникативного поведения Основные вопросы педагогики, психологии, лингвистики и методики преподавания в образовательных учреждениях — 2013 — С. 61-64.

5. Насиханова А. З. К вопросу о сущности понятия иноязычная компетенция. Гуманитарные исследования - 2013. №2(46) – С. 41-45.

Pukhnata L. A.

TEACHING ENGLISH THROUGH DRAMA

Kyiv Gymnasium 48

To the average EFL teacher putting on a play with children in a foreign language may seem ambitious, especially when pupils are struggling with the basics. However many pupils leave primary school with no English at all other than “My name is Anna” despite having worked through several textbooks and sat in class for years. It may be time to try a different approach such as working with plays and skits.

Thus, one of the methods of the learner-centered education views has become drama. Why has drama been accepted as one of the methods of the child-centered education? What is the reason lying behind it? First of all, drama is associated with self expression which is an important factor in recognizing a student as an individual. Student centeredness and self-expression are not the only catch-words of the New Education movement with which drama is to become associated. “Learning by 15 doing”, “activity method” and “play-way” are the reasons why drama has become a tool of the student-centered education.

So, let`s see why we should use drama for teaching English. First of all, it's authentic. Using drama enables children to use English appropriately in real conversations, expressing emotions and ideas and listening to the feelings and ideas of their peers. In other words, English is taught in the context in which it will be used, which is far removed from lists of vocabulary and work-sheets and which makes students aware of the language first and foremost as a means of communication.

This conversational use of language promotes fluency. While learning a play, students are encouraged to listen to, potentially read and then repeat their lines over a period of time. By repeating the words and phrases they become familiar with them and are able to say them with increasing fluency. In addition, drama also teaches them to enunciate their words properly and to project their voices when they speak, helping them to become clear and confident speakers. Using drama to teach English also helps to improve the understanding and retention of a word. By

the time a child has read, rehearsed and acted out a scene focusing on the word 'frustrated', for example, there is little likelihood of ever forgetting it. The same would not hold true if the word had been memorised by rote for a vocabulary test.

Obviously, then, the active participation required in a drama lesson involves not only the intellect but also student's imagination and emotions. By encouraging self-expression, drama motivates students to use language confidently and creatively.

Finally, drama is an appropriate method for teaching children with different learning styles and at different levels of understanding. No one learns in exactly the same way, we all have different methods of processing information. By actively involving him in his own learning process, dramatisation allows each child to absorb the language in his own way. Similarly, children whose language skills are still very limited are given the opportunity to communicate using nonverbal cues such as body movements and facial expressions.

Nevertheless, it shoud be taken into account some specific disadvantages of the use of role-play and simulation in the ESL classroom.

1. Activity is artificial

Although role-play is supposed to provide authentic situations for students to use language, the situations sometimes created were artificial and not relevant to the needs of the students.

2. Activities are difficult to monitor

With so much activity both physical and verbal going on, it is sometimes difficult for the teacher to monitor a student's performance. There is the fear among teachers that the students are having too much fun and that no learning is taking place.

3. Causes embarrassment

In some situations, especially among adult learners, role-play and simulation activities cause a lot of embarrassment, awkwardness and very little spontaneous language use. The choice of appropriate roles for different students is thus very important.

4. Encourages incorrect forms

Since the teacher is not encouraged to correct mistakes immediately so as not to discourage students, this provides opportunities for learners to produce and practise ungrammatical and inappropriate forms.

5. Has cultural bias

These activities are more suited for learners from cultures where drama activities and learner - directed activities in teaching is common. in cultures where the teacher-dominated classroom is still the norm, the learners may not respond willingly to the activities.

6. Teachers' fear of losing control

Since the activities require the full participation of the students and minimum participation from the teacher, the teacher may fear that he may lose control of the class. Furthermore the students may get carried away and become disruptive.

7. Spontaneity is lost

Very often the students get too caught up with WHAT to say. They hesitate to choose their words and do not interact spontaneously.

8. Timing lessons is difficult

The teacher has to spend a lot of time in preparation work especially for simulations. He is not able to predict the amount of class time that will be taken to carry out the activity since the ability of each class varies.

9. Activities may not be suitable for all levels

The above disadvantages however can be solved if careful thought and planning could be given before the activities are used in the classroom. The teacher himself must be convinced of the effective use of these activities if he wants to encourage students to have a positive attitude towards these novel ideas in language learning.

Drama is best defined by Shakespeare, “Life is a stage and, all people are actors”. Although traditional classroom rejects, drama is a vital component of English language training for, it not only develops for language skills- listening, speaking, reading, and, writing, but also enables learners to achieve meaningful learning acquisition. Drama is commonly used in ELT and foreign language classes for developing communicative competence, especially oral language skills. Whether or not they use it themselves, most instructors would agree that drama, particularly role-play, is a standard classroom technique which has long been recognized as a valuable and valid means of mastering a language.

Real life situations and communication are unpredictable. A student may learn all the correct forms of communication but may not know when to use them appropriately. Role-play and simulation provide opportunities to react to these situations and to give the students a taste of real life.

References

1. Koyluoglu N. Using Drama in Teaching English for Young Children.Konya, 2010.146 p.

2. Almond M. Teaching English with Drama.UK, 2005. 143p.

Remizova N. U., Milyaeva L. M., Rykova B. V.

UNIVERSITY TEACHER PROFESSIONAL COMPETENCE FORMATION

Astrakhan State University, Astrakhan
Astrakhan State University subsidiary in Znamensk

Today, rather strict requirements are given to a higher education tutor. This is due to a change in the overall education system development strategy, stated in the Concept of the Russian Federation long-term socio-economic development 2020. This document aims to create a modern system of continuous education, training and retraining, advanced training of scientific and pedagogical, pedagogical and managerial staff for all education system levels. Particular attention is paid to the formation of an important new segment of the advanced

training system, based on a decisive turn to take into account the possibilities of an educational institution as a self-learning organization, to develop and to implement programs aimed at professional competence developing of all subjects of the educational institutions pedagogical activities [1]. “The localization of advanced training at the level of an educational institution is based on the recognition of the fact that the professional environment of a particular educational institution is a value-semantic and personal-developing space for postgraduate education, in which the scientific method is purposefully organized scientific-methodical work on the pedagogical activity subjects professional competence development”[2].

The process of increasing professional competence of higher school teachers is carried out in a self-learning organization quite effectively. By definition given by P. Senge, a self-learning organization is a place “where people constantly expand their opportunities to create results that they actually strive for, where they find new large-scale ways of thinking, where people constantly learn how to study together” [3]. Peter Senge argues that the self-learning organization creates the most effective conditions for the learning process of all employees, and by constantly improving itself, it affects the external environment. In a self-learning organization, knowledge is created, transmitted and stored. Most often here we are talking about the creation within the framework of one organization, institution, and firm of a system of lifelong learning, aimed to employees training to solve innovative professional tasks [4]. Such an organization is capable for constant updating, which, ultimately, ensures its innovativeness and competitiveness. The purpose of self-learning organizations is to continuously improve employees, where various forms of training are used. Self-learning organization appears where employees become the leading factor in its development: they are constantly expanding their abilities in carrying out their professional activities by acquiring new knowledge and using modern technologies. At the self-learning organization basis is a high learning ability. Describing the self-learning organization, it can be noted that it is aimed at improving the employees skills nd due to the fact it is aimed at its organizational development. Its main task is to train employees in creativity and self-study skills, where each employee is among those who teach [5]. With such a formulation of the issue in a self-learning organization, the staff is vested with greater authority in the common strategic objectives implementation.

If it concerns an educational organization, it becomes competitive at the market of educational services. In the modern world it is almost impossible to find ready-made recipes, the use of which would allow an educational institution to create its own effective personnel training system. Each educational institution is original, different from others, and its task is to create a system of personnel training that is adequate to its specific features [11].

Astrakhan State University is a self-learning organization that is actively involved in improving the professional competence of its employees, using its own resources in their training [6]. We clarify the concept of the term "professional competence." In the "Encyclopedia of professional education" defines the term professional competence as "an integral characteristic of specialist business and

personal qualities, reflecting the level of knowledge, skills, experience, sufficient to achieve the goals of this kind of activity, as well as his moral position" [7]. From this point of view, for a university tutor, professional competence is associated with the pedagogical knowledge availability, experience in the pedagogical activity implementation, a number of personal qualities that ensure the tutoring and educating students professional tasks solution. Tutors are trained to solve these problems. It is carried out without cancelling from their main professional activities in programs of advanced training, short-term courses, production briefings, seminars, master classes, and organizational training on specific issues. The programs priority objectives these are the formation of professional competence of tutors, both in the subject area, and in the field of teaching methods from the modern requirements standpoint [8].

The effectiveness of learning is achieved by the introduction of relevant content for tutors, new technologies and methods into the learning process. In the training course, interactive technologies are widely used, allowing students to demonstrate personal experience, share author's achievements, realize their pedagogical potential. The leading specialists of our university are involved in conducting classes, as well as the students themselves, who have extensive teaching experience. Using the Internet - resources the tutors can observe the experience of leading educational institutions in Russia and abroad. This, according to program participants, allows us to look at one problem from different points of view, to organize dialogic communication, which, in fact, is a unique experience of interaction between tutors of different specialties. Classes are based on the well-known principle - 20% of theory and 80% of practice [11]. On the one hand, tutors play the role of leading speakers, revealing the theory of the issue in terms of their work experience. On the other hand, students are included in the so-called “reflexive attitude” in order to understand how to apply the knowledge and skills acquired in their professional activities. In the classroom, tutors systematically master organizing and conducting classes technology from the modern requirements point of view, learn teamwork, master group working methods. In future, the knowledge and skills acquired are applied in practice. During the classes, the most effective is the active learning technology, in which every student takes a subject position with a high degree of involvement in the educational process. The use of active learning methods: business game, brainstorming, discussion, case-method, design, etc. ensures the participants cooperation, collective interaction, students involvement in various activities, the skills acquisition to solve pedagogical problems independently. For example, when studying the topic “Theoretical and methodological foundations of education” (professional retraining program “Higher School Tutor”), students learned about the main forms of education and, team work, how to design an academic lesson model [9]. The model was based on theoretical knowledge about the pedagogical design levels. The model included conceptual, informative, technological and procedural levels. Continuing analysis of the classes, adjustment of the content and organization contributed to the development of tutors’ ability to effectively design

and organize the learning process. Understanding that university tutors are a special category of people with well-established views on education, their professional activities, we used the critical thinking technology, which provides to every student an opportunity to make decisions independently in terms of mastering the material, to be critical to any statements. So, when we got acquainted with the topic "Innovations in the system of education", we used the "Insert" technique (critical thinking technology) to work on the lecture text. The listeners were supposed to mark the following positions in the lecture text: "V" - I know that; "+" it is a new information for me; "-"it is contrary to what I knew; "?" - this is incomprehensible to me, we need explanations, clarifications.

This technique helped the audience to relate the material "in stock" with new information, expand knowledge on the topic and understand what to work on in future. In general, the use of critical thinking technology in the classroom allowed the audience to comprehend and to assimilate a large amount of theoretical material.

During the university tutor professional competence formation, we used game technology. The game, according to the researchers (I.P. Anikeeva, L.S. Vygotsky, I.P. Pidkasisty, G.P. Schedrovitsky, D. B. Elkonin), is a universal learning tool, because under the conditions of the game its participants are very fast acquire a subjective position, showing independence and activity, non-standard decision making [10]. Thus, during the game "Teaching Technologies", two game groups were assigned to prepare an advertisement for one of the technologies and demonstrate an activity fragment in order to prove the effectiveness of using this technology in the learning process. Other listeners were offered a variety of roles: active listeners, journalists, idea developers, critics, experts, students, etc .; each of them, according to the role, asked questions, expressed his point of view about the present technology. The game allowed every participant to expand their knowledge in the field of educational technologies, use personal experience, show pedagogical abilities, creativity, which is an indispensable condition for improving the professional competence of a university tutor.

While training, the implementation of each program began and finished with diagnostics. The input diagnostics was aimed at determining the students educational needs and requests, as well as the self-assessment of the level of formation of professional competence in the field of knowledge and skills of the organization of the training session from the point of view of modern requirements. The determination of the level of professional competence at the stages of input and final diagnostics was carried out using the self-assessment method in the groups of respondents who studied under the additional professional programs "Higher School Tutors", "Development of Professional Competences and Tutors' Skills" and "Project Management in Educational Activities".

The methodology content included questions relating to the degree of satisfaction with the students of various aspects of professional competence: pedagogical knowledge, experience in the implementation of pedagogical activity, the ability to solve professional tasks of teaching and educating students. The tutors

evaluated themselves on a five-point scale: 1 - “completely dissatisfied” (very low level); 2– “not satisfied” (low level); 3 - “partially satisfied” (medium level); 4 - “satisfied, but there is something to work on” (above average); 5 - “fully satisfied” (high level). The results of the self-assessment are reflected in tables 1 and 2.

Table 1.HEE tutors professional competence levels (self-evaluation) at the input diagnostic levels

Number of people	*HEE tutor professional competence levels*				
	very low level	**low level**	**medium level**	**above average**	**high level**
60 (100%)	–	3 (5%)	30 50%	21 (35%)	6 (10%)

Table 2.HEE tutors professional competence levels (self-evaluation) at the output diagnostic levels

Number of people	*HEE tutor professional competence levels*				
	very low level	**low level**	**medium level**	**above average**	**high level**
60 (100%)	–	–	15 (25%)	27 (45%)	18 (30%)

As you can see, at the stage of the output diagnosis, no one student noted a low and very low level. Among 60 respondents, 27 (45%) considered their level of professional competence higher than average and 18 people (30%) considered it to be high, noting their complete satisfaction with their knowledge, skills and abilities to solve professional tasks. This is confirmed by the opinions of the heads of departments and students about the qualitative changes in the educational process organization at the university.

Thus, the professional competence formation in a self-learning organization leads to a change in the educational process and contributes to the transition of the institution into a development mode. This is reflected in the introduction of new approaches to the organization of the educational process, the development of copyright programs by teachers, the use of modern technologies, the creation of educational and methodical recommendations and manuals. At the end, all this contributes to improving the education quality.

References

1. Миляева Л.М. Подготовка преподавателей вуза к инновационной деятельности в условиях самообучающейся организации. *Современные проблемы науки и образования.* 2013: № 5. с. 197.

2. Храпова М.П. Развитие идей модернизации системы повышения квалификации педагогов муниципальными методическими службами и образовательными учреждениями. *Образование в Астраханской области.* Астрахань: 2009: №3.С.37- 46.

3. Сенге П. Пятая дисциплина: искусство и практика самообучающейся организации. Москва: *«Олимп-Бизнес».* 1999.

4. Ремизова Н.У. Модель формирования педагогической компетентности преподавателей вуза в системе дополнительного профессионального образования. *В сборнике: Перспективы дополнительного профессионального образования: традиции и инновации Межвузовский сборник научных трудов.* Министерство науки и образования Российской Федерации, Астраханский государственный университет, Институт непрерывного образования. Астрахань:, 2014: 60-63.

5. Рыкова Б.В. Совершенствование профессиональной компетентности педагога в условиях дополнительного профессионального образования. *В сборнике: Многоуровневая подготовка в вузе: современные проблемы, инновационные технологии обучения материалы III научно-методической конференции*. Ответственный редактор: Г.П. Стефанова. Астрахань: 2011: 200-203.

6. Ремизова Н.У., Миляева Л.М., Рыкова Б.В. Формирование педагогической компетентности преподавателей вуза в системе дополнительного профессионального образования. *Грани познания*. Волгоград: 2015: № 7. 198-201.

7. Энциклопедия профессионального образования. *В 3-х томах.* Под ред. С.Я. Батышева. Москва: *АПО.* 1998.

8. Миляева Л.М. Инновации в сфере профессиональной переподготовки преподавателей вуза. *В сборнике: Перспективы дополнительного профессионального образования: традиции и инновации Межвузовский сборник научных трудов.* Министерство науки и образования Российской Федерации, Астраханский государственный университет, Институт непрерывного образования. Астрахань: 2014: 43-48.

9. Ремизова Н.У. Профессиональное развитие личности педагога в системе непрерывного образования. *В сборнике: Педагогическая наука и образование в диалоге со временем Материалы Международной научно-практической конференции, посвященной памяти В. А. Пятина*. Астрахань: 2016: 67-71.

10. Рыкова Б.В. Компетентностная основа непрерывного профессионального образования педагогов. *В сборнике: Перспективы дополнительного профессионального образования: традиции и инновации Межвузовский сборник научных трудов.* Министерство науки и образования

Российской Федерации, Астраханский государственный университет, Институт непрерывного образования. Астрахань: 2014: 67-72.

11. Ремизова Н.У., Миляева Л.М., Рыкова Б.В. Самообучающаяся организация как фактор повышения профессиональной компетентности преподавателя ВУЗА// Мир науки, культуры, образования. – 2018. – № 2. – С. 212-214

Simonenko M. A.

LITERARY METAPHOR IN ARCHITECTURAL DISCOURSE

Astrakhan State University, Astrakhan

Anthropological approach considers metaphors as units of "living knowledge" that belong to a language individual, so metaphors are rooted in human mindsets [1]. Such a view on the metaphor makes it natural for conceptual metaphors to expand their presence in professional languages. Different professional areas adopt a set of peculiar metaphors, which enables to conceptualize some difficult scientific and professional phenomena in terms of well-known things and ideas borrowed from other areas. Thus, we can suggest there should be a peculiar metaphoric system within each professional discourse.

Cognitive science interprets metaphoric system through the notion of metaphoric model that is defined as "a frame connecting two conceptual areas in a native language speaker's brain; the frame can be manifested by the formula: X = Y" [7, p. 70]. A metaphoric model in architectural discourse is a unit of professional world-image and it serves to reflect architectural phenomena through everyday concepts about the world. Architectural metaphoric models bring together knowledge fragments of different nature and this way they contribute to construction of coherent language picture of the world within architectural discourse.

In the work [6] we analyze four metaphoric models of architectural discourse: 1) architecture is a biological organism; 2) architectural objects are humans; 3) architecture is literature; 4) architecture is theatre. Obviously, while modelling their professional world-image, architects exploit cognitive areas that are rather familiar and understandable to them. Due to this, difficult professional concepts acquire necessary precision and accurateness.

Literary metaphoric model is one of the most productive in architectural discourse. This model reflects the tendency to comprehend professional architectural objects and concepts in terms of literature. There are a number of works on theory of architecture, semiotics and philosophical anthropology that emphasize contiguity of architecture and literature.

Semiotics finds contiguity in the sign nature of the two areas; culturology focuses on the unified spiritual axiological assignment of the two arts: "Architecture and literature create spiritual values and serve as the key means of culture manifestation" [4, p. 339].

Literary metaphoric model like any other metaphoric models is based on a set of frames, i. e. "knowledge structures stored in memory… These structures enable adequate cognitive processing of standard situations" [8, p. 71]. Architects widely exploit an image of a book to represent architecture: *architecture is a poem; architecture is a bureaucratic document; architecture is a chronical of an epoch; walls are pages of a book*. Architectural monuments and literary works are set equal; they become symbols of a certain historical epoch and together with other cultural signs make up a coherent cultural space.

Traditionally, semiotics equals architecture with the text. A. V. Olyanich covers signs of different nature, both language and architectural ones, under one term "presentema" which is, according to the author, "a complex linguosemiotic (sign) integrity, whose main function is to have an impact on the recipient" [3, p. 182]. Accordingly, both architectural and literary texts are analyzed in the same terms: they have their own style, syntax, morphology, which finds verbalization in the architectural metaphor, e. g. *laconism of architectural forms; grammar of construction rules; vocabulary of construction art; verbosity of architecture; architectural forms are words.*

Both architectural and literary texts have their "author" and the "reader". Literary metaphoric model in architectural discourse exploits the concept of interaction between the architect-author and the viewer-reader*: reading the architectural forms; an architect builds up a metaphor*.

Architectural texts or "spatially located presentemae" (A. V. Olyanich) serve as specific semiotic means of influence, they are specific "markers of individual and collective expansion of space" [3, p. 182]. So architectural texts have the same function as literary texts, the aim in common is to encourage the recipient to conceptualize the content of the text and reveal the author's message. Metaphors in architectural discourse create the images of two equally active participants of architectural communication process. One of them is the author of architectural works, who takes efforts to construct a new material world. The other one is the reader of architectural texts, who takes efforts to understand and evaluate the author's intention.

All the examples of literary metaphors quoted above are borrowed from works on architecture, namely, monographs, periodicals, architectural Internet sites. It should be noted that the metaphors quoted in the article are quite frequent in architectural discourse. Literary metaphoric model is steadily rooted in the professional architectural lexicon. Metaphorization is based on cognitive processes that can be interpreted as "expansion of source domain concepts into target domain and their further assimilation within this new domain", these processes result in "conceptualizing new objects and deconstructing the existing stereotypes of our mind" [2]. According to I. V. Polozova, metaphor is born due to irrational belief in interconnection between all the things in the universe and assumption of our close unity with the world [5].

To conclude, we tend to think that the productivity of literary metaphoric model in architectural discourse arises from assumption of cognitive identity of the

two arts. Philosophy and semiotics gave rise to the concept of setting equal city architecture and the text. This concept became part of the conceptual system of the architect to make a peculiar fragment of the professional world-image.

References

1. Залевская А. А. Психолингвистические исследования. Слово. Текст: Избранные труды. М.: Гнозис, 2005. 543 с.
2. Кобозева И. М. К формальной репрезентации метафор в рамках когнитивного подхода. URL: http://www.dialog-21.ru/digest/2002/articles/kobozeva/
3. Олянич А. В. Презентационная теория дискурса: монография. М.: Гнозис, 2007. 407 с.
4. Павлов Н. Л. Алтарь. Ступа. Храм. Архаическое мироздание в архитектуре индоевропейцев. М.: ОЛМА-ПРЕСС, 2001. 368 с.
5. Полозова И. В. Онтологические основы метафоры. *Философские науки*. М.: Гуманитарий, 2003. №4. С. 51-63.
6. Симоненко М. А. Архитектурная метафора в контексте архитектуры. Астрахань: Издатель: Сорокин Роман Васильевич, 2010. 124 с.
7. Чудинов А. П. Метафорическая мозаика в современной политической коммуникации: монография. Екатеринбург: Урал. гос. пед. ун-т, 2003. 248 с.
8. Яскевич Т. В. Анализ фрейма «Выбор» в современном английском языке**:** сборник научных трудов. Иркутск: Изд-во ИГЭА, 2000. 282 с.

Skripnitschenko L. V., Masalowa L. V.

VERSTEHEN BRAUCHT SEHEN: HÖR-SEH-VERSTEHEN IM DAF-UNTERRICHT (IM RAHMEN DER INTERNATIONALEN WISSENSCHAFTLICHEN ZUSAMMENARBEIT ZWISCHEN DEM SPRACHENZENTRUM DER OTTO – VON – GUERICKE – UNIVERSITÄT MAGDEBURG UND DEM LEHRSTUHL FREMDSPRACHEN DER NATIONALEN TECHNISCHEN UNIVERSITÄT „CHARKOWER POLYTECHNISCHES INSTITUT“)

Höchsten Attestationskomission der Ukraine,
Nationale Technische Universität „Charkower Polytechnisches Institut“

Die zunehmende Verwendung technikgebundener Unterrichtsmittel ist ein Entwicklungszug im modernen Fremdsprachenunterricht (FU). Im Zusammenhang mit der kommunikativen Orientierung des FU ergibt sich immer wieder die Frage, wie die Fremdsprachenausbildung weiter zu rationalisieren und zu intensivieren ist. Im Lehr– und Lernprozess können hierbei Übungen und Aufgaben auf der Grundlage von Unterrichtsfilmen zu einer wesentlichen Niveausteigerung des Verstehens und Sprachkönnens beitragen.

Charakteristisch für den Unterrichtsfilm ist, dass er Prozesse, Ereignisse, Handlungen und Vorgänge akustisch und visuell im ihrem Verlauf veranschaulichen kann. Es handelt sich also um eine Wesenseigentümlichkeit, die andere Unterrichtsmittel nicht im gleichen Maße vorzuweisen haben. Gerade diese Dynamik des Filmbildes unterscheidet den Film von anderen Anschauungsmitteln und determiniert seinen didaktisch-methodischen Einsatz.

Für den FU ist der Film vor allem aus folgenden Gründen interessant:

- Da der Film große Möglichkeiten auf dem Gebiet der Veranschaulichung bietet, lässt er sich gezielt für die effektivere Gestaltung des Sprachvermittlungs- und des Sprachaneignungsprozesses nutzen. Durch den Film können die Lernenden sowohl zur Ausübung rezeptiver und reproduktiver, als auch produktiver Sprachtätigkeiten angeregt werden.
- Tonfilme weisen durch ihre Zweikanaligkeit der Informationsübertragung (Bild und Ton) einen hohen Informationsgehalt auf. Es ist z.B. nachgewiesen [1, 8], dass man in einem 20 Minuten langen Film ebenso viele Informationen aufnehmen kann, wie in einem zweistündigen Vortrag. Die Aufnahmefähigkeit und die Gedächtnisleistung können mit visuellen und akustischen Mitteln wesentlich gesteigert werden, weil wir nach der Gehirn- und Lernforschungen behalten und aufnehmen: 10% von dem, was wir lesen; 20% von dem, was wir hören; 30% von dem, was wir sehen; 50% von dem, was wir hören und sehen.
- Durch den Film können dem Lernenden nicht nur bestimmte Informationen angeboten werden, sondern der Film kann auch vorrangig auf die Gefühle der Rezipienten einwirken.

Fragt man nach den Einsatzmöglichkeiten des Films im FU, so lässt sich folgendes feststellen.

Die Funktionen, die man dem Film zuordnen kann, sind sehr mannigfaltig. Sie reichen von der Kenntnisvermittlung bis zur Entwicklung sprachlicher Fertigkeiten und Fähigkeiten.

Der didaktisch-methodische Einsatz hängt von der jeweiligen artspezifischen Hauptpotenz des Films ab. Das heißt, dass der Film nicht nur eine einzige Aufgabe übernehmen kann, sondern dass man dem Film im FU in Abhängigkeit von seiner speziellen Gestaltungsart unterschiedliche Funktionen im Spracherlernungsprozess übertragen kann, z.B.

- Zur Schulung und Verbesserung der Aussprache werden kurze Tonfilmstreifen eingesetzt. Sie veranschaulichen die Artikulation optisch und akustisch. Mit ihrer Hilfe werden bestimmte Laute und Lautverbindungen durch bewusst imitatives Sprechen eingeübt.
- Zur Entwicklung des Hörverstehens werden spezielle Unterrichtsfilme eingesetzt, die die Lernenden auf das Erfassen fremdsprachiger Dokumentar- oder Spielfilme vorbereiten, z.B. **der CD zum Thema „Studium und Lehre“ begleitende Farbfilm,** in dem Otto-von-Guericke die Vorlesung über seinen Versuch mit den Magdeburger Halbkugeln und 16 Pferden hält.

- Auf der Grundlage der Filme können die Funktion bestimmter grammatischer Erscheinungen bildlich verdeutlicht werden, was man beispielsweise häufig in Sprachfernsehkursen findet.
- Eine wichtige Rolle kann der Film im FU bei der Vermittlung landeskundlicher Kenntnisse spielen, z.B. **der Farbfilm zum Lehrwerk „Magdeburg –Universitätsstadt am Ufer der Elbe“, zu Themen „Architektur, Kultur und Kunst von Magdeburg“.**
- Der Film dient schließlich zur Entwicklung produktiven sprachlichen Könnens auf dem Gebiet des monologischen und des dialogischen Sprechens.

Seit einigen Jahren wird verstärkt für den Einsatz solcher Unterrichtsmittel plädiert, die den Lernenden Gelegenheit geben, sich mündlich in monologischer und dialogischer Form zu äußern und damit in den verschiedenen Arten des Sprechens zu üben.

Durch Untersuchungen und praktischen Unterricht kann nachgewiesen werden, dass der Film gute Möglichkeiten bietet, seine sprachstimulierende Funktion zum Hauptzweck zu nutzen, d.h. der Lernende muss zu Äußerungen angeregt werden, die vom Film gebotenen Informationen über Vorgänge, Prozesse und Handlungen usw. gründen, kommentieren und eigene Meinung zu äußern.

Literatur

1. TELC Training, www.telc.net /training, S. 8. Dr. Barbara Biechele.

Sukhotina V. Ju., Kudinova V. I.

REZEPTIONSTHEORETISCHE INTERPRETATION DER KURZGESCICHTE «BRENNENDES GEHEIMNIS» VON STEFAN ZWEIG

Scientific Advisor — Cand. Phil. Sc., Assoc. Prof. Kudinova V. I.
Language Advisor — Cand. Phil. Sc., Assoc. Prof. Kudinova V. I.
Tula State Pedagogical Lev Tolstoy University

Literarische Werke werden oft im Licht ihrer Rezeption betrachtet. Das Werk ist ein «Wortkunstwerk» als Formgebilde in einer Ordnung, die anders nicht möglich ist. Um die Textprobe «Der Überfall» aus der Novelle von Stefan Zweig «Brennendes Geheimnis» zu analysieren, wurden rezeptionstheoretische Interpretationsansätze gewählt, weil bei diesem Verfahren die Darstellung und Deutung sprachkünstlerischer Phänomene am Einzelwerk im Mittelpunkt stehen. Man kann auch sagen, dass Sprache ein System von Zeichnen ist, das die Grundlage für die formale und sprachliche Gestaltung des literarischen Werkes bildet [1, 6].

«Brennendes Geheimnis» von Stefan Zweig ist den Problemen der Halbwüchsigen gewidmet. Publiziert wurde das Werk erstmals im Jahre 1911. Damals und auch heutzutage ist es schwer für den Jungen, seine eigenen Gefühle zu verstehen und sich in der Welt der Erwachsenen zurechtzufinden. Das wird klar

in der Textprobe «Der Überfall» demonstriert [3, 6—10]. Die Beziehungen zwischen dem Baron und der Mutter beunruhigen Edgar, den Protagonisten dieser Novelle. «Wer war dieser Mensch, der geheimnisvolle, der plötzlich in ihr (der Mutter) ruhiges Leben getreten war?» - sagt er sich. Hass und Eifersucht stauen sich in ihm auf. «Noch war ja, seine Mutter nicht in ihrem Zimmer, noch war sie mit diesem verhassten fremden Menschen». Diese Worte verstärken die Gefühle von Eifersucht und Angst im Jungen [2, 17].

Der Text lässt sich in 2 Abschnitte gliedern. Der 1. Abschnitt handelt von den Gemütsbewegungen des Jungen: in dem Moment war die «Welt aus seinen Büchern immer gültig». Er sorgt für seine Mutter sehr und ist bereit, alles zu tun, um sie zu schützen. Wir lesen im Text: «Edgar zitterte vor Erregung. Es war so viel Angst in der Stimme seiner Mutter, dass das Kind erschrak. Was will er denn noch von ihr? Warum fürchtet sie sich?».

Darauf folgt der Zusammenstoβ zwischen dem Jungen und dem Baron. Edgar versteht nicht, was der Mann mit seiner Mutter vorhat. Seine ganze Wut entlädt sich gegen den Mann. «Der (der Baron) fühlt in dieser Sekunde eine kleine schwache Faust in seinem Gesicht…. Der Baron schlägt…zurück. Die Gedanken machen ihn wild. Das Kind weiβ, dass es der Schwächere ist, aber es gibt nicht nach». Bei der Beschreibung dieser Szene verwendet der Erzähler viele dynamische Verben wie «schlagen, verbissen, stoβen», die den Text expressiv machen.

Im Schluss des Textes geht es um die ruhige Atmosphäre im Zimmer nach dem Überfall. Niemand hat gelauscht. Nur oben flimmert «höhnisch ein letztes unruhiges Licht». Der Autor benutzt hier Personifikation um seine Gefühle aufzudecken.

Die Geschichte wird aus der Perspektive des auktorialen Erzählers berichtet. Der Autor weiβ die Gefühle und Handlungsmotive des Jungen z. B. «Edgar trat atmend zurück vom Fenster. Das Grauen schüttelte ihn». «Edgar zitterte, sie kamen näher, und er musste alles hören. Jeder Schritt gegen ihn zu tat ihm, so leise er auch war, weh in der Brust». «Dort…presste er sich hinein, um auf ihre Schritte im Gang zu lauern. Denn nicht einen Augenblick, so hatte er beschlossen, wollte er sie allein lassen».

Die Handlung erscheint auf den ersten Blick kompliziert. Der Text ist mit einfachen und parataxischen Sätzen erzählt z. B. «Furchtbares schien bevorzustehen»; «Er horchte angestrengt»; «Das Flüstern war zu entfernt»; «Edgar zitterte, sie kamen näher, und er musste alles hören».

Der Titel «Brennendes Geheimnis» lässt zunächst die kriminalistische Novelle erwarten. Diese Lesererwartung wird im Verlauf der Geschichte nur teilweise erfüllt. Es ist klar, dass der Titel das Verhältnis des Jungen zur Situation widerspiegelt. Der Junge versteht nicht, warum das Paar allein gelassen werden will. Im Text finden wir das Wort «geheimnisvoll». Es besitzt eine groβe Ausstrahlungskraft, weil das Wort das innere Leben des Jungen aufdeckt («Noch nie war er in seinem Leben ähnlich geheimnisvollem so nah gewesen») [4, 38].

Das Hauptmotiv «Furcht und Aufregung» zieht durch den ganzen Text. Daher ist der Text voll von Wörtern wie «die Angst, grauenhaft, wild, erschrak». Der Junge hat Schwierigkeiten, diese Situation zu überleben.

Der Erzähler verwendet sehr viele Adjektive, die den Text anschaulich machen. Die evaluativen Adjektive (spannend, grauenhaft, katzenhaft) machen das Geschehen sehr lebendig. Viele deskriptive Adverbien (beweglich, fürchterlich, hässlich) beeinflussen den Leser stark.

Die Gefühle der Hauptfigur können vom Leser gut nachvollzogen werden, da sie dem Leser auch bekannt sind. Stefan Zweig wollte hier vielmehr die inneren Gemütsbewegungen eines Halbwüchsigen zeigen.

Zum Schluss können wir sagen, dass diese Erzählung als Parabel bezeichnet werden kann und bis jetzt sehr aktuell ist. Alle obengenannten Sprachmittel unterstreichen die Vielfalt der Emotionen, die den Jungen in einem bestimmten Zeitraum seines Lebens füllen. Besonders die Doppelmoral der damaligen Zeit, die gesellschaftlichen Standesunterschiede und das Gefühl, ausgenutzt zu werden, machen es dem Jungen schwer, sich zu orientieren. Aber Edgar geht wie alle anderen seinen Weg zum Erwachsenenalter, überlebt verschiedene Schwierigkeiten und schließlich wird es ihm klar, was es bedeutet, die Geheimnisse der Erwachsenen zu teilen. Der Autor verwendet ein bestimmtes Vokabular, um die Dynamik der Handlung zu zeigen. Als Leser verfolgen wir die Entwicklung eines spannenden Sujets und das macht uns einen echten Spaβ.

References

1. Кудинова В.И., Богатов А.А. Studienpraktisches Interpretieren. Theorie, Analysen, Kommentare und Interpretations-hilfen: Учеб. пособие по нем. яз. для студентов старших курсов фак. иностр. яз. (на нем. яз.) / В.И.Кудинова, А.А.Богатов. - Тула: Тул. гос. пед. ун-та им. Л.Н. Толстого, 2000. - С. 6.

2. Кудинова Е.Н. Тексты для чтения и анализа = Texte zum Lesen und analysieren: Учеб. пособие по нем. яз. для студентов старших курсов фак. иностр. яз. (на нем. яз.) / Е.Н.Кудинова, И.А.Шестакова. - Тула: Тул. гос. пед. ун-та им. Л.Н. Толстого, 2007. - С. 17-21.

3. Anna Krüger. Texte für den Deutschunterricht: Kommentar zu den Texten für das 5. Und 6. Schuljahr // Verlag Moritz Diesterwerg/Otto Salle Verlag, Frankfurt am Main, 1974 – 120 S.

4. Kudinova V. I., Ilicheva I. S. «Die groβe Konferenz» von Siegfried Lenz aus der Sicht eines Wekrimmanenten Interpretationsansatzes // Студентство. Наука. Іноземна мова: збірник наукових праць студентів, аспірантів та молодих науковців. – Харків: ХНАДУ, 2017. – Вип. 9. – Частина 2 – С. 35 – 38.

Tikhonova M. E.

THE CLOSEST FUTURE IN TEACHING

Kharkiv National University of Civil Engineering and Architecture

Today many technologies can be used in e-learning. These include webcasts, blogs, collaborative software, and virtual classrooms. Most e-learning situations use combinations of these techniques. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term blended learning is commonly used .E-learning services have evolved since computers were first used in education. There is a trend to move toward blended learning services, where computer-based activities are integrated with practical or classroom-based situations. E-learning lessons are generally designed to guide students through information or to help students perform in specific tasks. Information based e-learning content communicates information to the student. These are known as inform programs. Examples include content that distributes the history or facts related to a service, company, or product. With information-based content, there is no specific skill to be learned. By contrast, programs designed to build specific skills as classified as perform programs. In performance based content, the lessons build off of a procedural skill in which the student is expected to increase proficiency. Some typical examples of perform elearning are lessons on software use or designing a database Computer based learning (CBL) refers to the use of computers as a key component of the educational environment. While this can refer to the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes. The concept is generally seen as being distinct from the use of computers in ways where learning is at least a peripheral element of the experience (e.g. computer games and web browsing). Computer-based training (CBT) services are where a student learns by executing special training programs on a computer relating to their occupation. CBT is especially effective for training people to use computer applications because the CBT program can be integrated with the applications so that students can practice using the application as they learn. Historically, CBTs growth has been hampered by the human resources to create the program, and hardware resources needed to run it. However, the increase in PC computing power, and especially the growing prevalence of computers equipped with CD-ROMs, is making CBT a more viable option for corporations and individuals alike. Many PC applications now come with some form of CBT, often called a tutorial. Web-based training (WBT) is a type of training that is similar to CBT; however, it is delivered over the Internet using a web browser. Web-based training frequently includes interactive methods, such as bulletin boards, chat rooms, instant messaging, video conferencing, and discussion threads. Web based training is usually a self-paced learning medium though some systems allow for online testing and evaluation at specific times. Recent years have seen an explosion in online training for educators by numerous content providers. Computer-supported collaborative learning (CSCL) is one of the most promising

innovations to improve teaching and learning with the help of modern information and communication technology. Collaborative or group learning refers to instructional methods whereby students are encouraged or required to work together on learning tasks. It is widely agreed to distinguish collaborative learning from the traditional model in which the instructor is assumed to be the distributor of knowledge and skills.

E-learning communication technologies are generally categorized as asynchronous or synchronous. Asynchronous activities use technologies such as blogs, wikis, and discussion boards. The idea here is that participants may engage in the exchange of ideas or information without the dependency of other user's involvement at the same time. E-mail is also asynchronous in that mail can be sent or received without having the recipient's involvement at the same time.

By contrast synchronous activities involve the exchange of ideas and information with one or more participants during the same period of time. A face to face discussion is an example of synchronous communications. Synchronous activities occur with all participants joining in at once, as with an online chat session or a virtual classroom or meeting. Virtual classrooms and meetings can often use a mix of communication technologies. In synchronous e-learning, the instructor reviews student answers and gives feedback, as in a traditional face-to-face classroom.

The challenge in e-learning, as in any learning program, is to build lessons in ways that are compatible with human learning processes. To be effective, instructional methods must support these processes. That is, they must foster the psychological events necessary for learning. While the computer technology for delivery of e-learning is upgraded almost daily, the human side of the equation, the neurological infrastructure underlying the learning process, is very old and designed for change only over evolutionary time spans. In fact, technology can easily deliver more sensory data than the human nervous system can process. To the extent that audio and visual elements in a lesson interfere with human cognition, learning will be depressed.

Traditional training, while highly effective, may not have the capacity to deliver the results required. From the above discussion it can be seen that e-learning can be used to significantly accelerate the skills development process, provided the course content is designed to make best use of the new technology.

References

1.2006 Industry Report, Training Magazine, www.trainingmag.com, December 2006

2. Global Industry Analysts, Inc. E-learning market survey, 2007

3. Sloan Consortium Conference on Online Learning, www.sloan-c.org

Tkachuk Ye. V.

MENTAL LEXICON AT THE LESSONS OF A FOREIGN LANGUAGE

Grammar School No.6, Gubkin

English teachers have become interested in linguistic studies in the field of foreign languages. The relevance of the chosen topic is determined by the fact that there is a lack of vocabulary among pupils. They have interior and extra vocabulary which is necessary for their work with English texts.

The problem of this study is a development of mental lexicon among pupils. E. S. Kubryakova , A. N. Shamov, N. Chomsky and other linguists have a great role in scientific linguistic bases. Their studies allow us to explore changes in English. The aim is a broad study of phonetic, morphological peculiarities and vocabulary. In the given article we try to analyze special peculiarities of mental lexicon in English language.

The study material is taken from various oral and written sources: from Internet, special educational literature, literary and artistic texts, from dictionaries.

In our opinion the topic of this study will be interesting for foreign language teachers. It is based on theoretical information about not only the mental lexicon, but also there are a lot of facts about two main types of people's vocabulary.

The system of language is divided into vocabulary and grammar, so the description of the language is built as opposed to the dictionary syntax and morphology. Paying attention to the nature and functions of the lexicon, we should not forget that this term is inextricably linked with linguistics.

N. Chomsky points out that the study of the "external", "exteriorized" language in linguistics was based on a detailed and detailed study, while the "internal", "interiorized" language, the language within us, also known as the metal lexicon, was studied to a lesser extent.

Referring to the definition of mental lexicon in the dictionary of linguistic terms T. V. Zherebilo, we found that the mental lexicon is represented by a system expressed in the linguistic ability of knowledge about words and their equivalent units.

Mental lexicon is understood as" a system that reflects knowledge about words and their equivalent units in the language ability and performs complex functions related to both words and the structures of representation " [5, 97].

From a historical point of view, the term "mental lexicon" began to be used in the scientific field by Anne Trisman in 1960 and by Richard Oldfield in 1966. This term is used not only in psychology (psycholinguistics) and cognitive Sciences, but also in cognitive linguistics.

The terms "language ability" and "internal lexicon" represent a theoretical part of the interiorized language experience. The internal lexicon is considered to be an element of the analog system that combines information about the language. According to E. S. Kubryakova, the lexicon is an important part of human memory, which is responsible for the transmission of information orally [4, 60].

Philosophers note that there is a real world around a person and there is a projection of the real world in the human subconscious. It means that the reflected

world is depicted in the form of a single conceptual system with all the images, representations and concepts of "there is a powerful verbalized part" [1, 54-55].

When learning words of foreign origin, the child begins to form functional structures in the form of links that combine the impact of the object and its name. On this basis, the beginning of the formation of "verbal networks" of internal vocabulary is organized [6, 10].

A. N. Shamov claims that networks interact with each other, and in this way they unite the lexicon into a single whole. "Verbal networks "of the internal lexicon provide not only the binding of verbal stimuli, their fixation, but also provides a certain order, that is, the organization of the “verbal networks". The orderliness and organization provide a quick search for the right word, its understanding in spelling or writing [7, 10].

Taking into consideration the internal lexicon, we have revealed that the mental lexicon is a part of human memory. Memory for the study of words in psychological and psycholinguistic science has a variety of definitions. T. N. Ushakova calls it "verbal memory" [6, 12]. A. Zalewskaya uses the terms: "internal lexicon", "lexical component of speech ability" [3, 65]. B.N.Velichkovsky calls this type of memory "semantic memory on verbal material" [2,132].

To sum up, memory and mental lexicon are inextricably linked, but memory is only a set of phenomena, memories of which are permissible in the absence of objects that characterize these phenomena, and the internal lexicon is a set of knowledge and information about this lexical unit.

We drew attention to the "mental dictionary" that is different from printed dictionaries with the content of ordinary concepts of the mental dictionary, which is not the usual notation. In addition, the words in the mental dictionary are related to each other. The semantic and informational content of mental units is several times higher than that of the real dictionary units.

References

1. Levelt W.J.W. Lexical Access in Speech Production [текст] / W.J.W. Levelt. - Oxford: Blackwel, 1993. – С.241-251.
2. Величковский Б.М. Современная когнитивная психология [Текст] / Б.М.Величковский. - М: Изд-во Моск. ун-та, 1982.- 336 с.
3. Залевская, А.А. Введение в психолингвистику [Текст] / А.А. Залевская. - Воронеж: ВГУ, 2000. – 382 с.
4. Кубрякова Е. С. Обеспечение речевой деятельности и проблема внутреннего лексикона [Текст] / Е.С. Кубрякова // Человеческий фактор в языке: Язык и порождение речи. М., 1991. – 240 с.
5. Кубрякова, Е.С. Краткий словарь когнитивных терминов / Под общей редакцией Е.С. Кубряковой [текст]/ В.З. Демьянков, Е.С. Кубрякова, Л.Г. Лузина, Ю.Г. Панкрац. – М.: Филол. ф-т МГУ им. М.В. Ломоносова, 1997. – 245 с.

6. Ушакова, Т.Н. Речь как когнитивный процесс и как средство общения языка [Текст] / Т.Н Ушаков //Когнитивная психология: Материалы финско-советского симпозиума.- М.: Наука, 1986. –№2.- С.15-23.

7. Шамов, А.Н. Ментальный лексикон в восприятии и употреблении лексических единиц на уроках иностранного языка [Текст] / А.Н Шамов // Иностранные языки в школе.- 2015. –№6.- С.9-16

Yurchenko Y. A.

THE ROLE OF FOREIGN LANGUAGES IN THE HOSPITALITY INDUSTRY

Scientific Advisor – PhD, Assoc. Prof. Medvid M. M.
Language Advisor – PhD, Assoc. Prof. Medvid M. M.
V. N. Karazin National University, Kharkiv

The article discusses the problem of foreign languages in hospitality industry and their role in the hospitality management education. Multilingualism offers a competitive advantage to both companies operating in the global hospitality market as well as people who pursue a career in it.

The key findings indicate a contradiction between theoretical acknowledgement of the importance of foreign languages in hospitality management and its practical promotion, particularly in regard to fluency in foreign languages, in service training initiatives and level of offered training courses.

Hotel information and reservations, customer service during holidays and after sales customer care are the key points of the tourism value chain [9, 59-72] in the global market. Understanding the inbound tourist culture through the language [10, 41-42] and engaging in an open dialogue that uses both verbal and nonverbal tools to combat stereotypes and misunderstandings support a successful approach of the RATER service quality model factors, namely reliability, assurance, tangibles, empathy and responsiveness [3, 14-17]. The so called hospitality language, hence “all linguistic expressions which relate to and represent hospitality concerns” [2, 73-91] throughout the stay of the guest, follows some distinctive rules, such as the use of a rather fixed vocabulary of welcoming and serving a guest and the formal behavior rules including accepted phraseology, idioms – slang, gestures, handling problematic situations, cultural interpretations to social issues, etc. - relating to the cultural background of each guest.

Therefore problems in intercultural communication may arise if sufficient use of the target language is not accompanied by the ability to understand, think and act according to the target culture.

Foreign language skills have indeed been identified as important managerial skills by several researchers [1, 906-918]. Managers should be equipped with both communicative and intercultural competence to be able to adapt and excel in the competitive work environment and foreign languages are the way to avoid stereotypes and gain insight into foreign people’s mentality [10, 41-42]. As cited in

Russel et al. [6, 136- 138] fluency in foreign languages is also a key element in developing business links with overseas business partners or foreign colleagues. The Rwanda Skills Survey (2012) reports linguistic competence to be the most wanted skill in globally known tourist destinations, such as Mauritius and United Emirates of Arabia. European Community has already expressed back in 2008 the need for advanced language skills in firms' higher management levels by "investing in language training or employing native speakers and ensuring good multilingual communication through the Internet."1 However a pan European research published by the European Centre for the Development of Vocational Training - CEDEFOP [8, 7-12] illustrates that foreign languages skills, often lack among tourism and hospitality staff. There has also been a discussion on the companies' need to apply a competency framework [4, 1044-1054] for human resource management assisting them in recruiting, training and assessing staff with the necessary professional competencies.

In another report of the European Business Forum for multilingualism it has been acknowledged that although the English language will remain the lingua franca, it is not enough to offer a company and its staff the key to excellence. Furthermore, the cultural awareness and breaking of stereotypes is promoted when it is enriched by more cultures than the ones expressed through the person's first and second language [7, 16-28].

The results affirm the research questions in regard to recognition of the importance of fluency in foreign languages for tourism by both targeted populations, and do not contradict previous international studies. However, they have raised some points, that need further interpretation.

On the one hand, the majority of hotel managers hesitate to undertake any in service training initiatives, even though they are not totally satisfied with the degree of efficiency in foreign languages for tourism of their personnel. Their rationale is the expenditure of time and money, however foreign languages for tourism competences influence the level of customer satisfaction, hence raise the company's long term financial profits.

On the other hand, the significantly high percentage of hospitality management students 'speaking only one foreign language, presumably English, also raises doubts as to which extend they truly understand the role of multilingualism when pursuing a career in the global tourism and hospitality industry. Intermediate knowledge of English is not anymore a competitive advantage to any company that wishes to progress in the current economic environment.

To sum up, foreign languages play an important role in the global hospitality management. International research has indicated their participation in the raising of customer lifetime value for the hospitality industry as well as of successful careers for future management personnel.

An ongoing cooperation between hospitality industry and hospitality management education could facilitate the planning and evaluation of foreign languages for tourism courses that depict the concrete needs students are most

likely to face in their career. Lectures of human resources managers and possibility to longer apprentices to hotels abroad could empower the young students with valuable expertise and experience on the working environment conditions and demands.

References

1. Agut, S., Grau, R. & Peiró, J. M. (2003). Individual and contextual influences on managerial competency needs. Journal of Management Development, 22(10), 906-918.
2. Blue, G. M. & Harun, M. (2003). Hospitality language as a professional skill. English for specific purposes, 22(1), 73-91.
3. Czaplewski, A. J., Olson, E. M. & Slater, S. F. (2002). Applying the RATER model for service success. Marketing Management, 11(1), 14-17.
4. Jeou-Shyan, H., Hsuan, H., Chih-Hsing, L., Lin, L. & Chang-Yen, T. (2011). Competency analysis of top managers in the Taiwanese hotel industry. International Journal of Hospitality Management, 30(4), 1044-1054.
5. Leslie, D. & Russell, H. (2006). The importance of foreign language skills in the tourism sector: A comparative study of student perceptions in the UK and continental Europe. Tourism Management, 27(6), 1397-1407.
6. Russell, H. & Leslie, D. (2004). Foreign languages and the health of UK tourism. International Journal of Contemporary Hospitality Management,16(2),136–138.
7. Sindik, J. & Božinović, N. (2013). Importance of foreign languages for a career in tourism as perceived by students in different years of study. Tranzicija,15(31), 16-28.
8. Strietska-Ilina, O., Tessaring, M. & Jonckers, P. (2005). Trends and skill needs in tourism. Cedefop Panorama series, 7-12.
9. Weiermair, K. (2006). Prospects for innovation in tourism: Analyzing the innovation potential throughout the tourism value chain. Journal of Quality Assurance in Hospitality & Tourism, 6(3-4), 59-72.
10. Zorina, N. M., Maslennikova, E. G. & Gazilov, M. G. (2014). The Formation of Intercultural Competence as an Integral Part of Professional Training in the Field of Tourism. World Applied Sciences Journal, 30(MCTT)), 41-42.

Zhukova Yu. V.

ANTHROPOMORPHOUS AND PHYTOMORPHOUS METAPHORS

Astrakhan State University

Synthesis of scientific researches of the linguistic and natural-science directions is of the increasing research interest recently. The cross-disciplinary character is reflected in such socially important sphere as a political discourse. The

use of anthropomorphous and phytomorphous metaphors in its structure is among current problems of a political discourse.

The relevance of this problem consists, first of all, in consideration of models of political metaphors, proceeding from their specific functioning in public speeches of politicians of the English-speaking countries.

In this article we consider relevant the appeal to definition of a metaphor which is treated as follows: tracks or the speech mechanism consisting in the use of the word designating some classes of objects, the phenomena, etc., for characterization or the name of the object entering other class, or names of other class of objects similar to given in any relation [5]. The metaphor represents important cognitive phenomenon demanding its research in the light of the human activity directed to understanding, interpretation and verbalization of the reflected world [2].

According to foreign and domestic researchers, in the field of cognitive linguistics metaphorization is natural process of thinking, and use of anthropomorphous and phytomorphous metaphors – a consequence of this process. Rather anthropomorphous metaphor A.P. Chudinov notes that "the person models political reality only on the similarity that allows to represent metaphorically political concepts, difficult and far from daily occurrence, as simple and well-known realities. At a research of this category the concepts relating to initial conceptual spheres "Anatomy", "Physiology"" [4] are analyzed. Such images of the speech connected with a human body laconically are integrated by political figures into the performances. Let's illustrate this situation with the following example from the speech of the United States Secretary of Defense D. Mattis: "So this is basically our engine again today that has been ever since around 1900 that kept us an as arsenal of freedom, an arsenal of democracy, but it's also meant in the broader terms of democratic values being reinforced by – using the economic sinews that we are now developing once again in a much more robust manner, if that addresses your question, senator" (It is, in fact, our cursor today which exists since 1900 which held us as the Arsenal of freedom, democracy Arsenal, but it also means in a broader sense democratic values which become stronger – using economic sinews which we now again develop in a much more reliable way if it concerns your question, senator) (https://dod.defense.gov/News/Transcripts/Transcript-View/Article/1538599/ remarks-by-secretary-mattis-at-plenary-session-of-the-2018-shangri-la-dialogue/). The use of a lexeme of a sinew acts as the way emphasizing importance of freedom and democratic value as a link without which development of the country is impossible further here.

According to O.L. Mikhaleva, the personification metaphor in the theory of a metaphor is characterized as basic, the person conceptualizes reality, proceeding from own ideas of a ratio of the individual and the world where in the center of the world around there is he that is explained by an initial anthropomorphous picture of the world created by the person [3].

An integral part of an anthropomorphous metaphor is the morbial metaphor which is understood as the words or expressions belonging to the conceptual field

"Medicine". It is possible to carry to this field the diagnosis, ways of treatment and recovery with application of various medical terms. Let's give several examples: "If you think some bad elements are there like Syria, Iraq, Iran, Afghanistan, you can do a surgical operation" (If you consider that there are such negative elements as Syria, Iraq, Iran, Afghanistan, you can perform surgery) (https://fpc.state.gov/09/286245.htm). The metaphorical model "surgical operation" is given as a categorical alternative for elimination of the developed problem here. The minister K. Nielsen dealing with cyber crime issues announced the following: "We must move from endemic vulnerabilities to system-wide endemic resilience" (We have to pass from endemic vulnerability to endemic stability). Indeed we have moved past the "epidemic" stage and are now at a "pandemic" stage – a worldwide outbreak of cyber attacks and cyber vulnerabilities (Really, we went through a stage of "epidemic" and now we are at a stage of "pandemic" – the Global flash of cyber attacks and cyber-vulnerability) (https://www.dhs.gov/news/2018/09/10/secretary-kirstjen-m-nielsen-remarks-national-election-security-summit). The metaphors designated in examples characterize the concept "diseases", bearing a conceptual vector of basic irreconcilability in policy and broadcasting to opponents a thought of inferiority of this or that action. O.L. Mikhaleva specifies that the metaphors formed on the considered model have mainly negative character, they are created first of all to convince the listener as the participant of a political discourse to join available at speaking to negative assessment of the described realities of surrounding reality, to transfer available for the listener the emotional relation to a concept source on a concept which is conceptualized by a metaphorical word meaning [3].

As for a phytomorphous metaphor, A.P. Chudinov emphasizes that "wildlife long since serves the person as some kind of model according to which he represents social, including political, reality, creating thus a language picture of the political world. In this case the conceptual sphere "Flora" is a source of metaphorical expansion, that is political realities are realized in concepts of the world of the nature surrounding the person" [4]. We will give the following statement as an example: "Its young people are withering under the weight of frustrated ambitions. They are longing to pursue the freedoms and opportunities of the 21st century" (Young people wither under weight of the disappointed ambitions). (https://www.state.gov/secretary/remarks/2018/05/282301.htm). Under the word withering (to wither) in this context the politician means weakening, loss of interest in life, loss of optimism, creating analogy to a flower or a plant which fade, dry up. It is important to note that use in texts of analogies to plants was initially carried by neutral or positive vectors of familiarizing with the nature. However, submitting to the general development of political communication, phytomorphous metaphors often give negative character to a statement.

According to O.L. Mikhaleva, the phytomorphous metaphor is based on the metaphorical model "Kingdom of Plants" which symbolical value creates associative communication of society with flora according to the following

scenario: political life is considered as development of a plant, results are fruits, the separate phenomena are parts of a plant [3].

Let's review the following example from a speech of the Secretary of Health and Human Services of the USA concerning biomedical researches and innovations A. Azar: "I once came upon someone using an African proverb to describe this challenge: "You cannot be so hungry as to eat the seeds," it says. Through institutions like FAPESP and NIH, government has an important role to play in planting the seeds of biomedical innovation. But eating those seeds – putting restrictions on how government funding supports innovation – will threaten the growth of the fruits we need. In the United States, we have very specific policies that are intended to protect the seeds. We protect the rights of private sector innovators to make profits from their work, because we know that is the best way to ensure patients, in the United States and around the world, reap the fruit" (I came across once the person who quoted the African proverb to describe this problem: "You cannot be so hungry that there are seeds", – it is said in it. Thanks to research institutes, the government plays an important role in landing of seeds of biomedical innovations. But the use of these seeds – imposition of restrictions on how public financing supports innovations – will threaten growth of fruits necessary for us. In the United States we pursue very concrete policy directed to protection of seeds. We protect the rights of Innovators of the private sector for receiving profit on the work because we know that it is the best way to provide that patients in the United States and around the world reaped the fruits.) (https://www.hhs.gov/about/leadership/secretary/speeches/2018-speeches/remarks-at-fapesp-on-biomedical-research-and-innovation.html). The developed conceptual metaphor (in parallel with other means) provides the connectivity of the text, she enhances the esthetic importance and pragmatic potential of the text, accents its semantic and emotional unity [4]. Quadruple repetition of words seeds and fruits focuses attention of audience on results in the near future. In the given fragment the author uses all range of various actions applicable to seeds: planting the seeds, eating seeds, to protect the seeds. Metaphors "to plant seeds" and "to reap the fruits" have the traditional character which is followed by a positive connotation.

Let's address the following example: "When the United States sees the shoots of liberty pushing up through rocky soil we pledge our solidarity, because we too took a hard first step towards becoming a free country a few years back" (When the United States are seen how sprouts of freedom sprout from the stony soil, we declare our solidarity because we took the heavy first step becoming the free country a few years ago too) (https://www.state.gov/secretary/remarks/2018/07/284292.htm). The word shoots meaning escapes, rudiments implicitly expresses updating, new life. rocky soil metaphor (the stony soil) relating to inanimate nature that is the lifeless soil, designates the aspiration of people to develop, raise contrary to the surrounding reality which is not allowing to make it. The politician thus emphasizes lack of necessary conditions for realization of freedom.

In political communication the erased metaphor – a word (expression) or a word meaning which originally arose by metaphorical transfer [1] is widely used.

As an example we will consider a fragment from the shorthand report of the British foreign minister Jeremy Hunt: "The heart of any democracy is freedom of expression, which allows citizens to access independent information to help decide who to vote for" (Heart of any democracy is freedom of expression which allows citizens to get access to independent information to help to solve for whom to vote) (https://www.gov.uk/government/speeches/foreign-secretarys-speech-at-the-united-states-institute-for-peace).

The Minister of Foreign Affairs of the USA M. Pompeo also uses the erased metaphor in the performances: "The deep commercial, security, and people-to-people relationships between our two countries are rooted in mutual interest and respect, as well as our shared commitment to combatting terrorism and fostering the conditions for prosperity" (The deep commercial, safe and interpersonal relations between our two countries trace the roots back to mutual interest and respect and also our general commitment in fight against terrorism and to creation of conditions for prosperity) (https://www.state.gov/r/pa/ei/speeches/#June). Being organically built in a natural language, primary structural analogy of metaphors to anatomy, botany is lost in official speeches of politicians. In the western culture similar metaphors became a language component practically of each speech of political leaders and during language evolution began to be taken by audience for granted, the certain template transformed as a result of conceptual or historical changes.

Thus, the research of anthropomorphous and phytomorphous metaphors in a political discourse allows to draw a conclusion that foreign politicians use a various palette of such metaphors which do not exist in itself, and are characterized in a context. Use of the presented metaphors in modern political communication is not weakened, and on the contrary, amplifies that allows to move to a new level of a research of process of metaphorization. All aforesaid gives the grounds to claim that anthropomorphous and phytomorphous metaphors in a political discourse enrich public statements of figures of policy and give to the text figurativeness and laconicism.

References

1. Ahmanova, O.S. Slovar' lingvisticheskih terminov [Tekst] / O. S. Ahmanova. – Izd. 2-e, stereotip. – M.: Editorial URSS, 2004. – 574 s.
2. Kas'yanova L.YU. Kognitivno-diskursivnye mekhanizmy neologizacii [Tekst]: monografiya / L.YU. Kas'yanova. – Astrahan': Izdatel'skij dom «Astrahanskij universitet», 2009. – 320 s.
3. Mihaleva, O.L. Politicheskij diskurs: Spetsifika manipuljativnogo vozdejstvija. – M.: Knizhnyj dom «LIBROKOM», 2009. – 256 s.
4. Chudinov, A.P. Politicheskaja lingvistika [Tekst] / A.P. Chudinov. – 2-e izd., ispr. – M.: Flinta: Nauka, 2007. – 256 s.
5. Jazykoznanie. Bol'shoj `entsiklopedicheskij slovar' / Gl. red. V. N. Jartseva — 2-e izd. – M.: Bol'shaja Rossijskaja `entsiklopedija, 2000. – 685 s.

BUILDING AND ARCHITECTURE

Adolf D. I.

COMMON AND MODERN FORMS IN ARCHITECTURE

Language Advisor — Senior Lecturer Galchenko V. M.
Kharkiv National University of Civil Engineering and Architecture

Each era of human development is characterized by the structure of social relations of spiritual values. Architecture as art, expressing these values in certain material forms, is a kind of cultural, aesthetic information message of its time.

In the construction of a centuries-old city, the actual problem of harmonious interaction of old buildings with the emerging modern buildings arises: the architectural potential of the city is determined by the way to solve this problem. Each city solves this problem in its own way, depending on the nature of the construction policy pursued by officials and top management.

Attempting by composition to link the stylistics of modern in terms of function and constructive solution of buildings with historical surroundings often takes absurd and ugly forms. So inappropriate looks styling banks, offices, shopping centers for old brick mansions (in some cities of Ukraine this approach is often used in construction).

It is a special transfer of ancient architectural traditions and forms to the modern urban structure creates the prerequisites for the emergence of national architectural color and as a result, the formation of national architectural schools with the appropriate styling of formation.

However, for such a broadcast of traditional architectural forms, there should be a weighty basis for their regional uniqueness. Such a basis exists in the countries of Central and Southeast Asia, the Middle East, Central America, North Africa, Central Europe, i.e. regions with a distinctive centuries-old national architecture.

The modern style and pace of life necessitate the use of a new form-making toolkit: the old form-building arsenal is acceptable only in cases of restoration of historic buildings.

In a number of cases, the cultural layer was sharply distinguished by its innovative searches among others and to a certain extent denied the achievements of previous or accompanying layers: this often caused misunderstanding and censure. However, the years passed, and the censured buildings became “masterpieces” and “symbols”.

Another general pattern of the formation of centuries-old historical buildings of cities is that only the best buildings of great cultural and artistic value were left and kept from each stratum: a huge mass of buildings of ordinary buildings were destroyed, rebuilt and replaced.

It is incorrect to compare the masterpieces of antiquity with the ordinary buildings of the present: it is necessary to remember: modern world architecture also has in its arsenal quite a few amazing structures that will delight future generations.

One of the “pain points” of the confrontation between innovators and conservatives in architecture is the problem of the emergence and development of modern high-rise buildings in the urban structure of many historical cities.

We can formulate an axiom: denying the emergence of a new architecture and in every way possible resisting its formation, the city denies the potential of its cultural development. “Outside the existing historical context and conservative traditions” such an ideological position of innovators is not at all a threat or a provocative alternative to the historical urban development formed over the centuries: it is a refusal to accommodate, ingratiate, adapt to historical prototypes. Modern architects respect the achievements of architecture of past eras, but they cultivate other approaches to the artistic formation of the urban development environment, which is absolutely natural and legitimate.

Modern architecture has a completely new image sound and specific artistic merit. Its expressive capabilities and shaping tools are so radically different from those previously developed, that in its appearance it is in principle incapable of stylistically linked with the historical environment and therefore will obviously contrast with it. The buildings and structures of outstanding modern conceptualists and innovators have nothing in common with what the architects of Ancient Greece, Rome, Byzantium, classicism, etc. worked on for centuries. There is no catastrophe in this. Such is the logic of the development of architecture as a historical and social phenomenon. The whole question is how expressively or unsuccessfully the specific volume-plastic composition of the new architecture is solved, and also how optimal is its town-planning location in the context of the general artistic image of the city.

It is impossible to stop the development of a new conceptual architecture.

Some cities protected by UNESCO may specifically mothball the historic urban development environment and thereby legally resist the emergence of avant-garde architectural sites within the framework of the international legal framework.

However, most developing cities in the world are fully capable of accepting new architecture as a symbol and potential of their cultural and technical progress, as a bridge between the past and the future.

References

1. https://cyberleninka.ru/
2. http://architime.ru/specarch.htm
3. http://proektp.ru/index.php?name=Pages&op=page&pid=13

Andrianova A. D.

RESTORATION OF CULTURAL ARCHITECTURAL HERITAGE OF KHARKOV

Language Advisor – Senior Lecturer Ignatyeva N.V.
Kharkiv National University of Civil Engineering and Architecture

Ukraine has a huge and diverse cultural heritage, which reflects our complex and dramatic history. This is evident especially due to the ancient architecture of our cities. Each of buildings is a symbol of a particular era, a reflection of the life, creativity and energy of our ancestors. The old city is a soul and a magnetic aura created by previous generations of its inhabitants.

Problems in preserving the architectural heritage of the city exist all over the world, but in Kharkov, a crisis situation developed. We actually have no monuments of architecture and history that have not been damaged to some extent in the last 20 years.

The loss of monuments began in Soviet times, but in the days of independent Ukraine, this process went much faster. According to the project manager, "Ctrl+S. Zakhisti Maybutne" Elena Rofe-Beketova who is a representative of one of the most famous ancient clans in Kharkov, often an old building is deliberately brought to a state where it is no longer subject for restoration.

Until recently there were no major Kharkov buildings that weren't included the State Register of Monuments neather in the status of "national" and "local" significance. Soviet signs "Protected by the State" are still hung on some of the most beautiful Kharkov buildings.

The history of the demolition of the house in which the family of the famous actor and playwright Mark Kropivnitsky lived is can be marked as indicative. This house on the lane Lopatinsky, 6 has a security number. The owner of the building is so sure of impunity that he didn't appeal anywhere - he just needed a plot of land on which the house was located. In November 2017, he demolished this house. At the end of 2016, the Department of Culture sent a letter to the prosecutor's office, but for some reason, the guilty party has not yet been brought to justice. The owner, who barbarously destroyed the monument of architecture, was not even fined.

The problem is not only that the houses are being demolished. The owners of cafes, shops, hotels, which have acquired historic buildings, believe that they can do anything with houses. The most fascinating sights of Kharkov are masterpieces of Rzhepishevsky on Rymarskaya, Darwin, Marshal Bazhanova and other old town streets. Unfortunately even this objects of cultural heritage are spoiled by inept reconstruction, plastic windows and satellite dishes.

Wonderful architectural historical buildings are being modernized, and none of the organizations that are supposed to control state of cultural heritage notice this. People don't understand that as soon as you change the double frames in the historic house for plastic one the appearance of this house will disappear. And somehow no one will remember how it looked like. Sometimes a pragmatic simplicity of the facade itself the entire emphasis was placed on the windows in the whole house. For example the economic building on the Mironositskaya street which is closer to the Mirror stream. Absolutely magnificent windows that had all the aesthetic load were changed in this building.

Another example is the so-called "bank wall" on the Constitution Square. The buildings of the former Land, Commerce, Volga-Kama and other banks. These

buildings were damaged during the Second World War and after more or less competently restored and partially reconstructed.

One of the houses that has survived better than the rest is the building of the St. Petersburg International Commercial Bank, now Sberbank. The glass with wonderful patterns that survived the 1917 revolution, the civil war and the Second World War were installed in its windows by the architect Victor Velichko Venetian. But they did not survive today's parsimony. The current owners of the building decided to place information stands in the windows, replaced the glass, and now you no longer see the old beauty.

In fact there is no real monitoring of the state of monuments of architecture in Ukraine. Furthermore there are no organs that could respond to damage promptly. Although according to the law substantial fines are provided for damaging architectural monuments, so far it does not work.

Doubtful organizations are often engaged in restoration. After such intervention houses are modernized and lose their authentic look. Often there is a reconstruction - in other words, restructuring, in fact goes on when restorationis announced. By the way the same situation happened with the philharmonic: after the so-called restoration, the building became a completely new structure. The building of the former opera house was not only a monument of architecture, but also historical sight.

Old buildings are a cultural heritage inherent in each city. They create a special atmosphere and give cities a face that can be recognized among hundreds. The beauty and safety of historic buildings depends on the townspeople behavior. Monuments of architecture need only be restored, which means maintaining in their original form, and reconstruction should be started only when it is impossible to restore them. In any case, the reconstruction should be coordinated with all conservation organizations.

References

1. Дёмина Г. А. Эволюция взглядов на формирование реставрационной теории и отношение к архитектурному наследию конца XIX – начала XX вв./ Науковий вісник будівництв. С. 114-118.

2. Черкасова Е. Т. Архитектурно-пространственные особенности городской застройки эпохи модерна на примере центрального исторического ареала г. Харьков и тенденции ее сохранения./ Сучасні проблеми архітектури та містобудування. Випуск 34, 2014, с.118-127.

Andrienko M. O.

IDENTITY OF ARCHITECT SANTIAGO CALATRAVA. STYLE AND INFLUENCES

Language Advisor – Kushchenko Zh. L.
Kharkiv National University of Civil Engineering and Architecture

Santiago Calatrava Valls (born 28 July 1951) is a Spanish architect, structural design and analyst engineer, sculptor and painter, particularly known for his bridges supported by single leaning pylons, and his railway stations, stadiums, and museums, whose sculptural forms often resemble living organisms. His best-known works include the Milwaukee Art Museum, the Turning Torso tower in Malmö, Sweden, the Margaret Hunt Hill Bridge in Dallas, Texas, and his largest project, the City of Arts and Sciences and Opera House, in his birthplace, Valencia.

He had his primary and secondary schooling in Valencia, and, beginning in 1957, studied drawing and painting at the School of Applied Art. In 1964, as the regime of General Francisco Franco relaxed and Spain became more open to rest of Europe, he went to France as an exchange student. In 1968, after completing secondary school, he went to study at the Ecole des Beaux Arts in Paris, but he arrived in the midst of student uprisings and turmoil in Paris, and returned home. Back in Valencia, discovered a book about the architecture of Le Corbusier, which persuaded him that he could be both an artist and an architect. He enrolled in the Higher School of Architecture at the Polytechnic University of Valencia. He received his diploma as an architect and then did higher studies in urbanism. At the University he completed independent projects with fellow students, publishing two books on the vernacular architecture of Valencia and Ibiza.

In 1975 he enrolled in the Swiss Federal Institute of Technology in Zürich, Switzerland for a second degree in civil engineering. In 1981 he was awarded a doctorate in the department of architecture, after completing his thesis on "The Pliability of three-dimensional structures." Speaking of this period, Calatrava told biographer Philip Jodidio:"The desire to start all over at zero was very strong in me. I was determined to put to one side all that I had learned in architecture school, and to learn to draw and think like an engineer. I was fascinated by the concept of gravity and convinced that it was necessary to begin work with simple forms." Calatrava explained that he was particularly influenced by the work of the early 20th century Swiss engineer Robert Maillart , which taught him that, "with an adequate combination of force and mass, you can create emotion."

Calatrava has never described himself as a follower of any particular school or movement of architecture. Critics have claimed that a number of influences can be seen in his work. In the journal of the American Institute of Architects, Christopher Hawthorne wrote about his design for Florida Polytechnic University, which he called "an example of Calatrava's architectural approach and creative sensibility distilled, for better and worse, to its essence. There are all the usual influences on view — the Eero Saarinen forms rendered in the Richard Meier, FAIA, palette — and they are remarkably legible and easy to parse here." Some other critics see his work as a continuation of expressionism. Asked about critics who classified him into different schools, Calatrava responded, "Architectural critics have not yet passed from a state of perplexity about my work."

Calatrava himself observed that he was particularly influenced by the work of engineers such as the Swiss Robert Maillart , whose work inspired him to seek simple forms which could create an emotional response. Calatrava defined his

objective this way in 2016 in a book about his work: "My major interest is the introduction of a new formal vocabulary, composed of forms adapted to our time." Calatrava, a sculptor, has also spoken frequently about the connection between sculpture and architecture in his work. "In sculpture, I have often used spheres, cubes and other simple forms often connected with my knowledge of engineering." He noted that his Turning Torso building had originally been conceived as a work of sculpture, and he praised the liberties taken by Frank Gehry and Frank Stella in creating sculptural art, but he also noted the differences. In 1997 he wrote that "architecture and sculpture are two rivers in which the same water flows. Think of sculpture as a pure plastic art while architecture is a plastic art which is submitted to function, taking into consideration the human scale." Calatrava also noted the influence of the sculptor Auguste Rodin, citing Rodin's words in his 1914 book Cathedrals of France: "The sculptor only achieves the greatness of expression in concentrating his attention on harmonic contrasts of light and shadow, exactly as an architect does."

Movement is also an important element in the architecture of Calatrava. He noted that many 20th century sculptors, such as Alexander Calder, made sculptures that moved. He wrote his own university thesis on "The Flexibility of three-dimensional structures," and described how objects, by moving, could shift from three dimensions to two and even to one. Moving elements which folded and expanded became an important element of almost all of his projects. "Architecture itself moves", he told a biographer, "and, with a little chance, becomes a magnificent ruin".

Calatrava is also a sculptor and painter. Some of his architectural works, most notably the Turning Torso in Malmö, Sweden, were originally works of sculpture. In 2006, the Metropolitan Museum of Art in New York City held a special one-man exhibition of Calatrava's drawings, sculpture, and architectural models, entitled Santiago Calatrava: Sculpture Into Architecture.

References

1. "Santiago Calatrava Biography - life, family, children, name, story, wife, school, mother, young - Newsmakers Cumulation". Www.notablebiographies.com.

2. https://thearchitect.pro/ru/news/6159 -Pravila_arhitectury_Santjago_Kalatravy

Andrushchenko A. S.

A WALK ON THE PLACE OF ALEXEY NIKOLAEVICH BEKETOV

Language Advisor – Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

Beketov Alexey Nikolaevich largely shaped the architectural appearance of Kharkov, having built more than 40 buildings, especially on the streets of Pushkinskaya, Zhen Myronositsy and Sadovo-Kulikovskaya. You can talk for

hours about the activities of this greatest person, but today we offer to take a walk through the places of Kharkov, which are connected with Beketov, and at least for a moment touch the beauty that he presented to our city.

Mansion of Academician A.N. Beketov

This building appeared in Kharkov a long time ago. It is distinguished by a special elegance, taste and unique architectural ensemble.

Own house A.N. Beketov built in 1897. At that time, the great architect had four children. According to the traditions of those times, Beketova's spouse, Anna Alekseevna, was appointed the owner of the house. Judging by the old photographs, the construction lasted about three years.

In the eclectic architecture of the house used forms of ancient Greece of the Hellenistic era, skillfully combined into a highly artistic composition. All the decoration of the building makes it possible to mentally move back into the past and imagine what the life of the inhabitants of the mansion looked like. The total cost of home ownership, according to the tax inspectorate, at the beginning of the twentieth century was 12,240 rubles. In 1934, the mansion was handed over to the House of Scientists.

The building of the Kharkov Automobile Technical School

Kharkov Motor Transport College is located in the very center of our city at the address of Constitution Square 28. Initially, the land bank was located here. The building was built in 1896-1898. by architect Beketov.

The two-story building impresses with its luxury and numerous architectural delights. It is made in the neo-Renaissance style. One of the brightest strokes, in my opinion, are the sculptures of lions guarding the entrance to the building.

Architects area

Architects Square is one of the youngest sights of Kharkov. It is located near the metro station Architect Beketov. The square was opened on August 23, 2009. By the opening, the asphalt pavement was renewed, benches were installed and the monument to lovers was reconstructed, around which a fountain appeared with light.

The mansion of Professor Nikolai Somov

The mansion in the Romano-Gothic style of the Kharkov Imperial University professor, ornithologist Nikolai Somov designed Beketov in 1899. The mansion turned out in the taste of country hotels of the end of the XIX century. On the first floor - an apartment of 8 rooms for rent, on the second - the owner's apartment (8 rooms and an attic) with a repository of zoological collection. The construction is picturesque both outside (hipped towers, open terraces, balconies, stucco details), and inside. The acoustics of the assembly hall, where an exciting modern staircase leads, knowledgeable musicians rank with

Kharkiv Philharmonic.

Kharkov library named after Korolenko

The building, which now occupies the State Library named after VG Korolenko, as the hands of the architect Beketov. The project implementation lasted 10 years, from 1891 to 1901.

At that time, the fund numbered 1,700 copies, and only 5 employees served the readers. Over the years of its existence, the library has participated in various congresses, competitions and exhibitions, and the number of books in the vaults has increased and increased. Just imagine, today there are 7 million books, documents, magazines, newspapers in the library, 60 thousand of which are rare publications!

References

1. Contemporary architecture
2. How architecture can help redefine the refugee crisis http://edition.cnn.com/style/article/sean-anderson-moma-refugee-architecture/index.html
3. https://www.huffingtonpost.com/

Anikeieva Ye. V.

THE STUDY OF SEVERAL TECHNIQUES RELATED TO THEORETICAL CALCULATION OF CYLINDRICAL STEEL-CONCRETE BEARING ELEMENTS OF BUILDINGS AND STRUCTURES

Scientific Advisor – Cand. Eng. Sc., Senior Lecturer Synkovska O. V.
Language Advisor – Cand. Pedag. Sc., Assoc. Prof. Borzenko O. P.
Kharkiv National Automobile and Highway University

Pipe and concrete structures are used in architecture and building for the half of a century. Countries with high level of industrial development, like USA, Japan and European countries, use pipe and concrete structures in industrial, civilian building technologies, as well as in building bridges and special structures.

The reason of such development was a wide distribution of multistory buildings construction, which has been started in the end of XX century. It must be considered that the building of such structures requires the use of hard, economical and safe vertical structures combining the reduction of structure weight, material quantity and human resources. It was impossible to solve the occurred problems in traditional way, so it was decided to create efficient structures with high level of reliability and minimum weight dimension.

Pipe and concrete structures met these requirements. They became a reasonable alternative to concrete and steel structures. Pipe and concrete structures have some strains. One of them is increased risk of corrosion comparing with ferroconcrete structures, as well as increased costs of maintenance of these structures.

One of logic methods of material economy is non-direct reinforcement. The advantage of non-direct reinforcement is the increase of bearing capacity allowing to add about 50 % of the existing load to centrally compressed ferroconcrete element in comparison to the element only with longitudinal reinforcement. It allows to reduce the dimensions of transverse element section.

However, this type of support has the number of strains, therefore scientists started searching new solutions. One solution was proposed by V. S. Shmukler [4] which was the use of slicing sheet hug for a non-direct reinforcement. This type of sheet has a number of advantages [2].

The result of various theoretical and testing works was the number of different formulas for calculation of breaking pressure [1] provided by O. O. Hvozdiev, V. A. Rosnovskyi, N. F. Skvortsov, A. F. Lipatov, V. I. Hnedovskyi.

These formulas were analyzed and developed by modern scientists L. K. Luksha, L. I. Storozhenko, E. D. Chykhladze, A. F. Milovanov, A. L. Krishan [1] have significant difference of component materials included to calculation process. They are difficult enough and require a huge knowledge of volume depressed positions.

According to Eurocode 4 (part 2) [3] for pipes with round section filled by concrete, the increase of concrete strength is provided by its limitation. Considering that relative flexibility $\overline{\lambda} = \sqrt{N_{pl,Rk} / N_{cr}}$ does not exceed 0,5< $e/d < 0{,}1$, and steel inclusion factor is within $0{,}2 \le \delta = \dfrac{A_a f_{yd}}{N_{pl,Rd}} \le 0{,}9$, where e is load eccentricity, d is column external diameter, $N_{pl,Rk}$ is characteristical plastic compression resistance value, N_{cr} is critical flexible force for the relevant hardness loss form, $N_{pl,Rd}$ is a resistance for plastic deformation from section compression, A_a is a section area of steel part, f_{yd} is a designed steel yield line value.

Plastic resistance to compression should be determined considering all above [3] by the next formula:

$$N_{pl,Rd} = \eta_a A_a f_{yd} + A_c f_{yd} \cdot \left(1 + \eta_c \cdot \frac{t}{d} \cdot \frac{f_y}{f_{ck}}\right) + A_s f_{sd}, \quad (1)$$

Where t is steel pipe wall thickness, A_c, A_a is a section area of concrete and armature, f_{cd}, f_{ck} is designed and characteristic values of cylindrical concrete compression strength, η_c is a factor of concrete limitations, f_y, f_{sd} are normal and designed values of construction steel yield line.

At the same time, according to EN 1994-1-1 [5] without considering existing element flexibility:

$$N = R_b \left(1 + 4{,}9 \frac{t}{D} \frac{R_c}{R_b}\right) A_b + 0{,}75 R_c A_c, \quad (2)$$

The calculation of axis compression load for pipe and concrete elements is an object of research in other countries. The method of round section elements [6] strength and hardness calculation was provided by the following scientists: Min Yu, Xiaoxiong Zha, Jianqiao Ye, Chunyan She, Yuting Li. This method can be used only for round section pipe and concrete elements. This method has passed testing by sampling hollow and solid pipe and concrete elements of round section [6].

Provided by science program of V. S. Shmukler [1, 4] techniques of cylindrical steel-concrete element bearing capacity with axis load are realized via the principle of superposition, bearing capacity of concrete core and steel hug are considered as different items working independently without considering common work but considering bearing capacity caused by squeezing concrete core by the hug.

Concrete wedges also provide natural adhesion of the core and the hug caused by monolithic concrete core leading to common work between steel-concrete element components of new type during all service life.

Therefore, the analysis of cylindrical steel-concrete element use area has confirmed its reliability.

References

1. Синьковська О. В. Ефективні сталебетонні циліндричні опори будівель та споруд : дис. … канд. техн. наук : 05.23.01. Харків, 2015. 267 с.

2. Синьковская Е. В. Опора моста облегченного типа. *Науковий вісник будівництва*. Харків : ХНУБА, ХОТВ АБУ, 2012. № 68. С. 96-100.

3. ТКП EN 1994-2-2009 (02250) Еврокод 4. Проектирование сталежелезобетонных конструкций. Часть 2. Основные принципы и правила для мостов (EN 1994-2: 2006, IDT). [Действующий от 10 декабря 2009]. Изд. офиц. Минск : Минстройархитектуры, 2010. 80 с. (Технический кодекс установившейся практики).

4. Шмуклер В. С., Климов Ю. А., Бурак Н. П. Каркасные системы облегченного типа. Харьков : Золотые страницы, 2008. 336 с.

5. EN 1994-1-1: Eurocode 4: Design of composite steel and concrete structures - Part 1-1: General rules and rules for buildings. [Supersedes ENV 1994-1-1: 1992]. European Committee for Standardisation, 2004. 188 p.

6. Min Yu, Xiaoxiong Zha, Jianqiao Ye, Yuting Li A unified formulation for circle and polygon concrete filled steel tube columns under axial compression. *Engineering Structures*. 2013. No 49. P. 1-10.

Ayvazyan M. V.

HIGH-RISE TIMBER BUILDINGS

Language Advisor – Senior Lecturer Galchenko V.M.
Kharkiv National University of Civil Engineering and Architecture

Over the past decade, the design industry has been increasingly looking toward timber as a building material for the construction of tall buildings. This interest is partly due to the development of new engineered timber products and the potential economic benefits of prefabricated timber elements and composite building systems. However, a recent emphasis on the importance of green and sustainable architecture and an understanding of the potential sustainability benefits of tall timber buildings can be seen as the primary motivator for many architects, owners, governments, and other building stakeholders wanting to design with timber.

Owners, managers, designers, and some government agencies have been placing a greater importance on sustainability in building construction and operation, as buildings are a major contributor to greenhouse gas emissions in their construction and operation. This has led to increased interest in the use of timber in buildings, as timber can be considered an attractive material for green building construction.

The use of timber in building construction can positively contribute to sustainable building practices in many ways:

- Timber is considered a renewable resource and the forests supplying timber can offer a natural carbon;
- The resource extraction and manufacturing phases of timber products demand a very low amount of energy relative to more conventional structural materials used in construction; and
- Innovative timber systems designed for prefabrication and disassembly allow for reuse of the material and a more resource-efficient product life cycle than typical demolition and down-cycling.

In addition to the sustainability benefits, timber has other positive attributes relative to other building material types:

- Possibility of offsite prefabrication and minimized onsite work allowing for high-quality certified production, independent from weather and a rapid erecting progress;
- Reduction of building weight, resulting in savings in foundation works when compared to other construction materials;
- Ease of alteration onsite; and
- Increased flexibility in architectural design options.

In general, light timber frame construction is composed of a greater number of small-section stud members to form wall and floor assemblies, typically enclosed within cladding to form wall or floor framing elements. Light timber frame construction is typically used in low- and mid-rise residential buildings and is often used in buildings up to five- and six-stories, typically above a reinforced concrete ground floor. Framing methods include "platform” and "balloon,” or stick-framed construction. Heavy timber frame construction is composed of a lesser number of large-section engineered products to form the building superstructure. While this includes solid sawn lumber sections, modern timber buildings generally use engineered timber products. Relative to solid sawn lumber, engineered timber

products offer greater strength and design flexibility and have enabled greater ambitions in architectural and structural design.

The use of heavy timber frame construction allows for greater design flexibility (relative to light timber frame construction) including longer unsupported spans, open-plan areas, and taller construction. The two predominant forms of heavy timber construction include post and beam construction and panelized construction.

Wood is a go-to material for floors, doors, furniture, and now, a skyscraper—the very first of its kind in the USA. Construction on Portland, Oregon's wood high-rise, Framework, is stated to begin this October. The 12-story mixed-use building—a collaboration between local firm Lever Architecture and real-estate developer Project—will be made primarily from timber. Thomas Robinson, Lever Architecture's founder, says his company is interested in "exploring the relationship between materials, experience, and the environment—how the way we build impacts the way we live and the environment as a whole."

References

1.Larsen, L., Rajkovich, N., Leighton, C., McCoy, K., Calhoun, K., Mallen, E., Bush, K., Enriquez, J., Pyke, C., McMahon, S., and Kwok, A. "Green Building and Climate Resilience: Understanding Impacts and Preparing for Changing Conditions," U.S. Green Building Council, Washington DC, 2011.

2.Buchanan, A., *Structural Design for Fire Safety*. John Wiley and Sons, West Sussex, UK, 2001.

3.White, R., "Analytical Methods for Determining Fire Resistance of Timber Members," *SFPE Handbook of Fire Protection Engineering*, National Fire Protection Association, Quincy, MA, 2008.

4.*Details For Conventional Wood Frame Construction*. American Forest & Paper Association, Washington DC, 2001.

5.Ostman, B., "Fire Safety in Timber Buildings – Technical Guideline for Europe," SP Report 2010:19. Stockholm, Sweden, 2010.

Babenko O. S.

HEYDAR ALIYEV CENTER BY ZAHA HADID ARCHITECTS

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

As part of the former Soviet Union, the urbanism and architecture of Baku, the capital of Azerbaijan on the Western coast of the Caspian Sea, was heavily influenced by the planning of that era. Since its independence in 1991, Azerbaijan has invested heavily in modernizing and developing Baku's infrastructure and architecture, departing from its legacy of normative Soviet Modernism.

Zaha Hadid Architects was appointed as design architects of the Heydar Aliyev Center following a competition in 2007. The Center, designed to become the primary building for the nation's cultural programs, breaks from the rigid and often monumental Soviet architecture that is so prevalent in Baku, aspiring instead to express the sensibilities of Azeri culture and the optimism of a nation that looks to the future. [1]

Design concept

The design of the Heydar Aliyev Center establishes a continuous, fluid relationship between its surrounding plaza and the building's interior. The plaza, as the ground surface; accessible to all as part of Baku urban fabric, rises to envelop an equally public interior space and define a sequence of event spaces dedicated to the collective celebration of contemporary and traditional Azeri culture. Elaborate formations such as undulations, bifurcations, folds, and inflections modify this plaza surface into an architectural landscape that performs a multitude of functions: welcoming, embracing, and directing visitors through different levels of the interior. With this gesture, the building blurs the conventional differentiation between architectural object and urban landscape, building envelope and urban plaza, figure and ground, interior and exterior.

Fluidity in architecture is not new to this region. In historical Islamic architecture, rows, grids, or sequences of columns flow to infinity like trees in a forest, establishing non-hierarchical space. Continuous calligraphic and ornamental patterns flow from carpets to walls, walls to ceilings, ceilings to domes, establishing seamless relationships and blurring distinctions between architectural elements and the ground they inhabit. Our intention was to relate to that historical understanding of architecture, not through the use of mimicry or a limiting adherence to the iconography of the past, but rather by developing a firmly contemporary interpretation, reflecting a more nuanced understanding. Responding to the topographic sheer drop that formerly split the site in two, the project introduces a precisely terraced landscape that establishes alternative connections and routes between public plaza, building, and underground parking. This solution avoids additional excavation and landfill, and successfully converts an initial disadvantage of the site into a key design feature.

Geometry, structure, materiality

One of the most critical yet challenging elements of the project was the architectural development of the building skin. Our ambition to achieve a surface so continuous that it appears homogenous required a broad range of different functions, construction logics and technical systems had to be brought together and integrated into the building's envelope. Advanced computing allowed for the continuous control and communication of these complexities among the numerous project participants.

The Heydar Aliyev Center principally consists of two collaborating systems: a concrete structure combined with a space frame system. In order to achieve large-scale column-free spaces that allow the visitor to experience the fluidity of the interior, vertical structural elements are absorbed by the envelope and curtain wall

system. The particular surface geometry fosters unconventional structural solutions, such as the introduction of curved ‘boot columns’ to achieve the inverse peel of the surface from the ground to the West of the building, and the ‘dovetail’ tapering of the cantilever beams that support the building envelope to the East of the site.

The space frame system enabled the construction of a free-form structure and saved significant time throughout the construction process, while the substructure was developed to incorporate a flexible relationship between the rigid grid of the space frame and the free-formed exterior cladding seams. These seams were derived from a process of rationalizing the complex geometry, usage, and aesthetics of the project. Glass Fibre Reinforced Concrete (GFRC) and Glass Fibre Reinforced Polyester (GFRP) were chosen as ideal cladding materials, as they allow for the powerful plasticity of the building’s design while responding to very different functional demands related to a variety of situations: plaza, transitional zones and envelope.

In this architectural composition, if the surface is the music, then the seams between the panels are the rhythm. Numerous studies were carried out on the surface geometry to rationalize the panels while maintaining continuity throughout the building and landscape. The seams promote a greater understanding of the project’s scale. They emphasize the continual transformation and implied motion of its fluid geometry, offering a pragmatic solution to practical construction issues such as manufacturing, handling, transportation and assemblyand answering technical concerns such as accommodating movement due to deflection, external loads, temperature change, seismic activity and wind loading.

To emphasize the continuous relationship between the building’s exterior and interior, the lighting of the Heydar Aliyev Center has been very carefully considered. The lighting design strategy differentiates the day and night reading of the building. During the day, the building’s volume reflects light, constantly altering the Center’s appearance according to the time of day and viewing perspective. The use of semi-reflective glass gives tantalizing glimpses within, arousing curiosity without revealing the fluid trajectory of spaces inside. At night, this character is gradually transformed by means of lighting that washes from the interior onto the exterior surfaces, unfolding the formal composition to reveal its content and maintaining the fluidity between interior and exterior. [2]

References

1. Heydar Aliyev Center http://www.zaha-hadid.com/architecture/heydar-aliyev-centre/

2. Heydar Aliyev Center / Zaha Hadid Architects https://www.archdaily.com/448774/heydar-aliyev-center-zaha-hadid-architects

Babkina V. A.

THE MOST INCRESIBLE BRIDGES IN THE WORLD

Language Advisor – Ignatyeva N.V.
Kharkiv National University of Civil Engineering and Architecture

Bridges - the crown of the most sophisticated and ambitious architectural structures created by human genius. This is not only a convenient way to travel and shorten the path, but also a real work of art that has always attracted genuine interest and admiration. After all, the construction of bridges looks truly majestic, striking with its scale, incredible beauty and fantastic flight of engineering thought, being a true example of the triumph of the most advanced technologies.

Each bridge is unique and unrepeatable in its own way, at this stage in the development of humanity a great number of them have been created.

The longest bridges of the world are striking in their scale, immense scope, genius and fantastic beauty. Almost every year in different parts of the world a new unique structure appears, which is even more perfect and majestic, eclipsing its predecessors.

Recently, it so happened that if we are talking about the most incredible and ambitious achievements of engineering thought, then China is on the first step of the pedestal, and the bridge building is the most vivid confirmation of this. The Ran Young Bridge (35,660 meters in length) was erected in China in 2007 and is considered the longest bridge across the river. It connects the banks at the widest point of the Yangtze River. Ran Young Bridge impresses with its technical solution, because this amazing structure is a complex structure consisting of a trestle, suspension and cable-stayed bridges.

The Hangzhou Bey Bridge (35,673 meters in length) across the Bay of Hangzhou is the longest trans-ocean cable-stayed bridge in the world, connecting the cities of Shanghai and Ningbo (Zhejiang Province). This fantastic bridge crosses not only the Hangzhou Bay in the East China Sea, but also the Qiantang River, located in the Yangtze River Delta, and is one of the most beautiful bridges in the world.

he Hangzhou Bay Bridge is built over a very difficult water area, because one of the most powerful water streams of the planet passes here. Therefore, when creating such a significant structure by bridge builders and designers, an exact calculation was made in order to ensure complete safety and reliability of the structure.

The Yangtsun bridge with a total length of 35 km 812 m was commissioned in 2008. It is part of the Beijing-Tianjin railway and is considered the longest flyover bridge in China.

Manchek Swamp Bridge was created in the 70s of the last century in Louisiana (USA). Manchek Swamp Bridge has a very impressive length of 36.7 km and is part of the main state highway.

Since it is laid over marshland, this is very difficult task developers and contractors. Bridge builders had to drive 76 meter piles into the swamp to ensure the reliability of the whole structure and safety for many years of operation.

The American Dam Bridge across Lake Ponchartrain (length 38,420 m, USA) is the longest continuous structure above the water surface.

The dam bridge consists of two parallel lanes that connect the cities of Metayri and Mandeville, located on the opposite shores of Lake Ponchartrain. To support such a grand structure, more than 9000 concrete piles were clogged and secured.

The Grand Qingdao Bridge (length 42,500 m, China) passes through the Jiaozhou Sea Bay and as of 2011 was the longest bridge in the world passing over the water surface. Qingdao Bridge is a six-lane structure that connects the city of Qingdao with the industrial district of Huandao. As it passes over the sea, a special structure was designed that can withstand a typhoon hit, an eight-point earthquake, or a collision with a vessel with a displacement of up to 300,000 tons.

The Bang Na highway (length 54,000 m, Thailand) is the longest road bridge 54,000 m long, passing the second tier over the streets of Bangkok, does not cross any water obstacle.

Such a grand land object was planned in order to relieve the main directions of traffic. The width of the highway is 27.2 meters, and the traffic itself occurs in 3 lanes in each direction.

The longest sea bridge in the world, connecting three Chinese megacities on the coast of the South China Sea - Hong Kong-Zhuhai-Macau Bridge (55,000 m length, China)

This large-scale project includes: the longest underwater tunnel, located at a depth of 48 meters, a length of 6,700 m, three artificially created islands and the bridge itself, whose length is 29,600 meters.

The large-scale complex Hong Kong-Zhuhai-Macau is designed for a 120-year service life and is able to withstand an earthquake of magnitude up to 8 points. Thanks to its construction, the travel time between Hong Kong and Zhuhai, Macau was significantly reduced from three hours to 30 minutes.

Changhua-Kaohsiung Viaduct (157,310 m length, Republic of China) - the second longest bridge in the world connects Baguashan and Zuoing, located on the western side of the island, and is an integral part of Taiwan's high-speed railway.

The Changhua-Kaohsiung Viaduct is one of the most complex structures in bridge construction because it is located in an active seismic zone.

The Danyang-Kunshan Viaduct (164,800 m, China) is the longest bridge in the world, truly unique, as it crosses many different obstacles in its path, starting from rivers, canals, lakes, rice fields, and pumping deep gorges and abysses.

The Danyang-Kunshan Viaduct is part of the high-speed railway that connects with Shanghai. Several trains can simultaneously move along this grand bridge at a time, and cars move along nearby lanes. The construction of this large-scale bridge took only 4 years.

Over the centuries, bridges have played a very important role, not only transport, but also aesthetic. Often, famous cities of the world are associated with the magnificence and power of the bridges that were built.

Bridges have become a symbol of self-assertion of man and overcoming the forces of nature. Today in the world there are more than a million bridges of different lengths, heights and beauty. It is difficult to overestimate their role in the modern international network of transport flows, their enormous trading and strategic importance.

References

1. Денисон, Э. Как читать мосты : интенсивный курс по истории создания мостов. Москва, 2012. 256 с.

2. Кёте, Р. Мосты. Москва, 1996. 48 с.

3. Коккинаки, И. Мосты : инженерное искусство. Москва, 2015. 143 с.

4. Bridges: Three Thousand Years of Defying Nature / edited by David Brown. 2005. 208 p.

5. Bridges: A History of the World's Most Spectacular Spans / edited by Judith Dupre, 2017. 176 p.

Bastrakova V. R.

DANIEL LIBESKIND

Languge Advisor - Kushchenko Zh. L.
Kharkiv National University of Civil Engineering and Architecture

Daniel Libeskind was born May 12, 1946. He is a Jewish Polish-American architect, artist, professor and set designer. Libeskind founded Studio Daniel Libeskind in 1989 with his wife, Nina, and is its principal design architect. His portfolio also includes several residential projects. Libeskind's work has been exhibited in major museums and galleries around the world, including the Museum of Modern Art, the Bauhaus Archives, the Art Institute of Chicago, and the Centre Pompidou. On February 27, 2003, Libeskind won the competition to be the master plan architect for the reconstruction of the World Trade Center site in Lower Manhattan.

Libeskind began his career as an architectural theorist and professor, holding positions at various institutions around the world His practical architectural career began in Milan in the late 1980s, where he submitted to architectural competitions and also founded and directed Architecture Intermundium, Institute for Architecture & Urbanism.

Libeskind completed his first building at the age of 52, with the opening of the Felix Nussbaum Haus in Osnabruck, Germany in 1998. Prior to this, critics had dismissed his designs as "unbuildable or unduly assertive." In 1987, Libeskind won his first design competition for housing in West Berlin, but the Berlin Wall fell

shortly thereafter and the project was cancelled. Libeskind won the first four project competitions he entered including the Jewish Museum Berlin in 1989, which became the first museum dedicated to the Holocaust in WWII and opened to the public in 2001 with international acclaim. This was his first major international success and was one of the first building modifications designed after reunification.

Studio Daniel Libeskind, headquartered two blocks south of the World Trade Center site in New York, is currently working on more than forty projects across the world. He has designed numerous cultural and commercial institutions, museums, concert halls, convention centers, universities, residences, hotels, and shopping centers. In addition to his architectural projects, Libeskind has worked with a number of international design firms to develop objects, furniture, and industrial fixtures for interiors of buildings.

In order to better understand the work of Libeskind, you need to consider several of his projects. The extension to the Royal Ontario Museum (ROM), now named the Michael Lee-Chin Crystal, is situated at one of the most prominent intersections in downtown central Toronto. It is the largest Museum in Canada and attracts more than a million visitors a year.

Its new name is derived from the building's five intersecting metal-clad volumes, which are reminiscent of crystals—inspired by the crystalline forms in the ROM's mineralogy galleries. Libeskind created a structure of organically interlocking prismatic forms turning this important corner of Toronto, and the entire museum complex, into a luminous beacon.

The entire ground level is unified into a seamless space with clarity of circulation and transparency. The Crystal transforms the ROM's fortress-like character, turning it into an inspired atmosphere dedicated to the resurgence of the Museum as the dynamic centre of Toronto.

The design succeeds in inviting glimpses up, down, into galleries and even from the street. The large entrance atrium, the Gloria Hyacinth Chen Court, separates the old historic building from the new, providing a nearly complete view of the restored facades of the historic buildings.

The second example is Mo Modern Art Museum, Vilnius, Lithuania. The MO Modern Art Museum in Vilnius is dedicated to the exploration of works created from 1960 to present by Lithuanian artists.

With a new public piazza located steps away from the historic medieval city, the 3,100 sq-meters museum stands as an expression of Vilnius past and present. The MO Museum is conceived as a cultural "gateway" connecting the 18th century grid to the medieval walled city. The concept is inspired by the historic gates of the city and references the local architecture both in form and materials.

The rectilinear exterior façade is clad in luminous, white plaster that references the local materials of the city. As visitors approach the museum, they encounter a dramatic open stair that intersects the museum on a diagonal axis creating an expressive counterpoint to the minimalist façade. The stair cuts the façade open connecting the street with the upper levels of the museum giving way to an openness that flows between inside and out. At the top of the exterior stair is a

stepped open air terraced roof that serves as a gathering area and place for public performances and talks. A five meter cantilevered fully glazed wall allows views from the galleries to the public terrace.

The museum includes a café, bookstore, educational areas, auditorium, as well as storage and administrative space.

In conclusion, I would like to say that work of Daniel Libeskind is not only architecture, but also philosophy and music, and in these areas he is as highly professional as in architecture. It is difficult to name another architect for whom music would be such an organic element in the architectonics of structures. Music, geometry, the word - sources of inspiration in the works of Libeskind, the architect.

References

1. Architects / edited by Komarova I.I. Intech 2002. 73 p.

2. Royal Ontario Museum / edited by Hiroshi Sugimoto-Daniel Libeskind: The Conversation. Intech 2008.

Bastrakova V. R.

CRYSTAL FORMS IN ARCHITECTURE

Language Advisor - Kushchenko Zh. L.
Kharkiv National University of Civil Engineering and Architecture

Until recently, crystallographic geometry was not very popular in architecture and building design, although some architects or scientists used it in their projects. However, individual studies did not allow to see how great the prospects for its use in the development of world architecture. For a long time science and art went hand in hand.

Geometry and architecture together originated, developed and improved: from the simplest residential structures to carefully thought-out projects. The strength, beauty and harmony of buildings at all times provided geometry. In the architecture of cities, its rules are combined with the needs and imagination of man. Earlier, when architecture was still being pushed into a stricter framework than it is now, simple forms, such as a cube, a prism, or a regular pyramid, mostly dominated in the urban space.

Now, when the construction industry is rapidly developing, such architectural solutions as the use of crystalline forms in the construction of buildings is very relevant. Nowadays, Archimedean bodies are used to create non-standard objects. In the architecture of various cities such buildings become real tourist magnets. Moreover, each architectural style has its own bright features. And crystalline forms or polyhedra favorably emphasize them. Massive pyramids singled out the power of ancient Egypt. The shape of the prism that skyscrapers have is characteristic of modernism.

They embody the ideas of internationalism and functionality. Correct and semi-correct polyhedra in architecture are typical of postmodernism, as they oppose the everyday routine of urban buildings. Nonconvex shapes are used in deconstruction to create fractures and destructive shapes that bring dissonance into the everyday routine of rectangular buildings.

Architects and engineers put the usual upside down, changing styles. But our space still remains filled with geometrical bodies, be it pyramids or prisms. The urban landscape requires constant changes, so the use of crystalline forms in architecture has recently acquired a slightly different character: ordinary and ordinary buildings of a prismatic or cubic form are becoming less and less - unusual buildings often come in exactly the crystalline form, since it is this form of space organization gives a wide field for fantasies and opportunities for their realization in life in the most unusual way.

A striking example of the use of crystalline forms in architecture is the new construction of the French architect Christian de Portzamparc - the residential skyscraper Prism Tower in New York.

The 40-story tower is located on the corner of Park Avenue and 27 streets - in the very "heart" of high-rise America - Manhattan. The crystalline form of the building is divided into two parts - due to this, the maximum number of apartments receive solar lighting and views. The “split” shape of the skyscraper also made it possible to avoid an indent from the red line (the urban planning norm in New York, thanks to which high-rise buildings do not obscure the streets and neighboring houses).

The glass-clad tower seems to be floating - the architect brings the perfection to a popular solution for megalopolises. The complex construction of the building has also diversified the internal layout of 436 apartments: apartments, condominium, rentable living spaces. Thanks to the design, the layout of 436 dwellings is diverse. On the one hand there is an entrance for tenants of the lower 22 floors of the tower, and on the other hand there is access to the upper eighteen floors from Park Avenue.

On the lower tier of the tower there are traditionally located shops, a fitness center with a 20-meter pool, a cinema. In addition, the building has its own entrance to the subway.

The project of the skyscraper Prism was approved back in 2000, has been waiting for implementation for more than 13 years. The cost of the glass "giant" is estimated at 400 million dollars.

Another example of the use of crystalline forms in architecture is the reconstruction of the Royal Ontario Museum. Here, Libeskind used as a prototype one of the exhibits presented in one of the halls of the museum to create such an unusual and original form.

Also, with the help of original crystalline forms, an architect can often influence the subconscious phenomenal perception of a particular form by a person in order to create the right impression or association.

References

1. Crystallographic architecture of space / edited by Korotich A.V. Intech, 2012. 90-100 p.
2. Crystallography / edited by Boldyrev A. K. Intech, 1934. 70 p.

Belan V. R.

POROUS ASPHALT CONCRETE

Language Advisor – Cand. Ped. Sc., Asst. Prof. Gerasymchuk T. V.
Kharkiv National Automobile and Highway University

Porous asphalt concrete is recommended to be laid at an air temperature not lower than 10 ° C. Rollers use rollers weighing at least 10 tons with steel rollers without vibration in order to reduce the destruction of inert material.

The behavior of porous asphalt during operation largely depends on the quality of the binder, and the best solution is the use of bitumen modified with polymers or with the addition of cellulose fibers. Such bitumen has a greater stability under heating and better elasticity.

At the junction of porous asphalt concrete to dense cross seams are made of fine-grained mixture. At the junction to the shoulders, the longitudinal edge of asphalt concrete should have a vertical edge.

Winter content of porous asphalt requires increased attention. It cools faster than dense, ice forms faster on it, and therefore anti-icing agents should be evenly distributed on the surface before lowering the temperature. Since these reagents do not linger on the surface, but are collected at the bottom of the layer, they need to be applied more frequently with less chemical consumption. Liquid reagents are more effective, their uniform distribution over porous asphalt concrete is more important than dense, since they do not spread on porous asphalt concrete over the surface.

The cost of one ton of porous asphalt concrete is slightly higher than the dense one; however, a part of its cost is compensated by the fact that the porous asphalt concrete, having a smaller bulk density, with equal mass and equal layer thickness will cover a larger area.

The surface area of inert materials in porous asphalt usually makes up less than half of this indicator in dense asphalt concrete. This determines both the smaller total area of contact of the particles with each other and the large value of the contact stresses. Inert material should consist of strong solid particles of crushed stone, crushed gravel or metallurgical slag, clean from clay and other harmful impurities, reducing the possibility of polishing them with traffic and transport at the points of contact.

Compliance with the technology of joints in porous asphalt concrete is more important than in dense. For longitudinal seams, which should be located at a

distance of at least 30 cm from the seams in the underlying coating, hot seams are most desirable. They are formed when the handlers move with a ledge.

With a porosity of 17–22% and a layer thickness of 40–50 mm, porous asphalt concrete provides drainage of water during heavy rain and its movement inside the porous layer. The US Federal Highway Agency considers the lower limit of porosity to be 15%, an increase in porosity above 22% faces practical difficulties.

The cost of one ton of porous asphalt concrete is slightly higher than the dense one, however, part of its cost is compensated by the fact that porous asphalt concrete, having a smaller bulk density, with an equal mass and equal thickness of the layer will cover a larger area.

The use of viscous binders, obtained by the oxidized organic component of Kirov, in hot asphalt concrete on acid (composition I) and basic (composition 2) stone materials showed that this material meets the requirements of the P grade B asphalt concrete standard, which is recommended for the device of the top layers of coverings on roads of roads. In addition, the binder can be used for the preparation of porous asphalt concrete for the construction of lower layers of coatings and bases on the roads of all categories that significantly expands the area of reduction of the organic part of the scientific part in road construction.

In addition, the obtained viscous bitumen can be recommended for the preparation of porous asphalt concrete for the device of the lower layers and bases on the roads of all technical categories.

In porous friction layers (otherwise, porous-friction layers) the thickness and uniformity of the film binder on the particles of inert material are very important, influencing the prevention of premature aging of bitumen and the destruction of asphalt concrete. The film thickness should be sufficient to reduce the contact stresses between the particles of inert material and protect the porous asphalt concrete from the effects of the atmosphere. It is believed that good results give a film thickness of 0 02 - 0 04 mm.

Winter content of porous asphalt requires increased attention. It cools faster than dense, ice forms faster on it, and therefore anti-icing agents should be evenly distributed on the surface before lowering the temperature. Since these reagents do not linger on the surface, but are collected at the bottom of the layer, they need to be applied more frequently with less chemical consumption. Liquid reagents are more effective, their uniform distribution to porous asphalt concrete is more important than dense, since they do not spread on porous asphalt concrete on the surface.

References

1. ГОСТ 9128–2009. Смеси асфальтобетонные дорожные, аэродромные и асфальтобетон. (Технические условия.)

2. ГОСТ 12801–98. Материалы на основе органических вяжущих для дорожного и аэродромного строительства. (Методы испытаний.)

3. ГОСТ 16557–2005. Порошок минеральный для асфальтобетонных и органоминеральных смесей. (Технические условия.)
4. Гезенцвея Л. Б. Дорожный асфальтобетон. Москва: Транспорт, 1976.

Betin A. A.

MODERN BUILDING TECHNOLOGIES

Language Advisor – Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

Technology is touching our lives in every possible ways. Tech is changing the face of business too and how do they deliver solution. With the increased adaptation of technology in various industries, many construction professionals are acknowledging how technology is changing the industry. While facilities managers have fully embraced recent digital advances to operate their buildings more efficiently and effectively, the materials used in the construction of those buildings have remained pretty much the same for decades. But modern materials are being developed and will be used in construction in the future.

Below, we'll take a look at a few of the emerging high-tech building material and technologies

1. Transparent aluminum

Transparent aluminum is a bullet-proof new state of matter that is almost as strong as steel. Despite its herculean strength, it looks like glass which is four times weaker and shatters easily. Transparent aluminum is a new material and a see-through metal that is just breaking through the construction industry and adds a futuristic feel to buildings. This new material is such advanced construction technology that it is made out of aluminum oxy nitride (AION) and is created through the use of laser technology.

2. Aerogel insulation

Sometimes known as 'frozen smoke', aerogel is semi-transparent and is produced by removing the liquid from a gel, leaving behind the silica structure which is 90% air. Despite being almost weightless, aerogel holds its shape and can be used to create thin sheets of aerogel fabric. Aerogel fabric is beginning to be used within the construction industry, due to its incredible insulation properties. Aerogel insulation makes it extremely difficult for heat or cold to pass through and has up to four times the power of fiberglass or foam insulation.

3. Robotic swarm construction

Developed by researchers at Harvard, robotic swarm construction was designed based on how termites work. Termites work together like a 'swarm' and construction robotics are programmed to work together in this manner. Four wheeled robots are programmed in each instance to build a certain design and come with sensors to detect the presence of other robots, so that they can work together.

4. 3D printed houses

3D printed houses are a glimpse into the future of construction. 3D printing

homes will involve creating parts off-site and constructing the building on another occasion. It was pioneered by Apis Cor and based on San Francisco recently proved that they can 3D-print walls out of concrete in a relatively short space of time. The 'printer', which is similar in look to a small-scale crane, sets layers of concrete mixtures. 3D printed homes could be a great solution for quickly covering the housing needs of people who have been affected by physic al disasters such as tsunamis, hurricanes and earthquakes or for those in poverty.

5. Smart roads

Also known as smart highways, smart roads are the future of transport and involve using sensors and IT technology to make driving safer and greener. They give drivers real-time information regarding traffic information (congestion and parking availability for example) and weather conditions. This innovative technology can generate energy, charging electric vehicles on the move, as well as for street lights

6. Bamboo cities

Bamboo cities are cities made from innovative modular bamboo structures that interlock. It's a form of sustainable construction and a renewable resource that is stronger than steel and more resilient than concrete. The purpose is to hold a new community in the trees and as the number of inhabitants increases, the structure will extend to accommodate this. As the structure extends to accommodate the number of people, it grows in strength. Modular structures are incredibly scalable and can grow in any direction, making it perfect for a city in the trees. Another added bonus – they can resist earthquake tremors due to bamboo's high flexibility.

7. Vertical cities

Vertical cities may soon become reality as the world's population grows and land increasingly becomes scarce. They are tetris-like buildings of towers for thousands of people to inhabit. Supporting an blooming population, vertical cities are a space-saving solution to preserve land for food, nature and production.

8. Pollution fighting buildings

Also known as 'vertical forests', they are high-rise forest buildings designed to tackle air pollution. Pollution fighting buildings will be home to over 1,000 trees and 2,500 shrubs to absorb pollution in the air and to help filter it to make the air cleaner. Trees are highly productive in absorbing carbon dioxide, making this a cost-effective construction innovation.

References

1. http://www.ircgroup.com/en
2. http://buildingsciencepress.com
3. https://www.greenbuildingadvisor.com/blog/building-science
4. https://www.jrsengineering.com/services/

Bielykh E. M.

USE OF NEW TENT COATING IN THE ARCHITECTURE OF BUILDINGS AND CONSTRUCTIONS

Scientific Advisor – Senior Lecturer Bielykh I.M.
Language Advisor – Senior Lecturer Tkachenko S. V.
Kharkiv National University of Civil Engineering and Architecture

Introduction. Swift development of technologies in the field of building resulted in creation of new materials, on the physical properties and descriptions in several times excelling usual for us building materials. The methods of erection of building and ennoblement of territories took a step far forward - they differ in the using structures with a long service life and simple, quick installation. Taking into account that in the XXI century by virtue of a number of the reasons interest increases in planning and building of long-span building [2, 691-701], to the hanging constructions, including to the awning constructions, enhance able attention must be spared. Modern construction tasks have necessitated the creation of light and mobile structural systems that are characterized by extreme flexibility, mobility and short construction time. They are capable of organizing long-span spatial coatings of various curvilinear forms in which thin synthetic high-strength material serves as a barrier. Awning spatial structures that have new, including unique forms, the geometrical dimensions of which are practically unlimited, lightweight, transmitting daylight [3, 15].

Awning shelters conduct the history from ancient times. By the first in history example of brave decision of awning constructions, undoubtedly there is Coliseum. On his walls brackets, servings as supports for bars to that by means of ropes a giant silk awning-cover was fastened, were saved - "velarium" protecting an audience from the burning rays of a sun.

Nevertheless awning coverage's widely entered a professional culture and got confession as phenomenon of architecture only after victory on a grandiose competition La Grande Arche de la Défense (1983) of project Johan Otto von Spreckelsen, using an awning element as metaphor of the new understanding of space and time. If till now awning constructions in case of large building were used exceptionally for exhibition aims, and in solitary instances - for sport building, then now the spectrum of their application substantially broadened: shops, train station, airports, arenas of the different setting, coverage of archaeological sites, administrative, scientific building, objects of the industrial, agricultural setting, were added et al, requiring considerable spaces with long-span coverage's and different architectonically-structural decisions [1, 41-42].

Classification. 1) hanging awning coverings: - suspended structures, i.e., systems in which the cables perform the role of suspensions, reducing the span of the main structures and serving for them as original supports; - grids of cables: large-span coatings formed by a curvilinear contour, which differ in a variety of architectural forms, representing a system of sagging and tightening cables, when crossing they form almost orthogonal cells;

2) frame, which in turn are subdivided into: - rack-mount coatings: the awning directly rests on the rack, and along the perimeter of its edge is fixed to the supporting points - anchored to the ground or walls of buildings; - spatial structures: core and cell-like structures experiencing compressive or tensile forces; they can overlap almost any construction plan, allow free support of the supports, create cantilever canopies, arrange holes in the structure.

Examples of outstanding awning structures and cable coatings

The first major project implemented by Frei Otto was the grid tent pavilion of the Federal Republic of Germany at EXPO-67 in Montreal.

In 2000, the tent construction of the unprecedented size of the Hall of the Millennium (architect Richard Rogers) in London.

One of the symbols of the new Berlin was the Sony Center with a soaring dome. It was built by the architect Helmut Jahn and has seven floors with a total area of 26 thousand m^2.

One of the most exotic buildings of recent years has been the giant Khan Shatyr, which is the largest tent in the world. The height of the central pillar is 150 m, the total area is 127,000 m^2. This shopping and entertainment center can be considered a hanging cable construction, since its covering is formed by a network of steel cables suspended from the central pole. This second Norman Foster project in Astana, according to Forbes Style magazine, is among the ten best eco-ecological buildings in the world.

Findings. Compared with capital structures, awning structures have a number of significant advantages: - a short period (from 20 to 90 days) of the full implementation of the work from the project to the turnkey installation at the site of future operation; - building mobility, i.e. the possibility of its complete reshuffling in 2-3 years after the start of operation to another location; - modern design the possibility of manufacturing tent coatings of different colors with advertising on the surface of tent coatings by the method of silk-screen printing, full-color printing and application.

Based on the above, we can conclude that Ukraine has the potential of using tent structures - pre-fabricated, mobile, easily transformed in accordance with the change of function and having high aesthetic advantages. Awning architecture allows domestic designers to freely experiment with form and provides an opportunity to find their way into the global architectural process.

References

1. Мыскова О.В. Тентовые сооружения в современной архитектуре // Промышленное и гражданское строительство. 2003. №7. С. 41-42. - 0,4 п. л.

2. Bradshaw R., Campbell D., Gargari M., Mirmiran A., and Tripeny P. Special structures. Past, present, and fu-ture// Journal of Structural Engineering. June 2002. P. 691-701.

3. Riddle, Mason. “Living lightly on the Land: Fabric’s sustainable future may help lead design forward.” Fabric Architecture January/ February 2008. P. 15.

Blazhko Y. O.

DYNAMIC FASADES AS A NEW TREND OF ARCHITECTURE

Language Advisor – Asst. Prof. Tkachenko S. V.
Kharkiv National University of Civil Engineering and Architecture

Traditionally, the facades of buildings protected us from unwanted guests, noise, water, excessive heat or cold, and also pleased the passers-by, but now, with the development of modern technology, they can do much more!

A good example is kinetic architecture - one of the newest and most interesting areas of architecture. In short, this term can be explained as the movement of an object or a group of objects under the influence of natural forces.

Dynamic facades are a completely new trend in the world of architecture. A feature of such facades is the manufacturing technology - the main material is metal.

How such facades can be useful for us?

Perhaps the most popular and currently known dynamic facade is located on the Al-Bahar towers in Abu Dhabi. There, a design resembling flower petals opens when the sun is high and protects the interior of the towers from overheating.

Outside the buildings frame It is a way to reduce solar gain and glare. In the evening, all the screens will close. [1]

It is clear that in the United Arab Emirates, cooling by 50% is very important, not only in terms of well-being inside the room, but also in terms of savings on electricity for air conditioners (which are harmful to the environment). The dynamic system itself is powered not by the general house network, but by solar panels installed on the roof of the building.

Additional assistance in the fight against weather conditions, as it turned out, will not interfere not only in the sultry southern countries, but also Austria, with its temperate climate. The office building of the Kiefer Technic Showroom in the Austrian province of Stirmark is also equipped with a dynamic facade that visually resembles horizontally turned shutters. These multi-layered perforated aluminum panels are electronically controlled, which causes them to slide along the vertical guides. Thus, they can be closed and opened depending on the needs of people inside the respective premises, also creating a blackout.

Perhaps this solution may not seem the most convenient, due to the fact that the shutters are completely opaque. The fact is that this company specializes in the production of modern furniture fronts, and placing an analogue of its products on the facade is essentially an interesting advertising action.

German architects did not stay aside from the trend: on the Q1 building - the Thyssen Krupp headquarters in Essen - 3,150 kinetic “feathers” were installed, which, depending on the readings of sensors and commands entered manually, rotate around their axis, creating a different degree shading. Their rotation is calculated taking into account the achievement of normal visibility, as well as preventing the appearance of sun glare, complicating the work with a computer inside many offices located on the sunny side.

The success of this system proves that the building is ventilated naturally, that is, without the help of air conditioning.

Considering that not all air conditioners and ventilation systems are economical to maintain, dynamic facades used in projects, the system of which includes various sensors that measure air temperature, humidity and atmospheric pressure whitc help to save on costs. Thus, dynamic facades are savings for the customer and his running costs.

In the South Korean city of Yosu, architectural firm SOMA Architecture built the One Ocean exhibition pavilion, resembling a giant bio-design that repeats elements of the whale's respiratory system (and other marine life).

The kinetic facade of this building is one of the great complex of modern engineering structures. It is composed of 108 elastic gill plates made of reinforced plastic, which are opened and closed by elastic bending. The system is powered by 216 servos, which in strong winds, can bring most of the plates to the closed position.

The layout of the interior of the building is designed in such a way that the blowing winds can provide natural ventilation. The "gills" also help in the regulation of air flow, as well as the amount and direction of sunlight.

If all of the above technologies are in many ways similar, the dynamic facade of the BIQ House building by the architectural bureau Arup, built in Germany, in the Hamburg, definitely stands out from this range. Here, the facade is “engaged” in blackout of the premises exclusively on its own, because its panels are filled with living algae. These photo-bioreactors are made in the form of 129 flat glass panels measuring 2.5 by 0.7 meters and have a total area of 200 square meters. They are installed mainly on the western and southeastern walls of a four-story building, and when sunlight falls on them, the algae inside the panels begin to actively proliferate, making the transparent panels greenish. In addition to dynamic shading, the intensity of which varies with the amount of incident sunlight, they passively generate electricity and clean hot water, since automated systems collect and burn algae.

The problem of regulating the microclimate by the dynamic transformation, as well as reducing carbon dioxide emissions by up to 95%, is also solved by the dynamic façade of the Media-ICT building. ETFE thermoplastic “cushions” with gaseous nitrogen, stretched over the metal structure of the media center, not only prevent the penetration of aggressive temperature conditions, but also create the ability to control the transparency of facade elements.

According to one of the founders of this architecture, Christoph Bauder: “Kinetic architecture is the next step to create our environment. Architecture has always been known as static, solid and heavy. In the future, architecture will physically adapt to our needs and expectations, because change is an ongoing process of our time, our environment needs the ability to change. ”

The latest modern developments in the production of metals in combination with computer technologies provide a remarkable opportunity for architects to reach a new level of realization of the idea of kinetics and create an absolutely new

thinking about architecture: the appearance is no longer fixed, it becomes dynamic. All this gives a lot of opportunities for creativity to young designers and architects!

References

1. Al Bahar Towers Responsive Facade / Aedas/ https://www.archdaily.com/27059

Bondar O. G.

STEEL VS FIBERGLASS

Language Advisor –Senior Lecturer Galchenko V. M.
Kharkiv National University of Civil Engineering and Architecture

In the construction industry, new technologies and high-tech innovative materials are being used more and more often. The qualitative and operational parameters of those materials exceed the similar indicators of normal building materials by an order of magnitude. Today, manufacturers can offer not only steel, but also fiberglass reinforcement. Reinforcement is an important part of any reinforced concrete structure. It affects the strength characteristics.

The advantages of steel reinforcement

Metal products are used in reinforced concrete structures for more than a century. Steel reinforcement is used in prestressed reinforced concrete. This type of material is designed to overcome the effect of tensile stress. By production of similar reinforced concrete steel fittings they are used with a high indicator of tensile strength. First of all, steel rods are tensioned with a special device, and then a mixture of concrete is laid. As a result, of the release of wire or rods, the prestressing force is transmitted to the concrete and a certain compressive stress is created, which allows one to get rid of tensile stresses.

In addition to use in prestressed concrete, iron reinforcement has a greater modulus of elasticity and a coefficient of thermal conductivity. It has a wider range of diameters, in contrast to fiberglass reinforcement. You can buy products with a diameter of six to forty millimeters.

Fiberglass (FGR) rods have many advantages, but are not suitable for all types of concrete structures. They are best used for the reinforcement of brickwork, repair of buildings and structures for the foundation of low-rise buildings.

Glass fiber reinforcement has a number of obvious advantages:

1. Less specific weight;
2. Excellent resists corrosion, warping and rotting;
3. Material consumption is significantly lower;
4. Resistance to aggressive environments, sea water, etc.;
5. It is not necessary to use a welding machine for mounting the frame;
6. Installation without the use of construction equipment;
7. Resistance to breaks allows use in road constructions.

However, due to the low elastic modulus, FGR is not recommended for the construction of floor slabs. The rods of fiberglass at temperatures above 600 degrees Celsius can soften and lose their elasticity. To increase the fire resistance of the structure, it is worth using additional heat-insulating materials. The inability to weld rods of fiberglass leads to additional labor costs for connecting parts.

Comparison of technical parameters

From the table below, it can be seen that fiberglass rods are better resistant to stretching, but have a modulus of elasticity 4 times less than steel. SPA has a lower density and linear expansion coefficient. The inability to conduct current has a positive effect on the service life of the concrete structure.

Specifications	**Reinforcement**	
	Steel reinforcing rolling of the class A400 (A-III)	**Armature glass composite ASC "Rebar"**
Material	Steel	Epoxy based fiberglass
Standard tensile strength, MPa	390	1000
Modulus of elasticity, MPa	200 000	50 000
Heat conductivity coefficient, W / (m · ° C)	46	0,46
Coefficient of linear expansion, αx10-5/° C	13–15	9–12
Density, t/m^3	7,85	2,0
Corrosion resistance to aggressive media	Low	High
Electrical conductivity	Electrically conductive	Dielectric
Available diameters	6–10	4–20
Length	Rods up to 11.7 m long	In accordance with the buyer's application, up to 200 m
Durability	In accordance with building codes	Predicted durability of at least 80 years

Reinforcement of steel has a larger range of diameters than fiberglass, so it is advisable to use it on complex construction sites.

Cost Comparison

Above it was highlighted that the FGR has a smaller proportion and consumption. Due to lower flexural strength for the same concrete structure, a large diameter FGR is required. The cost of reinforcement from composite is several times less than the cost of steel reinforcement.

Conclusion

When erecting the foundation of a country house, a low-rise building of foam blocks and another type of cellular concrete, fiberglass reinforcement can be safely

used. For complex construction of large objects, it is still worth using time-tested steel reinforcement.

References

1. https://rmnt.mirtesen.ru/blog/43528794564/Sravnenie-stekloplastikovoy-kompozitnoy-armaturyi-i-stalnoy
2. https://rmnt.mirtesen.ru/blog/43528794564/Sravnenie-stekloplastikovoy-kompozitnoy-armaturyi-i-stalnoy

Butylina V. O.

BIONICS IN ARCITECTURE

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

Bionics is considered one of the more recent sciences, although it was established more than 500 years ago by Leonardo da Vinci. He was trying to build a flying machine by studying the bird's wing while flying. Bionics is the application of biological methods and systems found in nature. It turned to be very productive because evolution typically forces living organisms, including fauna and flora, to become highly optimized and efficient. For example, the world's leading helicopter manufacturer I. Sikorsky designed one of his helicopters by taking the dragonfly as a model. Today, Bionics is a popular direction in engineering, technology, medicine, architecture, design, and many other fields of human activity.

As to the bionic architecture, it is a movement for design and construction of expressive buildings whose layout and lines borrow from natural or biological forms. Bionic style in architecture and interior design began to mature in the early 21st century. It is one of the hottest trends these days as it has the power to create an aesthetically pleasing and ecofriendly environment. It combines organic forms and natural shapes with the latest technological achievements.

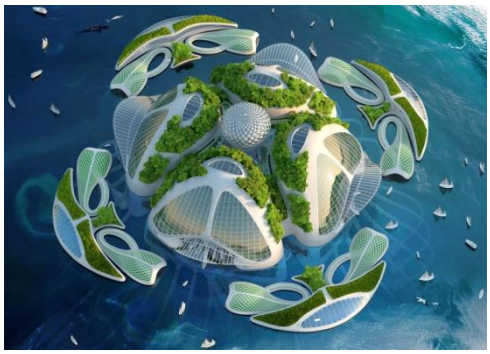
But everything new is well forgotten old. The adaptation of the forms and phenomena of nature is not a recent concept. It has been a primary source of innovation since prehistoric ages. Construction related Bionics thus appears in vernacular architecture. The most ancient architectural solutions can be still found in the architecture of aboriginals in Africa. For example, handmade adobe is a copy of a dove nest, or African minaret looks like a termite mound. Thatched roofs, once widely spread in Ukraine, resemble weaver bird nests.

Generally we can consider 3 biologic levels that modern technologies can be modeled based on them:

- Imitation from the natural producing methods
- Imitation from the mechanisms existed in nature
- Study of organized principles based on social behavior and organisms.

Antoni Gaudí's masterpieces are a real example of Structural Bionics, already appearing in the beginning of the 20th century. The Catalan architect realized that natural forms are able to provide more than decoration. Natural structures are not only aesthetically pleasing but in every way optimized functional units. His pillars refer to human bones or foliage, allowing to minimize the built-in material.

One of the most classic symbols of this science is the usage of impervious colors facing water which was achieved by observing the impervious surface of Lily flower. This effect is called "The Lily effect".



Belgian architect Vincent Callebaut has developed plans for a city of futuristic ocean buildings made from 3D-printed plastic waste which extend 1,000 metres below the water's surface. Described by Callebaut as "an oceanscraper printed in 3D from the seventh continent's garbage, "Aequorea" is a fictional water city off the coast of Rio de Janeiro. It draws its name from a type of bioluminescent jellyfish called aequorea victoria. The concept is intended to highlight the need to clean up the ocean from waste created by dumped plastic.

Santiago Calatrava brought a unique, radically innovative shaping in his structures inspired by natural forms. His architectural forms use human or animal skeleton analogies, demonstrating the aesthetic appeals of construction- and structural bionics. The architects' first skyscraper named the "Turning Torso" was inspired by a twisting human body.

Within the human analogs there is **Calatrava's Planetarium** in Spain. Its design resembles an eyelid that opens to access the surrounding water pool. The bottom of the pool is glass, creating the illusion of the eye as a whole. This planetarium is a half-sphere composed of concrete 110 meters long and 55.5 meters wide. The shutter is built of elongated aluminum awnings that fold upward collectively to form a roof that opens along the curved axis of the eye.

British architectural firm **Foster + Partners** have submitted a plan for a 1,000 foot tall skyscraper named **"The Tulip"** because of its floral structure. The key features of "The Tulip" will be a pocket park, a rooftop garden, an educational center, a sky bar, restaurants, and a viewing gallery with sky bridges, internal glass slides, and gondola pod rides. It will also be eco-friendly. The Tulip's soft bud-like form and minimal building footprint reflects its reduced resource use, with high performance glass and optimized building systems reducing its energy consumption. Heating and cooling is provided by zero combustion technology while integrated photovoltaic cells generate energy on site.

References

1. https://www.degruyter.com/downloadpdf/j/jbe.2017.5.issue-1/jbe-2017-0003/jbe-2017-0003.pdf
2. https://naked-science.ru/article/concept/aequorea-gorod-v-okeane-napech
3. https://www.telegraph.co.uk/property/commercial/may-become-city-londons-newest-tallest-skyscraper-tulip/

Demydenko M. O.

INCREASING THE SHEAR STABILITY OF ASPHALT CONCRETE

Language Advisor – Cand. Ped. Sc., Asst. Prof. Gerasymchuk T. V.
Kharkiv National Automobile and Highway University

During the operation of the highway on its road clothing is influenced by a number of factors that affect the general condition of the road, and in particular the state of coverage.

The main task in the road sector is to maintain and maintain the existing network of highway with minimal cost. Therefore, two tasks arise before road science:

- improving the efficiency of repair and maintenance of the existing network of highways in the required state at lower costs, using economical means;
- ensuring the increase in the durability of newly built roads in order to save money on their maintenance and further redirecting these funds to new construction.

In this regard, first of all, the issue of increasing durability of road clothing in general and coverage in particular. Solving this problem a big place is the issue of increasing the shear stability of asphalt concrete coatings.

Resiliency is the property of asphalt concrete to resist the formation of plastic deformations under the influence of transport in the warm period of the year, which is indirectly estimated by the margin of strength of standard asphalt concrete

samples under conditions of a volumetric stress-strain state at a temperature of fifty degrees Celsius.

Abrasion resistance of asphalt concrete is one of the most important indicators of the quality of asphalt concrete coating. High shear stability of asphalt concrete prevents the formation of road pavement plastic deformations in the form of waves, tracks, inflows and thus ensures the equality of road surface. In countries of Western and Central Europe, the prevention of plastic deformation of asphalt concrete coatings is considered as important task, under its solving of scientists and manufacturers are constantly working. In Ukraine, plastic deformations are a common type of destruction of asphalt concrete pavements.

The reasons for the accumulation of plastic deformations in asphalt concrete at high temperatures are the increasing intensity of road transport and significant loads on the car axle. The regulatory load on the axle in EU countries is 13.5 tons, against 11.5 tons in Ukraine. The beginning of large-scale construction in Ukraine of highways intended to increase the speed of transportation and transportation of heavy goods, leads the problem of maintaining equality of coverage in the category of the most relevant.

Bituminous concrete is the most common material for road pavement, but it has thermoplastic properties and can accumulate irreversible displacement deformations under the influence of transport loads. In order to keep the asphalt concrete covered with its equality for a given service life, in the road structure there should be no residual deformation of the inadmissible values from repeated use of transport loads

The increase of displacement of road asphalt concrete coatings was achieved by the use of medium- and multi-bitumen asphalt concrete (granulometric types, respectively, B and A). The effect of increasing the displacement resistance of asphalt concrete, provided by the mineral skeleton, was not sufficient to solve the problem under consideration. This led to the need to find ways to increase the shear stability of asphalt concrete due to bituminous binder. The use of traditional bitumen for this purpose is limited, as it does not allow achieving a significant increase in the strength of asphalt concrete without degradation of its low-temperature cracking strength.

In these conditions it is better to use bitumen with additives of polymers.

Changing the amount of large filler or the type and amount of additives can achieve maximum shear stability with optimal content of crushed stone or modified additive. Bitumen, modified by polymers (BMP), differs in their reduced penetration, elevated temperature of softening and reduced or, at least, the same as in the initial bitumen, the temperature of fragility. This allows high shear stability of asphalt concrete.

Referenses

1. Золотарев В.А., Чугуенко С.А., Галкин А.В. О взаимосвязи свойств битумополимерных вяжущих и сдвигоустойчивости асфальтобетона. *Автошляховик України.* №3. 2004. С.25-30.

Dmytriyeva I. O.

USE OF PHYTO AND FLORA-COMPOSITIONS. PHYTODESIGN AND PHYTOERGONOMICS

Scientific Advisor – Associate Professor Rodik Ya.S.
Language Advisor – Asst. Prof. Nikiforova S.M.
Kharkiv National University of Civil Engineering and Architecture

Human life is inextricably linked with nature, and consequently, with plant life. The custom of decorating a home with plants appeared, apparently, in countries with a pronounced change in the time of year as an attempt to detain elements of nature for the whole year. The use of plants in the formation of interiors of various locations is currently due to the natural human need to be closer to nature due to the widespread urbanization of cities.

With the constant growth of cities and industrial centers, when a person is surrounded by glass, reinforced concrete and synthetic materials for many hours, the role of living plants in the interior is especially important. Plants create the illusion of contact with nature, beauty of forms, pleasant smell and calm green color, have a beneficial effect on the central nervous system, helping to cope with a bad mood or a stressful state. But the sanitary and hygienic functions of plants are most important. It is proved that plants absorb dust, purify the air of carbon dioxide from the atmosphere, where it is almost 20 times more than in the open air, they contribute to the moistening and ionization of air, reducing its temperature, but what is especially valuable - they suppress and destroy many harmful microorganisms.

Flora and phytodesign represent a new direction in the formation of the architectural environment with the use of plants through their organic association with the objective world. In the formation of the phytomedium of the interiors, both artificial and natural plants are used. Especially effective is the use of natural plants. It is known that plants emit volatile substances – phytoncides – possessing great biological activity, contributing to the stimulation of human life processes, improving metabolism in the body, the process of respiration. A new field of activity, phytoergonomics, has emerged (from Greek “fiton” – plant, “ergon” – work, “shshos” – law). Phytoergonomics is a promising direction of modern science and practice. Termin was introduced in 1984 in connection with the selection of a special object of study in the "man – machine – environment" system.

Phytoergonomics originated at the crossroads of several sciences: biology, medicine, ergonomics, psychology, design, landscape design. Synthesizing the achievements of these sciences, phytoergonomics solves practical problems of optimizing a person's work activity taking into account a whole complex of

influencing factors (anthropological, psychophysiological, ecological, aesthetic, etc.). Particular attention is paid to achieving comfortable conditions in the labor process, reducing fatigue.

Phytocompositions are created only from natural plants that have a sanitizing effect on the environment and certain decorative effect. Flora composites can be created from both natural plants (these can be dried flowers) and artificial ones. They have only an emotional impact on a person.

The peculiarities of the formation of the phytomedia of various rooms consist in the sequential design with the use of natural means of landscape design.

Initially, environmental and ergonomic parameters of the environment in which phytocompositions are placed (temperature, humidity, light, gas pollution, etc.) are analyzed. Determines the degree of contamination of the environment by the sources of exposure of the hazards of the macro level and micro level. The nature of the labor process, its intensity, the degree and specificity of fatigue are revealed. The range of phytocompositions is selected taking into account the characteristics of the microclimate, the nature of the production process, and also takes into account the biological properties of plants (their required phytoactivity, the creation of normal conditions for plant growth and development, illumination, temperature, etc.). Then, issues of a functional pattern are solved, the spatial-organizing properties of phytocompositions are taken into account: the creation of compositions for partitioning spaces or their isolation, fencing and protection from noise, dust, gas, etc. The placement of phytocompositions in the interior space is finally determined and their ca destructive effect.

The effectiveness of phytocompositions on a human being is achieved by imitating a natural landscape with a color tone (warm and cold tones, nuanced and contrasting compositions), revealing the nature of the composition (static, dynamic) and the properties of its elementary forms (size, texture, structure, etc.), as well as taking into account additional influencing factors (lighting, music, flavoring environment)

The final formation of the phytomedium of the premises is carried out in accordance with the selected range of plants.

The following plants are used for landscaping both production, residential and public interiors:

– decorative leafy;
– ampelous and curly;
– decorative flowering;
– decoratively fruit.

Of the four groups of plants listed above, the most diverse compositions are: point and linear, group volume and flat-ornamental, vertical, and landscape fragments.

Microlandscape fragments are particularly prevalent in interior landscaping. The most appropriate is their creation in the atria. Atriums are currently, as a rule, the spatial core of a large multifunctional complex. The view that opens into the atrium from the surrounding premises should be perceived from all points.

Microlandscape fragments created in atriums can be formed from both natural and artificial plants, their composition can include the most diverse water devices – streams, springs, waterfalls, cascades, etc. Both natural and artificial lighting can be used. By the nature of a constructive solution, capacities for placing plants can be mobile and stationary.

The formation of phytomedia in interiors depends on the general architectural and artistic design and the functional purpose of a particular space and is carried out, as stated above, in a certain sequence.

Placement of plants in the interiors as elements of a common artistic composition should be subordinate to its main condition – scale. According to their location and emotional impact, growth groups can be sudden and increasing, uniform and impulsive. In addition, flora and phytocomposition can be the main emphasis in the interior with its compositional solution as a whole or as a visual background for a decorative structure, small architectural forms, or an organic addition to an architectural and spatial interior solution, etc.).

A variety of interior floradesign is ikebana, bonsai, collages. Western art picked up the Japanese tradition. Now, various arrangements made from plant materials, made by artists-florists, are widely used in interior design abroad and are becoming popular in our country.

One of the most interesting works of floristics is a collage – pictures from flat and volumetric dried plants, grains or seeds. Bonded with a matte varnish, they retain their colors and shape for many years, they are characterized by special expressiveness. Collages are the perfect decoration for any interior, especially in recreational areas.

References

1. Светлана Хрусталева. Фитодизайн, 2005. – 224с.
2. Гарнизоненко Т. С. Справочник современного ландшафтного дизайнера. Ростов-на-Дону: Феникс, 2005. – 313 с. – (Строительство и дизайн).
3. Доронина Н. Ландшафтный дизайн. – Фитон+, 2006. – 144 с.
4. Ильясова Н. И., Довлетярова Э. А. Современный ландшафтный дизайн. Учебное пособие. – М., 2008.

Doroshenko P. N.

ZAHA HADID: MAKER OF THE 21ST CENTURY

Scientific Advisor: Kushchenko Zh.L.
Kharkiv National University of Civil Engineering and Architecture

The flamboyant British designer—born on October 31, 1950 in Iraq, educated in Beirut, and known as the “Queen of the Curve” for her swooping, elegantly complex designs—was a Zaha Hadid.

Most of all, she transformed architecture with a vision all her own—despite the industry's biases, according to Phil Bernstein, Associate Dean and Senior Lecturer at the Yale School of Architecture, where Hadid was on faculty as the Norman R. Foster Visiting Professor of Architectural Design. "It used to annoy her, I think, to no end," Bernstein says, "that people would somehow correlate her exceptionalism as an architect with the fact that she was a woman."

Hadid's designs include the London Aquatics Centre for the 2012 Olympic Games, the Galaxy Soho in Beijing, the Heydar Aliyev Center in Azerbaijan, and the Rosenthal Center for Contemporary Art in Cincinnati. "Her formal interests in form and particularly parametric form generation were completely unique," Bernstein says. Sinuous, destabilized, and at times seemingly erupting from the landscape itself, the works defy easy definition, influenced by her preoccupation with Russian Constructivists, her study of mathematics at the American University of Beirut, and her early sketches and paintings.

"She started out making these incredible paintings of building forms that nobody thought would be taken seriously, and then she got a commission," Bernstein continues. "She won a competition to do a club in Hong Kong, and her career really took off from there."

Ho's relationship with Hadid stretches back more than 30 years, first as her student at the Architectural Association (AA) School of Architecture in London, then as an architect at ZHA, where he was on the design team for Hadid's first completed project, the Vitra Fire Station in Weil am Rhein, Germany.

Commissioned by the chairman of Vitra, Rolf Fehlbaum, after a lightning fire burned down nearly half of the furniture company's factory, the arresting structure comprised an angular mass of reinforced concrete walls and a pointed roof. Without Hadid's persistence and the confidence she inspired among the architects on her design team, Ho says, it would not have achieved its scale and symbolic power.

"A lot of people just see the work," he explains. "But the work was always very personal and never separated from the person. She was constantly pushing us to experiment with models and drawings; constantly pushing the limits of a project. I think, looking back, the greatest thing about Zaha was she was a teacher, through and through."

From its earliest days, he says, ZHA's office was set up as an atelier. Leading the practice with longtime partner Patrik Schumacher, who has become the sole principal, Hadid entrusted young architects with important roles on major commissions. Designs evolved through tireless iterations—isometric projections, distortions, cutouts, and worms-eye views—which, Ho says, often led to unexpected discoveries and fortuitous mistakes.

"It's quite interesting, the idea of the mistake, the palimpsest," Ho says. "If it didn't go right, a mistake would reveal another layer, another suggestion, another proposal, and illustrate how we would have to refine the thought process."

Later, according to Bernstein, software tools such as Autodesk Maya

Robert Stern, founding partner of the New York–based architecture firm Robert A.M. Stern Architects, shares the optimism of this belief. Stern met Hadid as a "brilliant, subdued" student at an AA dinner; in 2002, much later after her teaching at Columbia, he appointed her visiting professor of design at Yale School of Architecture, where he was Dean at the time.

Stern acknowledges the wild divergence of their architectural philosophies: His approach is rooted in responsiveness to context, her fascination was the design of spectacular objects that made their own context. "She was left of left, and I was right of right, but that's okay," he says. "As I often say, 'the house of architecture has many rooms.'"

Hadid and Stern often met at the Midpoint Istanbul Fine Dining restaurant in New Haven, where Hadid cut a figure in lavish dresses by Issey Miyake and charmed students and faculty with her wit and sensibilities. "She was a diva, and we referred to her as a diva," Stern says. "Very few architects are actually fascinating. I am. Philip Johnson was. Frank Gehry is, in a quiet, aw-shucks kind of way. A lot of architects are rather boring."

Hadid was far from boring. The arc of her career, Stern says, led to incredible projects in cities like New York, including a curving glass and metal residential tower at 520 West 28th Street overlooking the High Line. From skyscrapers to concert halls, her daring, tectonic structures expanded the possibilities of what could be realized.

"She just played the game the way the star men designers played the game," Bernstein says. "She had incredibly strong views of what she thought was right and wrong. She got her stuff built. She built an incredibly powerful practice to back up what her formal interests were. She did buildings and products. She wrote a lot. She taught a lot. She lectured a lot. She practiced architecture as well, if not better, than anybody else."

Zadja Hadid's creativity had a great influence on the architecture and worldview of people.

References

1. https://www.archdaily.com/907124/zaha-hadid-maker-of-the-21st-century
2. "Zaha Hadid. Complete Works of 1979-2009. Art Edition. (Zaha Hadid. Complete Works of 1979–2009. Art Edition). - Taschen Publisher
3. "Zaha Hadid. The complete works of 1979- to today" (Hadid. Complete Works 1979-today. - Taschen Publisher

Gerasimenko L. V.

GOTHIC ARCHITECTURE. COLOGNE CATHEDRAL

Language Advisor – Kushchenko Zh.L.
Kharkiv National University of Civil Engineering and Architecture

Gothic style, artistic style, which was the final stage in the development of medieval art in Western, Central and partly Eastern Europe (between the mid-12th and 15th to 16th centuries). The term "Gothic" was introduced in the Renaissance as a pejorative designation of all medieval art, considered "barbaric". From the beginning of the 19th century, when for the art of the 10th — 12th centuries.

The Gothic style originated in the Ile-de-France region of northern France in the first half of the 12th century. A new dynasty of French Kings, the Capetians, had subdued the feudal lords, and had become the most powerful rulers in France, with their capital in Paris. They allied themselves with the bishops of the major cities of northern France, and reduced the power of the feudal abbots and monasteries. Their rise coincided with an enormous growth of the population and prosperity of the cities of northern France. The Capetian Kings and their bishops wished to build new cathedrals as monuments of their power, wealth, and religious faith. The term Romanesque was adopted, the chronological framework of Gothic was limited, in it early, mature (high) and late phases were distinguished. Gothic style developed in countries where the Catholic Church dominated, and under its aegis feudal-church foundations were preserved in the ideology and culture of the Gothic era. Gothic art remained predominantly religious in purpose and religious in subject matter: it was correlated with eternity, with "higher" irrational forces.

For Gothic, the symbolic-allegorical type of thinking and the conventionality of the artistic language are characteristic. From the Romanesque style, Gothic inherited the primacy of architecture in the arts and traditional types of buildings. A special place in the art of Gothic architecture was occupied by the cathedral — the highest example of the synthesis of architecture, sculpture and painting (mainly stained-glass windows). [1,1]

Its most prominent features included the use of the rib vault and the flying buttress, which allowed the weight of the roof to be counter balanced by buttresses outside the building, giving greater height and more space for windows. Another important feature was the extensive use of stained glass, and the rose window, to bring light and color to the interior. Another feature was the use of realistic statuary on the exterior, particularly over the portals, to illustrate biblical stories for the largely illiterate parishioners. These technologies had all existed in Romanesque architecture, but they were used in more innovative ways and more extensively in Gothic architecture to make buildings taller, lighter and stronger. [1,2]

Cologne Cathedral

The Gothic cathedral dominates the skyline of Cologne and is one of Germany’s most famous landmarks. It is also one of the most beautiful examples of Gothic and Neo-Gothic architecture in the world. [2,2]

The plan of the cathedral is in the shape of a Latin Cross, and has two aisles on either side (a feature taken from Paris or Bourges), which support one of the highest Gothic vaults ever built, being almost as tall as that of Beauvais Cathedral, which collapsed in 1284. The general design of the building repeats that of the cathedral of Amiens, but not without variations.

The presence of a deep westwork, which shortens the nave and creates a feeling of centrality, is perhaps a holdover of local traditions. The medieval choir has a very tall arcade, a narrow triforium gallery (with detailed tracery) lit by windows, while the clerestory windows are tall with some of the original stained glass in the lower sections. The vault is composed of a plain quadripartite arrangement. The 'modern' aspects of Cologne are its abandonment of the engaged column derived from Chartres to adopt instead a clustered arcade pier, a group of shafts that rise straight up without interruption to the springers of the vaults, and its luminous glazed triforium, similar to an elegant work of filigree thanks to the elimination of the small arches from the pendentives.

Externally the outward and downward thrust of the vault is absorbed and channelled by flying buttresses in the French manner. Indeed its exterior is famous for its extravagant use of tracery, flying buttresses, stone sculpture, pinnacles and lofty porticos. [3, 1-2]

Building of the Cologne Cathedral was commenced in 1248, it took over 600 years to complete but the cathedral still dominates the skyline of the city.

In 1996, the cathedral was added to the UNESCO World Heritage List. In 2004, it was the only Western site to be placed on the ‘World Heritage in Danger’ list, as plans were made to construct a high-rise building which would have had a negative visual impact on the cathedral. The authorities decided in 2006 to enforce height restrictions on nearby buildings, allowing the cathedral to be removed from the list.

Today, the cathedral is a major tourist attraction, with visitors climbing the 533 stone steps of the spiral staircase to a platform which offers a view over the Rhine.

References

1. http://tooday.ru/?l=eng&r=16&t=architecture-arhitektura-63 [1,1]
2. http://www.colognecathedral.net/ [2,1]
3. http://www.visual-arts-cork.com/architecture/cologne-cathedral.htm

Haiduk O.

UNFORGOTTABLE WOMEN-ARCHITECTS

Language Advisor – Senior Lecturer Ignatyeva N.V.
Kharkiv National University of Civil Engineering and Architecture

History is not a simple meritocracy: it is a narrative of the past written and revised - or not written at all - by people with agendas. The reasons we forget women-architects are varied and complex. Until recently, historians assumed that there were no female practitioners before the mid-20th century and so they did not bother to look. Nor was it likely that they would stumble upon these designers by chance, given that traditional research methods focus on archives and libraries,

institutions that have been slow to collect women's work. The International Archive of Women in Architecture, housed at Virginia Tech in Blacksburg, was created in 1985 by Bulgarian architect Milka Bliznakov out of frustration at the enormous loss of material from the first generations of women architects. Few archives wanted their papers, and as these women passed away, decades of drawings, plans and records ended up in the trash. As a result, anyone seeking to learn about their lives and careers has had to be inventive and eclectic in their use of sources in order to supplement the archival documentation conventionally understood as the historian's primary materials.

Prominent architects seeking to consolidate their position in history's pantheon often write or commission their own monographs, projects that are rarely self-critical. The monograph's insistence on heroic individualism has also discouraged histories about collaborations, as if acknowledging the work of a team would diminish the pot of glory. This has contributed significantly to the forgetting of women architects because it is common for them to work in partnership (for professional and personal reasons), usually with a male who is often also a spouse. Even when she has been a full and equal partner, a woman's contribution is rarely recognized as such. The painful cancellation of Denise Scott Brown in the 1991 awarding of the Pritzker Prize solely to her husband and collaborator, Robert Venturi - which has prompted a global petition demanding that the Hyatt Foundation, 22 years later, set the record straight - is an important, but by no means exceptional, example of how female partners are written out of history by a profession suffering from Star Architect Disorder (SAD).

Scott Brown's case is notable, however, not only because of the controversy it has generated, but also because she has been an outspoken critic of her own erasure, bringing attention to the sexism of architecture's star system long before the Pritzker Prize jury all but sealed her argument with their verdict. But even when women-architects have stood up for their own contributions, most historians and prize juries - following the cultural practice of glorifying individual heroes - have usually ignored them, no matter how compelling the evidence.

Admittedly, women have sometimes contributed to their own disappearance. Male architects do not hesitate to take an active role in preserving their legacies by writing memoirs and ensuring the safe-keeping of their models, drawings and correspondence. Women - taught that self-promotion is an unattractive female trait - have made less effort to tell their stories. Among older generations, some women in partnerships have chosen to stand in the shadows in order to shine the spotlight on their husbands.

But while histories of women are now increasingly available, they have yet to become readily visible. They rarely appear in course syllabi; indeed, it is still common in architecture schools for students to complete an entire degree without ever having heard the names of women who practiced before 1970. You can't walk into a large commercial bookstore, where the design shelves are filled with glossy monographs on international stars, and expect to walk out with a book on a woman architect. Their work is rarely exhibited in major museums: the National Building

Museum in Washington, D.C., has never devoted a show to a woman architect. In other words, there is a disconnect between the production of histories and their broader dissemination. The books and articles alone have not been enough to build a collective memory that recognizes women architects.

But there is something that we can all do to turn written words into public awareness. Namely, we can intervene to ensure the presence of women architects in online histories - which is increasingly important to do as the web becomes a primary site for making and preserving the cultural record. Their current scarcity in the virtual sphere threatens to reinforce the assumption among younger generations that women have not contributed significantly to the profession until very recently. The dearth of entries in the collectively produced, free online encyclopedia Wikipedia, one of the most visited websites in the world, is particularly worrisome. But it's not just women architects who are missing. While women comprise half of

Wikipedia's readers, they are dramatically underrepresented among the ranks of the site's editors: only 9% in 2012, down from 13% in 2010. Not surprisingly, the gender gap among editors is reflected in a gender gap in content; male editors write about subjects with which they are familiar and which interest them. Sue Gardner, executive director of the Wikimedia Foundation, has said that she wants to raise the number of women editors to 25% by 2015, but admits that the website's culture resists female participation. Women editors who submit new entries on women's history routinely find that male editors question their sources and the significance of the topic and are quick to nominate such entries for deletion. In March 2012 edit-a-thon, "She Blinded Me with Science," held at the Smithsonian to add notable female scientists, entries were nominated for deletion almost as soon as they were posted.

Contributing to Wikipedia and other online databases represents a real opportunity to provide students and younger readers, and the larger public, with a more accurate perception of women's participation in architecture. There is also something very satisfying about writing a forgotten figure - a professional ancestor, maybe even a pioneer - into history. And as the long and rich history of women in architecture becomes more broadly known, it will become that much harder to ignore them, whether in the classroom, the museum, or on prize juries. As Sue Gardner of Wikimedia put it, "Wikipedia will only contain 'the sum of all human knowledge' if its editors are as diverse as the population itself: you can help make that happen. And I can't think of anything more important to do, than that."

Even if you introduce women architects in Google, you will be surprised that you know little about architecture, how many of these lovely ladies you will find. About which they have never even heard how sad it is that the world gives us so little information, hiding and belittling all gender inequality. Only 52 of the most famous Google counts, and how many more.

All these beautiful women have made such a huge number of famous projects that we don't even know about and think that the author of these buildings will be a man.

As long as there have been cities, women have built them: shaping structures, influencing architecture, and designing the neighborhoods we live in. But today, in the world-leading firms imagining the cities of the future, equality remains a long way off.

Even as the gender gap closes in architecture school - with nearly as many women graduating in architecture as men - research shows that across the world women are hired less, paid less and blocked from key creative positions at the top of firms.

In survey of the world's 100 biggest architecture practices, only three were headed by women, and just two had as many female managers as male, according to magazine Dezeen in November.

But, at the same time gender equality comes under the spotlight across the creative industries - from the Hollywood to high art - a transformation is happening in architecture. There is now a "crescendo" in female designers' creativity, said Denise Scott Brown, the pioneering post-modernist designer who has blazed a trail through the industry's male-dominated world for five decades.

"The efforts of women are making architecture a better atmosphere for women as they are in politics, art, and beyond," said Scott Brown, the principal of the firm Venturi, Scott Brown and Associates, and co-author of the classic "Learning from Las Vegas."

"We need to be brave and encourage our children to be brave."

In wake of movements such as #MeToo and the international efforts to force industries to publish their gender pay gaps, the architectural world is opening up to change and the realization that, by embracing women, we can create better cities, according to top designers.

For International Women's Day 2018, we asked five of the world's leading architects what it will take to break down barriers - from the classroom to the boardroom - for women in architecture, and offer words of advice for the next generation of female creative's.

As a result I want to say that women architects and planners are increasingly engaged in designing our cities. But these achievements by women architects and planners are still the exception and not the norm. While I am optimistic, we are likely several generations away from women making an equal contribution to designing our cities.

References

1.https://placesjournal.org/article/unforgetting-women-architects-from-the-pritzker-to-wikipedia/

2.https://archinect.com/news/article/74514211/unforgetting-women-architects

3.https://www.nytimes.com/2018/12/15/opinion/sunday/women-architects.html

4. Allaback, Sarah. The First American Women Architects. Champaign: University of Illinois Press, 2008.

5. MoMoWo European Women in Architecture and Design . 1918-2018 Agit Mariogros, Beinasco (TO).

Harbiak A. I.

LIGHT AND SHADOWS IN ARCHITECTURE

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

The allure of a shadow is found all around us. It is contained in the shadow that a small flower casts onto the grass, or in the skyscrapers and buildings that take over our landscapes. In the design world, architects have always built with light in mind, but consider shadows just as often. Architects use shadows as part of their buildings, not just a projection of them. Shadows succeed at making patterns, providing shade, and adding a different dimension to the spaces around us.

As identified by Leonardo da Vinci, we often encounter three types of shadows: attached shadow, shading and the cast shadow. The attached shadow falls on the body itself – like a cantilever roof causing a shadow on the façade. The second type belongs to bright and dark contrasts, which are inherent to the form and depend only on the source of light, e.g. a ball shaped pavilion, which even under a cast sky shows a darker zone in the lower part. The third, cast shadow could be the result of a high house generating shadow on the street due to the projection of the building.

The idea of building with shadows is not a new one. One architect who knew the power of the shadow is Louis Kahn, known as the master of light. He believed that light's purpose is to cast shadows, and these shadows are present to evoke a certain mood. The darkness of a shadow is linked to the mystery and uncertainty of a space. Shadows are there to protect from the sun on a hot day, to create a new design and pattern, and to define the auras around us.

Louis Kahn's archetypical forms relate back to Greek architecture, which he studied in the 1950s. He said: "Greek architecture taught me that the column is where the light is not, and the space between is where the light is. It is a matter of no-light, light, no-light, light. A column and a column bring light between them. To make a column which grows out of the wall and which makes its own rhythm of no-light, light, no-light, light: that is the marvel of the artist."

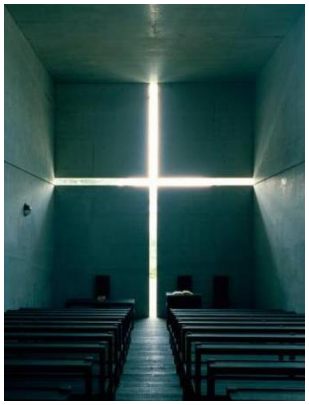
However, light was also a very important central element in Louis Kahn´s philosophy because he regarded it as a "giver of all presences": "All material in nature, the mountains and the streams and the air and we, are made of Light which has been spent, and this crumpled mass called material casts a shadow, and the shadow belongs to Light." For Kahn, light is the maker of material, and material's purpose is to cast a shadow.

Kahn never attempted a completely pure dark space for a formal effect. For Kahn, a glimpse of light elucidated the level of darkness: “A plan of a building should be read like a harmony of spaces in light. Even a space intended to be dark should have just enough light from some mysterious opening to tell us how dark it really is. Each space must be defined by its structure and the character of its natural light.” As a result, the light as a source is often hidden well behind louvres or secondary walls, thus concentrating all attention on the effect of the light and not simply on its origin.

“The “mysteriousness” of shadow was also closely linked to evoking silence and awe. For Kahn, while darkness evokes the uncertainty of not being able to see, of potential dangers, it also inspires deep mystery. It is in the hands of the architect to evoke silence, secret or drama with light and shadow – to create a “treasury of shadows”.

Therefore, walking through the sequence of openings at the portico of the Salk Institute brings to mind the dark silence of a cloister. Dark shadow lines and holes, from the precisely defined moulds, offer a fine texture on the large wall surfaces. The white stone and the grey concrete walls present a monotone three-dimensional canvas for the play of shadows. Shade turns into an essential element to reveal the arrangement and the form of Kahn’s monolithic volumes.

Louis Kahn did not design his buildings just to protect users from the sun, but rather to protect the sanctity of the shadow. He did not believe in artificial shade. Instead he used windows and doors in his double walls to direct and manipulate the light into the interior. Kahn describes the large open windows and doors of the Indian Institute of Management: “The outside belongs to the sun and on the inside people live and work. In order to avoid protection from the sun I invented the idea of a deep intrados that protects the cool shadow.”



Louis Kahn’s path of designing with shadow attracted and influenced numerous followers, like Tadao Ando with his Church of Light, Peter Zumthor and his Therme Vals or Axel Schultes with his Crematorium. All of these buildings include shadow as a form giver for silent spaces. This perspective presents a pleasant counterpoint in the modern architecture that strives for dynamic and bright icons.

As architects continue to create with more than simple materials in mind, the solid buildings around us will start to feel more alive. This is especially true in crowded cities, where giant skyscrapers cast many overlapping shadows. In order to capture the beauty of the shadow, our modern designers need to be more conscious of the

effect that building upward has. So, even though Peter Pan was able to run away from his shadow, our world will not be able to. We must use the materials around us to design beautiful structures while simultaneously creating appealing shadows.

References

1. https://www.archdaily.com/tag/louis-kahn
2. https://study.com/academy/lesson/louis-kahn-style-drawings.html
3. https://www.brainyquote.com/authors/louis_kahn
4. https://armour.wustl.edu/shadows-in-architecture/

Ignatenko P. V.

SUSPENSION BRIDGES: ADVANTAGES AND DISADVANTAGES. THE MOST FAMOUS PROJECTS

Language Advisor – Muzalevska Y.A.
Kharkiv National University of Civil Engineering and Architecture

A suspension bridge is a type of bridge in which the deck (the load-bearing portion) is hung below suspension cables on vertical suspenders. The first modern examples of this type of bridge were built in the early 1800s. Simple suspension bridges, which lack vertical suspenders, have a long history in many mountainous parts of the world.

Suspension bridges find the most successful application in the case of a long bridge, the impossibility or danger of installing intermediate supports (for example, in shipping places).

The main carrier cables (or chains) are suspended between pylons installed along the banks. Vertical cables or beams are attached to these cables, on which the roadway of the main bridge span is suspended. The main cables continue behind pylons and are fixed at ground level. The continuation of the cables can be used to support two additional spans.

Under the action of a concentrated load, the supporting structure can change its shape, which reduces the stiffness of the bridge. To avoid sagging in modern suspension bridges, the roadbed is reinforced with longitudinal beams or trusses that distribute the load.

The main advantages of the suspension bridges include:

1. The main span can be made very long with a minimum amount of material. Therefore, the use of such a structure is very effective in the construction of bridges across wide gorges and water barriers. In modern suspension bridges, wire cables and high-strength steel cables are widely used, which significantly reduces the bridge's own weight.

2. Suspension bridges can be built high above the water, which allows even high vessels to pass under them.

3. There is no need to put intermediate supports, which gives great advantages, for example, in the case of mountain faults or rivers with strong currents.

4. Being relatively pliable, hanging bridges can, without compromising the integrity of the structure, bend under the influence of strong winds or seismic loads, while tighter bridges need to be built stronger and heavier.

Due to the complex composition of the suspension bridge, two main difficulties arise: firstly, the bridge is aerodynamically very vulnerable (under the influence of strong winds, the supports are exposed to high torque, therefore they require a good foundation, especially in weak grounds), and secondly It turns out to be very difficult to describe the behavior of a bridge through simple mathematical models.

Until 1810 chain spans of small spans were built, as a rule. They had a considerable body weight and a relatively small carrying capacity. The main carrier element of such bridges was a chain made up of rings or individual rigid elements connected by bolts (hinges). The first suspension bridge was, which in its design scheme was close to modern suspension bridges, was built in 1741. in England across the river Teese. The span of this bridge was 21m.

Over the past 300 years, many countries have built a large number of suspension bridges, the design of which has been constantly improved, and the spans increased. At the heart of the architectural solution of hanging coatings are the constructive principles created by nature itself. So, for example, the carrier system of the web is nothing more than a spatial cable-stayed structure, the microstructure of the leaves of plants - a system of strained threads that penetrate the entire cellular structure. In other words, hanging designs are consciously or intuitively borrowed from wildlife. Deep study of natural constructive forms will allow creating rational building structures in practice. Consider the 10 most famous suspension bridges in history.

The suspension bridge across the Menai Strait in the British province of Wales is considered the first truly great suspension bridge in European history. It opened in 1826. Prior to that, in the Old World, only simple chain trailing transitions were built, the same construction was incredibly complex and useful for its infrastructure in its time. The main span of this bridge has a length of 176 meters.

The Clifton Suspension Bridge over the Avon River in Bristol is one of the most famous structures in the city and in the whole of Great Britain. This engineering structure with a hanging span of 214 meters in length was commissioned in 1864 and quickly became a symbol of English industrial power. An interesting fact is that it was here on April 1, 1979 that the world's first bungee jump was performed.

For several decades, two major cities on the shores of the East River, New York and Brooklyn had no other message than the boat. Engineers and the authorities of these settlements have long argued that it is better and cheaper to build: a bridge or a tunnel, until we stopped at the first option. In 1870, construction

began on the Brooklyn Bridge, which in 1883 became the longest suspended structure in the world (span length - 486 meters). Now it is one of the symbols of New York, no less than the skyscraper of the Empire State Building or the Statue of Liberty.

Suspension bridge Ambassador not for nothing has such nominal name. After all, it connects not just the two banks of the Detroit River, but two states - the United States of America and Canada. Moreover, 25 percent of trade traffic between these countries passes through it. The length of the longest span of this bridge is 564 meters. This building was opened in 1929.

Golden Gate is the most famous and beautiful bridge in the United States, if not all over the world. This building with a span of 1280 meters was built in 1937, becoming a record holder for this parameter for as much as twenty-seven years. Interestingly, this bridge is now the most popular place on the planet to commit suicide. It is believed that a jump from it caused the death of more than 1,200 people.

There are not so many large water barriers in Russia, for the sake of overcoming which could be built suspension bridges. That is why the relatively small construction, the Crimean bridge in Moscow, opened in 1938, is the most famous similar construction in the country. The length of its suspension span is 168 meters.

In 1973, a historic event happened for the whole of Eurasia - the first bridge over the Bosphorus was opened in Istanbul. It finally connected the European and Asian shores of this strait, which the local rulers had dreamed of over the last millennium. The total length of this building is 1560 meters, and the suspended span in it is 1074. Pedestrians have no access to it - the authorities in Istanbul do not want to take away the title “capital of suicides” from San Francisco.

In 1998, the Akashi-Kaikyu bridge was opened between Honshu and Awaji islands, which became the longest similar suspension structure in the world. And for more than fifteen years, he holds this honorary title. The length of the largest hanging span in it is 1991 meters. If you stretch all of its steel threads, you get a single cable that can gird the globe more than seven times.

The length of the largest overhead span of the Great Belt Bridge in Denmark is 1,624 meters. This is not the largest figure in the world (this is more than 300m ahead of the Japanese Akashi-Kaikyo), but a record in Europe. A record for the Old World engineering structure in 1998 was opened.

At the bridge over the Sydukhe River in the Chinese province of Hubei, the length of the largest hanging span is even less - “only” 900 meters. However, this structure is the tallest suspension bridge in the world. Its highest point above ground level is located at around 496 meters. The facility has been operating since 2009.

Few people know that the history of hanging bridges, in essence, is a long chain of disasters. In the history of technology there is no other example for a constructive solution to win its right to live under such contradictory circumstances and be paid at such a high price.

In 1864 and 1889 the victims of the wind were two bridges on Niagara. In the USA, only for the period from 1876 to 1888, 251 bridges collapsed. Most of these large and small bridges were trailing. One of the first documented examples of the catastrophe dates back to 1854, when, during a strong wind, the 336-meter bridge on the Ohio river near Wheeling collapsed. One of the witnesses wrote that he watched with alarm for the bridge, which resembled the ship's rolling during a storm. Suddenly the bridge rose almost to the height of the pylons, then sank abruptly; the huge structure curved heavily, almost turning over, and with a terrible crash fell from a dizzying height into the river. The dynamic stability of suspension bridges is their weak side. Ease of flexibility, being their undeniable advantage during a strong wind, turns into a serious disadvantage. Often the bridge is in the role of swinging and jumping ship deck. The absence of a rigid structure and the required kilograms makes the structure a toy for powerful gusts of wind. Stabilization is achieved with the help of stiffening beams that are under the track, and more often the bridge rails themselves are transformed into a power structure. However, for decades their role was not clear enough, and in those cases when they were set, the designers did it purely intuitively.

Nowadays, the main explanation for the instability of suspension bridges is explained by the aerodynamic forces arising from the interaction of wind and bridge. These forces act differently in accordance with how strongly the bridge is brought out of equilibrium, in particular, how large the angle is during torsion, and whether self-excitation and negative damping effects can occur.

References

1. Бачинська Л.Г. Ідеологічна сутність містобудівної спадщини / Сучасні проблеми архітектури і містобудування. Вип. №10, 2002. – с.129-139.
2. Стародубцева Л.В. Архітектура постмодернізму: Історія. Теорія. Практика: Посіб. для студентів архіт. спец. вищ. закл. – К.: Спалах, 1998. – 208 с.
3. A.M. Abdel-Ghaffar, Suspension bridge vibration: continuum formulation. J. Eng. Mech. 108, 1215–1232 (1982)
4. D.M. Abrams, B. Eckhardt, A. McRobie, E. Ott, S.H. Strogatz, Crowd synchrony on the millennium bridge. Nat. Brief Commun. 438, 43–44 (2005)

Ivanova Yu. D.

CLASSIFICATION AND TYPES OF PEDESTRIAN BRIDGES

Scientific Advisor – Cand. Eng. Sc., Senior Lecturer Krasnov S. M.
Language Advisor – Cand. Pedag. Sc., Assoc. Prof. Borzenko O. P.
Kharkiv National Automobile and Highway University

Ensuring the comfort and safety of pedestrian traffic is one of the most important and, at the same time, up to now, insufficiently developed sections of the

organization of pedestrian traffic. In practice, there is not enough attention paid to the organization of pedestrian traffic, and the efforts of engineers in the organization of this traffic are directed mainly to ensure the traffic of vehicles. This situation is largely due to the fact that in the analysis of the road accidents, the main causes of vehicle/pedestrian accidents are the violation of traffic regulations by pedestrians and drivers, and the effect of deficiencies in the traffic organization remains undetected. Therefore, the question of arranging pedestrian crossings at different levels with the highway becomes more and more relevant [1].

Designing of artificial constructions is a complex process, the management of which should be carried out by highly skilled engineers [3].

Designing of artificial constructions in modern conditions is developing by the creation of new effective forms of design, improvement of calculation methods, the use of new materials, the use of computers for calculations, the design of bridge elements and creation of their work drawings [3].

The pedestrian crossing in the city performs not only transport functions, but also is one of the main elements of the overall planning composition. Therefore, such structures are subject to increased aesthetic requirements. The distinguishing features of modern pedestrian bridges and crossings include the variety of their architectural forms and constructive solutions, which are usually closely interconnected [2].

Let's start with the fact that a pedestrian crossing is a special area on the road, intended for people to move from one side of the street to another. The crossing can be at the same level with the road or at different levels, and, in this case, the pedestrian crossing represents an artificial construction - above the ground or under the ground [2].

A ground level pedestrian crossing is an out-of-street pedestrian crossing, performed in the form of an engineering construction, located above the roadway or railways. It is often referred to as a pedestrian bridge. Pedestrian bridges are classified according to the material from which they are built: wooden, stone, concrete and reinforced concrete, metal, as well as bridges with the use of polymer (composite) materials [2].

By the type of work under the load of runways and supports, that is, depending on the static scheme, there can be beam, frame, arch, hanging and combined systems of pedestrian bridges. The most common are beam systems of bridges (beam bridges). They can be simple, temperature-continuous, continuous and cantilever truss with horizontal chords. The frame system is used in pedestrian overpasses and overcrossings due to more rational, compared with beam systems, force distribution and the possibility of obtaining structures with low construction height at sufficiently high vertical stiffness. Arch pedestrian bridges, with a large variety of constructive solutions, are used for almost every passing. They easily fit into urban development. The basis of bearing structures of hanging and cable pedestrian bridges is a system of stretched elements made of high-strength steel ropes or stay cables, to which stiffened beams with a pedestrian part are suspended.

In the practice of building hanging and cable bridges, one-, two- and three-span systems are used [3].

Simple stay cable systems (stay cable and beam bridges) can be of a symmetric or asymmetric type. According to the location of stay cables, there can be radial-stay cable bridges, when all the stay cables converge at the top of the pylon, storey-parallel – "harp" and storey-nonparallel – "hand fan". For constructive and architectural reasons, single-pole systems are often used in stay cable bridges. On the basis of arch and beam systems, depending on the ratio of stiffness, numerous combined systems are constructed [1].

Advantages of pedestrian bridges:

• lower cost (compared to an underground pedestrian crossing), no need to relocate underground facilities;

• external view of what is happening at the crossing, no need for round-the-clock lightning.

The main disadvantage of an above-ground pedestrian crossing is a greater elevation difference compared to an underground one.

Ground pedestrian crossings are usually marked with special signs or markings. However, in a large city with heavy traffic, preference is given to the construction of out-of-street crossings - underground or above-ground. First, they are safer for pedestrians themselves, and second, they allow to abandon traffic lights, which facilitate the movement of vehicle traffic [1].

References

1. ДБН В.1.2-15:2009. Споруди транспорту. Мости та труби. Навантаження і впливи. [Чинний від 2010-03-01]. Київ : Мінрегіонбуд України, 2009. 83 с. (Державні будівельні норми України).

2. Жемочкин Б. Н., Синицын А. П. Строительство мостов. Москва : Госстойиздат, 1962. 216 с.

3. Симвулиди И. А. Пешеходные мосты: конструкция, строительство, архитектура. Москва : Высш. шк., 1987. 76 с.

Jakimenko G. J.

DER EINFLUSS VON ELEKTRISCHEN VERHALTEN BEI DER OPTIMIERUNG DES BETONZUSCHLAGS

Wissenschaftlicher Leiter – Kand. techn. W., Dozent Dedenjowa O.B.
Sprachwissenschaftlicher Leiter – Kand. techn. W., Dozent Rachkovskiy A. W.
Charkower Nationale Universität für Bauwesen und Architektur

Die sogenannten kleinen Architekturformen einer modernen Stadt bestimmen sozialen Wert sowohl der Erholungsstellen als auch der ganzen Stadt. Die Ästhetik, der Typ und das Ausmaß der Architekturformen schaffen die Einzigkeit eines malerischen und täglich erreichbaren Milieus. Heutzutage existiert ein breites

Spektrum von kleinen Architekturformen eines bestimmten Design und einer individuellen Bestimmung.

Die kleinen Architekturformen sind gerade im Charkower Gebiet am meisten verbreitet. Der Erholungspark der Stadt Charkow, der einer der besten Parks Europas ist, ist ein bestes Beispiel dieser Architekturformen (Abb. 1).

Abb. 1 – Das Tor auf dem Kinderplatz

Die feinkörnigen dekorativen Betone stellen eine qualitative Struktur der Bauelemente sicher. Diese Betone sind sehr technischgerecht, mit mineralischen und organischen Farben leicht zu streichen, was von Farbton sehr wichtig ist. Die Oberfläche des feinkörnigen Betons ist ein guter Grund für jede Art der Polymerbeschichtungen, die eine Rolle des Schutzes des Betons gegen Zerstörungen spielen. Die Architekturformen sind dabei sehr farbenreich.

Diese Betonarten ermöglichen auch die Reduzierung der Produktionskosten. Die Modifikation der Betonmischung durch die organo-mineralischen Komponente mit dem örtlichen Sand führt zur Kostenminderung auf 15-20% im Verhältnis zum grobkörnigen Beton. Neben dem Nutzeffekt erhöhen sich auch die wichtigsten technischen und Betriebseigenschaften – Dichte, Festigkeit, Rissfestigkeit, Wasserdichtigkeit, Frostbeständigkeit, was für die Objekte in der Freibewitterung sehr wichtig ist.

Die Dauerhaftigkeit der kleinen Architekturformen ist von deren Strukturfestigkeit sehr abhängig. Die Autoren [4-6] motivierten das Gleichgewicht zwischen den negativ- und positivaufgeladenen Oberflächen der Dispersionsteilchen im Zementstein und feinkörnigen Beton. Die Optimierung der Zusatzstoffe unter Berücksichtigung deren elektrischer Oberflächenverhalten stellt die Dauerhaftigkeit des Betons sicher.

Materialien und Methoden der Untersuchungen. Gegenstand der Untersuchung ist feinkörniger Beton aufgrund des Portlandzements PZ II/A-S-400 Produktion „Eurozement Ukraine“, Zusatzstoff Quarzsand Beslüdower Tagebaugrube, Korn 0,316-0,16 mm. Als mineralisches Zusatzmittel wurden hyperfeine Stoffe gebraucht. Die chemische Base der Stoffe ist Kalzit: Kalkstein, Kreide, Dolomitspat, der Abfall von Wasserreinigungs- und Wasserweichmittel des

Charkower Wärmeversorgungsbetriebs mit der Inhalt Kalziumkarbonat von 2-100 Mikron.

Die elektrischen Eigenschaften der Oberfläche von den Zusätzen wurden im elektrostatischen Feld einer höheren elektrischen Spannung untersucht. Die Methode für die Untersuchungen entspricht den Regeln [8,9]. Das Gerät für die Durchführung der Untersuchungen heißt „Entladung“. Auf der Abb. 2 ist das Gerät für zahlenmäßige Bewertung des Oberflächenwerts der Ionenladung dargestellt. Spezifische Oberfläche der Dispersionsstoffe wurde mit dem Gerät T-3 festgestellt (Abb. 3).

Abb. 2 – Das Gerät für die Feststellung der elektrostatischen Verhältnisse von dispersen Füllstoffen und Torsionswaage mit der Messgenauigkeit von bis 0,001 g.

Abb. 3 – Das Gerät T-3 für die Feststellung der spezifischen Oberfläche der feinteiligen Stoffe.

Ergebnisse und Besprechungen. Die Dosis der zu erforschenden Materialien mit der Masse bis 1 g wurde auf der Torsionswaage mit der Genauigkeit bis 0,001 g abgewogen und auf dem Glas des Geräts zugewiesen.

Die Elektrode wurde über die Dosis mit dem Abstand von 1 cm angeordnet. Auf die Elektrode wurde der elektrische Strom mit der Spannung von 12 kW gegeben. Dabei erhielt die Elektrode eine positive oder eine negative Ladung. Unter der Wirkung des elektrischen Felds bewegten sich die Stoffteilchen auf die Seite der Gegenelektrode. Nach der Beendigung der Bewegung wurden die versetzten Teilchen des Stoffs. Die Dosis auf dem Glas ist neutral nach der doppelten Wechslung der Elektrodenpolung.

Die Bemessungen wurden mehr als 3 Mal durchgeführt. Jedes Mal wurde eine neue Dosis genommen. Dadurch wurde die Anzahl der verschiedenen Teile von positiven, negativen und neutralen Teilchen ausgewertet. Diese Daten wurden als Prozentgehalt von der Masse der ganzen Dosis verglichen. Damit wurde auch

die vorwiegende Anzahl des Wertes von der Ladung der Oberfläche dispersen Materials festgestellt.

Die Ergebnisse der Entmischung von der zu untersuchenden Pulvern im elektrostatischen Feld werden in der Tabelle 1 dargestellt. In der Tabelle 2 sind die Ergebnisse der Untersuchungen von Farbindikatoradsorption.

Tabelle 1 – Die Ergebnisse der Proben zur Feststellung der Werte von der Ladung der Zusatzteilchen im elektrostatischen Feld

№ п/п	Art des Stoffs	Probenwert des Ladungszeichens der Oberfläche
1	Kalkstein	vorwiegend neutral
2	Dolomit	vorwiegend neutral
3	Abfall erweichenden Mittels für das Wasser des Wärmeversorgungsbetriebs – 5 (CaCO3) №1	vorwiegend neutral
4	Abfall erweichenden Mittels für das Wasser des Wärmeversorgungsbetriebs – 5 (CaCO3) №2	vorwiegend neutral
5	Quarzsand	vorwiegend negativ
6	Zementstein im Alter von 28 Tage	vorwiegend negativ

Tabelle 2 – Adsorption der Farbindikatoren auf den aktiven Mittelpunkten von feindispersen Teilchen der Zuschlagstoffe

Untersuchender Stoff		Adsorption auf den aktiven Mittelpunkten, *A*, mg-equiv./g×10^{-5}, Indikatoren mit pK_a:							
		-4,40	-0,29	+1,30	+3,46	+5,00	+8,00	+10,5	+12,8
Quarzsand		3,1	1,4	0,2	3,9	-	2,5	6,6	14
Portlandzement		-	0,7	-	4,8	-	-	-	54
Kalkstein		-	1,7	-	-	180,5	-	-	8,4
Dolomit		-	38,76	40,08	-	4,53	0,155	-	76,014
Abfall erweichenden Mittels für das Wasser (CaCO3)	№1	-	93,57	21,08	-	7,83	0,019	-	69,09
	№2	-	131,65	79,59	-	8,58	0,104	-	133,54
aktive Mittelpunkte (nach Netschiporenko)		Lüiser basisch		Brensteder azid			Brensteder basisch		
Typ aktiver Mittelpunkte (Ladungszeichen)		(+)	(+)			(-)		(-)	

Die Daten in den Tabellen zeigen, dass die Anzahl der Teilchen mit einer positiven und einer negativen Ladung im Kalkstein und im Abfall des Kalziumkarbonats fast gleich ist. Die Konzentration von aktiven Zentren, die die Ladung der Oberfläche verursacht, ist fast gleich, das heißt, dass die Zentren fast elektroneutral sind. Aber infolge dieser höhen Konzentration von aktiven Zentren mit säurigem Gehalt sind sie imstande, individuelle oberflächliche Kontakte zu bilden.

Der Quarzsand und Portlandzement haben eine negative Ladung der Oberfläche. Die Konzentration von aktiven Zentren, die eine negative Ladung der Oberfläche bestimmen, ist viel höher als die Konzentration anderer Elemente.

Das Gehalt der genannten Komponente im feinkörnigen Beton ermöglicht die Bildung von den festen Kontakten harten Komposits, was die Reduzierung der Porosität und die Erhöhung der Dichte und Härte sowie den Korrosionswiderstand, die Wasser- und Frostbeständigkeit verursacht.

Zusammenfassung

1. Bei der Optimierung der Zusatzstoffe muss man die elektrische Ladung der Oberflächen berücksichtigen. Diese Berücksichtigung ermöglicht die Festigkeit von Kontakten der Zusatz- und Zuschlagstoffen des feinkörnigen Betons.

2. Die Schaffung der dichten Kompositstoffe mit einer hohen Korrosions-, Frost- und Wasserbeständigkeit erhöht die Dauerhaftigkeit kleiner Architekturformen aus feinkörnigem Beton, die heute einen großen Bedarf in der Architektur der Großstädte haben.

Literatur

1. Деденьова О.Б., Дьоміна О.І., Волкова О.С., Кривицька А.А. Мікроармовані дрібнозернисті бетони в архітектурі міста / Збірник наукових праць УкрДАЗТ, 2015, вип.152, с. 187-192.

2. Деденьова О.Б., Рачковський О.В., Климова Є.І., Романчук Н.А. Применение декоративных мелкозернистых бетонов для малых архитектурных форм. / Збірник наукових праць Системи обробки інформації – Харків : ХУПС ім. І. Кожедуба – 2016. Вип.7, с.108-111.

3. Деденева Е.Б., Костюк Т.А., Демина О.И., Якименко А.Ю. Архитектурный бетон с оптимальным соотношением эксплуатационно-технических и эстетических свойств/ Инновационные технологии в архитектуре и дизайне. Коллективная монография/ Харьков: ХНУБА, 2017.

4. Interaction of Mineral and Polymer Fibers with Cement Stone and their Effect on the Physical-Mechanical Properties of Cement Composites / >A.A. Plugin<, T.O. Kostiuk, >O.A. Plugin<, D.O. Bondarenko, >Yu.A. Sukhanova<, >N.N. Partala< // International Journal of Engineering Research in Africa JERA. – 2017. – Vol. 31. – P.59-68. https://www.scientific.net/JERA.31.59

5. Interaction of Portland cement hydration products with complex chemical additives containing fiberglass in moisture-proof cement compositions /

O.I.Demina, A.A.Plugin, E.B.Dedenyova, D.O.Bondarenko, T.A.Kostuk // Functional Materials, 24, No.3 (2017), p. 415-419.

6. Плугин А.А., Салия М.Г., Костюк Т.А., Бондаренко Д.А., Старкова О.В. Обоснование выбора наполнителей для гидроизоляционных сухих смесей на основе портландцемента // Материалы VIII Международной научно-практической конференции «Научное пространство Европы − 2012». – Софія: БялГРАД−БГ, 2012. – Том 29. Строительство и архитектура. − С. 62−67.

7. Бабушкин В.И., Кондращенко Е.В., Костюк Т.А. Роль активных центров и поверхностных зарядов в формировании структуры цементного и гипсового камня / Вестник НТУ «ХПИ».- Харьков, 2002.- №2.-Т.2.-С.52-60.

8. Бабушкин В.И., Кондращенко Е.В., Костюк Т.А., Новикова С.П. К вопросу о методологии измерения электроповерхностных свойств частиц в вяжущих системах/ Науково-технічний збірник НДІБМБ та ДНДІСТ.- К.: 2002.- Вып.17 .- С.38-43.

9. Formation of structure fine concrete with regard to their crystallographic - energy characteristics / Younis B.N., Dedeneva E.B., Kostuk T.A. // Proceedings of III International scientific conference “Modern scientific achievements: experience exchange”. Morrisville, Lulu Press., 2017, pp. 28-31.

Khodak A. M.

THE IMPORTANCE OF SPACE IN ARCHITECTURE

Language Advisor – Kushchenko Zh. L.
Kharkiv National University of Civil Engineering and Architecture

Space, that immaterial essence that the painter suggests and the sculptor fills, the architect envelops, creating a wholly human and finite environment within the infinite environment of nature. The concept that space can have a quality other than emptiness is difficult to grasp. When a building is entered, floor, supports, walls, and a ceiling are seen, all of which can be studied and perhaps enjoyed, while the space, in the sense that one is accustomed to think of it, is void: the absence of mass, filled by air.

But spatial experiences that express something are common to everyone, though they are not always consciously grasped. One feels insecure in a low cave or a narrow defile, exhilarated and powerful on a hilltop; these are psychological and motor reactions that result from measuring one’s potential for movement against the surrounding spaces, and the same reactions take root even in language. An infinite variety of such reactions may be summoned by the architect, because the architect controls the limits above, below, and on all sides of the observer. People entering the architect’s space measure it in terms of the degree and the quality of their potential for movement. The concept of potentiality is important, first, because observers can anticipate where they may move merely looking about and, second, because they can conceive movements that they cannot execute. Thus,

in the nave of a Gothic cathedral, the high walls closely confining the observers on two sides restrict their possible movements, suggesting advance along the free space of the nave toward the altar, or their compression forces the observers to look upward to the vaults and the light far overhead, there to feel a sense of physical release, though they are earthbound. The experience of Gothic space is called uplifting because it urges one to rise.

Renaissance space, on the other hand, attempts to balance its suggestion of movement, to draw observers to a focal point at which they can sense an equilibrium of movement in all directions, a resolution of the conflict of compression and release. At this point one feels physically at rest, at the opposite extreme from the elevating sensation of the cathedral.

Spatial experience is not restricted to the interiors of buildings. The sensations one has in nature's open spaces may be re-created by art. City squares and streets, even gardens, achieve a variety of expression comparable with that of interiors. The Baroque piazza of St. Peter's in Rome, which directs the observer along its great embracing arcs toward the entrance, is at least as moving as the church interior.

The exterior of a single building, particularly one that is isolated from other architecture, does not create a space. It occupies the space of nature. Thus, it may be experienced as sculpture, in terms of the play of masses in a void. The aesthetics of masses, like that of spaces, is rooted in one's psychology. When a tall tree or a mountain is called majestic and a rocky cliff menacing, human attributes are being projected. People inevitably humanize inert matter and so give the architect the opportunity to arouse predictable patterns of experience.

The appreciation of mass, like that of space, depends on movement, but this movement must be physical. It cannot be experienced in anticipation, because, no matter where one stands to observe even the simplest building, part of it is out of sight. The mass of a complex building is differently composed from every point of view. The 20th-century art critic Sigfried Giedion, emphasizing the need for movement in experiencing modern architecture, suggested that architecture may be four-dimensional, since time (for movement) is as meaningful as the spatial dimensions.

Some architecture depends much more on mass expression than on space expression. The Egyptian pyramid, the Indian stupa, and the dagoba of Sri Lanka have no meaningful interior spaces; they are architectural in function and technique, sculptural in expression. The interior of a Greek temple is of little interest compared with the wonderful play of forms on its colonnaded exterior, while early Christian and Byzantine architecture reverse the emphasis, making the simple exterior a shell for a splendid and mystical space. Gothic architecture balances the two, partly in order to express a dual content: earthly power over the world outside, spiritual power inside. Modern techniques permit a reduction of the contrast between space and mass expressions by reducing the mass of walls and the size and number of supports and by allowing the interpenetration of interior and exterior space.

Space and mass are the raw materials of architectural form; from them the architect creates an ordered expression through the process of composition. Composition is the organization of the whole out of its parts—the conception of single elements, the interrelating of these elements, and the relating of them to the total form.

Behind these changing theoretical methods, however, there seems to be a constant human reaction to spatial relationships that distinguishes harmony from cacophony, that makes one bored with a perfectly cubic room or prefer certain rectangular forms to others. This psychological response to form probably is connected to one's mechanisms of balance, movements, and stature—in short, to one's own composition—but the scientific analysis of the process is still at an early stage of development.

Kilchevskiy A. V.

GOTHIC AS AN ACHIEVEMENT OF EUROPEAN CULTURE

Scientific Advisor – Cand. of Architecture, Assoc. Prof. Kachemtseva L.V.
Language Advisor – Senior Lecturer Lysenkova T.M.
Kharkiv National University of Civil Engineering and Architecture

The history of most European national cultures dates back to the Middle Ages. The Roman legacy was assimilated by the barbarians, when they settled the territory of the former Roman Empire. The most prolific in the famous personalities, discoveries, inventions and the introduction of any new products in the lives of people, is the period of the classical Middle Ages.

As for me, the Gothic style in architecture is one of the main achievements that Europe can be proud of, because its emergence was one of the most important revolutions and an important and unprecedented breakthrough in the architecture and construction of religious and secular buildings in the history of European architecture. Gothic art originated in France in the first half of the XII century. In the Middle Ages, temple architecture was most important for Europe because of the great influence of religion on all aspects of people's lives. The Romanesque church of the early Middle Ages was overwhelmed by its gravity, grandeur and enormity. The scenes of the final judgment on its facades aggravated the sense of human imperfection, spoke of the futility and sinfulness of all earthly things. The use of the achievements of Romanesque art in the construction of churches that were overlapped by cylindrical and cross vaults allowed the construction of huge stone temples, the stability of which depended on the correct distribution of gravity and arch. The walls had to be thick and heavy enough to hold such arches. The architecture in the Middle Ages became the leading art, as evidenced by the then truly grand temple construction. The temple was called to unite, personified the triumph and universality of the Christian faith.

The main role in the Romanesque style was assigned to the harsh, serf-like architecture - churches, monasteries, castles: these massive stone buildings were

usually erected on elevated places and dominated the area. The exterior of the Romanesque buildings was distinguished by its monolithic integrity and solemn strength, the building consisted of simple, clearly identified volumes, underlined by uniform division; the power, the thickness of the walls was amplified by narrow window openings, stepwise deepened portals and imposing towers. Inside, Roman temples were divided into equal spatial cells and overlapped with arches (less often domes) on semicircular arches, which gave the building a feeling of unshakable stability, identified with the unshakableness of the divine world order. European architecture needed a revolution, something new that would make the structures more durable, elegant and economical than they were before. Therefore, ribbed arches were designed, which included slender stone arches that were located diagonally, across and longitudinally. The new rib vault, which was thinner, lighter and more versatile, made it possible to solve many architectural problems. Consequently, the thick walls of the Romanesque architecture could be replaced by thinner walls, which included extensive window openings. Because of this, the interiors received unprecedented lighting until then. With the advent of the Gothic vault, the design, shape, layout and interiors of the cathedrals changed. Gothic cathedrals acquired the character of lightness, direction up. Temples have become more dynamic and expressive, showed striving towards God. In the new Gothic style, many new features appeared. The colored light penetrating through the stained glass windows enhances the impression of boundlessness, the infinity of space, and the saturation of movement. The constructive basis of the cathedral is a frame of pillars and lancet arches resting on them. Bringing out the structural elements allowed creating a feeling of lightness and spatial freedom of the interior To combat the destructive effects of climate on the basic structural elements of the structure, buildings required additional reinforcing structures. Above the stone arches, a high rafter roof was made, which was covered with slate (small plates of gray-black clay slate) or sheet lead. The steepness of the roof slope depended on the intensity of snowfall and rain, as well as the type of roofing material. For the same purposes, buttresses were attached to a multistage form with small pitched roofs of tiers, from which water was dumped down or diverted into the gutters of the spillway so that the upper parts of the walls would not be wetted. The surface of the wall was also supplied with shelves and ebbs that drained water from the building. The windows were edged with embossed platbands so that the water flowed around them along the contour. Statues and sculptural groups on the portals or on the altar barriers acquired a deep spiritual content, aspiration and mobility, underlined by the rhythm of folds and slight bending of the figures. On the facades of the cathedrals were placed statues of saints and allegorical figures; the best of them are marked by spiritualized beauty, solemn serenity of poses and gestures; in other parts of the building there are numerous secular images - labor scenes, satirical images, fantastic figures of chimeras. Many cities in Europe and now adorn the majestic cathedrals with giant openwork towers, high pointed arches, windows, portals and numerous decorative details, in particular, a round window with a complex binding - a rose. Besides all this, the Gothic architecture also had

its own symbolism. The universe is divided into a belt of stained glass at the top of the temple, and an array of walls at the bottom, on the celestial and terrestrial world. The walls of the temple, as the abode of God, are dematerialized with relief and sculptural openwork. Such a constructive element as an arch symbolizes the rupture of the cycle of time, because in general the image of the Gothic church also carries a semantic load about the transience and finiteness of time (at that time the people of the Middle Ages were on the threshold of the soon end of the world). Gothic rose symbolizes the wheel of Fortune and expresses the cyclical nature of time. In the unique Gothic stained glass windows (in the *rose* windows), you can see scenes that refer to the cycle of time. Changes have occurred in the windows. Initially, the case was limited to grouping two or three medium-sized windows in a single architectural frame. Then the pier between these windows consistently decreased, while the number of openings increased until the effect of a fully dissected wall surface was achieved. A further reduction in the size of the stone walls between the smaller windows led to the emergence of a lacy window design, the ornamental design of which was created by thin stone edges. Initially assembled in the form of simplest geometric shapes, the lacy window structures became more and more complex with time. In England, this "decorated" style of the end of the 14th and 15th centuries was replaced by "perpendicular", which in France corresponded to the style of "flaming gothic". The multi-colored stained glass in these windows were assembled from small pieces of glass, clamped by an H-shaped lead profile that provided insulation from moisture. However, the lead clips did not have sufficient strength to withstand the wind pressure on a large glass surface, which subsequently required the use of frames made of iron rods or reinforcement. Over time, instead of iron fittings, curly stone ribs began to be used, which opened the way for freer lace compositions. In the 12th century stained glass windows the dominant colors were shades of blue, complemented by red, bringing warmth to the whole. Yellow, green, white and purple colors were used extremely sparingly. In the same century, the builders of the Cistercian churches, having refused to have an abundance of flowers, began to use grisaille for decorative purposes (painting in different shades of the same color, usually gray) on a plain greenish-white glass surface. In the 13th century the size of the stained glass pieces increases and red is applied much more widely. In the 15th century begins the decline of stained glass art. The light that penetrates the bright stained glass means Divine Light, Divine Providence.

Conclusions. So, summing up, I would like to say that from my point of view - Gothic architecture was the best period in the architecture of all of Europe throughout its history. This is undoubtedly the best achievement that Europe can and should be proud of, because none of the architectural styles have made such a leap in development and left an eternal mark in history, because throughout Europe and on this day there are Gothic temples that amaze with their beauty.

Kir'yan Y. O.

ARCHITECTURE – "GEOMETRY AT WORK"

Language Advisor – Senior Lecturer Pyvovarova O.I.
Kharkiv National University of Civil Engineering and Architecture

Masonic symbology has come down to us from the cuneiform scripts of the ancient Sumerians, about 3000 B.C.as well as the ancient Mesopotamians and Persians. Cuneiform writing was a series of pictographs which were drawn on clay tablets with a stylus. Freemasons are members of a fraternity dedicated to the brotherhood of man which came to be in the late 1600 to early 1700s. The legend of masonry appears as early as 1723. The movement is associated with the art of architecture, and, in a wider perspective, with the liberal art of geometry. This is the reason why treatises of the Freemasonry (those of Palladio and Vitruvius) served not only as a base and source of inspiration for the work of architects, but also became an object for contemplation for the Freemasons.

Although the actual origins of Freemasonry are clouded in the mists of antiquity, it is widely agreed that Masonry dates back to the late fourteenth century and flourished during the middle ages when guilds of Masons traveled throughout Europe building the great gothic cathedrals.

Much of Masonic symbolism is mathematical in nature, and in particular geometrical, which is probably a reason Freemasonry has attracted so many rationalists (such as Voltaire, Fichte, Goethe, George Washington, Benjamin Franklin, Mark Twain and many others). Freemasons use a variety of labels in order to avoid the idea that they are talking about any one religion's particular God or God-like concept.

The Freemasons rely heavily on the architectural symbolism of the medieval operative Masons who actually worked in stone. One of their principal symbols is the square and compasses, tools of the trade, so arranged as to form a quadrilateral. The square might be said to represent the world of the concrete, or the measure of objective reality, while the compasses represent abstraction, or subjective judgment, and so forth.

Symbolism based on architecture and construction laid the basis of all Masonic iconography. The trowel, the bevel, the plumb rule, the square, the compasses and Solomon's Temple are among the most recognized symbols of Freemasonry and they refer to its roots – the medieval builders' guilds (architects, masons, sculptors). These instruments don't just symbolize the masonry trade, but they are also a means of understanding the world and establishing the distinction between God's wisdom and human intelligence.

The most universal symbol associated with Freemasonry is the square and compasses. Thousands of variations on this design have been produced through the centuries. The square and compasses are recognized as tools of the architect and builder, which Freemasons use to teach symbolic lessons. It is the single most identifiable symbol of Freemasonry.

The Masonic Eye is symbolic of the Eye of God. It is the symbol of his divine presence and his ever always present care of the universe. God is without a beginning and without an end because he always is and has always been. The Masonic Eye of God watches over each of us.

The Letter G – in Hebrew, the language our Bible was originally written in, it is called Gimel and has a numerical value of 3. Throughout history, we see reference to the number 3 when we speak of God. The letter "G" in Freemasonry stands for both God and Geometry. There is also a thought that the "G" stands for "Great Architect of the Universe".

The Freemasons' cult of reason and admiration for the laws of geometry found its expression, as well as fulfillment, in the Italian architecture of the late Renaissance, with the works of Andrea Palladio (1508-1580). The English Freemasons played a significant role in popularizing his cult. It was thanks to the members of the Great Lodge of London that Palladio's style became dominant in England, and later also in the United States. Freemasonry or Masonry has been a longstanding object of conspiracy theories, urban legends and misunderstanding.

Freemasonry in Russia is no exception – having arrived in the 18th century.

Introduced by foreign officers, it's often associated with the activities of Franz Lefort and Jacob Bruce – close associates of Peter the Great. The architecture of St. Petersburg is filled with Masonic symbols. Obsessed with Amsterdam, Peter sought to build a version of the city on the banks of the Neva River. Peter appealed to the stonemasons. Masonic architecture features archetypal symbolism.

There are a lot of places in St. Petersburg bearing secret masonic symbols.

In St. Petersburg the Eye of Providence– an ancient religious symbol incorporated into standard Freemasonry iconography in 1797 – appears on the city's cathedrals and monuments. Here in the centre of the city, Andrei Voronihin built the Kazansky Cathedral and put a big triangle with the Eye of Omniscience ot the pediment.

We often see monuments with square and compasses at the old cemeteries, roofs of some old buildings are covered with frustum pyramids symbolizing dragon scales, and Hermes's caduceus decorate facades. Egyptian masonry is one of the most popular masonic forms, while the architecture of St. Petersburg has plenty of ancient Egyptian symbols and images — sphynxes, gryphons, pyramids, four-edge monument etc. "Egyptian style" elements are a popular decorum of dwelling houses. Freemasonry now exists in various forms all over the world, with a membership estimated at around 5 million.

References

1.https://www.masonic-lodge-of-education.com/freemason-sy...
2. www.ancientpages.com/.../12-masonic-symbols-explained/
3.https://gwmemorial.org/blogs/news/this-divine-science
4.inrussia.com/masonic-symbols-of-st-petersburg
5.www.secretsocietieswebsite.com/masonic-symbols

Kokot V. S.

5 NEW ENERGY EFFICIENT MATERIALS ARCHITECTS SHOULD KNOW

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

Whether architects are trying to meet the Architecture 2030 Challenge or pursuing their own mission to save energy, they have an opportunity to design buildings that can limit carbon emissions and be resilient against changing climate conditions.

To help architects meet their goals, a new wave of chemistry and material science is bringing innovative materials and building systems to the marketplace. From advanced insulation foams to multiwall cladding, this next generation of high-performing materials will help accelerate energy-efficient design.

1. Smarter windows power up with nanotechnology

Princeton University researchers predict that futuristic smart windows could save up to 40 percent in energy costs. The researchers developed a new type of smart window that controls the amount of light and heat entering the building and is self-powered by transparent solar cells in the window itself. The technology is deposited on a glass as a thin film, and the researchers are working to develop a flexible version that could be easily applied to existing windows. Eventually, homeowners and building managers could use an app on their phone to adjust the amount of sunlight passing through a window throughout the day to help save on heating and cooling costs.

2. Engineered wood products reach new heights

Think impressive, dramatic curving beams in homes and taller-than-ever before mixed wood buildings. Cross-laminated timber (CLT) panels are a relatively new material for architects that can be used to help meet these design goals. CLT offers certain advantages in terms of energy efficiency when compared to wood. CLT can also be made in dimensions up to 10 feet wide, 40 feet long and more than a foot thick. With engineered wood products, the wood fibers reinforce the lumber, making it potentially stronger than 100 percent recycled plastic. Furthermore, plastic functions as an outside barrier protecting the wood from rotting. Compared to only approximately 63 percent of a tree that can be used in solid lumber, composite panels can allow for more than 95 percent of the tree to be used.

3. Structural Insulated Panels (SIPs) go gray

The major components of SIPs, foam and oriented strand board (OSB), take less energy and raw materials to produce than other structural building systems. And while building professionals already rely on SIPs for energy efficiency, new advances in the panels will further enhance insulation throughout a building envelope. For example, some manufacturers are now producing panels with graphite polystyrene (GPS) insulation, easily recognized by its gray color, and which helps boost the panel's R-values even higher—sometimes more than 20 percent higher. In some cases, building professionals and architects can specify thinner panels while still meeting energy code requirements. SIPs may also aid architects in achieving LEED Platinum certification and Passive House standards.

4. Vacuum insulation panel (VIP) provide benefits to smaller homes and tiny houses

Trends are showing that U.S. homes are getting smaller and VIPs can offer one effective and space-saving solution for insulation. VIPs comprise a porous core material encased in an airtight envelope. The air trapped in these layers is evacuated and the envelope is then heat-sealed. The core material prevents the insulation panels from crumbling when air is removed. The National Research Council of Canada (NRC) has monitored and analyzed these roofing insulation panels for five years at the NRC facility, finding that some VIPs are predicted to maintain more than 80 percent of its thermal performance after 30 years.

5. Daylighting gets an efficiency boost

Wall cladding is an important part of a building's visual impact and also its environmental footprint—thermal bridging is one of the primary causes of energy loss in a building. To achieve both daylighting needs and energy efficiency, for instance, nanogel-filled polycarbonate sheets can be used on translucent walls and ceilings in a new type of multiwall system. Additionally, the energy used to extrude polycarbonate sheets is generally a fraction of that to manufacture glass. Polycarbonate sheets are also durable—250 times more impact-resistant than glass and virtually unbreakable; they are tested to perform from −40 to 120 C (−40 to 240 F) and can withstand more extreme weather such as windstorms, hail, or snowstorms. The insulating nanogel that is used to fill the polycarbonate sheets consists of synthetic polymers or biopolymers that are chemically or physically crosslinked to aid in energy efficiency, which may give a building up to 50 per cent energy savings compared to monolayer glass.

References

1. 8 New energy efficient materials architects should know https://www.archdaily.com/886414/8-new-energy-efficient-materials-architects-should-know

2. 10 Energy Efficient Building Materials | Dengarden https://dengarden.com/home-improvement/10-Energy-Efficient-Building-Materials

3. 8 Most Energy-Efficient Building Materials - High Stuff https://www.highstuff.com/energy-efficient-building-materials/

Kolesnik V. V.

THE DEVELOPMENT OF KHARKIV OBSERVATORY

Scientific Advisor – Cand. of Architecture, Associate Professor Hella O.I.
Language Advisor – Senior Lecturer Lysenkova T.M.
Kharkiv National University of Civil Engineering and Architecture

The Kharkiv observatory's building often changed its position, shape; it collapsed, but it was still rebuilt; it continued to be a shelter for scientists who made discoveries in the world of astronomy. It has belonged to the astronomy department of Kharkiv University since 1805. The subject of research is the history of development of the observatory, the stages of its construction, the leaders of the observatory, the architects who designed it.

The observatory for the study of the stars began to be built in the early sixteenth century. Initially, they were built privately, but eventually, observatories became created by governments. The first Government Observatory in Europe - Round Tower - was built in 1656 in the city of Copenhagen. The oldest of the currently working ones is in Paris; it was built in 1671. Subsequently, the Greenwich Observatory appeared in 1675. By the end of the XVIII century, more than 100 observatories had been operating in Europe.

A few years after the establishment of Kharkov University in 1805 an astronomical office appeared at the Department of Mathematics and Physics.

The first teacher of astronomy at Kharkiv University was Professor Johann Guth. In 1808 he was approved as the professor of mathematics at the Kharkov University. From 1809 to 1811, Professor Guth taught astronomy 2 hours a week; and at night, in the clear sky, he told the students about astrognosy and astronomy and did astronomical observations. Guth brought a large collection of devices with him to the university, which later was passed to the astronomical office. These tools included topographical instruments, clocks, an 8-foot mirror telescope, and a two-inch Dolton tube. In July 1809 Guth presented a project in which he proposed to build a small observatory, to make measurements to the full extent, along the meridian and the parallel lines of Kharkiv. Subsequently, in 1810 - 1811, the first university observatory in the south-western part of the university yard was built. Observations at this observatory took place over a short period of time, because in 1811 Prof. Guth moved to the University of Dorpat. Under the project of Prof. Guth, the Observatory represented an open terrace for observation and a small rotunda of two rooms on it. One housed the instruments and another was for the astronomer to warm up in winter. The construction of this building was entrusted to the assistant of architect Maslov under the supervision of Prof. Guth. Observatory was built in 1810. There were no locks or equipment in it. Guth, at his own expense, set up an observatory, and worked there for a short time, since he moved to another university. Guth’s rotunda was destroyed.

The second temporary observatory of the University was built in 1826, with the assistance of Prof. Zateplinskyi. It lasted until 1835.

Another teacher, A. F. Shagin, aimed at the construction of a permanent observatory for the university. The permission for the building was obtained in 1840; a comet seeker and 2 chronometers were ordered. That construction was suspended.

In the autumn of 1835, Architect Ton was instructed to make a plan and facades of the new observatory, while Shagin was instructed to find a place for the location of building. Initially, the rector planned to erect the observatory of wood, but then, due to lack of it, bricks were used. According to the calculations of the architect, this design came out a little more expensive than it had been planned. Shahin was also instructed to work on the plan of the observatory, but he refused to work with the architect. Due to the inadequacies between Shahin and Ton, namely the quarrel and the different views on the arrangement of the observatory, as well as constant changes to the plan, the construction was delayed until 1842, and then it was stopped at all, because of Shahin's mental illness.

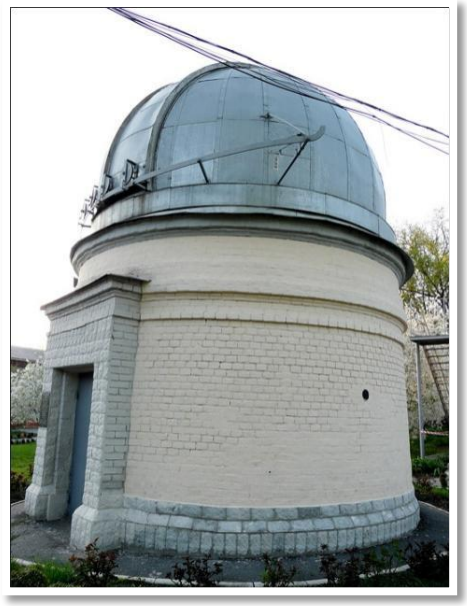
According to the project, the Kharkiv Observatory by Architect Andrew Ton and Shahin was similar to the Pulkovo Observatory, because the brother of A. Ton, Konstiantyn, was working on the latter.

In 1843, A. P. Shidlovskyi, an astronomer and surveyor, was appointed on the post of Professor of Astronomy. Shidlovskyi predominantly taught popular astronomy, the determination of orbits of planets and comets and taught students to do astronomical observations. While he hoped to have a permanent observatory, Prof. Shidlovskyi built a new temporary observatory in the University Garden. The new observatory consisted of a turnable tower which was 8 feet in diameter and an open pillar. The observatory lasted for a short time until the end of the 1950s. The follower of Shidlovskyi, I. I. Fedorenko, who was a professor of astronomy from 1857 to 1879, managed to build only the fourth temporary observatory building in the university yard near the street. This observatory served only for educational purposes.

In the 1880s, Prof. Levitskyi found the old foundation remains of Shidlovskyi’s observatory, and next to them he began to build a new one. In May 1883, the first stone pillar of the new observatory was built. Then they brought there the turnable tower and tools. Later Levytskyi was permitted to use the anatomical theater building and a house near it, which were in the vicinity of the observatory. In the summer of 1884, the stromonium office with all equipment was moved to new premises. Levitskyi did not stop at this and built a meridian hall with a meridian circle.

After Levitskyi, his students N.Yevdokimov and Yo. Sikora worked at the new observatory. The new observatory conducted, not counting observations of eclipses, coatings, etc., determining the latitude, the difference between the longitudes of Kharkiv-Nikolaev, the study of focal lengths of lenses, observations of sunspots. Prof. L. O. Struve continued the work on the transformation of the observatory. He replenished the toolkit in the observatory. In 1901, a small house at the meridian hall was enlarged to have 4 light rooms and a dark one for photographic works. In 1904, a platform for the observation with small instruments

was built above it. The works of the Observatory were printed in Ast. Nachr., "Notes from the Kharkiv University", "Excerpts from the Russian Astronomical Society", and others.



Levytskyi's observatory was built in 1883. The observatory was round in shape, the diameter being 8 feet. On the top there was a turnable tower, for observation. The main entrance is decorated with a "П" shaped portal. Its function is to highlight and increase the entrance to the observatory. The observatory is small in comparison with its "colleagues", but this does not diminish its value. Today it is one of the leading astronomical institutions in Ukraine where fundamental and applied researches on the physics of the Sun, the Moon, planets, satellites, asteroids, comets, fundamental astrometry and stellar astronomy are being carried out; and which develops and improves methods of astronomical observations.

References

1. Левицький Г.В. (1844). Астрономія і астрономічна обсерваторія Х. У. от 1808 по 1842 р. Записки Харьковського університету. Н.2.

2. Левицький Г.В. (1881). Астрономія і астрономічна обсерваторія Х. У. от 1843 по 1879 р. Записки Харьковського університету. Н.3.

Korol A. S.

DETERMINATION OF THE PROPERTIES OF COLD ASPHALT AND TARBITUM MIXTURES

Scientific Advisor –Cand. Tech. Sc., Asst. Prof. NurievaS. V.
Language Advisor – Cand. Ped. Sc., Asst. Prof. Gerasymchuk T. V.
Kharkiv National Automobile and Highway University

Feature of cold asphalt and tarbitum mixtures is their ability to maintain a loose state after cooling to normal temperature when stored in a warehouse in stacks and at transportation. This ability is provided by the use of liquid bitum and tar, limiting the content of the binder in the mixture and evaluates the indicator of traceability. Properties of liquid organic binders in the composition of cold mixtures affect the temperature regimes of their preparation and testing. Before the formation of asphalt concrete samples (tar mixes) organic-mineral mixture must be cooled to temperature (20 ± 2) °C. The mixture is compacted by pressing under a pressure of 40 MPa for 3 min. Then the methods determination of properties of cold asphalt concretes are being discussed, as test methods of cold tar mixes are similar.

30 min in water under vacuum and 30 min in water at atmospheric pressure in determining water saturation; hitches of asphalt concrete mix in boiling water with dissolved in sodium chloride for 3 min in the determination of the adhesion of bitumen with the surface of the mineral constituents in the cold asphalt mixtures.

Durability of cold asphalt concrete (tar mixes) compression determine only at a temperature of 20 °C, because it is believed that its strength at 0 °C does not exceed the dangerous value through use in its composition of liquid bitumen (tar). At determining the strength of cold asphalt concrete (tar mixes) samples before the test are kept for 2 h in air in the tank size 3-8 l. in the absence of special container for holding samples in air environment samples of cold asphalt concrete (tar mixes) placed on a wooden or porcelain stand in a vessel, installed in another larger vessel. Space between walls of the two vessels is filled with water and caused temperature.

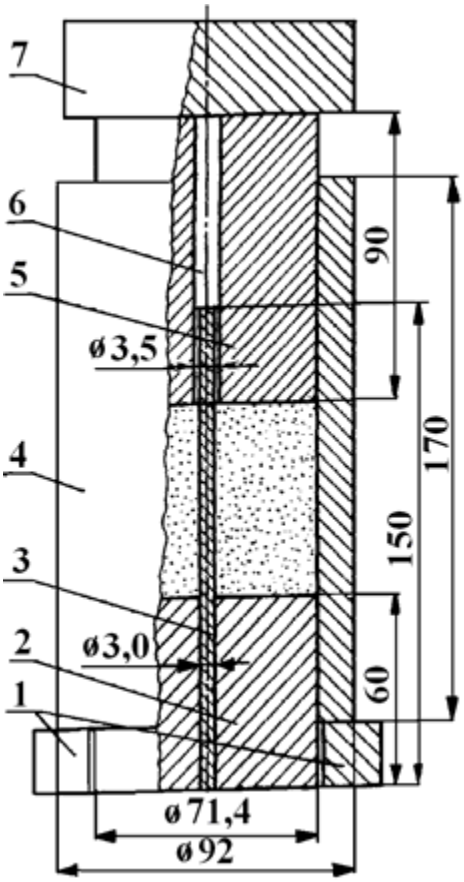
The feature of calculating the composition of cold asphalt concrete(tar mixes) is that after the pilot determination of the binder content in terms of physical and mechanical the properties of its value is reduced by 10-15 % to prevent packing of mixtures while keeping them in stacks in the warehouse or when transporting in any vehicle.

Samples of cold mix asphalt in the calculation the composition is tested in warm and cold conditions, so after keeping them for 12-48 hours after manufacture some of them are heated in a drying Cabinet at a temperature of (90 ± 2) °C. the Duration of heating is 2 hours when used in the composition of the asphalt concrete and liquid asphalts, and moderately thickening 6 hours if you use liquid slowly thickening bitumen – sparse and residual. Heated samples are tested on the next day after warming up. It is believed that the heating of samples with cold mix asphalt models changes in asphalt concrete during its operation in the road surface due to evaporation liquid fractions of bitumen in its composition.

Samples of cold mix tarbitum experience only in an unheated state.

Slumping cold asphalt (tar mixes)the mixture is its compaction under the action of its own weight in the stack in the warehouse or under the influence of mass and shaking in the vehicle and bonding of the mixture particles together in the places of their contact films of organic binder.

For determination of cold asphalt concrete caking mixtures of them are prepared samples in special cylindrical forms with a diameter 71,4 mm, with two cylindrical inserts.



Metal mold for compaction of samples from cold asphalt concrete (tar mixes) mixture testing slumping: 1 – stand under the form; 2-bottom liner; 3-steel core; 4 form; 5-top liner; 6-hole in top liner; 7-load.

References

1. Кривенко П.В., Пушкарьова К.К.,Барановський В.Б. та ін. Будівельнематеріалознавство / за ред. П.В. Кривенка. Київ :ТовУВПК «ЕксОб», 2004. 704 с.

Kovalenko D. E.

STRUCTURAL EFFECTS OF REINFORCED CONCRETE BEAM DUE TO CORROSION

Scientific Advisor – Cand. Tech. Sc., Assoc. Prof. Sayenko N. V.
Language Advisor – Senior Lecturer Galchenko V. M.
Kharkiv National University of Civil Engineering and Architecture

Corrosion of steel in reinforced concrete is one of the main issues among construction stakeholders. The main consequences of steel corrosion include loss of cross section of steel area, generation of expansive pressure which caused cracking

of concrete, spalling and delaminating of the concrete cover. Thus, it reduces the bond strength between the steel reinforcing bar and concrete, and deteriorating the strength of the structure.

Nowadays, it is relevant to investigate the structural effects of corrosion damage on the performance of reinforced concrete beam. Commonly, a series of corroded reinforced concrete beam with a corrosion rate of 0%, 20% and 40% of rebar corrosion is used in parametric study to assess the influence of different level of corrosion rate to the structural performance. Corrosion reinforcement is one of the main causes of structural deterioration and the most predominant degradation mechanisms in the reinforced concrete structures. It is usually associated with carbonation phenomenon or chlorides penetration, which generally induces uniform and localized attacks respectively. Corrosion of steel in concrete causes internal damage to reinforced concrete elements, owing to the loss of steel area and the formation of associated expansive corrosion products.

The properties of oxide layers as the corrosion products have a great influence on corrosion crack in the concrete. The most influential factor is the expansion ratio of the oxide which depends on the specific type of oxide formed [1-2]. Depending on the level of oxidation, the volume increase due to rebar corrosion is commonly around 2.0 [3, 453–464] and would be up to 6.5 times than the original iron volume which get consumed by the corrosion process because of the formation of various corrosion products [5, 1093–1109]. Nevertheless, Molina [4, 532–548] claimed that the effective expansion ratio maybe less than that corresponding to a given type if the oxide diffuses in the porous structure of the concrete. When corrosion of reinforcement develops significantly, the corrosive products expand continuously and generate internal pressure to concrete around the steel bar. The continuous process of reinforcement corrosion does not only affect in structural serviceability by cracking, or even spalling the concrete cover, but also give serious impact on the structural safety by decreasing the load-bearing capacity. Besides, the physical effects of corrosion include loss of steel area, loss of bond strength between steel reinforcing bars and concrete, and reduce of concrete strength due to cracking.

As for the concrete, elastic-plastic constitutive law based on the Drucker-Prager yield condition is applied. The degradation ratio due to the corrosion is defined according to the degree of damage in three principal axis directions and by assuming the tension softening. To adequately assess the progress of cracks in the concrete, it is necessary to make the tension softening stress released by subsequent tensile strength. The corrosion in concrete causes volume expansion of steel bar. Generally, the expansive pressure due to the volumetric change of the steel bar in concrete induces the tensile strains in the surrounding concrete and they are proportional to the degree of corrosion. As the expansion process begins continuously, the tensile strains developed and induces cracks in the surrounding concrete and also at the surface of concrete cover. In order to analyze the cracking of concrete cover due to steel corrosion, it is necessarily to know the relation between the amount of corrosion of steel bar and the internal pressure arises from

the corrosion. Therefore, a realistic relation between the amount of corrosion and the internal expansion pressure can be investigate.

K. Kim [6, 106–113] proposed a deformation model of steel bar corrosion, which consists r_0 as the initial radius of steel bar and x_p is the loss radius of steel bar due to corrosion. Meanwhile, the radius increment of steel bar due to corrosive expansion under restraint and unrestraint condition (mm) represent by Ur and Δr_b, respectively while the degree of corrosion of the steel bar which based on the ratio of weight loss due to corrosion to the initial weight of steel bar is known as w_{corr}. The corrosion product layer is compressed by the strain ε_{rust} due to expansive pressure, P. Lundgren [7] derived the relationship between normal stress versus strain of rust evaluated from a combination of experimental results and analysis together with the chosen parameter K_{rust} and p. According to their research, analysis results have a good agreement with the experimental results if they use the value of K_{rust} = 7.0 GPa and p = 7.0.

The mechanical behavior of the corrosion products needs to be known in modelling the corrosion layer. Molina [4, 532–548] assume that the rust is elastic but the mechanical properties of the rust should be replaced by initial property of steel. Meanwhile, a scratching test was used by Petre-Lazar & Gerard [8] to explore the mechanical properties of the corrosion products. They conclude that rust is cohesion-less assemblage of incompressible crystals. Al-Sulaimani [9, 220–231] and Cabrera & Ghoudoussi [10] have carried out pullout tests on corroded reinforcement bars concentrically placed in concrete blocks. In their study, the reinforcement corroded until the specimen was cracked and corrosion penetration was measured by the weight loss method. In addition, they performed axisymmetric finite element analyses of the test specimens and only the concrete was modelled with expansive normal stress.

In general, cracks and rebar corrosion of the reinforced concrete structures are caused by various environmental factors and reduction of adhesion strength is also observed. In this study, the adhesion strength of rebar was also considered with reference to the research by Lee [11, 1313–1318]. A reinforced concrete beam is considered to have two types of damage state with different corrosion position. For case 1, the corrosion is modelled in the main rebar with 600mm length at the mid span. Case 2 takes into account the corrosion of shear reinforcement at both ends.

As a result, the used of interface element in the finite element modelling predicted the worst case of corrosion analysis since cracks are induced and generate at this surface. On the other hand, a positive linear relationship was sketched between the increase of expansive pressure and the corrosion rate. Furthermore, the analysis shows that there is a significant effect on the load bearing capacity of the structure where the higher corrosion rate generates a higher stress concentration at the mid span of the beam.

References

1. K. Tutti, Corrosion of steel in concrete. (Swedish Cement and Concrete Research Institute, Stockholm, Sweden, 1982)
2. P.K. Mehta, P.J.M. Monteiro, Concrete Microstructure, Properties and Materials. (Indian Concrete Institute, Chennai, India, 1997)
3. C. Andrade, C. Alonso, F.J. Molina, Mater. Struct. 26, 1993. 453–464 p.
4. F.J. Molina, C. Alonso, C. Andrade, Mater. Struct. 26, 1993. 532–548 p.
5. K. Bhargava, A.K. Ghosh, Y. Mori, S. Ramanujam, Eng. Struct. 28, 2006. 1093–1109 p.
6. K.H. Kim, S.Y. Jang, B.S. Jang, B.H. Oh, ACI Material Journal 107, 2010. 106–113 p.
7. K. Lundgren, Bond between corroded reinforcement and concrete. (Chalmers University of Technology, Göteborg, Sweden, 2001)
8. I.P. Lazar, Proceedings EM2000, (14th engineering mechanics conference ASCE, Austin, TX, USA, 2000)
9. G.J. Al-Sulaimani, M. Kaleemullah, I.A. Basunbul, Rasheeduzzafar, ACI Struct. J. 87 (2), 1990. 220–231 p.
10. J.G. Cabrera, P. Ghoddoussi, Bond in Concrete, (Proceedings of an International Conference, CEB, Riga, 1992)
11. H.S. Lee, T. Noguchi, F. Tomosawa, Cement and Concrete Research 32, 2002. 1313–1318 p.

Kowalenko B. O.

HISTORISCH- ARCHITEKTONISCHE FORSCHUNG DES BAUDENKMALS ANFANG DES XX. JAHRHUNDERTS- DER EHEMALIGEN MANUFAKTUR IN DER ROZHDESTWENSKAJA STRASSE, 6 IN CHARKIW

Wissenschaftlicher Berater – PhD., Asst. Prof. Priluzkij W. A.
Sprachberaterin – Lomonosowa Zh. W.
Charkower Nationale Universität für Bauwesen und Architektur

Die Manufaktur von Pjotr Galaktionowitsch Mindowski [1], des russischen Textilherstellers, wurde nach dem Projekt von dem Architekten O.I.Rzhepischewski in 1910 aufgebaut.

Das Gebäude der Manufaktur wurde im Jugendstil gebaut, der dem Konstruktivismus der 20. Jahre des vorigen Jahrhundertes voranging. Der konstruktive Jugendstil ist eine der Abarten des Stils der Moderne, der sich mit den großen Verglasungsflächen, der Dekors Armut, den anspruchslosen farbigen Lösungen auszeichnet. Die Anwendung der modernen Technologien im Bau einschließlich mit den neuesten Stahlbetonkonstruktionen erlaubt die Fläche der Verglasung auf der Fassade zu vergrößern und, die Ausdruckskraft der architektonischen Plastik der Fassade zu gewähren, was dank der Anwendung der Erker möglich wurde. Meiner Meinung nach, hat der Architekt O.I. Rzhepischewski für die Ausstattung seiner Manufaktur einen der ersten

Wolkenkratzer in der Stadt Chicago als Beispiel genommen. [2] Das Aussehen des Gebäudes ist von den dekorativen Elementen nicht überlastet, jedoch gibt es der kaum bemerkenswerte Dekor in Form von Maskaronen, Trägern mit den Voluten, Kränzen, die man auf den Fotos sehen kann, die unten angeführt sind. Der Zustand des Gebäudes der Manufaktur hat im Jahr 2018 keine bedeutende Veränderungen erprobt, die Unterschiede bestehen nur im Verlust der abgesonderten dekorativen Elemente, in den Beschädigungen der Verglasung und in dem Teilersatz der hölzernen Brettern, damit es schwierig war, ins Gebäude durchzudringen. Vom Anfang der Manufakturerrichtung war das Dach mehrmals verändert, was in der Tabelle angeführt ist. (Die Tabelle 1.1)

Der innere Zustand des Gebäudes hat stark gelitten, und es gibt jetzt keine dokumentarische Zeugnisse über die ursprüngliche Innenausstattung.

Die Manufaktur ist das Rechteck im Grundriss. Im östlichen Teil des Gebäudes befindet sich der zusätzliche verbindende Teil, der das Treppenhaus des Notausganges, sowie den Zwischenkorridor vom Hauptgebäude zum zusätzlichen Teil hat, der auf die Lopanski Gasse hinausgeht. Die konstruktiven Komponenten des Gebäudes gehören zum Rahmentyp, der die inneren Stahlbetonrahmen mit den tragenden Außenwänden hat, auf die sich die tragenden Balken des Stahlbetongerüstes stützen.

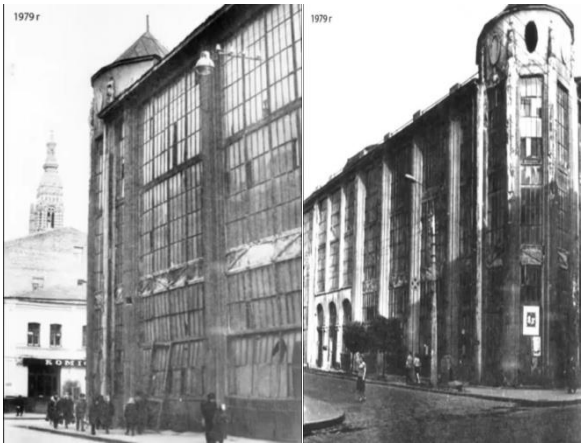
Die Fassaden des Gebäudes haben die senkrechte Gliederung mit den großen Verglasungsflächen. Die senkrechten Zwischenwände, auf die sich die Stahlbetonrahmen des Gerüstes stützten, waren mit der Ausnutzung des Schlackenfüllstoffes erbaut und hatten gute Wärmedämmung.

Die massiven Längsrahmen sind die wichtigsten Tragelemente des Gerüstes und des ganzen Gebäudes. Im Laufe der Rekonstruktion der Gerüstelemente des Gebäudes wurde die Kreuzung der Kolonnen der Hauptrahmen bei der Anwendung der Winkelschellen für die Kolonnen verändert. Der Fußboden auf den Überdeckungen fehlt. Das Fundament ist ein Monolithstützenfundament von dem pyramidalen Typ. Das Gebäude hatte Ofenheizung, die zentrale Kanalisation, die Wasserleitung und die Elektrizitätsversorgung.

Die mit dem Dachboden versehene Deckung ist mit hölzernen Dachsparren mit dem Metalldach ausgeführt. Das System der radialen Anordnung der hölzernen Dachbinder ist im Winkelturm verwendet. Die Standhaftigkeit der Deckung wird mit Hilfe von zwei metallischen Abstützstreben an dieser Stelle gewährleistet, die die halbrunden metallischen Glieder des runden Turmes festhalten. Im Jahr 1910 war der Abschluss des Winkelturmes helmähnlich, aber später während des Krieges war er zerstört. Nach der ersten Rekonstruktion im 1950 hatte der Abschluss des Turmes die Form des Konus, doch im Jahr 1990 wurde dem Turm seine ursprüngliche Form zurückgegeben. (Die Tabelle 1.1)

Die Treppenhäuser der Haupttreppe sind mit Metallwangen vorgesehen, und die Treppenabsätze sind aus Stahlbeton. Am Anfang des Betriebes des Gebäudes befanden sich innerhalb der Lagerräume der Aufzug und die Aufzuggrube, nach der Revolution hatte das Gebäude ganz andere Funktion, deshalb wurden der Aufzug und die Grube demontiert.

Die Tabelle 1.1 – der Veränderungen des Dachs des Winkelturmes des Gebäudes.

№	Jahr	Dachform	Foto
1.	In 20-30-en Jahren des XX. Jahrhunderts	Dachform ist wie ein Helm.	
2.	1942-43 Jahre	Dachform ist wie ein Helm, doch man sieht die Zerstörung des Dachs.	
3.	In 80-en Jahren des XX. Jahrhunderts	Nach dem Krieg sieht das Dach wie Konus aus.	
4.	Zustand des Gebäudes im Jahr 2014	Nach der letzten Rekonstruktion in den 90-ten Jahren wurde die Dachform zu der Ursprünglichen maximal angenähert.	

Ende des XIX. Jahrhunderts stand an der Stelle des gegebenen Gebäudes das Haus von Marfa Sidorowna Purzeljadze. Laut Angaben der Liste der Hausbesitzer im Jahr 1909 wurde von mir die Informationen gefunden, dass vom Besteller die Stelle für den Bau der Manufaktur für 16 650 Rubeln losgekauft war. [3, 142–143]

Aus den chronikalischen Materialien der Stadt Witschuga wurde bekannt, dass P.G.Mindowski der Gründer "der Gesellschaft auf den Anteilen der Wolgamanufaktur der Papier- und Leinerzeugnisse P.Mindowski und I.Bakakin" war. Die Fabrik war im Jahr 1882 in Betrieb genommen. Ende des XIX. Jahrhunderts arbeiteten mehr als anderthalb Tausend Menschen in der Fabrik, und ihr Jahresumsatz übertrat 2 Mio. Rubeln. Die Wolgafabrik von Mindowski war ein komplexer moderner Betrieb, der nicht nur mit der führenden Technik ausgestattet war, sondern stelle auch die entwickelte Sozialfürsorge für die Arbeiter dar, die hier in den speziell aufgebauten Wohnungsräumen wohnten.

Im Jahr 1910 vereinigte das Unternehmen in der Stadt Witschuga die textilen Fabriken in Nawoloki, Nikolski und Jurjewez, die Lagerhäuser in Moskau, Rostow am Don, Charkiw und Kyiw. [4]

Nach der Revolution 1917 hat das Gebäude der ehemaligen Manufaktur hat die funktionale Bestimmung geändert. In den 20.-30. Jahren des vorigen Jahrhunderts arbeitete hier die allukrainische permanente Ausstellung der Errungenschaften der Volkswirtschaft der USSR, und nachher befand sich dort das landwirtschaftliche Museum des Volkskomissariats des Ackerbaus der Ukraine.

Während des Großen Vaterländischen Krieges war das Gebäude tatsächlich nicht geschädigt, aber das Dach und der helmähnliche Abschluss des Turmes wurden jedoch zerstört.

Nach dem Großen Vaterländischen Krieg bekommt das Gebäude der ehemaligen Manufaktur seine industrielle Funktion wieder zurück, und bis zu den 70. Jahren des XX. Jahrhunderts befindet sich dort Prothesenfabrik.

Von den 70. Jahren des XX. Jahrhunderts hat das Gebäude zwanzig Jahre lang leer gestanden, und erst im 1990 Jahr wurde die Rekonstruktion durchgeführt und im zentralen Gebäudeteil, der auf die Gasse Lopanski hinausging, war Kasino "Split" veranstaltet. Im Zusammenhang der Verletzung der geltenden Gesetzgebung in der Sphäre des Spielbusiness und was die Frage der Kreditgewährung von Immobilien in der Banksphäre anging, war das Kasino "Split" abgeschaffen.

Der Eigentümer des Gebäudes wurde die Nationale Bank der Ukraine im Jahr 2015. Die Bank hat die Teilrekonstruktion des Gebäudes finanziert, jedoch hat der Zustand des Gebäudes im 2016 seine Attraktivität wieder verloren.

Heutzutage befindet sich das Gebäude im unbefriedigenden Zustand, die Eigentümer kümmern sich um seinen Zustand nicht, wenn so weitergeht, empfindet Charkiw die großen Verluste in der Sphäre des Kulturerbes.

Quellen

1. Про династию Миндовских [Электронный ресурс] : Режим доступу : https://www.liveinternet.ru/users/1259518/page24.shtml .
2. Про первый небоскреб в мире [Электронный ресурс] : Режим доступа : http://kakizobreli.ru/pervye-neboskreby/ .
3. Список домовладельцев г. Харькова, 1909 р., ст. 642.
4. Про фабрику Миндовского и Бакакина [Электронный ресурс] : Режим доступа : http://visitivanovo.ru/areas/kineshemski/sights/monuments/fabrika-p-mindovskogo-i-i-bakakina/.

Kozakova A. O.

ROTATING SKYSCRAPER IN DUBAI AN AMAZING PROJECT BY DAVID FISHER

Language Advisor – Tkachenko S. V.
Kharkiv National University of Civil Engineering and Architecture

The modern world is full of unique, eye-catching buildings, but a skyscraper under construction in Dubai will really be a breakthrough in the development of architecture. Building Dynamic Tower can rightly be called the next wonder of the world.

The author of the project is the Italian architect David Fisher. It is known that the Fisher company, the Rotating Tower Technology Company, intended to erect the first such tower near the Sheikh Zayed Road in Dubai.

The height of the building Dynamic Tower should be 80 floors, and the approximate height of the building from 388 to 420 meters.

Surprising is that all 80 floors of the original design rotate 360 degrees. Each floor will have to rotate around its axis depending on weather conditions (wind direction, sun position in the sky and precipitation, moon position) and at the request of the owners. Just imagine that you can enjoy the sunrise, waking up in the morning in your bed and dining overlooking the ocean, admiring the beautiful sunset.

On the first floor, according to the project of the unusual building, there is a hotel, the rest of the space is occupied by private apartments.

Rotating skyscraper in Dubai has a height of 420 meters. It is set in motion by the action of 79 wind turbines, which are located between the floors.

One of the main features of this innovation is its energy self-sufficiency: the turbines produce enough energy to continuously rotate the multi-storey building around its axis. The building will also be equipped with solar panels on the roof.

The David Fisher project Dynamic Tower was planned to be launched in 2010. The construction was the first construction in its likeness in the whole world. The amount of investment in this project is approximately 700 million dollars.

According to Fisher himself - the author of this unique project, a spinning skyscraper in Dubai, was the first building that can move and change its shape. This

design will always look in a new way, each time surprising everyone around, and especially apartment owners.

It takes 3 hours to turn the apartment around its axis and re-assume its original position. The shape and direction of rotation of the apartments are chosen by their owners.

The moving Dynamic Tower skyscraper in Dubai also plays the role of a power station, providing electricity not only for itself, but also for neighboring buildings.

Rotation of the floors of this incredible design will occur depending on weather conditions, this will be influenced by the wind direction, the position of the sun in the sky and the nature of precipitation.

According to the project of David Fisher, the skyscraper provides for the presence of swimming pools, gardens and freight elevators, designed to lift cars directly to the apartments of their owners.

The area of each floor is 420 square meters, they will be set in motion by a voice command with the force of wind turbines.

Dynamic tower is the first building in the world that can change its appearance.

Each floor of the building will be moving relative to the ground and other floors. The innovative 420-meter building will rotate its floors 360 degrees around one massive and fixed column with the help of 79 energy wind turbines located on each floor. Rotating floors will consist of prefabricated parts that will rotate around a concrete axis. Most floors will be controlled from the architect’s laptop computer, so their movement will be synchronized for creating to undulating forms.

In the "Dynamic Tower" they plan to place offices, hotels, apartments and 10 luxury villas. Although the whole tower will rotate, only these 10 private villas at the very top will be able to control their movement.

The rotating tower will be able to independently produce energy through solar panels on the roof and 79 wind turbines. This is more than 0.3 megawatts of electricity from each element, annually generating 1,200,000 kilowatt-hours of energy.

The Dynamic Tower building will accommodate office spaces, hotels, luxury real estate and apartments easier. Especially for car owners the freight elevators will be available in the building, which will take the homeowner home in the car. And for the decoration of buildings pools and gardens will be used.

References

1. Ecotechnics: [Electronic resource]. URL: https://ecotechnica.com.ua/arkhitektura/2113-v-dubae-stroitsya-vrashchayushchijsya-neboskrjob-dynamic-tower.html.

2. Dubai-life: [Electronic resource]. URL: https://dubai-life.info/1280-dynamic-tower-dom-v-dubai/.

3. Look at me: [Electronic resource]. URL: http://www.lookatme.ru/flow/posts/arcitecture-radar/24107-dubai-ne-perestayut-udivlyat.
4. Komodo: [Electronic resource]. URL: http://komodo74.com/s-miru-po-nitke/dynamic-tower-koncept-krutyashhegosya-neboskreba-v-dubae-video.html.
5. All about Dubai: [Electronic resource]. URL: http://www.champselysees-dubai.com.
6. Ganjalive: [Electronic resource]. URL: https://ganjalive.biz/topic/26093-pervyj-v-mire-tantcuiuschij-neboskreb-—-dynamic-tower-v-dubae/.

Krestova P. O.

MODERN CONCEPT OF AIRPORTS DESIGN

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

Over the last half of the century, air travel has become commonplace around the world. Once airports were all about function rather than form, but now architects are also charged with creating icons representing the status of the cities and countries they serve. The look and feel of the world's airports has evolved over the years, as have the methods used to design them.

Today, airport design is not the idea of the lone architect imposing his vision onto a project. It has become a highly collaborative process of designers and operators working with a lot of specialists to create a modern airport. Airports are very complex infrastructures, far more complex than the building of any other infrastructure project. The main aim of the airport designers is to create a calm, functional, safe, and aesthetically pleasing airport environment which helps reduce the stress of travel and provide enjoyable places to wait for aircraft to arrive.

The most important feature of up-to-date airport is its flexibility for growth and change. Flexibility means users can react to new changes and evolutions without having to change the building's structure substantially. With the massive increase in security concerns airports must make good use of emerging technology to be able to stay up-to-date. For example, now all airports must be equipped with full-body scanners and equivalent imaging devices as central to keeping airports secure at the same time minimizing bottlenecks and passenger flow disruption.

Airport projects themselves demonstrate how far airport design constraints and demands have changed. Passenger comfort enhanced by natural light, planting, outdoor access and a sense of calm and space became a priority. There are grandiose hopes to convert some airports into 'lifestyle destinations'. This principle has already been proved

by **Munich Airport**, which is considered the best in Europe. It attracts thousands with its own micro-brewery, live music, and Christmas market.

Munich Airport was home to the world's biggest man-made standing wave and an artificial beach for surfing where its own annual championships are held. The airport's Visitors Park features a playground and a mini-golf course, as well as attractions for aviation enthusiasts, such as historic aircraft you can step on board and explore. There are grand plans to expand the playground too, with the construction of five distinct "zones" (Africa, Asia, Europe, North America and South America) housing new climbing frames and swings.

İstanbul New Airport will be the largest airport in the world. The design is highly futuristic, but still reflects the Turkish heritage, drawing inspiration from the country's mosques, baths, and domes. Beyond the aesthetic appeal, the latest technology is planned. This includes intelligent lighting, beacon, and geo-finding technologies for indoor directions, virtual reality, augmented reality, 3-D holograms, smart kiosks.

The use of local architectural motifs — multiple arches throughout the terminal and a control tower cut with sinuous curves recalling a modern minaret — give a sense of place to Istanbul's new airport, located 20 miles north of the city. It will be furnished with the world's biggest duty-free shopping area under a single roof, which will be laid out like a traditional Turkish bazaar. Initially, 90 million passengers will use the new terminal, but subsequent expansion will enable the airport to reach a capacity of 200 million.

Jewel Changi Airport is the building designed as a new central connector between the existing airport terminals at Singapore Changi Airport. Based on the geometry of a torus, it is directly connected to the terminals via linkage bridges. At its core is the Forest Valley, a terraced garden which includes walking trails, cascading waterfalls, and quiet seating areas.

Jewel's distinctive dome-shaped façade is made of glass and steel. At the apex of its glass roof is an oculus that showers water down to the center of the building. The Rain Vortex will be the world's tallest indoor waterfall, transforming into a light and sound show in the evening. Additionally, rainwater funneled into the waterfall will be used for landscape irrigation systems.

John F Kennedy or JFK International Airport, the busiest airport in New York, had become outdated and was not able to handle the increasing passenger traffic. The airport is to undergo a major redevelopment to meet future air traffic growth and turn into a 21st century airport.

The JFK International Airport redevelopment project will mainly include the construction of two new passenger terminals. They will feature world-class amenities such as duty-free shopping, fine dining, modern conference and meeting rooms, first-class retail outlets, interior green space, and a children's play area. Terminals will feature larger waiting areas with high ceilings, natural lighting and modern architecture depicting iconic New York landmarks.

The redevelopment project will also include the installation of radiation detection and next-generation technology for the identification of unattended packages to enhance security at the airport. The plan also includes improvement of road network to the airport. Two new JFK Welcome Centers situated at the centre of the airport will feature taxis, buses, hire vehicles, as well as parking options.

References

1.http://www.perspectiveglobal.com/architecture/eight-of-the-best-designs-in-airport-architecture/

2.https://grimshaw.global/projects/istanbul-new-airport/

3.https://www.archdaily.com/803063/new-york-plans-10-dollars-billion-renovation-of-jfk-airport

Krivorotenko A. A.

FEATURES OF THE ARCHITECTURE OF THE FUTURE

Language Advisor – Muzalevska Y.A.
Kharkiv National University of Civil Engineering and Architecture

Architecture personifies its time, is a reflection of the development of society, culture, history. Architectural structures are created by people and for them. Events taking place in the world are also reflected in the architecture. At the same time there are projects that lead humanity into the future. Such architectural projects are waiting to be reflected on paper.

The main features of future projects are:

- cost-effectiveness
- ergonomics
- environmental friendliness.

Building materials are improved every year, which seriously affects the quality of new architectural structures. An architect is inherently an artist who paints an urban landscape. These artists are constantly looking for new ideas. Designers, technologists, designers and even biologists work together on projects of the future. The architecture of the future is characterized by biomorphic architectural forms, an imitation of nature.

Ample opportunities for future projects opens up the possibility of computer-aided design. Thanks to the use of computer-based innovative technologies, the

architecture of the future will become unique, thought out to the smallest detail, striking sophisticated humanity.

Biomorphy extends, being embodied in new masterpieces. Modern building technologies make the buildings of the "future" look like animated creations with unusual bends of structures. Thanks to a breakthrough in technology, the architecture of the future consists of buildings of any geometric shape. Buildings of the future will be filled with sensory sensors that pick up even the slightest climatic changes and launch a response system.

Projects like the Tower Suite Vollard are examples of dynamic architecture. Many ideas of the future have already been realized. A striking example of this is the modern architecture of the United Arab Emirates.

The architecture of the future is always described first by artists and science fiction writers. They try to look into the beautiful future, depicting fantastic pictures in their works. An important place in this area is, of course, science fiction. Of great interest, from this point of view, is the work of Stanislav Lem "Futurological Congress". In it, the author describes giant skyscrapers, presented the concept of total virtualization of the existing reality in the form of matrices. More than once, people have witnessed the implementation of technologies previously described in books by science fiction writers.

In ancient times, structures were built monumentally, for millennia. An example is the Egyptian pyramids. In the Middle Ages, the buildings were designed for centuries of service. The service life of modern buildings ranges from fifty to one hundred years. In accordance with the new concept, the building service cycle is calculated in advance. In such projects, at the initial stage, technologies for dismantling, installation and recycling of the building are laid. It should be noted that modern homes, even before their physical destruction, become obsolete morally and cease to conform to their functional purpose.

Mostly the architecture of the future will be focused on harmony and functionality. The increase in the price of energy and labor resources will lead in the future to the fact that reconstruction will be carried out much more often than demolition. Architectural masterpieces of the past will remain, but will be modified.

The world is moving fast towards globalization. It is obvious that humanity cannot avoid this process. Assuming that globalization will develop in a peaceful direction, then human society will come to the rational use of land resources, large-scale landscaping, and the development of environmental technologies.

Many projects that are already presented today provide for the use of unified construction materials-designers, which resemble the designer of Lego. There is a tendency to use glass with variable transparency. Already today, sensors that make houses "smart" are widely used. The question of the need to optimize space is also discussed. Pretentiousness will fade into the background in the architecture of the future. Modern vectors in construction are aimed not only at optimization and functionality, but at hybridization. In the future, we are waiting for the powerful

development of such areas as landscape design, gardening of adjacent territories, the integration of gardens and farms in urban conditions.

Already, modern architecture is actively using computer technologies that allow sending a computer model directly to production, and, bypassing the intermediate stages, make the details of the structure. In the future, this approach will lead to the fact that construction will be clean and speedy. Technologies will make the architectural structures more durable, and at the same time light, ephemeral. Building facades can change their appearance: windows, masonry and other options. It will be possible to visualize the real world or imitate the desired picture.

Gradually, the urban industry becomes more compact and dissolved in space. In the future, it will be more environmentally friendly than it is now.

The technological equipment houses seriously change in terms of saving resources. Homes will be transformed from consumers to energy suppliers. Increase the efficiency of water consumption through the introduction of the working cycle. The houses will be equipped with a system of protective filters in order to maintain the necessary balance of atmospheric pressure and protection from the harmful effects of the environment. Perhaps the construction of buildings under water will be developed. Concrete fittings will be replaced with carbon nanotubes made of cement composite. Thus, buildings will be sixteen times stronger. Steel cables will be replaced with diamond ropes, which are able to withstand a hundred times more load.

In conclusion, it is necessary to add that modern architecture is an absolutely new philosophy, whose global meaning is based not on creating eternal monuments of someone's ego, but in the service of humanity and its needs, which are a complex quintessence of functionality, comfort, convenience, beauty, emotionality, economy, and sustainability. Now, both in design and in architecture, the definition of “beautifully” received an additional meaning, namely, the expediency of its existence in each element. That is, the beautiful is ingenious, and all ingenious is simple and not littered with unnecessary details. Therefore, the ideal works of modern architecture are designed to be not just beautiful monuments, but vessels for our life.

References

1. Едике Ю. История современной архитектуры. М.: Искусство, 1972.

2. Мишель Рагон. Города будущего. Издательство «Мир», Москва, 1969г.

3. Фремптон К. Современная архитектура: Критический взгляд на историю развития. Пер. с англ. Е.А.Дубченко. Под ред. В.Л.Хайта. М.: Стройиздат, 1990.

4. Glibota Ante, Edelmann Frederic. Chicago. 150 years of architecture. 1833-1983. Exposition organized by the Paris Art Center and the Musee-Galerie de la Seita. Paris: Marchand.

Kruchkova A. A.

JAPANESE GARDENS-HISTORY, TYPES, ELEMENTS, AND MORE

Language Advisor – Kushchenko Zh.L.
Kharkiv National University of Civil Engineering and Architecture

Traditional Japanese garden is considered one of the most important elements of Japanese art. Each type of traditional gardens has their own beauty, and indeed they are very popular thing to explore in Japan! There is a list of historic Japanese gardens can be found across the country, especially in Kyoto (formal capital city of Japan) and Tokyo.

Kyoto is known for its historic temples and shrines that are mostly decorated with beautiful gardens. The landscapes of these gardens change frequently as the four seasons of Japan pass them by throughout a year. There, visitors can experience picturesque view of colorful foliage in the fall, and an unforgettable sakura blossoms display in the spring. [1, p.48] Making or building a traditional Japanese style garden is not an easy task at all, it takes time to build and let it grow naturally. A large number of tourists wish to visit to various Japanese gardens that are located mostly in Kyoto and Tokyo. Have you ever visited any Japanese garden? Japanese garden is beautiful as traditional Chinese garden. Although Japanese were inspired by ancient Chinese style outdoor garden, sometimes I believe Japanese garden is far beautiful than the Chinese ones. It represents the ultimate beauty of nature. Almost every Japanese garden symbolizes things such as sand or gravel symbolizes river while on the other hand rocks represent the mountain.

Japanese gardens that you find in the land of the rising sun, were not created yesterday. They have left so many years behind but still they shine like the old days. Some Japanese gardens you see in Kyoto and Tokyo are great and most of them were built thousands years ago from now. They represent a long period of history where you could experience both positive and negative view of them. Many beautiful gardens were destroyed over times, many were built in modern Japanese era and there are some which are being built by the great artists.

In Japan, Many Japanese merchants during the Asuka period (538–710) used to visit its neighboring country China. They were influenced by the contemporary Chinese arts. The beauty of traditional style Chinese gardens inspired them to make their own.

It is said that between 630 and 838, along with Buddhist monks, Japanese court had sent scholars, diplomats, students, translators to China. So, the idea of these unique gardens developed around the 7th century when Buddhism first was introduced in Japan from China. History indicates that Japanese gardens was developed throughout different periods of time such as in Asuka period, Nara period, Heian period, Kamakura & Muromachi periods, the Momoyama period, Edo period, Meiji period and Modern era. You can differentiate the different styles of gardens which were designed and built from Asuka period to modern era once you take a visit to gardens located in Kyoto and Tokyo. The garden of the Askua

and Nara periods were all destroyed in the past, now people can only find them in various paintings.

There is a type of Japanese garden called “Paradise Garden” – that was first developed in the Heian period (794-1185). A book called “The Sakuteiki” was written in this period and it was the first book ever written about garden making technique.

Zen Buddhism flourished during the Kamakura and Muromachi periods (1185-1573), as a result in many Zen Buddhist temples had built Zen Style Japanese Garden. On the other hand, during the Momoyama period (1586-1600), one of the most beautiful style Japanese gardens was introduced, which is widely known as a tea garden. During the Edo period (1615-1867), rock Zen gardens size became bigger than they were before in Kamakura and Muromachi periods. [3]

The famous gardens that were created in the Meiji era (1868–1912) all were built under the supervision of many businessmen and politicians. Today, in the 21st century you can even observe modern style Japanese garden which are distinct than those of the gardens styles you have been informed here earlier. Japanese garden has been designated as a place of peacefulness. In fact, it was one of the reasons why Zen garden making idea came in to mind of Zen Buddhist monks. Buddhism teaches us to be peaceful and this doctrine gives us a clear view how decorative and calm Zen garden could be just using sand or gravel. These two elements represent the water and when you take a look at one of these types of gardens you find peace there.

There are other important elements which represent various things we find in our nature, they are: water, sand, gravel, stone, rock, island, hills, teahouse, bridge, stream, fishes, strolling path, stone-lantern, bamboo pipe, moss, flowers, pond, trees, statues, gates, water basin, garden fences, and garden architecture. Every element has different meanings and they symbolize many things.

Water or pond is seen to be one of the vital elements of Japanese garden except Zen gardens. Though, Rock and Zen garden’s sand or gravel represents water, clouds and purity. Japanese bridges that you see in Japanese gardens reflect artistic feelings. Small ponds represent the ocean or sea while fishes are used as part of decorative element. A stone lantern represents the four natural elements: fire, water, earth and wind. [4] Every element that are shown above used to decorate or making one garden more appalling.

Traditionally, three main styles of Japanese gardens can be found here in Japan. These three different types (Karesansui, Tsukiyama, Chaniwa) of Japanese gardens represent different meaning based on their style of looking. [2, p.105] We would get familiar with other types of Japanese gardens which are truly profound.

References

1. А.П.Вергунов, М.Ф.Денисов, С.С.Ожегов. Ландшафтное проектирование. –1991. – с.105-106

2. James C. Dobbins// KAMAKURA BUDDHISM, JAPAN// electronic article /// –2016. – 1 December. URL: https://www.encyclopedia.com

Krykun V. I.

WINTER CONCRETING OF FLOOR SLABS

Language Advisor – Senior Lecturer Galchenko V. M.
Kharkiv National University of Civil Engineering and Architecture

One of the main problems of the construction period associated with the use of concrete and reinforced concrete is the problem of effective concreting. The most important of the conditions of effective concreting is the temperature regime of hardening of concrete, obtained by various methods, based on the real conditions that exist or can be created on a specific object.

The change in the temperature condition of structures during the construction period is due to release of heat of cement hydration, fluctuations in outdoor temperature, solar insolation, technological factors, etc. In any method of concrete work, the concrete should be protected against freezing until acquiring critical strength. The optimum temperature of the medium for concrete hardening is conventionally 15-20°C (normal conditions). At low temperatures, the strength of concrete increases more slowly than at optimum [1, 30-31].

When the temperature of the concrete is below 0°C, the hardening practically stops, as the process slows down cement hydration. In winter, there are frequent temperature transitions through 0°C, which directly affects the hardening of concrete. Laboratory test results show that freezing concrete at an early age leads to a loss of strength of about 40%, which is not restored during the subsequent hardening in the conditions of positive temperature.

Freezing of concrete after a set of critical strength practically does not affect its mechanical characteristics. Therefore, in winter, special methods are used. Winter concreting methods are:

- use of additives, including antifreeze;
- regulation of the temperature of the supplied concrete mixture (curing of concrete thermos);
- concrete work in a temporary shelter;
- installation of thermal insulation on the surface of the concrete block;
- electro thermal processing of concrete (electrode heating, induction heating, heating method wires, etc.);
- thermocline formwork and infrared heating of concrete.

Thus, when concreting in winter conditions, the following important technological task is to ensure the heat and humidity conditions of keeping laid in the structure of the concrete mix, which allows having a given strength with the ability to provide the design load.

The purpose of this article is to analyze modern methods and technologies for concreting monolithic structures in winter conditions and the study of the process of concrete strength development using the example of a slab overlapping, in particular, the heat-moisture regime of keeping the concrete laid in the structure mixes. It is necessary to solve a number of tasks:

1. Analysis of the existing complex of technological solutions for the production of concrete work in winter conditions, allowing for a given temperature and economic conditions the efficiency of the whole process;

2. Selection of a design model for numerical experiments;

3. Analysis of the work of the elementary volume of concrete in an arbitrary section of the slab.

The resulting enclosed space begins to be heated the day before laying concrete. With concreting the floor each concreted part of it must be covered with a tarp or dolomite mats, laid on the boards on the edge. Between the top of the slab and heating place the protection gap should be about 20 mm. To access heat in the resulting space in the lower part of the formwork the holes are made. Through them warm air or steam enters. The temperature inside is + 5°C. [2, 42-44].

Electric heating concrete is among the known methods of winter concreting. Electrode heating is preferred due to reliability and ease of installation. It is higher by 10-12% thermal efficiency than string electrodes. It rapidly achieves elevated temperatures with a more uniform distribution of temperature fields. For electric heating of concrete during winter concreting, different brands are used:

- heating wires: PNSV, PGPZH, PNZH;

- wire, H - heating, C - steel conductor, B - PVC insulation. Wire for heating concrete PNSV;

- It is a conductive core that has an insulating coating. Protection can be achieved by polyester or polyvinyl chloride.

To warm the concrete with the PNSV wire, it is immersed in concrete, then voltage is applied. The PNSV wire is evenly distributed by coils over the heating area in 2.5-20 cm increments, depending on the place of concrete heating.

Quality and safety of monolithic reinforced concrete structures erected in winter conditions mainly depend on production technologies. With any method of production concrete works, the concrete should be protected against freezing until it acquires a minimum (critical) strength. In the calculation practice there are examples of determining the optimal thermal protection parameters in the winter. The method of heating wires has the advantages compared with other methods. Its principal advantage is that heating occurs inside the concrete, which causes its accelerated hardening.

According to the study, with the failure of special technological measures to regulate the temperature of the concrete massif it is impossible to provide a mode keeping the concrete mixture laid into the structure, allowing it to get critical strength. In this case, the modeling of concrete strength in the program allows to have the most complete picture of temperature fields and produce quick selection of optimal parameters of concreting [3, 81-83].

Thus, when concreting in winter conditions, the following important technological task is ensuring the heat and humidity conditions of keeping laid in concrete mix design. Only in this case it is possible to ensure the construction of reinforced concrete structures of high reliability and durability.

In order to regulate and ensure the optimum temperature for keeping the concrete mix design, which allows it to gain critical strength, is most effective carrying out the following technological measures: after dismantling the heat body, cover the surfaces plates with heat-insulating layer, as well as apply electrical heating.

The required thickness of the insulation, in the case of the considered design situations, depends on outdoor temperature: at -5°C it is necessary 10 mm, between -10°C and -20°C it is 20 mm, at -30°C it is 30 mm. With the above ratio "temperature - thickness of insulation" analysis shows that during the first 8 days the plate does not freeze through, temperature is maintained (normal conditions ≈+20°C), providing optimal conditions for the curing of concrete. [4, 84-85].

References

1. Tarasova A. Y. The winter concreting. How to do it correctly? Concrete technologies. 2015. Pp. 40-43.

2. Pikous G. A., Mozgalev K. M. Control for concrete characteristics under winter conditions. 2013. Pp. 42-44.

3. Zolotukhin S. N., Goryushin A. N. Concreting at low temperatures. 2012. Pp. 81-85.

Krylov D. E.

BUILDING TECHNOLOGIES OF THE FUTURE

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

It’s no secret that technology is revolutionizing literally every aspect of modern day life. The construction industry, continually being updated and upgraded with the latest technology, is one such example of this.

Technology in construction comes with devising innovative new ways of constructing and whilst the changing future of construction is largely unknown, there are some construction technology trends that are paving the way for certain futuristic construction technology.

I want to talk about the two technologies of the future

1. Self-healing concrete

Cracks in concrete are a common phenomenon due to the relatively low tensile strength. Durability of concrete is impaired by these cracks since they have provided an easy path for the transportation of liquids and gasses that potentially contain harmful substances. If micro-cracks grow and reach the reinforcement, not only the concrete itself may be attacked, but also the reinforcement will be corroded. Therefore, it is important to control the crack width and to heal the cracks as soon as possible. Since the costs involved for maintenance and repair of concrete structures are usually high, this research focuses on the development of self-healing

concrete. Self-healing of cracks in concrete would contribute to a longer service life of concrete structures and would make the material not only more durable but also more sustainable.

The science behind this technological marvel shows itself when water enters a crack. This reactivates the bacteria that were mixed in during the mixing process. When the bacteria are activated, it excretes calcite which then heals the crack.

A promising technology developed by Hendrik Jonkers of Delft Technical University in the Netherlands and commercialized by Basilisk Concrete, uses bacteria. In their self-healing concrete, these bacteria produce limestone if triggered by contact with water and air, and in doing so they repair the crack. Basilisk uses this autonomous repair system in several products that are applicable both for new constructions and in existing structures. For instance, they sell a self-healing agent for fresh concrete mixtures and a self-healing repair mortar for existing structures. And they sell a liquid repair solution for small, narrow cracks in concrete which cannot be sealed with a mortar. After application the liquid forms a gel which seals the crack watertight. The bacteria then convert the gel into limestone for a permanent seal. Because small cracks are sealed watertight, frost resistance and durability of the structure will increase considerably. Basilisk has formed collaborations with renowned names in the international world of concrete. As a result, they have created a platform for a broad introduction of the technology. Their work has been applied in major projects and has also attracted international attention

At Ghent University in Belgium, they research more options of self-healing concrete. Bacterial repair is one of them. Like Basilisk, the Ghent researchers embed the bacteria in microcapsules or micro gels, where they may survive hundreds of years, whereas they would not be long-lived when introduced into the concrete mixture right away. But they also investigate the use of these hydrogels as such. These gels swell when water enters into the concrete; this partly seals the crack. Then the gel will provide the fluid to the surrounding matrix for internal curing, further hydration and the precipitation of calcium carbonate. In this way, cracks may close completely. Alternatively, encapsulated polymers can be used in self-healing concrete. When a crack appears, the capsules break and the content is released. Due to capillary action, the agent will flow into the crack. After reaction, the crack faces are bonded together and the crack is thus healed. Polyurethane, methyl methacrylate, water repellent agents and elastic polymers are among the polymers used, depending on the primary goal of crack repair: reduction of water permeability, strength restoration, aesthetic view or effective crack sealing. And finally, a form of self-healing concrete can be obtained by adding fly-ash or blast-furnace slag to the concrete mixture. These would seem to be inferior with regard to early age microstructure and strength development, but their self-healing capability can be high, because they will still contain some unreacted particles that can be activated when cracks appear.

The ultimate goal is to develop concrete materials that continually monitor, regulate, adapt and repair themselves without external intervention. Such self-

healing concrete will save both lives and resources, and significantly reduce life cycle carbon emissions. A whole new and promising area of research lies in the incorporation of nano-scale mineral and chemical additives into concrete. This might add new properties, like enhanced mechanical and durability performance, or self-cleaning. Some researchers get excited at the prospect of adding graphene to concrete, which might deliver these new properties and even eliminate the problem of steel corrosion, the biggest and most expensive deterioration problem in concrete.

2. Smart bricks

Smart bricks are modular connecting bricks and are similar to 'Lego.' Made out of high strength concrete and developed by 'Kite Bricks', smart bricks are versatile and come with substantial thermal energy control and a reduction in construction costs. As they are modularly designed, they are easy to connect and have space for insulation, electricity and plumbing

Smart Bricks are designed to be easily joined together, with open internal spaces where insulation and infrastructure elements can be run through the bricks, allowing easy access to these elements. Floors, walls, and ceilings are all constructed using the appropriate bricks to allow for facile, solid construction with little mess and significantly reduced construction costs. Smart Brick construction also greatly reduces the need for natural materials such as sand, iron, and water.

Bricks are designed to be easily joined together, with open internal spaces for insulation and infrastructure elements to be run through the bricks and allow for easy access to these elements.

Floors, walls, and ceilings are all constructed by appropriate bricks to allow for facile, solid construction with little mess and significantly reduced construction costs.

What is it good for?

Save Money: Estimates show that using the revolutionary brick system can lead to savings of 50% of the total expenses associated with building an eight storey building.

Save Energy: The brick's amazing thermal properties can lead to enormous savings in heating and cooling costs. It is known that ~60% of energy costs for a building are associated with heating and cooling, including water heating. The Smart Brick allows for enormous savings in electricity and other energy costs by effectively redirecting heat in the summer, while trapping it in the winter. The block's design allows for greater thermal energy control and thus significant savings for owners as well as a smaller energy footprint for all of us.

Save Resources: The brick is also amenable to clean, quiet building practices as the bricks are made to order, including shapes, sizes and finishes, both inside and out.

Extreme Strength: The methods of Smart Brick construction also significantly reduce the requirements for natural materials such as sand, iron, and water. The block has been designed with the aid of top experts in building and

design; the block and its associated structures are made for extreme strength, including during earthquakes and weather-related stresses.

The Smart Brick offers it all: high thermal control, full passage of pipes, wires, cables and the like, finishes for both indoors and outdoors, extraordinary tensile strength, ease of construction, safety of materials, and total application throughout a structure—floors, ceilings, and walls. The Smart Brick is the solution for building from Africa to Manhattan.

Architect Point of View: Architects consulted in brick development see a whole new world of possibilities and opportunities with the brick for making inexpensive, revolutionary structures, from single homes to multi-storey towers.

Worldwide Solution: The whole world is Smart Brick's future. The brick's patented design is flexible enough to be relevant from Vietnam to London. The brick's low cost and great flexibility means that it can be constructed from a wide range of materials, reflecting local availabilities and traditional uses. The brick offers advantages to the Indian farmer as well as to the French wine broker. The blocks allow expression of the individuality of the owners / occupants of the final structure, while always giving low construction cost, high quality of performance and outstanding thermal behavior. While we anticipate choosing certain markets for initial block penetration, we do believe that the block will find acceptance throughout the world.

References

1. Building technologies http://edition.cnn.com/style/build/sean-anderson /index.html
2. Building science https://www.greenbuildingadvisor.com/building-science
3. The National Institute of Building Sciences https://www.nibs.org/default.aspx

Kryvulia A. M.

THE ARCHITECTURE OF CHERNOBYL: PAST, PRESENT, AND FUTURE

Scientific Advisor – Tikhonova M.E.
Kharkiv National University of Civil Engineering and Architecture

April 26th saw the 32nd anniversary of the 1986 Chernobyl Nuclear Disaster, with the explosion of the Reactor 4 of the Chernobyl Nuclear Power Plant in Ukraine causing the direct deaths of 31 people, the spreading of radioactive clouds across Europe, and the effective decommissioning of 19 miles of land in all directions from the plant. Thirty-two years later, a dual reading of the landscape is formed: one of engineering extremes, and one of eeriness and desolation.

As the anniversary of the disaster and its fallout passes, we have explored the past, present, and future of the architecture of Chernobyl, charting the journey of a landscape which has burned and smoldered, but may yet rise from the ashes.

Past. The Chernobyl Nuclear Power Plant, known as the V.I. Lenin Nuclear Power Plant during the Soviet era, was constructed between 1970 and 1977 and was situated 60 miles north of the Ukrainian capital of Kiev. The plant was the first nuclear power station to be built in Ukraine and comprised four nuclear reactors. Plans for an additional two reactors were abandoned following the 1986 disaster. In tandem with the scheme's construction was the establishment of the town of Pripyat, built to house the workers and families of the Chernobyl plant. Pripyat contained over 13,000 apartments, almost 100 schools, a hospital, and a central administrative core familiar to many Soviet urban plans.

The town bore the hallmarks of an intermodal Soviet modernist architecture, optimized by the town's 160 vast, state-funded, prefabricated apartment blocks. Within the generic, concrete street-space lay subtle flourishes of color and uniqueness, such as the Prometheus cinema's stained glass windows casting unique light forms on colorless facades, or the much-photographed amusement park. Following the 1986 disaster, the town was evacuated and remains empty to this day.

Present. The passing time has resulted in two very different readings of the urban landscape in Chernobyl and Pripyat. In Chernobyl, an effort to shield the damaged nuclear reactor has resulted in the construction of the world's largest movable metal structure. Known as the New Safe Confinement, the structure is large enough to accommodate the Statue of Liberty, or two Boeing 777s placed end to end. The arched steel structure was moved into position above the site with the help of hydraulic jacks, having been assembled nearby. The project, almost entirely without precedent, cost over $1.7 billion and was completed in 2016.

The current architectural reading the nuclear site may signify the lengths; humanity must go to in order to contain its own mistakes. However, the town of Pripyat demonstrates a counterpoint; the effects of total human abandonment. Frozen in time for 30 years, the urban and natural landscapes have become entwined. Buildings are being consumed by grasses and trees absorbing radiation from soil, while the only evidence of human interference manifests in graffiti, and the looting of stained glass windows and cables. Today, the town has become the focus of major public intrigue, as images from the abandoned town leak throughout the online world through television programs, and urban explorers.

Future. The 1986 nuclear disaster rendered the surrounding landscape too dangerous for human habitation or agriculture. However, the future of Chernobyl contains overtones of optimism and renewal. The site which once played host to Ukraine's first nuclear plant will soon play host to its first solar plant.

Only 100 meters away from the disaster's epicenter and steel dome, over 3,800 solar panels have been installed on a concrete base. The plant will use some of the old nuclear infrastructures, operated remotely from Germany to minimize human interaction with the still-dangerous reactor site. When operational, the plant

will power 2,000 homes, with future plans for the scheme to produce more electricity than the destroyed Reactor 4.

Meanwhile, the city of Pripyat is growing in popularity as a tourist hotspot, with guided tours of the city's crumbling architecture offering spectators a leap backward in time, albeit for a maximum of two hours per visit. Here, a beautiful eeriness is derived as much from architectural landmarks such as the amusement park's Ferris wheel, as it is from embellished details such as gas masks strewn across classroom floors.

The journey of Chernobyl, past, present, and future, embodies a broader political and social narrative. It operated at the height of one of the most intense political crises of the 20th century, and was the result of a determined drive by two opposing ideologies to showcase technological and architectural superiority.

With the 1986 disaster, undoubtedly the most infamous nuclear accident in history, the collapse and abandonment of Chernobyl would soon be followed by the collapse of the political ideology which created it. The mammoth architectural undertaking needed to contain the dangerous site underlines both the strength and weakness of modern technology.

Poignantly, however, the rebirth of the Chernobyl Nuclear Plant as a producer of solar energy represents a positive narrative for both architecture and humankind: a continued drive for progress, advancement, and rebirth.

Whether reflecting on the past, present, or future, the name "Chernobyl", and the architecture which embodies it, will continue to capture our imagination for decades to come.

References

1. Hill A. P. "Dose Estimates from the Chernobyl Accident," ANS Transactions, Winter 1987.
2. "Recommentations of the Internation Commission on Radiological Protection." ICRP Publication 26, ANN. ICRP, 1 3 (1977).
3. Casterronovo F. P. "I-131 Thyroid Burdens of European Travelers Returning to Boston after the Chernobyl Accident", New Eng. Jou. Med., Vol. 315, No. 26., pp. 1679-80, 1986.
4. https://www.archdaily.com/893523/the-architecture-of-chernobyl-past-present-and-future
5. https://www.timeout.com/newyork/art/best-architects-of-all-time-ranked
6. Cohen B. "The Nuclear Reactor Accident at Chernobyl" , Am. J. of Physics, Dec. 1987.

Kupina A. D.

JET GROUTING

Conseiller de langue - Kushchenko Zh.L.
Université Nationale de Génie Civil et d'Architecture de Kharkiv

On désigne par "jet grouting" un procédé de construction utilisant un jet de fluide à haute énergie cinétique pour déstructurer un terrain et le mélanger avec un coulis liquide.

Il ne s'agit donc pas exactement d'une technique d'injection, mais plutôt d'un procédé de mélange hydrodynamique terrain-coulis visant à former un "béton de sol" in situ dans la masse du terrain. C'est pourquoi on préfère employer la dénomination jetmix, laquelle qualifie mieux les phénomènes physiques impliqués et le rôle du terrain constituant partiellement le mélange final.

L'idée du jetmix est née au Royaume Uni à la fin des années 50. Une première réalisation au Pakistan, bien que couronnée de succès, n'eut pas de suite. Il fallut attendre le début des années 70 pour voir l'idée reprise au Japon, avec des matériels différents. Depuis, les procédés se sont multipliés, et leur domaine d'application dans la construction n'a cessé de s'étendre.

Le jet grouting fait appel, séparément ou en combinaison, à trois phénomènes physiques:

- déstructuration du terrain par un jet à très grande vitesse;
- extraction d'une partie du terrain jusqu'à la surface par les fluides de jetting;
- incorporation d'un liant apporté par le coulis.
- Le traitement se déroule généralement ainsi:
- réalisation d'un forage de petit diamètre (100 à 200 mm) sur la hauteur à traiter;
- dans ce forage, mise en vitesse d'un jet de fluide envoyé par une pompe à haute pression (plusieurs dizaines de MPa) à travers une ou plusieurs buses de petit diamètre (1 à 10 mm) placées sur un "moniteur" au pied d'un train de tiges de diamètre 70 à 100 mm;
- remontée lente des tiges, avec mise en rotation pour former une colonne de béton de sol avec le coulis envoyé sur la hauteur traitée depuis le pied du train de tiges.

Le résultat (diamètre, composition, résistance des colonnes) dépend des parametres du traitement (vitesses de translation et de rotation des tiges, pression et debit des fluides utilisés, dosage du coulis), des caractéristiques du terrain en place (nature, granulométrie, composition, compacité) et de la méthode employée (simple, double ou triple).

Les méthodes principales:

Jet simple

Dans ce procédé, le fluide du jet destructeur est le coulis lui-même, qui assure les trois fonctions de base de déstructuration, extraction et incorporation.

Une partie importante de l'énergie cinétique du jet est dissipée par frottement dans le terrain mis en suspension et le spoil formé devient parfois trop visqueux pour remonter librement jusqu'en tête de forage.

Jet double

Si on protège le jet de coulis à très grande vitesse par un jet d'air annulaire, le rayon d'action du jet destructeur en face du même terrain se trouve considérablement augmenté par le cône d'air enveloppant.

Dans le procédé jet double, le rôle de l'air est aussi d'améliorer les possibilités d'extraction du terrain en place par phénomène d'air lift.

Jet triple

Dans le jet triple, les fonctions déstructuration et extraction du terrain sont obtenues par un jet double d'eau et d'air séparément de la fonction d'incorporation du liant assurée par un jet de coulis envoyé simultanément à basse pression (quelques MPa) généralement par une buse inférieure.

La pompe et le circuit haute pression utilisés en jet triple ne supportent que de l'eau, avec en contre par tie la nécessité d'une pompe supplémentaire à basse pression pour le coulis et d'une ligne d'outils à triple tube.

Comparaison des méthodes

La comparaison la plus significative concerne les diamètres de colonnes que l'on obtient généralement par le procédé jet simple et par les procédés avec jet entouré d'air (jet double, jet triple) en face des terrains les plus courants.

Bien entendu, les termes de la comparaison dépendent des paramètres employés pour le traitement, mais on constate que le rayon d'action double à énergie égale entre jet simple et jet double ou jet triple. Il est ainsi exceptionnel d'arriver à obtenir économiquement des diamètres approchant 1 m avec le jet simple, alors que les procédés avec air peuvent permettre de dépasser aisément 1 m et d'atteindre même 2 à 3 m dans certaines circonstances.

Evidemment, ces performances dépendent du terrain et plus précisément de:

- la granulométrie du sol (plus le terrain est fin, plus il est difficile à déstructurer);
- la compacité du sol (plus le terrain est cohérent ou dense, moins le jet est efficace).

Domaines application

Un premier domaine type d'application est celui du traitement des terrains meubles non ou difficilement injectables tels que les limons et argiles, que l'on cherche généralement à consolider, quelquefois à étancher (cas des limons et sables très fins).

La recherche d'une résistance mécanique élevée, l'existence d'une couverture faible, l'interdiction d'emploi de produits chimiques, ou plus simplement l'économie du projet peuvent conduire à l'utilisation des procédés de jet pour la consolidation et l'étanchement de terrains meubles injectables par ailleurs sans problèmes, tels que les sables et graviers.

Le fait que les procédés de jetmix soient mis en oeuvre à partir de forages en petit diamètre leur confère une grande souplesse d'utilisation, en particulier pour la fermeture de fenêtres localisées dans des rideaux de palplanches, des murs en pieux sécants ou en paroi moulée (passage d'une canalisation, dégrafage de palplanches, joints défaillants, etc.) et pour réaliser des protections d'ouvrages depuis la surface en présence d'obstacles enterrés.

Les techniques de jet grouting viennent compléter remarquablement les moyens dont dispose le spécialiste pour l'amélioration des sols. Leur souplesse d'exécution permet leur adaptation à de nombreux cas en frontière des techniques habituelles d'injection et de fondation.

Références

1. Les domaines d'application du Jet grouting. Jet grouting in construction. J. MOREY. BACHY*. Rev. Franç. Géotech. nO 61, pp. 17-30 (décembre 1992).

Kustowskaja K. J.

RÄUMLICHE DISTANZEN ALS ARCHITEKTONIK DER KONZEPTION

Wissenschaftlicher Leiter – Doktor der Philos., Dozent Jarowitskaja N. A.
Sprachwissenschaftlicher Leiter – Kand. techn. W., Dozent Rachkovskiy A. W.
Charkower Nationale Universität für Bauwesen und Architektur

Alle zeitlichen Raumfernen komprimieren sich...
M. Heidegger

Jeder Abstand, jede Distanz einer beliebigen Art führt im menschlichen Geist zu einem verlockenden Versuch, sie zu überwinden, zu reduzieren. Distanz bedeutet eine bestimmte begrenzte Länge, deren Größe das Individuum zu überwinden oder sogar auf ein Minimum zu reduzieren sucht. Durch Überwindung eines Hindernisses in Form von Distanz erlangt eine Person neue Eigenschaften mentaler, ästhetischer, axiologischer Eigenschaften. Wenn sich eine Person die Aufgabe stellt, etwas Getrenntes zu verbinden, dann beginnt sie mit der Beschriftung von Zeit und Raum. Der Versuch, das Entfernte anzunähern, stößt bei der Durchführung einer auf eine Verbindung gerichteten Aktion auf das Risiko der Absorption von den Entfernungen. Diese Aktion enthält die Energie für die mögliche Divergenz davon, was noch nicht verbunden ist. Am deutlichsten ist der Sinn der Distanz im architektonischen Raum enthalten.

Der architektonische Diskurs umfasst die wichtigsten und aktuellsten Fragen der Konvergenz von Raum und Zeit. Die Tendenz zur Entstehung von "Grenzen" und "Distanzen" ist ein wichtiger Faktor für die Transformation des Alltags unter dem Einfluss der Expansion durch technische Mittel [1,2]. Es sei darauf hingewiesen, dass die Prozesse der Schaffung und des Abbaus von Grenzen mit grundlegenden Phänomenen des humanitären Wissens wie der Verbindung und Trennung des sozialen Lebens verbunden sind, über die der deutsche Soziologe und Philosoph Georg Simmel sprach [1]. Die Verbindungsfunktion wird von der Kategorie „Brücke“ ausgeführt, die den menschlichen Wunsch nach Überwindung der passiven Getrenntheit des Weltraums verkörper.

Herr Simmel ist überzeugt, dass der binäre Gegensatz „Verbindung und Trennung“ die Symmetrie und Gleichwertigkeit dieser Prozesse hat, da „eine

Person ist eine Kreatur, die verbinden und trennen kann, und die gleichzeitig nicht verbinden kann, ohne was zu trennen“ [1, c. 146-148].

Die natürliche Dualität der Welt trägt zu den Transformationen von den Menschen durch die Prozesse der Verbindung und Trennung bei. In der symbolischen, physischen und geistigen Weise des Seins „sind wir diejenigen, die das Einheitliche trennen und das Geteilte vereinen“ [1, c. 145-146]. „Der Wille zur Verbindung ist zu einer Form von Dingen geworden, die das Phänomen des Wegs personifizieren“ [1, 146]. Dies ist nicht nur ein Konstruktionsaspekt, sondern auch ein mächtiges theoretisches ideologisches Konzept. Der Begriff „ die Bahn“ ist ein Element, in dem das „Element selbst sowohl die Ableitung von dem Gang als auch von seinem Ende enthält“. [1, c. 146]. Die Bewegung und das Ende, Statik und Dynamik sind gleichzeitig in das Konzept einer Brücke eingebettet. Die Brücke symbolisiert somit die Ausdehnung unseres Willens im Weltraum und zeigt die Wechselbeziehung zwischen Subjekt und Raum. Die Brücke hat einen ästhetischen und ontologischen Wert [2]. Die Brücke macht die Einheit direkt sichtbar. Die Brücke hat die ultimative Bedeutung, die ganze Sinnlichkeit übersteigt und sie sich selbst unterordnet. [1, c. 147].

Es sei jedoch darauf hingewiesen, dass die moderne Techniksoziologie (B. Latoura) andere humanitäre Konzepte bevorzugt, und nämlich die Kategorie „Tür“. B. Latoura weist auf die Zerstörung des „dialektischen“ Denkmodells hin und bringt die Idee der fehlenden Symmetrie zwischen dem Herstellen einer Verbindung und ihrem Bruch vor, da alles im „natürlichen Zustand“ miteinander verbunden ist [1]. Die Ausrückfunktion wird durch die Kategorie "Tür" sichtbar [1]. Dieses Konzept „bricht den kontinuierlichen unendlichen Raum und vervollständigt ihn nach einem einzigen Plan“. Die Wand ist stumm und die Tür sagt. Gleichzeitig verkörpert sie (die Tür) den Abstand der Präsenz in Bezug auf die Abwesenheit. Dies berücksichtigt die Art der Bildung der „Dualität“ des Seins.

Es wäre darauf hingewiesen, dass die Methodik von G. Simmel eine wichtige Komponente bei der Realisierung des Entwurfs eines gemeinsamen architektonischen Diskurses ist, der die Postulierung anthropologischer Merkmale, die ontologische Explikation und den ästhetischen Auffüllung der architektonischen Umgebung beinhaltet. Der deutsche Forscher stellte fest, dass bei „der Möglichkeit der Aneignung, die es nicht ohne die Idee der Trennung von der übrigen Realität einer geschlossenen Einheit gibt“ [2], die Bedingungen ästhetischer Kontemplation entstehen. Bei der Betrachtung der Begriffe "Brücke" und "Tür" teilt G. Simmel dem Begriff "Brücke" ästhetische Dimension zu. Die Brücke bietet den Augen die gleiche Möglichkeit, die Seiten des Raumes zu verbinden, wie sie dem Körper in der praktischen Realität bietet [2, c. 135]. Die Erfahrung der Reflexion über den Begriff „Brücke“ führt zur Bildung eines solchen Verständnisses, das von der Kraft des sinnlichen und individuellen Verstehens befreit wird. Somit stellt die Brücke eine „visuelle und materielle Verkörperung“ dar [2, S. 135], die durch symbolischen Modus und praktische Umsetzung offenbart wird und die Mechanismen des Vorhandenseins der Grenze der menschlichen Existenz - ontologische und existentielle Aspekte - aufdeckt.

Die Distanz, die sich in den wichtigen Kategorien „Tür“ und „Brücke“ manifestiert, legt die tiefe Funktion des Verbindens oder Annäherns frei. Durch die Überwindung der Distanz erlangt ein Subjekt ein wert-ontologischen Komplex von der "Pflege", Solidarität und körperlichen und geistigen Einheit. Das Individuum wird gleichzeitig Autor und Teilnehmer der Transformationen des sozialen Seins. Diese Kategorien können zu einem methodologischen "Gitter" für das Studium von Krisenphänomenen in Politik, Wirtschaft, theologischen Diskussionen, Kunstraum und Moral werden.

Literatur

1. Зиммель Г. Мост и двер. Социология власти. – №3, 2013. – С.146-150.
2. Кобыща В. В. Концепция эстетики Г. Зиммеля и проблема границ / Мониторинг общественного мнения. - №2 (108), 2012. – С.131- 146.

Malkova Y. V.

ECOLOGICAL BUILDING

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

An Ecological Building is a structure that is designed to create and sustain mutually beneficial relationships with all of the elements of its local ecology. A building's local ecology, or environment, is made up of particular physical and biological elements and their interactions. Ecological Building is both a design process and the structure that is a result of such a design process.

Buildings use up enormous amounts of energy, some calculations make it as much as 70% of all the used energy when all the factors are taken into account. This energy is mainly used for heating and lighting and therefore the aim is to design houses that are well insulated and make the best use of natural light.

Insulation. Increasing the amount of thermal insulation is the main component of preventing energy loss. This includes draft exclusion, glazing, wall and roof insulation.

Passive solar gain. In the northern hemisphere, a south facing site will be a much better location than a north facing site because of access to sunlight and protection from the cold northerly wind. An eco-house starts life facing the sun.

Ideally the site for the house should have a south westerly aspect and be protected from the north and east. It’s not always possible to do this but there will usually be an opportunity to take advantage of the passive solar gain by having more glazing on either the front or the back of the building. Planting trees and creating wind breaks on the north and east sides of the site can enhance the solar gain effect by protecting the house from the cold north easterly winds.

Having faced the house towards the sun, high performance windows are used to draw in as much light and warmth as possible. Sunlight then floods into the

house, and any heat generated is retained by a highly insulated building shell, draught proof windows and doors and thermal mass within the building.

Active solar gain. Orientation towards the sun also means that active solar systems can be fitted, both solar water heating panels and electricity generating solar panels on the roofs, further adding to the free heat and electricity gained from the sun.

Living gain. Living in the house also generates heat. Active human beings can produce as much heat as a one bar electric fire. Add to this heat from cooking, washing, lights etc. and you can begin to see how an eco-house could get too hot. Conventionally opening the windows reduces heat, but an eco-house design could include heat recovery ventilation systems.

Heat recovery ventilation. These systems extract the warm, moist air from bathrooms and kitchens and take the heat out of the stale, damp air before venting it outside. The heat recovery system transfers this collected heat to fresh air coming into the building and distributes it to the bedrooms and living rooms. An added benefit is that filters can be fitted on the air intake to provide a barrier to pollen or other irritants.

Living heat loss. With the passive and active solar gains, insulation, draft proofed building shell and heat recovery system, eco-houses could be zero heat, that is, in theory, you shouldn't need to keep pumping heat into them from a central heating system. In practice life isn't like that. Kids leave the door open, pets come in and out, people go out all day, cold snaps happen and some people like to sleep with the window open. An eco-house can incorporate design to have heating systems that can react quickly and efficiently to any changes in room temperature as well as providing a heat boost to the water temperature down-stream of the solar panels.

Health. Other benefit of an eco-house, aside from the obvious one of having minimal heating costs, is a healthy living environment. The heat recovery system can eliminate dampness and the moulds that are so often a health hazard. The air intake filters prevent dust coming in with the incoming fresh air and the internal vacuum cleaner system extracts dust from the house and vents it (via the dust collection bag and filter) to the outside, thus no microscopic particles of dust remain in the house..

For the health of the householder, and the planet, an eco-house should be built with materials that are free, wherever possible, from toxins or harmful products of the petro-chemical industry.

Sustainable materials. One of the wider issues of energy efficiency is the embodied energy within the construction materials. Wood is a primary building material for eco-housing. This is because trees grow using energy from the sun, they don't pollute, they produce oxygen, absorb CO2, they provide a wild life habitat, they can be replanted, they can be sourced locally, the timber can easily be put to some other use after a building is demolished.

Cement is a very useful building material and there are places where we have to be practical and use it. However, one alternative to cement is lime. Lime has

been used as a building material for thousands of years and although energy and CO2 are used in its production it gently returns back to limestone in time, taking in CO2 in the process. There is also the use reclaimed materials, particularly bricks, slates and roof tiles, to make use of the embodied energy within these materials. This can also help new buildings to blend in with their surroundings.

When you're thinking of building a new home, it's important to look at every aspect to see what materials you can use that are sustainable. It's not just the exterior walls or the roof. The floor, furniture, pipework and almost everything that is needed in a house can be evaluated to see if there is a better solution.

References

1. http://www.sustainablematerials.org.uk
2. https://www.legrand.com/en/our-solutions/green-building/green-building-description
3. https://www.ecovillagefindhorn.com/index.php/building

Melkov N. A.

CONCRETE FOUNDATION SYSTEMS AND FOOTINGS

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

The importance of a foundation in a structure is a major consideration in the construction of any building, whether it is intended for residential, commercial and industrial purposes. The load of the structure is the primary consideration in the design. Buildings, dams, monuments, bridges, piers, walls, roads, and any construction requiring a stable base for successful execution requires accurate structural analysis as well as the in-depth review of the supporting geology. Historical examples of failed design in foundation construction are legion. The leaning tower of Pisa is a well-known early anomaly, built at a site with inadequate geological load bearing capacity coupled with poor structural foundation design

All foundations are divided into two categories: shallow foundations and deep foundations. Shallow foundations can be made in depths of as little as 3ft (1 m), while deep foundations can be made at depths of 60 - 200ft (20 – 65 m).

Shallow foundations are also called spread footings or open footings. The 'open' refers to the fact that the foundations are made by first excavating all the earth till the bottom of the footing, and then constructing the footing. The idea is that each footing takes the concentrated load of the column and spreads it out over a large area so that the actual weight of the soil does not exceed the safe bearing capacity of the soil. There are several kinds of shallow footings: individual footings, strip footings, and raft foundations. In cold climates, shallow foundations must be protected from freezing. This is because water in the soil around the foundation can freeze and expand, thereby damaging the foundation. These

foundations should be built below the frost line, which is the level on the ground above which freezing occurs. If they cannot be built below the frost line, they should be protected by insulation: normally a little heat from the building will permeate into the soil and prevent freezing.

Strip footings are commonly found in load-bearing masonry construction, and act as a long strip that supports the weight of an entire wall. These are used where the building loads are carried by entire walls rather than isolated columns, such as in older buildings made of masonry. Raft foundations, also called mat foundations, are most often used when basements are to be constructed. In a raft foundation, the entire basement floor slab acts as the foundation; the weight of the building is spread evenly over the entire footprint of the building. It is called a raft because the building is like a vessel that 'floats' in a sea of soil. Mat foundations are used where the soil is a week, and therefore building loads have to be spread over a large area, or where columns are closely spaced, which means that if individual footings were used, they would touch each other.

A pile is basically a long cylinder of a strong material such as concrete that is pushed into the ground so that structures can be supported on top of it.

Pile foundations are used in the following situations: (a) when there is a layer of weak soil at the surface. This layer cannot support the weight of the building, so Loads of the buildings have to bypass this layer and be transferred to the layer of stronger soil or rock that is below the weak layer and (b) when a building has very heavy, concentrated loads, such as in a high-rise structure.

When homeowners think of all the things with the potential to damage the footings and foundation of their home or commercial property, chances are, homeowners not thinking about the site itself. In fact, even if homeowner keeps guttering and downpipes in good repair, poor site drainage can contribute to foundation damage.

Damp, soggy lawns are the least of your troubles if site drainage on your property is compromised. More than just a muddy lawn, the homeowner may also be facing damage to footings or foundations. When water begins to pool around footings or the soil surrounding a foundation is consistently waterlogged, the extended presence of moisture can and will weaken foundations, damage footings and lead to structural damage. There are several different factors which can contribute to poor site drainage, which may not always be immediately obvious to the untrained eye.

Slopes can lend visual interest to homeowner property, for instance, but they can also send water sluicing to the lowest point. Depending on the presence of man-made drainage systems and the condition of the soil upon which homeowner structure is built, water may be retained in the soil for extended periods of time. Slope-related drainage problems can usually be addressed with the addition of ditches or even a subsurface drain.

Just building homeowner home or commercial building can compact the soil and diminish its ability to absorb water properly. Compounded by foot traffic and the presence of vehicles, compacted soil becomes even less absorbent over time.

There are two types of settlement that occur as a result of construction: (a) Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but the granular (particularly sandy) soil is susceptible. (b) Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases. These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

References

1. Anastasopoulos, I., & Gazetas, G. (2007). Foundation–structure systems over a rupturing normal fault: Part II.
2. Buchanan, A. H., & Newcombe, M. P. (2010). The performance of residential houses in the Darfield (Canterbury) earthquake.

Melnyk A. D.

GOLDEN GATE BRIDGE

Scientific Advisor – Cand. Eng. Sc., Asst. Krul Yu. M.
Language Advisor – Cand. Pedag. Sc., Assoc. Prof. Borzenko O. P.
Kharkiv National Automobile and Highway University

The Golden Gate Bridge is a technical masterpiece that can only be described in superlative terms. When the bridge was completed in 1937 it was the world's longest and tallest suspension bridge. But above all this masterly example of engineering is a magnificent monument set against a beautiful backdrop. Construction of the Golden Gate Bridge started in 1933. The bridge, which was designed by engineer Joseph Strauss was built to connect San Francisco with Marin County across the 1600 meter (+5000ft) wide strait known as the Golden Gate which links the San Francisco Bay with the Pacific Ocean [1].

The dimensions of the bridge defied all imagination. The total length of the bridge is 8,981ft or 2,737 m. The main span between the two enormous towers is

4,200 ft or 1,280 meters long, making the Golden Gate Bridge the world's largest suspension bridge, a record that would stand until 1964 when the Verrazano-Narrows Bridge in New York was completed. The two beautiful Art Deco towers are almost 820ft or 250 meters tall, of which more than 20 meters is below the sea level. The road, six lanes and 90 ft / 27m wide is an amazing 220 ft or 67 meters above the water level. It is supported by enormous cables, anchored in hundreds of bars locked into concrete blocks with a pulling power of 25 million kg. The two cables have a total length of 2,332 meters and a diameter of 90 centimeters. They are woven from 27,572 threads of steel with a total length that equals three times the earth's circumference [1].

Soon after its completion the Golden Gate Bridge already enjoyed worldwide fame, not only because the bridge was breaking records, but also thanks to the elegant Art Deco design of the two huge towers and the magnificent surroundings near the Pacific Ocean. The eye catching orange-red color of the bridge also helped its popularity. The color was suggested by engineer Irving Morrow, who thought the traditional gray color was too boring. The Golden Gate Bridge has now long lost its record of the longest bridge, but it is still one of the world's most famous structures [2].

Even though there is a sidewalk on the Golden Gate Bridge, it's quite a challenge to cross the bridge. Not only is it almost 3km long, but it is a breathtaking 67 meter (220ft) above sea level. In extreme circumstances the bridge can sway almost 28ft (8 meter). This makes the bridge less sensible to external forces such as strong winds and earthquakes but it can make the crossing rather unpleasant. The views however are amazing. An alternative to crossing the bridge on foot is driving by car - but don't forget you'll have to pay toll - or you can take one of the busses that connect San Francisco with Marin County. There is a bus stop right at the start of the bridge [2].

The Bridge is popular with pedestrians and bicyclists, and was built with walkways on either side of the six vehicle traffic lanes. Initially, they were separated from the traffic lanes by only a metal curb, but railings between the walkways and the traffic lanes were added in 2003, primarily as a measure to prevent bicyclists from falling into the roadway. The main walkway is on the eastern side, and is open for use by both pedestrians and bicycles in the morning to mid-afternoon during weekdays (5 am to 3:30 pm), and to pedestrians only for the remaining daylight hours (until 6 pm, or 9 pm during DST). The eastern walkway is reserved for pedestrians on weekends (5 am to 6 pm, or 9 pm during DST), and is open exclusively to bicyclists in the evening and overnight, when it is closed to pedestrians. The western walkway is open only for bicyclists and only during the hours when they are not allowed on the eastern walkway. Bus service across the bridge is provided by two public transportation agencies: San Francisco Muni and Golden Gate Transit. Muni offers Saturday and Sunday service on the Marin Headlands Express bus line and Golden Gate Transit runs numerous bus lines throughout the week. The southern end of the bridge, near the toll plaza and parking lot, is also accessible daily from 5:30 a.m. to midnight by Muni line 28.

The Marin Airporter, a private company, also offers service across the bridge between Marin County and San Francisco International Airport. Lands and waters under and around the bridge are homes to varieties of wildlife such as bobcats and sea lions. Three species of cetaceans that had been absent in the area for many years show recent recoveries/(re)colonizations vicinity to the bridge, and researchers study them to strengthen protections, concerning actions by public and recommending to watch whales either from the bridge and nearby, or to use a local whale watching operator [3].

The Golden Gate Bridge is a spectacular sight which can be seen from many areas around San Francisco. Here are some locations from where you have great views on the bridge:

- South Vista Point. This is the most popular site, situated at the San Francisco end of the bridge.
- North Vista Point, located at the Marin County side of the bridge.
- Land's End. Panoramic View from the northern tip of Lincoln Park.
- Baker Beach at the Presidio Park.
- Conzelman Road. At the Marin County side; great view from an inlet near the bridge.

The Golden Gate is at its most enchanting in the morning when the bridge is often shrouded in mist. But the bridge is also alluring at night when the lighting makes it seem as if the spires of the towers dissolve in the darkness [2].

References

1. Golden Gate Bridge: History, Construction, & Facts. URL: https://www.britannica.com/topic/Golden-Gate-Bridge.

2. Golden Gate Bridge, San Francisco: A View on Cities. URL: https://www.aviewoncities.com/sf/goldengatebridge.htm.

3. Golden Gate Bridge.
URL: https://en.wikipedia.org/wiki/Golden_Gate_Bridge.

Mukonin N. D.

USE OF OLD ASPHALT CONCRETE GRANULATE IN ROAD CONSTRUCTION: PRACTICAL ASPECTS AND BENEFITS

Scientific Advisor – Cand. Tech. Sc., Asst. Prof. Oksak S. V.
Language Advisor – Cand. Ped. Sc., Asst. Prof. Gerasymchuk T. V.
Kharkiv National Automobile and Highway University

The tasks of development of the Ukrainian transport system due to the economic growth of the country, accompanied by an increase in road density movements. This process requires more reliable and safer roads for people and the environment. At the same time, for the construction of new and maintenance of existing roads free access to resources is needed, including the binder – bitumen,

and high-quality bulk materials. This requirement imposes economic and environmental restrictions on the organization of the road industries. The need for low cost application and quality resources, in compliance with environmental legislation, requires an assessment of the products used throughout its lifecycles. Therefore, the road construction industry needs to focus on integrated management resources: bulk materials and binders.

The granulate of old asphalt concrete is enough to but it is used as a raw material for the underlying layer of the pavement, rural roads, etc. At the same time, with rational use of this material, it is a more valuable product than just "black gravel" –a solid filler in these applications. Today, the use of 10-20% of GOA in the composition of new hot mix asphalt. In some countries, in particular Germany and the Netherlands, about 50 per cent if GOA are already in use and they work is under the way to further increase of this level.

Granulate is a valuable resource and the benefits of the application if it in hot asphalt mixes includes:

– reducing the consumption of primary raw materials (binder, bulk materials);

– reduction of long-distance transport related with transportation of raw materials to asphalt plant;

– reducing the cost of raw materials;

– reduction of CO_2 emissions.

Under these conditions, an increase in the percentage of granulates in hot asphalt mixtures is important task from the economic and environmental points of views.

In Ukraine, where in 2012 new roads were laid in general complexity of 2.4 thousand km, road network with hard surface was 920 thousand kilometers; there is still a growing need for new highways. In addition to the construction of new roads, there is a growing need for maintenance or reconstruction of already laid roads. This year, the Agency planned to repair and reconstruct 9 thousand km of Federal highways. This is 60% more than in 2012.

In the Kharkov region, the intensity of traffic flows, as a rule, is significant, and its growth makes it necessary to repair the pavement every 2-3 years, thus new expanded roads and interchanges are required. But in Central Ukraine there is not enough rubble of good quality, so it has to carry from afar: from Karelia or from Russia, for 1000 km or more.

At the same time, capacities for bitumen production in Ukraine are limited. In connection with the requirement for refineries to increase the depth of processing – output of light fractions of oil, there is the tendency to reduce the production of bitumen. It is very likely that in the future the volume of production of binder for roads in Ukraine will not be able to meet the growing demand for it.

The main task is as follows: where to get resources to meet and sustain such ambitious growth rates? Under these conditions, the solution is the re-use of the granules of the old asphalt concrete-reliable and environmentally friendly. At the

same time, the materials from which the road surface is currently made, can be consider as a potential source of a mine filler and a bituminous binder as well.

Today, the greatest technical difficulty is the reuse of binders contained in the granulate of old asphalt. The limiting factor is aging bitumen's. This mechanism is complex and involves the negative effects of oxidative processes and changes in the chemical structure of bitumen. Both increases the stiffness of the material and makes it brittle. On the one hand, rigidity can be considered an advantage, since the road is less deformed in summer time. On the other hand, the material hardens, that is, its tendency to cracking increases, and this is a significant drawback, especially in low temperature conditions in winter. Technology to use a higher percentage granulates (up to 100%), should ensure the restoration of the properties of the old binder and make it fluid in the final mixture. For Ukraine, this is crucial value, given the influence of low temperatures and the susceptibility of asphalt to cracking, if the proportion of granulate of old asphalt in the new asphalt the mixture exceeds 20%.

Another difficulty when reusing old asphalt concrete occurs during the preparation and application of hot mix. Due to the increased rigidity of the binder in the granules, its melting to mix with the first used bulk materials and fresh bitumen require strong heating. Otherwise, the granulate of the old asphalt concrete will play a simple role in the mixture "black rubble". Often, asphalt is mixed with the granules are difficult to produce, difficult to achieve good the level of opacity, it is more difficult to apply and seal, than mixes, which use only the primary fillers and binder. This makes it difficult to achieve the required level of density and meet the requirements of specifications.

References

1. Фізико-хімічна механіка дорожньо-будівельних матеріалів / укладачі: Золотарьов В.О., Космін О.В.. Харків :ХНАДУ, 2009. 161 с.

Ozheredov B. I.

THE HISTORY OF LANDSCAPE ART IN CHINA

Language Advisor – Kushchenko Zh.L.
Kharkiv National University of Civil Engineering and Architecture

China is the oldest civilization in the world, with a cultural and historical heritage that goes back five centuries. China is a big country. So large that on its territory you can find almost all varieties of natural landscapes. Here are some of the highest mountains in the world, long rivers and hot deserts, plenty of pastures, small areas of mountain-tundra forests and oases of tropical forests.

The special attitude to nature in the culture of China is based on the understanding of nature as an expression of cosmic forces in the religion of Tao. Architecture, man and nature have always been thought of as a single social and

universal community. Therefore, landscape and landscape park has always been included in the architectural ensemble. The art of building parks was very developed in medieval China. At the breakdown of the park, all the natural components of this landscape were taken into account. The best of them were used.

Large-scale imperial gardens were spread in the north of China, while the tradition of the shaman gardens of the state of Chu, which are oriented towards inner trance, quite possibly served as a stepping stone for the development of the so-called heart gardens. The first type was a large-scale picture of the world, striking the imagination in size, riot of colors and a variety of forms, and the second was characterized by predominant monochrome, smaller size and a great tendency to detail and miniature compositions.

The Ming period is associated with the expulsion from China of the Mongol invaders (the Yuan dynasty). During this period, the state was strengthened militarily and politically, and private manufactures, trade unions and workshop owners were created. New architectural canons, special laws and treatises regulating the construction of cities and the planning of ensembles are being created. The Ministry of Construction is being created - Gunbu. Changes in architecture were mainly related to the improvement of layouts, architectural structures and forms, the creation of large urban complexes and ensembles. Built more than 30 cities. The capital city of Beijing (Beijing), the former Mongolian Khanbalik, is being rebuilt. In this regard, there is a need for a landscape gardening area for residents of new cities.

The temples of heaven "Tian" and temples of the ancestors "Miao" appeared, altars dedicated to the forces of nature. Basically, the buildings were dedicated to the forces of nature, gods or emperors (who were leveled with gods)

The imperial burial complexes were built in the picturesque environs of Beijing. They consisted of a number of buildings and structures. The Ming Dynasty burial complex is located northwest of Beijing. It leads to the "Road of Spirits" - a long avenue leading to the funerary temple and hill. Along the avenue there are 18 stone statues - figures of commanders, clergymen, officials, camels, elephants, personifying the honorary guard. The alley begins with the Pai-Low gate, a stone structure with five spans, and ends with burial hills under which there are underground crypts where marble sarcophagi are installed. The ensemble facilities are harmoniously combined with the surrounding nature.

In the following centuries, Chinese garden art was continuously improved. The important role was played here by the ideas of neo-Confucianism, the emphasis on special attention to nature and the inner self-knowledge of man through a dialogue with nature.

The creators of the gardens drew inspiration from the natural landscapes, and the exceptional quality of garden space in China was, to a large extent, the result of a special method of reproducing hand-drawn objects in a three-dimensional image on a plane, in which there is never just one vantage point. The garden is a sample of such a concept, in which time correlates with space and involves the spectators in a greater degree in the sense of the depicted, rather than simple visual perception.

Creating a garden, the Europeans say that it must first be planted, and in China they build gardens, or, in other words, construct them. In Chinese gardens you will not find the famous English lawns, or neat outlines of the French style. At the same time, gardeners in China do not just imitate Nature: they try to create an ideal landscape in miniature - with mountains, lakes, trees, even energy - and combine it with the living space of man. Combining such natural elements as stone, water, trees and flowers, with artificially created elements of architecture, painting and poetry, the masters strive to achieve the balance and harmony of Man and Nature in accordance with the principles of Taoism.

References

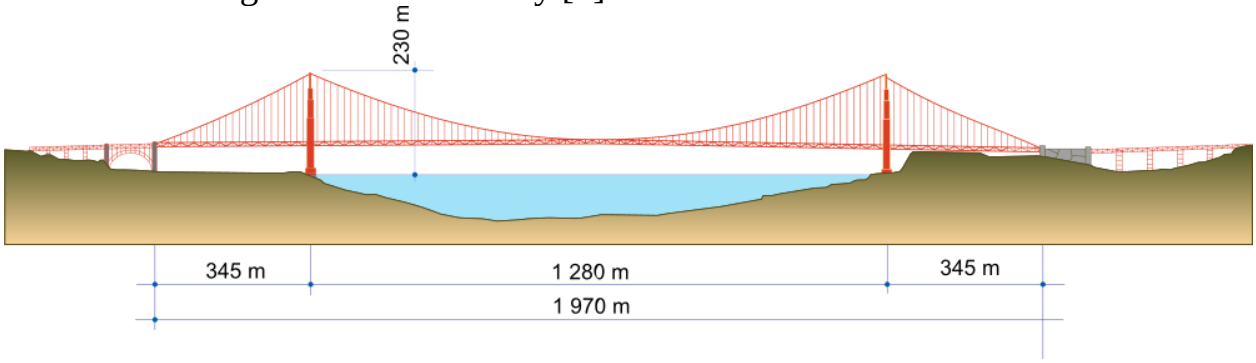
1. Sokolskaya OB The history of landscape art. M.: INFRA-M, 2004.
2. Ozhegov S.S. History of landscape architecture. M.: Stroyizdat, 1994.

Papochkin O. O.

GOLDEN GATE BRIDGE

Language Advisor – Muzalevska Y.A.
Kharkiv National University of Civil Engineering and Architecture

The Golden Gate Bridge is a suspension bridge spanning the Golden Gate, the one-mile-wide (1.6 km) strait connecting San Francisco Bay and the Pacific Ocean. The structure links the American city of San Francisco, California – the northern tip of the San Francisco Peninsula – to Marin County, carrying both U.S. Route 101andCalifornia State Route 1across the strait. The bridge is one of the most internationally recognized symbols of San Francisco, California, and the United States. It has been declared one of the Wonders of the Modern World by the American Society of Civil Engineers. Strauss was chief engineer in charge of overall design and construction of the bridge project. However, because he had little understanding or experience with cable-suspension designs, responsibility for much of the engineering and architecture fell on other experts. Strauss's initial design proposal (two double cantilever spans linked by a central suspension segment) was unacceptable from a visual standpoint. The final graceful suspension design was conceived and championed by Leon Moisseiff, the engineer of the Manhattan Bridge in New York City [1].



Construction began on January 5, 1933.The project cost more than $35 million,($493 million in 2016 dollars) completing ahead of schedule and $1.3 million under budget. The Golden Gate Bridge construction project was carried out by the McClintic-Marshall Construction Co., a subsidiary of Bethlehem Steel Corporation founded by Howard H. McClintic and Charles D. Marshall, both of Lehigh University. Strauss remained head of the project, overseeing day-to-day construction and making some groundbreaking contributions. A graduate of the University of Cincinnati, he placed a brick from his alma mater's demolished McMicken Hall in the south anchorage before the concrete was poured. He innovated the use of movable safety netting beneath the construction site, which saved the lives of many otherwise-unprotected ironworkers. Of eleven men killed from falls during construction, ten were killed on February 17, 1937, when the bridge was near completion and the net failed under the stress of a scaffold that had fallen. The workers' platform that was attached to a rolling hanger on a track collapsed when the bolts that were connected to the track were too small and the amount of weight was too great to bear. The platform fell into the safety net, but was too heavy and the net gave way. Two out of the twelve workers survived the 200-foot (61 m) fall into the icy waters, including the 37-year-old foreman, Slim Lambert. Nineteen others who were saved by the net over the course of construction became members of their Half Way to Hell Club. The project was finished and opened May 27, 1937. The Bridge Round House was then included in the southeastern end of the Golden Gate Bridge, adjacent to the tourist plaza which was renovated in 2012. The Bridge Round House, an design by Alfred Finnila completed in 1938, has been popular throughout the years as a starting point for various commercial tours of the bridge and an unofficial gift shop. The diner was renovated in 2012 and the gift shop was then removed as a new, official gift shop has been included in the adjacent plaza [2].

During the bridge work, the Assistant Civil Engineer of California Alfred Finnila had overseen the entire iron work of the bridge as well as half of the bridge's road work. With the death of Jack Balestreri in April 2012, all workers involved in the original construction are now deceased. Until 1964, the Golden Gate Bridge had the longest suspension bridge main span in the world, at 4,200 feet

(1,300 m). Since 1964 its main span length has been surpassed by thirteen bridges; it now has the second longest main span in the United States, after the Verrazzano-Narrows Bridge in New York City. The total length of the Golden Gate Bridge from abutment to abutment is 8,981 feet (2,737 m).The Golden Gate Bridge's clearance above high water averages 220 feet (67 m) while its towers, at 746 feet (227 m) above the water, were the world's tallest on a suspension bridge until 1993 when it was surpassed by the Mezcala Bridge, in Mexico. The weight of the roadway is hung from 250 pairs of vertical suspender ropes, which are attached to two main cables. The main cables pass over the two main towers and are fixed in concrete at each end. Each cable is made of 27,572 strands of wire. The total length of galvanized steel wire used to fabricate both main cables is estimated to be 80,000 miles (130,000 km) [3]. Each of the bridge's two towers has approximately 600,000 rivets. I n the 1960s, when the Bay Area Rapid Transit system (BART) was being planned, the engineering community had conflicting opinions about the feasibility of running train tracks north to Marin County over the bridge. In June 1961, consultants hired by BART completed a study that determined the bridge's suspension section was capable of supporting service on a new lower deck. In July 1961, one of the bridge's consulting engineers, Clifford Paine, disagreed with their conclusion. In January 1962, due to more conflicting reports on feasibility, the bridge's board of directors appointed an engineering review board to analyze all the reports. The review board's report, released in April 1962, concluded that running BART on the bridge was not advisable. Modern knowledge of the effect of earthquakes on structures led to a program to retrofit the Golden Gate to better resist seismic events. The proximity of the bridge to the San Andreas Fault places it at risk for a significant earthquake. Once thought to have been able to withstand any magnitude of foreseeable earthquake, the bridge was actually vulnerable to complete structural failure (i.e., collapse) triggered by the failure of supports on the 320-foot (98 m) arch over Fort Point. A $392 million program was initiated to improve the structure's ability to withstand such an event with only minimal (repairable) damage. One challenging undertaking is completing this program without disrupting traffic. A complex electro-hydraulic synchronous lift system was custom built for construction of temporary support towers and a series of intricate lifts, transferring the loads from the existing bridge onto the temporary supports. This was completed with engineers from Balfour Beatty and Enerpac, accomplishing this task without disrupting day-to-day San Francisco commuter traffic. The retrofit was planned to be completed in 2012. The color of the bridge is officially an orange vermilion called international orange. The color was selected by consulting architect Irving Morrow because it complements the natural surroundings and enhances the bridge's visibility in fog. Aesthetics was the foremost reason why the first design of Joseph Strauss was rejected. Upon re-submission of his bridge construction plan, he added details, such as lighting, to outline the bridge's cables and towers. In 1999, it was ranked fifth on the List of America's Favorite Architecture by the American Institute of Architects. The bridge was originally painted with red lead primer and a lead-based topcoat, which was

touched up as required. In the mid-1960s, a program was started to improve corrosion protection by stripping the original paint and repainting the bridge with zinc silicate primer and vinyl top coats. Since 1990, acrylic top coats have been used instead for air-quality reasons. The program was completed in 1995 and it is now maintained by 38 painters who touch up the paintwork where it becomes seriously corroded. A visitor center and gift shop, dubbed the "Bridge Pavilion", is located on the San Francisco side of the bridge, adjacent to the southeast parking lot. It opened in 2012, in time for the bridge's 75th anniversary celebration. A cafe, outdoor exhibits, and restroom facilities are located nearby. On the Marin side of the bridge, only accessible from the northbound lanes, is the H. Dana Bower Rest Area and Vista Point, named after the first landscape architect for the California Division of Highways. Lands and waters under and around the bridge are homes to varieties of wildlife such as bob cast and sea lions. Three species of cetaceans that had been absent in the area for many years show recent recoveries/(re) colonizations vicinity to the bridge, and researchers study them to strengthen protections, concerning actions by public and recommending to watch whales either from the bridge and nearby, or to use a local whale watching operator [1].

References

1. [Електронний ресурс]. – Режим доступа: https://www.history.com/topics/landmarks/golden-gate-bridge
2. Офіційний телевізійний канал CNN. [Електронний ресурс]. – Режим доступа: https://edition.cnn.com/travel/article/golden-gate-bridge-secrets-california/index.html
3. [Електронний ресурс]. – Режим доступа: https://en.wikipedia.org/wiki/Golden_Gate_Bridge

Parkhomenko Y. M.

UNDERSTANDING THE SIGNIFICANCE OF AVANT-GARDE

Language Advisor – Senior Lecturer Pyvovarova O.I.
Kharkiv National University of Civil Engineering and Architecture

On May 17, 1863, Paris saw the opening of the Salon des Refusés, an exhibition of artworks that were rejected by the jury of the prestigious Paris Salon, held annually by the Académie des Beaux-Arts. It was the very first time the term avant-garde was used in relations to the arts, and it marked the beginning of a cultural revolution.

To define avant-garde is a bit of a challenging task. The dictionary word originates from the French language and it translates to “vanguard” or “fore-guard”. The late 19th and the early 20th century was a time of momentous change – including in art. Artists rejected the established patterns and prevailing aesthetic principles and began their search for new means of expression. Avant-garde artistic

trends such as cubism, expressionism, futurism and constructivism came to being and influenced the art of the whole century.

Architecture, as an art of design, engaged in a constant dialogue with the changing reality, underwent a complete metamorphosis. In their quest for new solutions, architects were inspired by the materials that had never been used before in such an avant-garde context. The art's fascination with new technology also had a tremendous impact on architecture.

The large-scale urban experiments conducted in the 20s and 30s of the 20th century in different parts of the world sought to establish a new set of aesthetical standards and promote their attendant values. With its inherent features such as discovery of new routes and application of innovative design solutions, the avant-garde architecture accompanied artists also in the second half of the 20th century.

Avant-garde became a symbol of progress, exploration and innovation, of everything and anyone ahead of their time and ways of doing. One of the main characteristics of avant-garde was going against the academic understanding of art, the imposed rules on what an artwork should look like and the way it should be produced. This kind of departure from an established norm could also be seen in the Italian Renaissance, which encouraged nudity and represented figures from the Bible in an entirely naturalistic manner in both painting and sculpture, defying Byzantine and Gothic art, as well as the influential Catholic Church.

Most of the movements occurred during the inter-war and post-war periods, where it is understandable that major shifts in the society were needed. The avant-garde architecture of Ukraine, and especially of Kharkiv, is represented by constructivism buildings.

Constructivism was an artistic and architectural avant-garde movement that originated in Russia beginning in 1913 by Vladimir Tatlin. This term described art and its function, which dismissed traditional art in favor of an art used as an instrument for social purposes, namely the construction of the socialist system.

Constructivism, or Constructivist Art, is a term used to describe a type of non-representational, or totally abstract, relief construction, sculpture, painting, and kinetics. Constructivist buildings are usually ordered and often minimal, spatial, geometric, architectonic and experimental with how industrial material is used.

Early constructivist art and architecture was idealistic and seeking a new order that dealt with various social and economic problems. The appearance of several constructivist buildings and monuments is characterized by an emphasis on geometrical shapes like rectangular solids and

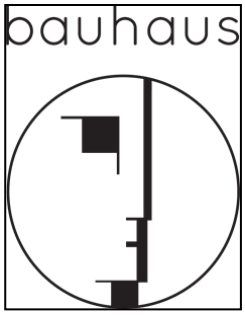
cylinders, often intersecting each other or demonstrating asymmetry. Limited colour range is another quality of constructivist buildings.

The typology of buildings was completely new. These are buildings for the new government, for recreation and leisure of the new man, for the connection between the love of the new time.

Kharkiv Freedom Square hosts one of the largest modernist architectural ensembles in Europe. Between 1927 and 1929, a House of State Industry (Derzhprom) was built to a design by Sergei Serafimov, Samuel Kravets and Mark Felger. The building became a symbol of the rapid development of modern, industrial Ukraine. The first monolithic concrete skyscraper in the USSR, a series of towers linked by high glazed walkways, even today its scale and drama is strikingly futuristic.

Constructed in 1927–1929 as per the competition winning design by A. Mordvinov, the building of the General Post Office (now Railway Post Office No. 52) encloses Railway Station Square from the North. Its dynamic composition and functionality secured this prime example of Constructivism world fame.

The Palace for Culture of Railway Employees (designed by A. Dmitriyev, 1932) is located in 83a, Kotlov Street, not far from the Railway Station. The building is designed in the style of Constructivism, the facade is constructed in the form of five concave surfaces, resembling a stretched accordion. The Palace for the Culture of Railway Employees is considered one of the best buildings of the style and time.



The German “Constructivism” or the Bauhaus Architecture. The German word “Bauhaus” literally means “House of Building” or “Building School.” It refers to a school in Germany famous for the style and design that it taught. It is a form of modernist architecture that was founded by Walter Gropius and existed in Germany, some parts of Europe, the United States, and Israel from 1919 to 1933. The Bauhaus was an architectural ideology similar to Russian Constructivism and existed at the same time that it did. As Constructivism lost its favour because of Stalinist Neoclassicism, the Bauhaus gradually became inactive as the Nazi rose to power.

Just like Constructivist structures, Bauhaus buildings usually possess a cubic design and favor right angles owing to its geometrical figure. Nevertheless it may occasionally feature rounded corners as

well as balconies. These buildings usually have an open floor plan and smooth facades.

Avant-garde architecture has always contained a unique social message. Large-scale urban experiments the 1920-1930s that took place in different parts of the world were not only directed at establishing new architectural and aesthetic standards, but also on the dissemination of new values, habits, lifestyles, and eventually formed a new society and new people. Avant-garde architecture was not only inseparable from society; it directly transformed it, setting new trends in social life. For this reason it is essential to understand what we can observe today in avant-garde architecture; they are more than "landmarks" and historical "heritage."

References

1.https://c20society.org.uk/botm/gosprom-kharkov-ukraine/
2.https://www.calvertjournal.com/.../modernist-kharkiv-battle-..
3.theconstructivistproject.com/.../modernist-kharkiv-behind-ba..
4.https://curatorhall.wordpress.com/.../constructivism-architect...
5.www.bauhaus-movement.com/en/

Pasichnikov A. S.

BAROQUE ART STYLE

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

Baroque art style originated in the late 16th century in Italy. The history of the name is associated with the Portuguese sailors, who the word Baroque denoted defective pearls irregular shape. Italians willingly adopted the term, combining them pretentious and strange manifestations of a new cultural trend. During the 17-18 centuries Baroque in architecture, art and music widely spread in Europe and America, came to Russia. The heyday of the style coincided with the strengthening of absolute monarchies, the development of colonies, the strengthening of Catholicism. It is logical that in urban planning it was manifested by the scale and monumentality.

The main feature of the Baroque is the creation of a curved space, where the planes and volumes are curvilinear and flow into each other, ellipses and rectangles prevail in the plans.

In the design of facades widely used technics when part of the wall is exposed a little forward or Vice versa buried along with all the elements. It turns out the alternation of convex and concave sections with the effect of spatial illusion. Even more expressive facade composition makes all sorts of Bay Windows, towers and balconies. A distinctive feature of Baroque buildings is a conscious violation of proportions in the ancient order system.

Parts of the order (base, entablature, capital) are stretched, superimposed on each other, twisted; first, a harmonious structure (proportionate to the person) acquires massiveness and a ragged rhythm. Our description of the Baroque style would be incomplete without an emphasis on the Union of buildings with the surrounding area: the city square, Park, garden. This was a progressive trend, the buildings began to be perceived as a whole with the landscape: from now on fountains, sculptures, broken paths and lawns – a full part of the Palace ensembles. Our description of the Baroque style would be incomplete without an emphasis on the Union of buildings with the surrounding area: the city square, Park, garden. This was a progressive trend, the buildings began to be perceived as a whole with the landscape: from now on fountains, sculptures, broken paths and lawns – a full part of the Palace ensembles. The Baroque interiors feature sculptures, carvings, paintings, mirrors, massive columns and stairs. Of the materials used travertine, dolomite, marble, basalt. Contrasts of scales, play of light and shadow, intense deep colors (Golden, pink, blue) - all this creates a feeling of illusory and constant variability of the world. Of the total number of the most brilliant architects of the time. Italy's Francesco Borromini (1599-1677), which started out as a stonemason at the St. Peter's Cathedral, but later became assistant to Giovanni Lorenzo Bernini (1598-1680) Michelangelo, and Pietro da Cortona. In France – Francois Mansart (1598-1666) and Louis Left (1612-1648), who worked for Louis XIV, in Austria - Johann Bernhard Fischer von Erlach and his son (the authors of the main Vienna Palace). In Austria it is Johann Bernhard Fischer von Erlach and his son (they are authors of the main Vienna Palace), in the Czech Republic – Francesco Karatti (author of the Cherninskii Palace), in Russia – Ukhtomskii Dmitry Vasilievich (1719-1774). Many samples of Baroque in the territory of present Poland and Ukraine (then Polish-Lithuanian Commonwealth). In Russia, the flowering of the Baroque style falls on the second half of the XVIII century, while in Europe there is already a transition to classicism. Like other styles, Baroque in Russia has acquired a certain identity, in this regard, there was such a term as" Russian Baroque " and differed from the European simpler structure of architectural compositions. At the same time, Russian architects actively used bright colour and colour contrasts in painting, including gilding. As a finishing material to further paint a preference for plaster and gypsum. Therefore, the colours become more vivid and saturated: red, blue, yellow in combination with white. As a stucco decoration used in the form of modeling ornament in the traditional Russian style. For finishing of various details of an interior, and also roofing coverings the gilding technique is applied .In the late XVII-early XVIII century Russian Baroque was divided into many currents: "Moscow" Baroque, "Naryshkin" Baroque, followed by "Stroganov" and "Golitsyn". Such names have arisen due to the family genus of persons, under the patronage of which the most important objects of the era were built. There are even "Ural Baroque" and "Siberian Baroque".

The most striking personification of the Baroque became the Palace ensembles of St. Petersburg, Peterhof and Tsarskoe Selo, the luxury and scale of

which are unmatched in Europe. One of the outstanding architects of that era was Francesco Rastrelli, the founder of the "Elizabethan Baroque".

By the middle of the XVIII century Baroque was replaced by even more refined and eclectic Rococo style.

References

1. http://www.facade-project.ru/spravochniki/razdel_statej/fasadnyj_dekor_v_stilyah_arhitektury/arhitekturnyj_stil_barokko/
2. http://rdh.ru/site/entsiklopediya/19864/
3. https://www.culture.ru/architecture

Paustovskaia M. O.

ANTONI GAUDI I CORNET ARCHITECT

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

“My client can wait”. – Antonio Gaudi

The son of a coppersmith, Antonio Gaudi was born on June 25, 1852 in Riudoms, a rural area to the south of Barcelona. His father was a craftsman and worked with rough iron. Antony often spent time visiting his father's workshop as well as taking long walks around nature. Both things influenced Saudi's works later on as an architect. "Those who look for the laws of Nature as a support for their new works collaborate with the Creator", said Gaudi.

In 1870 Gaudi went to study in Barcelona, the city that would become the home to most of his great works. He graduated from the Provincial School of Architecture in 1878.His architecture style was starting to attend out as something really different from what any other student was doing. It is said that during the graduation ceremony, for his native land and great pride in his Mediterranean heritage for his art. He believed Mediterranean people to be endowed with creativity, originality and an innate sense for art and design.

Gaudí had a deep appreciation by stating, "We own the image. Fantasy comes from the ghosts. Fantasy is what people in the North own. We are concrete. The image comes from the Mediterranean. Orestes knows his way, where Hamlet is torn apart by his doubts." Time spent outdoors, particularly during summer stays in the Gaudí’s family home Mas de la Calderera, afforded Gaudí the opportunity to study nature. Gaudí's enjoyment of the natural world led him to join the Centre Excursionista de Catalonia in 1879 at the age of 27. The organization arranged expeditions to explore Catalonia and southern France, often riding on horseback or walking ten kilometres a day. Young Gaudí suffered from poor health, including rheumatism, which may have contributed to his reticent and reserved character. These health concerns and the hygienist theories of Dr. Kneipp contributed to

Gaudí's decision to adopt vegetarianism early in his life. His religious faith and strict vegetarianism led him to undertake several lengthy and severe fasts. These fasts were often unhealthy and occasionally, as in 1894, led to life-threatening illness.

Between 1875 and 1878, Gaudí completed his compulsory military service in the infantry regiment in Barcelona as a Military Administrator. Most of his service was spent on sick leave, enabling him to continue his studies. His poor health kept him from having to fight in the War, which lasted from 1872 to 1876. In 1876 Gaudí's mother died at the age of 57, as did his 25-year-old brother Frances, who had just graduated as a physician. During this time Gaudí studied architecture at the Barcelona Higher School of Architecture, graduating in 1878. To finance his studies, Gaudí worked as a draughtsman for various architects and constructors such as Leandre Serrallach, Joan Martorell, Emili Sala Cortés, Francisco de Paula del Villar y Lozano and Josep Fontserè. In addition to his architecture classes, he studied French, history, economics, philosophy and aesthetics. His grades were average and he occasionally failed courses. When handing him his degree, Elies Rogent, director of Barcelona Architecture School, said: "We have given this academic title either to a fool or a genius. Time will show." Gaudí, when receiving his degree, reportedly told his friend, the sculptor Lorenz, with his ironical sense of humour, "Lorenz, they're saying I'm an architect now."

Upon graduation, Gaudi initially worked in the artistic vein of his Victorian predecessors, but he soon developed his own style. "There are no straight lines or sharp corners in nature. Therefore, buildings must have no straight lines or sharp corners." Gaudi created his works animating the surfaces with patterned brick or stone, bright ceramic tiles and floral or reptilian metalwork. The salamander in Guel Park, for example, is a representative of Gaudi's work.1883 is a turning point in Saudi's life. After architect Francisco de Paula del Villiar quits building a church

for the Association of Devotees of Saint Josef, Gaudi is appointed to continue the construction works. He is going to change the project completely, and this church will become the work of his life. Now it is famous Sagrada Familia. The idea of Gaudi was great. The height of the cathedral, 170 metres, had to be only a few metres lower than the highest point of Barcelona, Mount Monjuic. So Gaudi wanted to emphasize that the creation of a man cannot be higher than the creation of God. The similarity of the Sagrada Familia with the Catholic church is exhausted by the fact that it represents the Latin cross in the plan. The rest is a figment of eccentric Gaudi's fantasy. Gaudi did not like to draw the plans of his buildings. He preferred to build 3D models of them to create a more accurate portrayal of what he saw in his mind.

From 1914 Gaudi focused entirely on the temple. Sagrada Familia became a synthesis of his architectural evolution. After completion of the crypt and the apse,

in Gothic style, the rest of the church is conceived in an organic style, imitating natural shapes with a lot of ruled surfaces. He wanted the interior to resemble a forest with inclined columns like trees.

A strange construction, rising over Barcelona and breaking all the canons of architecture, was built with donations. It was even called "The Cathedral of the poor". It certainly slowed down the work. Sometimes the work just stopped, but that was Saudi's rule. Gaudi is buried in the temple which he had been building for 43 years and which is being built these days.

The declaration of Gaudí's works as World Heritage aims to recognize his outstanding universal value.

References

1. Antonio Gaudí Overview and Analysis https://www.theartstory.org/artist-gaudi-antoni.htm

2. Spotlight: Antonio Gaudí https://www.archdaily.com/519298/happy-birthday-antoni-gaudi

Pereboeva D. V.

GREEN ROOF CONSTRUCTION

Language Advisor – Asst. Prof. Nikiforova S.M.
Kharkiv National University of Civil Engineering and Architecture

In the modern world, the urbanization of society is growing every day, the number of cars and high buildings is increasing, the "green" world and pollution are being crowded out. The basis of landscape design is landscaping. The main purpose of gardening is to decorate the appearance of the object, creating various compositions, groups, hedges, borders, flower beds, etc., using various forms, types and varieties of trees, shrubs and flowers.

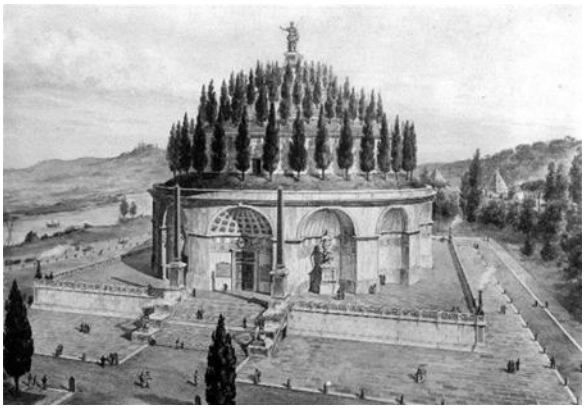
The term "green roof" can also be used in the arrangement of roofs using advanced "green" technologies, as well as using solar panels and photovoltaic modules. Green roofs are also called eco-roofs and living roofs. Green roofing is a roofing device using soil and vegetation as the main element. This is the roof of a building that is partially or completely covered with soil and vegetation and the system of its vital activity of this micro ecosystem. Placement on the roof of this garden requires compliance with certain conditions. We are talking, in particular, about the ability of the structure to withstand the overall load, about the reliability of the roof itself, about the presence of a certain inclination of the roof, about optimal insulation. Conditions must be provided not only for watering, but also for heavy rain.

A green roof is a unique way to give your home a unique look, express your individuality and highlight the sense of style of home owners.

To create a small roof garden, you must first consider its configuration in the plan. Around the perimeter of the roof should have a reliable fence. By the nature of the planning organization, a small roof garden can be solved in a regular, free (landscape) and mixed style. Regardless of the adopted planning style, it is necessary to strive to create a comfortable environment, primarily in terms of functional, environmental parameters. In order to achieve the environmentally necessary environmental parameters, water devices that cool and moisturize the air (small cascades, waterfalls, decorative pools) should be introduced in roof gardens, active watering of plants should be provided for drainage of nutrient soil, as well as shelter for the winter roofs, arrange windproof walls, vertical gardening, geoplastics; apply special species of vegetation. The constructions of buildings and their flat roofs influence their landscape decisions, first of all by the arrangement of columns or other supports, since it is better to place high vegetation above the supports.

The device of storm drains is combined with them. Fence gardens on the roofs are best done in the form of solid parapets, high, but with the possibility of viewing beautiful panoramas and landscapes, if any.

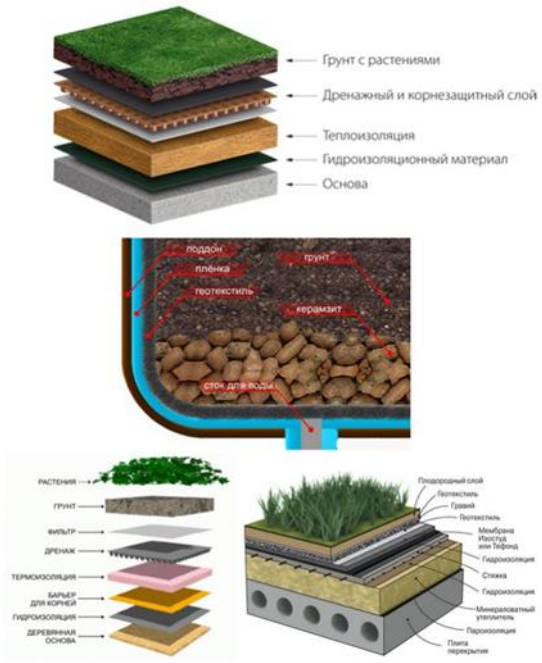
Italy is especially famous for its gardens. They were created in the most diverse periods of its history - not only in ancient times, but also in the Renaissance. In Florence, the Medici villa with a roof garden (1400) was famous; in Mantua, a little later, a huge hanging garden was built over the palace.



A kind of imitation of hanging gardens.

Semiramides were built in the XVI - XVII centuries. on the cliffs of the Isola Bella island, the terraces of the magnificent hanging garden reflecting in the waters of Lake Lago Maggiore in the north of Italy, surrounded by mountains.

Gradually, roof gardens begin to move to the north of Europe. The hanging garden with vineyards, fruit trees and flowers was laid out in the southern part of the Nuremberg Castle of the German Emperor Frederick III (1487). Got fame and garden on the roof of the castle of Carlsberg in Sweden. Later, in Germany, a two-level garden was created on the roof of the palace of Archbishop Johann-Philip in Passau.



Design features of exploited and unexploited "green roofs"

Non-operational (extensive) roof gardens are designed to protect the building from excessive solar radiation, as well as to improve the environmental parameters of the surrounding space. Flat roofs are becoming increasingly popular around the world. Particularly relevant is the use of free roof areas in large cities, where the cost of land is extremely high. The exploited (intensive) roofs can be used for organizing pedestrian areas, summer cafes, parking lots, gardens, etc. Moreover, the creation of gardens on the roofs-terraces, due to the lack of green areas at ground level, become an important compositional-spatial component not only of the space-planning, but also of the town-planning structure.

Consider the basic design and types of green roof.

Basically the green roof consists of 6 layers:

- plant layer;
- soil substrate;
- filter layer;
- drainage system;
- waterproofing layer;
- thermal insulation layer.

References

1. https://greenroofs.org/about-green-roofs/

2. http://www.archdesignfoto.com/zelenye-kryshi-texnologiya-ustrojstva-i-samye-krasivye-foto-zelenyx-krysh.html#prettyPhoto

3. https://www.onduvilla.ru/blog/zelenaya_krovlya

Peresada D. D.

DANIEL LIBESKIND – MASTER OF DECONSTRUKTIVISM ARCHITECTURE

Language Advisor – Kushchenko Zh.L.
Kharkiv National University of Architecture and Civil Engineering

Daniel Libeskind is a Jewish Polish-American architect, artist, professor and set designer. Libeskind today is one of the most prominent figures in world architecture. He is characterized by an interdisciplinary approach, the desire to critically rethink the architectural activity [1].

Architecture is not based on concrete and steel and the elements of the soil. It's based on wonder. And that wonder is really what has created the greatest cities, the greatest spaces that we have had. And Daniel Libeskind thinks that is indeed what architecture is. It is a story. By the way, it is a story that is told through its hard materials. But it is a story of effort and struggle against improbabilities. If you think of the great buildings, of the cathedrals, of the temples, of the pyramids, of pagodas, of cities in India and beyond, you think of how incredible this is that that was realized not by some abstract idea, but by people.

So, anything that has been made can be unmade. Anything that has been made can be made better. There it is: the things that Daniel Libeskind really believes are of important architecture. These are the dimensions that he likes to work with. It's something very personal. It's not, perhaps, the dimensions appreciated by art critics or architecture critics or city planners. But he thinks these are the necessary oxygen for us to live in buildings, to live in cities, to connect ourselves in a social space.

And Daniel Libeskind therefore believes that optimism is what drives architecture forward. It's the only profession where you have to believe in the future. You can be a general, a politician, an economist who is depressed, a musician in a minor key, a painter in dark colors. But architecture is that complete ecstasy that the future can be better. And it is that belief that he thinks drives society.

And today we have a kind of evangelical pessimism all around us. And yet it is in times like this that he thinks architecture can thrive with big ideas, ideas that are not small. Think of the great cities. Think of the Empire State Building, the Rockefeller Center. They were built in times that were not really the best of times in a certain way. And yet that energy and power of architecture has driven an entire social and political space that these buildings occupy.

So again, Daniel is a believer in the expressive. He has never been a fan of the neutral. He doesn't like neutrality in life, in anything. He thinks expression. And it's like espresso coffee, you know, you take the essence of the coffee. That's what expression is. It's been missing in much of the architecture, because we think architecture is the realm of the neutered, the realm of the kind of a state that has no opinion, that has no value. And yet, Daniel believes it is the expression – expression of the city, expression of our own space – that gives meaning to architecture. And, of course, expressive spaces are not mute. Expressive spaces are not spaces that simply confirm what we already know. Expressive spaces may disturb us. And he thinks that's also part of life. Life is not just an anesthetic to make us smile, but to reach out across the abyss of history, to places we have never been, and would have perhaps been, had we not been so lucky.

And Daniel Libeskind thinks our architecture is a confrontation with our own senses. Therefore he believes it should not be cool. There is a lot of appreciation for the kind of cool architecture. He has always been an opponent of it. Daniel think emotion is needed. Life without emotion would really not be life. Even the mind is emotional. There is no reason which does not take a position in the ethical sphere, in the philosophical mystery of what we are. So he thinks emotion is a dimension that is important to introduce into city space, into city life.

And of course, we are all about the struggle of emotions. And Daniel Libeskind thinks that is what makes the world a wondrous place. And of course, the confrontation of the cool, the unemotional with emotion, is a conversation that he thinks cities themselves have fostered. He thinks that is the progress of cities. It's not only the forms of cities, but the fact that they incarnate emotions, not just of those who build them, but of those who live there as well.

You know, too often we want to understand everything. But architecture is not the language of words. It's a language. But it is not a language that can be reduced to a series of programmatic notes that we can verbally write. Too many buildings that you see outside that are so banal tell you a story, but the story is very short, which says: "We have no story to tell you" [2].

So the important thing actually, is to introduce the actual architectural dimensions, which might be totally inexplicable in words, because they operate in proportions, in materials, in light. They connect themselves into various sources, into a kind of complex vector matrix that isn't really frontal but is really embedded in the lives, and in the history of a city, and of a people. So again, the notion that a building should just be explicit Danil Libeskind thinks is a false notion, which has reduced architecture into banality.

Of course, what would we be without computers? Our whole practice depends on computing. But the computer should not just be the glove of the hand; the hand should really be the driver of the computing power. Because Daniel believes that the hand in all its primitive, in all its physiological obscurity, has a source, though the source is unknown, though we don't have to be mystical about it. We realize that the hand has been given us by forces that are beyond our own autonomy. And Daniel thinks when he draws drawings which may imitate the computer, but are not computer drawings – drawings that can come from sources that are completely not known, not normal, not seen, yet the hand – and that's what he really, to all of you who are working – how can we make the computer respond to our hand rather than the hand responding to the computer.

And of course that is finally what I believe architecture to be. It's about space. It's not about fashion. It's not about decoration. It's about creating with minimal means something which can not be repeated, cannot be simulated in any other sphere. And there of course is the space that we need to breathe, is the space we need to dream. These are the spaces that are not just luxurious spaces for some of us, but are important for everybody in this world.

So again, it's not about the changing fashions, changing theories. It's about carving out a space for trees. It's carving out a space where nature can enter the

domestic world of a city. A space where something which has never seen a light of day can enter into the inner workings of a density. And Daniel Libeskind thinks that is really the nature of architecture.

References

1. Информационно-образовательный ресурс Archtime.ru [Электронный ресурс]: Мастера архитектуры. Крупнейшая в мире подборка работ известных архитекторов. Даниэль Либескинд. Автор идеи - Мария Малицкая. URL: http://architime.ru/architects/a_daniel_libeskind.htm

2. Интерьер-дизайн [Электронный ресурс]: Даниэль Либескинд: любой объект строится для людей. URL: http://www.interior.ru/design/talk/2333-daniel-libeskind-lyuboj-obekt-stroitsya-dlya-lyudej.html

Poltoran Y. E., Vedishchev K. A.

3D PRINTING OF BUILDINGS AND BUILDING COMPONENTS AS THE FUTURE OF SUSTAINABLE CONSTRUCTION

Language Advisor senior lecturer Belovodskaya I.I.
Belgorod State Technological University named after V. G. Shukhov

The first 3D printer was invented in 1984 and over the last decades, 3D printing has become one of the fastest growing technologies. At the beginning it was very complicated and what is more, expensive technology. Over the years, 3D printing started to be present in everyday life and printers became commonly used in all kinds of industry fields. A lot of achievements have been made in medicine, automotive or aerospace industry. Thanks to the open source systems, prototyping of new product, and innovative applications of 3D printing in various fields are available for everyone.

Improvement of the printing material and 3D technology became to be the goal for many companies all over the world from all industry sectors. In 2014, real revolution in construction industry has started, as the first house was printed starting a new chapter in building technology.

3D printing technology and materials

The idea of 3D printing was born already in 1983, when Charles W. Hull came up with an idea of hardening the tabletop coatings with the UV light [2]. This simple thought has lead him to invention of stereolithography, first technology of 3D printing. Stereolitography was the first technology of rapid prototyping which means fast, precise and repeatable production of elements usually with computer support. First step in creating the technology was invention of additions to the synthetic resins that after lightening of the resins, were causing start of the polymerisation process. Stereolitography is a technology that can build objects with a high precision and extremely complicated geometry and that’s the reason why it is used in many fields like for example: medicine, automotive and plane industry,

and even art and design. Fused deposition modeling FDM is a technology that was invented in 1988 by S. Scott Crump. Ductile materials which are hardening itself during cooling process, are extruded through double headed nozzle. Both, modelling and supportive materials are being deposited according to the cross-section layers, generated from digital model supporting the printer. The nozzle contains resistive heaters that keep the filament in appropriate melting point, which allows it to flow easily through the nozzle, in case to form the layers. Materials usually used in FDM technology are called filaments and are used in printers as a roll of thermoplastic materials like ABS (Acrylonitrile Butadiene Styrene) or PLA (Polylactic Acid). Over the past two decades, fused deposition modelling has become the most popular and widely used 3D printing method in the world.

Examples of 3D printing application in building industry

Canal House in Amsterdam

In 2014 Dutch designing company Dus Architects decided to build a house by printing its parts by a giant printer. In Europe, this is the first project that will be realized entirely by 3D printing technology. Project called 3D print Canal House takes place in Amsterdam and it is going to take at least three years. Architects from Dus Architects want to prove, that by printing components of the house directly on the site, they will be able to completely eliminate building waste and minimize costs of the transport. Mobility of the printer, is a considered as the main advantage as it may be transported all over the world, thanks to what, a cost of transport of the material and its storage on a building site will probably disappear. The time of the project was estimated, to allow them studying the technologies of the printing and developing the appropriate material. Building site is open to the public and it will remain open even after the project is finished, as the main aim of the operation is to discover and share potential usage of 3D printing in construction industry [1].

Components of the house are printed by a giant 3D printer called KamerMaker. Printing technique is very similar to most of the printers. Process starts on a computer, where in a respective 3D program models are being created and converted to the desired format. Thermoplastic material (what in this particular case is biodegradable plastic), is heated by the printer until it reaches appropriate liquid state, so it can be lay down by a printer’s nozzle. After one layer is created, another layer is built on the previous one. In this stage of the process the most challenging thing to develop is a material that after fabrication by the printer will be at the same time flexible enough to create fitting layers, adhesive so the subsequent layer will join with the previous one and stiff enough so that the component will preserve its shape.

WinSun Company buildings

WinSun Decoration Design Engineering Co is a Chinese enterprise, working on material similar to concrete that will be suitable to use in 3D printing technology. In 2014 they have accomplished to build houses printed in 3D technology. This technology is based on building components printed as prefabricated elements and assembled on a site. Components are being printed by

printer, 6 meters high, 10 meters wide and 40 meters long. The printer extrudes the material (mortar) through a nozzle layer-by-layer. Walls have diagonally reinforced pattern, with hollow structure that will be acting as insulation layer. Components are being printed in a factory and after printing, they are being transported to the building site and assembled together to create whole construction [3, 14-22].

References

1. 3D PRINT CANAL HOUSE: http://3dprintcanalhouse.com/construction-technique, (2016).
2. Wikipedia: https://en.wikipedia.org/wiki/Chuck_Hull (2016).
3. Z. Malaeb, H. Hachen, 3D concrete printing: Machine and mix design, International Journal of Civil Engineering and Technology 6, 2015. 156 p.

Popov A. V.

USING OF REINFORCED CONCRETE IN CONSTRUCTION

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

Concrete and reinforced concrete are widely used in all countries for the construction of a wide variety of different structures. I think, in the future they will remain the most used materials in all areas of construction.

People began using of reinforced concrete in the 80-s of the XIX century. It was most widely spread in the south of the country, where reinforced concrete was necessary. In addition, there were favorable conditions for the construction of reinforced concrete structures. Mostly it was used in the construction of multi-store industrial and civil buildings, port facilities and bridges. There are two types of reinforced products: prefabricated and monolithic. The advantage of precast concrete in comparison with monolithic is the possibility of extensive use of efficient and stronger reinforcement with concrete. Monolithic reinforced concrete products and concretes are used in areas with complex geological conditions, with increased seismicity. Monolithic structures are preferred for several reasons: monolithic construction allows you to apply a variety of solutions; the equipment required for the construction of the frame, formwork and pouring of concrete is cheaper than the arrangement of the production site; monolithic buildings are more durable and reliable, as there are no joints; their sound insulation and heat insulation qualities are higher than those of panel structures.

Effective chemical modifiers of binders and concrete, active mineral fillers and new technological methods have appeared and are widely used. A feature of new technologies is the effective impact on the structure of the material at all stages of production. The preparation and selection of materials, the design of the composition in accordance with the design requirements, the preparation of the

mixture and the molding of the product, the initial curing and setting, the subsequent hardening are all linked into a single complex.

In terms of technical and economic indicators, concrete and reinforced concrete remain the main structural materials. Reinforced concrete received the title of "material of the XX century" reinforced concrete, thanks to the unique properties.

The use of concrete and reinforced concrete made it possible to build durable and unique objects and structures. Concrete "high performance" is already standardized in all technologically developed countries of the world. Self-compacting concretes appeared. Highly plastic mixtures when filling a formwork form have the properties of a liquid and have an increased resistance to delamination. Naturally, with the increasing complexity of the technology of concrete and reinforced concrete increases its cost. However, this increases the operational reliability and service life of structures.

The main lack of concrete is high thermal conductivity. The material is significantly inferior to brick in terms of this indicator, and the introduction of steel reinforcement into the construction only worsens the matter: the metal conducts heat perfectly. Therefore, considerable attention is given to the insulation of houses made of reinforced concrete. However, the thermal characteristics of modern concrete insulation can even surprise experts, but have low mechanical strength, which makes them difficult to transport and install, so monolithic concrete insulation appeared, which in the future are likely to become widespread. Also for insulation of buildings during construction use various heat-insulating materials that can be mounted on or into the wall. Examples of the use of such materials in construction: In case of low-rise construction, walls with an air gap are constructed. Voids are filled with insulation - expanded clay, mineral wool in a moisture-proof casing and other things; Plate insulation is fixed on the wall with glue and dowel fungi. With a smooth surface of the walls there is no need even in the construction of the frame. The application of a decorative layer or coating does not prevent the insulation; Mineral wool is fixed in a way that provides greater durability, at which there is an obstacle to the condensation of moisture between the wall and the layer of insulation; Plaster - with a small house is quite appropriate way. Plaster is applied with a layer of 2 cm and significantly reduces thermal conductivity; this method is also used for apartments in a high-rise building. In any case, insulation outside is a better option than internal insulation.

The high architectural properties of concrete are generally recognized throughout the world. Therefore, reinforced concrete is universally used for unique structures, and for mass urban development. Modern concrete can be given almost any shape, including those with opposite surface angles. They have an excellent exterior texture through which you can transmit any architectural designs. Therefore, concrete is increasingly being used for architectural elements. Architectural concrete has become an independent direction in concrete technology.

On my opinion, reinforced concrete will remain the main structural material with broad prospects in the construction of the future. It is applicable in a variety of

operating conditions, harmoniously combined with other building materials and the environment, has a high architectural expressiveness, meets the modern requirements of the economy and aesthetics, while ensuring environmental safety and operational reliability.

References

1. Specialty of use reinforced concrete in construction http://as-el.com.ua/2018/02/osobennosti-primenenija-betona-i-zhelezobetona-v-stroitelstve/
2. Reinforced concrete in modern construction http://www.niizhb.ru/statzvezdov2.htm
3. Specialty of reinforced concrete http://stroyres.net/beton/zhelezobeton/primenenie-pri-stroitelstve.html

Povelychenko I. Y.

ARCHITECTURE IS MORE THAN A CLEVER ARRANGEMENT OF BRICKS

Language Advisor – Senior Lecturer Pyvovarova O.I.
Kharkiv National University of Civil Engineering and Architecture

Architectural psychology is an important field where findings reveal how we can design buildings better for occupants. Architects create environments for human beings. Therefore they need — in addition to technical and design knowledge — some sort of “psychological” knowledge of the effects of their planning decisions on the occupant.

Architecture refers to the style, character, design, and structure of a building. Built structures or buildings are not mere constituents of brick, stone, wood, etc. A deeper examination of a building, especially its architecture is associated with various psychological aspects.

The architecture of any place reflects its history and heritage. It reflects the identity of civilizations that thrived in the past. The architectural style of a particular period is the reflection of the culture of that time. Examples of specific architectural styles that reflect culture and society are the European architecture, Indo-Islamic architecture, Ancient Indian architecture, Central Asian architecture, and so on.

Along with reflection of culture and display of semantics, architecture, the style in which buildings are designed, has been found to have an influence on mental and physical health of people. A well-designed space, apart from its practical advantages, has a beneficial influence on human senses and emotions. The appropriate forms, shapes and colours affect our mood, often subconsciously**.** Whether we realize it or not, the environment in which we live and work affects us.

Architecture can impact or affect human behaviour in positive and negative ways, and impact or affect the health and well-being of humans, as well as human performance, which has an effect on human behaviour. Humans spend the majority of their lives in built environments and less of their lives in natural environments; therefore, it is inevitable that architecture regardless of whether it is residential or commercial architectural designs will indeed impact or affect human behaviour in positive and negative ways.

Unfortunately, a lot of architects and designers don't have the same approach. They design homes and workplaces which may look gorgeous on photos, but are not at all human friendly. We must not forget that we design for people and not for glossy magazines or famous blogs!

How do psychological principles influence architectural structures? For example, the great pyramids of Egypt had meaning in relation to the pharaohs. The beautiful cathedrals and castles of Europe all reflected an innate human tendency to equate importance with size, beauty, complexity, and structure. It is hard to hard at those pyramids and their 3 million huge blocks without thinking "Geez! These pharaohs must have been very important! Look at the size of those suckers!"

Architecture, in particular, which moves beyond mere building, strives to enhance the human condition and promote emotional well-being through the manipulation of space, light, material, and form. We may define ourselves as out-going, adventurous, full of wanderlust but it is surprising just how much of our lives are spent indoors. From alarm clocks buzzing in the morning to the last blink in the night, an adult spends as much as 80–90% of his/her time indoors and the space, lighting, colours, acoustics, aesthetics indeed play a big role on the psychology of the individual. Individual differences are bound to exist so proper architectural implementation is necessary to meet everyone's psychological desires. Hence, there is a definite relationship between architecture and psychology.

For an architect to show his skills, it is essential to keep in mind the taste and preferences of the client along with the purpose of construction of a particular space. For instance, an old age home should be soothing and calm where senior citizens could feel like at home, therefore, the architect works on the design scheme by introducing soft colours with some cooling effect, soft materials and patient-friendly features, a healing garden, a space for them to gather, private rooms, taking in the consideration of temperature for their healthy well being.

An architect can control human behaviour with his design by understanding the way that a building's design can influence a person's behaviour, thus, modifying the individual's mood and perception, whether the environment is natural or man-made. Understanding the way in which environment effect people could enable the design and construction of work, recreation and living space that has the ability to influence people's behavior.

To that end, there are a lot of elements of architecture which impact psychology of people inhabiting the place from basic performance of employers in an office to attracting customers and boosting sales at a retail outlet. A hard working architect is the one who creates a beautiful space which the people love to look at

and appreciate, however a smart working architect is the one who makes the place look beautiful inside, as it is on the outside, making the people feel comfortable and elated throughout.

The impact architecture has on a person's mood is huge. Arguably these are the fundamentals of architecture: not how it looks, but how we feel it, through the way it allows us to act, behave, think and reflect. Every psychological process and every human interaction occurs in a physical place. The architecture and interior designs that create spaces for and guide daily human functioning are not only products of the human psyche but also act on the psyche in important ways. The built environment may influence individuals' moods, motivations, judgments, decisions, health, behavior, and interactions with others.

References

1. astudentofpsychology.blogspot.com/.../in-what-ways-can-arc...
2. https://www.wattpad.com/95332760-architecture-human-psy..
3. https://www.psychologyofarchitecture.org/
4. www.kut.org/post/argument-role-psychology-architecture

Povnenkaya A. M.

PROBLEMS OF RESTORATION AND PRESERVATION OF ARCHITECTURAL MONUMENTS

Language advisor – Senior Lecturer Lysenkova T.M
Kharkiv National University Construction and Architecture

In the 21st century, the question often arises about the preservation of architectural monuments. A long time ago, traditions of preservation and respect for the architectural heritage of Ukraine were laid. In most cities, restoration work is limited to one or two minor objects, and they often boil down to trivial overhaul. The reasons for the current situation are known – the disastrously low financing of such an important area of preservation of architectural monuments as restoration. The existing state system of restoration enterprises was almost completely lost, which led to the destruction of the school of professional class restorers.

Restoration refers to the revival and strengthening of the construction of historical monuments, damaged, deformed or destroyed by time, requiring a qualified approach and interaction of various specialists. During the restoration the following types of work are performed:

- strengthening the structure of the monument with the use of materials identical to the object, or using advanced technologies, without harming the monument;
- redressing parts;
- removal or recultivation of elements that have changed under chemical exposure.

The restoration, together with the elements of conservation and repair, provides for the modification of the existing type of monument to most fully reveal its artistic properties, as well as the exclusion of the most recent low-value layering of architectural and layout type including its annexes and superstructures.

Restoration of buildings and architectural monuments is of great importance in preserving the historical heritage of ancient cities. These construction works are carried out with the aim of saving and modernizing the technical condition,

Restoration is needed in cases where the structures, over a considerable period of service, have become old, have begun to collapse, and as a result, have lost their own unique characteristics. Restoring of architectural monuments are much more expensive than their demolishing. It is for this reason that many historical buildings are not restored. This policy can lead to the fact that after a certain amount of time, there will not be a single building on the streets that could indicate anything of the past.

Monuments of architecture of Ukraine today are carefully protected both at the state and local levels. Our task today is to preserve, multiply and leave to our children the memory of both old and modern historical events. Unfortunately, today a huge number of historical monuments and buildings require restoration of their facades, interiors, and exteriors of courtyards.

Another problem of restoration is the chronic lack of funds for their maintenance.

Only in Kiev, according to the register of objects and monuments of the cultural heritage of the capital, there are 3,488 monuments. Almost a third of this amount is architectural buildings, complexes, annexes, etc. Of these, 173 are monuments of national significance and 960 are of local significance.

According to the Office of Cultural Heritage Conservation of Kyiv Municipal State Administration, in the capital, 48 sites are in poor condition. Among them are such objects as the Sikorsky Outhouse and the Karaite Kenas on Yaroslav Val Str., and the Anatomical Theater on Bogdan Khmelnytsky Str.

Financing the repair, restoration, maintenance of these monuments, according to the law "On the Protection of Cultural Heritage", falls directly on the owner. With rare exceptions, these owners are either the state (monuments of national significance) or municipal authority (monuments of local significance).

The same problems arise in other cities. So, in Dnipro, there are 19 architectural monuments of national significance and 125 of local ones. 20 architectural monuments require urgent repair and restoration or emergency work due to their age and improper operation. But there is no money in the budget for this.

In Lviv, a whole area of 158 hectares is included in the UNESCO World Heritage List. The city has 2089 monuments of architecture. This year, according to Lviv City Council, 53 objects are in need of repair. For these tasks in the city budget 54 million UAH are provided. But in addition to repair, 50 million UAH is needed annually only for restoration work.

Paraphrasing Mikhail Lomonosov, one can say: "A people who do not save their past have no future." I want to believe that Ukraine, having stood on the path of integration into the European Union, will find the possibility of funding the restoration and preservation of historical heritage of our ancient state - Ukraine.

References

1. Гендель Э. М. Инженерные работы по реставрации памятников архитектуры: Учеб. пособ. – М.: Стройиздат, 1980.
2. Соронин Л. Памятники архитектуры: что останется потомкам? // [Электронный ресурс]. – Точка доступа: http://abcnews.com.ua/ru/business/pamiatniki-arkhitiektury-chto-ostanietsia-potomkam

Prjadko I. O.

WASSERDICHTE VERBUNDSTOFFE MIT VERBESSERTEN PHYSIKALISCH-MECHANISCHEN UND HYDROPHYSISCHEN EIGENSCHAFTEN

Wissenschaftlicher Leiter – Dokt. techn. W., Prof. Kostjuk T. O.
Sprachwissenschaftlicher Leiter – Kand. techn. W., Dozent Ratschkowskij A. W.
Charkower Nationale Universität für Bauwesen und Architektur

Aktualität. Moderne Forderungen auf den Verbundstoff sind höhere Werte von hydrophysischen Eigenschaften bei der Schaffung von neuen Projekten in der Architektur mit der Verwendung einer niedrigen Materialintensität [1].

Diese Untersuchung wurde in Rahmen eines Budgetthemas „Die Feststellung physikalisch-chemischer Gründe für die Produktion von silikatischen Kompositen mit hohen hydrophysischen Eigenschaften“ durchgeführt. Festgestellt wurde, dass die besten hydrophysischen Eigenschaften die Zusammensetzung mit der Inhalt von 0,2% Farbe, 1,5% perlitischer Sand, 11% feindisperser Zusatz Kalziumkarbonat, 3,5% Mischung von chemischen Zuschlagstoffen haben. Die chemischen Zuschlagstoffe tragen zur Synthese der zusätzlichen Kristallhydrate bei, die die Struktur des Mikroniveaus verdichten.

Materialien und Versuchsmethoden. Für die Untersuchungen wurden Portlandzement PZII/A-III-400 [2], Produktion „Eurozement-Ukraine“ gebraucht sowie ausgesiebter und gewaschener Quarzsand Beslüdower Tagebaugrube, Fraktion 0,316-0,16 [3], Polyesterfaser mit der Dichte 1,4 g/cm^3, Biegefestigkeit 780 MPa, E-Modul 8600 MPa, Verlängerung bei der Zerreißung 11%, die Zuschlagsstoffe für die Konsistenzregelung des Dichtungsgemischs [4-11] – Na_2CO_3, $CaCl_2$, Na_2SO_4, $Ca(OH)_2$, $NaNO_3$. Physisch-mechanische Untersuchungen wurden aufgrund der allgemeingültigen Normen [12-15].

Ergebnisse und Besprechung. Physikalisch-mechanische Prüfungen des Materials wurden mit den Probebalken 4 × 4 × 16 cm bei einer normalen

Temperatur +20°C durchgeführt. Die Zugversuche wurden mit der Hilfe hydraulischer Presse PSU-10 verwirklicht. Die Werte der Bruchbelastung wurden auf der Skala in Kilo festgestellt. Die Ergebnisse werden in der Tabelle 1 dargestellt.

Tabelle 1. Die Daten der Prüfungsbefunde der Biegefestigkeit

Muster-nummer	Ausmaß des Musters, cm			Bruchbelastung, *P*, kg Durchschnitt von 5 Mustern	Festigkeitsgrenze bei der Biegebelastung, R_{big}, kg/cm^2 (MPa)
	Breite, *b*	Höhe, *h*	Länge, *l*		
1	4,0	4,1	16,0	480(48,0)	112,00(11,20)
2	4,0	4,2	16,0	740(74,0)	143,43(14,34)
3	4,0	4,2	16,0	620(62,0)	115,4(11,54)
Ohne Zugabe	4,0	4,1	16,0	180(18,0)	42,19(4,22)

Die Werte der Schrumpfung durch die Querverformung wurden mit der Hilfe eines Rings und eines Ankers festgestellt. Die Prüfungsbefunde werden in der Tabelle 2 dargestellt.

Tabelle 2. Die Prüfungsbefunde der Rißbeständigkeit der Muster eines Ringschnitts

Muster-nummer	Risskontrolle auf der Oberfläche bei der Härtung			
	3 Tage	7 Tage	14 Tagen	28 Tagen
1	keine	keine	keine	keine
2	–«–	–«–	–«–	–«–
3	–«–	–«–	–«–	–«–
Kontrolle	–«–	Haarriss	Haarriss	Haarriss

Die Befunde und Analyse von der Tabelle 2 bestätigen die Rißbeständigkeit der Muster mit dem komplexen chemischen Zuschlagstoff in seiner Zusammensetzung. Das kann man so erläutern. Die Spannungen bei der Schrumpfung werden durch eine zusätzliche Erhöhung von Kristallhydraten im Porenraum des Zementsteins ausgeglichen. In den Mustern unter der Nummer 1,2,3 der erhaltenen Zusammensetzung werden keine Risse bei der Erhärtung festgestellt.

Die Reduzierung der kapillaren Porosität einer erhärteten Zusammensetzung wurde durch die Messung der Wasseraufnahme der Muster von der Masse und dem Umfang. Für die Proben wurden die Probebalken aus einer neuen und aus einer normalen Zusammensetzung hergestellt. Die Wasseraufnahme wird durch eine Standardmethode untersucht. Die Ergebnisse werden auf der Abb. 1 dargestellt.

Die Abb. 1 zeigt, dass der harte Kontrollmuster eine Kapillarporosität von 16,22% hat, was der Wasseraufnahme von dem Umfang entspricht. Die Zugabe eines komplexen Zuschlagstoffs (rund 8-9%) reduziert die Wasseraufnahme der Muster mehr als um achtmal (Muster №2).

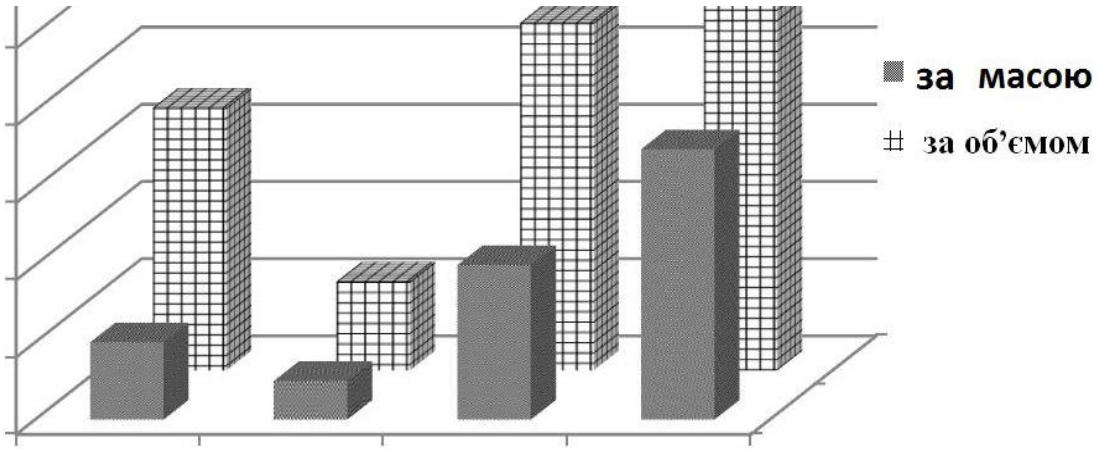


Abb. 1. Wasseraufnahme von der Masse und von dem Umgang der Zusammensetzungen mit verschiedener Inhalt von den komplexen chemischen Zuschlagstoff und Polyesterfaser

Die Wasseraufnahme und Frostbeständigkeit eines erhärteten Musters wurden nach einer zeitsparenden Methodik mit dem Gerät AGAVA-2PM festgestellt. Die Messung der Widerstand gegen die Penetration der Luft durch die Deckung wurde von der Seite der aufgebrachten Mischung verwirklicht. Der Befund der Untersuchung wird in der Tabelle 3 dargestellt.

Tabelle 3. Die Befunde der Werte der Feststellung von Frostbeständigkeit verschiedener Teile des Verbundstoffes

Musternummer	Beständigkeit gegen Wind, m_c, Sek./cm^3	Wasserdichtigkeit, *W*	Frostbeständigkeit, *F*, Periode
1	8,9	*W*4	100
2	63,8	*W*12	mehr als 200
3	9,0	*W*4	100
Kontroller Muster	2,3	*W*2	niedriger als 50
Feinkörniger Beton der Platte	2,2	*W*2	-«-

Die Tabelle 3 zeigt, dass die Mischung №2 eine beste Ergebnis, weil der Muster nach der Methode KHL und Makrodiol optimiert wurde.

Zusammenfassung

1. Es wurde ein neuer silikatischer zementbasierter Verbundwerkstoff mit verbesserten hydrophysischen Eigenschaften ausgearbeitet. Die Druck- und Biegefestigkeitswerte betragen 41,1 und 12,5 MPa. Die Adhäsion zur Betonoberfläche beträgt mehr als 2,36 MPa, die Wasserbeständigkeit – W12, Frostbeständigkeit – höher als F200, Schrumpfverformung nach den 6 Monaten – 0,07%. Alle diese Werte sind vielmal so höher als die Normenforderungen.

2. Die ausgearbeitete Verbundwerkstoff wird für die Sanierung und Abdichtung von den Erzeugnissen und Bauwerken aus Beton und Stahlbeton empfohlen sowie für die Verfugung von Fügen und Stößen, Abdichtung unterirdischer Bauten, den Schutz der Dächer vor Leckagen.

Literatur

1. Плугин А.Н., Плугин А.А., Трикоз Л.В., Кагановский А.С., Ал.А. Плугин. Основы теории твердения, прочности, разрушения и долговечности портландцемента, бетона и конструкций из них. Том 1. Коллоидная химия и физико-химическая механика цементных бетонов. – Киев, 2011. – 331 с.

2. ДСТУ Б В.2.7-46:2010. Будівельні матеріали. Цементи загальнобудівельного призначення. Технічні умови. – 13 с.

3. ДСТУ Б В.2.7-32-95. Пісок щільний природни для будівельних матеріалів, виробів, конструкцій і робіт. технічні умови. – 13 с.

4. Афанасьев Н.Ф., Целуйко М.К. Добавки в бетоны и растворы. – Киев: Будівельник, 1989. – 127 с.

5. Композиційний матеріал для ремонтних та інших будівельних робіт. Т.А. Костюк, В.А. Арутюнов, А.А. Плугін, О.В. Старкова, Д.О. Бондаренко. Патент України №103280. публ. 25.09.2013. Бюл.№ 18.

6. Композиційний матеріал для екстреного ремонту та відновлення бетонних та кам'яних споруд. Т.А. Костюк, В.А. Арутюнов, А.А. Плугін, О.В. Старкова, Д.О. Бондаренко. Патент України №103852. публ. 25.11.2013. Бюл.№ 22.

7. Interaction of the hydration products of Portland cement with complex chemical additives containing fiberglass in the moisture-proof cement compositions. O.I. Demina , A.A. Plugin, E.B. Dedenyova[1], D.O.Bondarenko[1], T.A. Kostuk[1], A.I. Bondarenko. - "Functional materials", 24, № 3 (2017), p. 1-5. - DOI: https://doi.org/10.15407/fm 24.03.1

8. Interaction of Mineral and Polymer Fibers with Cement Stone and their Effect on the Physical-Mechanical Properties of Cement Composites. Andrii Plugin, Tatiana Kostyuk, Dmitro Bondarenko. International Journal of Engineering Research in Africa, 2017. - Vol. 31, PP. 59-69

9. Formation of structure of high-strength composites with account of interactions between liquid phase and disperse particles. Andrii Plugin, Elena Dedeneva, Tatiana Kostyuk, Dmitro Bondarenko and Olga Demina. - MATEC Web Conf., 116 (2017) 01010. - Published online: 10 July 2017. DOI: https://doi.org/10.1051/matecconf/201711601010

10. Influence of complex chemical additives on the water resistant silicate materials. O.Hryhorenko, A. Lobanova, I.Kazimagomedov, K. Plakhotnikov. 6th International Scientific Canference. Transbud - 2017. Kharkiv,Ukraine, Anpril 19-21. 2017. https://doi.org/10.1031/matecconf/201711601010

11. Taylor N. F., Cement Chemistry, Academic Press, New York, 1990. – P. 62-63.

12. ДСТУ Б В.2.7-187:2009 . Цементи. Методи визначення міцності на згин і стиск.

Protskiy A. K.

MODIFIED BITUMENS BY POLYMERS

Scientific Advisor – lecturer Nurieva. S. V.
Language Advisor – Cand. Ped. Sc., Asst. Prof. Gerasymchuk T. V.
Kharkiv National Automobile and Highway University

In this scientific work the influence of a polymer on the properties of bitumen is considered. Licomont was chosen as the modifier.

Bitumens petroleum viscous for road building, modified by polymers (hereinafter referred to as MBP) are used as binding material for the construction and repair of highways in all road-climatic regions of Ukraine in accordance with RBS V.2.3-4 and other regulatory documents.

The process of bitumen modification is a process aimed at improving the properties of bitumen by combining bitumen with special polymeric additives. The introduction of the appropriate polymer and getting modified bitumen allows the substance to obtain improved properties, namely increased heat or frost resistance, increased resistance to loads, better elasticity, durability and so on. As a rule, materials from modified bitumen are called polymeric bituminous, and in some cases, especially in the translated literature, one can find a term like rubber modified bitumen, it means materials based on bitumen, which are modified by SBS polymer or plastic bitumens.

Due to special advanced technologies and additives of selected polymeric substances, the properties of ordinary bitumen are significantly changed, so they are modified. Similar measures are used mainly to obtain higher quality material at the outlet, since the modified bitumen may have higher frost resistance, elasticity, and high resistance to loads, which ultimately will one way or another increase the coefficient of durability of this product.

The temperature of the mixing of the MBP with mineral materials should ensure the rapid spread of the binder and its maximum surface coating of these materials. On the basis of experiments and accumulated experience in the former USSR, and now in Ukraine, the temperature at which the viscosity is equal to 0.5 Pa·s (T 0.5) is taken at the minimum temperature of the binder during stirring.

Licomont BS 100 is structurally (energy-saving) additive to bitumen. It allows you to lower the laying rate of asphalt concrete mixture by 15-20 ° C. It can be introduced directly into the asphalt concrete mixture. It strengthens the resistance of the coating to the formation of gauge and their heat resistance. The strength of the asphalt concrete is increased less than the introduction of polymers. It increases the softening temperature of bitumen by 20-40 ° C. Licomont BS 100 increases the viscosity of bitumen and cohesive strength of bitumen practically does not change. The adhesive properties of bitumen increase up to 90%.

Licomont BS 100 is a low molecular weight fatty acid asphalt modifier, which can increase the lifetime of road surfaces, especially in high temperature environments. By improving adhesion, sealing and hardening of the asphalt

concrete, it provides optimum grip and minimum climatic deformation, even when manufactured at a relatively low temperature of 140 degrees.

This low-temperature mode of asphalt concrete production provides real cost savings and environmental benefits by reducing energy consumption in the production of mixtures, as well as during transportation and roads paving.

The Licomont BS 100 modifiers are highly resistant to deformations at high temperatures, allowing road surfaces to withstand heavy traffic loads. In addition, a cracking resistance at low temperatures is provided. This reduces the probability of damage to the surface and vehicle, the latter can occur during aquaplaning, and increases the level of comfort for road users.

Two samples of bitumen were selected for the experiment. The first bitumen sample is from Kremenchug refinery, and the second one is Nynas. The first bitumen is oxidized, and the second is distilled. All the characteristics of the bitumens they had before mixing with Licomont are given in Table 1.1.

Table 1.1 - Characteristics of the initial samples of bitumens

Type of bitumen	**Penetration, mm / 10**	**Ductility (25°C), sm**	**Temperature softening °C**
Acidified	116	43	44
Distillation	116	>100	42

Then 3% of Licomont was added to each sample, that is 700 grams of sample contained 21 grams of Licomont and 679 grams of bitumen. These samples were warmed to a temperature of 180 ° C with constant mixing. All the received characteristics are summarized in Table 1.2.

Table 1.2 - Characteristics of the received bitumen

Type of bitumen	**Penetration, mm / 10**	**Ductility (0°C), sm**	**Ductility (25°C), sm**	**Temperature softening °C**
Acidified + 3% Licomont	74	1,2	44,2	89,3
Distillation + 3% Licomont	68	1,3	>100	76,6

From these characteristics it is clear that the received bitumen significantly decreased penetration, so the bitumen became more viscous. But it is also evident that the softening temperature has increased substantially, about twice, which is also apparent from the table.

References

1. Фізико-хімічна механіка дорожньо-будівельних матеріалів / Укладачі: Золотарьов В.О., Космін О.В.. Харків :ХНАДУ, 2009. 161 с.

2. Технические, реологические и поверхностные свойства битумов. Избранные труды. Т 2. / Составитель: В. А. Золотарев 1-е изд. Санкт-Петербург: Славутич, 2013. 149 с.

Riabchynskyi E. A.

CONSTRUCTION OF THE INTERNATIONAL SPACE STATION

Language Advisor –Senior Lecturer Galchenko V. M.
Kharkiv National University of Civil Engineering and Architecture

Space as a huge construction site and the construction of space stations in it can solve the problem of overpopulation.

The International Space Station weighs almost 400 tonnes and covers an area as big as a football pitch. It would have been impossible to build the Space Station on Earth and then launch it into space in one go - there is no rocket big enough or powerful enough. To get round this problem the Space Station was taken into space piece-by-piece and gradually built in orbit, approximately 400 km above the Earth's surface. This assembly required more than 40 missions.

A partnership between European countries (represented by ESA), the United States (NASA), Japan (JAXA), Canada (CSA) and Russia (Roscosmos), the International Space Station is the world's largest international cooperative programme in science and technology.

The largest, most complex international construction project in space began on the steppes of Kazakhstan 20 years ago. Atop its Proton rocket, on Nov. 20, 1998, the Zarya Functional Cargo Block (FGB) thundered off its launch pad at the Baikonur Cosmodrome into cold wintry skies. Zarya was built by the Khrunichev in Moscow and served as a temporary control module for the nascent ISS. Nine minutes later, Zarya was in orbit and began unfurling its antennas and solar panels, seemingly coming alive in the airless environment of low Earth orbit. The launch of the first element of the International Space Station (ISS) kicked off an incredible journey of orbital assembly, operations, and science.

The ISS Program can trace its roots back to 1984, when President Ronald W. Reagan proposed that the United Stated develop an Earth orbiting space station. The United States invited Canada, Japan, and the European Space Agency (ESA) to join the project in 1988, and five years later President Bill Clinton invited Russia to join the partnership. Russia not only brought its many years of experience with long-duration human space flight to the program but also modules for the planned Mir 2 space station. Former adversaries on Earth were now working together to build the largest laboratory in space.

Construction of the world’s largest ship sailing the skies, rather than the seas, at more than 5 miles per second is under way. The International Space Station began with the launch of the Zarya control module in November 1998. Since then, the massive structure in the sky has grown into an unprecedented construction site.

On Dec. 4, Space Shuttle Endeavour on the STS-88 mission roared off Launch Complex 39A at Kennedy Space Center in Florida, carrying the Unity Node 1 module in its cargo bay. Built by The Boeing Corporation at a facility at the NASA Marshall Space Flight Center in Huntsville, Alabama, Unity was the first American component of the ISS. Two days after launch, Endeavour and her six-person crew rendezvoused with Zarya, and using the Shuttle’s robotic arm, captured the Russian module and mated it with Unity. Designed and built by engineers thousands of miles apart and never joined together on Earth, the first two modules of the ISS fit perfectly together when they met in space. The STS-88 crew spent the next few days making connections between the two modules before releasing the newly formed but still embryonic ISS. This marked the first step in the assembly of the ISS, which continued for 13 years.

By late 2000, the ISS was ready to receive its first long-duration residents. On October 31, the Expedition 1 crew of William M. Shepard, Sergey K. Krikalev, and Yuri P. Gidzenko blasted off from Baikonur and docked with ISS two days later. Since that day, international teams of astronauts and cosmonauts have kept the ISS permanently occupied, performing the routine operations and maintenance on the station including dozens of spacewalks and conducting research in a wide array of scientific disciplines.

Today, the ISS is the largest space vehicle ever built and a unique laboratory for conducting research in a wide variety of scientific disciplines. Including its solar arrays, it is as large as a football field. The habitable volume in its various international modules is larger than a six-bedroom house. Since November 2000, more than 230 individuals from 18 countries have visited the ISS. As a laboratory, the ISS has hosted more than 2,500 scientific investigations from more than 100 countries.

The installation of the new truss segments and unfurling of the arrays require unprecedented robotic operations. Those operations will use the shuttle and station's Canadian-built mechanical arms to delicately maneuver school bus-sized station components into place.

The operations will rely heavily on the station's mobile transporter, a sort of space railway that positions the robotic arm along the truss to install the components.

"The assembly of the station on these flights has no parallel in space history," Suffredini said. "We have planned, studied and trained for these missions for years. We know they will be hard, and we may encounter the unexpected. But we are eager to get started, and there is tremendous excitement building in NASA and among our international partners."

The main purpose of the International Space Station is to provide an international laboratory for experiments within the space environment. Which,

despite all our technological advances, is nearly impossible to replicate here on Earth. Because for many of those experiments, the key parameter is — you guessed it — weightlessness.

The station's assembly and maintenance in orbit, the long-duration spaceflight experience gained aboard the complex, and the research into the effects of long spaceflights contribute to NASA's plans for future missions to return to the moon and travel beyond.

References

1. https://www.nasa.gov/feature/20-years-ago-iss-construction-begins
2. https://www.nasa.gov/mission_pages/station/main/iss_construction.html
3. https://www.nasa.gov/feature/a-bold-step-apollo-8-sends-first-human-flight-beyond-earth

Rud T. A.

WATER TOWER OF ROZHNOVSKIY

Language Advisor-Asst. Prof. Lukianova G.V.
Kharkiv National University of Civil Engineering and Architecture

A water tower is an elevated structure supporting a water tank constructed at a height sufficient to pressurize a water supply system for the distribution of portable water and to provide emergency storage for fire protection. In ancient times, during the wars, the enemy primarily tried to destroy the water tower in order to leave his opponent without the main life resource — water. In the modern world, water towers are also very popular.

Despite the fact that we live in the age of automation of all technological processes, the good old water towers that provide us with water, continue to serve people in modern living conditions. Currently, such structures are mainly erected in various rural areas.

In 1936 the engineer Rozhnovsky created the idea water tower. At that time, there were such structures, but they were built of bricks and had a lot of shortcomings. Rozhnovsky came up with an excellent solution to this problem. The building is assembled in just 4 days (the maximum period). It doesn't take a lot of money to create it. Moreover, the design is such that in winter it is not required to heat it to ensure the preservation of the liquid state [1].

Rozhnovsky's water towers are special structures in the water supply system, designed to regulate the pressure and flow of water in the water supply network, which contribute to the creation of its reserve, and also to equalize the schedule of operation of water pumping stations.

The main purpose of water towers is the accumulation of water to reduce the load on the pumping system of the water supply system. The greatest use was given to the water towers of the Rozhnovsky system.

The production of water towers has a number of features. First of all, this is due to the fact that the water storage tank is located at a certain height and the entire structure requires sufficient rigidity and reliability, because in addition to the weight of the structure itself, it is necessary to keep the weight of the water in it.

What is the main function of the towers? Provide constant water, and the flow should be uninterrupted. Especially the towers of Rozhnovsky are important for settlements in which light industry is actively developing. All such structures are capable of storing a large amount of water. Moreover, if the pumps for any reason stop, then the pressure is still present, though not strong. Immediately in the construction there is a reserve of water, which is used as a reserve and fire-fighting. Towers are needed for those settlements in which electricity is supplied by the clock or with permanent failures. The fact is that electric pumps can not work under such conditions [2].

The structure of the hydraulic structure includes a support part (the barrel of the tower); water tank; external and internal stairs or brackets with a side fence; inspection hatch, located on the lid of the tank; pipeline, supplying and diverting water; overflow device that prevents overflow of the tank with water; devices that control the water level in the tank, and transmit information to the dispatcher on duty; pumping station.

The installation of the Rozhnovsky tower is quite simple. It should be understood that such a design is capable of providing water sampling, as well as help in firefighting. For this, two closed valves are installed during the installation. The station, which ensures the operation of the pumps, pumps the groundwater into the tower. At the same time, all the liquid is filtered and disinfected. After that from the tank through the cranes it enters the final destination (residential apartments, houses).

The main thing is to correctly determine the height of the tower, and then it will serve perfectly. The reservoir should be higher than the maximum floor of the serviced house. This is the only way to ensure a normal water supply.

When creating the foundation of the tower, Rozhnovsky needs understanding that the design work is very intense. Why? Water should be constantly recruited and accumulated, until its consumption is increased. As soon as there is a need for more liquid, the accumulated stock will begin to be used. The liquid is supplied by pumps. As soon as the water reaches a certain height in the tower, the sensor starts working immediately and the pump turns off. Considering that water consumption is constant and uninterrupted, its level does not go below a certain level. As soon as the liquid reaches this line, the sensor will work and water pumping will begin again.

Modern towers Rozhnovsky are equipped with level sensors to track the upper and lower critical indicators. Control over the filling and emptying of the tower is carried out from the control room or directly by the automation system of the pumping station. The project of the tower of Rozhnovsky is in demand. It is considered successful and reliable. All structures have the simplest design and long service life. They can not be replaced by analogous devices, since they play a large

functional role. In 1942 Rozhnovsky received the Stalin Prize for the construction [3].

At present, the towers of Rozhnovsky continue their work for the benefit of agriculture for the water supply of livestock farms, irrigation of land, in the housing sector to create a network of cold water supply in small villages, in order to provide water to industrial enterprises, if required by the technological process. They are still sold and installed despite the emergence of multiple new developments and inventions. These towers have become an integral part of the rural landscape.

References

1. Прозоров Н.В., Гидравлика, водоснабжение и канализация. - М., Высшая школа, 1991.
2. Водоснабжение. Наружные сети и сооружения. - М.: Стройиздат, 1985.
3. https://erch2014.com/domashniy-uyut/14880-bashnya-rozhnovskogo-harakteristiki-cena.html

Rudenko V. E.

HOW WAS KHARKIV DERZHPROM BUILT OR THE HISTORY OF THE FIRST EUROPEAN SKYSCRAPER

Language Advisor – Senior Lecturer Galchenko V. M.
Kharkiv National University of Civil Engineering and Architecture

The building, which every resident of Kharkiv will remember with its eyes closed, can be called the Derzhprom. Built in the 20s of the XX century, it still remains one of the symbols of the modern city.

Becoming the capital of Soviet Ukraine, Kharkiv began to actively develop. This was helped by the industrialization of the country, which turned the city into an industrial giant.

On March 21, 1925, the Supreme Council of the National Economy announced an all-Union competition for the development of a new type of building project corresponding to the new tasks of social construction. In the project was very interesting and it was challenge for many famous architects.

So, for example, the famous architect Academician Olexiy Beketov participated in the competition for the construction of the Derzhprom, but his traditional "Beketovsky" project, due to its "old-fashionedness", could not compete with young architects of constructivism. The winner was the project with the motto "Uninvited guest" by S. Serafimov, S. Kravets and M. Felger. Construction work was led by Pavel Rottert, known for such projects as the building of the Southern Railway Administration on Pryvokzalna Square in Kharkiv, DniproHPS in Zaporizhia and the Moscow underground.

Derzhprom was built in record time - the project was announced in 1925, and the building itself was commissioned in 1928. For a city in which even in the center there were clay huts with thatched roofs, this was a great achievement. To build this skyscraper, it took five thousand workers, enthusiasts and students of the current Kharkiv Polytechnic Institute, who worked in three shifts. Despite such a speedy time of construction, it should be noted that almost all stages of construction were carried out manually. Horses with carts and 14 trucks were used as vehicles. For the first time in the world, the accurate calculations of complex spatial frame reinforced concrete structures have been developed and applied. The builders, for the most part, manually dug an excavation for a building of 20 thousand cubic meters and removed the land on horse-drawn carts.

1315 wagons of cement, 9,000 tons of metal, 3,700 wagons of granite and 40,000 square meters of glass were used for the construction of the Derzhprom. The total construction volume of excavation ground is 347 thousand square meters.

During the Second World War, while retreating, the Germans wanted to blow up the Derzhprom and even mined the building. The construction was saved by the 'genius' of the structure - there was nothing to burn, because the building was made of reinforced concrete and the main building was not structurally damaged.

After the war, the Kharkiv Derzhprom was rebuilt for three years. Moreover, the restoration began in 1944, and ended in the 1947.

In 1955, one of the first television towers was installed on the first skyscraper in the USSR. Its length was 45 meters. Thanks to this tower, the total height of the building is 108 meters. Also, 7 of the 12 Derzhprom elevators have been operating to this day since 1928 and have not been replaced. Also, the "chip" of the Derzhprom are copper knobs, which, according to the data of Soviet physicians, were made of a special alloy that killed germs. We can not say about the fact that when digging the elevation of the 6th entrance the mammoth bones were founded. Today, these bones are in the Museum of Natural History in Kharkiv.

Our story about the State Industry would be incomplete without a dramatic moment connected with the policy of the ruling Soviet regime. We are talking about the Commissar of Education, Mycola Skrypnyk, who shot himself in the office.

He entered the history of Ukraine as the People's Commissar of Education (1927-1933), who advocated the national-cultural development of Ukraine and in every way promoted its national revival.

After another party asset in the assembly hall of the Gosprom, where Skrypnyk was accused of national deviation and demanded to write another "penitential" letter addressed to Stalin, he could not stand it: he went to his office at the fifth entrance of the Derzhprom and shot himself. As the newspapers would later write, dying in the hands of one of the party members, Skrypnyk called this his decision "the biggest mistake." So it was - is not known.

The Derzhprom building is one of the most prominent examples of constructivism in architecture. Thus, in the World Architectural Encyclopedia the article "Constructivism" is illustrated by the image of this particular building. Work

was also carried out to include it in the UNESCO list of monuments, but at the moment the Derzhprom is only in the preliminary list of the organization.

References

1. Топ-5 історичних будівель Харкова. URL: https://mykharkov.info/interesno/top-5-istoricheskih-zdanij-harkova-45934.html
2. История первого советского небоскреба. URL: https://kh.vgorode.ua/news/transport_y_ynfrastruktura/144692/
3. Харківський Держпром - символ конструктивізму. URL: https://planetofhotels.com/ukraina/harkov/gosprom

Savchenko N. K.

ZAHA HADID – FIRST WORLD KNOWN FEMALE ARCHITECT

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

Zaha Mohammad Hadid, an Iraqi-British architect was the first woman to receive the Pritzker Architecture Prize, in 2004. She received the UK's most prestigious architectural award, the Stirling Prize, in 2010 and 2011. In 2012, she was made a Dame by Elizabeth II for services to architecture, and in 2015 she became the first and only woman to be awarded the Royal Gold Medal from the Royal Institute of British Architects.

She was described by “The Guardian” as the "Queen of the curve", who "liberated architectural geometry, giving it a whole new expressive identity". Her major works include the aquatic centre for the London 2012 Olympics, Michigan State University's Broad Art Museum in the US, and the Guangzhou Opera House in China. Some of her designs have been presented posthumously and several of her buildings were still under construction at the time of her death, including the Al Wakrah Stadium in Qatar, a venue for the 2022 FIFA World Cup.

Zaha Hadid began her career teaching architecture, first at the Architectural Association, then, over the years at Harvard Graduate School of Design, Cambridge University, the University of Chicago, the Hochschule für bildende Künste in Hamburg, the University of Illinois at Chicago, and Columbia University. She earned her early reputation with her lecturing, radical early designs and projects, which were widely published in architectural journals.

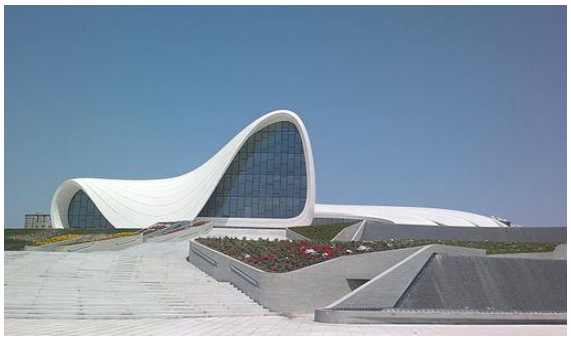
Her ambitious but unbuilt projects included a plan for an opera house in Cardiff, Wales, (1994). The Cardiff experience was particularly discouraging; her design was chosen the best by the competition jury, but the Welsh government refused to pay for it, and the commission was given to a different and less

ambitious architect. Her international reputation was greatly enhanced in 1988 when she was proposed to show her drawings and paintings as one of seven architects chosen to participate in the exhibition "Deconstructivism in Architecture" at New York's Museum of Modern Art.

At the end of the 1990s, her career began to gather momentum, as she won commissions for two museums and a large industrial building. She competed against well-known architects for the design of the **Contemporary Arts Center in Cincinnati**, Ohio. She won, and became the first woman to design an art museum in the United States. The project demonstrated Hadid's ability to use architectural forms to create interior drama, including its central element, a 30-metre long black stairway that passes between massive curving and angular concrete walls.

Between 1997 and 2010 Zaha Hadid ventured into the engineers' domain of bridge construction, a field also occupied by other top architects including Norman Foster and Santiago Calatrava. Between 2005 and 2008, she designed and built the **Bridge-Pavilion of Zaragoza**, which was both an exhibit hall and a bridge.

During this period she constructed a much more ambitious bridge, the **Sheikh Zayed Bridge**, between the island and the mainland of Abu-Dhabi. Both the design of the bridge and the lighting consisting of gradually changing colours, were designed to give the impression of movement. The silhouette of the bridge is a wave, with a principal arch 235 metres long, standing 60 metres above the water. The total span of four lanes also includes pedestrian walkways.



The Heydar Aliyev Centre in Baku, Azerbaijan (2007–2013) is one of her last completed projects. It is a gigantic cultural and conference centre containing three auditoriums, a library and museum. Peter Cook in Architectural Review called it "… a white vision, a wave form sweeping up, almost lunging, into the sky ... . The shape of the building is wave-like and the overall view is unique and harmonic. The lines of the building symbolize the merging of past and future. It is the most complete realization of the Iraqi-born architect's vision of sweeping curves and flowing space."

The Dongdaemun Design Plaza is among the largest buildings in Seoul, South Korea. Its name means "Great Gate of the East", in reference to the old walls of the city. The complex contains exhibition space, a museum of design, conference rooms and other common facilities. The main building has seven levels, including three levels underground.

The giant mushroom-like structure floating atop sloping pylons is made of concrete, aluminium, steel and stone on the exterior, and finished inside with plaster reinforced with synthetic fibre, acoustic tiles, acrylic resin, and stainless steel and polished stone on the interior. It also features many ecological features, including a double skin, solar panels, and a system for recycling water.

On 31 March 2016, Zaha Hadid died of a heart attack in a Miami hospital. The statement issued by her London-based design studio announcing her death read: "Zaha Hadid was widely regarded to be the greatest female architect in the world today". She is buried in Brookwood Cemetery, England.

References

1. http://www.zaha-hadid.com/
2. https://www.designboom.com/tag/zaha-hadid/
3. https://www.curbed.com/zaha-hadid

Semenova S. O.

EVERYTHING YOU NEED TO KNOW ABOUT ART DECO

Language Advisor – Senior Lecturer Pyvovarova O.I.
Kharkiv National University of Civil Engineering and Architecture

The common place in Art Deco definitions is that it was certainly one of the most influential decorative styles in the first half of the twentieth century. The name itself came from the Exposition Internationales des Arts Décoratifs et Industriels Modernes which was held in France in 1925.

Although it was the most popular movement in the period between two World Wars, it wasn't recognized as a movement in its own right until the sixties and some art historians even today argue whether Art Deco should be identified as a distinct style. This new style was founded on the avant-garde tradition, including Fauvism, Futurism, the visual language of Constructivism and Suprematism. Art Deco designers also searched for the exotic cultural elements they could incorporate into their design, and it is not surprising that there is a rich selection of cultural motifs, from Aztec and Egyptian art, as well as from Classical Antiquity. The choice of the motifs was also inspired by the local Art Deco variants, as this movement was the first global decorative style.

Art Deco designs marked the period of newly found optimism after the war and great depression. Although it drew its inspiration from the past art movements, one of the main features of Art Deco style was its orientation towards the future and celebration of modern ideas of progress. As a style that combined arts and craftsmanship, Art Deco found its use mostly in the fields of architecture, interior, textile, furniture and fashion design. To a lesser extent, it can be found in visual arts, usually painting, sculpture and graphic design. Art Deco mostly relied on collaborations of artists working in different mediums from architects and painters to sculptures and designers and in the interwar periods it was the most commonly used architectural style, most notably in the United States.

The structure of Art Deco is founded on mathematical geometric shapes which drew equally on Greco-Roman Classicism, the faceted architectural forms of Babylon, Assyria, Ancient Egypt, and Aztec Mexico - notably their ziggurats, pyramids and other monumental structures - and Machine Age streamline designs from aviation, the radio, and the skyscraper. Art Deco began to grow in popularity and became a commonly adopted style for buildings such as theatres, cinemas, commercial buildings, government buildings, apartments, industrial complexes, and the emerging building form of the age - the skyscraper.

Art Deco also sometimes used stylized images from nature like waterfalls, sunrises, and palm tree leaves. In particular, Art Deco designs are characterized by trapezoidal, zigzagged, and triangular shapes, chevron patterns, stepped forms, sweeping curves and sunburst motifs (the spire of the William van Alen Chrysler Building (1928-30) in New York). You can see arched sunrise-like figures on the top of the Chrysler Building.

The distinctive mark of the Times Square Building, New York, (1929) is undoubtedly the aluminium “Wings of Progress” crowning the pinnacle.

Florin Court is a residential building in London, built in 1936. The key feature is the elegant, curved, glass-and-all facade that is hemmed in by projecting wings and rendered in brick.

Characteristics. In classic Art Deco, rectangular blocky forms were often arranged in geometric fashion and broken up by curved ornamental elements. The aim of classic Art Deco was always to achieve a monolithic appearance with applied decorative motifs.

Materials. Art Deco materials included stucco, concrete, smooth-faced stone and terra cotta. Steel and aluminum were often used along with glass blocks and decorative opaque plate glass (vitrolite). Expensive materials like gold, ivory, and lacquer were used for accents.

Roof. Art Deco designers adorned flat roofs with parapets, spires or tower-like constructs to accentuate a corner or entrance. Decorative curiosities such as chimneys were added to further enhance the design

Windows. Windows in Art Deco designs usually appear as punctured openings, either square or round. To maintain a streamlined appearance for the building, they were often arranged in continuous horizontal bands of glass. Wall openings are sometimes filled with decorative glass or with glass blocks, creating a contrast of solid and void forms while admitting daylight.

Entrance. Doorways in Art Deco architecture are sometimes surrounded with elaborate pilasters and pediments and door surrounds are often embellished with either reeding (a convex decoration) or fluting (a concave decoration).

Although it has lost its popularity after the World War II, Art Deco was revitalized during the sixties. Due to its global visual language and its nature that responds well to the requirements of the mass production, the heritage of this decorative style is still present today, mostly in the field of fashion, product and industrial design. Art Deco items are also becoming increasingly popular in the art market and this newly found appreciation for the movement lead to the establishment of many Art Deco foundations which continue to work on the restoration and preservation of architectural monuments built at the Art Deco golden ages.

References

1. https://study.com/.../art-deco-architecture-characteristics-hist...
2. https://www.highsnobiety.com/.../art-deco-architecture-exam...
3. https://www.designingbuildings.co.uk/wiki/Art_Deco
4. www.visual-arts-cork.com/history-of-art/art-deco.htm

Shabatura N. I.

ECOLOGICAL ARCHITECTURE

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

Ecological architecture has existed for thousands of years. A famous example is Angkor Wat, a Cambodian temple complex built in the 12th century AD that still stands today. Angkor Wat uses a complex irrigation system and hydraulic engine to power many aspects of the complex, including reserving water for drier months, watering crops, and heating and cooling areas as needed. Angkor Wat also uses locally-sourced natural materials throughout its structure, meaning that its carbon footprint is lower than a structure where the materials would have been transported to the site from around the globe.

These transport emissions are a huge

source of carbon emissions within the building industry; looking back at the practices used in Angkor Wat could help us to improve our own practices 900 years later.

20-th architecture begun as a manifestation of the industrial and technological era, but during the 90s it started to change in new era of information and ecology. One of the most complicated and problematic issues of the humanity of this century will be how to construct settlements in harmony with nature, always taking into account a creative dialogue, rather than a utopist selection.

Frank Lloyd Wright was a symbol of the biggest resistance and an innovator, whose works shaped the basic principles of architecture harmonization with nature. This impressive genius can also be considered as a predictor of the environmentalist movement since the very beginning of the 20th century, long before the word "Ecology" was commonly used. In 1991, members of the American Institute of Architects named Wright's masterpiece - Fallingwater the "best all-time work of American architecture".

Contemporary ecological architecture aims to combat the prevalent architecture style that is damaging the earth. According to the Encyclopaedia Britannica, the building of shelter consumed more than half of the world's resources in the early 21st century. This includes: - 16% of the freshwater resources - 30-40% of all energy supplies - 50% of all raw materials withdrawn from the Earth's surface (by weight) - 40-50% of waste deposits in landfills - 20-30% of greenhouse gas emissions.

The goal of eco-architecture is to have as little impact on the environment as possible. For example, habitats are often destroyed to make way for new buildings, but now new projects are being built in and around habitats to minimise the effect on wildlife and nature. Where habitats are impacted, buildings are created with a replacement for nature in mind, such as grass roofs, or structures built into the landscape, including underground properties with spectacular skylights and clever lighting techniques to make the most of the natural light. Gardens are also being incorporated into new buildings to encourage local wildlife such as birds and insects.

Sustainable materials, including recycled and second-hand products are often used alongside traditional materials such as steel and plastic. From salvaged timber to restored tiles and windows, there is a focus on re-using building materials and creating something new from something old.

Clever techniques are also included within eco architecture to make the running of the building sustainable for the environment too. Reflective materials, including mirrors in some cases, are used to reflect heat away from buildings which is an effective way to cool buildings, especially in warmer countries. This technology is reversible too to maintain heat with exterior walls that can adjust to warm a building up.

Solar panels are now often installed on new buildings to help maintain the running of the building with renewable energy and help keep maintenance costs down. With governments contributing to solar schemes, it's now more efficient than ever for new buildings to be erected with renewable energy installations.

Canada was one of the first countries in the world to change their building codes in order to use wood in vertical structures. It is a pioneer in adding high-rises made out of wood to their urban fabrics. The Canadian government awards buildings that exceed carbon footprint standards.

Architecture studio Penda is planning a modular wooden skyscraper, the Toronto Tree Tower. It is intended to be a residential building that is more efficient to construct and more ecological than many common buildings. The 18-storey tower will stand 62 m high and will provide 4,500 sq. m of residential space and 550 sq. m of public space. The warm, natural appearance of wood and the plants growing on its facade could be a model for environmental friendly developments and sustainable extensions of our urban landscape.

The Tree Tower proposes using pre-fabricated and pre-cut cross-laminated timber panels, assembled into modules off-site at an indoor facility. The modular, prefab process is faster, less noisy, reduces waste and allows a high degree of quality control. The future of ecological architecture will include a further rise in popularity, as well as positive effects on urban ecosystems.

References

1. https://www.kj-architects.co.uk/news/what-is-eco-architecture/
2. https://www.smart-magazine.com/sustainable-architecture-2018/
3. https://www.designbuild-network.com/features/torontos-tree-tower/

Shevchenko A. N.

TECHNOLOGICAL PROPERTIES OF CONCRETE MIXTURES

Scientific Advisor –Cand. Tech. Sc., Asst. Prof. Arinushkina N. S.
Language Advisor – Cand. Ped. Sc., Asst. Prof. Gerasymchuk T. V.
Kharkiv National Automobile and Highway University

Workability – is the ability of the concrete mixture to fill the form and compacted in it under its own weight or a little mechanical effort. It is determined by mobility or rigidity. Depending on the index of workability concrete mixes according to divided into brands.

The measure of workability of mobile concrete mixtures are the mobility, determined by sedimentation under the action of its own weight a truncated cone of standard dimensions that is formed from concrete mixtures.

The mobility of the concrete mixture is determined by special sample of concrete mixture in the form of a truncated cone with a height of 300 mm with a maximum grain size of crushed stone for 40 mm has a bottom base diameter of 200 mm and a top base diameter 100 mm. the Sample is made using metal molds appropriate size. Value of the cone subsidence value concrete mixture, which is determined by a cut cone with a height of 450 mm and a size of the upper and lower bases 300 and 150 mm, adjusted to the value of the precipitation cone height 300 mm multiplied by a factor of 0,67.

The mobility of the concrete mix determined in such sequence: establish a form of a cone on a metal sheet, wipe the inner surface of the cone shape with a damp cloth and fill out a form-the cone with the concrete mixture through the funnel three layers of equal thickness. Each layer of concrete mix is compacted bayonet 25 standard metal pressings bar in the form height is 300 mm. While the form is pressed to the sheet with two blades remove the watering can, cut excess mixture to the edges with the upper edges of the mold and slowly raise it straight up, then set the form-cone near the formed concrete mix.

The draft of the cone is determined in centimeters using laying of a metal ruler with an edge on the top of the cone shape and measure the distance from the bottom of the ruler to the top of the cone with concrete mix with an accuracy of 0,5 cm.

The draft of the cone (CD) is determined to an accuracy of 1 cm as the arithmetic mean of the results of two trials of a concrete mix from one sample. The results of the two tests shall not differ by more than 1 cm at CD< 4 cm; 2 cm at CD = 5-9 cm; 3 cm at CD ≥ 10 cm.

If the subsidence of the cone is zero, consider that the concrete the mixture has no mobility and refers to rigid or super-rigid mixtures. Their characteristics of workability are increased rigidities. The stiffness is determined by the vibration period of the mixture in seconds required to make the molded cone concrete mixtures of cylindrical shape.

Rigidity of concrete mixtures (vibration time in seconds) determine on a laboratory vibrating table that provides the frequency 2800-3000 oscillations per minute and amplitude 0,5 mm. Test carried out in such sequence: set on the vibrating table the cylindrical ring of the device and rigidly fix it. In the ring have a standard metal cone and fix it the institution handles them to the ring grooves, install the watering can. Fill out a form-cone apparatus, concrete mixture, it is subjected to standard seal, and then remove the form-cone with the molded mixture in the same way as when determining workability of concrete mix. Further, the disc device diameter 230 mm, 4 mm thick and 50 g weight are brought into contact with the surface of the mixture. Fix the tripod in the fixing sleeve by clamp by screw. At the same time the vibrating table and the stopwatch and observe the alignment and seal concrete mix under the influence of vibration.

The vibrating of the concrete mix continues until, until the separation of the cement paste from the two holes will begin disk. At this point, the stopwatch and the vibrating table are simultaneously turned off. A certain time of vibration (in

seconds) characterizes the stiffness concrete mix. The rigidity of the concrete mixture is determined with precision up to 1 s as the arithmetic mean of the results of two hardness tests of a single sample mixture that differ between no more than 20 %.

Plasticity – the ability of the cement concrete mixture during compaction do not delaminate. The stratification of the concrete mixture, which characterizes its connectivity under dynamic action, determined by comparing the content of the soluble component concrete mix in the lower and upper parts of the newly formed sample with dimensions of 200 × 200 × 200 mm.

Referenses

1. Грушко И.М., Золотарев В.А., Глущенко Н.Ф. Испытания дорожно-строительных материалов. Лабораторный практикум. М. : Транспорт, 1985. 200 с.

Shevchenko V. A.

HOW 3D PRINTING IS CHANGING ARCHITECTURE

Language Advisor – Senior Lecturer Tkachenko S. V.
Kharkiv National University of Civil Engineering and Architecture

In architecture, investments and final products are of course quite sizable, so any design modifications made at an early stage are well worth the effort. 3D printing is uniquely equipped to play a critical role in the creative process by efficiently producing tangible, physical visualizations of complex designs that can be easily shared and understood

3D printing is transforming the way architects design the structures we live, work and play in.

Three-dimensional printing is one of the most talked-about technologies of these decades. Some consider it the beginning of the third industrial revolution, while others point out the constraints of the technique. Is 3-D printing changing our architecture, and is it the way we'll design our homes in the future? 3D printing is transforming the way architects design the structures we live, work and play in.

In the last decade, the concept of 3D printing has reached main stream public awareness. Most people have either seen it on TV, their kids are working with it in school or they have researched it themselves out of curiosity. In the Architecture world, we are now seeing the native integration of 3D printing in architectural software.

The technology of 3-D printing was invented by Chuck Hull, an American engineer. He initially called the new process stereolithography and patented it in 1986. The technique links molecules using laser light to form polymers into solid shapes.

In 3-D printing, objects are constructed layer by layer. The idea stems from printing with ink; in that process, the ink lies on top of the paper. If the process was repeated time and again, but with more solid materials and a slight shift to create movements in the layers, a 3-D printing effect would occur. Materials used in 3-D printing range from the more common synthetic resins and plastics to steel and concrete.

3-D printing will make geometric complexity in building construction possible without much additional effort or expense.

Making prototypes in 3D allows architects to work in a more detailed way and at a scale the human hand cannot produce. It helps the architects create various complex prototypes.

Materials used in 3-D printing range from the more common synthetic resins and plastics to steel and concrete. Some are experimenting with natural materials such as bamboo, wood and natural stone waste. Small versions of 3-D printers are finding their way into designers' studios, schools and private homes.

But some synthetic materials used for printing are suspected of emitting toxins. In the course of an experiment, a doctoral student at the University of California at Riverside found that her zebra fish were dying in the container she had printed. A research team then tested the products of two of the most common 3-D printers and discovered that the toxicity levels of both were quite alarming. Researchers worldwide are working to find safe materials and techniques and caution that the printers should be used in well-ventilated places.

China is one of the countries where 3D printing has developed rapidly. So it should come as no surprise that the largest printed architectural object was created there. Vulcan, a pavilion was revealed to visitors from all over the world during Beijing Design Week 2015. But it was not printed all in one piece. Its curved form — 27 feet (8.2 meters) long and 9.4 feet (2.9 meters) high — was assembled from 1,023 individual components, all produced by a printer.

Although this achievement was rewarded with an entry in Guinness World Records, it also shows the limits of today's 3-D printing technology: To print entire houses, the printers would have to be gigantic or run on huge scaffolds.

Another Chinese company Winsun has constructed two buildings using a 3D printer that recycles industrial waste to form new building material.

They have been showing off the two neighboring projects, one an 1,100-square-metre villa, the other a six-story residential block, in the Chinese city of Suzhou. The residential block is the world's tallest 3D-printed building, according to the company. It took a day to print out one level of the residential block, and then five more to put the level together.

As for the villa, both the interior and exterior of the home were created using the company's 3D printing tech.

The company's printers are 6.6 meters tall, and work by secreting layers of construction material on top each other to form densely packed building blocks. The "ink" is mainly a mixture of cement and glass fibre.

In Amsterdam, though, DUS Architects printing a canal house. Construction on the house has already started in the northern part of Amsterdam, and is projected to take three years.

The printer creates large bricks from layers of molten plastic, which builders can stack like Legos. The stacked plastic bricks will ultimately become the framework for each room.

WASP Organization (World's Advanced Saving Project) introduced the Big Delta - the world's largest delta 3D-printer. This 12-meter-high giant designed for very low-cost housing construction using local materials, and low energy. It can be transported in the problem areas, where were natural disasters, and make there temporary and cheap homes for people who lost their homes.

The ability to quickly build houses with very limited budget and using additive manufacturing can be useful not only on Earth, but in space. In space, this technology will open up opportunities in the selection and design of future structures will create a structure that is simply impossible to build any other way.

Fans of the new technology put us on the threshold of a new era. If the technology is shared and becomes accessible to everyone, 3-D printing could potentially change the world. Product fabrication could move into the living room, and there would be less pollution because of the reduced need for transportation of goods.

3D printing houses, like 3D printing other parts, will not completely replace traditional processes, but it adds another tool to help engineers continue to develop new and interesting solutions. To further this technology, designers should remember to take advantage of inherent properties to increase the benefits of this construction technique.

This sort of building technology would change our daily world and the way we live completely. Because the technology creates components with multiple layers, we will have the possibility of creating very complex building components with gradient characteristics.

References

1.Printing Architecture: Innovative Recipes for 3D Printing: Edited by Ronald Rael – 2018 – 174 p.

Shupta A. V.

EACH SYRACTURE IS A DISPLAY OF ITS OWNER

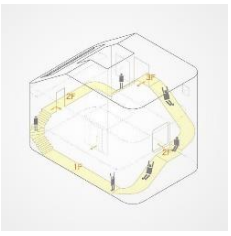
Language Advisor – Asst. Prof. Nikiforova S.M.
Kharkiv National University of Civil Engineering and Architecture.

Previously, architecture was a way of providing a roof over the heads. But with each century, century, and now a year, customers increasingly want more and more innovations in their home. The most expressive way to stand out, to show that

not only you, but also the place in which you live, is extraordinary. Customers come up with new thoughts or ideas, and architects need to realize even their weirdest quirks. And the architects themselves are no exception, because more often it is precisely the architects who have the strangest places to live. Ancient architecture is certainly beautiful, their canons and principles, but just like everything, it adapts to modern trends, needs, as well as to their rapid changes, as well as man himself. How would you like to livevna castle, a tree house or even undergroung? This might not be as unusual as you think. In this article I would like to talk about some of the most interesting or strange, as some seem to be houses.

Renzo Piano “Architecture is a very dangerous job. If a writer writes bad books, people just don’t read them. But if an architect does his job poorly, he condemns any place to be monstrous for a hundred years. ”

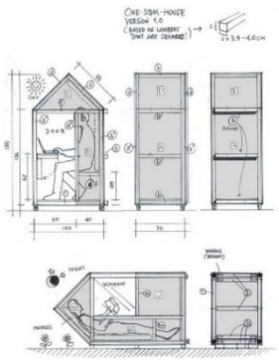
Transparent house, Japan. One of these houses is not like the others. This house in Tokyo by Sou Fukimoto Architects, known as *House NA*, stands out with its modern and transparent style. The building is unlike its neighboring houses in its appearance and structure. The interior of the residence has hardly any walls. The house boasts large glass windows for plenty of daylight, but the downside seems to be a lack of privacy. Just about everything indoors is exposed to neighbors and passerby. On the bright side, there are plenty of positive features in this vertical living space to focus on including its sleek, contemporary aesthetic with adventurous appeal. The design appears to mimic a tree without outright copying its appearance. There’s also something about it that has the architectural feel of a bunk bed. I’m guessing it’s all the climbing without actually entering a new room.



House with slide (“House with a Hill”) is a three-story residential building built by Level architects architectural studio for a family with several children. A unique feature of unusual housing has become a real children's slide, which is used as an alternative staircase portal for the younger generation. The slide continuously rounds the structure of a minimalist Japanese house around the perimeter, turning it only in two places into steps, by means of which adults can move from floor to floor without resorting to the help of fun children's fun. An unusual volume placed in itself a hallway, living room, library, playground, nurseries, bedrooms, kitchen and bathrooms. Since the space in which the slide-staircase is located occupies most of the perimeter of the house, some rooms receive daylight through skylights and a thought-out system of interaction between openings, transparent glass partitions and, of course, artificial lighting.

House of American actor and producer Dick Clark in the style of "Flintstones", USA. Flintstones Home. The single-story structure with its rocky interior looks just like the home of Fred and Wilma from the classic 60's cartoon. This real-world version of the snts Flintstones' home has one bedrooms and two bathrooms, a fireplace and several large glass windows offering views of city lights and sunsrts as well as Serrano Valley, the Boney Mountains, the Channel Islands and the Pacific Ocean. The unique architecture of the dwelling imitates the Neolithic cave, complemented by some elements of modern life and decor that corresponds to the general context. The structure harmoniously adapts to the surrounding landscape of the Pacific coast, without disturbing its magnificent beauty and providing beautiful panoramic views to its inhabitants.

House of 1 square meter, Germany. The world's smallest house is finally here. For real. Compared to the One-Sqm-House by Van Bo Le-Metnzel of Hartz IV Möbel, all of the other teeny weeny little dwellings we have featured over the years are enormous. And now they're going to take over the world. As the name implies, the One-Sqm-House house only occupies one square meter. But it is remarkably adaptable. It can be laid down flat for sleeping or propped upright to act as a miniature mobile shop or meeting place.



Nautlus Giant Seashel House. If you've ever wondered how it feels to be living in a shell, you should visit the Nautilus House in Mexico City. This amazing shell shaped house was designed by architect Javier Senosiain and built in 2006. As strange as it looks, it`s a real housc built for a young family with two children who were tired living in a conventional home and wanted to change to one integrated to nature. It was inspired by the work of Gaudi and has a lot of smooth surtaces and spiral stairs that makes it feel like you're living inside a snail.

But remember, "Architecture is the science of how to waste space." Philip Johnson.

References

1. Alan Colquhoun «Modern Architecture», 2002
2. https://uznayvse.ru/interesting-facts/samyie-neobyichnyie-doma-v-mire.html

Skorikova A. G.

HISTORY OF VERTICAL GARDENING

Scientific Advisor – Assist. Prof. Sharlay O. V.
Language Advisor – Assist. Prof. Nikiforova S.M.
Kharkiv National University of Civil Engineering and Architecture

The first mention of vertical gardening dates back to the third millennium BC (Picture 1). Egyptian gardens with their clearly planned composition and taking into account the laws of symmetry were famous for their beauty. Plants were planted in the courtyards of houses, curly grape vines and tropical lianas wrapped up vertical structures: pergolas, lattice fences, gazebos.

Picture 1- First mention of vertical gardens

From the end of I century BC and before the beginning of I century AD, the arbours, wrapped in ivy and lily was very popular. A large number of gardens in Greece and in Rome was due to the high development of civilization. Historians describe a grove, more like a huge winter garden, around the perimeter it was surrounded by a lattice wall. They created a solid green carpet, maintaining inside the garden a pleasant coolness and twilight.

During the Middle Ages, gardens are already much smaller, they are fenced with massive stone walls. In order to visually enlarge the garden area and hide the dark gray walls, they planted climbing plants next to them, which, as they grew, hid the stone.

Picture 2 - Inventor Stanley Hart White

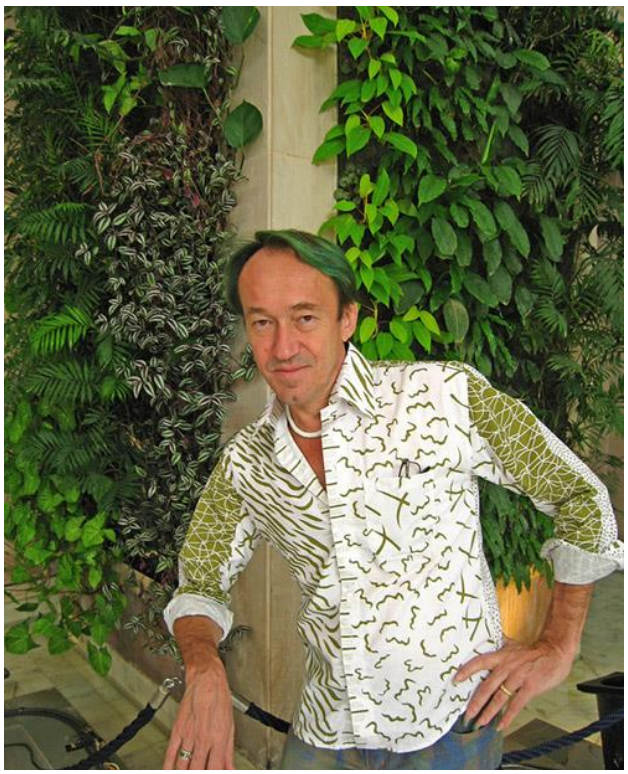
The romantic avenues of the Renaissance and the passages from one part of the park to another were lined with a large number of arches, covered with plants so that the result was a green corridor.

In the XVI-XVIII centuries, garden trellises were widespread - trellis walls, which either served as a support for twisted plants, or a support for placing flowers in pots. Planting was used for decoration of sculptures and niches, pavilions and pergolas, fences and external walls of buildings.

In the 30s of the twentieth century, for the first time, appeared a vertical landscaping, as we know it now. The author of the invention is Stanley Hart White (USA) (Picture 2).

Peter Blank became the modern founder who patented and introduced a new way of landscaping (Picture 3).

He proposed to move the green cover from the horizontal to the vertical - a technology known as the "Vertical Garden System", which will allow the greening of large facades, and later include "green walls" directly in the interior of the buildings.



Picture 3 - Architect-designer Peter Blank

The most ambitious project of vertical planting of Peter Blank today is the design of the walls of the Museum of Contemporary Art Quai Branly in Paris. On the wall with a total area of 800 m^2 more than 170 species and 15,000 plants are located.

Today, vertical gardening technology is becoming increasingly popular. Man moving to the city needs in the natural environment and creates it at home, decorating the interior with indoor flowers. Scientists predict a big future for phytostines as a means that can naturally improve the microclimate of premises.

References

1. http://greenwall.su/history_of_vertical_gardening/
2. http://www.cre8tivez.org/uncategorized/vertikal-ni-sadi/
3. http://www.gazon.ua/man/article/Rol_ozeleneniya

Sosiuk V. G.

DAMS AS ENGINEERING STRUCTURES

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

An engineering structure is a three-dimensional, planar or linear building structure designed to carry out production processes, storage of materials, movement of people and goods. Dams are hydro technical engineering structures.

Hydro technical engineering focuses on the study of liquids and designing applications to store, control, and transport water throughout the world.

Dam is a barrier constructed to hold back water and raise its level, forming a reservoir used to generate electricity or as a water supply.

Dams are ancient hydraulic structures that still impress people. The first known dam that was built is the Jawa Dam. Located in modern-day Jordan, the Jawa Dam was originally constructed around 3,000 BCE in what was then Mesopotamia. While most ancient dams were simple gravity dams constructed of gravel and masonry, the Jawa Dam was reinforced with rock fill behind the upstream wall in order to protect the wall from water pressure breach. In its prime, the Jawa Dam was 15 feet tall, 80 feet long, with a base of 15 feet. It created the Jawa Reservoir that had a capacity of 1.1 million cubic feet [1, 6].

The first constructed dams were gravity dams (not considering Jawa Dam), which are straight dam made of masonry (stone brick) or concrete that resists the water load by means of weight. ." Around 2950-2750 B.C, the ancient Egyptians built the first known dam to exist. The dam was called the Sadd el-Kafara, which in Arabic means "Dam of the Pagans. The dam was 37 ft height, 348 ft wide at the crest and 265 ft at the bottom. The dam was made of rubble masonry walls on the outsides and filled with 100,000 tons of gravel and stone. A limestone cover was applied to resist erosion and wave action. The structure had no need for cement because the shear weight of the structure was sufficient to ensure stability. Using the expected hydrology for ancient times, the capacity was estimated to be 20 million cubic ft or 460 acre-ft. The dam failed after a few years and it was concluded that overflow was the cause of failure. The dam was not watertight and water flowed through the structure quickly eroding it away. Once the water overflowed the crest, it quickly eroded away the dam.

Around 2000 BC in Mesopotamia the earthen Nimrod's Dam was built. Earth dams are massive dams similar to gravity dams except they are made of soil. The dam is made watertight, with a core wall and filled with an impervious center usually made of clays. Nimrod's dam was used to prevent erosion and reduce the threat of flooding. The intention was to divert the flow in the river and help irrigate the crops. The dam was built of earth and wood, so it is difficult to be certain of the exact characteristics of the dam.

Due to the large size and amount of building material were needed to construct these dams, the arch dam was invented. An arch dam is dependent on its shape for strength, requires less material to build, and is relatively thin. The first known arch dam is Kebar, which was built around 1280 AD in the Mongol period. The limestone dam is located near the ancient town of Quam and stands 85 ft high, 180 ft long at the crest, 16 ft thick at the crest and has a constant radius of curvature of 125 ft. An arch dam needs to be supported by the surrounding geology, the rock formations on either side support the arch [2, 6].

Dams are built to provide water for human consumption, for irrigating arid and semiarid lands, or for use in industrial processes. They are used to increase the amount of water available for generating hydroelectric power, to reduce peak

discharge of floodwater created by large storms or heavy snowmelt, or to increase the depth of water in a river in order to improve navigation and allow barges and ships to travel more easily.

Auxiliary works that can help a dam function properly include spillways, movable gates, and valves that control the release of surplus water downstream from the dam. Dams can also include intake structures that deliver water to a power station or to canals, tunnels, or pipelines designed to convey the water stored by the dam to far-distant places. Other auxiliary works are systems for evacuating or flushing out silt that accumulates in the reservoir, locks for permitting the passage of ships through or around the dam site, and fish ladders (graduated steps) and other devices to assist fish seeking to swim past or around a dam.

However, dams have become a focus of environmental concern because of their impact on migrating fish and riparian ecosystems. In addition, large reservoirs can inundate vast tracts of land that are home to many people.

In terms of engineering, dams fall into several distinct classes defined by structural type and by building material. The decision as to which type of dam to build largely depends on the foundation conditions in the valley, the construction materials available, the accessibility of the site to transportation networks, and the experiences of the engineers, financiers, and promoters responsible for the project. In modern dam engineering, the choice of materials is usually between concrete, earth-filled, and rock-filled. Although in the past a number of dams were built of jointed masonry, this practice is now largely obsolete and has been supplanted by concrete. Concrete is used to build massive gravity dams, thin arch dams, and buttress dams. Earth-filled and rock-filled dams are usually grouped together as embankment dams because they constitute huge mounds of earth and rock that are assembled into imposing man-made embankments.

For a better understanding the structure work, in practice, various three-dimensional models of dams are now being made. However, while computers are useful in analyzing designs, they cannot generate (or create) the dam designs proposed for specific sites. This latter process, which is often referred to as form making, remains the responsibility of human engineers.

Each of the two basic dam materials, concrete and earth-filled, possesses weaknesses that must be accommodated in the design process.

Unless reinforced with embedded steel bars, concrete is weak in tensile strength; that is, it can easily crack or be pulled apart. Concrete dams are therefore designed to place minimum tensile stress on the dam and instead to take advantage of concrete’s great compressive strength.

Various expedients are used to counter the likelihood of cracking, and much attention is often paid to reducing the amount of heat generated by the concrete. Concrete is usually cast (or poured) in separate, distinct blocks with heights (or “lifts”) of no more than about 1.5 metres (5 feet). Gaps between these blocks may be left to facilitate heat dispersal, and these gaps can be filled in later with cement grout. There are many methods of cooling concrete.

Many large dams have been built in the seismically active regions of the world, including Japan, the western United States, New Zealand, the Himalayas, and the Middle East. In 1968 the Tokachi earthquake damaged 93 dams in Honshu, the main Japanese island; all were embankment dams of relatively small height.

Despite a great deal of work on the distribution of seismic activity, the measurement of strong ground motions, and the response of dams to such motions, earthquake design of dams remains imprecise.

Concrete has the best characteristics in seismic zones, because it blends well with the bedrock.

Dam failures are generally catastrophic if the structure is breached or significantly damaged. The main causes of dam failure include inadequate spillway capacity, piping through the embankment, foundation or abutments, spillway design error (South Fork Dam), geological instability caused by changes to water levels during filling or poor surveying (Vajont, Malpasset, Testalinden Creek dams), poor maintenance, especially of outlet pipes (Lawn Lake Dam, Val di Stava Dam collapse), extreme rainfall (Shakidor Dam), earthquakes, and human, computer or design error (Buffalo Creek Flood, Dale Dike Reservoir, Taum Sauk pumped storage plant) [3, 6].

Despite the fact that the dams themselves are grandiose structures, among them the largest can be identified. Kariba Dam is the world's biggest dam based on water storage capacity. Located at the former Kariwa (Kariba) Gorge, the dam creates Lake Kariba, which has a storage capacity of 185 billion cubic metres of water and a surface area of 5,580km2. The Lake Kariba covers a length of 280km and is 32km wide at its widest section. This is a double curvature concrete arch dam was constructed between 1955 and 1959 by Impresit of Italy. The dam is designed to avert a one in 10,000-year flood event. The dam is 128m high, 617m in length, and was constructed using 1.036 million cubic metres of concrete. It comprises of two power stations generating a combined 1,470MW of energy, which constitutes approximately 60% of the hydropower outputs for Zambia and Zimbabwe.

Bratsk Dam in Siberia, Russia, ranks as the second biggest dam in the world thanks to its 169.27 billion cubic metres reservoir. The dam impounds the Angara River and the reservoir created by it covers a surface area of 5,540km2. The concrete gravity dam was constructed from 1954 to 1964 by Bratskgesstroy (formerly Nizhneangargesstroy management). The dam is 125m high and 1,452m in length, and has a rail line and a highway on its top. The power plant at the dam has an installed capacity of 4,500MW comprising of 18 Francis turbines.

The Akosombo dam, located in Ghana, is the third biggest dam based on water storage capacity. Constructed on the Volta River, the dam creates the 8,500km2 Lake Volta, which is the world's biggest reservoir by surface area. The lake impounds a mammoth 144 billion cubic metres of water. The rock-fill embankment dam has a crest length of about 700m and a height of 134m, and involved 12 million cubic metres of surface excavation. It was constructed from 1961 to 1966 primarily for the purpose of electricity generation, but also provides a

livelihood for about 300,000 people through fisheries in the lake. The power plant at the dam consists of six turbo generator units rated at 128,000kW each [4, 6].

The Hoover dam, the second largest dam in the United States was an engineering marvel in its day. It is sited on the Colorado River, at the border between Arizona and Nevada, creating Lake Mead, which stretches 110 miles upstream to the Grand Canyon. This dam takes advantage of the naturally existing canyon, which is an extension of the Grand Canyon to provide its foundation as well as room for the lake it created. Upon its completion in 1938, it was the tallest dam in the world. One of the great challenges which faced the civil engineers in the creation of the Hoover Dam was in diverting the flow of the Colorado River while the dam was being created. To accomplish this, they dug four diverter tunnels through the solid rock of the canyon walls. Once completed, a cofferdam was erected upstream of the dam's location, to divert the water through these tunnels.

At the time of its building, the Hoover Dam required more concrete than had ever been used in a single structure. Engineers on the project calculated that such a large volume of concrete would require 75 years to fully set. Since that was unacceptable, they designed a series of cooling pipes, carrying cold water throughout the dam, cooling the concrete. This allowed it to set considerably faster. At the time, this was a revolutionary method, which had never been attempted before and was invented just for the construction of the Hoover Dam.

Dams are important and impressive engineering structures, the technology of which is improving every year. They allow you to provide the territory with water and generate electricity, which allows you to save many cubic meters of land and ensure the livelihoods of millions of people [5, 6].

References

1. A history of dams: https://tataandhoward.com/2016/05/a-history-of-dams-from-ancient-times-to-today/

2. https://watershed.ucdavis.edu/shed/lund/dams/Dam_History_Page/History.htm

3. https://en.wikipedia.org/wiki/Dam

4. https://www.water-technology.net/features/feature-ten-largest-dams-in-the-world-reservoirs/

5. http://www.civilengineeringcareers.org/civil-engineering-structures

Stepanova Y. Y.

INNOVATIVE CONSTRUCTION MATERIALS

Language Advisor – Senior Lecturer Pyvovarova N.I.
Kharkiv National University of Civil Engineering and Architecture

The expected development of construction industry is gaining momentum. Modern technologies allow to combine many different properties in structural

materials, making them even more durable, light and cheap than before, and also bringing into them the functions unusual for these types of materials. In an effort to reduce the cost of building production and make it less harmful to the environment, researchers create many amazing inventions.

Translucent wood as construction material. We now have translucent wood that can be used to develop windows and solar panels. It is created by removing the lining in the wood veneer and then through nanoscale tailoring. The resulting effect creates translucent wood that has various application in the construction industry. As a very cheap resource, it can benefit projects by reducing cost of resource. The innovation took place at Stockholm's KTH Royal Institute of Technology. Lars Berglund, a professor at KTH claims that transparent wood is a low cost, readily available and renewable resource. The wood can be mass produced and can be used commercially.

Cooling system in bricks. Through the combination of clay and hydrogel, students at the Institute of Advanced Architecture of Catalonia have created a new material that has a cooling effect on building interiors. Hydroceramics have the ability to reduce indoor temperature by up to 6 degrees celsius. Its cooling effect comes from the presence of hydrogel in its structure which absorbs water, up to 500 times its weight. The absorbed water is released to reduce the temperature during hot days. Incorporating an innovative cooling system in the current building structure has made Hydroceramics into one of the coolest building materials to revolutionize construction. More progress in this direction, may make household air conditioners obsolete.

Cigarette butts to make bricks. On a yearly basis, 6 million cigarettes are manufactured and they produce 1.2 million tonnes of cigarette butt waste. The impact on the environment is tremendous. Elements such as arsenic, chromium, nickel and cadmium enter the soil and harm nature. In order to reduce the impact of cigarette butts on the environment, researchers at RMIT developed lighter and more energy efficient bricks made of cigarette butts. In short, innovatively utilizing waste in a much more eco-friendly manner. Dr. Abbas Mohajerani, the leading researcher of the project, along with his team discovered that by infusing even 1% of cigarette waste in fired-clay bricks they can have great results in removing pollution from our environment. Not only does this research help with reducing waste, but the resulting brick is also lighter and requires less energy in manufacturing it.

Light generating cement. Dr. José Carlos Rubio Ávalos from UMSNH of Morelia, has created cement that has the ability to absorb and irradiate light. With this new light generating cement the potential uses and application of it can be huge. The construction industry is evolving and one of the main trends is the move towards a more resource and energy efficient way of creating structures. Therefore, the implications of cement acting as a 'light bulb' are very broad. We can use them in swimming pools, parking lots, road safety signs and much much more.

Pollution absorbing bricks. We now have pollution vacuums in bricks. Developed by assistant professor Carmen Trudell at Cal Poly, college of architecture and environmental design, the Breathe Brick sucks in pollutants in the

air and releases filtered air. The innovative material is designed to be part of a building's standard ventilation system. It has a two layer facade system, with the specialist bricks on the outside and standard insulation on the inside. In the center is a cyclone filtration system that separates out the heavy air particles from the air and collects them in a removable hopper. Its design is very similar to a vacuum. The design of breathe bricks can be configured in a wall with window and a cooling system as well. In short, it is a technology that can be easily applied to the current construction processes. By performing wind tunnel tests, it was proven that the system can filter 30% fine particle pollutants and 100% coarse particles such as dusts.

Self healing concrete. Dutch civil engineer, Dr. Schlangen at Delft University has created a self healing concrete. In his presentation, he demonstrated the effectiveness of the material by breaking it in two, putting the pieces together, and heating the concrete in a microwave oven. Once the melted material cools down, it joins together. Of course with this method, the concrete needs heat. If the material is used to create roads, how will they be heated up? To solve that problem, Dr. Schlagen and his team created a special vehicle that passes induction coils on the road. Dr. Schlagen estimates that the machine will be used to run on the concrete every four years and that this innovative technology could save the country $90 million annually.

CABKOMA Strand Rod. Japan-based Komatsu Seiten Fabric Laboratory has created a new thermoplastic carbon fiber composite called CABKOMA Strand Rod. The Strand Rod is a carbon fiber composite which is covered in both synthetic and inorganic fibers and finished with a thermoplastic resin. The carbon fiber strands have many advantageous features. Not only is it aesthetically pleasing, but it also is the lightest seismic reinforcement in the world. It has high tensile strength with a "delicate but strong structural body." World renowned architect, Kengo Kuma was the first to use this reinforcement material with his design of Komatsu Seiren's head office.

As you can see, modern technological opportunities offer many prospects for the development of the construction industry.

References

1. https://geniebelt.com/blog/10-innovative-construction-materials
2. https://www.archdaily.com/785175/komatsu-seiren-fabric-laboratory-creates-cabkoma-strand-rod-to-protect-building-from-earthquakes
3. https://www.slideshare.net/ShivaSparky/tpt-ppt-main

Storozhilova K. Y.

ECO-FRIENDLY INSULATION MATERIALS IN CONSTRUCTION

Language Advisor–Lecturer M.E. Tikhonova
Kharkiv National University of Civil Engineering and Architecture

For years scientists have been discussing new approaches for greater sustainability in architecture. An energy efficient building method of the future needs to focus increasingly once more on the topographic, climatic and cultural

conditions of its own environment, according to German architect Professor Stefan Behnisch.

One way of increasing the energy efficiency in buildings is to use insulating materials. Not only do they provide greater comfort but they also fulfil important tasks such as heat insulation, damp proofing, fire protection, and noise insulation. Some, such as expanded polystyrene (EPS) have come under criticism, and others are waiting for their major breakthrough. This includes environmentally friendly insulating materials made of hemp, cellulose or wood. Their raw materials extraction, manufacture, processing and disposal requires less energy than is the case for conventional insulating materials and they present a low risk to waterways and soil. They consist of renewable raw materials and are 100 percent recyclable. Some outperform traditional insulating materials due to their specific properties.

Production of these environmentally friendly insulating materials requires far less energy than conventional mineral wool. Moreover, wood, hemp and sea grass can be recycled easily, either for re-insulation as bulk material or for composting in the earth. Their market share is currently five percent. An increase in the next few years is expected however. There are individual and building policy efforts under way to step up climate protection because healthy and sustainable architecture has a significant role to play in the future.

The most well-known material for environmentally friendly insulation is cellulose. The flock or boards are made of crushed newspaper. In order to ensure sufficient fire protection the manufacturers add borates or aluminium sulphate. The building material, for instance, serves as roof insulation or as insulation for walls in wood frames.

Wood is suitable as a sustainable insulating material for roofs and facades and also for footfall noise insulation. The material can be processed in the form of boards, flock or wood wool. It has excellent thermal insulation. A follow-on variant has been developed by researchers at the Fraunhofer Institute for Wood Research in Braunschweig. They create a foam suspension of wood fibres and water mixed with carbon dioxide. This creates a pressure-proof hard foam made of 100 percent renewable raw materials.

Another building material of the future is hemp. It has marked moisture regulating properties: the hemp insulation boards can absorb up to 17 percent of their own weight in moisture without reducing their insulation capability. The plant is highly resistant to pests and very durable. These features distinguish hemp insulation as a key component for sustainable building.

Flax can indeed only be used internally but impresses on account of its thermal insulation and sound insulation. Just like hemp, flax absorbs vibrations well and transforms them into heat. The flax mats can be used for example in the between-rafter insulation. Maize starch acts as supporting fibre.

Sea grass takes environmental protection one step further. This marine plant does not have to be cultivated and can simply be collected on beaches in Albania or Egypt. The dried and subsequently shredded fibre material is used for insulating roofs, ceilings and walls. It naturally contains borates, which have to be added

synthetically to insulating materials such as hemp or flax. This keeps the plant flame retardant, it does not become moldy and is extremely durable.

Therma Cork is a product made from the outer bark of oak trees and is natural, renewable, recyclable, and biodegradable. Once produced, the finished product actually has a negative carbon footprint. Cork reduces energy consumption and will continue to do so far longer than most insulation choices. It's also hypo allergic, free of domestic toxins, and works to mute sounds.

You've heard of using sheep's wool in clothing and blankets to keep us warm – but what about in our walls and ceilings? The plush yet fire-resistant material works just in our homes as it does on a sheep. Compressed wool fibers form air pockets that trap air to keep us cool in the summer and warm in the winter. The breathable material's inner layers absorb moisture without feeling damp or affecting its ability to retain heat. Because of wool's properties, you don't need to constantly adjust your heating and cooling systems, which saves energy and money.

The cotton plant is both natural and renewable, making it incredibly eco-friendly. But denim in your walls? No, there aren't stacks of jeans inside the walls, the material is rolled into batts like fiberglass. But unlike fiberglass, cotton doesn't contain the dangerous gas formaldehyde. Furthermore, cotton doesn't cause respiratory problems and it's also an insect repellent! Cotton insulation does come with a hefty price tag (twice as much as fiberglass) but think of all the jeans you're saving from a landfill.

Natural, formaldehyde-free materials make eco-friendly insulation products the best choice for a green and healthy home. Unlike fiberglass, insulation materials like wool and cotton are safe to handle and cause no irritation to the skin or respiratory tract. And choosing insulation with recycled materials reduces your carbon footprint, since you're investing in a product that makes use of content that would otherwise be sent to a landfill.

The materials used most frequently are polystyrene foam and mineral wool, which are coming under increasing criticism because of their detrimental effect on the environment. Builders, therefore, want sustainable insulation of facades and roofs and this is possible via the use of wood, hemp, flax, thermacork, wool, denim, cellulose and sea grass.

References

1. Types of eco-friendly insulation materials https://www.insulation-info.co.uk/eco-friendly-insulation

2. The proportion of insulating materials made of sustainable raw materials in nowadays https://blog.allplan.com/en/environmentally-friendly-insulating-materials

3. ECO-FRIENDLY INSULATION BENEFITS https://elemental.green/the-complete-guide-to-eco-friendly-insulation/

Tsarova M. O.

THE MESSINA STRAIT BRIDGE

Scientific Advisor – Dr. Eng. Sc., Prof. Kozhushko V. P.
Language Advisor – Cand. Pedag. Sc., Assoc. Prof. Borzenko O. P.
Kharkiv National Automobile and Highway University

Sicily is one of the most beautiful places in Italy, but its island location does not have the most positive impact on the economy and, in particular, on the development of tourism.

The idea of connecting Sicily with the continent by a bridge existed for thousands of years. Some historians believe that the Romans even implemented a similar view, constructing a pontoon bridge. However, the pontoon bridge had a distinct lack: the bridge interfered with the shipping. Charles the Great, Robert Guiscard, Ferdinand II of Bourbon considered the problem. The task was difficult. At the narrowest point, the width of the strait is a little over 3 km. The depth of the seafloor is uneven, and in the deepest points, the seafloor is lowered by more than 100 m. In addition, such large-scale and technically complex project required considerable costs. There was a revive of interest in the project concerning the connection of the continent and Sicily after the unification of Italy. They even offered options of an underground tunnel [1].

Isolation of the large island Sicily from the continent is one of Italy's main transport problems, so the project of building a bridge across the strait has long been circulating in different communities. However, the implementation of this project is likely to take place only in the distant future, it is going to be a mega-bridge that will break the record in terms of distance among the majority of most existing bridges [1].

The bridge will pass over the Strait of Messina and connect two Italian regions – Sicily and Calabria.

The first reason, because of which the opponents of the project criticize it, lies in the fact that the Strait of Messina is the busiest sea route. The construction of such large-scale structure may create some safety problems for ships and trains that will move across the bridge. Also this area is very windy and there are a number of engineering considerations that may make the project much more expensive.

The second problem about which the opponents of construction talk is the mafia.

The government plans to finance the construction of the bridge in amount of 1.3 billion euros from taxpayers' money.

Critics fear that a significant portion of these funds will come to the pockets of various mafia clans, which, in fact, control the public works and the distribution of budget funds in southern Italy.

The opposition claims that construction of the bridge should become a priority in the current economic climate. The design of the three-kilometer stiffening girder of the center span is of particular difficulty, as well as the existence of such a bridge in a highly seismic zone of construction.

There are practically no bridge projects equal to this in the world!

The current project is quite different from the first one. It will be a road-rail bridge: in the center of the bridge there will be located a double-track railway, to the right and left of it there will be three traffic lanes.

It is planned to improve the local ports. It is expected that after all the tremendous amount of work is accomplished, the bridge will attract many tourists.

For the first time the project was seriously considered only when the prime minister of Italy was Silvio Berlusconi (from 2001 to 2006), but his successor from the left-wing coalition Romano Prodi blocked the decision because, in his opinion, this bridge would bring benefits only to construction companies controlled by mafia. The new prime minister called the project "the most useless and dangerous plan during the last 100 years". The total cost of the bridge is estimated at 6.1 billion euros. If the bridge is built, it will be the longest suspension bridge in the world. According to the design, the length of the bridge will be 3,300 meters [2].

According to the plan, the bridge can withstand the load of 5,000 vehicles per hour.

Some engineers have warned that the huge pylon towers would be vulnerable to strong winds. Minister of public works of Italy stated that the cost would really come to about six billion euros, but the project had already started and there was no turning back. The tender for the construction of the bridge has been won by the Italian company Impregilo, which will work together with the Spanish partner Sacyr Vallehermoso.

Builders say that the bridge will be one of the largest cable-stayed bridges in the world, whose central span length of 1104 meters will be recorded in the world practice of bridge building [2]:

- the total length of the bridge – 1885.53 m;
- the total length with approaches – 3100 m;
- the length of the main span – 1104 m;
- the width of floor – 23.8 m;
- the height of the pylon towers – 320 m.

In developing the project there were involved more than 100 professors and engineers with a worldwide reputation, 12 research institutes, 39 associations and companies (Italian and foreign). The main contractor (since 2005) is the association of enterprises Evrolink.

Indeed, to participate in such a project is a great honor for any bridge-builder!

References

1. Fabio B., Giorgio D., Ezio F. The Messina Strait Bridge: A Challenge and a Dream. Roma : Taylor & Francis, 2009. 334 p.

2. Fabio S. The Bridge on the Strait of Messina: "Lowering" the Right of Innocent Passage? The International and Comparative Law Quarterly. 2001. № 2. P. 411–419.

Varbanskaya E. S.

EUGENE FREYSSINET, INVENTEUR DE LA PRECONTRAINTE

Conseiller de langue - Kushchenko Zh.L.
Université Nationale de Génie Civil et d'Architecture de Kharkiv

Eugène Freyssinet (13 juillet 1879 à Objat, Corrèze - 8 juin 1962 à Saint-Martin-Vésubie, Alpes-Maritimes) est un ingénieur français, père du béton précontraint dont le premier brevet est déposé le 2 octobre 1928, avec son ami l'ingénieur et inventeur Jean Charles Séailles. Pour mettre en œuvre ses inventions, Edme Campenon créa en 1943 la Société technique pour l'utilisation de la précontrainte (STUP) qui devint en 1976 la société Freyssinet.

Nommé ingénieur des ponts et chaussées à Moulins dans l'Allier en 1905. Ingénieur ordinaire, il commence par construire des ponts d'intérêt local. À l'occasion d'un appel d'offres sur des projets de passages à niveau il fait la rencontre de l'entrepreneur François Mercier. Ce dernier ayant vu en 1907 un avant-projet en béton armé du pont Boutiron dans le bureau de Freyssinet au moment où il allait soumissionner le nouveau pont du Veurdre, il lui fit la proposition de construire trois ponts sur le même principe - pont du Veurdre, pont Boutiron et pont de Châtel-de-Neuvre - au prix de l'estimation du seul pont du Veurdre. Le conseil général de l'Allier accepta cette proposition et Freyssinet est nommé pour assurer le contrôle, ce qu'il fera jusqu'au début de la Première Guerre mondiale.

Dans les années précédant la Première Guerre mondiale, il fait des essais sur modèles réduits sur la déformation différée du béton:

- le retrait du béton qui est une déformation du béton par dessiccation au cours du temps, depuis la prise (sans chargement du béton), et;
- le fluage du béton qui est une déformation différée du béton sous l'action d'un effort de compression.

Il se renseigne auprès du Laboratoire des Ponts et Chaussées pour savoir pourquoi les mesures qui y ont été faites n'ont pas montré le phénomène du fluage. Il apprend ainsi que les laborantins démontaient chaque soir les appareils de mesure qui étaient remis à zéro le lendemain matin, empêchant ainsi de mesurer ce phénomène. Il va s'intéresser à l'influence de la composition du béton sur ces phénomènes, en particulier le rapport eau/ciment. En 1913, il invente les voûtes à nervures par-dessus. La construction des ponts de Châtel-de-Neuvre et de Villeneuve-sur-Lot débute en 1914 mais leur réalisation est arrêtée par la guerre.

Pendant la Première Guerre mondiale, il est nommé capitaine du génie. En janvier 1916, il est mis en congé sans solde et devient directeur technique et associé de la Société Mercier, Limousin et Compagnie. Elle est devenue ensuite la Société Limousin et Compagnie, Procédés Freyssinet.

Le premier pont qu'il a réalisé comme directeur technique de l'entreprise Mercier, Limousin et Cie est le pont de la Libération de Villeneuve-sur-Lot, commencé en 1914, et dont le gros œuvre est terminé en 1919. Dans la série d'articles sur ce pont qu'Eugène Freyssinet publie dans la revue Le génie civil, il indique l'intérêt que présente la mise en compression à l'aide de vérins placés à la

clé des arcs du pont pour imposer un état de contrainte aux arcs, première idée menant à la précontrainte.

Dans les années 1920, il participe à la construction du pont Albert-Louppe à trois travées identiques de 180 m de portée où il découvre les lois de la déformation différée des bétons. Ses nombreuses recherches lui permettent de mettre au point des cintres roulants, des voûtes à nervures au-dessus et surtout, il découvre en 1917 l'effet bénéfique des vibrations sur la mise en œuvre du béton.

C'est Eugène Freyssinet qui a l'idée de pré-comprimer le béton. En 1908, à Moulins (Allier), il a expérimenté ce procédé en construisant une arche d'essais de 50 mètres dont les culées étaient reliées l'une à l'autre par un tirant de section environ triple de celle de la voûte, et précontraint sous 2 500 tonnes. Il a parlé alors de «précompression permanente des bétons». Il n'inventera le mot «précontrainte» qu'en 1933. Ce tirant est le premier de tous les ouvrages en béton précontraint.

Dans les années qui suivent, il poursuit ses recherches sur ce matériau nouveau et sur le béton dont il va découvrir la déformation lente: le béton se resserre et se raccourcit pendant des mois voire des années.

En 1928, il décide de se consacrer à faire du béton précontraint une réalité industrielle. Pour ce faire, il va devoir prendre un brevet. Son ami Jean Charles Séailles qu'il a connu au cours de la guerre, auteur de nombreuses inventions et habitué à déposer des brevets, lui propose de l'aider. En octobre 1928, ils déposent un brevet en nom commun qui définit le principe de la précontrainte et le procédé de mise en œuvre par pré-tension et fils adhérents. Le premier concessionnaire du brevet de la précontrainte est la société Forclum qui avait besoin de poteaux pour les lignes électriques.

Le pas décisif de la précontrainte est l'invention de la «précontrainte par post-tension» permettant de la libérer sans mettre en œuvre des bancs de mise en tension. Le 16 octobre 1950, quatre ingénieurs, l'Italien Rinaldi, le Néerlandais Bruggeling, l'Anglais Gooding et l'Espagnol Fernandez Conde demandent la création d'une Fédération Internationale de la Précontrainte (FIP) pour permettre la connaissance et la diffusion de cette invention dans le monde. Cette fédération voit le jour en 1952. Eugène Freyssinet participe à sa création.

Eugène Freyssinet meurt en 1962 à 83 ans à Saint-Martin-Vésubie dans les Alpes-Maritimes. À l'époque de sa disparition, la technique du béton précontraint est utilisée dans le monde entier.

Références

1. Eugène Freyssinet (1879-1962), sa vie, ses œuvres (textes et documents réunis et présentés par la chambre syndicale nationale des constructeurs en ciment armé et béton précontraint), Paris, 1993

2. Jean Barets, Le Béton précontraint, Eyrolles, Paris, 2005

Vlasenko K. S.

HIGH-TECH ARCHITECTURE

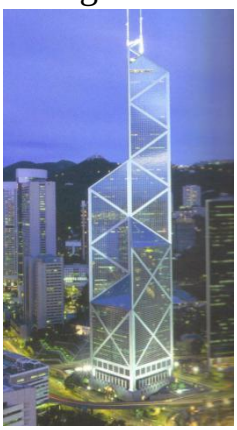
Language Advisor – Senior Lecturer Pyvovarova O.I.
Kharkiv National University of Civil Engineering and Architecture

All new inevitably becomes old. Today humanity has an interesting look into the unknown future, at least partially transferred from the dream into reality. At the beginning of the twentieth century, modern building techniques and new materials (glass, steel, concrete) have been appreciated by contemporary modernist architects. As technology has greatly evolved, new materials and modern equipment started to be used in the construction industry. Thus was born a new architectural design developed using advanced technology, known as high-tech.

High-tech architecture, also known as Late Modernism or Structural Expressionism, is an architectural style that emerged in the 1970s, incorporating elements of high-tech industry and technology into building design. It is an architectural style that incorporates elements of the new high-tech industries and advanced construction techniques into building design. Technical elements, such as blinds or solar cells, are a kind of modern ornament, especially when put together in repetitive sequence.

High-tech architecture refers to the broadly defined postmodernism. In contrast to modernism here the object itself is important, not the object as a functional use of space. The object is the aim. It aimed to achieve a new industrial aesthetic, inspired by technological progress and the computerization of industry.

It sought to integrate the technical equipment of the building into its structure, marrying functionality with its aesthetics. This would be taken further by architects such as Richard Rogers on buildings such as Lloyds of London and the Centre Pompidou in a style that was sometimes referred to as 'bowellism', based on the idea that the greatest amount of free floorspace could be maintained by externalizing building services.



Some of the most well-known architects identified with the high-tech style are Norman Foster, Renzo Piano, Richard Rogers, Michael Hopkins, Nicholas Grimshaw, Schweger & Partner, Jean Nouvel, Paul Andreu, Michel Virlogeux.

Buildings designed in this style usually consist of a clear glass facade, with the building's network of support beams exposed behind it. Perhaps the most famous and easily recognized building built in this style is I.M. Pei's Bank of China Tower in Hong Kong.

Like Brutalism, Structural Expressionist buildings reveal their structure on the outside as well as the inside, but with visual emphasis placed on the internal steel and/or concrete skeletal structure as opposed to exterior concrete walls. In buildings such as the Pompidou Centre, this idea of revealed structure is taken to the

extreme, with apparently structural components serving little or no structural role. In this case, the use of "structural" steel is a stylistic or aesthetic matter.

Buildings in this architectural style were constructed mainly in Europe and North America. After the destruction of many historic buildings in Europe during World War II, repairing them was a difficult matter. Architects had to decide between replicating the historic elements or replacing it with new modern materials and aesthetics.

High-tech architecture aimed to give everything an industrial appearance. Another aspect to the aims of high-tech architecture was that of a renewed belief in the power of technology to improve the world. This is especially evident in Kenzo Tange's plans for technically sophisticated buildings in Japan's post-war boom in the 1960s, but few of these plans actually became buildings. High-tech architecture aimed to achieve a new industrial aesthetic, spurred on by the renewed faith in the progression of technology.

The High Tech buildings make persistent use of glass curtain walls and steel structure. High Tech architecture developed a technical language, free of historicist ornaments likes it predecessor, Modern Architecture. Many High Tech buildings meant their purposes to be dynamic. This could best be explained by Günther Behnisch and Frei Otto's Olympic Stadium in Munich. This structure made sport in the open possible and is meant to be used for many purposes. Originally an abandoned airfield it now became a Sport stadium, for various disciplines.

The brightest examples: the Centre Pompidou, Paris (1977), by Piano and Rogers; the Sainsbury Centre, University of East Anglia, Norwich (1977), by Norman Foster; the Lloyd's Building, London (1986), by Rogers; the Hong Kong and Shanghai Bank, Hong Kong (1986), by Foster; and the Financial Times Printing Works, Docklands, London (1988), by Grimshaw are among the most paradigmatic High Tech structures.

London also presents striking examples of hi-tech architecture, of shining glass and lace-like metal constructions, such as City Hall, Ark West and Hammersmith Flyover, London Centre Point, Swiss Re Building and of course London Eye Millennium Wheel - world's largest observation wheel.

References

1. http://www.search.com/reference/High-tech_architecture -
2. http://www.search.com/reference/Le_Corbusier
3. https://www.building.co.uk/...high-tech-architecture/509312...
4. https://www.designingbuildings.co.uk/.../High-tech_architect...

Voloshina D. A.

THE ARCHITECTURE OF ROMAN

Language Advisor – Tkachenko S. V.
Kharkiv National University Of Civil Engineering And Architecture

Roman architecture continued the legacy left by the earlier architects of the Greek world, and the Roman respect for this tradition and their particular reverence for the established architectural orders, especially the Corinthian, is evident in many of their large public buildings. However, the Romans were also great innovators and they quickly adopted new construction techniques, used new materials, and uniquely combined existing techniques with creative design to produce a whole range of new architectural structures such as the basilica, triumphal arch, monumental aqueduct, amphitheatre, granary building, and residential housing block. Many of these innovations were a response to the changing practical needs of Roman society, and these projects were all backed by a state apparatus which funded, organised, and spread them around the Roman world, guaranteeing their permanence so that many of these great

Roman architects continued to follow the guidelines established by the classical orders the Greeks had first shaped: Doric, Ionic, and Corinthian. The Corinthian was particularly favoured and many Roman buildings, even into Late Antiquity, would have a particularly Greek look to them. The Romans did, however, add their own ideas and their version of the Corinthian capital became much more decorative, as did the cornice - see, for example, the Arch of Septimius Severus in Rome. The Romans also created the composite capital which mixed the volute of the Ionic order with the acanthus leaves of the Corinthian. The Tuscan column was another adaptation of a traditional idea which was a form of Doric column but with a smaller capital, more slender shaft without flutes, and a moulded base. The Tuscan column (as it came to be known in the Renaissance period) was especially used in domestic architecture such as peristyles and verandahs. The Romans also favoured monolithic columns rather than the Greek approach of using several drums stacked on top of each other. In addition, columns continued to be used even when they were no longer structurally necessary. This was to give buildings a traditional and familiar look, for example the front of the Pantheon in Rome. Columns could be detached from the building yet remain attached to the façade at the base and entablature (free-standing columns); see, for example, Hadrian's Library in Athens. Finally, columns could become a part of the wall itself (engaged columns) and function as pure decoration, for example, the upper floors of the Colosseum exterior (last quarter 1st century CE).

Greek influence is also evidenced in the fact that late Republican innovation, such as the basilica and bath buildings, usually occurred first in the south of Italy in Campania (see especially Pompeii) which was closer to the long-established Greek colonies of Magna Graecia. It was from here that we have the oldest surviving dome building, the frigidarium(cold room) of the Stabian Baths at Pompeii. As with many other areas, the Romans took an idea and pushed it to its maximum

possibility, and the huge imperial bath complexes incorporated soaring arches, arches springing directly from column capitals, and domes which spanned seemingly impossible distances. The Augustan period saw a surge in building activity, innovation in design, and extravagant use of marble, symptoms of a Rome that was beginning to flex its muscles and with an increased confidence break away from the rigid tradition of earlier civilizations. This was also the time when increased imperial patronage allowed for ever bigger and more impressive building projects to be undertaken, not only in Rome itself but across the Empire, where buildings became propaganda for the might and perceived cultural superiority of the Roman world.

As the Empire expanded, ideas and even craftsmen became integrated into the Roman architectural industry, often following their familiar materials like marble to the sites of construction. The evidence of eastern influence can be seen in such features as papyrus leaves in capitals, sculptured pedestals, street colonnades, and the nymphaeum (ornamental fountain).

In the Roman world the credit for buildings was largely placed at the feet of the person who conceived and paid for the project rather than the architect who oversaw the realisation of it; therefore, he often remains anonymous. Those architects employed for specific projects by the emperor are better known. We know of Trajan's favoured architect, Apollodorus of Damascus, famed for his skills in bridge building, for example, and who was responsible for, amongst other projects, Trajan's Forum and Baths in Rome. Severus and Celer were the architects responsible for the fantastic sounding revolving roof of Nero's Golden House. In general, architects supervised whilst it was contractors (redemptores) who actually carried out the project based on the architect's measured drawings.

Certainly, the most famous Roman architect is Vitruvius, principally because his On Architecture, a 10-volume study of architecture, has survived intact. We do not actually know much about his own work - only a basilica he constructed in Fano and that he did work for Julius Caesar and Augustus. On Architecture covers all facets of architecture, types of building, advice for would-be architects, and much more besides. One interesting point about the work is that it reveals that the ancient architect was expected to have many skills which nowadays would be separated into different specialisations. Vitruvius also encapsulated the essential ethos of Roman architecture: 'All buildings must be executed in such a way as to take account of durability, utility and beauty. Roman architecture, then, has provided us with magnificent structures that have, quite literally, stood the test of time. By combining a wide range of materials with daring designs, the Romans were able to push the boundaries of physics and turn architecture into an art form. The result was that architecture became an imperial tool to demonstrate to the world that Rome was culturally superior because only she had the wealth, skills, and audacity to produce such edifices. Even more significantly, the Roman use of concrete, brick, and arches twinned with building designs like the amphitheatre and basilica would immeasurably influence all following western architecture right up to the present day.

References

1. Івянская І.С. Архітектура Греції. Київ,2005.235 с.
2. Кідсон П., Мюррей П., Томпсон П. Історія архітектури Греції, 2003. 105 с.

Voloshina Y. A.

THE ARCHITECTURE OF ENGLAND

Language Advisor – Tkachenko S.V.
Kharkiv National University Of Civil Engineering And Architecture

Like any other art form, the architecture of the state is a kind of a calling card, by which the inhabitants of other countries can judge the level of its cultural development and the peculiarities of its citizens' character. England's architecture is aristocratic and conservative. An eclectic diversity — these two words are the best to formulate the main feature of England's architecture.

Eclecticism or, in other words, historicism, suggests the presence of the main features of the European architecture in the England's architecture of the 15-18th centuries. At the same time, the British eclecticism tends to have its inimitable distinctive traits inherent to different stylistic schools of those times. These styles had been formed and developed sequentially. This continuity can be traced by examining the buildings of the Tudor, Georgian, Victorian and Edwardian periods.

Another outstanding feature of England's architectural monuments which survived to our times is a pronounced functionality of the buildings. The thing is that the majority of large-scale structures of the most productive period in the development of the British architecture were defensive and religious buildings — fortresses, churches and monasteries. Of course, the purpose of the building could not but affect its appearance.

The oldest and, accordingly, the fewest in England are the reminders of the Tudor period (16th century). Tudor-style buildings can be recognized by black wooden frames and steep roof arches surmounted by groups of chimneys decorated with ceramic ornaments. Another characteristic feature of this period's buildings is the presence of small windows and narrow tall doors.

Gothic traits borrowed from the French architecture of the same period are manifested by the elongated, aspiring to the sky cathedral buildings with multiple lancet arches and wall-bounds. The most outstanding examples of Tudor architecture are considered to be The royal palace of Hampton Court near London and the buildings of Oxbridge colleges.

Modesty and nobility of this style inspired the British architects so much that in 19-20 centuries there emerged the style, imitating the old days' trend – the Tudorbethan style. Such buildings as Liberty department store near Oxford Circus and numerous pubs on Fleet Street in Soho are designed in this style.

Georgian style, which was forming from the early 18th to mid-19th centuries, has witnessed the reign of King George the First, George The Second, George The Third and George The Fourth. The heyday of the British Empire explains the presence of some Georgian-style traits in the architecture of the countries having been the parts of the empire in that period.

The Georgian style buildings are characterized by simple symmetrical layout and minimalistic decor presented by white ornament. The most outstanding examples of the Georgian style buildings are the famous Pushkin House, Hazlitts hotel in Soho and others. Such historic ensembles of central London as The Trafalgar Square, St James and Regent Street which were designed by John Nash, are deserving special attention. Many Georgian buildings, located in the province of the British capital, are perfectly preserved and present popular objects of the real estate market.

The Victorian style falls on the period of the British state's highest degree of flourishing under the leadership of Queen Victoria from 1837 to 1901. This period in architecture can be described as the most motley, including the constructions from the neo-classical to neo-Gothic styles. You can dive into the atmosphere of the Victorian era going to one of such areas as Barnsberry Square, Gibson Square, Cloudsley Square, Lonsdale Square, Milner Square and Thornhill Square. Here you will see buildings with large windows and round "portholes", stained glass windows and moldings, unplastered facades and lancet windows, asymmetrical layout and quaint turrets. This is where the British eclectic was born.

The Edwardian style was developing during the reign of Edward the Seventh, who ascended to the throne after Queen Victoria and ruled for several decades. The buildings of this period carry the traits of baroque, neo-classical and Georgian architecture. They are designed in brighter colors and characterized by the simplicity of the layout as well as the modest ornamental load. The most notable Edwardian buildings in London are The Admiralty Arch, The Criminal Court "Old Bailey", County Hall on the South Bank of the Thames and the "Electric Cinema" in Notting Hill.

They say, one look is worth a thousand words. Sightseeing tour on London's architectural sights could become a perfect gift for a lover of architecture as well as for every English learner who wishes to learn more about the country of Albion and its people.

References

1. Івянская І.С. Архітектура Англії. Київ, 2005. 235 с.

2. Кідсон П., Мюррей П., Томпсон П. Історія англійської архітектури. Англія, 2003.105 с.

Yena O. V.

TO LISTEN TO ARCHITECTURE AND TO SEE MUSIC

Language Advisor – Asst. Prof. Tkachenko S. V.
Kharkiv National University of Civil Engineering and Architecture

They say that Architecture is the frozen Music. There are similar principles in architecture and music. We can enjoy separately each of these arts. We enjoy music with our ears, and we enjoy architecture with our eyes. The principle of these arts is the harmony of composition. Different elements are gathered in single wholes, rhythmic rows. Music sounds in time, and architecture can "sound" vertically and horizontally. In music, there is a combination of sounds that are harmonious or disharmonious; it has linearity, development, conflict, which should be resolved at the end. In architecture, there are proportions, volumes, rhythm, which, in their unity, should create an integral stable structure.

Music and architecture have been joined by a cosmic connection, the idea that they both are generated by an underlying code. This order, revealed by mathematics and geometry, was first espoused by Pythagoras, and it led to many Greek temples designed on proportional elemens discover not only supreme beauty but 'the music of the heavenly spheres' − either God or nature. The idea was so appealing that many later designers tried to take the idea with new materials.

The sun, moon, fire, air, water and earth were installed by God, moderating over the cosmos, but architecture was created to reflect this music.

Architecture is art, which is perceived differently. It is accurately experienced from several distances and speeds of movement, a property operated Kazan Cathedral, locating in Saint Petersburg. Once, citizen of St. Petersburg told me that every time when they walk by Kazan Cathedral no matter whether they are in a hurry or not, they always slow down. Let's go back to the music. This is a semicircular building, in which the columns stand, they also set the rhythm of our perception (movement), when everything is clearly and evenly on a flat facade, then, if we imagine the plan, everything is uniform, but only in the plan. However, passing by it, people try unconsciously to move at the same speed with the columns, because the columns are visually getting closer to the center, and the speed of our movement remains the same. That is, regardless of whether the columns are close to each other or further, the duration that we pass between them remains equal.

That is, the fact that a person unconsciously slows down a step, passing by this building, it does not depend on his personal mood or condition, external restrictions are imposed on him, in this case - the step of columns.

Therefore, we can talk about the perception of these two spheres of art. Great music and supreme architecture are sometimes better estimated when they are amiss understood, which is not to say that the creator of each was not aware of his craft.

Nevertheless, it works when you enjoy a building or music inattentively. When every sphere is part of a background. Let`s return to the Cathedral and explore the contrast between architecture and music of this building. Walking by the cathedral, you don`t notice the influence of architecture at yourself. Music act the same way, you don`t perceive music like something, that you can really admire.

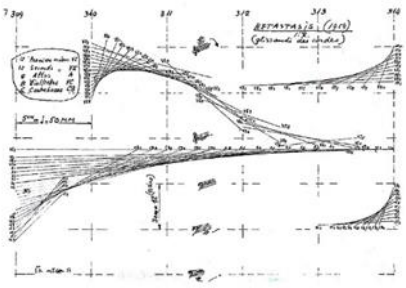
Architecture is immovable in time. But... imagine. Gradually approaching to building, moving from room to room, we can feel the music of architecture in space, and not in time. But no ... in time too, because to see all the music of architecture, people should move from one room to another, and this needs time. So all percepts are made one after another. We see a space with moving eyes. It starts to connect the two arts back together. We project the future onto the present, the next phrase or chord onto music, the next room inside a building.

The obvious place where these similar arts meet is the concert hall, and the phrase ‘space as chords of sound’ turns into an expressive, petrified music. In this beating room, it is as if the listeners were inside a giant, instrument sounding in sync with both the musical chords and the architectural space. Similar curves are used on the outside as well.

One of the most famous graphic examples creating of music by architecture and vice versa is the Philips Pavilion, designed by Le Corbusier. He worked with the composer and architect Janis Xenakis on together. At the time of the start of work on the pavilion project, Xenakis has already formulated a peculiar author's hypothesis about how music takes on an architectural form. He said: “The architecture covers the three-dimensional space in which we live. Convex and

concave surfaces are of great importance both for the sound and for the visual sphere. The main thing here is observe for proportions. ”

Designing the pavilion, the composer and the architect used ideas from his own orchestral music. Xenakis had already written his most famous play of music, Metastasis. It begins with the famous glissando, the slowly rising sound of strings, and enough to look at the schematic depiction of the Philips Pavilion to catch the outstanding similarity in the musical form and the shape of the frame of the building.



Architecture is not a set of spaces, and music is not an alternation of notes. The architecture has plastic, drawing, a variety of contours, light and shade, and in music, there is a great variety of melodies, nuances of dynamics. Music brings emotions such as sadness or fun, sublimity or mysteriousness. Also you can be experienced and admiring architectural masterpieces. Combining sounds merge into one melody. Rhythm is one for everything! The architecture also has repeatability and rhythm (columns). Architecture is the beauty of arrangement.

References

1. The Architectural Review Issue 1395 / edit by Manon Mollard, May 2013.

Наукове видання

СТУДЕНТСТВО. НАУКА. ІНОЗЕМНА МОВА

Збірник наукових праць

Випуск 11
Частина 1

Засновник – Харківський національний автомобільно-дорожній університет

Свідоцтво про державну реєстрацію
Серія ХК № 1495-236Р
від від 29 грудня 2008 року

Адреса редакції: 61002, м. Харків, вул. Ярослава Мудрого, 25, тел. 752-88-87

Відповідальний за випуск Є. Б. Новікова