

CONTENT OF CREATIVE-GRAPHIC ACTIVITY OF ARCHITECTS AT THE CURRENT STAGE OF SCIENCE AND TECHNOLOGY DEVELOPMENT

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The rapid pace of scientific, technical and technological achievements into the national economy shows the scarcity of highly qualified creative specialists. In the conditions of today's automated production, experts require such features as understanding the content of work and its description. From the requirements of science and technology development, it can be said that a modern specialist should have the characteristics of a high level of craftsmanship, the ability to understand new and fast-learning techniques and technologies.

Modern architect is a new type of productive worker, creator-builder, architect-designer - an active representative of creative activity. His productive activity is inextricably linked with physical and mental work, broad polytechnic thinking, spatial imagination and high graphic preparation.

Architectural activity is a process closely related to graphic activity, which creates new, economical and beautiful projects of modern constructions. Architects are the advanced unit of the creative class, creatively minded, incessantly sought-after creative workers.

The architect's work is the main component of any building production. Studying the work of the architect in the most important branches of construction and design, it is possible to conclude that architects use a single principle of design. They "speak" with drawings, the "language of technology" in solving architectural problems. Making drawings - the same design principle is used in the fields of production, such as aircraft construction, shipbuilding, and clothing, which are very far from each other. The more specialized and graphic knowledge and skills an architect has, the more successful projects they create.

Recibido: 27 October 2023 / aceptado: 23 November 2023 / publicado: 08 December 2023

Designing, which is engaged in by design organizations, is a complex and long-term process, consisting of a set of works, from the creation of a project assignment for the object to the preparation of projects for the construction of the object.

Design documents include graphic and text documents. They determine the composition and structure of the building individually or together, have the necessary information for control, acceptance, operation and repair. The Unified System of Design Documents (ESPD) envisages the following main types of design documents: technical documents are usually developed for the construction of a building in two stages: first, a technical design, then working drawings.

The technical project includes the following: the scheme of the approximate master plan of the building, general architecture - several types of construction drawings - facades, plans, cuts; estimate-financial accounts, explanatory note, list of construction structures and engineering equipment, etc.

On the basis of the approved technical project, the master plan is determined and a detailed working drawing is prepared for the preparation of technical and technological construction and assembly works, separate items and details.

General architectural-construction drawings include facades, plans, elevations, ground plan and communication drawings.

A building project - is a document containing a picture of a building and other information necessary for its construction and control. Its composition will consist of the following drawings:

- **drawing of building facades** - a drawing of the image of the front and side views of the building, a document that reflects the architectural solutions of the building;
- **building cut drawing** - a document describing the structural elements of the building formed as a result of cutting by means of frontal and profile planes;
- **building plan drawing** - a document containing an image of the building taken from the base on a horizontal plane, and other information necessary for its assembly (preparation) and control;
- **specification** - a document that defines the composition of the assembly unit, i.e. a document consisting of a list of details included in the assembly unit represented in the drawing, their number and some technological data;
- **explanatory note** - a document consisting of a description of the structure and operation procedure of the planned construction, as well as evidence of the technical and technical-economic solutions adopted in its production;
- **design** - means a creative and systematic process of developing a memorial document, the size and quality of which allows building to build in compliance with all the requirements of construction technology.

The chief architect of the project plays a leading role in the design. He must prepare the project of the object, make sure of the correctness of the architectural and constructive solutions found, as well as develop a memory project consisting of a complete set of graphic and textual documents that will be the basis for the construction of many such construction objects. Architectural project documents are the result of architectural creativity, a tool that helps the architect to express his creative ideas and convey the construction object to the developers.

A technician-architect also plays a major role in the development of architectural documents. He makes working drawings of some parts according to the general view drawing of the object developed by the architect-engineer. Prepares specifications and tables, explanatory notes and notes. The process of object design in production consists of the following three types of design:

- creating a sketch project of the object;
- preparation of technical drawings;
- preparation of working project drawings.

Engineers-architects, like all production specialists, actively participate in the creation of perfect examples of memory with their creative results in the conditions of the development of science and technology. They perform several tasks (functions) in their creative work activities: prediction, planning, calculation, design, search for scientific and technical information, control of architectural documents (technological, normalization, metrological and copyright control).

In the planning function, the issue of developing a project of a new object is cross-sectional, and it implies carrying out scientific research, determining the quality indicators of the object's parameters, and so on. It is also planned to improve the quality and modernization of the new construction facility. Creates a grid graph reflecting the calendar plan of the development and clearly reflects the set to be executed.

The design function - is one of the main decision-making functions of an engineer-architect and solves the following issues:

- development of a technical proposal (if there is a need to clarify the project or nodes of the object and provide additional information in the technical assignment);
- object project options and choosing the best;
- development of a technical project;
- development of working documents.

Architects should have a wide range of general scientific, general engineering and special knowledge. This system of knowledge includes the following: social, moral, psychological,

natural-scientific, mathematical, technical-technological, economic, demographic, medical-physiological, ecological, legal, aesthetic, general cultural, informational, etc.

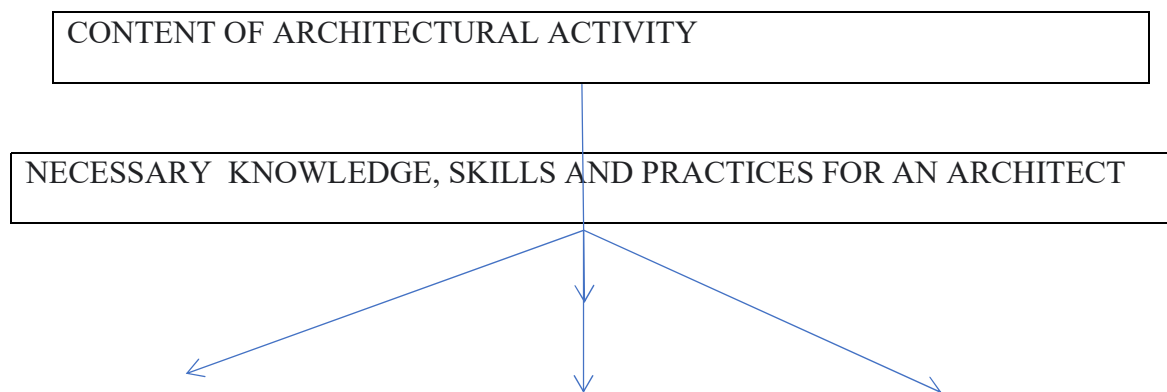
Spatial perception is crucial to the creative activity of architects. His ability to visualize the space allows him to make drawings of the object. A simple case of the application of spatial imagination to the architect's work is that his ability to imagine spatially is demonstrated when creating an orthogonal projection of a spatial object. According to the assigned task, the architect draws up the drawings of the construction object. During process of the design, the architect prepares the drawings of the new structure, which is not in practice, but formed in his imagination. Imagining the spatial surface with its shape, structure and all its features, creating its projections requires spatial imagination. Spatial imagination, like all abilities, can grow and develop with the help of practical training. This drawing is formed when solving practical problems from geometry and performing orthogonal projections of various spatial forms. Practice shows that not all people have the level of spatial vision necessary for an architect. That is why spatial perception is the limit of testing the professional ability of the memory.

Knowledge- is a system of concepts acquired by a person. And graphic knowledge is the concept of visualizing graphic images performed during the design process.

Competence - is the ability of a person to perform his work effectively in the required quality at the specified time. Graphical competence is the ability to describe the graphic images of the project of the object, which appeared as a result of graphic knowledge and spatial imagination, in projection methods.

Skill (including graphics) - is the ability of a person to perform necessary activities automatically without special attention.

Qualifications and skills required for engineer-architects include: professional-engineering, general engineering and graphics (see Figure 1.)



General engineering knowledge, skills and abilities	General knowledge, skills and abilities	Graphic knowledge, skills and abilities
Separating the properties and characteristics of building materials;	Theory, structure and working principles of construction objects;	Use of drawing tools and devices;
Performing engineering calculations;	Architecture-building history and its role and perspective in society;	Performing geometric constructions;
Use of general design solutions;	"Technical language".	Representation in projection methods;
To know and create a unified system of construction documents (ESKD).	Modern EHM and their graphic capabilities;	Making drawings in a computer graphics program.
	The essence of designing in ALT(CAD).	

Figure 1.1. Content of the architect's creative work

Engineer - the personal characteristic of the architect - is cut as the main criterion of his work and is defined as follows:

- **ideological direction:** ideological stability; moral and spiritual

purity; social obligation and civic responsibility, socio-political activity;

- **professional - architectural direction:** professional work ability; engineering ethics, technical thinking; spatial perception;

- **direction of knowledge:** scientific erudition; thirst for knowledge and interest; personal activity; anticipation of newness; willingness to learn independently.

Devices, tools and new methods of drawing execution cannot fully ensure the level of improvement of the efficiency of architectural project works. This is explained by the fact that the modern architectural object cannot fully ensure the level of improvement of the quality of project works. This is explained by the fact that the process of designing a modern architectural object does not consist only of graphic works. It is a complex, multi-step process, many of which are no longer up to date with the use of traditional and popular mechanization tools.

From the second stage, the designer-architect begins to actively use information from literary sources. He uses mechanization tools only from the sixth stage. In order to eliminate the gap between the level of mechanization and automation of the production process and design work, it is necessary to make changes to the principle of design work. This can be achieved by developing and implementing a design automation tool and machine (computer) graphics system.

The EHM(electronic calculator machine)'s RAM contains several groups of data for the machine's programming language:

- the general sample information for project development belonging to a separate field of construction;
- programs for necessary calculation to develop the project of the architectural object;
- construction of graphic images, in particular, orthogonal projections,

AvtoCAD graphic editor for changing scales, creating orthogonal and axonometric projections, cutting and doing sections, setting dimensions and writing texts;

EHM(electronic calculator machine) includes a special electron-beam tube (display).

Visualization of construction drawings is of great importance in design automation and graphic design work. A drawing is one of the most complex and necessary documents in production. It is intended for extensive human observation, demonstrating the capabilities of modern automated systems for the perception of complex network graph structures. Automating drawing and graphic work, which is used by architects and designers for half of their working time, is an urgent problem.

The issue of training highly qualified architects in the new socio-economic conditions requires not only their professional direction, but also the formation and development of computer graphics literacy. Great attention is paid to information and computer culture for the wide use of new information technologies in all work activities of engineers-architects.

This has a strong impact on the design work of an architect-engineer, as it demonstrates students' theoretical and practical knowledge and skills in working with the graphic capabilities of new information technologies. Today, computer technologies are widely used to effectively organize the work of specialists in various fields of the national economy. Modern computer technologies provide the ability to quickly process not only numerical and textual information, but also complex graphic information.

In this regard, S.S. Sviridenko, a major specialist in computer technologies, said: "Automated designer (architect) workplace has a number of features. Here, the main devices are the display and the graphomaker.

The development of today's modern electronic - computing machines, the automation of the production process allows the automation of the entire technological complex, starting from a simple drawing (project) to the production of the finished product. Along with professional (technical, technological, graphic and other) knowledge for engineers-architects, they acquire knowledge and skills in computer graphics, which is an element of computer technology. This necessity arises due to the fact that today the drawing - the main design document is created by an automated method, with the help of computer graphics editors, stored on information media, depicted on the display screen, and printed on a plotter.

Formation of design-architecture and graphic knowledge and skills in students is one of the important problems of their professional training. The practice of production is a reliable testimony to this fact that engineers-architects must have deep knowledge of graphic knowledge and skills at the same time as drawing and designing. Without this graphic knowledge, skills and abilities, they cannot perform their professional activities at the required level.

Our many years of pedagogical activity in the system of higher technical education and the analysis of scientific and pedagogical literature show that the subject "Drawing geometry" in the curriculum is considered the basis for the formation of graphic knowledge, skills and abilities, and opens the way for the manifestation of creative abilities. It expands their spatial imagination and equips them with graphic literacy skills such as reading and executing drawings that form the basis of design, sketching objects and making working drawings. Also, in the process of studying general engineering subjects and special subjects, the levels of graphic literacy develop, the knowledge and skills acquired in the process of completing stage projects are further improved, and in the process of completing the graduation qualification work project, their graphic and creative abilities are fully demonstrated.

Thus, graphic knowledge, skills and practice play an important role in the content and structure of professional training of future architects and occupy one of the main places. The basis of designing is graphic activity. Architecture and architectural design are one of the necessary components of professional training of architects in line with scientific and technical development in modern production.

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