WAYS TO CREATE A MOCK-UP PROJECT AND PREPARE FOR MOCK-UP MAKING CLASSES

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Аннатоция: With the growth of the quality of life there is a need to build modern, quality housing, using modern building materials, the labour of qualified builders becomes in demand and highly paid. This situation forces us to approach the process of building design with special care, to strive for a longer life of both architectural objects and complexes, as well as residential, public interiors and landscaping. The main task becomes the guarantee of quality and safe construction, i.e. risk reduction. The only way to evaluate the idea at the project stage is to create its computer model or traditional layout. Mastering the basics of modelling in the training and education of specialists: architects, designers, restorers is one of the most important factors in the modern education of higher school students.

Keywords: "Layout", artistic techniques and methods of volumetric modelling, architectural elements, cardboard and paper, finishing materials, planning layouts, colour in layout, design and architecture.

Introduction. In modern Uzbekistan, as well as all over the world, attention to the objects of architecture and design is growing. In the years of independence, especially in recent years, the course of our country to improve the quality of life requires an increase in the construction of housing, social and industrial facilities and this is given great attention by the state.

Projects of architectural drawings give a planar image of the object and do not give a full volumetric vision of the designed building, construction, whether it is a residential house or special purpose objects - schools, hospitals, commercial enterprises, etc. that is do not give to see the whole idea of the designed object in a finished form.

Therefore, it makes sense to produce architectural models, which visually express the designer's idea and provide significant assistance in the design of buildings and building ensembles, as well as in the approval of projects and their demonstration.

One of the main tasks of modern architectural education is the development and improvement of abstract thinking and imagination, as well as creative method and professional outlook. Therefore, in the process of education and professional training of students of architects, designers to use only graphical methods of sequential two-dimensional design drawings is not enough. In this regard, it is necessary, along with the graphical execution of projects to use the techniques of layout modelling.

‘Layout’ studies the variety of artistic techniques and methods of volumetric modelling with the use of various materials, thus contributing to a better understanding of the form and structure of designed objects and the organisation of socio-cultural space. As a result of studying and mastering the discipline ‘Layout’ a graduate designer must master the basics of three-dimensional modelling of complex geometric shapes with the use of different textures and textures. Acquire the ability to work in different materials, taking into account their specificity to create spatial compositions of varying degrees of complexity, to apply the methodology of work on the volumetric-spatial composition with the subsequent use of the results obtained in the design projecting. With the development of computer technologies, it has become possible to create models of various processes. For example, modern volumetric modeling programs allow us to estimate what the natural lighting of buildings and structures will be like on any given day, hour or even minute. Taking into account insolation is important not only at the level of large projects, but also on the scale of private living space. In addition to the physical characteristics of comfort, lighting determines the emotional perception of an object, which, as a rule, is complemented by a fairly accurate rendering of the colors, textures and textures of the designed object.

The possibilities of three-dimensional modeling in designing building structures and engineering systems are impressive. Even today, emergency modelling is used to calculate evacuation routes in crowded places. And futuristic ideas of building construction by robots that receive digital information directly from the designer's computer do not look so utopian today.

Methods: The method of searching and showing architectural project in volume/mock-up/ has been used in the past. Beautiful architectural monuments of Central Asian architects of XIV-XV centuries are widely known. Since ancient times, the miniature image was used to test architectural and structural solutions, to search for the perfect image and perfect structure of the conceived construction. At the same time, one of the key functions of the model was to demonstrate the future object, the confirmation of this has come down to us from different times and places.



Fig.1. https://sverenins.uz/wp-content/uploads/ga-unwto-25_0__3_0.jpg

Each building created by these remarkable masters, before it was built, was carefully checked on a model, where all architectural elements were worked out in detail, sections and interiors were shown. Previously, models were made mainly of wood, cardboard, paper, gypsum and clay. Recently, architectural compositions are created with the use of polymeric

materials, such as organic glass, celluloid, cellon, foam plastics, and various plastics, which have a significant advantage over wood, cardboard paper and gypsum. Polymeric materials are weatherproof, easy to work with and bond to each other and to other materials.

Results: Architectural mock-ups are classified according to scale, materials of manufacture, type and degree of mechanization .Types of architectural mock-ups according to their purpose.

Architectural maquette is one of the varieties of maquette. The following types of architectural maquettes are divided in modelling:

1.Layout/scheme/greening represents a building and the space around it to be greened.

2.Interior layout - a model showing the internal layout of the space, finishes, colours, furniture and decorations.

3.Landscape design layouts - layouts of landscape design development include layouts of paths, bridges, pergolas, small architectural forms, plant patterns and decorations Landscape design layouts usually show common areas and in some cases include models of buildings.

4.Town-planning models - models, as a rule, of small scale / starting from 1/500 and smaller: 1/700; 1/1000; 1/1500; 1/2000; 1/10000; 1/20000/, representing several city blocks, sometimes whole cities, industrial objects, resorts, etc. Town-planning models are a vital element for planning the development of the territory[1].

For a more accurate recreation of the future object when making models, it is important to observe the scale.

Scales of image reduction on models should be chosen from the following range: 1:5; 1:10; 1:20; 1:25; 1:50; 1:100; 1:200.

When designing general plans, the scales of reduction of images on models should be chosen from the following range: 1:100; 1:200; 1:400; 1:500; 1:1000; 1:2000; 1:5000.

Layouts are also classified by other parameters:

- By scale differentiate:M1/1000; M1/500; M1/300; M1/200; M1/100; M1/50; M1/20.
- On materials of manufacture: paper, cardboard, wooden, plastic, metal, combined.
- By type: Conceptual urban planning, planning, landscape, panoramic, interior, collapsible, planning models of industrial objects.
- By degree of mechanisation: With backlighting, without backlighting, with internal backlighting, with external backlighting, with dynamic backlighting, with moving elements.

Modelling is the oldest method of modelling. Volumetric models have been known since prehistoric epochs, the highest achievements of the art of modelling are kept in museums, for example in the Research Museum of the Russian Academy of Arts (St. Petersburg), the Musée des Plans-Reliefs (Paris). And the models were used not only to present design ideas. It is no exaggeration to say that the use of models has largely influenced the character of Modern architecture. Among the defining characteristics of this trend we will single out the attitude to the architectural object as a spatial composition, most holistically perceived from a bird's-eye view, i.e. from the perspective typical for the perception of a model in the average scale (1:100, 1:200).

Skills of layout modelling are becoming more and more in demand for the implementation of project ideas not only in art, architecture, design, but also in other types of activity. In terms of methodology, the most productive is the working modeling, carried out in order to find a compositional solution.

Working modelling/ layout/ assumes active activity of students connected with visualisation - thinking 'measuring' of the layout, finding relations between parts, checking different points of view and relations of internal and external space. Abstract thinking is supported by visualisation - the student creatively learns the method of modeling. Architectural models can be made both in the process of designing and in assistance /working models/, as well as according to the finished project drawings /exhibition-demonstration models/[2].

Discussion: The purpose of a building model is to show the architecture with varying degrees of detail of the element. An architectural model of a single building or structure, made on a large scale, allows you to judge not only its external form but also its interior. In some cases, to demonstrate various construction processes are made active models. The spread of the method of modelling contributes to improving the quality of the developed projects, helping their perception and gives the opportunity to see the conceived project in the closest to the natural form.

Fixtures, tools and materials for modeling

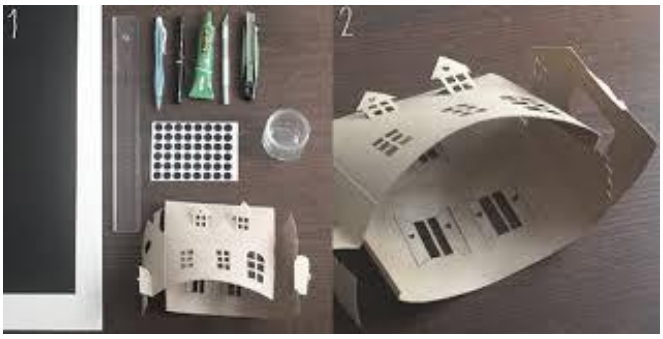


Fig. 2 - http://www.creativetherapy.ru/2014/04/08/maket-domika-iz-bumagi/

Materials for making the layout and landscape base. There are different materials used in modelling, the choice of which depends on the purpose of the layout. Cardboard and paper are the most accessible and common materials.



Fig. 3. https://zsmk-neft.ru/dom/makety-domov-dlya-stroitelstva-foto-izgotovlenie-maketov-domov-dlya-stroitelstva-pod-zakaz.html

- **Cardboard and paper** are used as materials for modeling - the most accessible materials from which it is possible to make any model, including plastic forms in the papier-mache technique, easily give any color and get any texture. Cardboard can be sheet and roll, of different thickness /0,2-3,0 mm/ and density. It is well colored and glued. Cardboard is mainly used for making reliefs. Paper is mainly used for drawing /watman/. White, dense, it is well cut and glued to wood and cardboard. You can easily make a model of a house out of it, for example. Corrugated cardboard, foam board, foam plastic are also used. Paper and cardboard

are the most common materials for creating models, especially in the educational process. This is explained by their easy handling, availability and economy, as well as a high set of expressive means. Paper and cardboard for modelling should have both sufficient rigidity to ensure the strength of the model and, at the same time, sufficient plasticity to convey the character of the surface shape. For making furniture models in scale 1:10, 1:5, 1:1, planning models, interior models, coniferous and hardwoods are used. In addition to solid wood, glued plywood of various thicknesses, veneer (peeled and planed), fibreboard, chipboard and joinery boards are used.

- **- Foam plastics - ultra-light plastic masses .** The specific feature of these materials, obtained on the basis of synthetic polymers, is their heterogeneity and peculiarity of structure, resembling the structure of frozen foam. In the production of volumetric greens, elastic polyurethane/porolone is used.
- - Sheet organic glass, celluloid, styrene copolymers, polystyrene foam, polyvinyl chloride foam, foam plastic, polyethylene foam, etc. are often used for making models. Using the plasticity of polymeric materials, it is possible to perform various layouts, achieving a high artistic effect. Rigid foams have low volumetric weight and are well machinable, therefore they are used for making working models of furniture, planning layouts and interior layouts in any scale.
- **- Metals** (wire, tin, tubing) are used for modelling various frameworks, bases, openwork compositions (nets, shelves, etc.).
- **- Glues** are used depending on the type of material and the nature of its joining with other materials. Glues For gluing parts made of wood, cardboard and paper, various glues of vegetable and animal origin/starch, fur, casein, albumin, rosin, PVA, crystals, 'Moment' and others are used. At gluing of products it is necessary to know properties not only glues, but also glued materials, which are porous /wood, cardboard, paper, foam plastic, etc./ and non-porous /organic and silicate glass, celluloid, cellon, plastic, etc./ In modelling both organic and synthetic glues are used. Synthetic glues are more practical and convenient in use, therefore they are successfully used for gluing of various materials including polymeric ones.
- **- Finishing materials** are necessary to give the layout the greatest expressiveness. They include paints (gouache, tempera, polyvinyl acetate, oil), enamels, varnishes, dyes (mineral and aniline), etc. They are applied with a brush, tampon or spray. They are applied with a brush, tampon or sprayer.

- Fabrics, ceramics, glass, threads and vegetation elements are also used in models. Structural elements of the model, which have no prototype in nature, are painted white or made of transparent colourless material.

Architectural models, as a rule, performed in a limited range of colours, to ensure the integrity of the perception of a large space - to bright colours do not crush the layout.

Layouts of interiors are performed with a conditional approximation to the colour scheme of the project to ensure its expressiveness and visibility

Demonstration models are made taking into account the final materials of the project execution, which allows to present the shape of the object, its proportions, colour design.

Exploratory (working) models are made in a monochrome colour scheme, as their main purpose is to check the layout of details and units, to clarify the basic proportions of the object.

In urban planning modelling, the unity of the planning concept and spatial idea of the building is achieved, as well as the connection with nature and urban planning situation[3].

Colour in layout. Color as well as any other element of composition should be carefully considered from the position of maximum compliance with the created image. Features of color perception, based on associations, have the right to be taken into account when designing any object of design and graphics.

Emotional-spatial parameters of the most common colors are as follows:

-Yellow - visually removes, expands, forms a feeling of warmth, lightness, vigor, cheerfulness.

-Orange - visually approximates, forms a feeling of dryness, high temperature, the disposition of the spirit of joy.

-Violet - visually reduces, compresses, Forms a feeling of coolness, solidity, emotionally deprives will, induces sadness.

-Blue - visually reduces, shortens, creates a feeling of coldness, dampness, comforting. Antiseptic, tidy.

-Green - visually minimises, narrows, unifies. Forms a sense of cold, emotionally soothing. Pleasant, healthy, natural.

-Red - visually approximates, limits, creates a feeling of warmth, excites. It carries the following parameters: dynamism, activity, danger.

-White - visually expands, expands, increases. Forms a feeling of lightness, emotionally leaves indifferent.

-Black - visually approximates, reduces. Creates a feeling of oppression by heaviness,

-Grey - visually does not update anything in any way, the feeling of moderation, solidity.

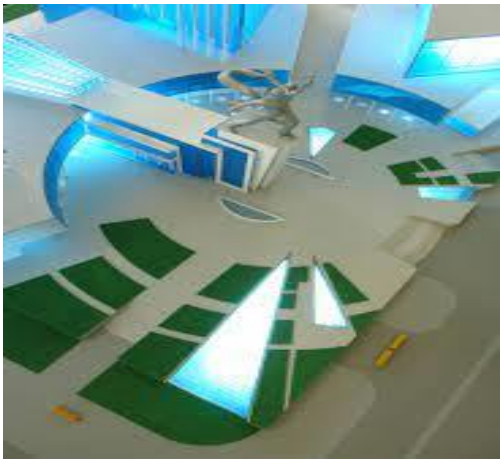




Fig.4. http://www.mirmaketa.ru/images/arc/vdnh/3b.jpg

Fig.5. https://www.facebook.com/photo/?fbid=1255576677907012&set=pcb.1255578681240145&locale=fr_CA

Such mock-ups allow assessing not only the general appearance of the facility, but also compliance with ergonomic and safety requirements, as well as a number of other technical characteristics. The volumetric real model allows to reveal the mistakes made earlier, to evaluate functional, technical and aesthetic advantages of the project[5].

Layout takes a firm place in the process of training of specialists in design and architecture.

in the training of specialists in design and architecture. When using traditional media such as paper and cardboard, plasticine and foam plastic, modeling remains the easiest way of modeling to master. Tangible paper blanks are much more visual than objects on the screen of monitors, and familiar, almost everyday, tools for processing are clearer than any interface. Working with a tangible form contributes to the consistent development of students' spatial thinking, and the acquired skills of work will lay the foundation for mastering the ways of modeling with the help of computers[5].

Conclusions: All these features make layout one of the main disciplines for students of design and architecture.



Fig. 6. https://zsmk-neft.ru/dom/makety-domov-dlya-stroitelstva-foto-izgotovlenie-maketov-domov-dlya-stroitelstva-pod-zakaz.html

- students have a general idea about volumetric-spatial models, their scope of application, materials and manufacturing technologies;

- skills of working modeling, to form an individual-

The project method in solving creative tasks;

- volumetric-spatial thinking, to get experience of volumetric-spatial construction;

- of systematic independent work on a considerable volume of course work;

- work with scale, to get an idea about regularities of perception of objects in nature, on scale models, on photo images and three-dimensional visualizations;

- gain experience working with historical materials, familiarize themselves with architectural details of one of the historical epochs.

Students after studying the discipline should know:

- main types of volumetric spatial models, their features, scope of application;
- basic materials used in modelling, their properties,
- peculiarities of production and processing technology;
- basic tools used in layout;
- layout method, history of its development;
- modern digital modeling technologies, methods of integration of traditional layout practices into modern pro-

The main tools used in the layout method, history of its development;

- digital modeling technologies, methods of integration of traditional layout practices into the modern design process.

The following are the methods of integration of traditional layout practices into the modern design process by means of CAD (Computer-Aided Design Systems).

CAD (computer-aided design systems) be able to:

-put up creative problems and solve them individually on scale-scale models;

-define material and technologies of making models, proceeding from on the basis of design tasks;

-present their design ideas in layouts, comparing the volume of the technical work on the preparation of the presentation with the specifics of the project and the target group.

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