MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
UKRAINIAN STATE UNIVERSITY OF SCIENCE AND TECHNOLOGIES

23rd International Students' Scientific Conference

Engineer of the Third Millennium

17 May, 2024

Dnipro
2024

UDC 81'243

The editorial board bears no responsibility for the content of submissions and any possible errors in them.

Publishing board address:
USUST, 2 Lazarian St, 49010 Dnipro, Ukraine

Engineer of the Third Millennium: Proceedings of International Students' Scientific Conference. Dnipro: USUST, 2024. 112 c.

The collection of papers presents the materials of the 23rd International Students' Scientific Conference *Engineer of the Third Millennium*, held at Ukrainian State University of Science and Technologies. The papers are in English, German and French.

For students, graduate students, and lecturers.

Chairman of Scientific Committee

K. Sukhyi – Doctor of Technical Sciences, Professor, Acting Rector, Ukrainian State University of Science and Technologies, Ukraine.

Members of Scientific Committee

A. Radkevitch – Doctor of Technical Sciences, Professor, First Vice-Rector, Ukrainian State University of Science and Technologies, Ukraine.

Yu. Proidak – Doctor of Technical Sciences, Professor, Vice-Rector, Ukrainian State University of Science and Technologies, Ukraine.

M. Kapitsa – Doctor of Technical Sciences, Professor, Director, Educational and Scientific Institute "Dnipro Institute of Infrastructure and Transport", Ukrainian State University of Science and Technologies, Ukraine.

T. Vlasova – Doctor of Philosophic Sciences, Professor, Head, Philology and Translation Department, Ukrainian State University of Science and Technologies, Ukraine.

Zhang Huodzhyn – Dean, Institute of International Education of Lanzhou Jiaotong University, People's Republic of China.

D. Sergieev – Doctor of Technical Sciences, Professor, Riga Technical University, Republic of Latvia.

G. Vaichiunas – Doctor of Technical Sciences, Professor, Vilnius Gediminas Technical University, Republic of Lithuania.

Ya. Kalivoda – Doctor of Technical Sciences, Professor, Czech Technical University in Prague, Czech Republic.

O. Sladkovskyi – Doctor of Technical Sciences, Professor, The University of Silesia in Katowice, Republic of Poland.

Members of Organising Committee

A. Bezrukov – Candidate of Philological Sciences, Associate Professor, Philology and Translation Department, Ukrainian State University of Science and Technologies.

O. Bohovyk – Candidate of Philological Sciences, Associate Professor, Philology and Translation Department, Ukrainian State University of Science and Technologies.

D. Bieliakova – Master's Degree Student, Philology and Translation Department, Ukrainian State University of Science and Technologies.

TABLE OF CONTENTS

NOISE POLLUTION AS ELEMENT OF COMPREHENSIVE ASSESSMENT OF POPULATION VITAL ACTIVITY IN URBAN AREAS

Zh. Alavania
V. Hilov
L. Druzhinina
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

The main part of human activity takes place in the urbanized areas. Cities have a great potential to meet various human needs and ensure the quality and life protection of people (QLPP). But in the urbanized areas there is a large number of various factors that negatively affect human health. More than 300 factors are involved in the comprehensive assessment of the quality of urban areas.

One of the factors that negatively affects the health of the population is noise pollution. Excessive noise is the cause of various diseases. Therefore, we consider human health as the main criterion for environmental safety of the population. The main source of noise pollution in the residential areas is road transport [1, 2, 3].

For a comprehensive assessment of the environmental quality indicator, we use methodology that consists of the following stages:

1) selection and determination of the number of factors;
2) qualitative assessment of factors;
3) determining the importance of factors;
4) definition of a comprehensive quality indicator [2].

Factors are evaluated from 1 to 4 points. The basis of the assessment is the ratio of the optimal (normative) and actual value of this factor.

There is a system of indicators to assess the quality of the living environment. To estimate the "Noise pollution" factor, we use the indicator of the number of people in the noise pollution zone (%). A noise pollution zone is an area with a noise level which is higher than the maximum permissible level. In residential areas, the maximum permissible level is 55 dBA (daytime) (table 1) [4].

Table 1

Permissible values of sound levels in areas are directly adjacent to residential buildings

Time of day	Sound pressure levels, dB, in octave bands of geometric mean frequencies, Hz								$L_{A\,e}$, dB A	$L_{A\,m}$, dB A
	63	125	250	500	1000	2000	4000	8000		
8^{00} - 22^{00}	75	66	59	54	50	47	45	43	55	70
22^{00} - 8^{00}	67	57	49	44	40	37	35	33	45	60

Let's consider the estimated characteristics of the factor "Noise pollution of residential areas" and compile a qualitative table (table 2):

1) Indicator: population in the zone of noise pollution (%)
2) Indicator type: A – quantitative
3) Evaluation method:

0% - completely suitable assessment of the factor (CS) - 4 points;
1%-10% - suitable assessment of the factor (S) - 3 points;
11%-30% - partially suitable assessment of the factor (PS) - 2 points;
more than 31% - unsuitable assessment of the factor (US) - 1 point.

Table 2

Qualitative table of evaluation of the factor "Noise pollution of the residential area"

Factor	Indicator	Qualitative evaluation of the factor			
		CS 4 points	S 3 points	PS 2 points	US 1 point
Noise pollution of the residential area	Number of population in the pollution zone, %	0	1-10	11-30	>30

In order to solve the problems of assessing the QLPP according to the factor "Noise pollution of the residential area" it is necessary:

- to determine the estimated noise level on the main street;
- to determine the percentage of the population living in the uncomfortable zone;
- to determine the score of QLPP.

If the qualitative assessment of the factor "Noise pollution of the residential area" is 4 points, no noise protection measures are necessary. If evaluation of the factor is 3 points, the minor noise protection measures are required. If evaluation of the factor is 2 points, the medium noise protection measures are required. If evaluation of the factor is 1 points the significant noise protection measures are required.

Measures to ensure acoustic comfort in residential areas are being developed in three directions:

1) reduction of noise at the source of its formation;
2) reduction of noise from its source to residential buildings;
3) reduction of noise in residential buildings.

Noise reduction in residential areas:

1) reduces occupational diseases,
2) reduces industrial injuries,
3) increases the productivity of physical and mental work,
4) extends the period of active labor activity of a person,
5) improves human living conditions,
6) increases human life expectancy.

The implementation of noise protection measures will ensure an ecologically safe state of residential areas due to the factor of noise pollution from motor vehicles.

REFERENCES

1. V. V. Hilov, P. M. Sankov, V. M. Poltoratska, and N. O. Tkach. Study of the level of noise pollution from motor vehicles on the roads of the Dnipropetrovsk region. Ecological Sciences, Kyiv. 2022. No. 2(41). with. 52-55
2. Scientific foundations of modern engineering: monography / Sokolovskaya O., Ovsiannykova L. & Stetsiuk V., etc – International Science Group. – Boston:

Primedia e Launch, 2020. 528 p. Available at: DOI 10.46299/isg.2020.MONO.TECH.I

3. Road traffic noise and health-related quality of life : A cross-sectional study [Електроний ресурс] / D. Welch, D. Shepherd, K.N Dirks, D. McBride, S. Marsh // Noise & Health. Vol.15. 2013. P. 224–230
4. State building regulations B.1.1-31: 2013 "Protection of territory, buildings and structures from noise". K.: Ministry of the Region of Ukraine, 2014. 85 p.

AI vs HUMAN TRANSLATION: CHALLENGES AND OPPORTUNITIES

K. Babina
A. Bezrukov
Ukrainian State University of Science and Technologies, Ukraine

Translation is an important bridge between different cultures and languages, providing effective communication. Traditionally, human translators have been essential, using their linguistic knowledge and cultural vision to accurately transfer meaning. However, the arrival of artificial intelligence (AI) has dramatically changed the translation landscape, presenting challenges and opportunities.

One of the biggest challenges facing AI translation is its ability to detect nuances and complexities of human language. AI systems are Great at processing large amounts of text and recognizing patterns but often struggle to understand the meaning of context, idiomatic expressions, and cultural references. Human language is rich and dynamic, creating side-by-side with culture and history, making it difficult for AI algorithms to produce translations that authentically resonate with native speakers. Human translators acquire the intuition and sensitivity necessary to effectively navigate these complexities based on a deep understanding of language and culture.

Moreover, AI translates by comparing the text to be translated with a huge amount of data to learn and do better at their performance. However, datasets often have biases and gaps that the machine does not understand, causing the translation to be incorrect. Machines also have difficult cases with difficult grammar in various languages and a lack of an array of standardized spelling and punctuation standards. Therefore, the final product of AI's translation action will probably not meet the exacting quality requirements that apply to a typical professional translator.

Ethical considerations also come into the foreign discussions about AI translation. Questions about data privacy, security, and the responsible use of AI algorithms raise a concern about the integrity and reliability of machine-generated translation. Organizations need to ensure that sensitive and confidential information is handled with care and that AI systems are trained on diverse and representative datasets to reduce the risks. In addition, there are concerns about the potential impact of AI translation on the job market for human translators, as automated solutions could displace traditional translators and lead to job losses.

Despite these challenges, AI translation offers attractive opportunities for innovation and efficiency: AI technology has the potential to automate routine translation tasks, allowing human translators to focus on more complex and specialized

tasks. Machine translation tools can also facilitate global cross-cultural communication, break down language barriers, foster collaboration and interaction, and improve the accessibility of multilingual content.

In conclusion, the AI vs. Human translation debate underscores the importance of finding a balance between technological advances and human expertise. While AI offers speed, scalability, and automation, human translators bring linguistic subtlety, cultural understanding, and ethical judgment. By embracing collaboration between AI and human translators, organizations can navigate the challenges and opportunities of translation in an interconnected world and ensure effective communication across languages and cultures.

LA CONSTRUCTION A PARTIR DES PLANTES COMME UNE DES SOLUTIONS EFFICACES EN ARCHITECTURE VERTE

D. Beketova
A. Slavinska
V. Zadunai
La Prydniprovska Académie d'Etat de Génie Civil et d'Architecture

L'actualité du sujet. A nos jours, l'humanité s'est trouvée face à un désastre écologique, donc, elle a commencé à réfléchir à la préservation des ressources naturelles et aux problèmes environnementaux. Ainsi, il est nécessaire de trouver de nouvelles façons de résoudre ce problème. L'une des options pour en trouver la solution est le recours à l'architecture verte.

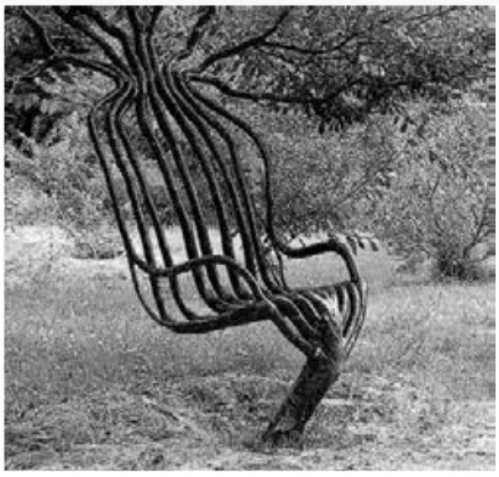
Les grands principes de l'architecture verte sont la construction utilisant des matériaux écologiques et l'exploration de ressources naturelles, telles que les plantes vivantes. Ainsi, le but de ce travail est d'analyser les concepts généraux de l'architecture verte.

La partie essentielle. L'architecture verte est un type et une forme de construction dont l'idée principale est de minimiser l'impact de l'homme sur l'environnement [1]. A la base de l'architecture verte on voit l'interaction entre l'architecture et la nature, par exemple, l'utilisation du paysage naturel.

Pour préserver en maximum le paysage naturel, on peut concevoir la disposition compacte des bâtiments résidentiels ainsi que l'utilisation des technologies qui économisent les matériaux et les ressources naturelles (la lumière, l'énergie éolienne) et des matériaux recyclés (les déchets de chantier, les déchets industriels et des matières plastiques). Dans ce cas, l'utilisation des matériaux recyclés est possible, quand ils sont naturels et ne sont pas toxiques [2].

Actuellement, il y a une opportunité pour les architectes d'utiliser dans le domaine de l'architecture verte l'aménagement paysager et de construire à partir des plantes elles-mêmes [3]. Cette technologie qui consiste en utilisation des matériaux vivants, à condition de la conception appropriée, permet de créer presque tout, à partir d'une structure autonome jusqu'une petite forme architecturale. Des exemples de cette approche sont présentés sur l'image 1.

L'avantage principal de ce type de construction est une économie considérable des ressources, puisque celle-ci ne nécessite que de l'imagination et du temps. De plus, construire à partir des plantes vivantes est un moyen efficace d'améliorer la biodiversité et de conserver de nombreuses ressources naturelles, car il vaut mieux construire à partir des arbres vivants qu'avec des arbres coupés.



a

б

Les formes architecturales (d'après l'œuvre [2]) : a) - la chaise qui a été cultivée par Peter Cook ; b - Le Patient Jardinier sur le campus de l'École Polytechnique de Milan, association artistique Visiondivision.

En guise de conclusion, il faut dire que la tâche principale de l'architecture verte consiste en exploration maximale des zones vertes existantes et celles créées artificiellement tout en respectant l'environnement des villes. La condition nécessaire au développement de l'architecture verte est l'utilisation des ressources naturelles et la construction à partir de matériaux recyclés qui ne sont pas toxiques.

REFERENCES

1. Зелена архітектура. [Електронний ресурс]. – Режим доступу: https://danica.ua/ua/blog/zelena-arhitektura/
2. Бондар А. В. «Зелена архітектура» сучасних міст [Електронний ресурс] / А. В. Бондар, Л. В. Кучеренко, В. С. Редченко // Матеріали XLIX науково-технічної конференції підрозділів ВНТУ, Вінниця, 27-28 квітня 2020 р. – Електрон. текст. дані. – 2020. – Режим доступу: https://conferences.vntu.edu.ua/index.php/all-fbtegp/all-fbtegp-2020/paper/view/10567.
3. Гой Б. В. Розвиток поняття "зеленої архітектури" в сучасному проєктуванні та будівництві / Б. В. Гой, Х. О. Катола // Вісник Національного університету "Львівська політехніка". Архітектура. - 2015. - № 816. - С. 99-108. Режим доступу: http://nbuv.gov.ua/UJRN/VNULPARX_2015_816_15

SPATIAL COORDINATES IN THE NOVEL «THE MALTESE FALCON» BY DASHIELL HAMMETT

M. Berchuk
Oles Honchar Dnipro National University
S. Nechyporenko
Communal Institution of Higher Education «Dnipro Academy of Continuing Education» of Dnipropetrovsk Regional Council

Art space is an imaginary world which depicts by writer in his artwork and in which flows the life of the characters created by him. This concept was analyzed by representatives of various scientific branches: philosophers, cultural experts, literary and art critics. Among them are O. Spengler, M. Heidegger, J. Ortega-y-Gasset. In a literary work the author builds a separate world with certain time-space dimensions that reflect his worldview and the author's ideas about good and evil, the laws of society's existence and people's characters.

Samuel Dashiell Hammett – the author of many novels, tales and short stories, that have become classics of American literature, a recognized master of detective prose, one of the founders of the «noir-detective» genre, a screenwriter and a political activist. He is the creator of a character named Sam Spade in the novel «The Maltese Falcon», Nick and Nora Charles («The Thin Man»), Continental detective («Red Harvest» and «The Dain Curse») and the character of comics Secret Agent X-9. In his own novels the proseman depicted the life of American society, where greed, cruelty and betrayal are the main driving forces of human actions.

D. Hammett wrote most of his detective stories on the streets of San Francisco, which are often recorded on the pages of his books. His detective the noir novel «The Maltese Falcon» was published at first in the magazine «Black Mask» (1929), later in a separate edition (1930). Detective story is told from the third person, there are also no descriptions of the thoughts or the characters feelings, only what they say and do, how they look. In 1990, the novel was ranked 10th in the Crime Writers Association's list of the 100 best crime novels of all time, was screened by several times.

Even if the world of novel remains inhabited with the fictional characters for the purpose of creating illusions of the reality of events, Dashiell Hammett introduces many toponyms, names of real objects into the text. In the novel are mentioned cities, where the writer served in the army, was later treated and met his future wife Josephine, to whom the composition was dedicated; the place of action is the second largest American city of San Francisco, where the writer lived with his family. Toponymic signs are indicated in the novel: the events take place on *Bush-street, Stockton Street, Powell Street, Taylor street,* named urban districts *Downhill, Chinatown,* hotels «*Belvedere*», «*St. Mark*», the prison on the island of *Alcatraz.*

Considering his experience as a private detective, D. Hammett easily obtained material, and soon became a favorite of detective readers for «hard» stories that had a flavor of truth. «The Maltese Falcon» by Dashiell Hammett was the author's third novel in the genre of «hard-boiled fiction» and the first with the participation of a private

detective Sam Spade. The writer decided to combine in Spade several features of previously depicted detectives, including cold detachment, attention to detail, unwavering and sometimes ruthless determination to achieve his own form of justice and a complete lack of sentimentality. There is a version that Samuel Dashiell Hammett used his own name, to name his hero, at the same time writer insisted that he has no prototypes, but has absorbed the traits of many representatives of this profession.

The starting location is traditional for the detective genre – the detective's office, where a young attractive person comes with a request to find her sister. Events are unfold dynamically in «The Maltese Falcon». The main character Sam Spade is a private detective, who works in San Francisco with his partner Miles Archer. The lovely Miss Ruth Wanderley hires them tailing Floyd Thursby, who she says ran away with her 17-year-old younger sister. Archer declares first, but at that night he was found shot dead on the street almost close. The place of action in detective noir is often a night city, the most important events take place at night, under conditions of artificial lighting. Let's analyze the references to specific locations and space in the novel «The Maltese Falcon» by Dashiell Hammett.

A feature of the interior and exterior location is that the events of the novel take place in apartments, hotels and furnished rooms. Noir is characterized, first of all, by the closedness of space, a limited amount of furniture, a gloomy atmosphere and the absence of sunlight, or, conversely – luxury and pathos (which increases the contrast of the image). Let's consider the first location – the main character's apartment: «*The phone rang in the dark. After the third bell, the bed creaked, fingers began to fumble on the table; something small and heavy fell on the carpeted floor, then the bed springs creaked again, a switch clicked, and a white orb hanging from the ceiling on three gilded chains, flooded the room with light. Spade looked grimly at the phone on the table, his hands pulling out a brown paper package and a bag of Bull Durham tobacco from behind it. Through two open windows, cold, foggy air rushed into the room, frequent fog sirens sounded from Alcatraz Island. Arrows of the alarm clock that stood in the very corner of Duke's book «Celebrated Criminal Cases of America», showed five minutes to three. Spade rolled a cigarette, picked up the lighter that fell on the floor in a leather case and lit a cigarette*» [2, p. 8]. Dim lighting and limited furniture emphasize a gloomy aura, tobacco and bottles with alcohol, as well as the proximity of the Alcatraz prison island create an uncomfortable oppressive atmosphere, the author seems to remind Spade – there are many criminals and his duty pursue justice.

In the film directed by John Huston (black and white, produced in 1941), as in the literary work, the places of events or locations typical of noir detectives are indicated. The specific atmosphere of the city was reproduced by the means of cinema: «The night fog of San Francisco, thin, sticky and penetrating, blurred the street» [2, p. 12], transmitted sounds «cold steamy air blew through two open windows, bringing the dull moan of Alcatraz's anti-fog sirens half a dozen times a minute» [2, p. 11].

Sam Spade's conversations with Bridget O'Shaughnessy take place in a hotel – a location that fully corresponds to the spirit and behavior of the «femme fatale» as a noir heroine full of adventure, reflecting her inconstancy, impulsiveness and readiness to leave

the hotel room and later move into another room or apartment under a another fictitious name, being chased by fate and coincidence. *«First, while speaking with Spade in his office, she introduced herself as Ruth Wonderley and said she was staying at the St. Mark's Hotel».* (*«She arrived last Tuesday, the registration card says she's from New York. She didn't have a trunk, just some bags. She left at half past ten this morning, came back an hour later, paid the bill and took the bags to the car. She left a forwarding address – "Ambassador Hotel, Los Angeles", – hotel detective Fried told Spade»* [2, p. 25]). She was waiting there for her sister, but for some reason, the day after Miles was killed, suddenly left the hotel.

After Sam returned to the office, secretary Effie Perrin informed him that Miss Wonderley had called: *"She is in the Coronet residential complex, on California Street, apartment 1001. Ask Miss LeBlan"* [2, p. 26]. In addition to indicating a specific genre, the description of the interior characterizes the era, social status and taste of the character. *«Miss Wonderly in a green dress of crepe silk with a belt, opened the door of apartment 1001 on Coronet. She led him past the kitchen, bathroom, and bedroom into the cream-red living room. "Everything is upside down. I didn't even have time unpack things". She placed his hat on the table and sat down on the walnut sofa. He sat across from her on an upholstered brocade chair with an oval back»* [2, p. 26]. The beauty explains that she had to leave through traces of search in her room at the St. Mark's Hotel. Her words also contain pointers to specific locations: *«As soon as I noticed that my number was searched, I realized that I had to move, and I found this place yesterday. Then I came here and called to your office»* [2, p. 31]. It is important to emphasize the characterological role of the interior: a room in a hotel and an apartment building showed that Bridget O'Shaughnessy had a lot of experience in choosing a safe hiding place – it is, as a rule, a small room with a small amount of furniture, which creates a feeling of extremely limited space and correlates with a general psychological feeling of tension, temporality, disorder, chaos, in which are remain the heroes of the noir genre novels. John Huston's film «The Maltese Falcon» (1941) ends with the arrest of Bridget O'Shaughnessy and the scene when she enters the elevator, the door with a metal grate closes – the actress's face looks gloomy due to tears, and despair is conveyed in her eyes.

Also the derivation of the type of criminal is characteristic of a noir novel. This is how Sam's meeting with Gutman is described in The Maltese Falcon: *«The mahogany door of room 12-C of the Hotel "Alexandria" was opened by a guard, with whom Spade spoke in the Belvedere lobby. A very fat man hurried to meet him. His dark eyes, that were covered with fat, glistened. He wore a black trench coat, a black waistcoat, a black satin necktie "Ascot" with a pink pearl, striped gray worsted trousers and patent leather shoes. Holding Spade's hand, the fat man turned, took it with the other hand under his elbow and led him along the green carpet to a green plush chair near the table, on which stood a siphon, glasses, a bottle of "Johnnie Walker" whiskey, a box of "Coronas del Ritz" cigars, a small simple box made of yellow pumice stone, there were two newspapers. All the doors leading into the room from three different sides were closed. The fourth wall, behind Spade, had two windows facing Geary Street»* [2, p. 92]. This description of the interior characterizes the high social (or rather, criminal) status of the criminal, and flattering language – his way of communicating, confusing the interlocutor: *«We begin well, sir», – the fat man purred,*

turning with a proffered glass in his hand», – and then said the toast: «*Well, sir, here's to plain speaking and clear understanding*» [2, p. 92].

Spade keeps an expression on his face polite attention and talks about a black bird. According to Vitaly Gerasimenko, in the plots of noir films, MacGuffin plays an important role – it's a certain thing that is important for all characters. It can be a statuette ("Maltese Falcon"), jewels ("Asphalt Jungle"), "atomic bomb" ("Kiss Me to Death") [1]. It is known, that O'Shaughnessy and Thursby escaped with the Maltese Falcon to Hong Kong, and from there to San Francisco. The fat man asks: «*Mr. Spade, do you have any idea how much money you can make on this black bird?*». Spade carelessly flicked his cigarette: «*I know its immense value, as I see that you are willing to give your life for it*» [2, p. 94–95].

Writer Dashiell Hammett created the image of a criminal leader – Gutman, who resides in a suite, wears fashionable clothes that indicate financial ability, a taste for jewels and the «sweet life», he is not afraid to enlist his own bodyguard to achieve his goal, flaunting his status in front of Spade.

So, in the novel «The Maltese Falcon» by Dashiell Hammett, you can find the vast majority of noir features, in particular, such as: limited space, events take place in the dark, in the shade, or with artificial lighting, light penetrates into the house through blinds, by lines, whimsical patterns (expressionism), the night city is depicted. In the scenes of the works, both literary and film, is often depicted water (wet asphalt, fog, rain, river, etc.). The action revolves around the macguffin – the Maltese falcon, there are types of criminal, femme fatale and the image of a cynical and experienced detective, an important role in disclosure of plot twists and revealing the character's personality is played by the art space.

REFERENCES

1. Gerasimenko V. Deconstruction of the noir genre, https://moviegram.com.ua/deconstruction-of-genre-noir.
2. Dashiell Hammett. The Maltese Falcon. https://studyenglishwords.com/book/Мальтийский-сокол/1182?page=1

DEVELOPMENT OF THE MAPLET APPLICATION FOR DETERMINING THE CAPACITY OF REACTIVE POWER COMPENSATION

V. Berezhnoi
H. Tuluchenko
National Technical University «Kharkiv Polytechnic Institute», Ukraine

In [1], the authors study a scientific and practical problem that is important for Ukraine under martial law. The stability of the Ukrainian power system has significantly decreased due to constant rocket attacks on infrastructure facilities, and some equipment has been decommissioned. The Ukrainian power grid cannot withstand the load of consumers, which leads to long blackouts.

The authors of [1] propose to use full compensation of reactive power in a generalized power supply system using capacitors connected in parallel.

This allows to unload the power grid, ensure uninterrupted power supply and increase the grid's efficiency. The results of the calculations showed that power losses are reduced by 2.5 times and efficiency increases by 23% when applying the technical solution they proposed.

In order to expand the scope of practical application of the above method of full reactive power compensation, the author of these theses has developed a Maplet application that implements this method.

The main problem of the traditional compensation method is partial compensation, which leads to additional load on the power grid. The solution to this problem is to replace series partial reactive power compensation in high-voltage power supply lines with parallel full reactive power compensation at the low-voltage load node. The use of controlled inductances with counterly thyristors switched on and power active filters with pulse width modulation makes it possible to accurately determine the required capacitance of the compensation capacitor. In Fig. 1 shows a generalized diagram of a power supply system using controlled inductors.

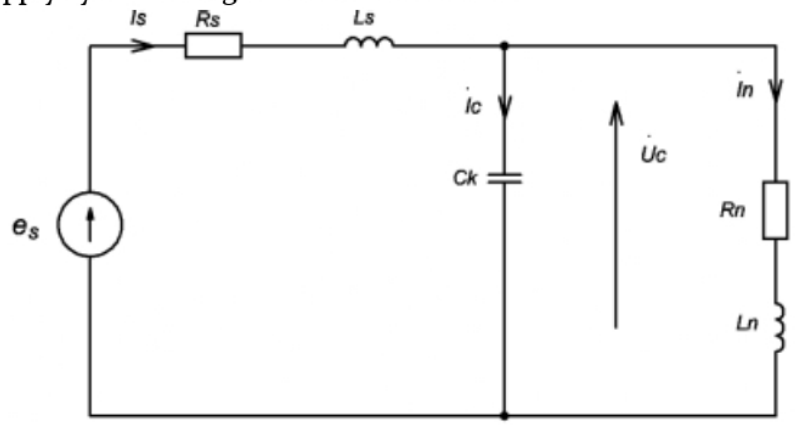


Figure 1 – Substitute scheme of a generalized power supply system with a compensator
*The scheme is borrowed from [1].

In this scheme, the notation: R_s i L_s – are the active resistance and inductance of the transmission line, which also includes the corresponding parameters of the real generator; R_n i L_n – are the active resistance and inductance of the load when the load is represented by a series equivalent. The system of equations by the method of complex amplitudes describing this equivalent substitute circuit is as follows in the basis of variables $\dot{I}s, \dot{I}n, \dot{U}c$

$$(R_s + j\omega L_s)\dot{I}_s + \dot{U}_c = \dot{e}_s;$$
$$(R_n + j\omega L_n)\dot{I}_n - \dot{U}_c = 0;$$
$$\dot{I}_s - \dot{I}_n - j\omega C_k \dot{U}_c = 0.$$

Since there are 4 unknown elements in the system, namely the unknown currents $\dot{I}s$, $\dot{I}n$, voltage $\dot{U}c$ and capacitance C_k, it is necessary to use complex computational algorithms for solving the system of equations using the optimization method by the deformed polyhedron algorithm.

Instead of performing complex calculations, the authors of [1] suggest using the method of equivalent transformation of the circuit into a simpler one, which can significantly reduce the number of calculations.

The application allows to calculate the required capacitor capacity for full compensation of reactive power in the network based on the specified numerical values of the system configuration, using the method of equivalent transformations (Fig. 2).

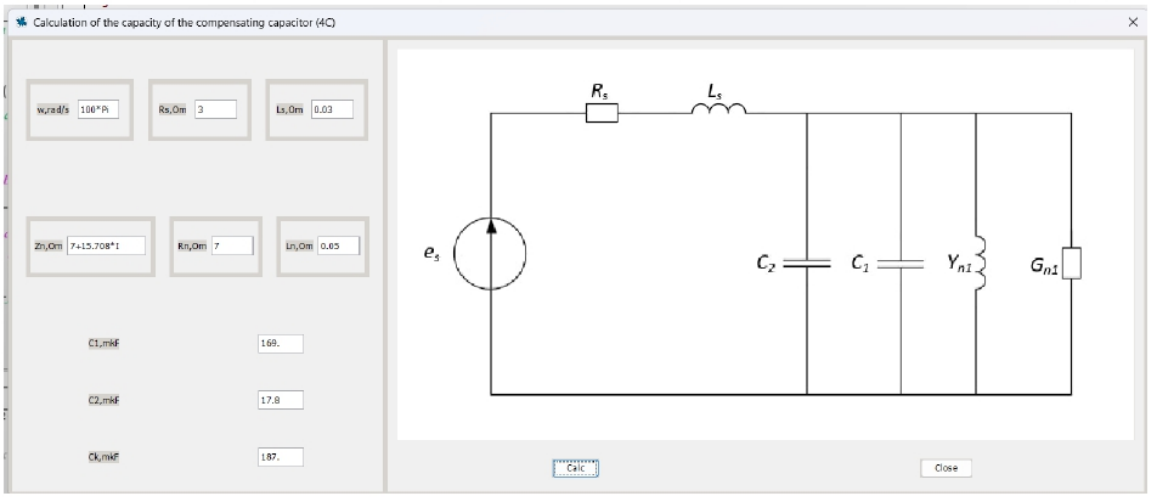


Figure 2 – Interface of the application 'Calculation of the capacity of the compensating capacitor (4C)'

The software has an intuitive interface (Fig. 2). Thanks to the open-source code, each user will be able to verify the effectiveness of the method proposed by the authors of [1], as well as use the program for calculation of an electrical network of a different configuration.

REFERENCES

1. Yagup V.G., Yagup K.V. (2024). Analytical Method of Determining the Conditions of Full Compensation of Reactive Power in the System. Electrical Engineering and Electromechanics. **2**, 75-80. https://doi.org/10.20998/2074-272X.2024.2.11

THE PICTURE OF OSCAR WILDE'S DRAMA

D. Bieliakova
O. Bohovyk
Ukrainian State University of Science and Technologies, Ukraine

Oscar Wilde was an Irish-English poet, playwright, novelist and essayist. He is one of the most famous English writers in the world.

Wilde's plays are considered the least studied of his literary works. However, it is worthwhile to consider his most famous plays.

"The Ideal Man" is a play in four acts by Oscar Wilde that deals with blackmail and political corruption, as well as the themes of public and private honour. It was first performed at London's Haymarket Theatre in 1895 and ran for 124 performances. It has been revived in many theatrical productions and adapted for film, radio and television.

“The Importance of Being Earnest” is a play written by Oscar Wilde. It is a farcical comedy in which the characters maintain fictitious personas to escape burdensome social obligations. The main themes of the play are the triviality with which such serious institutions as marriage are treated and, as a result, the satire of Victorian conformity.

“Lady Windermere’s Fan” is a comedy by Oscar Wilde that seems to be a satire of society in general. Lady Windermere suspects her husband of having an affair with Mrs Earlene. He asks his wife to invite her to the ball. In fact, Mrs. Earlene is Lady Windermere’s mother, who left her family for another man twenty years ago, and Mr. Windermere, without admitting it to anyone, is simply trying to reintegrate the woman into society. When she arrives at the ball, Lady Windermere, offended, goes to the residence of Lord Darlington, her suitor. Just as a group of men are about to enter the room, Mrs Earlene, who has tracked down her daughter, tries to persuade her to return home. They hide, but Lady Windermere has the temerity to leave her fan in plain sight. Mrs Earlene saves her daughter from scandal by coming out of hiding. Lady Windermere manages to escape unnoticed.

Oscar Wilde’s “A Woman of No Importance” is a “new and original play of modern life” in four acts, first performed at the Haymarket Theatre in London on 19 April 1893. As Wilde’s other society plays, it satirises upper-class English society. It was revived from time to time after he died in 1900 but is considered by many to be the least successful of his four drawing-room plays.

“Salome” is a one-act tragedy by Oscar Wilde. The original version of the play was first published in French in 1893; an English translation appeared a year later. The play depicts the attempted seduction of Jokanaan (John the Baptist) by Salome, the stepdaughter of Herod Antipas, her dance of the seven veils, the execution of Jokanaan at Salome’s persuasion, and her death by Herod's order.

“The Duchess of Padua” is a melodramatic tragedy in the verse of Oscar Wilde. Written in white iambic pentameter with small splashes of prose. It imitates the spirit and techniques of the late post-Shakespearean drama of the English Renaissance – in particular, the title and some features of the play refer to “The Duchess of Malfoy” by John Webster; in addition, the author was inspired by the romantic dramas of Victor Hugo – “Angelo, Tyrant of Padua” and “Lucrezia Borgia”, also set in Renaissance Italy. Wilde’s socialist sympathies come to the fore in the second act when the Duchess defends the poor from her husband.

“The Florentine Tragedy” is a fragment of an unfinished play by Oscar Wilde. The plot concerns a great Florentine merchant of the 16th century who places his wife, Bianca, in the arms of the local prince, Guido Bardi. Under the pretext of hospitality, Simone sets off the duel and disarms and strangles him. This awakens the woman's affection and they reconcile.

“Faith, or the Nihilists” is Oscar Wilde's first play. It is a melodramatic tragedy. The work is full of anachronisms, such as the mention of trains, the liberation of serfs, and the term ‘nihilism’. Here Oscar Wilde sought to demonstrate his commitment to the Irish Home Rule movement.

"La Sainte Courtisane" or "The Woman Covered with Jewels" is an unfinished play written by the Irish writer Oscar Wilde in 1894. Written after Anatole France's novel "Tais", the play describes one of Wilde's favourite paradoxes – the conversion of someone to a certain idea leads to one's own loss of faith in it. The writer also described this paradox in the prose poem "Teacher of Wisdom", which was included in the collection "Poetry in Prose".

Oscar Wilde's dramaturgy remains interesting to the modern reader because it highlights several problems that have always troubled society and still do. Each of his works has a deep meaning in which every reader can find answers and reflect on life.

AUSTRALIAN ENGLISH FROM A SOCIOLINGUISTIC PERSPECTIVE

A. Bohush
A. Bezrukov
Ukrainian State University of Science and Technologies, Ukraine

Australia is known for its rather interesting history, which is associated with the arrival of various groups of British, including outlaws. The transfer of prisoners to this continent continued for a very long period – as much as 80 years, stopping only after the decree was issued in 1868. However, the situation suddenly changed in the 1850s when significant reserves of gold were discovered. This became the catalyst for the mass emigration of British people seeking a better life. After colonization, the British, Irish, Welsh and Scots began to come to the mainland en masse. Over the next 50 years, about 2% of the UK population moved to Australia. Linguist Bruce Moore noted that settlers from southeast England who arrived during the gold rush made a significant contribution to the formation of Australian English.

It is also known that in 1973 England lost its dominance over its overseas colonies due to its accession to the European Union, and Australians' perception of their own identity underwent significant changes. Australian English arose from the various dialects of English brought over by English and Irish colonists in the 18th and 19th centuries and has also been enriched by elements of various dialects introduced by immigrants from around the world. Now Australia is seen as an independent state with its unique characteristics.

Researchers have identified some factors that contributed to the Australian people's awareness of their Asian-Pacific ancestry. These include Australia's multilingual population, weakening ties with Britain, the worldwide ethnic rights movement, and the growing need among white Australians to strengthen friendly relations with Aboriginal Australians.

The changing national identity of Australians had a double impact on language. Firstly, there was a change in the status of Australian English. Secondly, there was a change in the status of other languages used in communication in Australia. Thus, Australian English became a symbol of Australian identity and also its separation from British colonialism. In addition, it opened up the possibility for people who speak

different languages to communicate in Australian society, bringing their unique communication models.

Being a complex synthesis of various linguistic and cultural aspects, Australian English is an object of sociolinguistic research. Its origins are connected with the history of interaction between different ethnic groups and immigrants who settled on the Australian mainland.

Australian English has many loanwords from German, Polish, Belgian and other European languages that became popular during the gold rush. When people were more inclined to live in their national groups, the internal words and expressions of different peoples were often used in specific localities.

The variety of dialects in Australia covers different categories, namely:

- indigenous languages, which include the languages of the Aboriginal and Torres Strait Islander peoples;
- pidgin and creole dialects that are common among Aboriginal, Torres Strait Islander and Pacific Islander peoples;
- Australian Sign Language (Auslan), languages of immigrants and their descendants;
- Aboriginal English used primarily by Aboriginal and Torres Strait Islander peoples;
- Australian English, which is the official language of the country, is spoken by about 90% of the Australians.

Australian English predominantly uses a spelling similar to British English. Spelling variants with -re (centre, theatre, metre), -our (harbour, flavour, favour), -ll- (travelling, parallel, teller), -ise/ize (organise/organize, realise-realize, maximise/maximize) are used.

Differences in Australian English are not usually related to geographical regions but rather are determined by the social status of the speaker. Linguists distinguish three dialects, namely Broad Australian, which is spoken by about a third of the population, slightly more than half use General Australian, and approximately 10% speak Cultivated Australian.

Interesting fact is that Australians are very prone to abbreviated words, for example, «breakfast» – «brekkie», «Christmas» – «Chrissie», «football» – «footie», «definitely» – «defo», «barbecue» – «barbie», «sunglasses» – «sunnies», «smoking» – «smoko», «mosquito» – «mozzie», «mushroom» – «mushie» and so on.

Another interesting fact is that Australian English contains words from all parts of Britain, indicating considerable cultural and linguistic diversity. For example, such a word from Scotland as «billy», which means a bucket of milk, «dust up» from Ireland, which means a fight, and another one from Yorkshire «larrikin», which means bully.

However, many Australian English expressions are authentic and reflect aspects of Australian life, for example, «dog's breakfast», which means complete chaos or mess, «Good oil» – good information, «London to a brick» –showing certainty, «boomerang», which means aboriginal weapons and anything you've borrowed and it must be returned.

The more important and relevant an industry is to Australians; the more unique words and terms are used in it. The most authentic words are found in such areas as flora and fauna, landscape, cattle breeding, and mining, including gold. For example, «wattle», which means any of various Australian acacia trees with feathery leaves and golden flowers; «station» – a large Australian farm or ranch, typically devoted to raising livestock; «sluice» – a sloping trough or flume through which water is run to wash gold-bearing gravel; «billabong» – a branch of a river forming a backwater or stagnant pool, made famous by the iconic Australian song «Waltzing Matilda»; «outback» – the vast, remote interior of Australia, and so on. In general areas of knowledge, Australians use commonly used vocabulary.

The British note that Australian English is more informal than British or even American English. In colloquial Australian English there are such phrases as «How're you going?» – How are you?, «G'day», which is used when greeting someone, «Gnarly» – which means «awesome», «Good on yer!» – «good afternoon», and so on.

For more than two centuries in Australia, English has undergone significant changes, becoming a unique national variant different from British, American and other languages. These linguistic differences can be interpreted as a reflection of the unique cultural and historical characteristics of the country, where language is an expression of the national identity and uniqueness of the people.

The Australian English evolution reflects Australia's rich history, from its colonial origins to its emergence as an independent nation with a diverse population. As Australian society continues to evolve, so does its language, incorporating influences from different cultures while maintaining its own identity. While the linguistic landscape continues to change and adapt, Australian English remains a testament to the enduring heritage of a nation shaped by diversity and resilience.

FOLKLORE AS A CULTURAL CODE OF THE NATION

A. Bohush
V. Galatska
Ukrainian State University of Science and Technologies, Ukraine

According to researchers, folklore is an important tool that conveys aspects of culture, tradition and values. It is a living reflection of the collective experience and wisdom of the people, which includes many symbols, images and plots that reflect the cultural features of society, and also contribute to its unity and self-identification. Folklore is the rich heritage of the Ukrainian people, embodied in folk songs, fairy tales, rites, folk wisdom and handicrafts.

Today, Ukrainian folklore is an object of study and interest not only within the country, but also abroad. Currently, Ukrainian folklore as a cultural code attracts the attention of scientists, researchers and tourists from all over the world. It is important for intercultural communication, promoting mutual understanding, respect and enriching the world's cultural diversity.

As the American anthropologist and linguist Edward Hall notes, «culture itself is communication, and communication is culture», so folklore is a key element of this

cultural communication. Each fairy tale, song or rite in folklore has a deep meaning, which contains moral lessons, historical events, patterns of behavior and the worldview of society. It is through these symbols and images that folklore becomes a language accessible to members of a culture, enabling them to interpret the cultural messages encoded within it.

It is worth noting that the cultural code plays a significant role in the formation of the linguistic and ethnic identity of the Ukrainian people. The language and manner of expression in folk songs, parables and fairy tales reflect the peculiarities of the Ukrainian mentality, which contributes to the preservation of the unique cultural heritage.

Nature and rural life are clearly visible in Ukrainian folklore, which reflects the deep connection of the Ukrainian people with the land and its fertility. Songs about field work, rites dedicated to birth and weddings are an expression of cultural traditions and also an understanding of Ukrainians' life and worldview.

For example, the Dnieper Cossack song is the basis of Ukrainian mentality, national culture and an expression of Ukrainian character. In 2017, it was recognized as a UNESCO intangible cultural heritage site.

The Dnieper region is a glorious Cossack region that is the subject of folk songs and legends. The cultural phenomenon of the Cossacks was studied by prominent representatives of regional culture, such as the poet Ivan Manzhura, academician Dmitry Yavornitsky and folklorist Yakov Novitsky. The Cossacks left a big mark in folk songs. Images of folk heroes and historical figures, such as Bohdan Khmelnytskyi, Nechay, Morozenko and Doroshenko, became the heroes of folk songs of their time.

The Cossack song is characterized by special comparisons, epithets that are typical of folk poetry. Each song starts with the following:

«Ой на горі де женці жнуть,

А попід горою, попід зеленою, козаки йдуть...».

In the 2000s, the problem of the history of the Cossack song and folklore heritage of the Dnieper region was studied by outstanding scientists, such as professors K. P. Frolov, V. D. Buryak, M. O. Dolgov, M. M. Marfobudinova, V. L. Galatska and V. E. Karpovych. The fact that these scientists made a theoretical contribution to UNESCO's «Cossack Song» project is significant, and musicologist Victoria Karpovych was a member of the expert council.

In November 2017, Yevgeny Nyshchuk, then Minister of Culture of Ukraine, presented representatives of Dnipro regional government with a UNESCO diploma.

Today, when Ukraine is in a difficult military situation, economic and spiritual crisis, the Cossack song is an important symbol of national unity. As a phenomenon of the Ukrainian nation, it is a symbol of spirituality and heroism of the Ukrainian people. It can unite people in the fight against the Russian aggressor and support the spiritual morale of Ukrainians in times of trials.

This element of UNESCO's intangible cultural heritage was chosen because the Cossack song is considered to be the embodiment of the national spirit and Ukrainian mentality basis. It conveys all important aspects of Ukrainian cultural identity, such as freedom-loving, lyricism and emotionality. This heritage is unique, able to become

known to the whole world, as well as a powerful presentation of Ukraine, our spirit, unique culture and history.

Ukrainian folk songs, known as «dumas», have been an integral part of the life of the Ukrainian people, and they still play a significant role in the cultural heritage of Ukraine. The thoughts reflect the struggle for freedom and independence, which makes them relevant even in our time. They are not only a source of knowledge about the past, but also a stimulus that inspires the preservation of cultural identity and the strengthening of national self-awareness. One of the most famous Dumas is the Ballad of Cossack Golota and the Duma about the Escape of the Three Brothers of Azov, which talk about heroic deeds and events from Ukrainian history, highlighting the national ideals, values and indomitable spirit of the Ukrainian people.

It is also worth mentioning the «Duma of Khmelnytskyi and Barabash», dedicated to the heroic exploits of Hetman Bohdan Khmelnytskyi, who led the uprising of the Ukrainian people against Polish feudalism in the 17th century. This thought symbolizes the desire of Ukrainians for liberation and struggle for their rights.

The legend of the Cossack Mamai is another example of Ukrainian folklore that defines indomitability and belief in justice. This legend talks about Mamai, a Cossack leader who became a symbol of justice and indomitability in the face of enemies. Even in the most difficult times, he did not lose faith in the victory of truth. This legend illustrates heroism, courage and belief in justice, which are important aspects of Ukrainian culture and history.

Another example of a Ukrainian folklore element that expresses a cultural code is pysanka, that is, a traditional Ukrainian Easter egg decorated with various geometric patterns and symbols. It is known that Easter eggs have a deep meaning, which also reflects the spirit of the Ukrainian people. Each pattern on the Easter egg has its own meaning: triangles symbolize the trinity, lace – the eternity of life, the sun – light and new life. Colours also have symbolism: red means love and joy, black – earth and fertility, yellow – life and warmth, green – awakening of nature and rebirth of life, white – purity and integrity. Pysanka is a unique language talking about Ukrainians' beliefs and traditions. This folklore element is not just a decoration for Easter, but, more importantly, a bridge between the past and the future.

One more example is Ukrainian vyshyvanka, in which each pattern has its own symbolic meaning, highlighting regional affiliation, family traditions, social status or even magical beliefs. For Ukrainians, wearing a vyshyvanka is a kind of expression of national pride and belonging to Ukrainian culture. Vyshyvanka became a symbol of national revival and resistance during the struggle for Ukrainian independence. In other words, it is a kind of cultural code that helps Ukrainians to preserve their history and values in the face of modern challenges.

Thus, folklore is not just fairy tales, songs or customs, but rather a unique cultural code that allows us to see the depths of the history and soul of the people, understand their beliefs and worldview. Ukrainian folklore is the key to understanding difficult Ukrainian history and traditions that form Ukrainians' collective consciousness. Its study helps to preserve national identity and strengthen cultural ties between generations.

TO THE PROBLEM OF IMPROVING ORGANIZATIONAL AND TECHNOLOGICAL SOLUTIONS IN THE CONSTRUCTION OF ENERGY-EFFICIENT BUILDINGS

A. Dvornichenko
T. Kravchunovska
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

An energy-efficient building refers to a structure designed and constructed to minimize energy consumption while maximizing performance and comfort. The construction of such building involves using technologies and strategies such as efficient insulation, high-performance windows, energy-efficient heating, ventilation, and air conditioning (HVAC) systems, as well as renewable energy sources like solar panels. The goal of this research is to reduce the building's environmental impact and operating costs by conserving energy.

It should be stressed that several technological solutions contribute to constructing energy-efficient buildings.

They are:

Insulation: High-quality insulation materials like spray foam, cellulose, or rigid foam boards reduce heat transfer, keeping the building cooler in summer and warmer in winter, thereby lowering the need for heating and cooling.

Energy-Efficient Windows: Double or triple-pane windows with low-emissivity (low-E) coatings reduce heat transfer, prevent UV rays from entering, and improve overall insulation.

HVAC Systems: Energy-efficient HVAC systems such as variable refrigerant flow (VRF) systems, heat pumps, and geothermal systems use less energy while providing adequate heating and cooling.

LED Lighting: LED bulbs consume less energy and last longer than traditional incandescent or fluorescent bulbs, contributing to overall energy savings.

Smart Thermostats: These devices optimize HVAC usage by adjusting temperature settings based on occupancy, time of day, and external weather conditions, reducing energy waste.

Renewable Energy: Incorporating solar panels, wind turbines, or geothermal systems can generate renewable energy on-site, reducing reliance on grid power and lowering energy costs.

Energy Management Systems (EMS): EMS monitor and control energy usage in real-time, identifying areas of inefficiency and optimizing energy consumption throughout the building.

Building Automation: Automated systems for lighting, HVAC, and other building functions can adjust settings based on occupancy, weather conditions, and energy demand, enhancing energy efficiency.

Green Roofs: Installing vegetation-covered roofs helps insulate buildings, reduces the urban heat island effect, and improves air quality while providing natural cooling.

Water-Efficient Fixtures: Low-flow faucets, toilets, and showerheads reduce water consumption, leading to energy savings associated with water heating. By integrating these technologies and strategies, builders can significantly enhance the energy efficiency of buildings, reduce operating costs, and minimize environmental impact.

REFERENCES

1. On programs to increase energy efficiency and reduce energy consumption: Decree of the Cabinet of Ministers of Ukraine dated December 17, 2008. URL: https://zakon.rada.gov.ua/laws/show/1567-2008-%D1%80#Text (date of application: 10.04.2024).
2. Analysis of the effectiveness of implementation of state programs in the field of energy saving. Analytical note. URL: https://niss.gov.ua/doslidzhennya/nacionalna-bezpeka/analiz-efektivnosti-vikonannya-derzhavnikh-program-u-sferi (access date: 04/10/2024).
3. Energy saving in the housing stock: problems, practice, prospects: Handbook / "NDIproektrekonstruktionsiya", Deutsche Energie-Agentur GmbH (dena). Instituts Wohnen und Umwelt GmbH (IWU), 2006. 144 p.

HOW LANGUAGES DIE: THE FORMER POWER OF EXTINCT LANGUAGES

A. Dziuman
A. Bezrukov
Ukrainian State University of Science and Technologies, Ukraine

It is generally believed that a language exists as a living organism which is born, evolves and dies, just like any society in which it is spoken. Languages evolve to match the information requirements of their speakers and adapt to the contemporary world. As people live in a society and interact with others to survive, so do languages come into contact with other ones, leading to the exchange of not just borrowings but also the emergence of entirely new means of conveying information.

Nevertheless, there is nothing eternal, and even the most widespread languages lose not only their popularity but also their speakers over time. Such a process, when a language becomes extinct, lost, and even forgotten, is called the death of a language, although there is nothing wrong with that, as death is considered as natural as life.

Let's take a look at the final stages of the existence of languages that once were powerful, influential and significant, as well as examples of languages that have lost their speakers and their fate.

Latin was the official language of the Roman Empire, and it had considerable influence in Europe as well as many other regions. Although its influence also began to decrease after the fall of the Roman Empire in 476 CE, it remained in use as a language of scholarship, church texts, and diplomacy until the 19th century. However, at the end of the Western Roman Empire and the beginning of the Middle Ages - about the 1100s - Latin began to develop into the modern Romance languages. Latin has been replaced in

some countries, such as the United Kingdom and North Africa, by other languages, like English and Arabic.

Nowadays, Latin remains a living language only in a few domains, such as medicine, zoology, botany and other science fields for nomenclature, and is also used relatively often among the clergy.

Sanskrit was one of the most influential languages of ancient India and had a significant impact on the development of Hinduism, Buddhism and other aspects of Indian culture. Among the other religions which used Sanskrit for both verbal and written forms of communication were Buddhism, Jainism and Sikhism. An important place in the pantheon of ancient art and drama is occupied by Sanskrit literature.

Throughout the years, many rulers, such as the Mongols, Arabs and the British, conquered and distributed the territory of modern India. Most of them replaced Sanskrit with their languages. One more reason for the language's extinction was its difficulty, as learning Sanskrit required a lot of time, thus making the language inconvenient for the majority of people. Even though Sanskrit now is a dead language, it remains in use in religious rituals, literature, and science, especially in the study of Eastern texts.

Maya language was one of the most developed writing systems before the American colonisation. With the invasion of the Spanish, many of the Maya texts were destroyed, and the language was no longer used in everyday life. Linguists and archaeologists have been able to partially decode the Maya script, but the language no longer has living speakers.

Old English developed in England from the 5th to the 12th centuries and used to be the language of the Anglo-Saxon tribes. It had a significant influence on the development of the English language overall, especially with the introduction of words, grammatical structures and phonetic changes. Altogether, Old English did not extinct, but gradually evolved into a more simplified language. The main difference between it and the previously mentioned languages is that nobody renamed the language during this transformation, as was the case with Latin. According to scientists, Old English finally disappeared in the middle of the 11th century, replacing Middle English, which was far closer to our modern language.

Thus, we should begin by clarifying some aspects. There is a difference between “extinct” and “dead” languages. This difference is rather obvious:

Languages are considered “dead” when there are no living speakers left, but they are still used in some way. These are the cases of the previously mentioned Latin and Sanskrit, which still are used in science and religion. Some people continue speaking and studying these languages, but they are not being used regularly and are not being passed down from one generation to the next.

On the other hand, “extinct” languages are those that nobody can speak or understand nowadays. Some of them may have disappeared so long ago that they require decoding to understand, for example, the Maya language.

There are several ways in which languages die, such as the “Natural evolutionary course”, “Gradual language death”, “Top-to-bottom language death”, “Bottom-to-top

language death", "Sudden language death" and "Radical language death". Let us briefly consider each of them.

The most common way for languages to extinct is through the process of natural evolution. All languages change and evolve throughout time. As new words are created through borrowing, changes in meaning, inventions, and grammar, they also change to match the speakers' needs.

"Gradual language death" is a case when languages gradually fall out of use.

"Top-to-bottom language death" is the death of a language when speakers of one language contact speakers of another, more prestigious" language and then gradually abandon their language in favour of the new one.

"Bottom-to-top language death" refers to the case when the language is no longer used primarily by its speakers but continues to exist in a formal, religious, literary or ceremonial context.

The "sudden death of a language" occurs when all or most of its speakers suddenly die because of a catastrophe, such as an epidemic, violence, or natural disaster.

"Radical language death" is a similar case where the death of a language occurs very quickly – literally throughout one or two generations. But in this case, the death of a language is the result of political repression or (fear of) violence. For instance, speakers of a particular language are not being killed, but forced to abandon their native language for fear of prosecution.

The diversity of languages has been declining over the last several hundred years. With globalisation, colonialism and standardisation, the world's 100 largest languages are spoken by 85% of the population. Nevertheless, languages continue to develop, evolve, die and disappear, because it is natural and nothing remains the same.

MULTICULTURALISM AS A SCIENTIFIC ISSUE

A. Dziuman
V. Galatska
Ukrainian State University of Science and Technologies, Ukraine

Multiculturalism in contemporary humanities is defined as a socio-cultural approach or a policy that recognises and values the diversity of cultural traditions, beliefs, values and practices in society. According to this approach, different cultures can peacefully co-exist and cooperate despite their differences.

In the late twentieth century, there was an intensive study of the problem of multiculturalism in foreign social sciences. Among the scholars who developed the theory of multiculturalism in their research were L. Nizamova, Z. Bauman, O. Kuropyatnyk, J. Habermas, S. Benhabib, V. Tishkov, A. Borisov, M. Viéviorka, R. Bernstein, M. Walzer, N. Glaser, A. Lipkin, U. Kimlicka, M. Tlostanova, R. Le Coadyk, B. Parekh, C. Taylor and others.

It is well known that the issue of multiculturalism has become relevant in the last fifteen years. The first initiation of such a discussion was the publication in 2001 of the book Liberalism and Minority Rights by Canadian scholar Will Kymlicka. In her paper,

Liapina mentions the 2004 publication of the Canadian social philosopher Charles Taylor's *Multiculturalism and the Politics of Recognition*, translated into Ukrainian, as another theoretical basis for discussing multiculturalism among Ukrainian researchers.

As a result of this discussion, one of the first collective monographs in Ukraine was published in 2005 under the title *The Concept of Multiculturalism*, edited by O. Homilko.

Researchers identify the following as the main principles of multiculturalism.

- "Respect for differences": Multiculturalism recognises that different cultures have the right to express and preserve their identities. It supports diverse languages, religions, customs, traditions and cultural expressions.
- "Understanding and cooperation": multiculturalism encourages cooperation between different cultures, and promotes mutual understanding, tolerance and respect.
- "Equality and justice": this approach advocates equal opportunities for all cultures in society, regardless of their origin or status.
- "Non-discrimination": active opposition to any form of discrimination on cultural, racial, ethnic or religious grounds.

On the other hand, Ukrainian scientist S. Dorozhyna defines multiculturalism as a broad ideological and practical complex that includes not only objective phenomena but also subjective interpretations. This reveals in her understanding of multiculturalism not only as tolerance for cultural diversity but also as a requirement for legislative recognition of the rights of different racial, religious and cultural groups.

Ukrainian scholars do not generally recognise the value of multiculturalism, but they consider it important for Ukraine's national development and preservation of cultural identity while entering the international political and ideological arena.

Multiculturalism can be of great importance for modern societies, especially for multinational and multicultural countries. According to scholars, it contributes to building an open, tolerant and inclusive environment in which everyone can feel respected and valued. However, it is important to note that the success of implementing multiculturalism depends on real-life practice and the adoption of political and social measures to support these principles.

Governments adopt multiculturalism policies in different countries to protect the rights and interests of cultural minorities and promote intercultural coexistence.

In a multicultural society, issues of identity and self-awareness arise as people from different cultures face the challenge of preserving their own cultural identity while opening up to other cultures.

The diversity of cultures can also be a source of economic benefits, as it fosters innovation and business development through access to a variety of ideas and approaches.

With globalisation, multiculturalism is spreading not only at the level of individual countries but also globally, as cultural relations cross the borders of national states.

There are also challenges associated with multiculturalism, such as ensuring social cohesion and resolving cultural conflicts. Nevertheless, if implemented effectively, multiculturalism can enrich society by harnessing the collective strengths and contributions of different cultural groups.

3D SCANNING AS A MODERN ARCHITECT'S TOOL

A. Fandiei
A. Sopilniak
K. Shabanova
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

With the development of the architectural field, it is impossible not to recognize the importance and influence of 3D scanning as a modern tool for architects, especially in the context of restoration and reconstruction of historically significant buildings. This innovative technology provides unique opportunities for accurate reproduction of architectural details, analysis of the condition of buildings and optimization of restoration processes.

First, 3D scanning allows you to create a digital model of the building, taking into account all its characteristics and the history of changes. This provides restorers and architects with important information about the building that helps them make informed decisions during the work process.

Secondly, with the help of 3D scanning, it is possible to conduct a virtual analysis of various options for restoration or reconstruction of the building. This allows you to choose the most effective and economically justified solutions, which is especially important when working with historical objects.

In addition, 3D scanning can help reproduce the details and facade of a building to preserve its authenticity during restoration. The use of this technology in the reconstruction and restoration of buildings becomes an integral part of achieving high quality standards and preserving cultural heritage.

Also, one of the methods of reproduction of existing architectural forms is laser scanning, the principle of which is similar to the principle of operation of an electronic total station and consists in measuring the time of passage of a laser beam from the emitter to the reflecting surface and back to the receiver. By dividing this time by the speed of propagation of the laser beam, the distance to the object is determined. The scanner consists of a laser rangefinder adapted for high-frequency operation and a laser beam scanning unit.

The method of operation of modern laser rangefinders used in scanners is based on pulse and phase distance measurement methods. During the scanning process, the direction of propagation of the laser beam and the distance to the points of the object are fixed. The result of the scanner is an array (cloud) of points of laser reflections from objects in the scanner's field of view, with five characteristics, namely spatial coordinates (x, y, z), intensity and real color. Usually, the characteristics of the real color for each point is obtained using a digital camera [1].
For example, you can take a scan of Surukchi's house in the city of Kharkiv on Sadova Street 7 (Fig. 1). The work involved obtaining a sufficient amount of materials, namely point clouds of the facade of the building for the further work of architects and designers. To solve this problem, a complex solution was applied, combining laser scanning and photogrammetric imaging. The work was divided into two stages.

Fig. 1. Photo of the Surukchi house in the city of Kharkiv on Sadova Street 7

In the first stage, laser scanning was performed with panoramic photography and obtaining photos of the object from the UAV. 16 scanning stations and 350 photos were needed to create an informative point cloud of the facade. 4 hours were spent on filming.

Fig. 2. 3D model of the Surukchi house in the form of a cloud of colored dots

The second stage provided for the performance of camera work and consisted in stitching the scan data in the software. The data stitching error did not exceed 2 mm. The next step was to automatically combine the point cloud and photos. As a result, we got a cloud of colored object points. After noise cleaning, the following 3D model of the building was obtained (Fig. 2) [2].

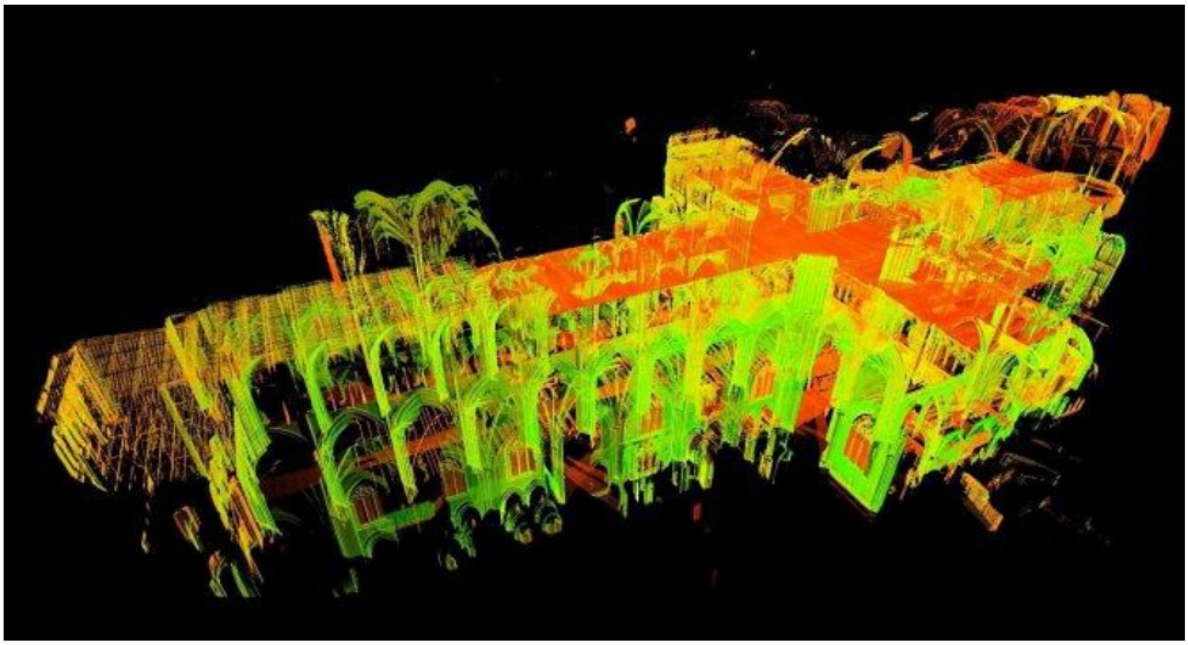


Fig. 3. 3D scans of Notre Dame Cathedral in Paris, made before the fire

Numerous successful restorations around the world demonstrate the effectiveness of BIM and 3D scanning. For example, these technologies have greatly benefited the restoration of Notre Dame Cathedral in Paris, which was severely damaged by fire in 2019. Detailed 3D scans taken before the fire (Fig. 3.) provided an accurate basis for the reconstruction, guaranteeing compliance with the original design.

Another striking example is the restoration of the historic Alhambra complex in Granada, Spain. Here, a 3D scan was used to capture an image of intricate Islamic art and architecture, which was then integrated into a BIM model. This model not only provided the basis for the restoration, but also provided a valuable digital archive for future efforts. [3]

Fig. 4. 3D scan of the historic Alhambra complex in Granada, Spain

Although BIM and 3D scanning offer great opportunities, the use of these technologies can be limited due to their cost and the need for specialized knowledge. In a project with a limited budget or scale, these technologies may be out of reach. In addition, the interpretation of information and its integration into the restoration process requires a careful approach to preserve the authenticity of historical structures.

Despite these challenges, the integration of BIM and 3D scanning into restoration projects is a paradigm shift, providing a high degree of accuracy and detail previously unattainable. This enables better decision-making and more efficient recovery processes. Despite the challenges, the potential of these technologies to preserve our cultural heritage is enormous. Further development of these tools will open up new opportunities in conservation, ensuring that our historic buildings are preserved and understood for future generations. [4]

REFERENCES

1. ПРИНЦИП ЛАЗЕРНОГО СКАНУВАННЯ // Leica Geosystems. 2022. URL: https://ngc.com.ua/ua/info/whats_hds.html
2. СКАНУВАННЯ БУДИНКУ СУРУКЧІ ДЛЯ РЕКОНСТРУКЦІЇ // Leica Geosystems. 2022. URL: https://ngc.com.ua/ua/info/lazernoe-skanirovaniye-fasada-doma-surukchi.html
3. Bhoda S. BIM and 3D Scanning: Transforming Historic Building Restoration // About Geospatial Technology. 2023. URL: https://www.linkedin.com/pulse/bim-3d-scanning-transforming-historic-building-santosh-kumar-bhoda-g8khe/
4. Bhoda S. 3D Scanning in Architecture: A Step towards Digital Excellence // About Geospatial Technology. 2023. URL: https://www.linkedin.com/pulse/3d-scanning-architecture-step-towards-digital-excellence-bhoda-5jn7c/

USE OF VENTILATED FACADES IN RESIDENTIAL CONSTRUCTION

O. Holubenko
I. Merylova
Prydniprovska State of Architecture and Civil Engineering, Ukraine

Topicality. The relevance of ventilated facades in residential construction lies in their key role in ensuring energy efficiency and residents' health. They efficiently retain heat indoors, reducing energy consumption and ensuring comfort. Ventilation systems constantly extract air, preventing the accumulation of harmful substances and odors. Additionally, they contribute to the aesthetic appearance of the building, allowing for customization of its exterior, and are resistant to weather conditions, ensuring long-term operation. The sound insulation capabilities of ventilated facades also contribute to reducing noise levels indoors, making them even more comfortable for residents. All these factors make ventilated facades an integral part of modern residential construction.

Goal. To examine the technology of using ventilated facades, their construction and design solutions in residential buildings on the example of one of the projects.

Presenting main material. A ventilated facade in construction terminology is described as a structure that not only provides external protection and aesthetic appearance of the building, but also performs the functions of thermoregulation, removal of water vapor and moisture with the help of gravity ventilation. Such a facade has a specific horizontal section with an air chamber or ventilation gap. Its components include a building structure, an empty space for thermal insulation and a facade cladding that protects the entire system from external influences. (Fig. 1), [1].

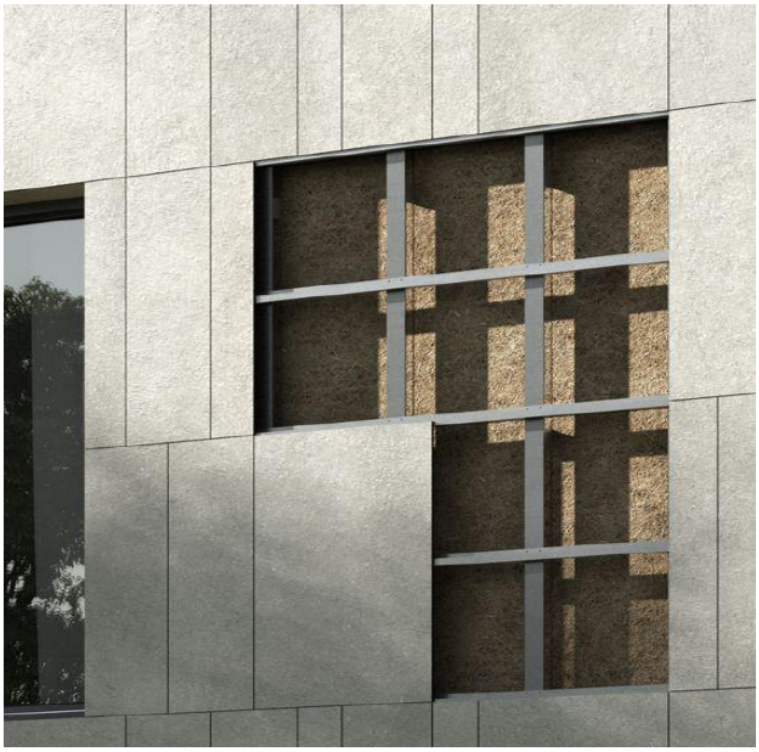


Fig. 1, an example of an external facade (Exterior facade. Sika tack panel system)

Panels can be fixed to the substructure in three ways:

Mechanical visible method: Plates are fastened with rivets or screws that pass through the panel and are visible from the outside. Rivet or screw heads can be painted to match the color of the panel to make them less noticeable. (Fig. 2), [2].

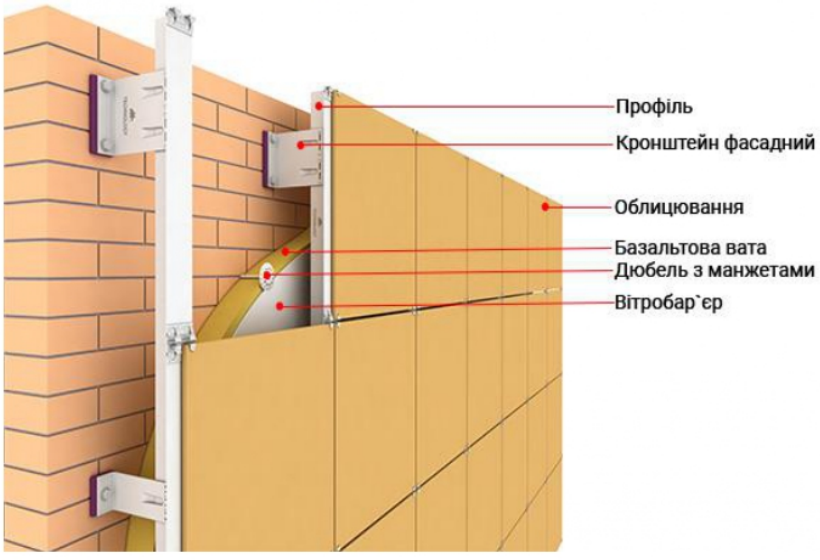


Fig. 2, an example of a mechanically visible method

Mechanical hidden method: Panels are suspended using special screws or hangers located on the back of the plate. This method provides the ability to adjust the position of the panels and to easily replace them even after the facade is finished. (Fig. 3), [2].

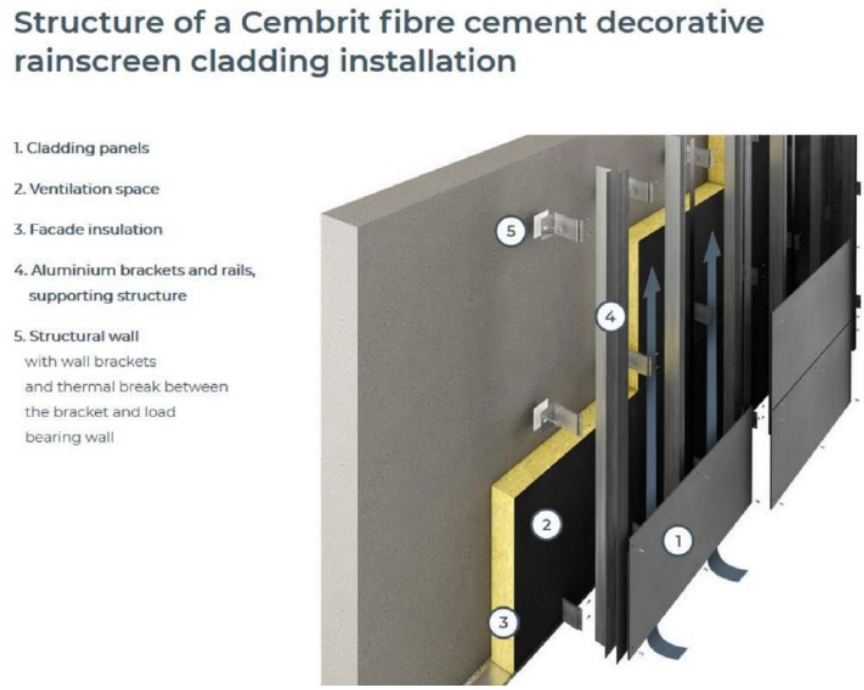


Fig. 3, an example of a mechanically hidden method

Invisible adhesive method: Panels are attached to the substructure using special adhesives without the use of visible fasteners. This method gives the facade a cleaner and more modern look. (Fig. 4), [2].

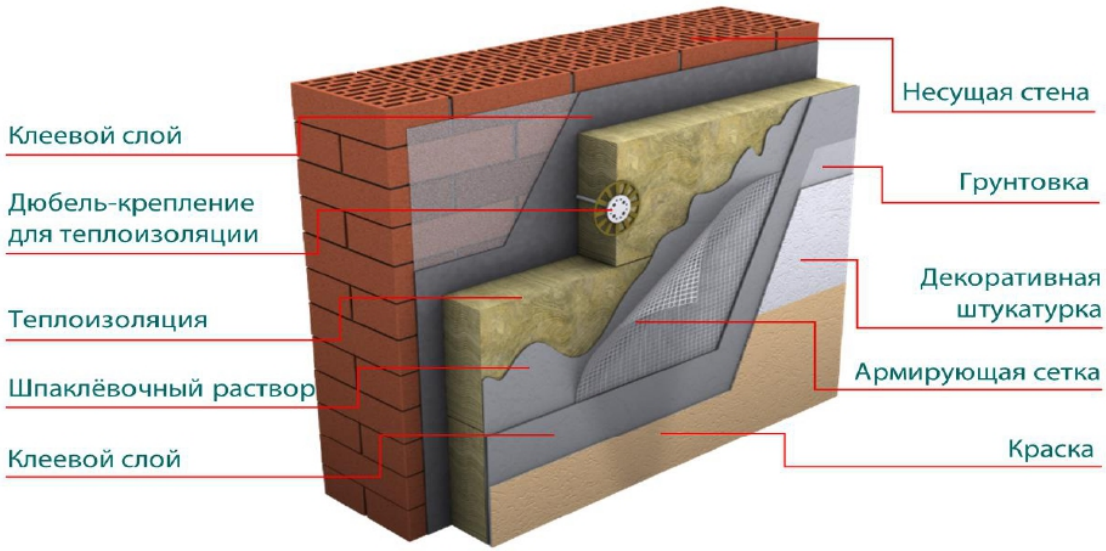


Fig. 4. An example of an invisible adhesive method

The structure of the ventilation facade (VF) includes several layers, which are arranged in order of decreasing heat transfer. This construction includes: the walls of the building, heat-insulating plates that protect the walls from freezing and thawing, ensuring their stability; a wet and windproof film that protects the insulation from atmospheric influences; metal guides; an air gap that helps remove moisture and is a temperature buffer; facing material, such as sandwich panels or corrugated board, which provide protection from weather conditions and create a comfortable microclimate inside the building. The use of such a structure allows not only to protect the building from external influences, but also to ensure effective maintenance of a comfortable temperature and sound insulation. (Fig. 5),[3]. To fix the brackets to the wall, anchors are used, the length of which depends on the thickness of the heat-insulating board, and the number of anchors is calculated depending on the weight of the cladding. The insulation is laid in a checkerboard pattern, ensuring a close fit of the plates to each other. The final stage of forming the first layer of the ventilation facade consists in covering the heat-insulating plate with a moisture-wind protection. [3]

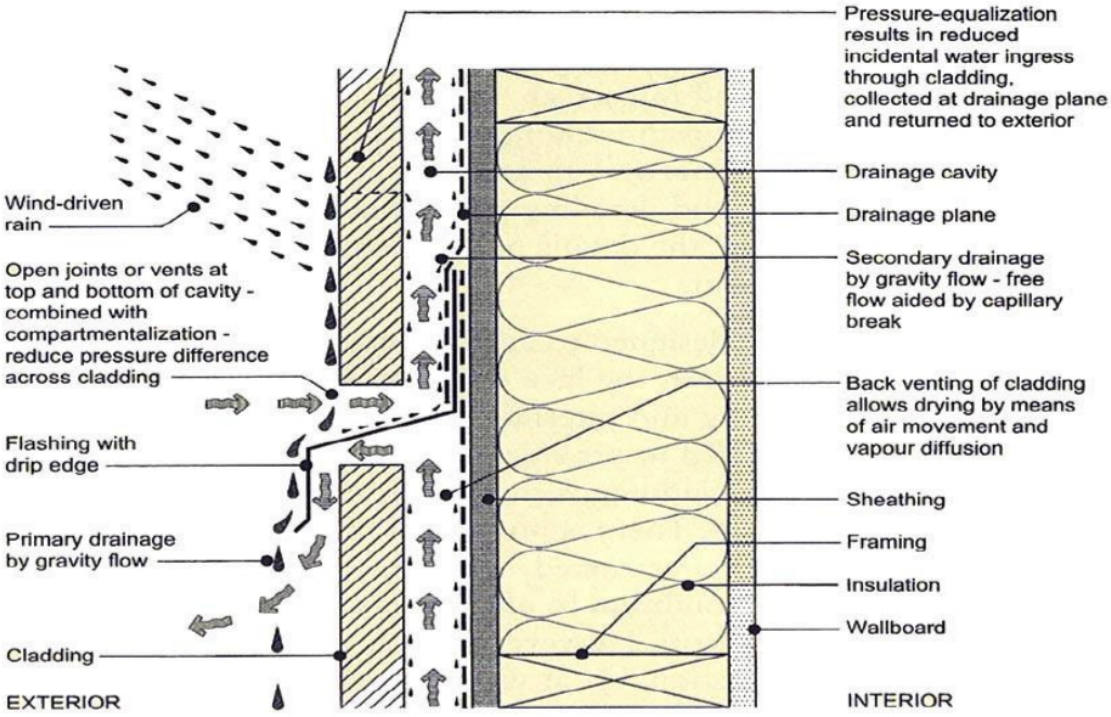


Fig. 5. Construction of a ventilated facade

Ventilation facades significantly extend the life of buildings. Another advantage of such facades is their ability to effectively prevent the penetration of water and moisture into the walls and joints. Due to the presence of a gap, steam and atmospheric moisture are removed naturally, which contributes to the maintenance of a comfortable microclimate inside the building, thereby reducing the need for air conditioning costs. [4].

The project is as follows: The residential building is located in the old town of Warsaw, surrounded by iconic architectural monuments.The main idea is to create a cozy harbor in the noisy city center, where residents will feel comfortable and calm. Around

the building there are numerous green spaces, a children's playground, areas for walking pets. On the ground floor, there is a spacious lounge where residents can spend time near the atrium, enjoying the view and the atrium that runs through the entire building. There is also a small garden available to residents of the two apartments on each floor. Residents of the 4th floor have their own terraces with a garden and a rest area, and the balcony of the 5th floor occupies a significant area of the apartment, which makes it a unique terrace with the opportunity to admire the beauty around from every corner.
(Fig. 6)

Fig. 6., situational plan and perspective view of the house

Regarding the design of the ventilated facade, the method of a mechanical hidden facade was used, stone tiles, 20x20 cm, were used for facing. Below is a detail of the construction
(Fig. 7)

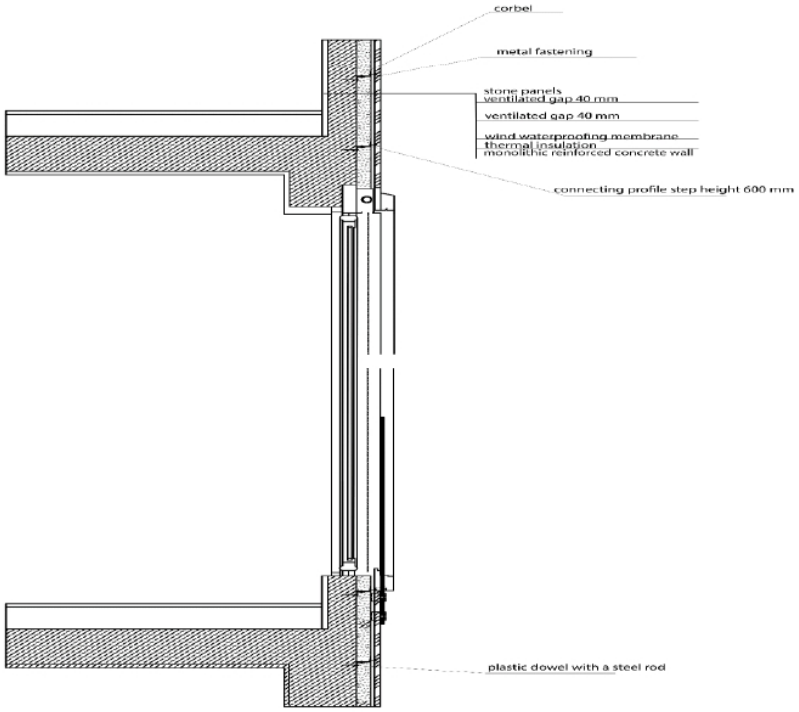


Fig. 7 is a detail of the design solution

Conclusions. A ventilated facade is a modern and popular solution in construction, which is widely used due to its numerous advantages. One of the main advantages is its ability to provide effective thermoregulation and energy conservation, which allows you to reduce the costs of heating and air conditioning of premises. In addition, ventilated facades reliably protect buildings from moisture and other atmospheric influences, ensuring their durability and resistance to external factors. The use of ventilated facades in residential buildings is an ecological and aesthetically attractive alternative. Thanks to the use of high-quality materials and effective thermal insulation, they help save energy and reduce emissions into the atmosphere, which makes them an important step in the direction of sustainable construction. In addition, ventilated facades give the buildings a modern and stylish look that complements the architectural landscape and emphasizes their elegance. Taking into account the European climate, the use of ventilated facades is especially appropriate, as they provide optimal conditions of heat and comfort in any season of the year.

REFERENCES

1. TILES FOR BUILDING FACADES [Електронний ресурс] / 1 – Режим доступу до ресурсу: https://kronosceramiche.com/outdoor/ventilated-building-facades/.
2. Приклеювання панелей на вентильовані фасади [Електронний ресурс] – Режим доступу до ресурсу: https://proventuss.eu/uk/%D0%BF%D1%80%D0%B8%D0%BA%D0%BB%D0%B5%D1%8E%D0%B2%D0%B0%D0%BD%D0%BD%D1%8F-

3. Що таке навісні вентильовані фасади, їх ключові переваги та особливості монтажу [Електронний ресурс] – Режим доступу до ресурсу: https://www.promstan.com.ua/ua/articles/chto-takoe-navesnye-ventiliruemye-fasady.
4. ВЕНТИЛЬОВАНІ І НЕВЕНТИЛЬОВАНІ ВИДИ ФАСАДІВ [Електронний ресурс] – Режим доступу до ресурсу: https://fasiding.com.ua/ventylovani_i_neventylovani_vydy_fasadiv/.

MULTI-FUEL BOILERS

S. Larkova
H. Berezuk
L. Druzhinina
Ukrainian State University of Science and Technologies, Ukraine

In heating private households or country cottages the combined boilers are often used to heat the house and they provide a comfortable temperature in all rooms, regardless of the availability of centralized gas supply or firewood. Multifuel boilers allow you to choose more economical and efficient heat carrier [1].

There are several options for combining fuel in boilers: gas-electricity, wood-gas, wood-electricity.

Option 1. Gas and electricity are used as fuel and it allows to switch one to another in the absence of one source of energy. Each system may have a different device. The common similarity lies in the spacing of the two heaters in different housings with mandatory grounding, which ensures a high level of safety. There are several schemes that differ in the operational principle:

- 2 heaters operate continuously and in parallel;
- the main element is an electric heater and the gas device is connected to increase the output power and water temperature;
- the gas burner is the main one, and the electric heater is the secondary one.

Although gas is an economical type of fuel, but the same cannot be said about electricity. Therefore, you should look at another version of the boiler that runs on a different fuel for houses located in areas with a poorly developed gas supply network. This type of boiler is well suited only if there is no gas supply to your house now, but you are sure that it will be provided soon. Then, you can use electricity as a source of energy and connect gas when it becomes possible. In other situations, this option is completely uneconomical.

Option 2. Gas and firewood are considered to be more economical types of fuel. Their disadvantage is the size of the boiler operating on such fuel. There are separate combustion chambers for each type of fuel. Two types of combined gas-firewood boilers are:

- single-circuit are boilers that are used only for space heating;

- double-circuit are boilers that provide the possibility of heating the building and at the same time heating water for the domestic needs of residents. On average, they are able to provide 700-750 liters of hot water per hour.

We consider this type of boiler to be the most reliable, since there is almost always an opportunity to get the solid fuel. In the conditions of war in Ukraine, this type of boiler is also the most optimal. If the electricity is turned off or the gas supply is damaged, the presence of such boiler will provide its owners with complete independence from the centralized systems and the desired temperature in the premises.

Option 3. We think that this type of boilers is the most controversial. Electrical energy is a very inefficient form of energy carrier, and solid fuels have their own difficulties, such as the need for a large and dry storage space for the fuel. This type of combined boilers can only be used if your house is not planned for connection to the gas network. It has several positive qualities:

- usage of two energy sources alternative to natural gas at once;

- provision of continuous heating of the premises, even if the contents of the firebox are completely burned out, also due to this it increases the degree of convenience in using hot water.

In conditions of electricity lack, this type of boiler will fit just as well as the gas-firewood type. The electric heaters of this boiler are only of an additional nature, and the main type of fuel is, of course, wood or pellets [2].

To sum up the above given information, it is possible to say that combi boilers are a very convenient way to optimize the heating system in your home. Each type of boiler has its pros and cons. Some boilers are suitable only for installation in private house, other boilers can be installed in an apartment. In wartime, it is very important that the combined boiler can operate on solid fuel. It is easily mined and can be stored, unlike gas and electricity. For peacetime, the most cost-effective option is gas and solid fuel boilers.

REFERENCES

1. G. Bennett, C. Elwell, T. Oreszczyn (2018): Space heating operation of combination boilers in the UK: the case for addressing real world boiler performance.
2. Top Advantages of Using A Multi-Fuel Boiler (2023). URL: https://alternateheatingsystems.com/resources/blog/top-advantages-of-using-a-multi-fuel-boiler.

ACQUIRING KNOWLEDGE

M. Litman
T. Vlasova
Ukrainian State University of Science and Technologies, Ukraine

Innovation literally means to make something new, different, or unique. It can be both tangible, like the light bulb, or a process, like that of the “back to basics” social movement. It involves breaking existing patterns and conventions. In order to create

something new, the innovator must have a good idea of what those existing patterns and conventions are, but so much so as to hamper or dampen the creative process.

How do we acquire knowledge? How do we learn? Our brains put information in a short-term memory bowl of neurons. If the information is transitory, it is erased. If the information is reinforced, it is transferred into long-term memory and stored. The more that pieces of information are connected, the longer they are retained. Cross-connections can be made by repetition, practice, and emotional response. In the learning process, repetition, practice and emotion all have a role. Repetition drives the information deeply into the mind. Practice, using the information in a variety of ways, provides cross-connections. Emotions develop strong retention.

Most of us are proficient at repetition and practice because they are the mainstays of the traditional learning environment. Suppressing emotion in favor of the intellect, however, is a mistake which we too often make. Emotions aid the ones with high emotional content. Learning should be active, not passive.

FORMATION OF GAS-AIR CLOUDS AT ENTERPRISES AND METHODS OF THEIR PREVENTION

S. Mamaienko
M. Nalisko
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

There are many enterprises that work with natural gas. They include gas processing plants, gas supply and transportation enterprises, as well as all enterprises that use natural gas as a raw material for the operation of machines or mechanisms. Improper handling of gas can lead to the formation of leaks, which in turn form the gas-air clouds that can cause great destructive consequences for all objects of the enterprise and also pose a threat to human life.

In this regard, a detailed analysis of the mechanisms of formation, consequences and their prevention will be provided. Detonation is the most likely outcome after impact gas-air flammable vapor. The flame sweeps through inflammable vapors reach about 1800 m/s in contact with excess pressure of about 20 bar. People cannot survive in such conditions. Objects in the middle of the blast cloud are destroyed or rendered unusable.

The following is an example of a detonation in Buncefield, UK, 11 Dec 2005. The area covered by the vapour cloud was estimated to be around 120,000 m2 and the average height of the cloud was around 2 m, giving an approximate volume of 240,000 m3.

Parked vehicles located in open, uncongested spaces of the vapour cloud showed signs of the high over-pressures observed in the detonation tests. Vehicle tyres were debeaded. Partially empty storage tanks were not distorted by fire, oil filters and oil drums were uniformly crushed (Fig. 1). A building (Fuji), on the west side of an open car park, was completely destroyed on its south side. (Fig. 2). [1]

After collecting data on incidents with explosions of gas-air clouds that occurred during 50 years, as well as experiments on modeling explosions, it was first of all

established that the accumulation of deciduous trees or the accumulation of pipes, as well as other obstacles, lead to the accumulation of gas in these places, which provokes an increase in the chance of their explosion and its power. The first recommendation of experts for all enterprises is the correct design of infrastructure placement on the territory of the enterprise in order to reduce the risk of the formation of gas-air clouds. [2]

One perfect way to protect occupied buildings from collapse is to locate buildings away from congested units and areas of potential vapor cloud accumulation. Where this is impractical, some degree of explosion protection is required, particularly for control rooms. Drainage systems should be equipped with water traps to prevent the migration of flammable vapours along the drains. [1]

It is important to understand that emissions of a large amount of gas can be very dangerous both for the infrastructure and for the lives of employees, therefore, at enterprises with the risk of gas leaks, a comprehensive system for preventing the formation of detonation combustion of gas-air clouds should be developed.

Fig. 1 Machines, tanks and reservoirs after detonation

Fig. 2 Building after detonation

REFERENCES

1. Elaine S. Oran, Geoffrey Chamberlain, Andrzej Pekalski. Mechanisms and occurrence of detonations in vapor cloud explosions

2. Andrzej Pekalski, Jonathan Puttock, Simon Chynoweth. Deflagration to detonation transition in a vapour cloud explosion in open but congested space: Large scale test.

NUCLEAR ACCIDENT DOSIMETRY

O. Horokh
V. Shalomov
L. Druzhinina
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

In nuclear facilities where fissionable material is present and there is a potential for a criticality accident, special dosimeter types must be provided. A nuclear criticality accident may result from fissile material being placed in a geometry or physical position where a chain reaction can occur. The position or location of the fissile material resulting in a criticality could include its proximity to hydrogenous material such as water. Hydrogenous materials can reflect and moderate fast neutrons, thereby increasing the population of slow neutrons that can contribute to the chain reaction [1].

Since the neutron fluence spectrum produced in a criticality accident will likely differ from the ambient spectra in the facility, the accident dosimeter should have a capability for providing a simple, few channel, neutron fluence spectrum. The neutron spectrum resulting from a criticality depends upon the geometry of the material, the composition of surrounding materials such as water, and the composition and geometry of walls that might reflect neutrons. Since nuclear accident doses may amount to several gray, the dynamic range of these dosimeters must be larger than for the types of dosimeters normally used in routine power plant operation. At accident levels, the protection quantities such as dose equivalent should not be used because the protection quantities take into account the stochastic biological effects at low doses. At high doses above a few tenths of a gray, deterministic effects such as cell killing occur, and the radiation weighting factors used for low doses are not suitable. Absorbed doses to tissue should be determined, and a value of the relative biological effectiveness should be evaluated for the specific neutron fluence spectrum. The relative biological effectiveness is the ratio of the dose of 250 kVp X rays to produce a particular biological effect (usually cell killing) to the dose of neutrons to produce the same effect. Nuclear accident dosimeters must also be able to measure large absorbed doses of gamma rays in the presence of the above-mentioned large doses of neutrons. Because of the serious effects of a critical incident, it is necessary for nuclear accident dosimeters to be read out quickly, usually within 24 hours, so that appropriate medical decisions can be made.

Nuclear accident dosimeters are of two general types: those that are worn on the body and those that are installed at fixed locations in the facility. Installed accident dosimeters should be capable of determining neutron absorbed dose with an accuracy of about ±25% from 0.1 Gy to approximately 100 Gy and should be able to provide an approximate, few channel, neutron spectrum. These dosimeters should also be capable of measuring fission gamma ray doses from 0.1 Gy to approximately 100 Gy in the presence of neutron radiation with an accuracy of approximately ±25%. Installed nuclear accident dosimeters must be mounted with a minimal amount of shielding between the potential sources of criticality and dosimeter so that the neutron fluence spectrum is not altered by the presence of the shielding and then the installed dosimeter will be exposed to

approximately the same fluence spectrum as the exposed worker. At the point of the installed dosimeter the neutron background radiation should be relatively low so that the reading taken during an emergency is not confounded by a large intrinsic background reading. Personal neutron accident dosimeters should likewise be capable of measuring the absorbed dose from 0.1 Gy to approximately 10 Gy with an accuracy of about ±25%.

Personal neutron accident dosimeters can include several detector materials with different neutron activation cross-sections that are sufficiently well known for a simple fluence spectrum. Activation foils are commonly used for this purpose. The specific detectors are chosen because their cross-sections are large and they exhibit several thresholds in the energy region where neutrons are expected. This energy region is approximately 20 MeV. The neutron interactions in the foils should also produce radionuclides that decay with convenient half-life, usually hours, rather than seconds or years. Thus, emitted gamma rays can be conveniently counted using standard NaI or high purity germanium detector systems. The counting of gamma rays is the most convenient method of readout, although some materials will undergo reactions producing beta particles that can be counted with gas flow proportional counters or scintillation detectors. Neutron activation foils composed of indium, copper or gold, and pellets of cadmium-covered sulphur, may be used to estimate the neutron flux in the energy range expected in critical level accidents.

Fixed nuclear accident dosimeters are usually passive devices containing activation foils, TLDs and etched track dosimeters. Active criticality alarms have also been designed and used in nuclear facilities. They may incorporate high range ionization chamber detectors and have usually been developed by the facilities themselves. An example of a fixed passive accident dosimeter is shown in Fig. 1.

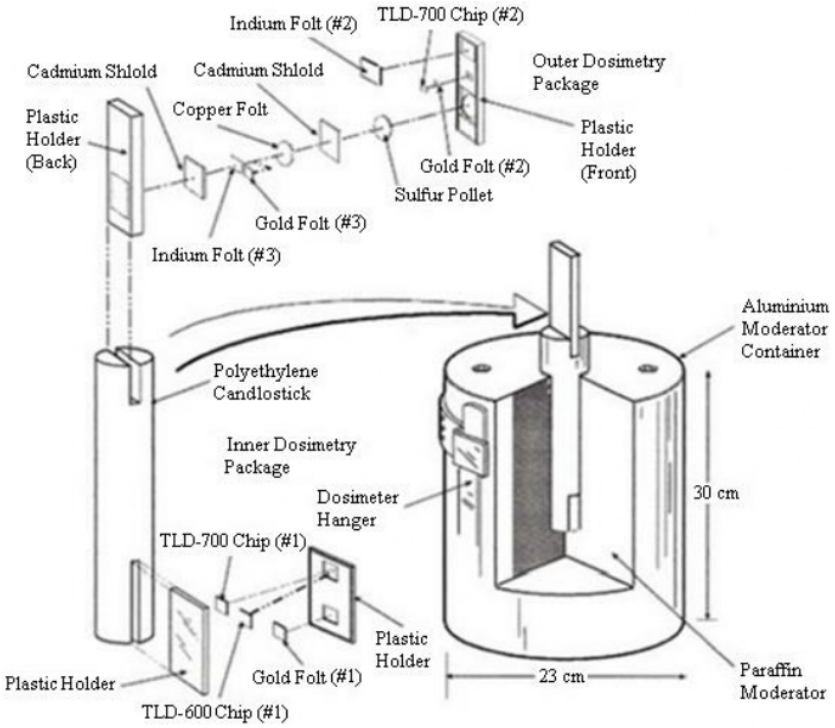


Fig. 1. Cutaway view of an installed neutron accident dosimeter containing TLDs for

measuring neutron and photon doses. Activation foils and pellets of various materials comprise a simple, few channel spectrometer. Detectors are placed free in air at the top of the dosimeter and within a hydrogenous moderator (paraffin) in order to estimate the effect of moderation of the neutron fluence spectrum within the body.

If the personal nuclear accident dosimeters are absent, metal objects carried by employees can provide estimates of exposure to neutron radiation from analysis of the activation produced. Objects can be counted using gamma spectroscopic equipment, and after that, an assessment of neutron exposure can be made.

REFERENCES

1. Sahu M.K. Thermo Luminescence Stimulated by Different Technique. *International Journal of Applied Engineering Research.* 2020. V. 15. No. 9. P. 933-947.

DEEPER INSIGHT INTO MACHINE LEARNING

O. Ivanchenko
I. Atroshenko
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

It is important to note that machine learning and artificial intelligence are inseparable topics, as machine learning is one of the methods for artificial intelligence to function. This method is aimed at creating algorithms that, after processing a large volume of similar data, can find patterns in the given data.

It is worth to understand how it works. In such a case, to explain this through one of the branches of artificial intelligence - computer vision appears to be the easiest way. This branch commonly specializes in processing photos, videos, and graphical information. In other words, our artificial intelligence (AI) is tasked with recognizing what creature is depicted in a photo. Supposing, we have a photo with a fish. For the AI algorithm to recognize a fish, it needs to know what it looks like. More precisely, to recognize a fish in an image, it should have already seen images of fish before. Therefore, in order to identify that exactly a fish is depicted in the image, you need to show the AI several images of fish. It is important to provide the algorithm with many images as it needs to find precise patterns in the images for a more accurate result. Typically, the algorithm is given many files with similar images to check, and it compares each pixel in each file for similarity drawing conclusions from it. And the more images of fish you provide to the algorithm, the more confidently (with greater probability) it can answer whether there is a fish in the next image. Similarly, you can complicate the task and ask the algorithm to recognize the species of this fish. Again, you show the algorithm images of different fish species refining its responses.

Thus, how can machine learning help? From the example above, machine learning algorithms can classify data more easily. You might say that a person can also distinguish images of fish, and it is possible to agree with you, but it cannot be denied that a trained AI will do it faster than a human. Also, a machine learning algorithm can classify not only images but also videos, audio, or text files, and in general, anything that can be

categorized. Again, the algorithm needs to process many similar files to be able to distinguish and classify them. Overall, machine learning is aimed at automating and optimizing existing tasks. You may have also encountered a situation where, after buying a product in an online store, you see ads for related items. Such advertising is also trained by machine learning algorithms. Following the same principle, machine learning algorithms select songs in YouTube Music and Spotify, movies on platforms like Megogo or Netflix, and other recommendations in various apps and websites. The same ChatGPT uses machine learning algorithms to provide answers to your questions.

In conclusion, it should be noted that machine learning is one of the methods of AI functioning that is aimed at creating, simplifying, and optimizing various algorithms and tasks. Machine learning has already made a significant contribution to human life and will continue to develop and improve life with the advancement of AI.

GLOBAL INFANTILISATION OF THE POPULATION – WHO NEEDS IT AND WHY?

A. Kapinus
O. Bohovyk
Ukrainian State University of Science and Technologies, Ukraine

I have been observing the emergence and development of social infantilism as a large-scale process since the beginning of the 21st century. Of course, the term has been around for a long time. The French neurologist E. Lasegue coined the term in 1864. He called infantiles adults who physically or mentally manifested themselves as children. Modern psychologists have specified the list of manifestations – uncontrollable emotionality, egocentrism, irresponsibility, lack of independence, lack of desire to develop, lack of desire to solve problems in an adult way, lack of goals in life, poor communication skills, lack of empathy, the need for constant entertainment – these are the main signs of infantilism.

How can such qualities be cultivated? I have my own opinion, having witnessed this process with my own eyes. In 2000, the "End of the World" did not happen, so we revived and set ourselves a goal - to live on. The spread of the Internet and mobile communications inspired people to develop in various fields. This innovative period was characterized by generosity of information and opportunities, instilling strength, optimism, and self-confidence in our consciousness. During the Zero years (2000-2005), a flood of diverse information provided fresh and unusual perspectives on ordinary things, broadening our thinking. It is important to maintain objectivity and avoid subjective evaluations. How to treat oneself, raise a child, and live properly? There are many answers, but it is important to approach these topics objectively and without bias. Entrepreneurial activity, standard of living, and birth rates have all increased rapidly, leading to the satisfaction of basic needs. Our children, born at the beginning of the century, rarely face any lack due to our ability to provide for them. The text has been revised to adhere to the desired characteristics of objectivity, comprehensibility, conventional structure, clear and objective language, format, formal register, structure, balance, precise word choice, and grammatical correctness. We aimed to provide care for

our children and adopt modern parenting practices. We read extensively on education and implemented what we learned. Despite disagreement from the older generation, we believed in our intelligence and ability to navigate generational differences.

This is how many children born in the millennial generation found themselves in a warm and comfortable environment. They may not have had the opportunity to learn how to overcome difficulties, set and achieve goals, as their parents may have done it for them. Additionally, they may not have learned the value of patience and perseverance, as they were quickly provided with toys, entertainment, and other distractions. Parents or the internet may satisfy these desires, but independence and activity are not being developed. The individual is not learning enough to create, build, or fix anything, including relationships. Compromises and considering others are seen as 'out of fashion', with personal interests taking priority. Popular slogans such as 'I am what I am' promote this individualistic mindset. The individual appears to be experiencing feelings of being overwhelmed and forgetfulness, as well as a lack of motivation. The statement 'If someone is not satisfied with something - goodbye' suggests a tendency to avoid conflict. It also appears that the individual may not have fully developed their sense of responsibility for their actions and interactions with others.

Instead of developing independence, responsibility, and proactivity (the fundamental qualities of adulthood), children have become reliant, entitled, and apathetic towards their environment. As a result, we now have a significant number of individuals who may appear to be adults at 20 years old, but cannot be relied upon or trusted. The following are the main values that I have observed:

1. Satisfaction. If something is not fun, I will not do it. Boring
2. Superficiality. If you need to delve into something, figure it out, I refuse it. Boring
3. Speed. If I have to wait for something, I refuse it. Boring
4. Money. If I don't buy an iPhone for this amount, I won't work. They found a fool.

Such uninitiative, amorphous, and unthinking youth are timely. Later, I will explain who needs them and why. Now, let's focus on us adults.

How can we become like children?

The recipe is simple. We need a TV (as Ray Bradbury suggested 70 years ago) and rest.

The phrase 'you can do anything' may sound appealing, but it is important to be realistic. Firstly, offer a wide range of options. Adults often set themselves multiple tasks, with multifunctionality now being one of the main qualities sought after by employers. However, this can lead to exhaustion and a lack of critical thinking. On one shelf, there are 20 types of sauces, breads, and beers. While this may seem like a display of wealth, it can actually contribute to decision fatigue. Additionally, it can be a distraction and cause confusion, leading to exhaustion.

However, it does provide the convenience of being able to quickly purchase anything desired in the moment. Instantly get a loan for your needs through your phone without the need to visit a bank. However, it is important to note that failure to repay the loan on time may result in additional loans being offered to you, leading to financial strain and fatigue. It is important to consider the responsibility that comes with taking out a loan.

Indispensably allow unrestrainedness, emotionality, ignorance, entertainment. The Fourth Estate with the help of Leaders of Public Opinion - politicians, stars, rich people and (oh, my God!) bloggers, does an excellent job with this task! Everything is possible. Express yourself. Look for yourself. This is Freedom. No frames. No restraint. No focus.

The text fragment provided promotes films such as 'Spider-Man', 'Barbie', and 'Oppenheimer'. It is important to consider the values that these films convey. It is crucial to avoid underestimating the influence of the film industry. Recalling 'Overton's Windows', which describes how to radically change a person's opinion. These films expand our thinking, but what values are we getting used to?

It is important to limit time for thinking and avoid a life without pauses. Work, study, communication, and leisure activities can all be conveniently accessed through your phone. With just a press, you can consume information without the need to physically move. The 'Myelophone' always has something to offer, providing a continuous stream of content for you to engage with. The prevalence of ready-made conclusions and the ease of access to information through the click-and-scroll culture has led to a superficial mode of thinking, lacking depth and critical analysis.

The prevalence of ready-made conclusions and the ease of access to information through the click-and-scroll culture has led to a superficial mode of thinking, lacking depth and critical analysis. This is compounded by the fast-paced nature of modern life, which prioritises speed over reflection. The popularity of reels and stories as a means of consuming information further exacerbates this issue. Fast, interesting, clear. This is indicative. Speed is a trend. By the way, the modern program of NUS for schoolchildren seems interesting, versatile, comprehensive. However, upon closer examination, the topics transition so rapidly that one does not have sufficient time to study them thoroughly. The following statement then presents itself: This can lead to children becoming fatigued and demotivated by their lack of success. Children should not be evaluated before the 4th grade as it can have a negative impact on their psyche. It is important to allow children to develop their critical thinking skills and understand causal relationships. It is crucial to consider the future of our children. It is concerning that there is a possibility that children may not mature. Adults who remain childlike can help us build bridges, houses, and relationships, as well as give birth and raise new people. I prefer not to travel in a vehicle driven by a child, nor to consume food prepared by them. Additionally, I would not feel comfortable undergoing a medical procedure where a child is involved in any capacity.

Why has the infantilization of the population become a trend? Who benefits from it and why? In today's world, where opportunities for personal growth are abundant, individuals have the freedom to choose who they want to be and what they want. However, this poses a threat to those in power. Assuming that the majority of individuals will be adults who are active, ambitious, purposeful, and responsible, significant changes are likely to occur in the world. It is suggested that the modern Rothschilds may need to make concessions in such a scenario. Therefore, it is important to prevent the development of individuals who have accelerated their learning through unrestricted

access to information. We must strive to promote purposefulness, emotional balance, responsibility, and activity. It is crucial to enable individuals to make conscious choices.

Making the majority of the population children can be an effective way to manage them. Children are easy to please with toys and sweets, but this approach is not ethical or sustainable. The given text contains biased and inappropriate language that should be avoided in formal writing. Children are dependent and incapacitated. They may demand or clamour for help, which can be convenient for those in power. It is our responsibility to ensure their well-being and protect their rights. However, it is important to remember that children are not merely tools for the powerful to exploit. That is all.

To avoid being patronised, it is advisable to limit time spent at railway stations and avoid ticket distribution points. It is recommended to engage in classic literature. Gadgets and mass media can quickly alter values, so it is important to prioritise health, common sense, and mental stimulation over material possessions. When it comes to children, they Children rely on adults for guidance. If an adult spends time with them, they may be less likely to repeatedly visit the same location. It is beneficial to expose children to nature, animals, and different environments. This allows them to analyze, synthesize, compare, summarize, classify, systematize and comprehend their surroundings.

SPATIAL AND PLANNING FEATURES OF URBAN GREEN LANDSCAPES (ON THE EXAMPLE OF THE DNIPRO CITY)

M. Kihalova
T. Tsymbalova
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Statement of the problem. The topic of environmental protection from the harmful sanitary and hygienic impact of heavy industry is extremely relevant for urbanized areas around the world. As one of the means of ecological optimization of urban spaces, the practice of creating a system of artificial plantations for sanitary and recreational purposes is used. In the conditions of the modern Dnipro city, a historical industrial center, the problem of the consequences of anthropogenic impact has become particularly important.

The purpose of the study is to investigate the typological structure of existing green landscapes on the example of the Dnipro city. The sanitary and recreational possibilities of the urban complex green zone are analyzed.

Research results. The world history of urban development shows that the irreversible consequences of the transformation of the natural environment (which inevitably occurred as a result of the development and growth of cities) were to some extent compensated for by the creation of man-made green landscapes.

According to historical data, in the first decades of Katerynoslav (Dnipro)'s existence, intensive deforestation took place, as the city was built on the site of a dense forest that stretched in a wide strip along the right bank of the Dnipro, near the Cossack settlement of Polovytsi. [1], [2].

Since the middle of the nineteenth century, considerable attention has been paid to the development of the urban greening system in Katerynoslav; active landscape development of the city territory, especially in the central part of the city, has begun: numerous large and small gardens, boulevards, and green spaces along the streets are created.

In the 1880s and 1890s, during the period of rapid construction and commissioning of the first metallurgical enterprises of the Dnipropetrovs'k-Dniprodzerzhyns'k agglomeration, the origins of modern environmental problems in the Dnipro region began. It was then that a disastrous system of violation of sanitary and hygienic standards of operation of industries with a high degree of harmfulness began to form:

– absence or insufficient parameters of sanitary protection zones (required distances between the territories of heavy industry enterprises and residential buildings);

- discharge of untreated waste into the atmosphere and water sources;

– accumulation and storage of hazardous substances in sumps, storage facilities, and dumps in conditions that do not meet safety requirements.

Today, a significant portion of Dnipro's buildings is located in close proximity to large industrial enterprises with a high hazard class, such as metallurgical, chemical, and energy enterprises (there are more than 170 enterprises in Dnipro). The most unfavorable environmental conditions are found in certain areas of the city on the right bank of the Dnipro River; on the left bank, where man-made impacts are much less pronounced, there are green landscapes of the main recreational fund and reserve [4].

The current architectural and planning structure of Dnipro is an urban complex with three main industrial zones. In fact, in many parts of the city, there are buildings with close adjacency of industrial and residential areas, sometimes with alternating zones, without the necessary sanitary protection zones (especially near old factories) [4].

In the context of severe pollution of the city's inhabited areas, the sanitary role of green spaces, which mainly represent species that have lived in this area since ancient times, is of particular importance [2].

The complex green zone of Dnipro is spatially differentiated into green landscapes of different typologies, typical for large urban formations (the structural elements of the green zone differ in the degree of health, recreational, economic and sanitary use; the green complex includes objects of the nature reserve plantation fund) [3]:

- forests around the city of Dnipro, which serve as a protective green belt;
- agricultural land;
- city and district parks, forest parks, squares, embankments, pedestrian boulevards (picture 1);
- green spaces of streets and roads;
- green spaces of public buildings;
- green areas of adjacent territories in residential areas;
- green spaces on the territories of sacred objects;
- sanitary protection zones of industrial enterprises and green spaces on the territories of industrial production facilities;
- sanitary protection zones of high-voltage lines;

- green spaces in urban gullies and ravines;
- forest protection strips along railways and highways;
- vegetation of the Dnipro and Samara islands [5].

Figure 1. Image of the main entrance to Taras Shevchenko Park (Dnipro)

Conclusions. Under the conditions of the modern system of green landscapes in Dnipro, careful use of favorable green landscape bases and the creation of new cultural green landscapes play a significant role in maintaining sustainable ecological balance.

REFERENCES

1. Акінфієв Ів. Як. Рослинність Катеринослава наприкінці першого сторіччя його існування. Ч. 1. Катеринослав: друкарня Н. Я. Павловського, 1889. С. 238.
2. Кернічна О. О., Старостін В. С. Ретроспективний аналіз ландшафтно-планувальних особливостей освоєння території Дніпропетровська. Вісник Дніпропетровського університету. Геологія Географія. Дніпропетровськ. 2002. Віп. 4. З. 145-150.
3. Манюк Вадим, Манюк Володимир. Природно-заповідний фонд Дніпропетровщини. Вип.1. Дніпропетровськ: «РоялПрінт». 2010. С. 166.
4. Павлов В. О., Переметчик М. М., Колотенко В. П., Шевченко Б. Є. Екологічний паспорт міста Дніпропетровська. Дніпропетровськ: УкО ІМА-прес, 2000. С.112.
5. Myronenko V. P., Tsymbalova T. A. The Art of green Landscape Formation in the post-industrial Pridneprovie. Uniwersytet Przyrodniczy w Lublinie. Seria «Kulturowe i cywilizacyjne postawy polaków». Lublin: Wydział Ogrodnictwa i Architektury Krajobrazu Uniwersytet Przyrodniczy w Lublinie, 2018. S. 27-37.

MODELING OF THE INTERACTION OF FOUNDATIONS WITH THE SOIL ENVIRONMENT REINFORCED WITH SOIL-CEMENT ELEMENTS

S. Kovalevskiy
Yu. Volnianskyi
V. Kovba
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Today, there is a growing need to strengthen the bearing capacity of slab foundations of buildings and structures. Also, dense construction limits the possibilities of using foundation installation technologies with significant dynamic impact. The only rational solution is the use of drilled and bored piles. In turn, it is possible to reduce the cost of pile foundation construction by using the soil underlying the building.

Reinforcement of foundations is an effective constructive method of improving the mechanical properties of foundation soils by introducing special inclusions [1] (spatial elements of increased strength), with higher mechanical characteristics compared to the soil, which have high adhesion and friction with the surrounding soil. Therefore, the paper compares the calculation and modeling of various options for the impact of the foundation slab on the reinforced foundation with soil-cement elements.

Within the scope of the given task, the simulation of an artificial foundation reinforced with vertical elements under the load of only the plate was performed in the PC Plaxis 3D. The purpose of the calculations is to study the features of the deformation of the artificial base and the redistribution of stresses between the vertical reinforcing elements and the soil in order to choose the rational thickness of the damping layer.

Accepted engineering-geological conditions, represented by weak silty-clay soils in the upper layers and strong sandy soils in the lower ones, were used during modeling. Strong sandy soils served as the basis for vertical reinforcing elements. Numerical modeling of the stepwise loading of the foundation (thickness of 0.9 m) was performed. During the simulation, the calculation was carried out with a change in the thickness of the damping layer: 0.25 m, 0.5 m, 1 m, 1.5 m, and 2 m. This task was performed in a non-linear formulation using an elastic-plastic model with soil hardening - Hardening Soil Model [3], so its application requires the selection and verification of characteristics in accordance with individual engineering and geological conditions by solving the test inverse problem [2], as well as creating an algorithm for its solution. Compacted soil (due to movement) causes the formation of additional tangential stresses, which also transfer part of the loads to the reinforcing elements.

Conclusions: Test calculations of foundation slab problems were carried out, and features of artificial base deformation and stress redistribution between vertical reinforcing elements and soil were investigated for choosing a rational thickness of the damping layer. The nonlinear elastic-plastic Hardening Soil Model with soil hardening was chosen for the calculation.

REFERENCES

1. Армовані основи будівель та споруд / М.Ф. Друкований, С.В. Матвєєв, Б.Б. Корчевський та ін. – Вінниця: УНІВЕРСУМ Вінниця, 2006. – 235 с.

2. Recommendations for the design, construction and control of rigid inclusion ground improvement / Association for the Promotion of Investment and innovation. – Paris: Presses des Ponts, 2013. – 383 p.
3. Bower T. A., Jefferson A. D., Cleall P. J. A reformulated hardening soil model. Proceedings of the Institution of Civil Engineers - Engineering and Computational Mechanics. 2020. T. 173, № 1. C. 11–29.

L'ARCHITECTURE VERTE COMME SOLUTION POUR RÉSOUDRE DES PROBLÈMES ENVIRONNEMENTAUX ACTUELS

I. Krainyk, O. Klymenko
H. Slavinska, I. Yakovlieva
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Actualité. Dans le monde moderne, la question la plus pertinente est désormais la relation entre l'hommes et la nature. Encore une année consécutive la planète est couverte de changements, principalement liés au réchauffement climatique. Dans de nombreux pays, les émissions de gaz à effet de serre des bâtiments s'élèvent à plus de 20 %. Afin d'éviter les émissions encore plus importantes dans l'atmosphère, ils existent des mesures d'amélioration de l'efficacité énergétique comme réponse aux conséquences du changement climatique, telles que: la réduction des émissions de gaz à effet de serre, la réduction des gaz formés pendant la production, le transport et l'installation de matériaux de construction, la réduction des émissions de gaz à effet de serre pendant l'exploitation du bâtiment[1].

Objet d'études. L'architecture est directement responsable de l'écosystème, puisque chacun de ses acteurs affecte l'environnement [2]. Son impact négatif peut être réduit grâce à la construction de bâtiments plus petits à partir de matériaux recyclables et à l'utilisation de technologies très efficaces, ce qui constitue le concept d'architecture verte.

L'architecture verte est constituée de bâtiments capables de réduire leur impact sur l'environnement et la santé humaine. Un bâtiment écologique est conçu de manière à consommer le moins d'énergie possible et à réduire l'impact des matériaux. Ceci est réalisé par le placement de la structure, sa construction, son exploitation et son entretien.

Le concept de «maison passive» est l'une des solutions permettant d'économiser près de 10 fois l'énergie pour le chauffage, l'eau chaude et l'électricité des appareils électriques par rapport aux normes habituelles des bâtiments neufs. L'idée est la performance de l'enveloppe thermique pour récupérer l'essentiel de la chaleur de l'air sortant pour réchauffer l'air entrant: cela signifie une isolation de haute qualité des murs, des toitures, des sols et des fenêtres et portes, une construction sans ponts thermiques et une étanchéité à l'air [3].

Les maisons sans carbone impliquent d'être placées à proximité de sources d'énergie alternatives: éoliennes ou panneaux photovoltaïques. La quantité d'énergie consommée ne doit pas dépasser la quantité produite et ainsi la maison a la possibilité de

se déconnecter du réseau et de travailler de manière autonome, en se fournissant des ressources.[4].

L'une des méthodes d'architecture verte dans le design est la «façade au carré E» développée par Schüco [4]. Le concept consiste à intégrer des panneaux photovoltaïques en silicium amorphe dans les façades des bâtiments pour assurer à la fois la production d'énergie et le vitrage.

Conclusion. Bien entendu, l'esthétique joue également un rôle important dans l'architecture verte. Les bâtiments écologiques existent en tandem avec l'environnement «vert» environnant, non pas en tant qu'éléments séparés, mais en tant que partie de la nature, sa continuation. Une connexion harmonieuse avec l'environnement n'est pas seulement une solution fonctionnelle et écologique, mais aussi visuellement attrayante afin de créer un contexte esthétique favorable, où nature et architecture se complètent, formant un espace ordonné. Nous pouvons observer une telle combinaison dans le projet "STUDIO HOUSE" de Peter Zumthor (Fig. 1).

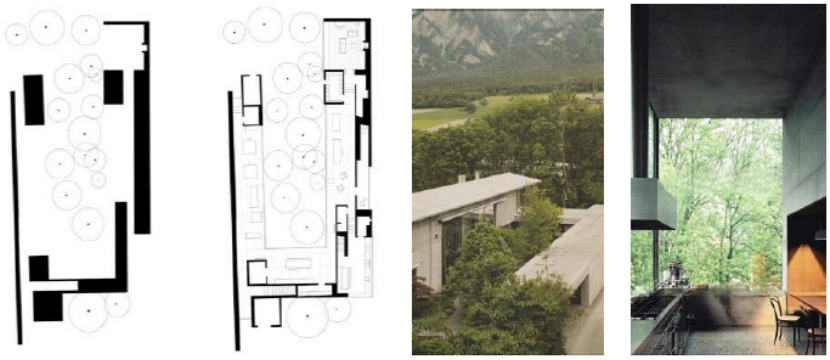


Fig. 1. "STUDIO HOUSE"

RÉFÉRENCES

1. Williamson T. Understanding sustainable architecture. pp. 111-125.
2. Attmann O. Green Architecture. Advanced technologies and materials pp. 24-27.
3. Sayigh A. Sustainability, Energy and Architecture. Case Studies in Realizing Green Buildings [Електронний ресурс]. – Режим доступу: https://www.perlego.com/book/1828171/sustainability-energy-andarchitecture-case-studies-in-realizing-green-buildings.
4. Yudelson J. Green Building trends. Europe [Електронний ресурс]. – Режим доступу: https://www.perlego.com/book/2985053/green-buildingtrends-europe.

A CONCEPTUAL PICTURE OF THE WORLD AS A GROUND FOR UNDERSTANDING A WORK OF FICTION

D. Kyzym
A. Bezrukov
Ukrainian State University of Science and Technologies, Ukraine

The modern literary criticism paradigm recognises that a conceptual worldview is a key factor in understanding works of fiction. This picture includes ideas about the basic aspects of existence, such as time, space, existence, morality, and others, which are reflected in the inner world of the characters and events of the work.

Scientists and literary critics are actively studying the influence of the conceptual worldview on the perception of works of fiction. This influence can be particularly evident in works where the author resorts to creating an alternative reality or recreating historical periods.

It is important to bear in mind that the conceptual worldview is individual for each person and can be shaped by various factors, such as cultural and social influences, personal experience and upbringing.

The study of this topic can help us to better understand the work of writers, their motivations and how they embody concepts in their literary works.

The conceptual picture of the author's world can be found in the following areas:

- In works of fantasy: The author creates his or her own universe with his or her own rules, and reproduces in it a concept of the world that may differ from the real one. For example, in the *Harry Potter* series of books, J. K. Rowling presents a magical world where there are magical creatures, spells, and a school of magic that differs from our real world.
- In science fiction: An author can use scientific concepts and ideas to create an alternative future or a world where technology has developed differently. For example, the book *1984* by George Orwell describes a totalitarian society ruled by dictators, which has created a completely different concept of the world.
- In contemporary prose: Authors can use their own feelings and experiences to create realistic images and scenarios. For example, the novel *The Diary of Anne Frank* shows the concept of the world during World War II through the eyes of a young girl hiding from the Nazi regime.
- In classical literature: One famous example is Jane Austen's *Pride and Prejudice*. In this work, the concept of the world is reflected through the prism of social classes, moral values and the role of women in society. The author reveals the conflict between passions and reason, reflecting the heroine's personal experiences and social expectations of her. Through this understanding of the concept of the world in the work, the reader can better perceive the behaviour and motivations of the characters, their actions and relationships, which helps to understand the essence and depth of the work.

These theses are aimed at studying the relationship between the conceptual worldview and the understanding of works of fiction, which is a relevant and interesting area in literary studies.

The conceptual worldview is the basis for understanding works of fiction, as it reflects the author's perception of the main aspects of life. This picture includes not only the elements of time, space and existence but also moral and other aspects that form the inner world of the characters and events of the work. The study of conceptual worldviews helps to reveal the motivations of writers and the ways in which they embody their ideas in literary works.

Such analysis is critical in cases where the author creates an alternative reality or recreates historical periods, as it allows us to understand the peculiarities of his or her creative approach and perceive the work in the context of his or her time. In addition, the conceptual picture of the world is individual for each person and is shaped by various factors, such as cultural and social influences, personal experience and upbringing.

It is also important to keep in mind that understanding the author's concept of the world helps to understand his or her work better and feel the depth of his or her ideas. For example, in fantasy or science fiction, the concept of the world can be very different from reality, which creates a unique atmosphere and expands the idea of the possibility of different realities.

Thus, the study of the conceptual worldview in literature is an important step in understanding and evaluating works of fiction, allowing us to better understand the motivations of writers and their approach to translating ideas into literary form.

ANALYSIS OF TERRITORIES FOR LAND MANAGEMENT OF AMALGAMATED TERRITORIAL COMMUNITIES USING GIS

M. Lapshyk
V. Gryanyk
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Problem statement. In the context of land reform and decentralization reform, local communities lack the access to the full range of information on land resources, including the lack of tools for analytical processing of information. It has been exacerbated by the martial law which restricted the access to the registers of the State Land Cadastre. Such situation limits local governments to manage land resources effectively, promote development strategies and meet the current needs of communities.

The purpose of the study. The study is aimed at analyzing the need and possibilities of creating and using municipal geographic information systems (GIS) for effective land management at the level of local communities. It involves identifying the main requirements for the functionality of municipal GIS, their potential impact on improving land management, and developing recommendations for integrating these systems into existing management processes at the local level.

Results of the study. As noted in [1], a geographic information system makes it possible to comprehensively overlay any information on the same territory and not only

solve various tasks related to the land reform, soil protection and rational use, monitoring of land and its natural resources, but also provide various information to other sectors of the national economy, local governments, regulatory and executive state structures.

The Cabinet of Ministers of Ukraine [3] has defined the goals of land reform in Ukraine, including transparent and effective land management. This goal can be achieved by:

- filling the State Land Cadastre with comprehensive and reliable information on the formed land plots;
- completing the land inventory;
- creating a simple and efficient procedure for providing information on the normative valuation of land plots using the tools of the State Land Cadastre system.

Taking into account the defined goals and ways of their achievement, it can be concluded that one of the components to implement the plans is the creation of an information system that will ensure the accumulation, storage, publication, systematization, and analysis of information on land resources.

The purpose of the decentralization reform is to form effective local self-government and territorial organization of power to create and maintain a full-fledged living environment for citizens, provide high-quality and accessible public services, establish institutions of direct democracy, and coordinate the interests of the state and territorial communities [2].

One of the achieved goals of the decentralization reform is to expand the resource base of amalgamated territorial communities. In particular, Law No. 1423-IX of 28.04.2021 amended Article 83 of the Land Code of Ukraine and determined that territorial communities own land and land plots outside settlements that have been transferred from state-owned land to communal ownership in accordance with the law.

The study analyzed the current state of land management at the local level in Ukraine and assessed the current needs of communities for information on land resources. The study identified key gaps in access to data and analytical tools, including the lack of opportunities for effective analysis, systematization and visualization of information on land plots within communities. The study identified the key requirements for the database structure and functionalities of municipal geographic information systems (GIS) necessary for effective land management at the local level. The main focus was on defining data processing requirements, including report generation and thematic mapping capabilities. Tools to support decision-making based on data analysis, such as spatial analysis tools, were also considered. The analysis showed that municipal GIS could integrate with existing state registries and information systems to ensure data relevance and efficiency of their use. It has been established that the introduction of municipal GIS can significantly improve the efficiency of land management providing access to information, increasing its transparency and simplifying the analysis and planning processes.

Conclusions. Taking into account the analysis, it can be concluded that the development and implementation of municipal GIS will be a significant step forward in ensuring effective and transparent land management at the local level in Ukraine.

Municipal GIS will provide local governments with a tool for comprehensive analysis of land resources, allow them to respond quickly to changes and needs of communities, and facilitate rational land use planning. For the successful implementation of these systems, it is necessary to ensure their integration with existing databases and information systems, as well as to organize staff training to work with the new tools. It is recommended to develop a detailed plan for the implementation of municipal GIS, including the stages of development, testing, user training and further support of the system. It is also important to create a legal framework to regulate the collection, storage and processing of data in municipal GIS to ensure their protection and confidentiality.

REFERENCES

1. Oleksandr Kovaliv, Implementation of the Land Reform in Ukraine: A New Paradigm: Monograph / O.I. Kovaliv - Kyiv: DIA, 2016. 416 p.
4. Government portal, Decentralisation reform, access mode: https://www.kmu.gov.ua/reformi/efektivne-vryaduvannya/reforma-decentralizaciyi;
5. Government portal, Land reform, accessed at: https://www.kmu.gov.ua/reformi/ekonomichne-zrostannya/zemelna-reforma;
6. "Land Code of Ukraine". Official website of the Verkhovna Rada of Ukraine: https: //zakon.rada.gov.ua.

PROSPECTS FOR THE USE OF INDUCTOR-VALVE MOTORS IN ROLLING STOCK

M. Mikhalchuk
V. Vasyliev
Ukrainian State University of Science and Technologies, Ukraine

Attention to inductor-valve motor (IVM) has now gone beyond theoretical debates about its place among the means of traction drive for electric rolling stock. Almost all leading electrical companies are developing and implementing them in new applications: Oulton (UK), Emerson Electric, TRW, DANA, General Electric Company (USA), scientists from leading universities in the USA, UK, Germany and Ukrainian specialists are working on the design technology and management of these drives.

The main actuator in this type of electric drive system is a jet-valve motor. It differs from traditional designs of electric machines by the sharply defined toothiness of the stator and rotor and the concentration of the winding only on the stator teeth, which in this case turn into phase poles arranged in a certain sequence.

The attractiveness of this type of engine for use as a traction engine is due to the following:

- the ability to control power and torque over a wide range of rotational speeds in accordance with the required traction characteristics. Regulation is performed by means of microprocessor control of the voltage inverter by changing the parameters of the phase

voltage pulses according to the required law: switching on angles, switching on duration, etc., which ensures smooth regulation;

- the ability to provide high energy performance of the drive, mainly due to the high motor efficiency factor (EF). Calculations show that at the same power values, supply voltage frequency, and at the same copper and steel consumption, as well as at the same grade of electrical steel, the main losses in the copper and steel of the EF can be less than in the induction motor (IM). This fact can be explained, firstly, by the design features of the IVM. Concentration of all conductive copper in the stator allows to significantly reduce the current density compared to the average current density in the windings of an induction motor, which reduces the main electrical losses. Secondly, this is due to the peculiarities of supplying the phases of the IVM with unipolar current pulses, which, together with the sharply pronounced toothed structure of the magnetic circuit, causes a completely different character of magnetization of its elements from other types of machines. The stator teeth are subjected to unipolar magnetization (from zero flux to maximum positive for poles of one polarity and to maximum negative for poles of the other polarity) with the frequency of the supply voltage.

We note important features of the IVM:

- flatness of the efficiency characteristic in a wide range of power changes while maintaining almost equally high efficiency values from starting modes to speeds significantly higher than the nominal ones, which is especially important for electric motive units with frequent starts (suburban electric trains, trams, trolleybuses, etc.)

- the possibility of a significant increase in the operational reliability of the electric drive;

- high reliability of the IVM: absence of rotating windings, extremely simple design of the stator winding with concentrated coils.

- The exceptional simplicity of the IVM design results in lower manufacturing and repair costs. For example, even if the consumption of copper and electrical steel is equal compared to that of an IV, the consumption of electrical insulation materials for an IVM is reduced by 30-40%. There is also no doubt about the 30% reduction in labor intensity due to the presence of only one winding with a small number of coils of the simplest shape, as well as operating costs for maintenance and repairs.

The above advantages of IVM make it indisputable that it is expedient to implement it as a traction engine across the entire range of possible applications from trams to electric locomotives, both auxiliary and traction engines.

There is no doubt that IVM, as the youngest direction in electric traction, requires further development in both theoretical and practical terms. The most relevant at present are the study of rational control laws for IVM in relation to different rolling stock and the study of IVM torque pulsations, especially the consideration of methods for regulating electromagnetic torque.

The method of electromagnetic torque control has a significant impact on the energy performance of a IVM. Taking into account the variety of control methods, it is of practical interest to find algorithms that provide high efficiency values with deep torque control of the EF.

A characteristic feature of the IVM is that the electromagnetic torque depends (to a first approximation) on the square of the magnetic flux in the air gap. Therefore, a decrease in torque and electromagnetic power is usually accompanied by a decrease in flux, phase current, and, accordingly, losses in the magnetic circuit and winding. Moreover, these losses also depend (to a first approximation) on the square of the flux and current. With rational control, along with a reduction in electromagnetic power, losses in steel and copper are reduced.

In this regard, it can be said that in the conventional sense of the word, control algorithms are possible for IVM that do not have no-load losses.

In the first case, along with phase control, it is possible to control the simultaneous change of supply current and voltage. In the second case, the control is amplitude-based. In addition, it is also possible to regulate both by changing (limiting) only the current amplitude and voltage while changing all the control parameters (the duration of the pause between the positive and negative voltage pulses on the winding, which occurs when one of the keys is closed). At the same time, the optimal laws of IVM control at startup differ from those when operating in a single-pulse mode, which is the main mode for most electric drives.

Amplitude torque control involves influencing its value by changing the amplitude value of both the phase current and the winding voltage, depending on the structure of the frequency converter and the operating mode.

In the current-limiting mode, only the amplitude control mode is practically feasible by changing the current-limiting setpoint. On the contrary, in the single-pulse mode, depending on the task, it is possible to regulate both by changing the current-limiting setpoint and by changing the input voltage at the inverter. For the latter option, we will consider the case in which the shape of the voltage curve on the winding does not change, only the voltage amplitude is subject to controlled correction.

Phase torque control is carried out by shifting the initial and final edges of current or voltage pulses relative to the tooth-groove position. In this case, it is possible to change both the amplitude of the magnetic flux of the phase pole and the angular position of the flux maximum. As a result, the torque changes either due to a change in the intensity of the magnetic field in the gap or due to a change in its efficiency.

Phase control manifests itself in different ways in the current-limiting mode and in the single-pulse mode, and in the latter case it is multivariate.

The criteria for selecting the control law may include losses in the winding or in the steel, the amplitude value of the current in the winding, motor efficiency, torque ripple on the shaft, etc. In this case, it is necessary to consider the control laws that ensure minimum losses and, accordingly, maximum efficiency. The variety of control options, together with the specifics of the idling of the IVM, makes it important to study the search for control laws that ensure maximum efficiency.

As a result of the analysis and preliminary calculations, the following conclusions can be drawn:

1 The design of IVM is rational not only as auxiliary engines for rolling stock auxiliary needs, but also as traction engines for trams, subways, electric trains and electric

locomotives. The simplicity of the stator design and the absence of windings on the rotor ensure its high reliability.

2 For unidirectional rotor rotation, the winding must be energized when the rotor and stator are in the «tooth-groove» position, and the winding must be de-energized in the «tooth-tooth» position. The sequential supply of current pulses to the respective phase windings ensures the generation of continuous torque.

3 The voltage inverter delivers unipolar pulses in a timely manner based on the rotor position sensor signals.

4 The converter for rolling stock can be made on the basis of modern electronics. It contains an input four-quadrant (4q-s) converter and an output converter - an autonomous voltage inverter.

5 The disadvantages of controlled IVMs include: increased frequency of winding power supply; the need to use a rotor position sensor; increased values of switched current in the inverter (approximately 15-30% more than in the case of IM).

TECHNOLOGIES OF BUILDING MATERIALS AND STRUCTURES. ADDITIVES FOR CONCRETE AND MORTARS

O. Mitkova
S. Bondarenko, S. Vasylenko, K. Shabanova
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Superplasticizers have taken a special place in the modification of concrete and mortar mixtures. Being thinners and highly effective plasticizers of concrete and mortar mixtures, they allow, other things being equal, to significantly increase the mobility of mixtures without causing a decrease in the compressive strength of concrete or mortar.

The superplasticizing effect also affects the change in the water of the solvate shells of particles of cement neoplasms. During the adsorption of surfactants on the surface of the solid phase, the amount of water in the solvate shells decreases, and the amount of free water increases. This leads to an improvement in the rheological characteristics of the mixture, but slightly slows down the processes of structure formation and cement hardening.

SP is introduced into concrete mixtures in the form of aqueous solutions of working or increased concentration based on the calculation of the content of the additive in the range of 0.7-1.5% of the mass of cement. At the same time, the SP dose for high-alumina cements is higher. The intensity of the decrease in the mobility of the concrete mixture over time also depends on the content of SA in the cement. On average, the effect of SP is limited to 2-3 hours from the moment of mixing.

SPs are mainly synthetic polymeric substances; therefore, they are relatively expensive, and their use in concrete and mortar mixtures should be technically and economically justified. But, despite increased cost, concretes modified with such surfactants are effective, including due to saving cement. In addition, the use of SP makes it possible to use cast concrete mixtures, which leads to a decrease in labor costs and improvement of working conditions in production.

According to their chemical nature, superplasticizers are divided into four groups:

- I - sulfonated melamine formaldehyde resins,
- II - condensation products of naphthalene sulfonic acid and formaldehyde,
- III - modified (desugared) lignosulfonates,
- IV - additives based on polycarboxylates (polyacrylates). Superplasticizers are anionic organic substances with many polar groups in the chain.

The effectiveness of SP depends on the structure, presence and type of functionally active groups, their location in the molecules, the length and shape of the chains, and the molecular weight.

The general chemical structure of the main types of SP is shown in Figure 1:

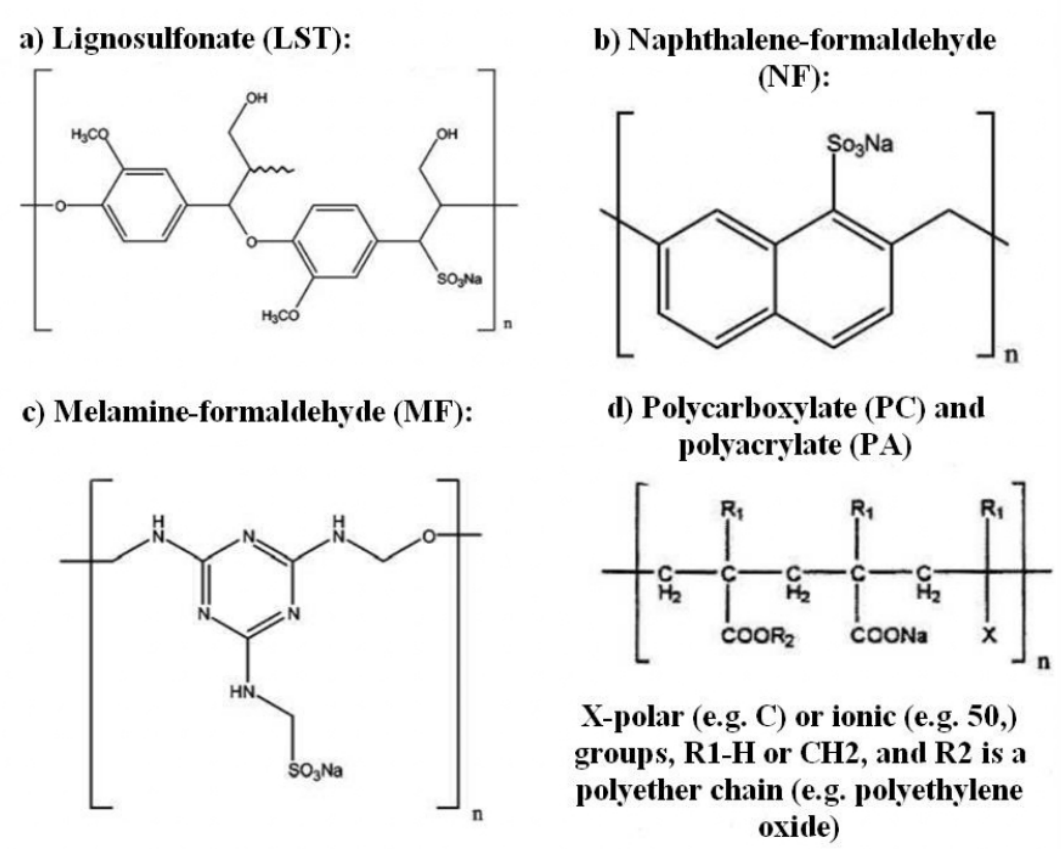


Fig.1: Chemical structure of the main types of superplasticizers

The effectiveness of plasticization is determined by the adsorption of polymers on the surface of cement particles immediately after mixing and on neoplasms in the first hours of hydration.

Adsorption of polymers, in turn, depends on the surface properties of cement particles and neoplasms.

According to, the efficiency of adsorption of superplasticizers on clinker minerals varies according to the scheme CA > CA > C_3S > C_2S. At the same time, research shows that superplasticizers of the naphthalene-formaldehyde and melamine-formaldehyde types are more sensitive to the content of particles whose surface is characterized by a positive "zeta" potential (SzA, ettringite, monosulfate, syngenite, etc.), accordingly, an increase in the content of CA in the system leads to the need to increase the

concentration of these SPs to ensure the necessary plasticity, and an increase in the content of * stringite, monosulfate and syngenite leads to a decrease in the plasticity of the system over time. SPs of the polycarboxylate (P) type are less sensitive to the content of particles with a positive "zeta" potential, while the adsorption capacity of SPs of the P type depends on the molecular structure of the polymer and increases with an increase in free carboxy groups and, accordingly, a decrease in the number of side chains (Fig. 3). It should be noted that the adsorption of SP of all types decreases with a decrease in the "zeta" potential of the surface of the particles, so that on particles of portlandite and gypsum with a negative zeta potential do not actually adsorb these polymers. In practice, this is accompanied by the absence of a plasticizing effect.

In the mechanisms of action of SP types of NF, MF, LST, the effect of electrostatic repulsion of cement particles and stabilization prevails, caused by the fact that adsorption layers of SP molecules increase the value of the zeta potential on the surface of cement particles. The value of zeta potential depends on the adsorption capacity of SP (the higher the value of adsorption, the greater the value of zeta potential, which has a negative sign).

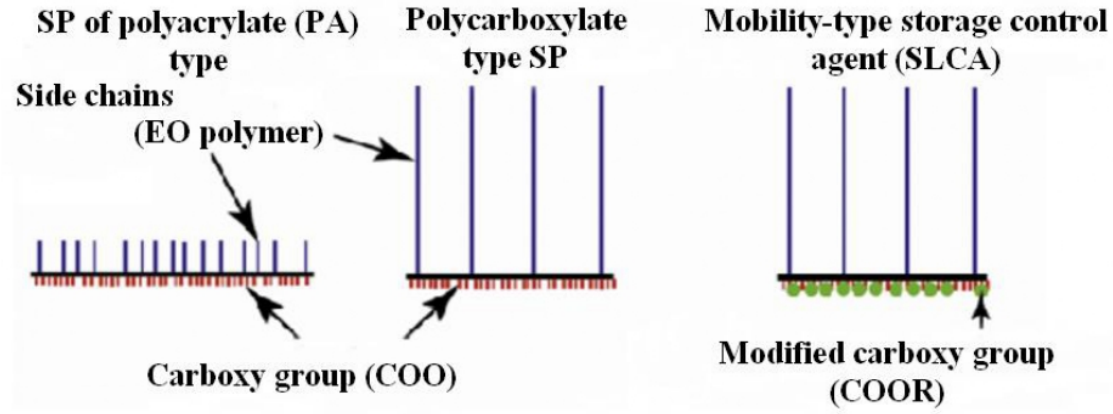


Fig.3: Schematic molecular structure of polycarboxylate (P), polyacrylate (PA) and self-linking control agent (SLCA) based SPs

Strong plasticizing additives are substances of the hydrophilic type, which include such widely used organic products as modified lignosulfonates, some ethers and other substances, each molecule of which contains a significant number of functional groups of different polarity interspersed with non-polar radicals. When adsorbed on cement particles, not all polar groups of such surfactants face the solid phase, some of the least polar of them face outward. This adsorption coating primarily affects the initial phase of the cement grain. Although the film itself can be mono- or bimolecular (depending on the dosage of the plasticizer), but due to long-range of vander Waals forces, it keeps a rather thick layer of water near it. As a result, hydrodynamic lubrication is created between solid particles, which ensures a decrease in the coefficient of internal friction.

At the same time, due to physical adsorption in the microcracks of the clinker part of the cement, the microrelief of the grains is smoothed, which also contributes to the plasticization of the concrete mixture.

A rather important feature of hydrophilic surfactants is their dispersing effect. Dispersion consists in the separation of aggregates into primary particles under the

influence of the shear action of the active surface of cement particles in the process of hydration and hydrolysis, which in turn accelerates the interaction of cement with water and reduces the number of unreacted clinker particles. The modifying effect of surfactants leads to the slowing down of the growth of neoplasm crystal nuclei as a result of the formation of adsorption layers on their surface. Slowing down the growth of individual germs causes an increase in the total number, that is, the dispersion of crystalline products of hydrolysis and hydration of cement increases significantly, which can affect the density of the newly formed structure, the deformability of cement stone and the limit deformability of concrete.

During the adsorption of surfactants on the centers of crystallization of aluminum-containing phases, their stabilization occurs, which consists in reducing the growth rate and accumulation of many small particles of neoplasms (often X-ray amorphous or poorly crystallized). Thus, the dispersity of the resulting solidification structures increases with the introduction of increased surfactant concentrations. This applies both to the dimensions of the solid phase and the average effective diameter of pores and capillaries. Thus, surfactant additives, introduced in small amounts of 0.2-0.25%, slow down the processes of hydration and hardening of cement primarily due to the shielding of its grains by adsorption layers. It is necessary to consider that with higher dosages of additives there is an increase the viscosity of the medium, as well as the adsorption of surfactants on hydrated neoplasms, which leads to a significant slowing down of concrete hardening processes. With an overdose of hydrophilizing surfactants, air bubbles may be drawn into the concrete mixture, but they are isolated and easily removed from the mixture during mixing. As research has shown, the effect of highly plasticizing additives is selective about individual minerals of cement clinker. When introducing additives, it is worth considering their compatibility with cements, mineral dispersion components, as well as the compatibility of additives when they are integrated.

ECOCRITICISM AS A MODEL OF INTERPRETATION AND A FIELD OF LITERARY STUDIES

A. Mokrianska
A. Bezrukov
Ukrainian State University of Science and Technologies, Ukraine

Ecocriticism is an interdisciplinary approach in literary and cultural studies that explores the relationship between literature and the environment. It developed in the late 20th century to respond to environmental concerns and the need to consider environmental issues within the humanities. Both as a model of interpretation and a branch of literary criticism, several key features and perspectives can be distinguished in ecocriticism. Ecocriticism places a central focus on the natural world, including ecosystems, landscapes, animals, and the impact of human activities on the environment. It examines how literature reflects, influences, and responds to environmental issues such as pollution, climate change, deforestation, and species extinction.

Within ecocriticism, ecosystems are considered as complex networks of interdependent organisms and environments. It examines how literature represents different ecosystems, from forests and oceans to deserts and urban landscapes, and explores the ecological dynamics within these systems. Through the analysis of literary depictions of ecosystems, ecocriticism gains insight into the diversity, resilience, and fragility of the natural environment.

An environmental criticism focuses on the representation of landscapes in literature, considering them as physical spaces and cultural constructs. It explores how landscapes shape human identities, experiences, and narratives, and how literature reflects changes in landscapes over time caused by human activities, such as urbanisation, industrialisation, and agricultural practices. With the analysis of literary landscapes, ecocriticism reveals the social, historical, and ecological significance of different geographical environments.

It also examines the representation of animals in literature, recognising them as living beings with their own experiences, perspectives and freedom of action. It explores how literature represents the relationship between humans and animals, especially the themes of friendship, exploitation, domination and empathy.

It covers the impact of human activity on the environment, such as pollution, climate change, deforestation, habitat destruction and species extinction. It examines how literature reflects these environmental challenges, critiques human-centred ideologies and practices, and imagines alternative ways of living in harmony with nature.

The methodology draws on the ideas and methods of various disciplines, such as literature, ecology, environmental science, philosophy, sociology, anthropology and cultural studies. This interdisciplinary approach allows for a comprehensive analysis of the complex relationships between humans, nature and culture.

One of the main sources of analysis in ecocriticism is literature. It examines how authors represent nature, environmental themes, and the relationship between humans and nature in their works. The literary analysis in ecocriticism involves close reading of texts to identify environmental motifs, symbols, and narratives, as well as how literature reflects cultural attitudes towards the environment.

Ecology is based on the principles and concepts of ecology, the scientific study of ecosystems and the interaction between organisms and their environment. Through the integration of ecological knowledge, ecocriticism analyses literary representations of ecological processes, such as succession, adaptation, and ecological interdependence. Such ecological concepts help ecocriticism to understand the complexity and dynamics of the natural systems depicted in literature.

Ecocriticism draws on the findings of ecological science, especially climatology, hydrology, conservation biology and environmental chemistry. Based on scientific research, ecocriticism contextualise environmental issues described in the literature, such as climate change, pollution and habitat loss. Through the integration of scientific knowledge, ecocriticism provides informed interpretations of literary texts and promote interdisciplinary dialogue on environmental issues.

Ecocriticism is based on philosophical views of nature, human beings and the environment. Philosophical concepts such as deep ecology, ecofeminism, environmental ethics and posthumanism are at the heart of ecocritical analysis and debate.

Literature is placed in a broader cultural context, drawing on cultural studies perspectives to analyse the production, dissemination, and reception of environmental narratives. Eco-critics study how cultural discourses about nature, wildlife, and ecology are reflected and shaped in literature. They also study how literary representations of nature intersect with issues of identity, race, class, gender, and colonialism, highlighting the diversity of environmental perspectives and experiences.

It opposes anthropocentric perspectives that prioritise human interests and ignore the intrinsic value of non-human beings. It seeks to give dignity to human narratives and to consider the agency and subjectivity of other beings, including animals, plants, landscapes and ecosystems.

In ecocriticism, the literary texts are analysed through an ecological perspective, exploring how authors represent nature, ecological themes and ecological relations in their works. It focuses on how literature shapes and is shaped by cultural attitudes towards the environment.

Within the framework of ecocriticism, ethical issues related to humanity's relationship with the natural world are considered, and environmental protection, sustainable development and social responsibility are promoted. It encourages readers to reflect on their ethical responsibilities towards the environment and future generations.

It examines literary texts in their cultural, historical and political contexts, and how environmental issues intersect with issues of race, class, gender, colonialism, globalisation and capitalism. It also explores how literature reflects and responds to social and environmental crises and movements for environmental justice.

Through environmental criticism, literary texts are analysed in their cultural and historical context to understand how attitudes and perceptions of the environment have changed over time. As they study literature within specific historical periods, ecocriticism reveals how environmental issues intersect with broader cultural movements and historical events.

The political dimensions of environmental issues are explored in ecocriticism, by considering the ways in which power dynamics, governance structures, and policies shape the relationship between humans and the environment. It identifies how literary texts critique or reinforce existing political systems and promote alternative visions of environmental governance and justice.

Within ecocriticism, the environmental consequences of globalisation and capitalism are explored, taking in processes such as industrialisation, urbanisation, consumerism and economic growth. It examines how literature reflects the ecological consequences of the capitalist systems, critiques the commodification of nature and the prioritisation of profit over environmental sustainability, and explores alternative narratives and models of economic development that prioritise environmental protection and social equity.

There is often an intersection between ecocriticism and environmental activism and advocacy, as scholars and writers seek to raise awareness of environmental issues, inspire environmental consciousness, and promote positive change through literature and culture.

Overall, ecocriticism offers a rich and dynamic framework for interpreting literature and understanding humanity's relationship with the natural world. It fosters interdisciplinary dialogue, critical inquiry, and a deeper appreciation for the interconnectedness of all life on Earth.

SPECIFICS OF SETTING UP A LASER MACHINE FOR PROCESSING WOOD MATERIALS

M. Nehrub, I. Vyshnevskyi
S. Nehrub
Ukrainian State University of Science and Technologies, Ukraine

Introduction. For several years now, the staff of the Department of Mechanical Engineering Technology has been participating in the international project "Strengthening the role of Higher Education Institutions in Industrial Transformation in the context of the Industry 4.0 paradigm in Georgia and Ukraine". Within the framework of this project, a training laboratory "Virtual Machine-Building Enterprise" was created, for which certain equipment was purchased, including a machine for laser cutting of wood materials.

Objective. Mastering the equipment and using it in the educational process, as well as in various retraining programs. The goal required attention to the process of laser cutting.

Methods. Laser machines are used for cutting or engraving wood, metal, plastic, glass, leather, and paper products. Unlike cutting, the laser does not leave behind large chips - only smoke, which is quickly removed by the ventilation system to the outside, making it easier to work with the equipment. Due to the peculiarities of working with CNC, namely the possibility of locating the contours of future parts most economically, the cost of the product is reduced and, ultimately, the attractiveness of the finished product among consumers is increased.

When working with a laser machine, there are specific features that need to be worked out to obtain a high-quality and consistent result: focal length of the lens, laser power, speed of movement, and workpiece fixation [1]. You need to know the focal length for fine cutting without large material burns. From physics lessons, we know that lenses focus rays at a single point called the focal point. In fact, there is a focal spot - an area of maximum ray concentration, and therefore energy. This results in neat edges of the part, no burns or ignition, and no uneven or excessively wide material removal (due to defocus, the contact spot is larger, which means more material is burned, leading to dimensional errors). So, for our machine, we had to find out the focal length.

Focusing the laser machine. Option 1. A focal ruler is supplied with the machine, and the focal length is set according to the supplier's recommendations. Option 2.

Selection of the focal length without a focal ruler and knowledge of the focal length of the lens (Fig. 1).

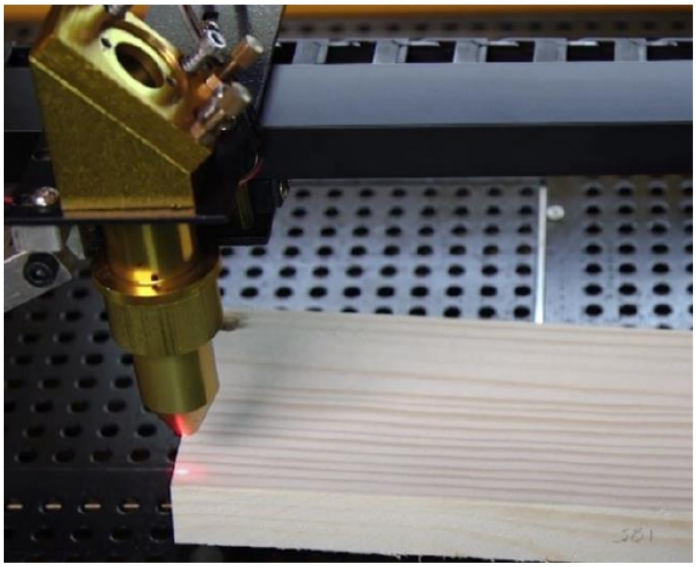
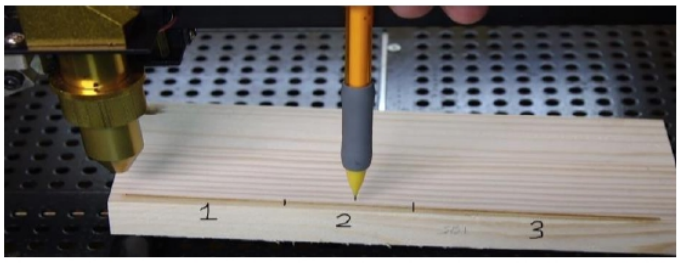


Figure 1 - Setting up the workpiece for the focal length experiment [1]

Since we could not find a ruler, we had to use the second method of determining the focal length. For that purpose, 1) a rigid material, for example, a plank, is taken and placed at a small angle (for example, 10 degrees) relative to the machine table. Next, a long straight line is started and cut/engraved and the result is examined (preferably without moving from the position). If the focal length is observed on the line, the area with the narrowest possible cut and the area with the widest possible cut in front and behind the area is visible (Fig.2). To obtain the absolute focal length, add the relative focal length (Fig. 3) and the material thickness.



1) out of focus area; 2) in focus area; 3) out of focus area
Figure 2- Engraved line and its sections [1].

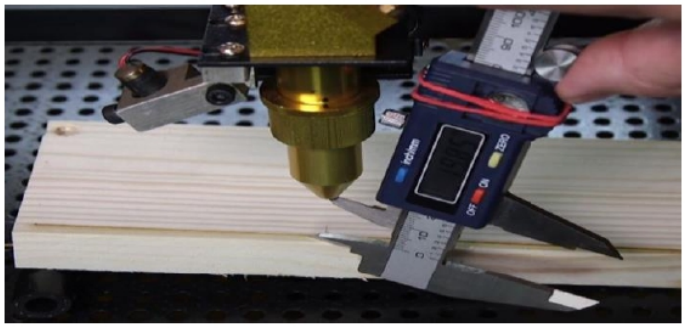


Figure 3 - Measuring the relative focal length with a caliper [1]

2) If the defocus of the machine is not too strong, it makes sense to cut a focal ruler from a free file on the Internet in this mode instead of measuring with a caliper or ruler (Fig. 4).

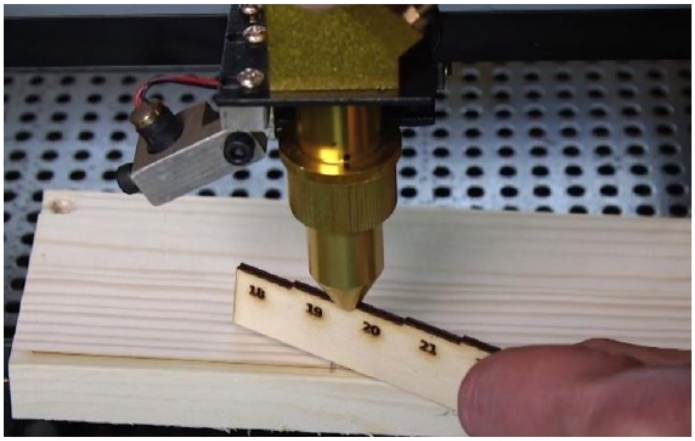
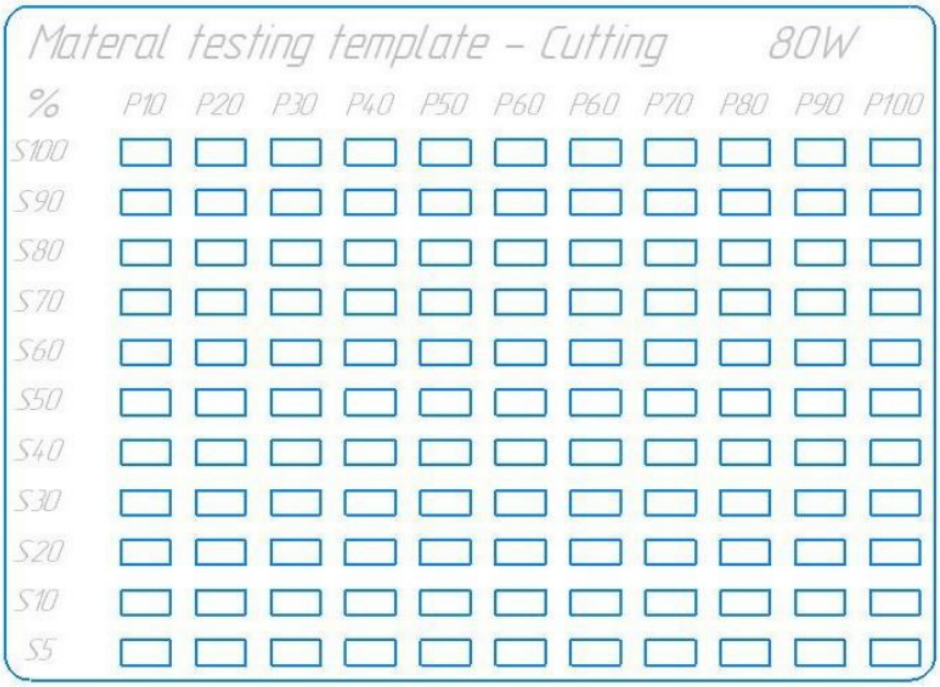


Figure 4 - Measuring the relative focal length with a focal ruler [1]

It is necessary to bring the nozzle of the machine under the approximate middle of the focal part of the cut line and slide the focal ruler until its section with the nozzle touches. The number of this section is the relative focus, which should be set as the distance between the nozzle and the surface of the workpiece.

Selecting laser power and cutting/engraving speed.

Like any machine tool, a CNC laser machine has its operating modes, but their selection is much less common in literature. There are tables for selecting modes that are cut out by the machine user for a certain material thickness and laser power (and if the maximum power of the machine is constant, the material thickness varies, and therefore, when working with new material, it is advisable to first cut and engrave the plates for the best operating modes) (Fig. 5).



a)

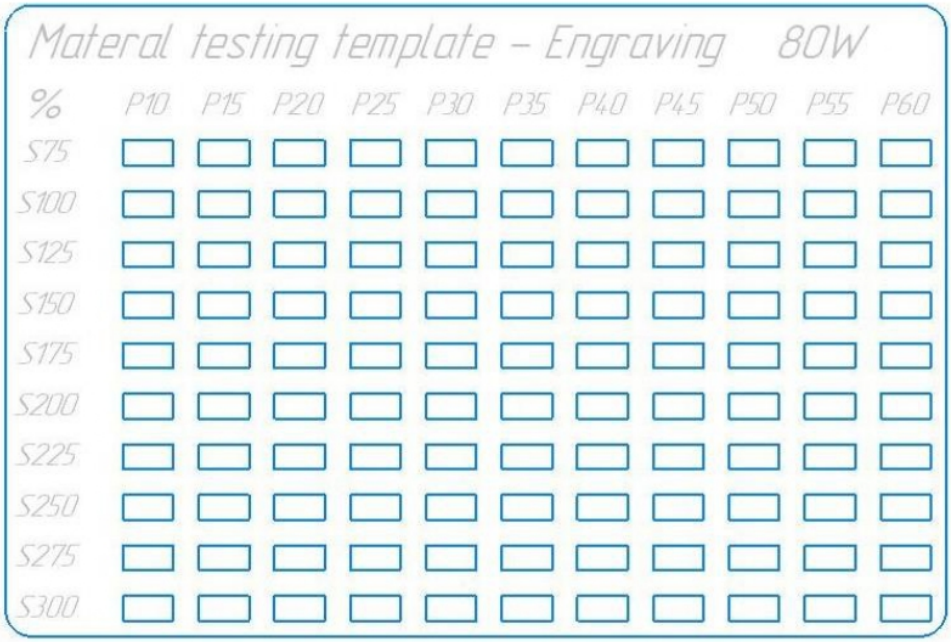


Figure 5 - A simple test for cutting and engraving material

Clamping the workpiece.

Although most of the materials with which the machine works are not heavy and do not experience huge forces that are necessary for processing via cutting/pressure, etc., these materials are not rigid, and therefore, with sufficiently large workpiece sizes, there will be bending of the material. Most often, the table of a laser machine is perforated - made of sheet material that forms honeycomb-shaped holes. To mount a workpiece on a non-metallic table, you need to use clamps (Fig. 6) made of strong and rigid material - wood, plexiglass, etc. For fixing the workpiece on a metal table, you can either continue to use clamps or use magnets, which will make it easy to move the fixture if necessary, within the workpiece and speed up the installation of subsequent workpieces.

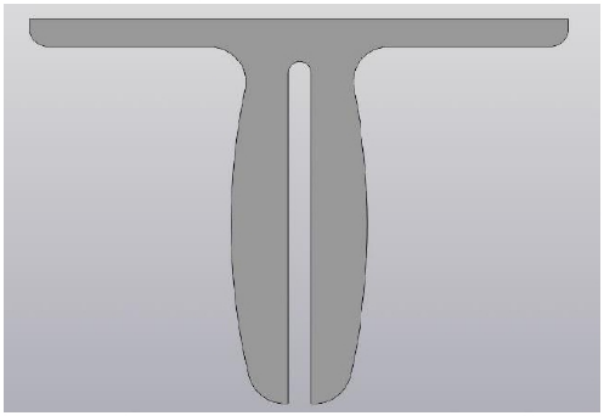


Figure 6 - Example of a honeycomb table cap [2]

Making designs for use on the machine is quite simple. If you need to create a blueprint for cutting a material, then any CAD program (COMPAS, AutoCAD, SOLIDWORKS, etc.) will do, then the drawing (preferably a fragment, since the frame can also be counted as the cutting lines by the program associated with the machine) must be saved in whatever format your machine control program prefers (most often

.dxf). To convert the image to a format suitable for the machine, you need to convert it from a full-color photo to a two-bit image (the image is formed by two colors - black and white, which occupy one bit each). This can be done in programs like PhotoSHOP, CorelDraw, etc., or you can use the professional PhotoGRAV program, which quickly processes a photo for engraving and generates a preview of the final result. After uploading the photo and setting the image dimensions, we switch to the interactive mode. In this mode, by changing the black, white, and gamma sliders, we can observe a simulation of the final result after engraving (Figs. 7-8).

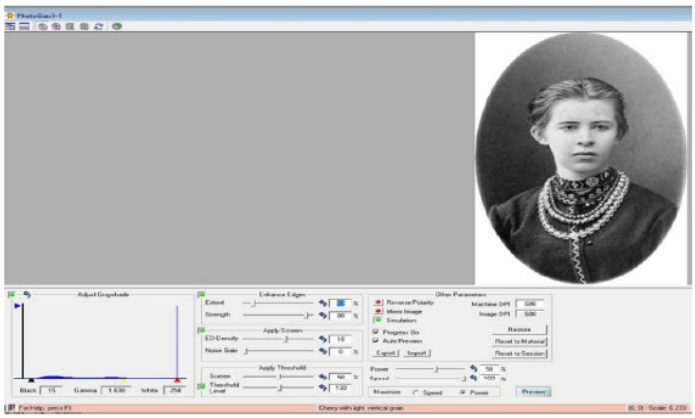
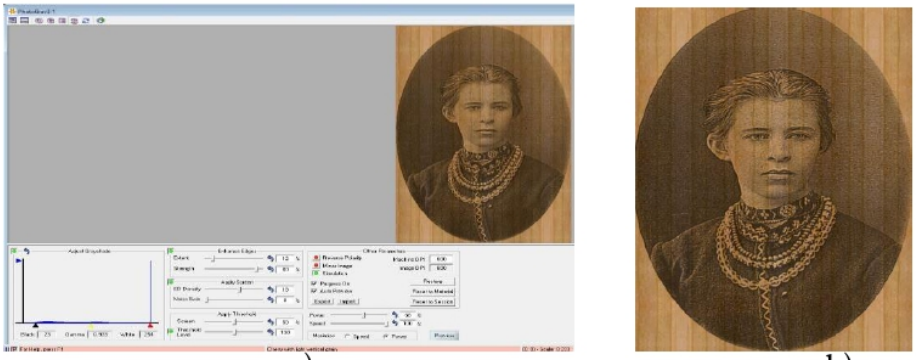


Figure 7 - Photo in interactive mode before adjusting the settings



a) b)

a) program window, b) saved simulation

Figure 8 – A real-time simulation that suits us.

When saving, you can save the simulation or the file for engraving (Fig. 9).

a) b)

a) a picture in two-bit format for engraving, b) the same in approximation

Figure 9 - Saved image in two-bit format for engraving

In this way, the students were able to master the machine and use it in the educational process, the implementation of educational projects developed by the students is to follow.

REFERENCES

1. https://www.youtube.com/watch?v=tPrY3bFdtIw CO2 Laser Focus / Focusing Laser Lens Ramp Test - Laser Engraver Beginner Series Ep. 6
2. https://engraveandcutfiles.com/product/honeycomb-bed-hold-down-pins/ Honeycomb Bed Hold Down Pins

EIN INTEGRIERTER ANSATZ IM FREMDSPRACHENUNTERRICHT AN HOCHSCHULEN

A. Nysowa
I. Pysmenna
Universität für Zoll und Finanzen, Ukraine

Die Frage, wie die Qualität des Fremdsprachenunterrichts für ukrainische Studenten verbessert werden kann, ist heute eine der häufigsten Aufgaben der modernen Wissenschaft. Eine dieser Methoden ist ein integrierter Ansatz für das Fremdsprachenlernen, der im Ausland an Popularität gewonnen hat, aber in der Ukraine noch wenig genutzt und erforscht wird.

Ein integrierter Ansatz garantiert die angemessene Verbindung und Synthese von Komponenten intra- und interdisziplinärer Lerninhalte, ihre Verallgemeinerung auf der Ebene von Fakten, Konzepten, Theorien, Ideen und die Bildung eines integralen Systems von allgemeinem Wissen, Methoden und Aktivitäten.

Ein hohes Integrationsniveau beim Fremdsprachenlernen ist für Studenten nicht nur eine Garantie für ein hohes Niveau an Fremdsprachenkenntnissen, erfolgreiches Lernen und Prüfungen, sondern auch eine Möglichkeit für eine intensive Entwicklung der kognitiven Aktivität, die Entdeckung der eigenen individuellen Fähigkeiten und ein tiefes Verständnis des komplexen Ansatzes, durch den Fächer, Fachkenntnisse, Ideen und verschiedene Ansichten in Bezug auf die erlernte Fremdsprache mit der realen Welt in Verbindung gebracht werden.

Eine Fremdsprache ist ein Schlüssel zum globalen Verständnis und zur kulturellen Integration, ein Mittel, die Welt zu lernen. Die Beherrschung einer Fremdsprache ermöglicht es, eine fremde Kultur zu verstehen und den Platz der eigenen Kultur in der Welt besser einzuschätzen. Deshalb ist es sehr wichtig, Elemente der Landeskunde in den Fremdsprachenunterricht einzubeziehen, denn jede Fremdsprachenlektion ist auch eine Lektion in Landeskunde. Unter Landeskunde versteht man die Vermittlung von kulturellem und sozialem Wissen über das Land und die Menschen, deren Sprache man lernt. In diesem Sinne soll der Fremdsprachenunterricht das Interesse an landeskundlichen Informationen wecken und umgekehrt - die Vermittlung von landeskundlichen Informationen soll dem Sprachenlernen dienen.

Eine weitere wirksame Methode ist das multisensorische Lernen, bei dem alle Sinne - Hören, Riechen, Sehen und Tasten - zum Einsatz kommen und das Einprägen erleichtert wird. Diese Methode ermöglicht es, die Intellektualität und das kreative Denken der Studenten zu entwickeln, die Fähigkeit, bildhaft und ausdrucksvoll zu sprechen, Informationen im Zusammenhang mit Klängen zu verstehen und die eigenen Emotionen und die Emotionen der Gesprächspartner zu erkennen.

Beim Erlernen einer Fremdsprache ist lohnt es sich auch, ihre Verbindung zur Informatik zu nutzen. Der Einsatz von Multimedia hat viele Vorteile. Das sind die gleichzeitige Nutzung mehrerer Wahrnehmungskanäle, die Differenzierung beim Unterrichten von Studenten mit unterschiedlichem Ausbildungsstand, die Nutzung zusätzlicher Möglichkeiten, um Studenten zur Beherrschung einer Fremdsprache zu motivieren, und die Verbesserung von Lernmanagementmechanismen.

Um ein integriertes Lehrprogramm umzusetzen, muss man einen Plan für die Organisation eines integrierten Unterrichts entwickeln, der folgende Inhalte umfassen kann:

1. Vorbereitende Arbeiten (Bildung von Teams, Bestimmung der Meinungen von Studenten zu einem bestimmten Thema, Lehrmethoden und Verwendung der verschiedenen Arbeitsformen);
2. Suche nach interdisziplinären Verbindungen, d. h. nach Fächern, in denen der Unterricht integriert werden soll;
3. Den Studenten die Möglichkeit geben, Studentenprojekte zu entwickeln;
4. Bestimmung des Bewertungssystems vor dem Beginn des integrierten Unterrichts;
5. Bereitstellung von Mentoring-Möglichkeiten für die Studenten.

Ein integrierter Ansatz im Fremdsprachenunterricht an Hochschulen kann nicht nur auf Ebene der Verbindungen zu anderen Fächern, sondern auch innerhalb des Fachs selbst angewandt werden.

Deshalb ist die Methode der Integration aller Arten von Sprachaktivitäten - Lesen, Schreiben, Sprechen und Hören - im Unterricht erfolgreich.

Die Bedeutung der psychologischen Komponente beim Erlernen einer Fremdsprache ist besonders wichtig. Die wichtigsten Faktoren, die zur Schaffung eines guten psychologischen Klimas im Unterricht beitragen und die Ausbildung der kommunikativen Fremdsprachenkompetenz beeinflussen, sind eine gute emotionale Stimmung des Lehrers und der Studenten, eine Atmosphäre des ruhigen Gleichgewichts, ein Gefühl der Gleichheit und Zusammenarbeit sowie gegenseitiges Vertrauen. Die vorherrschende Atmosphäre des guten Willens und des gegenseitigen Respekts stimuliert den Wunsch der Studenten, gute Taten zu tun und nach Erfolg zu streben, was sicherlich wichtig für ihre berufliche Entwicklung ist.

Ein integrativer Ansatz für das Erlernen der Fremdsprache an Hochschulen macht den Unterricht in erster Linie informativer, entwickelt einen wissenschaftlichen Denkstil und fördert den Erwerb von Fähigkeiten und Kenntnissen, die über die verschiedenen Disziplinen hinausgehen. Daher vermittelt er den Studenten nicht nur ein komplexes Wissen über eine Reihe von Themen, sondern hilft ihnen auch, sich eine besondere

Weltsicht zu bilden und die Vielfalt der Kulturen zu verstehen, die es in der Welt gibt. Das Wichtigste ist, dass eine erfolgreiche Umsetzung die Motivation der Schüler steigern kann, da sie die praktische Bedeutung des gelernten Stoffes erkennen, die Notwendigkeit der erworbenen Fähigkeiten für ihren künftigen Beruf verstehen und sich mehr für das Ergebnis ihrer Arbeit interessieren. Das ist sicherlich sehr wichtig, da es ihre Wettbewerbsfähigkeit auf dem globalen Arbeitsmarkt erhöht.

RESEARCH OF INCREASE DIRECTIONS EMPLOYMENT POTENTIAL OF THE ENTERPRISE

S. Onoichenko, D. Snitko
T. Fonarova
Ukrainian State University of Science and Technologies, Dnipro, Ukraine

The development of labor potential is gaining more and more importance and relevance in the conditions of the knowledge economy and the rapid intellectualization and digitalization of all aspects of enterprise activity. Many scientific works and practical studies in this direction make it necessary to analyze the definition of the concept of «labor potential», which is given in Table 1.

Table 1 – Analysis of the determination of the economic essence of the definition «labor potential»

Author	Definition of the concept
V.S. Vasylchenko , A.M. Hrynenko, O.A. Hrishnova, L.P. Kerb	The economic essence of society's labor potential is that it, acting in the form of an active workforce, creates material and spiritual values, and as a potential workforce, it is capable of producing them. Society is interested in the maximum specific weight of the labor potential involved in socially useful work, because this increases the gross domestic product and national income, which ultimately makes it possible to improve the quality of life of the population. [1]
L.A. Yankovska	The labor potential of the enterprise is the ability of its employees, under certain conditions, to ensure the realization of the enterprise's goals with the most rational costs of all production resources: technical, material, energy, labor, financial [2].
D.A. Tereshchenko	Labor potential is a complex socio-economic category that encompasses a set of relationships regarding the formation of a person's professional qualities, the use of labor, its efficiency and development. The economic component of the country's labor potential is characterized by a significant interregional differentiation of the concentration of business activity around powerful industrial nodes, which causes a decrease in the possibilities of using the labor potential in «peripheral» territories.[3].

V. V. Buhas O.M. Naumenko	Labor potential can be described as an evolutionary, integral, special characteristic of the abilities and capabilities of both existing and prospective employees, which are determined in the complex of labor resources and the set of their characteristics, which can be realized in the work process in the conditions of innovative development of the transition of society to an economy based on thorough knowledge for the effective implementation of the set goals. [4]
T.V. Davydiuk	... the labor potential of a person is determined not so much by a list of individual qualities, but by the rationality of their combination." According to the scientist, the realized part of the labor potential is considered to be human capital, since it expresses those qualities of a person that under certain circumstances bring or do not bring income [5].
A.V. Cherep, Ya.O. Zubrytska	The labor potential of the enterprise is the existing and prospective capabilities of the labor team of the enterprise to quantitatively and qualitatively satisfy the needs of the enterprise and realize its goals in the most efficient way, in the presence of appropriate resource provision [6]

The analysis carried out in Table 1 showed that:

- it is necessary to consider the labor potential of the employee as a component of the labor potential of the enterprise, which should give a synergistic effect as part of the labor team. And also, take into account the peculiarities of the enterprise's sphere of activity when determining the components of its labor potential. [6];
- the components (components) of labor potential are important, but their combination is also important;
- when implemented, labor potential is transformed into human capital;
- labor potential affects such economic indicators as:

1) at the state level, it increases the gross domestic product and national income, which ultimately makes it possible to improve the quality of life of the population,

2) at the interregional level, there is a differentiation of the concentration of business activity around powerful industrial hubs;

3) at the enterprise level, ensures the realization of the enterprise's goals with the most rational costs of all production resources and in the most efficient manner, in the presence of appropriate resource support;

4) at the personal level, labor potential is a special characteristic of the abilities and capabilities of both existing and prospective employees.

Based on the above-mentioned conclusions, we will form directions for increasing labor potential and the results to which this increase will lead, which are presented in fig. 1.

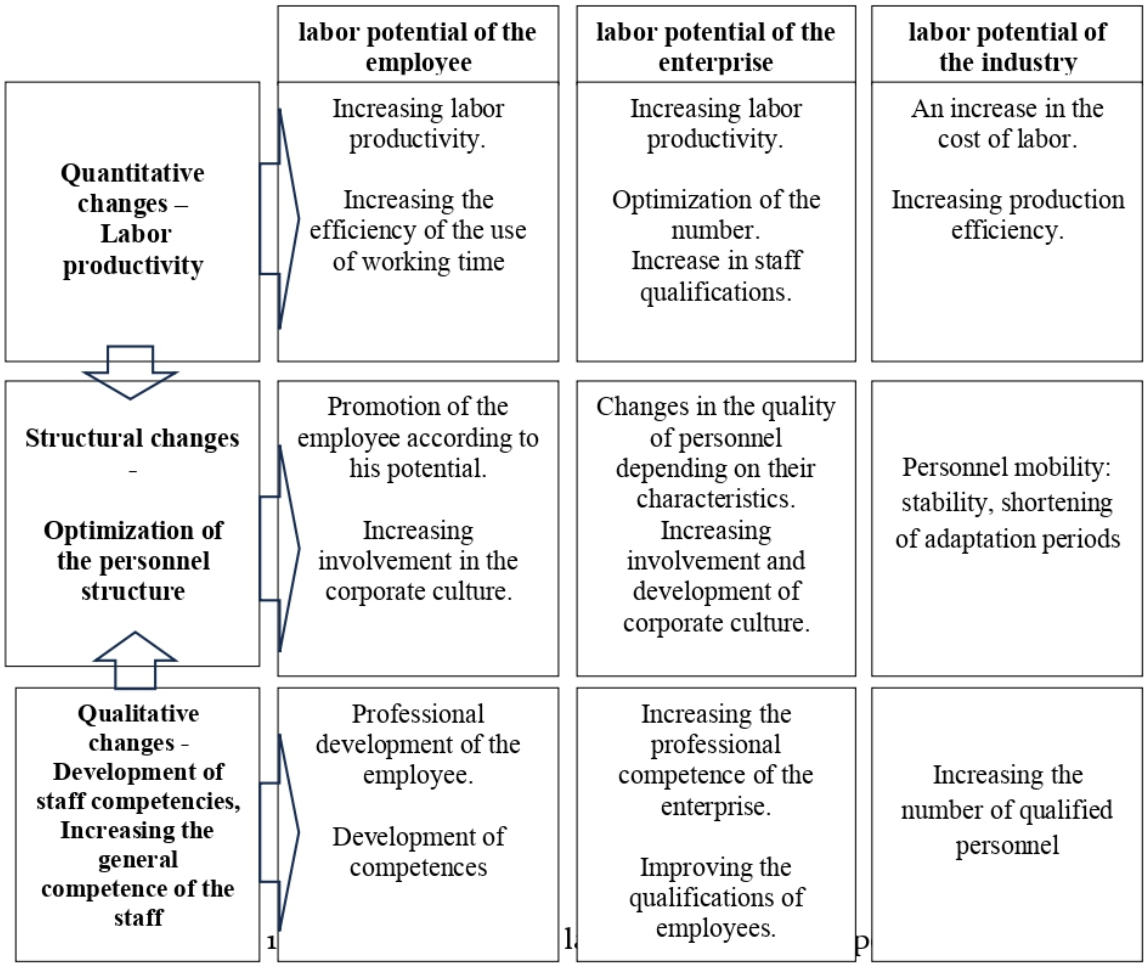


Figure 1. Components of labor potential

To ensure an increase in labor potential, it is possible to recommend that enterprises constantly monitor the personnel policy and work with personnel in order to identify deficiencies that, in turn, reduce the level of the organization's labor potential.

The most widespread shortcomings that lead to a decrease in the labor potential at the enterprise are as follows: there is no clear strategy for the development of personnel potential, as a result of which priority is given in the work with personnel mainly to solving local problems, and not to the prospective formation of high-quality industrial and production personnel and the stabilization of their number ; management of enterprises does not invest in personnel training, but wants to get ready-made specialists; almost no sociological studies are conducted to study the personality of the worker and the state of collective conflict, there are practically no scientific approaches to the organization of workplaces.

In order to eliminate these shortcomings, it is proposed to develop an organizational and economic mechanism for the development of labor potential, which is based on the competence approach, that is, observing the connection between the components of labor potential, competences and interaction of personnel.

This will make it possible to: develop a mechanism for assessing and forecasting the need for highly qualified personnel, prevent threats of negative effects on the

economic security of the enterprise; to plan and manage the necessary level of qualification compliance of employees with the requirements of production technology, the state of the material and technical base; to effectively use and develop the abilities of the company's employees, improve their qualifications, as well as create a favorable psychological climate, carry out systematic work on the development of professional communication between employees, which will lead to the quantitative and qualitative development of the company's labor potential.

REFERENCES

1. Vasylchenko V.S., Hrynenko A.M., Hrishnova O.A., Kerb L.P. Labor potential management: Tutorial. Kyiv: KNEU, 2005. 403 p.
2. Yankovska L.A. Optimization of labor potential in the personnel management system of an industrial enterprise. Actual problems of the economy. No. 9, 2006. P. 200 - 203.
3. Tereshchenko D.A. Labor potential of the country and regions: current state and development trends. Theory and practice of public administration 2(65)/2019. P. 208-221. doi: 10.34213/tp.19.02.26
4. Buhas V.V., Naumenko O.M. Labor potential of the enterprise: essence and structure. Electronic scientific publication «Efficient Economy» №1, 2018.
5. Davydiuk T. V. Labor resources, labor potential, labor force, human capital: relationship of categories. Bulletin of the Zhytomyr State University of Technology. Series: Economic Sciences. No. 1, 2009. P. 30 - 35.
6. Cherep A. V., Zubrytska Ya. Research of the essence of the economic category «labor potential» in the management of different levels. Bulletin of Zaporizhzhya National University No. 4(8), 2010. P. 90-95.

TO THE PROBLEM OF ORGANIZATIONAL AND TECHNOLOGICAL RELIABILITY OF CONSTRUCTION PROCESSES

M. Pakhomov

E. Zayats

Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Organizing and ensuring the technical reliability of construction processes involves several key steps and considerations.

The main aspect is project planning. Developing a comprehensive project plan that outlines project goals, timelines, budget, resources, and key milestones are of great importance. The factors such as site conditions, regulatory requirements, and environmental considerations should be considered.

Assemble a skilled and experienced project team comprising architects, engineers, contractors, subcontractors, suppliers, and other stakeholders should be taken into account. Foster clear communication, collaboration, and coordination among team members throughout the project lifecycle means well-done team coordination

Risk Management is necessary to identify potential risks and uncertainties associated with the construction project, such as budget overruns, schedule delays,

material shortages, and technical challenges and to develop risk mitigation strategies and contingency plans to address unforeseen issues effectively.

Procurement and Logistics procure materials, equipment, and resources efficiently. To ensure timely delivery, quality assurance, and cost-effectiveness. Implement effective logistics and supply chain management practices to optimize resource utilization and minimize waste.

Construction Techniques. It is necessary to employ modern construction techniques, methodologies, and best practices that prioritize safety, efficiency, quality, and sustainability. Train and educate workers on proper construction techniques, safety protocols, and quality standards, is also of great importance.

It is urgent to have *quality assurance and control* to establish robust quality assurance and control processes to monitor and evaluate construction activities, materials, and workmanship. Conduct inspections, testing, and quality checks at various stages of the construction process to ensure compliance with design specifications and regulatory requirements.

Technology Integration in wholes leverage technology solutions such as Building Information Modeling (BIM), construction management software, drones, sensors, and Internet of Things (IoT) devices to streamline construction processes, enhance productivity, and improve decision-making.

It should be emphasized that *Safety Measures*. Are key questions that prioritize safety by implementing rigorous safety protocols, training programs, and safety equipment on the construction site. Conduct regular safety inspections, hazard assessments, and emergency preparedness drills to minimize accidents and injuries.

Environmental Sustainability should be taken consideration. The main aspects are incorporate sustainable construction practices, green building materials, energy-efficient technologies, and waste management strategies to minimize environmental impact, conserve resources, and promote sustainability.

By focusing on organization, effective communication, risk management, quality assurance, technological innovation, safety, sustainability, and documentation, construction processes can be organized and technically reliable, leading to successful project outcomes and client satisfaction.

REFERENCES

1. G. Atkinson “Construction Quality and Quality Standards: The European Perspective” (2003) Vol. 352
2. Park, Seunghwa; Kim, Inhan. ArchNet-IJAR : International Journal of Architectural Research; Cambridge "BIM-BASED QUALITY CONTROL FOR SAFETY ISSUES IN THE DESIGN AND CONSTRUCTION PHASES” (2015) pp.111-129
3. Lapidus, Azariy; Makarov, Aleksandr; Kozlova, Anastasiia. Buildings; Basel Vol 13/9, (2023)

AVANTAGES ET INCONVENIENTS DES IMMEUBLES DE GRANDE HAUTEUR

O. Pushkash
M. Ovsieieva
Prydniprovs'ka Académie d'État de Génie Civil et d'Architecture

Avantage des immeubles de grande hauteur

- L'avantage le plus évident des immeubles de grande hauteur est la capacité d'accueillir autant de pièces que possible et d'utiliser une grande surface à des fins humaines. À l'intérieur d'un gratte-ciel, on peut y avoir n'importe quoi : un centre d'affaires, un centre commercial, un complexe résidentiel ou un hôtel.
- On peut dire que les immeubles de grande hauteur sont beaucoup plus beaux et pittoresques que les immeubles de faible hauteur.
- Tout d'abord, il s'agit du loyer et du coût des services publics relativement bas. Cela s'explique par le fait que le coût de réparation et d'entretien des systèmes d'ingénierie dans un immeuble de grande hauteur est réparti entre tous ses habitants. La même chose se produit avec les logements de faible hauteur. Mais comme beaucoup plus de personnes vivent dans un immeuble de grande hauteur, chaque propriétaire d'appartement dépense moins d'argent qu'un habitant d'un immeuble de petit nombre d'étages.
- Un gratte-ciel représente des solutions architecturales et de conception bien plus intéressantes que les immeubles de faible hauteur. Un immeuble de grande hauteur reflétera mieux la puissance et le développement avancé d'une ville ou d'un pays qu'un complexe de cinq étages situé en centre-ville. Il est à noter que les bâtiments de faible hauteur peuvent contenir des peintures murales ou des panneaux commémoratifs illustrant la culture de la ville. Mais il faut dire que le développement de la technologie sera mieux représenté par un grand gratte-ciel.

Inconvénients et problèmes

La plupart des immeubles de grande hauteur créent des problèmes aux citadins plutôt que de leur apporter des avantages. Par exemple, le fait d'être dans des étages élevés, un bruit constant et une grande quantité de lumière artificielle affectent négativement la santé mentale. Ces mêmes facteurs ont également un effet néfaste sur la faune : un grand nombre d'oiseaux nocturnes meurent chaque année à New York. Tout cela est à cause de la lumière artificielle et du verre dans la conception des bâtiments.

Les embouteillages et la forte densité de population constituent le plus gros problème. De plus, en Ukraine, cela n'a pas été rentable depuis longtemps, car environ la moitié des appartements dans les nouveaux immeubles ne sont pas vendus en raison de la hausse des prix et du danger lié à la guerre.

Il est à remarquer que de nombreux immeubles de grande hauteur manquent très peu de places de stationnement. Les propriétaires n'ont pas tout simplement de place où garer leur voiture, c'est pourquoi les résidents peuvent entrer en conflit les uns avec les autres sur cette question.

En faisant des observations on peut dire qu'en Ukraine, les normes concernant la hauteur des bâtiments et leur emplacement ne sont pas respectées. Ils peuvent ériger un grand complexe au milieu d'un ancien micro-quartier, ce qui gâchera complètement toute la vue par sa présence, même si le bâtiment lui-même est très beau.

Pour « attirer l'attention »

Beaucoup de monde comparent le développement et la force de l'économie du pays avec le nombre de gratte-ciel bien que cela soit inexact. Après tout, si l'on prend en compte cette idée, l'économie ukrainienne dépassera celle de n'importe quel autre pays d'Europe, car nous possédons le plus grand nombre d'immeubles de grande hauteur dans cette partie du monde.

On ne devrait pas construire de grands immeubles simplement parce que c'est à la mode. Si on commence à construire des villes avec des gratte-ciel pour « attirer l'attention » alors cette idée échouera bientôt, car la principale raison de l'échec d'une telle réforme de la construction sera le manque de demande et la non-rentabilité.

Résumons

On pourrait dire qu'à l'avenir, dans de nombreux pays, y compris l'Ukraine, on cessera de construire des immeubles de grande hauteur et on les remplacera par des immeubles de faible hauteur mais plus confortables. Après tout, à bien des égards, le bonheur n'est pas une belle vue depuis la fenêtre, mais la commodité de la vie et l'absence d'embouteillages et de foules.

Évidemment, chacun a sa propre opinion sur cette question. L'objectif était de montrer les principaux avantages et inconvénients afin qu'on puisse les prendre en compte lors de l'achat d'un appartement pour ne pas regretter après le choix.

EFFICACITE ENERGETIQUE

M. Pyshnyi
M. Ovsieieva
Prydniprovs'ka Académie d'État de Génie Civil et d'Architecture

L'efficacité énergétique domestique est un ensemble d'indicateurs de rationalité et d'efficacité de la consommation d'énergie. Ces indicateurs sont influencés par l'efficacité du chauffage, de l'éclairage, de l'approvisionnement en eau et de la ventilation, ainsi que par la quantité de matériaux et d'équipements économes en énergie utilisés dans la construction de la maison.

En général, il existe sept classes d'efficacité énergétique de A à G. La détermination de la classe d'efficacité énergétique est une évaluation de la qualité de la construction.

Une maison économe en énergie est une maison qui nécessite plusieurs fois moins d'énergie pour chauffer et maintenir un microclimat confortable qu'une maison ordinaire. Cela implique simultanément une réduction des coûts de maintenance.

Selon l'expérience européenne, la gradation suivante des bâtiments existants a été adoptée en Ukraine:

- les bâtiments anciens construits avant 2007 et consommant jusqu'à 300 kWh/m2 pour le chauffage et le refroidissement ; (Ces bâtiments ont la priorité pour la modernisation énergétique)

- les nouveaux bâtiments construits avant 2016 avec une consommation d'environ 150 kWh/m2;

- des bâtiments économes en énergie avec une faible consommation d'énergie, environ 60 kWh/m2;

- les bâtiments passifs, construits selon la norme maison passive, avec une consommation inférieure à 15 kWh/m2 par an;

- les bâtiments à consommation énergétique nulle (en fait, ce sont des bâtiments passifs dotés d'équipements de production d'énergie pour compenser leurs pertes énergétiques), ils consomment - 0 kWh/m2;

- des bâtiments de classe Energie + qui produisent nettement plus d'énergie qu'ils n'en consomment.

Les exigences minimales obligatoires pour la classe d'efficacité énergétique sont liées à la destination des bâtiments (bâtiments résidentiels, bâtiments publics dans les zones éducatives, sportives, commerciales, médicales, etc.), au nombre d'étages des bâtiments et à leur emplacement dans le premier ou le deuxième climat. zone.

Au moment de décider comment augmenter l'efficacité énergétique d'une maison, il est nécessaire de prendre en compte certaines conditions pour sa construction, notamment :

- conception correcte du chalet,
- placement correct de la maison sur le site,
- construction de haute qualité utilisant des méthodes modernes et des matériaux économes en énergie.

Lors de la planification d'une maison, les chambres d'enfants doivent être orientées au sud-ouest, les bibliothèques et les bureaux au nord et les salles communes au sud.

En plus des portes isolées, il faut penser au vestibule et au dressing. Des matériaux écologiques « respirants » doivent être utilisés pour les murs de la maison. L'isolation thermique des murs est pratiquement le principal paramètre affectant le coût d'entretien d'un chalet. Il est donc nécessaire d'éliminer les ponts thermiques et de rendre les surfaces extérieures étanches à l'air.

Des plans souterrains isolés, un toit chaud, une couverture de toit durable et étanche sont une autre étape vers la résolution du problème de la réduction des pertes de chaleur à la maison.

Il faut tenir compte du fait que seules les fenêtres orientées plein sud peuvent offrir une efficacité énergétique avec une bonne isolation thermique. Le reste travaillera sur la perte de chaleur.

Dans une maison économe en énergie, il est recommandé d'installer différents types de pompes à chaleur, de capteurs solaires, d'éoliennes, d'un système de ventilation mécanique et d'utiliser des échangeurs de chaleur géothermiques - récupérateurs.

Il existe une opinion largement répandue selon laquelle l'utilisation des ressources géothermiques est inacceptable dans notre pays. Mais ce n'est pas vrai. Preuve en est, le

puits canadien, parfois appelé provençal ou « puits canadien » que vous pouvez vous équiper dans de nombreuses régions.

Qu'est-ce qu'un puits canadien ?

Le puits canadien comprend un ensemble de canalisations situées sous terre à l'extérieur du périmètre de la maison, mais reliées à son volume interne.

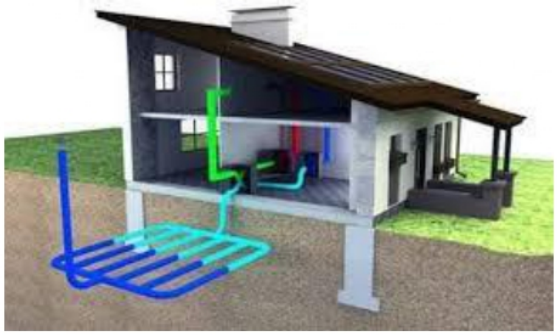
L'efficacité énergétique du système d'alimentation électrique est également obtenue grâce à l'utilisation de lampes à économie d'énergie et d'interrupteurs à relais temporisés pour l'éclairage des locaux de la maison.

Un système qui utilise l'inertie thermique de la terre et permet de réguler la température interne de la maison se caractérise par les avantages importants suivants :

- l'abordabilité, qui est due à la fois au coût des matériaux nécessaires et au coût d'installation ;
- la capacité de fonctionner complètement sans consommer d'électricité ;
- efficacité et respect de l'environnement.

Le principe de fonctionnement du système repose sur le fait que la température souterraine reste presque constamment stable, quelle que soit la période de l'année. En été, il est plus bas que dans la maison. En hiver, il s'avère plus élevé, grâce à la chaleur accumulée pendant l'été. Un échangeur de chaleur souterrain chauffe l'air en hiver et le rafraîchit en été. Et tout cela se passe sans consommer d'électricité.

De plus, lorsqu'on envisage d'installer un tel système, il est conseillé de déterminer d'abord le type de sol dans la zone où il est prévu de l'installer, en accordant une attention prioritaire à sa conductivité thermique. C'est ce paramètre qui indiquera le niveau d'inertie thermique, assurant le fonctionnement efficace du puits canadien.



Le principe de son fonctionnement est simple : les tuyaux sont posés sous terre près de la maison à une profondeur de 1,5 à 2,5 mètres. D'un côté les tuyaux entrent dans la maison, de l'autre ils sortent dans l'air. Cette conception ressemble à des puits de ventilation. En hiver, même en cas de fortes gelées, le sol à une telle profondeur ne gèle jamais, mais reste relativement chaud, sa température varie de +5 à +8 degrés. L'air aspiré par la pompe de ventilation, avant d'entrer dans la maison, passe par les tuyaux souterrains de l'échangeur de chaleur et est chauffé de plusieurs degrés. En été, le même système fonctionne pour rafraîchir la maison. La température des conduites souterraines, même par temps chaud, ne dépasse pas 10-14 degrés, de sorte que le « puits canadien »

fonctionne comme un climatiseur. L'énergie géothermique bon marché constitue une alternative intéressante aux systèmes de chauffage domestique traditionnels.

Examinons les principales mesures qui contribueront à améliorer l'efficacité énergétique de votre maison.

C'est l'une des techniques les plus efficaces pour augmenter l'efficacité énergétique d'une maison, car entre 25 et 40 % de la chaleur est perdue à travers les murs. Dans ce cas, la couche isolante doit être installée à l'extérieur - cela déplace le point de congélation et réduit les pertes de chaleur. Pour le revêtement, des matériaux en laine minérale (laine de basalte ou de roche, laine de laitier ou laine de verre) ou en polystyrène (polystyrène ou polystyrène) peuvent être utilisés.

Une pratique généralement acceptée qui a fait ses preuves est l'installation de fenêtres métal-plastique à économie d'énergie. L'utilisation de structures multi-chambres permet de minimiser les échanges d'air entre la pièce et l'environnement extérieur et les pertes de chaleur associées. L'installation de fenêtres économes en énergie peut réduire les pertes de chaleur de 15 à 20 %. Dans le même temps, il est important non seulement de choisir une fenêtre à double vitrage de haute qualité, mais également de l'installer correctement afin d'éviter les pertes de chaleur causées par une mauvaise installation.

Les mesures qui améliorent l'efficacité énergétique d'une maison réduisent pratiquement à zéro l'échange d'air naturel. Par conséquent, dans les maisons modernes économes en énergie, l'importance du système de ventilation augmente considérablement. D'une part, il doit assurer un bon échange d'air, en assurant le flux d'air riche en oxygène et l'élimination de l'air à haute teneur en dioxyde de carbone. D'autre part, l'échange d'air doit s'accompagner d'une perte de chaleur minimale. À cette fin, des systèmes de ventilation forcée spéciaux avec unités de récupération sont utilisés. En hiver, ils permettent de chauffer l'air provenant de l'extérieur et en été, de le rafraîchir.

Voici plusieurs façons de réduire la consommation d'électricité:

1. transition vers une option de paiement multitarif - le tarif de nuit de l'électricité est 50 % inférieur au tarif de jour, il est donc préférable de transférer les opérations énergivores vers la nuit
2. installation d'éclairage à économie d'énergie – lampes LED
3. sélection d'équipements avec classe de consommation énergétique A ou A+
4. installation de détecteurs de mouvement dans le système d'éclairage extérieur
5. transition vers l'électricité autoproduite : installation de panneaux solaires ou d'éoliennes.

Modernisation du système de chauffage.

Le système de maison intelligente vous permet d'optimiser la consommation d'énergie, par exemple grâce à des capteurs spéciaux, analysant la présence d'une personne dans la pièce, réduisant ou augmentant la température dans la pièce. De plus, ils permettent de maintenir la température minimale acceptable alors que personne n'est à la maison.

Les technologies et solutions de conception modernes peuvent augmenter considérablement l'efficacité de l'utilisation de tous les types de ressources énergétiques. À l'avenir, la création de maisons neutres en énergie, de maisons à consommation

énergétique nulle. Dans de tels bâtiments, toute l'énergie nécessaire à la vie est générée sur place grâce à l'utilisation de sources d'énergie renouvelables.

CURRENT TOOLS FOR CREATING MOBILE APPLICATIONS ON THE ANDROID PLATFORM

S. Rusakevych
L. Tymoshenko
Ukrainian State University of Science and Technologies, Ukraine

Mobile apps are extremely popular in today's world, and the number of developers and apps available is growing rapidly. This leads to an increase in the number of cross-platform frameworks that contribute to the efficient creation of applications. With the help of these frameworks, mobile applications can easily use data from satellites, which makes communication with satellite communication modules more convenient. The multi-functionality of the Android operating system allows you to create applications with a wide range of capabilities that can go beyond mobile phones. This platform is becoming more and more popular in other devices and applications. Development of applications for the Android operating system is one of the most relevant branches in the field of mobile programming. According to data as of January 2022, Android occupies more than 50% of the mobile operating system market. The rapid development of these trends stimulates the use of the latest frameworks for application development. Let's consider some of the most useful frameworks for creating applications for Android:

1. Sencha Touch is a development framework that uses JavaScript and HTML5 to create dynamic and complex applications. Sencha Touch provides high performance because it includes hardware acceleration methods. This framework helps to develop exciting and attractive mobile applications with smooth animations and scrolling. It also supports built-in user interface and real-time testing.

2. TheAppsBuilder is a new HTML-based Android framework that supports a codeless user interface. TheAppBuilder has built-in blocks that include features like feedback, content updates, polls, push notifications, and more. Currently, there are seven popular cross-platform mobile frameworks such as Appcelerator Titanium, Kony Platform, Adobe PhoneGap, IBM Worklight, Telerik Platform, Verivo Akula and Xamarin But only Xamarin creates applications using the C # language.

3. Xamarin is used to develop Android applications using ".NET". It is relatively older than most other cross-platform frameworks. Xamarin has an extensive set of tools that developers can use to work with code written in C# or XAML. This code sharing feature reduces coding time for developers and reduces errors during the development process. Xamarin is a framework for cross-platform development of mobile applications (iOS, Android, Windows Phone) using the C# language. Xamarin is based on an open-source implementation of the .NET platform - Mono. The application code is written in the widely used C# programming language, using all the usual language features such as LINQ, lambda expressions, Generic and Async. At the same time, there is full access to all the capabilities of the SDK platform and the UI (user interface) creation mechanism,

resulting in an application that is no different from native applications and is not inferior to them in terms of performance. The Xamarin framework consists of several main parts: - Xamarin. IOS is a class library that provides the developer with access to the iOS SDK; - Xamarin. Android is a class library that provides access to the Android SDK; - compilers for iOS and Android; - Xamarin Studio IDE; - plugin for Visual Studio. For each platform, Xamarin provides the ability to use native UI development tools and native UI elements. For Android, creating a UI can be done directly in code or using a declarative approach with a description of the interface in XML. For iOS, it's also code, or using native interface design tools. For each of the platforms, you need to implement your own UI layer, that is, the code that is responsible for the appearance of the application will have to be written for each platform separately. Xamarin developers suggest using either their own IDE - Xamarin Studio or Visual Studio - as a development environment. Xamarin Studio is a cross-platform IDE that works on both Mac OS X and Windows. Xamarin also offers the ability to develop in Visual Studio after installing a special plugin. When considering how to create apps for iOS and Android, many people think that the only option is the Objective-C, Swift, and Java machine languages. However, a new ecosystem of mobile app development platforms has emerged over the past few years.

4. Google Flutter is intended for creating cross-platform applications. The framework is written in the Dart language and uses a single codebase. This leading Android framework has a cutting-edge approach to app development. It simplifies the cross-platform development process for creating high-quality interfaces for Android and iOS. The Flutter framework benefits greatly from a 2D rendering engine called Skia. Flutter is a reliable testing framework for performing UI, unit and functional tests. It has many advantages like fast playback, screen reader, large number of themes and many more.

5. Appcelerator Titanium SDK allows developers to build their own applications using a single JavaScript codebase. As a result, Appcelerator had to be included in the list of new Android frameworks for developing highly efficient and reliable applications. Thanks to the framework, you can create multi-platform applications. In addition, it provides access to APIs for operating systems including Android, iOS, Universal Windows, HTML5, and Blackberry.

6. Ionic helps developers build modern hybrid applications using HTML5, CSS3, and JavaScript across multiple platforms. Ionic includes many software tools and animations. These resources contribute to the development of modern mobile applications. The framework includes a simple CLI that provides access to emulators, live reboots, logging, and more. Ionic integrates quite easily with other libraries such as Cordova and AngularJS.

7. React Native uses React, a huge JS library. The cross-platform feature allows developers to write code only once and then run it elsewhere. React Native has built-in UI components and access to a native API, allowing Android apps to have good design and high performance.

Consequently, a comprehensive analysis was conducted on contemporary Android frameworks utilized in mobile application development. Particular emphasis was placed

on examining the Xamarin cross-platform framework, given its widespread adoption as one of the primary tools in this domain.

TRANSPORT AND TRANSPORT INFRASTRUCTURE

K. Saguichenko
K. Roman, K. Shabanova
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Transport and transport infrastructure are critical components of modern society, influencing economic development, social integration and environmental sustainability. Transportation covers a variety of modes and means of transportation, from cars, trains, and planes to bicycles and footpaths, each of which plays a role in the overall transportation network.

Road transport is the most widespread type of transport, which includes cars and trucks, buses and motorcycles. Road transport promotes flexibility of movement, but also causes problems such as congestion, air pollution and traffic accidents.

Rail transport is efficient for transporting large volumes of goods and passengers over long distances. Railways require significant investment in infrastructure, but provide fast and energy-efficient movement.

Maritime transport is key to international trade, as the majority of world trade in goods takes place by sea. Large ports and ships ensure the economical movement of large volumes of goods.

Air transport is the fastest way to move people and goods over long distances. Air transport requires significant investment in airports and aviation management systems.

Cycling and walking provide an environmentally friendly way to get around, promote a healthy lifestyle and reduce congestion and pollution.

Transportation infrastructure includes all types of facilities and structures that are necessary for the operation of various modes of transportation, including roads, railways, ports, airports, electric vehicle charging stations, bicycle paths and sidewalks. Developing and maintaining this infrastructure requires significant investment and careful planning to accommodate the needs of future development and technological innovation.

Urbanization – the growing concentration of population in cities requires the improvement of public transport and infrastructure to reduce congestion and improve the availability of services.

Technological innovations – autonomous vehicles, unmanned aerial vehicles and digitalization of transport systems open up new opportunities for optimizing transport and improving safety.

Construction vehicles play a vital role in the construction industry by transporting materials, equipment and workers to construction sites. This type of transport includes a wide range of vehicles and machines, each of which is designed to perform certain tasks in the construction process. Let's consider in more detail the key aspects and types of construction transport:

Dump trucks are used to transport large volumes of earth, sand, crushed stone and other construction materials. These heavy-duty vehicles are designed to withstand the harsh conditions of construction sites.

Excavators are machines designed for digging and moving earth, as well as for dismantling old structures. Excavators can be equipped with different types of buckets, which allows them to perform a wide range of tasks.

Cranes are necessary for lifting and moving heavy materials and structures, such as steel beams, concrete blocks and other structural elements. They can be stationary or mobile and play a key role in large-scale construction projects.

Bulldozers are used for leveling and moving earth and other materials on construction sites. Bulldozers are known for their ability to work in difficult conditions and on various landscapes.

Asphalt pavers are specialized machines for laying asphalt and other road surfaces. They provide an even and effective surface during road construction.

Logistics and planning – effective management of construction transport requires careful planning to ensure timely delivery of materials and optimization of work processes.

Safety – Construction sites can be dangerous, so safety measures such as proper staff training, regular machine maintenance and compliance with safety regulations are critical.

Technological innovation – modern technologies such as GPS monitoring, automation and robotics are increasingly integrated into construction vehicles, increasing the efficiency, accuracy and safety of work.

Construction transport is a fundamental component of the successful implementation of any construction project. The efficiency, safety and economic benefits of construction depend on the correct selection and management of construction vehicles. Investments in the latest technologies and compliance with high safety standards allow to achieve optimal results and contribute to the successful conduct of construction works.

REFERENCES

1. Construction Equipment and Methods" by Robert L. Peurifoy, Clifford J. Schexnayder, Aviad Shapira, and Robert Schmitt
2. Construction Planning, Equipment, and Methods" by R. Peurifoy, C. J. Schexnayder, and A. Shapira
3. Heavy Equipment: The World's Largest Machinery" by John Carroll
4. Construction Equipment Management for Engineers, Estimators, and Owners" by Douglas D. Gransberg, Calin M. Popescu, and Richard C. Ryan
5. Modern Construction Equipment and Methods: For Safety and Profit" by Fred C. Luthans and William M. Luthans.

REPENSER LES BATIMENTS INDUSTRIELS DANS LE CADRE DE LA RECONSTRUCTION DE L'UKRAINE

R. Sakara
O. Mosendz
V. Zadunai
La Prydniprovska Académie d'Etat de Génie Civil et d'Architecture

La fin du XXe et le début du XXIe siècle ont été caractérisés par une augmentation significative du développement urbain mondial. Cette tendance est due à de nombreux facteurs sociaux et économiques, mais en même temps, on assiste à une diminution progressive de la quantité de terrains urbains disponibles pour le développement partout dans le monde. Le nombre de nouveaux bâtiments augmente chaque année, mais en même temps, il y a une quantité considérable de bâtiments qui ont cessé d'être utilisés, qui ont été abandonnés, par la suite, et qui se détériorent progressivement.

Ces tendances sont également typiques pour l'Ukraine. Il existe dans notre pays un nombre important de grands bâtiments industriels qui ne fonctionnent pas pour un certain nombre de raisons, notamment à cause du changement de la production. Ces bâtiments et leur destruction progressive entraînent la dégradation des quartiers et l'augmentation du niveau de dépression dans les villes ukrainiennes. Cependant, d'après les recherches, beaucoup de bâtiments de ce type font partie des zones historiques centrales des villes, ce qui constitue un problème majeur. La communauté des architectes s'est penchée à plusieurs reprises sur le sort des entreprises et des bâtiments en difficulté. Dans presque tous les cas, la discussion aboutit à une décision difficile: démolir, reconstruire ou revitaliser le bâtiment ou l'ensemble de bâtiments.

Le concept de la revitalisation architecturale est de plus en plus présent dans la littérature scientifique et se définit comme un ensemble de mesures visant à restaurer et à renouveler des objets architecturaux abandonnés ou obsolètes afin de leur redonner vie, fonctionnalité et attractivité dans des contextes urbains ou régionaux spécifiques. Du point de vue de la revitalisation industrielle, il s'agit d'une opportunité de préserver un ensemble de bâtiments qui ont perdu leur pertinence, pour leur offrir une destination moderne qui est plus nécessaire à l'heure actuelle.

La comparaison du concept de la revitalisation avec celui de la reconstruction révèle sa signification plus profonde et sa portée progressive. La reconstruction se concentre avant tout sur la restitution de la fonction et de la forme existantes dans leur aspect original, tandis que la revitalisation cible la modification de l'objectif fonctionnel et la nouvelle utilisation de l'espace. La revitalisation cherche à transformer les espaces urbains qui existent déjà, en créant des lieux publics attrayants et en redonnant une nouvelle vie aux zones défavorisées.

Les objectifs de la revitalisation comprennent le changement de destination d'un bâtiment ou d'un ensemble de bâtiments et leur adaptation à de nouvelles activités, l'application des technologies de construction environnementales modernes, en respectant les exigences de la sécurité et la mise en conformité avec les normes modernes, ainsi que l'aménagement de la zone autour du bâtiment.

L'utilisation des technologies et des matériaux respectueux de l'environnement dans le cadre de la modernisation des bâtiments est aussi importante. Dans la mesure où, dans de nombreux pays, la revitalisation est conditionnée par des préoccupations environnementales, les projets dans ce domaine peuvent inclure l'utilisation des technologies vertes telles que les énergies renouvelables, les panneaux solaires et les systèmes du chauffage et du refroidissement à faible consommation d'énergie. L'application des technologies à haut rendement énergétique dans les bâtiments rénovés réduit l'impact négatif sur l'environnement.

Pour créer les conditions d'une revitalisation efficace, afin de développer un ensemble des solutions pour la mise en œuvre du projet, il est nécessaire d'étudier les solutions architecturales et structurelles des constructions existantes du projet en question, d'effectuer une inspection instrumentale de l'état des structures, de réaliser une étude géologique du territoire et d'évaluer la faisabilité économique de l'ensemble des travaux de réparation et de construction.

Dans la plupart des cas, le coût de la réparation ou de la reconstruction d'un bâtiment est nettement inférieur au coût total de la démolition, des travaux préparatoires et de la construction d'un nouveau bâtiment. Après la revitalisation, de vieux bâtiments inutilisés acquièrent une nouvelle signification sociale et une nouvelle fonction. De nouveaux emplois sont créés pour assurer leur bon fonctionnement, ce qui représente un avantage économique important pour la société. En outre, les zones rénovées peuvent être commercialement attrayantes pour la location des magasins, l'emplacement des établissements de sport, de santé, de loisirs et d'autres activités.

L'amélioration des zones environnantes est un élément important de la revitalisation. Le projet d'amélioration est un élément pertinent et stratégiquement important du plan général de la ville. Il permet de transformer les zones adjacentes en parcs, en zones de loisirs calmes et actives ou en lieux de festivals et de concerts. Outre les avantages sociaux et économiques, des solutions d'aménagement paysager réussies pourront améliorer l'esthétique de la ville, créant un environnement écologique favorable et agréable pour les visiteurs.

HafenCity à Hambourg est un excellent exemple de revitalisation d'un site industriel, considéré comme l'un des projets les plus ambitieux de l'Europe visant à transformer les zones industrielles désuètes en un quartier urbain moderne. Cette installation est située sur le territoire de l'ancien port de Hambourg, à proximité du centre historique de la ville. La réussite du projet HafenCity est déterminée par la préservation maximale du patrimoine historique, qui a été utilisé pour créer un lieu moderne, fonctionnel et confortable pour vivre, travailler et passer le temps libre.

Un bon exemple de la revitalisation en Ukraine est l'usine d'art Plateforme à Kiev, qui est le plus grand projet national créé à la place d'une ancienne usine. La majeure partie du territoire de l'usine d'art est utilisée pour des manifestations culturelles: festivals de café et de tatouage, Comic Con, Gogol fest, Halloween, Nouvel An, etc.

En guise de conclusion il faut dire que la stratégie de "repenser" des lieux défavorisés qui implique la revitalisation des sites industriels, contribuera à la restauration efficace et à la création des zones postindustrielles durables, innovantes et

viables en Ukraine. Cette orientation stratégique contribuera à la reprise économique durable et au développement des villes du pays. Ce processus aura un impact positif sur l'amélioration des plans urbains, l'infrastructure sociale, la création de nouvelles zones de vie, de divertissement et des activités commerciales, ce qui favorisera une amélioration de l'environnement urbain.

Ainsi, les caractéristiques positives des projets architecturaux liés à la revitalisation des objets de construction seront particulièrement pertinentes et justifiées économiquement et socialement en Ukraine dans le contexte de la reconstruction du pays après la guerre.

THE MAJORITY OF NIGERIANS ARE POLYGLOTS

M. Salim Sarkham
I. Zavaruieva
Ukrainian State University of Science and Technologies, Ukraine

Language emerges, develops and exists as a social phenomenon. Its purpose is to serve the needs of human society, to ensure communication between members of a large or small social collective, as well as the functioning of the collective memory of that collective. The same ethnos may use two or more languages. Conversely, one and the same language may serve several ethnic groups. For example, Spanish is used in Spain, Chile, Argentina, Uruguay, Bolivia, Peru, Ecuador, Colombia, Venezuela, Panama, El Salvador, Honduras, Mexico, the Republic of Cuba, etc. Many West African states have unequal situations, with local languages having greater demographic power and inferior communicative power to European languages. . One of the most densely populated African countries is Nigeria, my home country. Nigeria is home to more than 250 ethnic groups and Nigerian languages show the influence of different cultures and ethnicities. There are about 500 languages in Nigeria, nine of them are so-called dead languages with a few dominating.

In Ukraine, everyone speaks Ukrainian, except for foreigners, who, in principle, also try to learn Ukrainian and make progress over time. One language is good, but in Nigeria, apart from the official English language, there are many other languages. There is probably no other country in the world where the population communicates in 410 different languages! The major languages in Nigeria include English as the official language, Hausa, Yoruba, Igbo, Edo, Efik, Idoma, and Kanuri Central are also common. Nigerian languages are divided into two groups: the Nygero-Congolese languages (Fulfulde, Ijoid, Efik, Tula Waja, Kwa, Tiwoid) and the Afroasiatic languages (Chadik, Berber and Semitic languages).

The most common language in the country is Hausa. It is spoken by the majority of Muslims.

Most ethnic groups prefer to communicate in their mother tongue, English is used in education, business and for official purposes, it remains the exclusive domain of a small section of the country's urban elite and is not used in rural areas, the majority of the

population uses indigenous languages for communication, some of which have become standardised from a range of dialects.

I think there is no point in listing all the other languages of the local peoples. Nigeria is the largest country on the African continent and almost all the nationalities of Africa are represented on its territory: Hausa and Fulani, Yoruba, Ibo, Ijo, Kanuri, Ibibo, Tiv, Bini, which is why there are so many different dialects. According to the residents of the country, it is not difficult for representatives of different nations to find a common language among themselves; it would be more difficult to learn a language foreign to Nigeria. It should also be noted that local newspapers publish news in 13 languages - and that's in one newspaper! Therefore, most Nigerians are polyglots. So modern literature, folklore, and radio broadcasting in Nigeria are developed not only in English, but also in the languages of the Yoruba, Hausa, and Igbo peoples.

The Nigerian culture is also characterised by a respectful attitude towards visitors. The hospitality of Nigerians is the most important socio-cultural tradition of the country.

Nigeria is a country with a rich cultural heritage. It is unique in that it embodies unity in diversity.

COMPARISON OF POPULAR METHODS OF THERMAL INSULATION

A. Shapoval
S. Vasylenko, K. Shabanova
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Thermal insulation is one of the main characteristics that determine the quality, comfort, energy efficiency and environmental friendliness of a building.

Properly done thermal insulation can:

- Reduce cost of heating and air conditioning, by reducing the amount of heat loss from the building in winter and reducing heat gain in summer.
- Increase sound insulation, because thermal insulation materials also absorb noise from the outside, making the room quieter and more comfortable.
- Protect buildings from destruction by preventing appearance of condensation on the walls, which can lead to mold, mildew, and deterioration of building materials.
- Reduce greenhouse gas emissions by reducing use of energy. Thermal insulation makes construction more environmentally friendly and helps to reduce greenhouse gas emissions into the atmosphere.

Thermal insulation materials are used to protect buildings, industrial and energy equipment, and pipelines from heat loss. They are characterized by a low coefficient of thermal conductivity, which indicates their ability to effectively restrain heat transfer.

When assessing the quality of thermal insulation materials, attention is paid to:

- thermal conductivity;
- resistance to temperature fluctuations;
- uniformity of properties;
- density;

- low flammability and explosion hazard;
- durability during transportation and installation;
- moisture and water resistance;
- resistance to weathering;
- chemical resistance;
- harmlessness to humans.

The ability to retain air is one of the most important characteristics of an insulating material, as air has low thermal conductivity.

The maximum permissible thermal conductivity is no more than 0.17 W/(m-K) and an average density of no more than 500 kg/m3.

The first thermal insulation materials appeared with the first buildings. At that time, people used animal fur, wool, and plants (flax, reeds, straw, and reeds). But with the development of humans, construction and thermal insulation methods also evolved. So I propose to investigate which popular method of thermal insulation is the most effective.

First, let's define traditional thermal insulation materials:

- Mineral wool;
- Glass wool;
- Foam plastic;
- Expanded polystyrene;
- Polyurethane foam;
- Pinoizol;
- Expanded clay.

Popular methods of thermal insulation in the XX and XXI centuries are: mineral wool, foam, glass wool, foamed rubber, polyurethane foam, expanded polystyrene, and materials made from aerogel. Let's learn more about each material:

Mineral wool is a fibrous material, obtained from rock melts (basalt), metallurgical slags and mixtures. Mineral wool made from rocks is more commonly used, as it has a longer service life. Mineral wool is a non-combustible material with good heat and sound insulation. It is also environmentally friendly and easy to install. Despite this, it can absorb moisture and is more expensive than other materials.

Glass wool is a material made of glass fibers with properties similar to mineral wool. To make glass wool with good thermal insulation characteristics, olive and quartz wool are used, and the fibers are bonded with special binders, such as phenol-formaldehyde resin. It is characterized by strength and fire resistance, and is environmentally friendly. It has good thermal insulation properties. However, like mineral wool, it can absorb moisture, and difficult to install (because it is prickly and can irritate the skin due to small glass particles in the composition)

Styrofoam is a type of gas-filled plastic, a lightweight, inexpensive and moisture-resistant thermal insulation material, that gmade from expanded polystyrene. It is easy to install due to its light weight, has good sound and heat insulation, and is resistant to moisture. But at the same time, it is flammable, which makes it dangerous to human life,

has low strength, is not environmentally friendly, and emits harmful substances when heated.

Foamed rubber is a chemical material made from synthetic rubber that is foamed using special technologies. It is flexible and elastic, which makes it easy to install. It is non-flammable, resistant to moisture and can sustain high temperatures (from -200°C to +150°C) without changing its properties. Due to its advantages and difficulty in manufacturing the disadvantage of foamed rubber is its cost.

Polyurethane foam is a synthetic material made from two liquid components that react chemically when mixed to form a rigid foam. The material has high thermal and sound insulation properties, is resistant to moisture, temperature extremes and chemicals, which ensures its durability. It is also easy to install, can be applied by spraying and does not require additional overlapping of joints, which guarantees better thermal insulation. But the material is expensive and flammable, which does not make it the best option for use.

Expanded polystyrene is considered the most economical and convenient material for installation. It is also environmentally friendly, resistant to moisture and has good sound insulation. Using expanded polystyrene as a heat-insulating material saves space. For example: a 12 cm thick wall insulated with expanded polystyrene will have the same thermal insulation as a 50 cm thick wall made of wooden bursa, a 2 meter high wall made of brick, or a 4 meter high wall made of iron. Unfortunately, it is a combustible material.

Aerogel is a nanomaterial based on silicon dioxide, which is the lightest solid material and has good thermal and sound insulation properties. Aerogel is resistant to moisture and non-flammable, and has good thermal and sound insulation properties. Some types of aerogel are flexible, although most are made in the form of slabs or panels, which complicates the installation process. Also, since aerogel is a man-made material, it is expensive and difficult to produce

Summarize the information in Table 1 and summarize the results:

Table 1

Material name	Average density *kg/m3.*	Thermal conductivity *W/(m-K)*	Advantages	Disadvantages
Mineral wool	150-300	0,042-0,05	Non-combustible, environmentally friendly, resistant to deformation, high thermal insulation properties.	Can absorb moisture, more expensive than other materials.
Glass wool	100-150	0,045-0,06	Non-flammable, environmentally friendly, resistant to deformation, high thermal insulation properties.	Can absorb moisture, difficult to install, prickly, can cause skin irritation.
Styrofoam	15-25	0,032-0,038	Resistant to moisture,	Flammable, low

			sound and heat insulation, lightweight, inexpensive, durable.	strength, non-polluting, emits harmful substances when heated.
Foamed rubber	250-500	0,03-0,04	Non-combustible, moisture resistant, elastic, good heat and sound insulation, easy to install.	More expensive and difficult to dispose of.
Polyurethane foam	20-80	0,036	It is resistant to moisture, durable, has soundproofing properties, and is environmentally friendly.	Flammable, difficult to install and more expensive than other materials.
Expanded polystyrene	10-45	0,038-0,05	Inexpensive, lightweight, easy to install, resistant to moisture, environmentally friendly.	Combustible, can crumble.

Taking into account all the advantages and disadvantages of each material, it can be determined that the best materials for thermal insulation are: mineral wool, foamed rubber and aerogel. Although they all have a common disadvantage - the price - they are non-combustible, have good thermal insulation and stability.

REFERENCES

1. The Epoch times. Будівельні матеріали для сталого розвитку та енергоефективності // The Epoch times. 2024. URL: https://www.epochtimes.com.ua/korysni-porady/budivelni-materialy-dlya-stalogo-rozvytku-ta-energoefektyvnosti-157711
2. Види утеплювачів для стін // Budmagazin. 2023. URL: https://www.budmagazin.com.ua/vidy-utepliteley-sten
3. ІСТОРІЯ ТЕПЛОІЗОЛЯЦІЙНИХ МАТЕРІАЛІВ: ВІД ПАЛЕОЛІТУ ДО СЬОГОДЕННЯ // ALENOR. 2022. URL: https://alenor.ua/articles/istoriya-teploizolyaczijnyh-materialiv-vid-paleolitu-do-sogodennya/
4. Конструкції та матеріали енергоефективних елементів оболонки будівель // Розділ 3. 2023. URL: https://moodle.znu.edu.ua/pluginfile.php/1066428/mod_resource/content/2/%D0%A2%D0%B5%D0%BC%D0%B0%206.pdf

RELATIONSHIP BETWEEN CYCLE TRACK WIDTH AND LATERAL POSITION OF CYCLISTS, REQUIREMENTS FOR CYCLE TRACK WIDTH

A. Shylina
V. Shalomov
L. Druzhinina
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Cycling contributes to public health because it requires physical effort and offers economic and environmental advantages over motorized transport. However, 41,000 cyclists die every year in traffic crashes, 3% of the total number of traffic deaths worldwide. Most fatal bicycle crashes are collisions with motor vehicles. The majority of severe injuries among cyclists and an increasing share of fatal crashes, however, are due to single bicycle crashes. An international review shows that the share of hospitalized casualties due to single-bicycle crashes is varied from 52% to 95% [1-5].

While the presence of a cycle track is important to prevent bicycle-motor vehicle crashes, sufficient cycle track width is important to prevent collisions between cyclists as well as single-bicycle crashes such as riding off the pavement. In a crash study it is found that increasing cycle track width by one meter reduces the odds of riding off a cycle track and falling (OR=0.43; CI=0.19–0.96). As it is difficult to derive cycle track width requirements from these studies, guidelines look at cyclists' steering behavior and assume that steering behavior contributes to bicycle crashes. Requirements on the minimum width of a two way cycle track in several design guidelines are specified to be 75 cm for the space occupied by cyclists (an assumed 55 cm cyclist body and 20 cm lateral deviation from a straight line) combined with two buffer zones as depicted in Fig. 1.

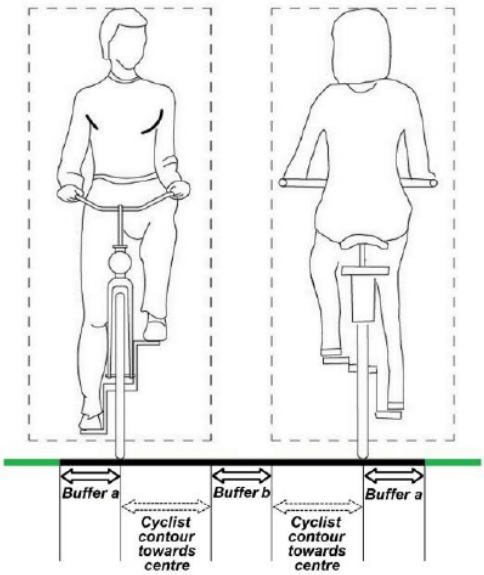


Fig. 1. Lateral space required for cycling: a) a buffer between the cyclist and the verge. In this study it is called 'lateral position'; b) a buffer between cyclists for meeting and overtaking.

The design manual for cycle traffic recommends a minimum of 150cm for standalone bidirectional cycle tracks where mopeds are not allowed and well-designed

verges are such as in Fig. 1. The width of 150 cm is based on three 25 cm buffer zones plus the lateral space of cyclists' physical contours towards the center of the cycle track of 75 cm. Buffer is not necessarily equal to a half of the physical contour of a cyclist because a cyclist may move partially across the shoulder. Many scientific studies examined the lateral position of cars, buses, or parked cars relative to cyclists, but few studies examined the lateral position of cyclists on physically separated cycle tracks so as to substantiate the assumed dimensions in guidelines such as in Fig. 1. The wider the cycle track, the more distance cyclists were kept from each other. Lateral position was examined in a number of observational studies since 2010.

A group of 24 experienced cyclists between 19 and 27 years old participated in the experiment. The group consisted of 11 male and 13 female students from the University of Technology. All participants were experienced cyclists and they all learned cycling at a young age (2–6 years old), except one participant who learned cycling at the age of 13.

Table 1 contains the descriptive statistics of the 18 participants with suitable lateral position based on 269 studies. The group consisted of 6 male and 12 female students aged 20 to 27 years. Higher values for lateral position are associated with a greater distance from the verge. On average, participants approached the verge to a minimum value of 21 cm on a 100 cm wide cycle track while their average maximum distance from the verge was 50 cm. Lateral space to maintain distance is the difference between the maximum and the minimum value in each trial, and the space that cyclists use around a straight riding line. The average lateral space to maintain distance per one trial is close to the difference between the average maximum and minimum lateral position. The standard deviation shows that median lateral position and lateral space for course holding vary somewhat between participants. Finally, the researcher who observed participants during all trials did not observe any crossing of the cycle track edge.

Table 1

Descriptive statistics per condition and for the total number of trials

Variable	100cm	150cm	200cm	150cm + parked bicycle	200cm + parked bicycle	Total
	Mean (SD)					
Median lateral position	36.4 (6.8)	48.9 (14.4)	54.9 (17.8)	37.2 (11.2)	46.3 (15.2)	44.8 (15.3)
Minimum lateral position	20.9 (8.1)	32.0 (13.5)	36.0 (17.8)	16.7 (7.0)	27.3 (11.7)	26.6 (14.0)
Maximum lateral position	50.2 (11.2)	64.8 (15.1)	69.9 (19.8)	57.9 (12.8)	64.5 (17.6)	61.5 (17.0)
Lateral space for course holding	29.2 (9.6)	32.8 (10.8)	33.9 (11.8)	41.2 (12.1)	37.2 (12.2)	34.8 (11.9)

Taking into account the experimental study and cross-sectional study, we come to the conclusion that an increase in cycle track width causes cyclists to ride further away from the verge and keep more distance from an oncoming cyclist. Doubling pavement

width increases lateral position by some 50%. Given the lateral position of cyclists when meeting an oncoming cyclist, the general differences between the behavior of cyclists and vehicle width and circumstances, the width of the cycle track must be 250 cm for safe maneuvering during oncoming traffic.

REFERENCES

1. Aldred, R. (2010). On the outside': Constructing cycling citizenship. Social & Cultural Geography, 11(1), 35–52.
2. Aldred, R. (2015). A matter of utility? Rationalising cycling, cycling rationalities. Mobilities, 10(5), 686–705.
3. Damant-Sirois, G., Grimsrud, M., & El-Geneidy, A. M. (2014). What's your type: A multidimensional cyclist typology. Transportation, 41, 1153–1169.
4. Fernández-Heredia, Á., Monzón, A., & Jara-Díaz, S. (2014). Understanding cyclists' perceptions, keys for a successful bicycle promotion. Transportation Research Part A: Policy and Practice, 63, 1–11.
5. Sanders, R. L. (2015). Perceived traffic risk for cyclists: The impact of near miss and collision experiences. Accident Analysis & Prevention, 75, 26–34.

CONNECTIONS AND IDEAS

O. Sudakin
T. Vlasova
Ukrainian State University of Science and Technologies, Ukraine

Ideas form from new connections.

Albert Einstein connected a dream about himself riding on a shaft of light to his efforts to determine the relationship between matter and energy to help form his theory of relativity. In 1865, Fricdrick August Kekule von Stradonitz connected his dream of snake's end to end in a circle to the problem of describing the chemical benzene. The result – his theory of a ring structure.

The ideas your mind forms from making connections are logical leaps in your thinking and may not seem like any big deal. You simply put one and one together and get two. However, what often seems like a simple idea can have a profound and lasting impact in ways that may not at first be apparent.

In the fifteenth century, Johannes Gutenberg lived in the wine-growing region of Germany. He was a printer who grew tired of using the laborious, time-consuming methods of the day. He broke the carved blocks of print into individual type and used a version of a wine press to stamp paper. His invention of a printing press with movable type was no big conceptual leap to him, but it revolutionized the printing and publishing industries and helped usher in the modern world.

Your mind makes some connections and forms some ideas naturally. You see a picture, hear a jingle, smell an odor, or touch an object. This information from your senses may connect in your mind with your problem and an idea forms.

A connection is a kind of analogy. Analogies are comparisons between two things that aren't the same but that have similarities. The human heart isn't a pump, but it

functions like one. Analogies make your mind more flexible because you have to stretch it to see the similarities between two things that are quite different.

COMPARISON OF OCCUPATIONAL SAFETY DEFINITIONS: GAS-FLAME AND FIRE WORKS

A. Syniavska
M. Nalysko
L. Druzhinina
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

What is the difference between flame and fire robots? Is it necessary to submit a declaration of compliance of the material and technical base with the requirements of the legislation on labor protection for fire works?

Gas-flame works belong to the List of works with increased danger, as well as to the Types of works of increased danger, which are performed on the basis of a declaration of compliance of the material and technical base with the requirements of the legislation on labor protection. Instead, temporary fireworks must be carried out according to a permit. There are many definitions of the term "fireworks" in the current legislation, but there is no definition of the term "flame (flame) works" [1].

Fireworks include production operations related to the use of open fire, spark generation and heating to temperatures that can cause ignition of materials and structures (electric and gas welding (cutting), gasoline gas cutting, work using blow torches, portable furnaces, bitumen heating) [2].

At each enterprise, a list of factories, shops, departments, and divisions must be developed, where fireworks must be carried out in accordance with the requirements of the National Fire Protection Act 0.00-5.12-01 and the requirements of the production instructions that are developed at the enterprises. The list of such objects must be coordinated with the emergency and rescue service (if available), labor protection and fire safety services and approved by an administrative document (clause 1.7 of the NPAOP 0.00-5.12-01). Fireworks, which are carried out in temporary places, must be carried out with the issuance of an order-admission for these works (clause 1.9 NPAOP 0.00-5.12-01) [2].

Fireworks are production operations related to the use of open fire, spark generation and heating to temperatures that can cause ignition of materials and structures (electric and gas welding (cutting)), gasoline-gas cutting, work using blow torches, portable furnaces (Clause 2.1 of Section II of the Rules for the Safety of Gas Supply Systems, NPAOP 0.00-1.76-15, approved by the Order of the Ministry of Energy and Coal Industry of Ukraine dated 05.15.2015 No. 285).

Fireworks include all types of electric welding, gas welding, gasoline gas and soldering works, boiling of bitumen and resins, as well as other works with the use of open fire or heating of parts to the ignition temperature of materials and structures (Chapter III of the Fire Safety Rules for the Operation of Nuclear Power Plants, approved by order of the Ministry of Fuel and Energy of Ukraine dated May 30, 2007 No. 256).

For the performance of temporary fireworks, an authorization order is issued (appendix to the Rules of Fire Safety in Ukraine, approved by the order of the Ministry of Internal Affairs of Ukraine dated 3012.2014 No. 1417; appendix 8 to the Rules of Fire Safety in Companies, Enterprises and Organizations of the Energy Industry of Ukraine, approved by the order of the Ministry of Energy and of the Coal Industry of Ukraine dated September 26, 2018 No. 491, hereinafter - Rules No. 491).

In Rules No. 491 the term “gas-flame works” is not used, the term “fireworks” is used.

Electric welding, gas flame, surfacing and soldering works are included in the List of works with increased danger (item 1 of the List of works with increased danger, NPAOP 0.00-2.01-05) [1].

Welding, gas-flame, as well as surfacing and soldering works performed with the use of an open flame belong to the Types of work of increased danger, which are done on the basis of a compliance declaration of the material and technical base with the requirements of the legislation on labor protection (clause 19 Group Appendix B of 2 of the Procedure for Issuing Permits to Perform High-Danger Works and to Operate (Use) High-Danger Machines, Mechanisms, and Equipment, Approved by Resolution of the Cabinet of Ministers of Ukraine dated October 26, 2011 No. 1107).

In the Rules of occupational safety during work with tools and devices (NPAOP 0.00-1.71-13) in section V there is chapter 3 “Occupational safety requirements during gas flame work” and chapter 4 “Occupational safety requirements during soldering work” (i.e. soldering works do not belong to gas-flame works), although clause 2.70 of chapter 2 of section V of NPAOP 0.00-1.71-13 contains the phrase “performance of manual gas-flame works”.

Gas-flame works include welding, cutting, heating products, etc. (clause 8.3.103 of the Rules for safe work with tools and devices, approved by order of the Ministry of Labor and Social Policy of Ukraine dated 06.05.2001 No. 252, the predecessor of NPAOP 0.00-1.71-13).

In conclusion it is possible to state the following:

1 In the Fire Safety Rules, the term “fireworks” has replaced the term “flame works”. The term “semi-luminous work” is more commonly used in labor protection regulations (in particular, NPAOP 0.00-1.71-13, NPAOP 45.2-7.02-12) than the term “fire work”;

2 According to the current legislation the works include: gas welding, gas to flame cutting, gasoline cutting, electric welding, electric cutting, soldering works; heating of bitumen, resin, etc.; use of portable furnaces; other work using open flame, sparking or heating to temperatures capable of igniting materials and structures (in particular, mechanical processing of metals with sparking);

3 The current legislation does not contain a definition of the term “flame (flame) work”. In accordance with the regulations on labor protection, flame works include metal processing (welding, cutting, heating, spraying);

4 Fire works do not belong to the List of works with increased danger and Types of works of increased danger, which are performed on the basis of a declaration of

compliance of the material and technical base with the requirements of the legislation on labor protection. Such requirements apply to gas-flame works [2].

REFERENCES

1. NPAOP 0.00-2.01-05. List of works with increased danger.
2. Fedorenko M. Gas flame and fire works. (2023). *Occupational Health.* Vol. 9. pp. 32-33.

SOFTWARE IMPLEMENTATION OF THE MODEL OF THE BLOCK ROUTE RELAY INTERLOCKING SYSTEM

O. Tihanov
R. Rybalka
Ukrainian State University of Science and Technologies, Ukraine

Currently, over the Ukrainian railway network, the electric interlocking systems (EI) for switches and signals are utilised to increase the capacity of railway stations. The majority of these systems are based on relay elements. To simplify the development of the schemes for the EI system, they are implemented using the allocation of relays in certain typical modules (blocks). EI systems that use such a structure are called block route relay interlocking (BRRI or in Ukrainian transcription - BMRC) systems.

EI systems are designed to ensure the safety of train traffic. In the event of a failure, the system switches to a more restrictive state (e.g., signalling to employees directly involved in train traffic to reduce train speed). In relay-based EI systems, this is guaranteed for a single fault. Therefore, when this failure is detected, the employees of such EIs should take measures to localise and correct it before the fault's multiplication.

Unfortunately, the relay EI systems on the Ukrainian railway networks are not equipped with automated (automatic) fault localisation. Therefore, the fault diagnosis (its duration) depends on the skills and experience of the maintenance personnel and their presence at the control centre ("post") equipped with the EC system after the fault is detected. Today, Ukrainian railways are experiencing a shortage of qualified personnel, including those maintaining the EI systems. This justifies the relevance of developing solutions that will lower the requirements for the skills and experience of relay EI system maintenance personnel and automated (or automatic) fault localisation.

In this paper, the author assumed that the fault localisation system (FLS) in the BRRI system uses sensors that measure the presence of a signal at certain points in the BRRI electrical circuit of a particular EI control centre. The most comprehensive solution is to install these sensors near each circuit's element. The disadvantages of this solution are the following: potentially high cost of installation and maintenance and increased complexity of maintenance of the LRF and the BRRI systems. Based on the assumption about the FLS, it is advisable to determine the set of sensor installation points for which the FLS will provide a sufficient level (coverage) of fault localisation. This work aims to create a software tool that simulates the operation of the FLS system circuit with the allocated sensors, which will allow estimating the level of fault localisation for different sets of sensor allocations.

There are various environments for modelling, including those able to simulate relay systems, such as MATLAB, GNU Octave, Electronics Workbench, and OrCAD. They contain libraries with relay models of certain real devices, which usually do not correspond to those used in the BRRI system. The schemas of the BRRI system are traditionally presented as a connection of windings and relay contacts. Therefore, implementing the circuits in the mentioned environments in this style will require artificially complicating the circuit, which is an additional disadvantage. To achieve the previously set goal, it is enough to work at the abstraction level that operates with the binary states of the elements of the BRRI system. Therefore, performing too detailed element settings is needed when modelling a BRRI system using element libraries in the mentioned environments. Thus, the author decided to implement the model of the BRRI system as a software tool, considering object-oriented programming (OOP).

The structure of a BRRI system consists of blocks connected in such a way that the electric circuits of relays and contacts (which are included in a block) form a series of connections, referred to as "strings". A logical test of certain conditions is performed in each “string”. Each “next string” depends on the “previous string”. Based on the above assumption about the FLS, displaying the measurement results of the sensors located in the BRRI system circuit on the monitor screen will reduce the time for fault localisation by decreasing the duration for performing similar measurements by employees at the EI control centre. I.e., to implement automated fault localisation.

Following the OOP, a hierarchy of types representing relays and other entities was created in this paper, which allows the presentation of a model of the BRRI system at an abstraction level that is sufficient to achieve the paper’s purpose. The entities implemented in the program are the following: classes - “Relay” (Relay), “Electrical Circuit” (Circuit), “Button” (Switcher), “Power Source” (VoltageSource), “Scheme” (Scheme), and “Environment” (Runtime); interfaces - “Contact” (iContact), “Relay Coil” (iRelayCoil), Electrical “Circuit Element” (iCircuitElement).

The “Relay” class contains, among other things, a unique identifier that indicates the name of the block in which the relay is located and the name of the relay itself. The functions of the class allow implementation of the operation of the relay armature considering its certain properties (e.g., time delay) and to simulate faults to test the FLS operation. The relay windings and contacts are combined in the “ElectricalCircuit” class. After programmatic activation of the “Button” class, an event is generated that triggers the test of the corresponding electrical circuits and updates the states of the contained elements. After updating the state of the “Relay”, an event is generated that notifies the corresponding “ElectricalCircuit” and “Environment”. The “Environment” class that implements a recursive algorithm determines the elements’ set that make up the closed electrical circuit and passes this set to the “ElectricalCircuit”, which provides switching of the corresponding elements. This process lasts until the final state of the BRRI system model is established.

The software tool was developed using the .NET 8 platform in the C# programming language. The software was tested in the Windows operating system environment. The adequacy of the software tool was proved by modelling several typical schemes of the

BRRI system and comparing the results with how the corresponding schemes should work in real cases.

Conclusions. The use of the software implementation of the BRRI system proposed in this paper allows modelling the behaviour of this system at the level of abstraction that operates with binary signals, including determining its state at any set of system points (sensors) and introducing a fault at arbitrary points of the system. This will make it possible to estimate the level (coverage) of the fault localisation for different sensor allocations. Consequently, this creates the ability to economically justify the suitability of using a certain configuration of the FLS in the BRRI system.

Further research. The author plans to create a failure generator (software tool) in the LMC system to accumulate a rich modelling results database.

IMPROVEMENT OF ORGANIZATIONAL AND TECHNOLOGICAL PROCESSES OF DATA COLLECTION FOR URBAN PLANNING MONITORING

L. Tkachenko
V. Gryanyk
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Statement of the problem. Urban planning monitoring is certainly not a new phenomenon and is considered a powerful tool of public authorities or local governments in managing the spatial development of settlements, the condition of urban planning objects, compliance with urban planning legislation and influencing the decision-making process [1]. The introduction of the national geospatial database infrastructure [3] in Ukraine has become a powerful impetus for the transition to the use of modern geoinformation technologies. However, the imperfection of the regulatory framework governing urban planning monitoring, the lack of a unified system of data collection and processing, and the insufficient use of modern information technologies in the field of urban planning monitoring means that governing bodies still face institutional obstacles, in particular, heterogeneity of data sources required for the functioning of monitoring systems, although inter-institutional cooperation is a fundamental condition for the successful operation of state and local governments. With the introduction of martial law in the country, access to information sources has been restricted, including lack of access to land resources and spatial planning data, as well as insufficient funding for urban monitoring activities. The result of the current situation is that the process of data analysis is sometimes inefficient and inaccessible, or not cost-effective at all, and the quality of the data may be inadequate.

The purpose of the study. The purpose of this study is to improve the organizational and technological processes of data collection [2] for urban planning monitoring at the level of local communities. The introduction of modern technologies for data collection and processing, as well as increased cooperation between various administrative bodies and local communities, will contribute to better planning and development of cities, as well as to improving the quality of life of the urban population.

Research results. The study is aimed at improving the organizational and technological processes of data collection for urban planning monitoring at the level of local communities. The objectives of this study are:

- identify the advantages and disadvantages of existing approaches to data collection in

urban planning monitoring, their effectiveness and suitability for use at the local level;

- identify the needs for data collection and analysis of urban communities;
- proposals development for improving methods and technologies of data collection for

urban monitoring, including the introduction of new tools and approaches;

- concept development of an optimal data collection system for urban planning monitoring, which takes into account the specifics of local communities and the needs of urban planning;
- identification of the main problems in the field of organizational and technological processes of data collection for urban monitoring and identification of opportunities for their solution;
- development of recommendations for local communities and authorities on the implementation of improved approaches to data collection and analysis for urban planning monitoring.

Ensuring reliability in organizational and technological data collection is key to the successful application of technological tools in urban planning monitoring and contributes to the achievement of its goals and objectives. One of the most powerful tools is geospatial technologies - geographic information systems. The use of data integration and analysis tools allows combining and analyzing various data sets from many sources, identifying valuable correlations, trends and insights.

Conclusions. The results of this study indicate that the use of improved organizational and technological processes of data collection for urban monitoring is one of the key factors in ensuring effective urban development in Ukraine. The developed technologies can be adapted to the needs of urban communities of different sizes and types. This research can have a significant impact on urban planning and development. The introduction of modern information technologies and improvement of the regulatory framework will significantly improve the quality and availability of information on the state and dynamics of urban development, which, in turn, will facilitate the adoption of sound management decisions on urban planning and development.

REFERENCES

1. Law of Ukraine "On Urban Development" Official website of the Verkhovna Rada of Ukraine https://zakon.rada.gov.ua.
2. Order of the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine "On Approval of the Procedure for Urban Planning Monitoring" https://zakon.rada.gov.ua.
3. Law of Ukraine "On National Geospatial Data Infrastructure". Official website of the Verkhovna Rada of Ukraine https://zakon.rada.gov.ua.

INNOVATIONS IN BUILDING MATERIALS

A. Trots
S. Vasylenko, K. Shabanova
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

The construction industry is constantly evolving, and building materials are evolving with it. Recent years have seen the rapid development of new and innovative materials that offer a number of advantages over traditional materials. These innovations not only contribute to improving the energy efficiency and sustainability of buildings, but also open up new opportunities for design and construction. Innovations in building materials are becoming a necessity to improve the quality of buildings, reduce environmental impact and increase the efficiency of construction processes. Building materials that have better characteristics than traditional ones are becoming more popular. These developments contribute to the emergence of new, unique architectural projects.

One of the innovations in building materials is aerogel. An aerogel is a lightweight, porous material consisting of 95-99.8% air, and the rest is a solid framework of silica, polymers, or other materials. It is used to insulate walls, roofs, floors, windows and doors.

The material is one of the best thermal insulators in the world, making it ideal for building insulation. It can significantly reduce heat loss in winter and heat penetration in summer, saving energy and money on heating and air conditioning.

Aerogel is extremely lightweight, making it an excellent material for buildings where structural weight is important. It can facilitate the transportation and installation of building elements, as well as reduce the load on the foundation and supporting structures. But despite its lightness, the material can be quite strong, especially when combined with other materials. This makes it suitable for use in various building structures, including walls, roofs, windows, and doors. It is also worth noting that some types of aerogel are fireproof and have excellent soundproofing properties.

Currently, aerogel is a rather expensive material, which limits its widespread use. However, with the development of production technologies and an increase in production volumes, its price is expected to decrease [1].

The next material to be mentioned is glass tiles. It is an unusual and elegant building material used for roofs. It is made of thick, tempered glass, which makes it resistant to weathering such as hail, snow, and rain. Glass tiles can be transparent or frosted, and come in a variety of colors and patterns, which gives you a wide range of design possibilities. Glass tiles are able to accumulate solar energy, which keeps the roof surface warm even at night. Consequently, snow does not accumulate on it. Such tiles are also used for roofing swimming pools and spas to create a bright and spacious room. However, it has its drawbacks. Glass tiles are more expensive than traditional roofing materials and can be prone to moss and dirt formation, which may require regular cleaning [2].

Conductive concrete is a special type of concrete to which conductive materials, such as metal fibers or carbon nanotubes, are added to facilitate the passage of electric

current through the concrete. At the same time, the concrete remains strong and resistant to external factors. Such concrete is used for the construction of structures that require lightning protection, as it is able to distribute electric current over its entire surface. Conductive concrete is also used for electric floor and wall heating, providing comfortable heat without the use of traditional heating systems. This can significantly save energy and reduce greenhouse gas emissions.

Studies show that conductive concrete can have the property of self-healing under the influence of electric current. This significantly increases the service life and durability of building structures [3].

Liquid granite is a special liquid construction mixture (70% of marble chips and 30% of special additives and decorative filler) that is sprayed onto a specific surface. Thanks to its composition, the liquid hardens beautifully and firmly. Liquid granite is an environmentally friendly material because it contains safe resins and natural marble chips and mineral fillers.

The material is characterized by moisture resistance, impact resistance, elasticity and high resistance to environmental influences such as UV rays, precipitation, and temperature changes. Thanks to these properties, liquid granite is ideal for decorating both building facades and interiors of premises for various purposes, and over time, during operation, the color will not differ from the original. This decorative liquid granite plaster creates a durable and very strong, moisture-resistant layer [4].

Transparent wood is a material made from wood processed using a special technology that has unique properties that make it a promising building material of the future. This material is used instead of glass for windows, creating bright and spacious rooms with better thermal insulation. In addition, it is used for building facades, providing them with natural light and aesthetic appearance.

Transparent wood is at least 5 times stronger and lighter than glass and is also more heat-resistant. Other advantages include the fact that the raw material is renewable and environmentally friendly: balsa wood grows quickly, and production costs are much lower than for glass, which has a significant carbon footprint due to heating and electricity costs. Transparent wood is quite flexible because it contains natural cellulose. To achieve transparency, balsa wood is soaked in a special solution, and then epoxy resin is added to the structure. Transparent wood or wood glass can be used instead of traditional double-glazed windows or other elements in building structures that require transparency but also strength, as well as environmental friendliness and energy saving [5].

Construction is an industry that always strives for development and progress. The construction sector is improving its methods, processes and materials to provide high-quality and environmentally friendly solutions. Innovations in building materials are constantly changing the landscape of the construction industry, providing new opportunities and improving traditional processes. New materials open up broad prospects for the development of modern construction projects. Their advantages, such as durability, aesthetics, cost-effectiveness and environmental safety, contribute to improving the quality and efficiency of construction work. Thanks to ongoing research

and innovation, we can observe the continuous development of building materials, leading to more sustainable, efficient and stylized buildings and infrastructure structures.

It is important to note that not all innovative materials are commercially available or widely used at the moment. Some are still under development or testing. However, their potential to improve the construction industry is significant and they are expected to play a significant role in the future.

REFERENCES

1. 1. Grishchenko, D. O., & Kovalsky, V. P. (2023). Innovative building materials (Doctoral dissertation, VNTU). [Electronic resource]. URL: https://ir.lib.vntu.edu.ua/handle/123456789/37753 (07.05.24).
2. Petrulya, A. V. (2016). Innovations in the heat and power sector of Ukraine. Benovskaya lya, 81.
3. Sobchuk, I. V., Cherepakha, D. V., & Khrystych, O. V. (2020). Composite material for corrosion protection systems of engineering networks. Kharkiv National University of Urban Economy named after OM Beketov Department of Tourism and Hospitality Management Trade Union Committee of Students, 306.
4. 4. Atanasiy, O. O., & Ishchenko, O. K. (2021). Trends in the development and use of modern synthesized facing materials. [Electronic resource]. URL: https://ir.nmu.org.ua/bitstream/handle/123456789/159771/7_%D0%90%D1%82%D0%B0% D0%BD%D0%B0%D1%81%D1%96%D0%B9_%D0%9D%D0%A2%D0%A3.pdf?sequence=1 (07.05.2024).
5. 5. Chicholik, A. A. (2023). Analysis of furniture products made of wood and epoxy resin. [Electronic resource]. URL: https://repo.btu.kharkov.ua/bitstream/123456789/43634/1/Konf_stud_2023-1%20FLDZ_DBTU-157-159.pdf (07.05.2024).

SOFTWARE IMPROVEMENT IN THE ARDUINO IDE ENVIRONMENT

O. Tymoshenko
L. Tymoshenko
Ukrainian State University of Science and Technologies, Ukraine

Arduino IDE is a multifunctional tool for developing and downloading programs to microcontrollers compatible with Arduino, based on C and C++ programming languages. As the complexity of projects created in the Arduino environment increases, so does the amount of software code that needs to be loaded onto the microcontroller. Due to the limited resources of microcontrollers, such as Flash, SRAM and EEPROM memory, optimization and minimization of the program is often required.

When optimizing the code, you should be guided by a few simple rules:

1. Use variables effectively. When programming on Arduino, it is important to use variables carefully. This means choosing the right data types for each variable and using them only where they are really needed. For example, if you need to store an integer, or the number is stored in the range 0 to 255, you can use the byte type instead of int to save

memory. Redundant global variables should also be avoided, as they occupy memory throughout the program's lifetime, even if they are not used at a certain point in time. Use local variables where possible and deallocate memory when they are no longer needed.

2. Avoidance of unnecessary operations. When programming for Arduino, it is important to avoid redundant operations such as redundant loops, redundant conditional checks, and redundant calculations. For example, if you know that a certain condition is always true or never true, you can avoid unnecessary checks in loops or conditional statements. Unnecessary floating-point operations should also be avoided, as they can be quite computationally expensive for resource-constrained microcontrollers. Also, avoid using nested loops or nested conditional statements if possible, as they can increase program execution time and resource consumption. Instead, choose more efficient algorithms and data structures that will allow you to achieve the desired result in less time and with fewer resources.

3. The use of libraries can greatly facilitate and speed up the development of the program. Libraries are sets of functions and classes that are already written and optimized for use in your project. One of the main advantages of using libraries is that they allow you to avoid rewriting code for common tasks. It is necessary to pay attention to the following points: functionality, resource saving, support (update) and license. Using libraries can save you a lot of time and effort during development, as well as help you avoid bugs and errors by using already tested and optimized code.

4. Optimize memories. Use local variables where possible and deallocate memory when it is no longer needed. Use the const and PROGMEM keywords to store constants in Flash instead of SRAM where possible. Use EEPROM to store data, avoid excessive writing and reading, as this may cause memory wear. Instead, use buffers to bulk read or write data. Use memory profiling and analysis tools such as avr-size to determine which parts of your code use the most memory and look for optimization opportunities.

5. Use multitasking or interrupts to optimize code execution and resource saving.

6. Thorough testing and profiling of the code is an important stage of optimization, which allows you to identify and eliminate possible problems with the performance of the program. Before you start optimizing, make sure your code is working correctly. Write test scripts that reproduce different operating conditions of the application and verify the correctness of the results. Use profiling tools to determine which parts of your code use the most resources, such as memory and CPU time. Tools like avr-size for memory and Serial.print for runtime can help identify hot spots in your code. When evaluating the performance of your code, consider the efficiency of your algorithms. Some algorithms can be more resource-intensive than others, so it is important to choose the most optimal methods of solving tasks. Consider the limited amount of memory on the microcontroller and make sure that your code does not exceed it. Large amounts of data or excessive use of libraries can cause memory overflow. After making the changes, test whether performance and functionality have improved. Repeat the cycle of testing, profiling and optimizing until you achieve the desired results. After identifying and correcting

performance issues, it is important to document the changes made. This will help save the improvements you made and make it easier to work with the project later.

Therefore, thorough testing and profiling of the code helps not only to ensure optimal performance of your software, but also to identify potential problems in the early stages of development. In general, code optimization is an important process that allows you to achieve greater efficiency and reliability of programs for Arduino microcontrollers and similar platforms.

HOW TEST-DRIVEN DEVELOPMENT ENHANCES PROBLEM-SOLVING SKILLS IN SOFTWARE ENGINEERING

H. Valuiskyi
I. Atroshenko
Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

Firstly, what is the Test-Driven Development exactly? Test-Driven Development or TDD is a software development process relying on software requirements being converted to test cases before the software is fully developed, and tracking all software development by repeatedly testing the software against all test cases. In layman's terms, we should not a write code before we have written automated tests that exercise that code.

For a deeper understanding it is proposed to dive into its history a little bit, and who is the best "guide" for that, if not the man, who developed or "rediscovered" the technique: Mr. Kent Beck. As is known, he holds a Master's degree in computer and information science and is a creator of extreme programming. And that's how Mr. Beck explained the history of TDD and his role as a "leading proponent":
"The original description of TDD was in an ancient book about programming. It said you take the input tape, manually type in the output tape you expect, then program until the actual output tape matches the expected output. After I'd written the first xUnit framework in Smalltalk I remembered reading this and tried it out. That was the origin of TDD for me. When describing TDD to older programmers, I often hear, "Of course. How else could you program?" Therefore I refer to my role as "rediscovering" TDD."

Worth mentioning that the practice of test-first development where planning and writing tests were done before development took place was first used by NASA's Project Mercury. In doing so, they shortened overall development time as the NASA test group had been able to write tests based on requirements and limits before their programmers implemented those features.

After the little history lesson thus explaining the origin of TDD, we can talk about how it is actually used in the projects and about its programming workflow or in other words cycle. The abovementioned Mr. Beck, in his "Test-Driven Development by Example" book, divides the TDD's workflow into the 3 main steps:

1. *Red* – Write a little test that does not work, and perhaps does not even compile at first.

2. *Green* - Make the test work quickly, committing whatever sins necessary in the process.
3. *Refactor* – Eliminate all of the duplication created in merely getting the test to work

Here we need to take a deeper look at each step:

The red phase marks the cycle's inception, posing the developer's greatest challenge: formulating tests against a nonexistent code. Despite the initial difficulty in conceiving test cases without a code, a shift in mindset is enough. Creating a test that presupposes code implementation is the way to think. During this phase, the developer prioritizes creating a user-friendly interface for future use. Indeed, attempting to write the first test without declaring a piece of code (e.g. a class or a function) throws a compilation error. Such test failure mirrors the red stage, prompting decisions on the code utilization based upon necessity, not assumptions.

Moving into the green phase: now, the code must pass the test, typically employing the simplest solutions. There is no need to even overthink it, since we will optimize it later. We should compile the code, and then launch the framework for unit testing. Novice TDD developers may grapple with the notion of producing a "just enough" code to satisfy the test. Once the initial test passes, the developer proceeds to create the next one to fail, progressively adding a code for success. Here, simplicity reigns supreme, with the sole task being to write a basic solution ensuring test success. Adherence to industry standards and code efficiency takes a backseat during this phase.

In the refactor phase, a developer can look back at the code to improve it while keeping all tests “green”. Now, it is easier to make it better or improve, because of the better understanding of the issue. Before, the developer did not consider additional factors such as design patterns, code maintainability, readability, and overall quality, so this phase is the time to check it all. Thereby, there is no need to worry about the functionality being lost while refactoring because test cases will automatically run to verify functionality every time the code is modified and recompile it.

For better understanding and summarizing all three phases combined, it is worth to draw attention to three simple examples set out below:

- Calculator Function: When building a calculator function, a TDD approach would involve writing a test case for the “add” function and then writing the code for the process to pass that test. Once the “add” function is working correctly, additional test cases would be written for other functions such as “subtract”, “multiply” and “divide”.
- User Authentication: When building a user authentication system, a TDD approach would involve writing a test case for the user login functionality and then writing the code for the login process to pass that test. Once the login functionality works correctly, additional test cases will be written for registration, password reset, and account verification.
- E-commerce Website: When building an e-commerce website, a TDD approach would involve writing test cases for various features such as product listings, shopping cart functionality, and checkout process. Tests would be written to

ensure the system works correctly at each process stage, from adding items to the cart to completing the purchase.

We can conclude that after you have learned about the history of test-driven development and gained insight into its proper implementation, you might start thinking this paper is solely about TDD's origins or its methodology. However, its core focus lies in how test-driven development enhances problem-solving skills in software engineers. And what is the best way to improve problem-solving skills? – The answer is to solve many problems, and TDD is all about solving problems, but being more specific, it is first about creating problems, and then solving them. After the continuous test-driven development practice, you will be able to create or predict problems and their solution will become much faster. But there are other few ways how TDD could improve your problem-solving skills: promoting a disciplined and meticulous coding methodology, TDD compels developers to contemplate every conceivable scenario for their functions. This rigorous approach fosters the creation of software that is both robust and resistant to errors. By breaking down the coding process into manageable stages and emphasizing the creation of tests as a primary priority, TDD enables developers to address complex problems more effectively. The outcome is solutions that are dependable, efficient, and streamlined.

MURPHY'S LAW AND ENGINEERING

O. Vlasov
Collegiate Institute of Toronto, Canada
T. Vlasova
Ukrainian State University of Science and Technologies, Ukraine

The first sewing machines were very delicate and complicated. Months were required for seamstresses to learn how to skillfully operate the machines. Even then, the machine sewing process was slow and prone to breakdowns.

An enterprising individual purchased twenty of the sewing machines and hired workers off the street to operate them. Only a rudimentary amount of training was provided. As each machine broke down, the problem was corrected through redesign or the installation of a stronger part. Within a matter of months, the sewing machine evolved into a rugged, easy-to-operate piece of equipment through the international application of Murphy's Law.

Also, remember Murphy can operate in reverse. The gremlins may decide to check on your flaws. Turnabout is fair play; so get your act together. Be Murphy and get Murpied; your organization will never be the same.

"Whatever can go wrong, will go wrong" is Murphy's Law. Experience tells us also that Murphy's Law will hit you at the worst possible time. Perhaps, your company develops a new product only to have the best customer find a major flaw. An important three-way conference call to a potential funding source is aborted by the new phone system. A volunteer forgets to turn off the coffeemaker and the ensuing fire destroys the document room. The thought of Murphy's Law invokes feelings of fear, apprehension and dread.

Murphy was right. Flaws in your product, services and organization will show up. Perfection is simply not possible in systems involving human beings.

IMPROVEMENT OF ORGANIZATIONAL AND TECHNOLOGICAL SOLUTIONS FOR THE CONSTRUCTION OF LOW-RISE RESIDENTIAL BUILDINGS TAKING INTO ACCOUNT THE RATIONAL CONSUMPTION OF ENERGY RESOURCES

O. Zaiko

E. Zayats

Prydniprovska State Academy of Civil Engineering and Architecture, Ukraine

The article deals with the problem of improvement of organizational and technological solutions for the construction of low-rise residential buildings.

Constructing a low-storied residential building with an emphasis on rational energy consumption involves several key considerations and design strategies.

Building Orientation. It should be oriented the building to maximize natural light exposure and minimize direct sunlight during hot seasons. This reduces the need for artificial lighting and cooling.

Insulation. The use of high-quality insulation materials in walls, ceilings, and floors will minimize heat transfer and maintain comfortable indoor temperatures, reducing the demand for heating and cooling.

Energy-Efficient Windows. It is necessary to install energy-efficient windows with low-E coatings, double or triple-pane glass, and proper shading to optimize natural light while reducing heat gain/loss.

Passive Solar Design means incorporation of passive solar design principles, such as south-facing windows for winter heat gain and thermal mass materials to store heat, reducing reliance on heating systems.

Ventilation. Design natural ventilation systems, such as operable windows, vents, and air pathways should enhance indoor air quality and reduce the need for mechanical ventilation.

Energy-Efficient HVAC Systems. Energy-efficient HVAC systems like heat pumps, VRF systems, or geothermal systems tailored to the building's size and occupancy for heating and cooling needs should be installed.

Energy-Efficient Lighting. Use of LED lighting fixtures and incorporate daylighting strategies well reduce electricity consumption for lighting while providing adequate illumination.

Water Efficiency. Installation of water-efficient fixtures, such as low-flow faucets, showerheads, and toilets, will minimize water consumption and reduce energy usage associated with water heating.

Renewable Energy Integration. Integrating renewable energy sources like solar panels or small wind turbines to generate clean energy on-site, offsetting electricity consumption from the grid should be considered.

Smart Controls and Automation. Implementation of smart thermostats, occupancy sensors, and automated controls for lighting, HVAC, and appliances will optimize energy usage based on occupancy and demand.

By integrating these design strategies and technologies, a low-storied residential building can achieve high levels of energy efficiency, reduce energy consumption, lower operating costs, and provide a comfortable and sustainable living environment for occupants.

REFERENCES

1. Peruzzi, L. 'The reliability of technological systems with high energy efficiency in residential buildings.' Energy and Buildings. (2014) Vol. 68. pp. 19-24.

2. Lapidus, A.A. 'Sip-technology as solution in low-rise multi-family residential buildings' E3S Web of Conferences. (2019) Vol.97. pp. 1-8.

3. Harris, J. 'Understanding Construction Stakeholders' Experience and Attitudes toward Use of the Structurally Insulated Panels (SIPs) in New Zealand.' Sustainability. (2019) Vol. 11 (19). pp. 1-14.

ANALYSIS OF TECHNOLOGIES FOR CREATING THE BACKEND OF WEB APPLICATIONS

R. Zulfaharov

L. Tymoshenko

Ukrainian State University of Science and Technologies, Ukraine

A framework is a set of basic programming language modules that dynamically expand and simplify the process of developing applications, websites and services. Using ready-made templates of frameworks allows you to avoid writing modules from scratch, which creates a convenient environment for developers. Many frameworks have an architecture based on layering (applications, modules), which allows you to extend the functionality of the application and use modified versions together with the framework code or third-party applications. The flexibility of this approach is one of the key advantages of using frameworks. In addition, the MVC concept is widely used in programming and when using frameworks, which allows you to divide classes into three groups.

There are two main functional areas in frameworks: work on the server side (backend) and work on the client side (frontend). The rules and architecture of server-side frameworks often prevent the creation of rich web applications, but they can create simple pages and forms. Also, server frameworks can provide security and generate output, being responsible for critical parts of the application. Some of the most popular server frameworks include Django (Python).

Django is a high-level framework that offers a fast and convenient solution for web development, including all the necessary components for writing high-quality and understandable code. In addition, it is an effective platform for interacting with customers of various businesses, is convenient for developers and avoids the need to rewrite code. Django allows you to create websites by composing different components,

which greatly speeds up the development process. This framework is able to effectively solve many tasks and work with large loads. Django is used to create various systems, such as CRM systems, CMS systems, communication platforms, reservation services, document flow management platforms, as well as algorithmic generators, email platforms, verification systems, filtering systems with dynamic rules, analysis platforms data and machine learning. Django also has an object-relational mapping (ORM) that automates interactions with databases, and mechanisms to prevent common attacks such as SQL injection and cross-site request forgery. Its modular and customizable architecture lends itself well to building both simple and complex APIs, and it comes with base classes for basic CRUD operations and a built-in utility for testing the API you're developing.

Zend Framework is an open source, object-oriented set of professional PHP-based web development packages developed and maintained by Zend. This framework consists of a set of classes that can be used both individually and in combination, which makes it a convenient and flexible tool for developing web projects. It is used mostly for large commercial projects and has support from big companies like Google, Microsoft and StrikeIron. Zend Framework uses various packages, including PHPUnit for testing and Travis CI for continuous integration. It supports PHP-FIG standards and has a PSR-7 implementation for HTTP messaging interfaces. The framework also provides MVC support with a Front Controller solution, and supports multiple database systems and providers. Zend Apigility helps developers build and document APIs using RPC and REST. Zend Server provides increased performance for PHP and the Zend Framework, including opcode acceleration and caching, as well as monitoring and diagnostic tools. Zend Studio is an integrated application development environment with features designed to make working with the Zend Framework easier, with MVC code generation, code formatting and analysis, parameter help, and other useful features.

So, after conducting an analysis between Django and Zend Framework, we came to the conclusion that the difference lies in the following aspects: the use of programming languages (Python vs. PHP), the architectural approach (Django implements built-in MVC support, while Zend Framework uses Front Controller) and the direction of application (Django is more often used to quickly create web applications, while Zend Framework is more suitable for developing large and complex projects).

НАУКОВЕ ВИДАННЯ

МАТЕРІАЛИ

XXII Міжнародної студентської наукової конференції

«ІНЖЕНЕР ІІІ ТИСЯЧОЛІТТЯ»

Англійською, німецькою, французькою мовами

Публікується в авторській редакції

Дизайн, комп'ютерна верстка: А. Безруков

Лист ДНУ «ІМЗО» № 21/08–7 від 04.01.2024 "Про Перелік міжнародних, всеукраїнських науково-практичних конференцій здобувачів вищої освіти і молодих учених у 2024 році" (№ з/п 115)

Український державний університет науки і технологій
49010, м. Дніпро, вул. Лазаряна, 2
www. ust.edu.ua
office@ust.edu.ua
conf.engineer@ua.fm