MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
KARAGANDA STATE TECHNICAL UNIVERSITY

Vavilova O.N., Antonenko R.I.

ARCHITECTURAL GRAPHICS AND MODELING

Karaganda 2018

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The manual introduces students to the means of imaging and types of architectural graphics and volumetric modeling, with its role in real and educational design, the relationship of graphics with the types of creative activity of the designer, and also helps to form the graphic knowledge and skills necessary for organizing and implementing the designer's activities. On the basis of the acquired graphic diploma, he prepares future designers of environmental objects for the proper use of methods and means of graphics in design design.

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INTRODUCTION

This manual will allow the student to master the knowledge of architectural graphics, modeling modeling, to acquire the skills of its use in professional activities. Architectural graphics is a language code for the presentation of creative ideas and therefore determines, prompts and corrects the direction of professional searches of the designer. Architectural graphics has an active influence on project creativity. It forms ideological and professional representations and this influences the author's position of each individual. Mastering it affects the quality and content of memory, imagination and fantasy.

In his work, the designer must professionally own architectural graphics, which will allow him to realize his creative intentions. All the variety of graphic techniques lies at the basis of the principles on which mechanics and image technology of manual graphics are built. Everyone is aware of the importance of researching the tools of architectural graphics not only as an effective means of improving the quality of modern design, but also the quality of education in higher education.

Graphics is one of the most effective ways of forming and developing creative skills for students in the process of their education. Architectural graphics in educational work pursues educational tasks. Thanks to the development of means and types of graphics, the student learns the compositional patterns of architectural and environmental objects, their style features, artistic and technical methods and techniques of image, various graphic materials. Graphics is one of the important criteria for the development and assessment of the creative abilities of the student, therefore, in the teaching practice of design, it is necessary to develop a culture of architectural graphics, to instill a taste for a variety of composition and graphic techniques for images and materials.

The teaching of architectural graphics is practically made up of the student's training in related disciplines, such as descriptive geometry, drawing and painting. Perfection is carried out in the process of educational design. It is there that various graphic techniques are worked out in accordance with the object and stages of design, with the idea and content of the architectural building or structure. In addition to architectural and design, there are other types of design. In all types of design, they use their own graphic techniques, which are closely adjoined and partially merged with architectural and design graphics.

1 GRAPHICS AND MODELING IN DESIGN

1.1 The role, main features and significance of architectural graphics. Architectural means

Architectural graphics - a set of tools and techniques for the image on the plane of an architectural object in the form of drawings and drawings that give a complete picture of the purpose, functional, compositional and structural features of the object.

In other words, architectural graphics are a language through which an architect professionally expresses his creative intentions.

Designing any architectural structure is a complex process, consisting of several stages: sketching, project development, graphic design. Each design stage solves specific tasks in accordance with which the most rational, effective means of the image are selected.

To express their creative intentions, architects use drawings, drawings of structures and other objects in orthogonal, axonometric and perspective projections, reflecting the appearance of buildings, their internal structure, details.

Architectural graphics relies on descriptive geometry - a discipline that is a theory of graphic representation of three-dimensional objects on a plane. On the other hand, graphic art uses graphic art tools that give architectural images greater visibility and reveal the artistic qualities of the depicted buildings and their details.

On the basis of the use of methods of descriptive geometry, architectural graphics are divided into three types of images: images in orthogonal projections, in perspective and in axonometry. When the image is executed, mainly using drawing tools, is called a drawing; when it is performed mainly "by eye" and "by hand", is called a drawing. In the graph, both methods are often combined.

The main tasks of architectural graphics are:

1. to the image of architectural objects in the drawings giving the possibility to build in nature:

2. to such images of architectural objects that would give the possibility of a more complete picture of the composition, of the structures and materials, of the internal interior and exterior appearance, of the three-dimensional properties and artistic plasticity of them, of the details, of the environment.

Such images allow us to evaluate the projected objects, i.e. to judge their profitability, the appropriateness of their planning and their designs, their artistic merits, and their conformity to the surrounding ensemble.

The set of images of the projected object with the corresponding calculations and explanations (which is usually defined as a set of technical documents) are called a project (from Latin predecessor).

Drawing formats

In architectural graphics, as well as in engineering and construction drawing, the drawing formats established in GOST 2.301-68 (ST SEV 1181-78) are used (Figure 1.1). The drawing formats are determined by the dimensions of the outer frame, united by a continuous thin line.

Sizes of the main formats:

A_0 – 841x1189 мм
A_1 – 594x841 мм
A_2 – 420x594 мм
A_3 – 297x420 мм
A_4 – 210x297 мм

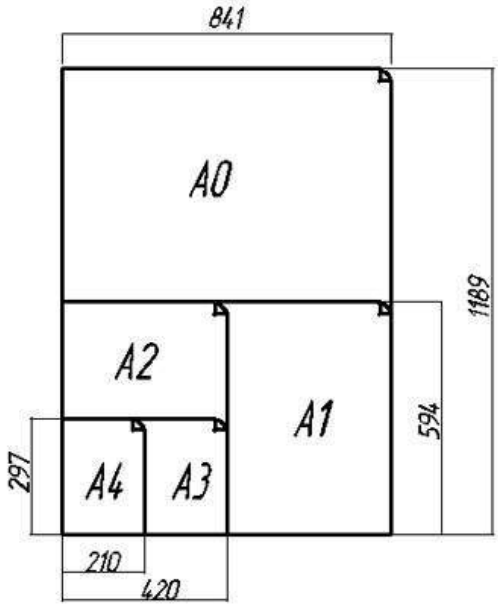


Figure 1.1 - Drawing Formats

In addition to these formats, the standard practice uses standard sheet or roll paper, stretched on a stretcher. The following dimensions of the subframes are common:

For 1-2 courses - 75x55 cm

On the 3-5 course - 80x80 cm, 100x100 cm

In architectural graphics, high-quality execution of works of large volume and duration is possible only on a stretcher with a stretched paper. Formats (A1-A4) are used to perform exercises, sketches.

Scale

All the drawings in the architectural chart are drawn to scale. A scale is a ratio that shows how many times the size of a line in the drawing is less or greater than the value of the corresponding line segment in nature, for example, a scale of 1: 100 means that 1 cm of the line of the drawing corresponds to 100 cm in kind.

In the architectural chart, the scale of the drawing is selected depending on the size of the structures, the purpose of the drawing. For the drawings of

plans, sections and facades, scales of 1:50, 1: 100 were adopted; 1: 200. Architectural and structural details are performed on a scale of 1: 5, 1:10, 1:20. For master plans, scales of 1: 400, 1: 500, 1: 1000, 1: 2000, etc. have been adopted.

For the speed of plotting on a scale, you can use self-made scale rulers: a blank line is drawn on a prepared strip of paper or cardboard and a segment equal to the base of the scale is laid several times on it (Figure 1.2).

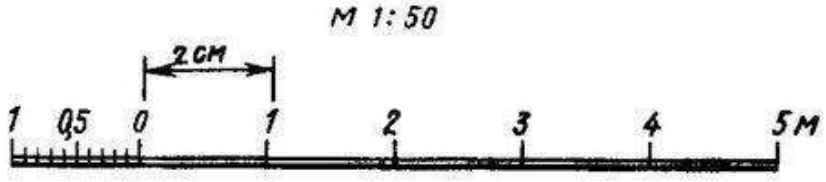


Figure 1.2 - Linear scale

So, for a scale of 1:50, the base is a line segment of 1000: 50 = 20 (mm), i.e. 20 mm in the drawing correspond to 1000 mm in kind. In the ruler above the dividing points of the line on the segment, numerical values corresponding to natural dimensions are inscribed.

Line, point, tone.

Any image in the architectural chart is constructed using a line, a point and a tone (Figure 1.3). The line is the most common, simple and versatile graphic tool. The sum of the graphic techniques allows you to identify the position of the object, its mass, dimensions, surface texture, etc. in the image.
Depending on the tools used, there are three types (reception) of the image in the architectural chart: linear, tonal and color. To successfully perform work on the architectural schedule, you must have the necessary number and composition of tools and materials.

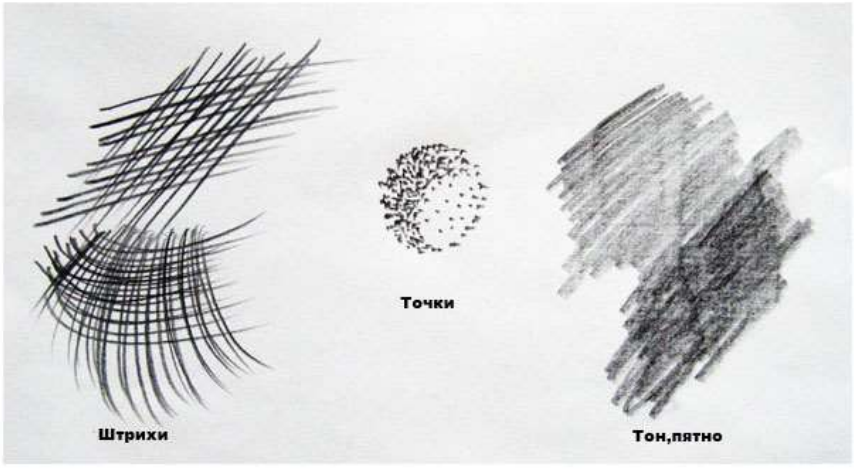


Figure 1.3 - Graphic tools - line, point, tone.

Materials and tools.

For the successful execution of works in the architectural schedule, it is necessary to have the necessary quantity and composition of materials and tools. Their quality, methods of use directly affect the final result - a graphic image. It is recommended first to study the properties and capabilities of materials, tools, various devices for graphic work. Doing the final, clean work, avoid using unfamiliar or poorly studied materials and tools to protect the work from an unexpected effect.

Paper.

As a material for design, the paper is selected depending on the purpose of the drawing and the image methods. For the work in the linear chart, paper of the grade "paper" is used, and the works in the washing technique look more textured on paper of the "gosznak" type (a watermark that is clearly visible in the corner of the sheet when viewed at a lumen) or "torchon"

Watercolor paper is an excellent basis for painting. It successfully withstands high humidity without slipping. Paints do not spread on a dense sheet, which gives the artist the opportunity to create original color variations and combinations. Finished work dries quickly, this process does not spoil the image quality. Such paper is suitable for drawing with gouache or watercolor.

(Figure 1.4).

Figure 1.4 Types of paper for graphic work

Paper with a friable surface - semi-wattman - is mainly used for sketches performed by soft pencils. In architectural graphics, white paper is mainly used, which emphasizes the expressiveness of the graphic image. The important quality of paper is its strength, which allows it to be washed repeatedly, rubbed with a rubber band, cut with a razor.

Pencils

In the architectural schedule. A pencil is used to develop a drawing, prepare it for an ink stroke and as a graphical tool with rich artistic capabilities. Depending on the tasks assigned, choose a pencil of a certain hardness. Pencils

with marks T, 2T, 3T, 4T, 5T ... etc. are used for drawing. (domestic production) HB, H, 2B, 3B, 4B ... etc (foreign production). For the picture, pencils TM, M, 2M, 4M, 6M and HB, B, 2B, 3B, 4B ... are recommended. etc. (Figure 1.5).

Techniques for working with a pencil depend on the graphic task. The main way to clean the pencil is "on the cone". To draw the lines along a vortex or a corner piece, the pencil should be kept slightly inclined, turning between the fingers.

It is advisable to pay attention to the quality of paper, if low-quality paper is used, it is advisable to draw ordinary pencils. On the paper, a pencil tracing paper is relatively convenient to use a thin automatic pencil. Pencils should be stored in a hard or soft case or a special box. For sharpening simple pencils, use a well-honed penknife.

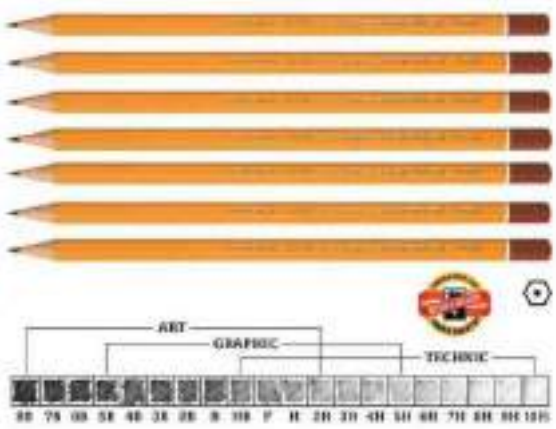


Figure 1.5 - Types of pencils

Preparatory

The set of tools that make up the set of the set includes: a compass, a gauge, an extension leg for drawing circles of large diameters, a ballerinas, pen drawers (insert-drawing tool) (figure 1.6).

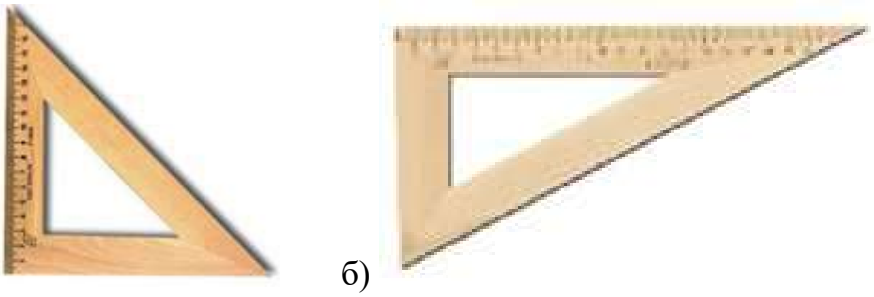
Figure 1.6 - Prepared for pencil drawing graphics

To work with the rapidogram, the set of tools that make up the set of the set includes: a compass, a measuring instrument, an extension leg for drawing large circles, a ballerina, a rapididograph nozzle (Figure 1.7).

Figure 1.7 - Prepare for the ink drawing drawing

Squares

For architectural graphics, a minimum of 2 gons, with an angle of 300, 450, is necessary. It is desirable to have gons of strong transparent plastic with chamfers along the working edges of the tool. Chamfers are necessary for working with the pen-drawing and rapidogram, because Such a device prevents the carcass from flowing under the working plane of the instrument (Figure 1.8).



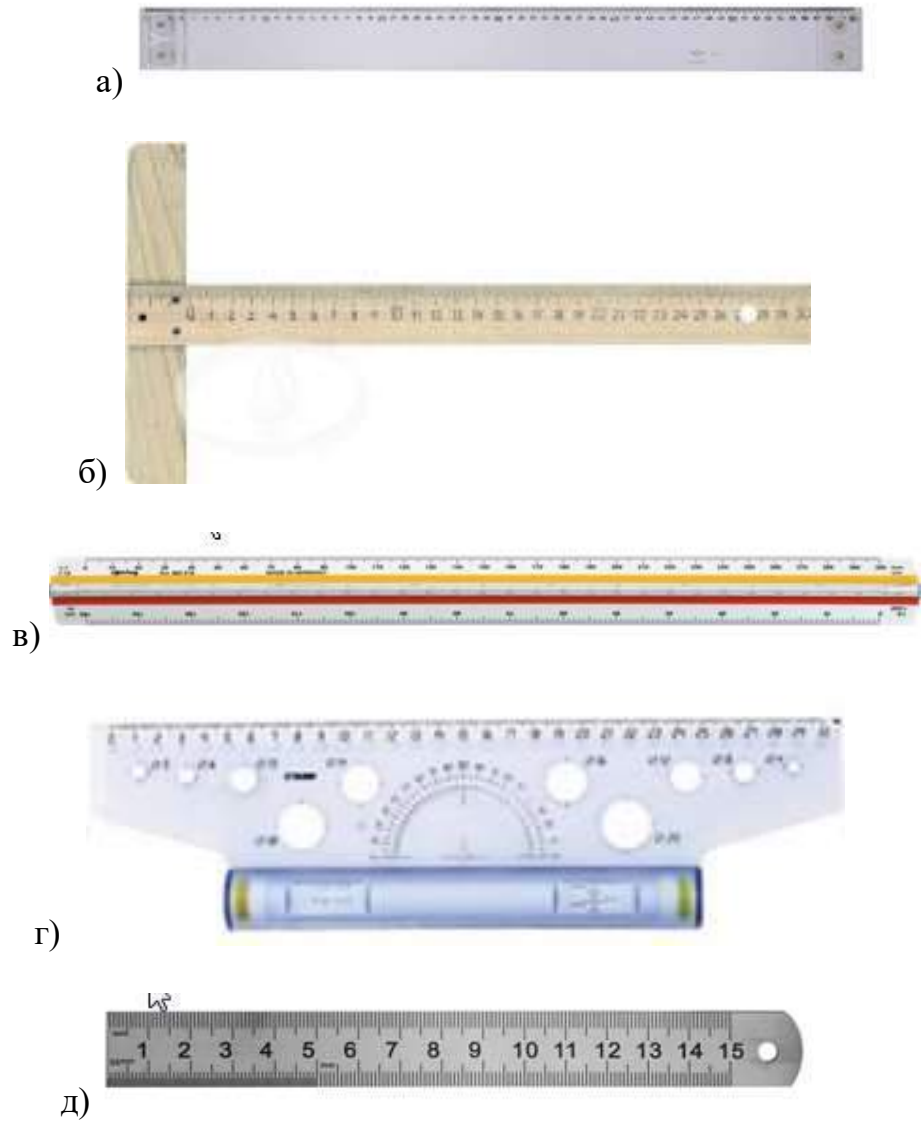
a) б)

a) gon 90 °, 45 °, 45 °; b) the angle of 90 °, 30 °, 60 °

Figure 1.8 - Types of angles

Rulers

For architectural graphics, one plastic (or wooden) rack with rollers is needed to work on a stretcher 15 cm long - 100 cm, one plastic or wooden length 40-30 cm and scale scale with linear scales of 1:50, 1: 100. It is desirable that the plastic rulers are made of strong plastic with a clear application of centimeter divisions and chamfers on the working edges of the tool. Dirty surfaces of tools should be cleaned (plastic wash with soap). Very convenient for drawing drawings inertial ruler (wheelchair). Metal rulers are convenient for cutting paper in prototyping (Figure 1.9).



a) reel with rollers; b) the Reich; c) scale scale;
d) inertial ruler; e) a metal ruler

Figure 1.9 - Types of rulers

Erasers

It is necessary to have a soft eraser for erasing pencil lines and a hard eraser for wiping ink and ink stains. It is advisable to pay attention to the purity of the eraser's erasable surface, because dirty eraser leaves dark stripes on paper.

Mascara

For graphic works, two types of carcass must be used: Chinese (tile) and liquid. Chinese mascara is the best means for performing work in washing washing techniques. It is desirable to store diluted solutions for work of Chinese

carcass in clean glass bottles with a ground rubber stopper (Figure 1.10). Rubbing of solutions of Chinese carcass is made only with the use of boiled water.

Figure 1.10 - Chinese Mascara

Liquid mascara (domestic and imported production) is intended only for drawing and graphic works and is not suitable for washing. In general, the drawing is performed with undiluted ink, but if necessary, the mascara can be diluted with water (Figure 1.11).

Figure 1.11 - Ink of domestic and foreign production

Diluted mascara should not be mixed with pure mascara, and it is not recommended to store it for a long time. it gets an unpleasant smell.

Brushes

In a.G. used squirrel, core and bristle brushes. In form they are round, flat and flutes (wide flat brushes for covering large surfaces with opaque paints). A good round brush (squirrel, columnar) moistened in water, after shaking is going into a bundle with a sharp end. Brushes are marked depending on the diameter of the hair follicle. For tonal and color graphics, the following types of round brushes are used (Figure 1.12, 1.13).

Figure 1.12 - Round squirrel brushes

Figure 1.13 - Round synthetic brushes

It is necessary to have a minimum of 3 round brushes from the hair of a squirrel or a column - thin (No. 4-8); - medium (№ 8-16); - thick (No. 20-24) for washing large surfaces.

Bristle brushes are used mainly to transfer the texture of the material in the so-called dry brush technique (Fig. 1.14, 1.15).

Figure 1.14 - Bristles of flat brushes

Figure 1.15 - Flanges

After watercolor paints, the brushes are washed in clean water, after gouache and tempera - washed with warm water and soap. The washed brush is not shaken, the hair bundle is wrapped in newspaper or tissue paper - so the brush retains its shape and does not collect dust.

Watercolor paints (for toning, painting, washing).

There are three types: solid - in tiles, soft - in plastic cuvettes and liquid - in metal tubes. The best available watercolors are St. Petersburg's Leningrad and Neva sets (Figure 1.16).

Рисунок 1.16 - Акварельные краски

For watercolor paints are characterized by lightness and transparency, and the highlighting of colors occurs due to the transmission of paper through the thinnest color layer.

Gouache

All the gouache paints are opaque (ie the previous layer of paint completely overlaps the previous one). Gouache equipment is characterized by dullness and velvety surface. The industry produces gouache of 2 types: artistic (for easel painting) and poster (for decorating works). The gouache is packed in

plastic and glass jars of various capacities, stored at room temperature. When drying, it is diluted with water (Figure 1.17).

Figure 1.17 - Gouache colors

Rapidographers

Rapidograph is a self-recording pen with a tubular needle head intended for drawing and graphic work with ink. The tool is marked according to the diameter of the tubular element in fractions of a millimeter (Figure 1.18).

Figure 1.18 - Set of Rapidographs by Rotring

In architectural graphics, the most commonly used are Rapidographs with a thickness of 0.18; 0,25 - for carrying out thin axial lines, images of small details; 0,3 - for drawing the main lines; 0.5; 0,7 - for cutting lines (Figure 1.19). In the process of working, the speedogram must be held vertically, to keep the line, without pressing the instrument. Sometimes a set of Rapidographs can be

equipped with a special ink, which, when filled with a tool, does not dry out for several days.

Figure 1.19 - Marking of Rapidographs and their Line Thickness

When using drawing ink of domestic production, Rapidographs should be washed daily in disassembled form with warm water and soap.

For the drawing of circles and curve curves by the rapidogram, there are special headstones that are attached to the compass (Figure 1.20).

Figure 1.20 - Nozzle for Rapidograph

Working Rapidograph, it is convenient to use rulers and chamfers with chamfers (notch along the bottom surface of the working edge of the ruler) to prevent leakage and lubrication of the carcass.

Micrograph

This thin collet automatic pencil is filled with graphite rods of different hardness and thickness (0.3, 0.5, 0.7 mm) (Figure 1.21).

Figure 1.21 - Microgram of the company Rotring

Felt-tip pens

Handle with felt rod, filled with colored ink. In the architectural chart is used mainly at the stage of sketching. The felt-tip pen is convenient in working on a smooth surface (Whatman, pencil tracing paper).

Figure 1.22 - Artistic marker (marker)

Tracing paper

Translucent paper designed for copying drawings. Conditionally, the tracing paper can be divided into two types: pencil (matte, with a slightly rough surface) and inked (more transparent and smooth) (Figure 1.23).

The most commonly used tracing paper is 297 mm wide, 420 mm, 594 mm, 610 mm, 841 mm, 914 mm (imported) and 420 mm, 625 mm, 878 mm (Domestic). Office formats A4 and A3 are popular for printing on copiers and laser printers, and for offset and stencil printing formats - 70 per 100 cm, etc., are preferable.

Carcass tracing

Pencil tracing paper

Figure 1.23 - Types of tracing paper

Patterns

Device for drawing lines of varying curvature. The patterns are produced in the form of plastic templates of various shapes and sizes or devices, consisting of a metal band, a screw or a plastic tape of a special material, which has the property of being fixed in the desired bend.

Figure 1.24 - Set of patterns

Scotch tape

Adhesive tape, rolled up in the form of a ring. For fixing sheets of paper to the plane of the stretcher, the culmination, the working table. It is better to use not thin buttons, but thin strips of scotch. If there is no scotch, then the sheet is fastened with buttons that stick into the working plane, not poking the paper, but pressing its edges with the plane of the button (Figure 1.25).

Figure 1.25 - Attachments for attaching paper

Heavy paper

For graphical sketching, production of sketch layouts, it is necessary to use small or medium-sized format. It is desirable that the paper for these purposes is dense, granular, convenient for work with a pencil, colored chalk, and the use of a pen, brush, and rapidogram. Heavy paper can be successfully used in prototyping.

Mocking Knife

For prototyping, for cutting out paper, using 3D modeling techniques in a. It is necessary to have a knife with a blade of knives of special hardening. It is advisable to use model knives with blades of standard width of 9mm or 18mm. Blades of such knives have notches, allowing to break off the dulled extremity, opening the scraped metal site after scrapping. To such knives it is necessary to have spare blades (Figure 1.26).

Figure 1.26 - Types of model knives

Glue

In the architectural graphics sometimes additional means of the image are used - volumetric models, applique, collage. In these cases, the quality of the adhesive used is of great importance. Stationery silicate adhesive discolours colored paper, leaves stains on it. For gluing large planes, it is convenient to use a paste made of flour or starch. The best glue is synthetic polyvinyl acetate (PVA) glue. It is white in color, odorless, and dries quickly. Glue PVA can be diluted with cold water to the desired concentration. And, on the contrary, if the

glue was liquid, it should be left open for a while: the water will evaporate and the glue will become thicker.

а)  б) 

a) packaged in bottles, b) in the form of a pencil

Figure 1.27 - PVA adhesive

Stretcher

Board for stretching paper. Dimensions of subframes for architectural graphics - 30x42cm, 55x75cm (Figure 1.28).

Figure 1.28 - General view of the subframe design

Plate (board) for drawing for the sheet format AZ (300x400 mm). The surface of the tablet (board) should be smooth and smooth. To work on the board, you need a trolley on rollers or a ruler, on the tablet - a vortex;

2 FONT IN ARCHITECTURAL GRAPHICS

1.1 Specifics of Architectural Font

The font in the architectural drawing should correspond to the nature of this or that image, making with it a single style and composite whole (Figure 2.1).

Figure 2.1 - Font as a sample of corporate style

Font is an extremely important element of the drawing. A well-executed drawing can be easily spoiled by a font that is ineptly applied or poorly associated with the image compositionally or stylistically. The font of the architectural drawing has a certain specificity, i.e. should contribute to the aesthetic expressiveness of the drawing.

The main requirements for the architectural font are:

1. Clarity, clarity, readability;
2. The simplicity of the outlines of letters, the absence of unnecessary strokes, supposedly "decorating" the font;
3. Style unity of the font and image on the sheet;
4. The compositional unity of all letters of the inscription with the image;
5. Coordination of the scale of the font and the drawing.

There are a huge number of types and types of modern fonts and among them there are many eclectic (eclectic - mixture of styles) that are gross or simply not suitable for use in an architectural drawing (Figure 2.2).

Figure 2.2-Fonts overloaded with decorative elements

It should also be taken into account that not every typographic font can be used for an architectural drawing (Figure 2.3).

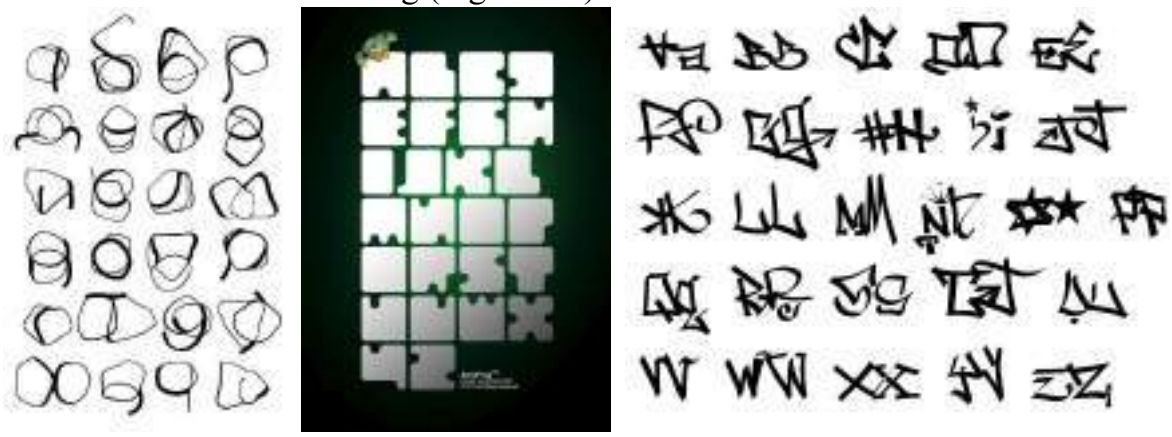


Figure 2.3 - Bad Readable Fonts

Figure 2.4 - Fonts used in architectural graphics

The fonts used in the architectural graphics should be concise readable (Figure 2.4).

1.1 General principles of the construction and arrangement of font letters

There are a number of common rules used to build all fonts.
1. All letters and inscriptions must be built according to one principle. For example, within one text, the construction of the letter "O" based on the circle, and the letters "C", "E" or "Yu" on the basis of an oval or an ellipse, is incorrect. In this case, the constructive unity of the font will be violated (Figure 2.5);

Figure 2.5 - Building font letters

2. The main criterion for the correctness of the construction of any text is the formally correct construction of its elements and their optical perception. In this regard, we must remember:

a) all letters are constructed on the basis of 3 simple geometric shapes: circle, rectangle, triangle (figure 2.6);

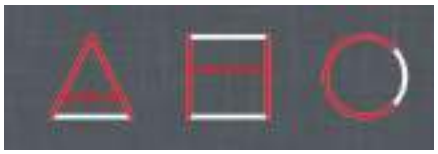


Figure 2.6 - Building letters of a font based on geometric shapes

b) According to the laws of visual perception, letters based on the form of a triangle and a circle, having the same height with letters that are built on the basis of a rectangle, will appear lower than the last. Therefore, to create an optical equivalence, they should be done somewhat higher (Figure 2.7);

Figure 2.7 - Adjusting the optical illusion of the font height

c) Letters that have a horizontal division (A, B, B, E, F, F, X, H, E, Z) look more stable if their lower part is larger than the upper one (Figure 2.8 a). A variant with a pronounced upper placement of the dividing lines is possible (Figure 2.8b). It is undesirable to divide these letters into equal parts, visually they will still seem unequal, and the upper part will appear larger (Figure 2.8c);

Figure 2.8 - The outline of the horizontal elements of the font

d) The distance between the letters is determined by the compositional requirements imposed on the inscriptions on the drawing. If the letters are facing each other with closed sides, then the distance between them should be the

maximum (Figure 2.9a). If two semi-open sides are located next to each other, the distance will be smaller (Figure 2.9b). If two open sides resist each other - the distance should be taken as minimal (Figure 2.9 c);

Figure 2.9 - Distance between letters

1.1 Figure 2.10 - Line spacing

e) The space between the lines first of all depends on the place occupied by the inscription in the general composition of the drawing. The space should not be too large, the inscription should be compact, but not too small - in this case reading the text will be difficult (Figure 2.10).

Sequence of font execution

1. Determine the place of inscriptions in the overall composition of the drawing, aimed at achieving the optimal scale ratio of the image and font;
2. Final refinement of the place and scale of the inscription after the projection image;
3. Drawing out sketches of font types and selecting the desired font;
4. Graphic execution of the font.

The architectural drawing, as a rule, contains the following groups of inscriptions (Figure 2.11): the main inscription-name of the drawing; the name of the projections; small explanatory inscriptions and figures.

Figure 2.11 - Architectural design

The main inscription is done with a pencil using drawing tools, followed by stroking letters in ink or pouring them with watercolors diluted in ink, gouache.

Names of projections can be performed both with the help of a ruler, and by hand. Explanatory inscriptions and numbers are carried out only by hand with a pen and ink.

For the correct spelling and beautiful construction of fonts in the drawing, you do not need to build their designs each time. To do this, it is sufficient to study the basic principles of compositional construction of different types of fonts and to practice their inscriptions as often as possible. It is very useful to copy the best samples of fonts.

Figure 2.12 - Architectural design

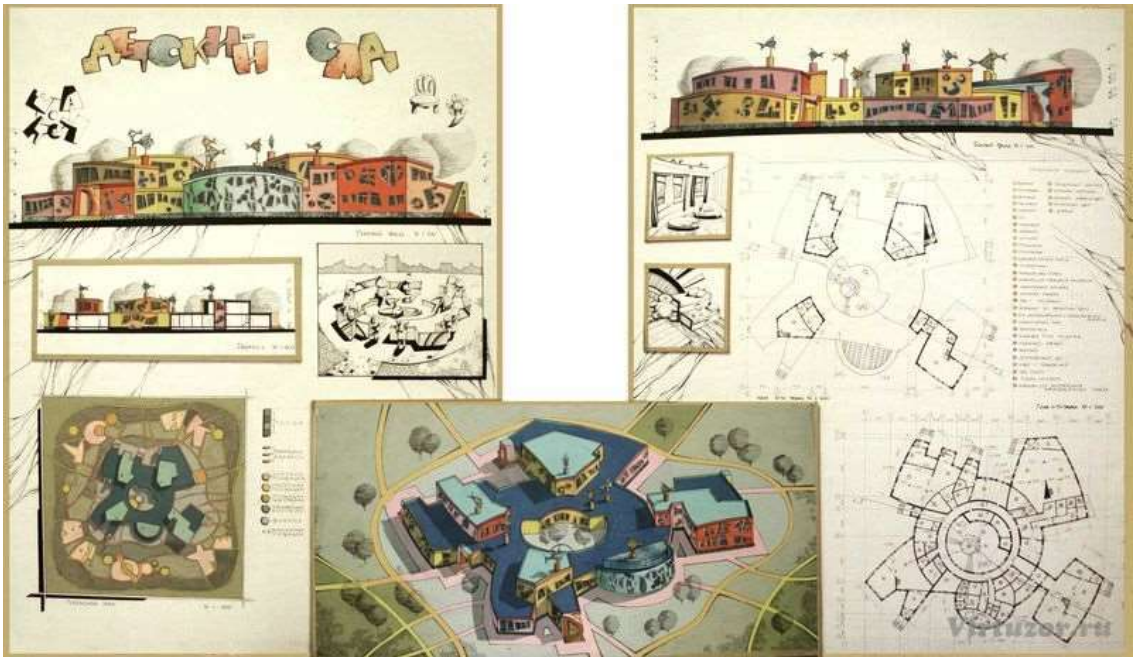


Figure 2.13 - Architectural design

From the first days of training, the student-architect and designer should be accompanied by various inscriptions. At the same time, one should strive to ensure that the characters of the font and the drawing correspond to each other. Linear drawings are suitable inscriptions, made thin lines with a simple pencil, pen, ink (Figure 2.12, 2.13).

1.2 Procedure for writing hand-written fonts

Performing certain exercises, you can develop the skills of writing fonts with a pencil, a rapidogram, a pen without a complex construction.

Practice on a sheet of tight white paper. First of all, you need to carefully study the construction of letters and numbers of the font.

After that, two parallel lines are drawn on the sheet at a distance corresponding to the height of the letters. On the formed strip make a marking of width of letters and distances between them.

Through the obtained points, before crossing with the second line, draw straight lines at an angle corresponding to the angle of inclination of the font. Then you can enter letters into the resulting rectangles (modules) (Figure 2.14).

Figure 2.14 - Building a font over the grid

To begin with, it is recommended to write letters of the alphabet.

Over time, when this stage of work is well mastered, one can begin to perform inscriptions consisting not only of individual letters, but also of words.

Subsequently, you can be from building a module for each letter, but the habit of holding two parallel lines to the height of the line must be retained.

When carrying out the inscription with ink, you must mark it in a pencil, and then draw a pen.

1.2. Draft font

The first standard "Fonts for inscriptions" was developed and approved in 1919.

The standard sets and determines the height and width of letters and numbers, the thickness of strokes, the distance between letters, words, lines.

The slope of the drawing font should be 75 °.

Such an angle can be obtained:

- with the help of 2 angles (45 ° + 30 °);
- on the cells (diagonal of the rectangle 1 x 4 cells) (Figure 2.15).

It is allowed to build a drawing font without tilting.

To carry out the inscriptions in drafting use GOST. GOST sets the numbers of drawing fonts (1,8, 2,5, 3,5, 5, 7, 10, 14, 20, 28, 40) of Russian, Latin and other alphabets.

The font number corresponds to the height (h) of the uppercase letter. For example, font No. 5 has a capital letter height of 5 mm (Figure 2.16).

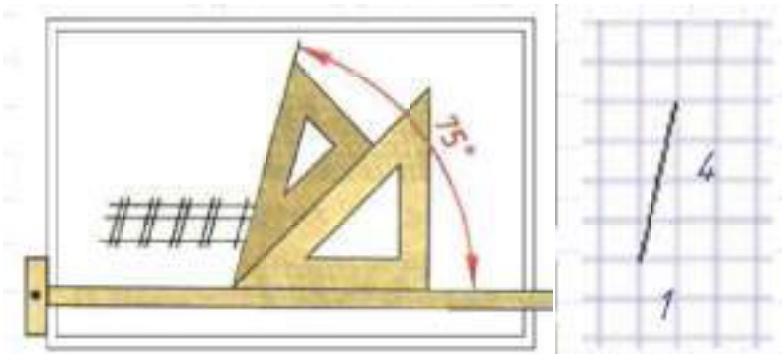


Figure 2.15 - Methods of constructing an angle of 75 °

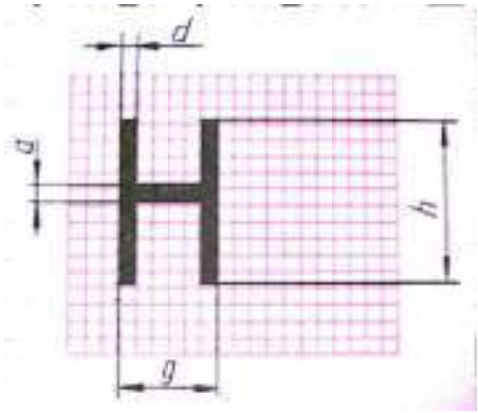


Figure 2.16 - The ratio of the height and width of the letter

The height of the letter is measured perpendicular to the bottom of the line.

The height of the uppercase letter: h is measured at right angles to the line

The thickness of the main element of the letter: d = 1/10 h. The width of the letter: g = 0.6h, except for G, E, C - 0.5h; M, N, U - 0,7h; Ж, Щ, Ф - 0,8h.

The distance between the letters in the word: a, if the letters are parallel to a = 2d, if the letters are not parallel to a = d (Fig. 17, 18).

Figure 2.17 - Parameters of the elements of the letters of the drawing font

The height of lowercase letters corresponds to the next smaller font size.

The width of the lowercase letter is g = 0.5 h, except for s s - 0.4 h; m yy - 0.7 h; f m ff = 0.8 h.

Distance between words: e = 6d.

Параметры	Обозначение параметров	Относительный размер	Размеры шрифта, мм				
			3,5	5	7	10	14
Высота букв: прописных строчных без отростков строчных с отростками	 h c k	 0,7h h	 3,5 2,5 3,5	 5 3,5 5	 7 5 7	 10 7 10	 14 10 14
Ширина прописных букв: узких (Г, Е, З, С) средних (Б, В, И, К, Л, Н, О, П, Р, Т, У, Ч, Э, Ь, Я) широких (А, Д, М, Х, Ц, Ы, Ю) особо широких (Ж, Ф, Ш, Ъ) сверхширокой (Щ)	g	 0,5h 0,6h 0,7h 0,8h 0,9h	 1,8 2,1 2,5 2,8 3,1	 2,5 3 3,5 4 4,5	 3,5 4 5 6 6,3	 5 6 7 8 9	 7 8 10 9 12,6
Ширина строчных букв: узких (с) средних (б, в, г, д, е, з, к, н, й, л, п, о, п, р, у, х, ч, ь, ъ, я) широких (а, м, ц, ы, ю, ъ) особо широких (ж, ф, т, ш) сверхширокой (щ)	g	 0,4h 0,5h 0,6h 0,7h 0,8h	 1,2 1,5 1,8 2 2,8	 2 2,5 3 3,5 4	 3 3,5 4 3,5 5,6	 4 5 6 7 8	 6 7 8 10 11,2
Толщина линий шрифта	d	0,1h	0,35	0,5	0,7	1	1,4
Расстояние между буквами	a	0,2h	0,7	1	1,4	2	2,8

Figure 2.18 - Parameters of the elements of the letters of the drawing font

All letters and digits of the drawing font are written in a certain sequence (Figure 2.19).

Figure 2.19 - The order of drawing letters

The most common font type B (Figure 2.19, 2.20).

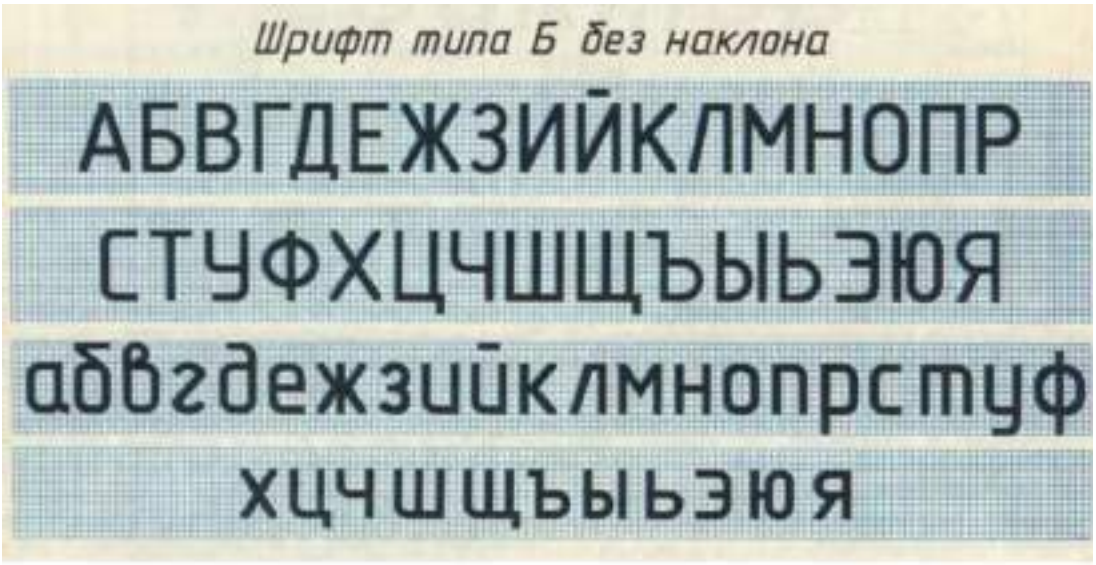


Figure 2.20 - Type B font without slope

Figure 2.21 - Type B font with slope

Drawing font is used when drawing working drawings of the project

1.2 Narrow and wide architectural fonts

Often, when drawing up drawings, an architectural font is used with the ratio of height and width of letters 1: 4, 1: 5, 1: 6 (Figure 2.22).

Figure 2.22 - Narrow architectural font

Letters “Ж, М, Ф, Ш, Щ, Ы, Ю” are one and a half times wider than the others.

Font for writing a straight line, without dividing by uppercase and lowercase letters.

At architects the font with the letters which are entered in a square is popular. Such a font is called a narrow architectural font (Figure 2.23).

Figure 2.23 - Wide Architectural Font

In some cases, the use of italic font is appropriate in the demonstration drawings.

It should be noted that letters in pencil, felt-tip pens, rapidograms are executed at a height of 5, 7, 10, in rare cases 14 mm, with spacing between rows in the vertical 2-5 mm.

The distance between letters in a word can vary depending on the shape of the letters, and the intervals between words are about 1.5 times the average distance between the letters.

Letters can be oblique.

3 LINEAR GRAPHICS

3.1 Features of linear graphics

The line is the most common image tool. The meaning of the line as a pictorial means consists in the special nature of human vision. Any object of observation is perceived by the movement of the eyes, tracing the contour of the object, the boundary of the surfaces of the object (Figure 3.1).

Figure 3.1 - Picture of the interior, made in the technique of linear graphics

Linear perception of the subject conveys informative information about the size, mass, shape and foreshortening of the object. The basis for constructing any image, including tone and color, is also a line (Figure 3.2).

Figure 3.2 - Drawing of an architectural landscape

Line - the visual means of the most common type of graphic technique - linear graphics.
Linear graphics - the basic technique for executing a drawing, sketch, drawing, technical scheme (Figure 3.3, 3.4., 3.5).

Figure 3.3 - Drawing of an architectural detail

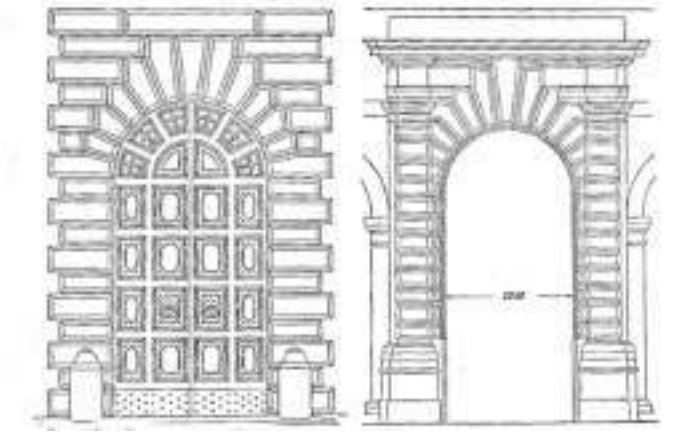


Figure 3.4 - Architectural drawing

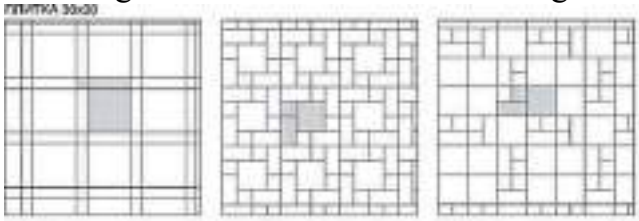


Figure 3.5 - Layout of paving slabs

On the contrast ratio of the image surface and the line of a certain thickness, slope, curvature and extension, the planar or spatial perception of the image, its static or dynamic nature is based (Figure 3.6).

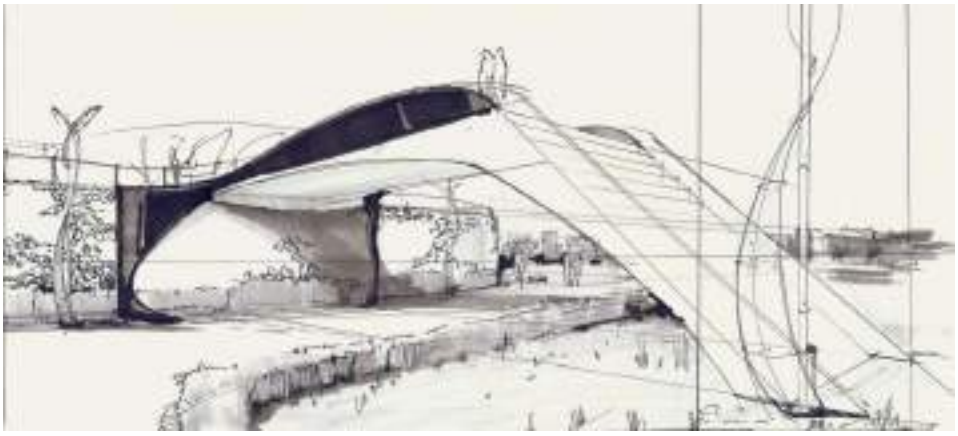


Figure 3.6 - Sketch of the bridge

Linear graphics - the most common, the simplest way to image the architectural form, the details of the object environment, and therefore it is very important for the architect to master this technique.

In the linear chart, a tonal, color development of the form is possible, revealing its illumination, mass, texture. In this case, a color line, fill, linear tone imitation - hatching is used (Figure 3.7).

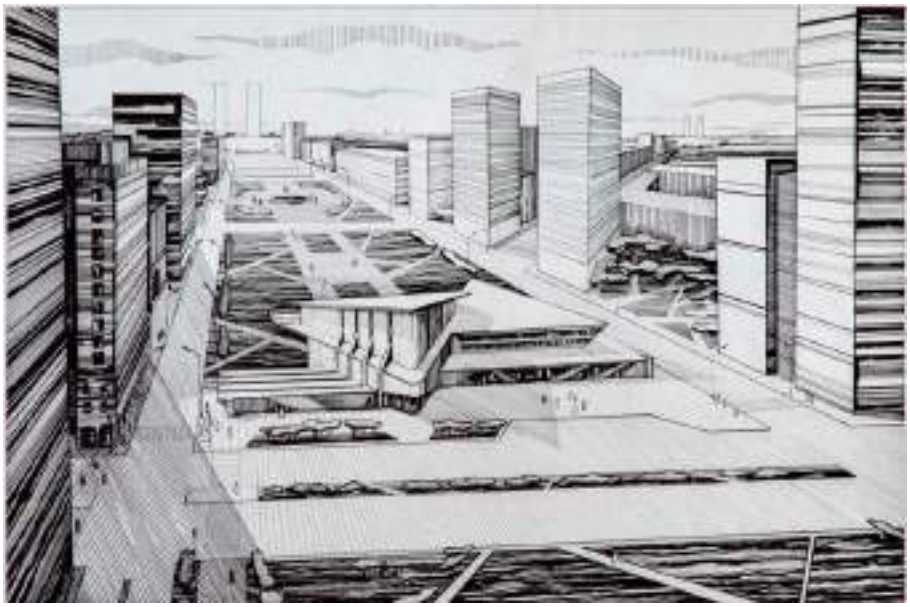


Figure 3.7 - Picture of a street panorama

3.2 Tools and materials

Tools and adaptations used in the technique of linear graphics can be divided into 3 groups:

1. Tools are primitive in design, reliable and effective by results of application - pencils, carbon sticks, feathers and a brush (Figure 3.8, 3.9, 3.10, 3.11).

Figure 3.8 - Techniques for pencil drawing

Figure 3.9 - Form-sketch of the pavilion. Pencil

Figure 3.10 - Varieties of pen tips

Figure 3.11 - Architectural landscape. Ink, feather

2. Tools adapted to display lines of the same thickness - graphos, markers, Rapidographs, Penning Devices (Figure 3.12, 3.13, 3.14).

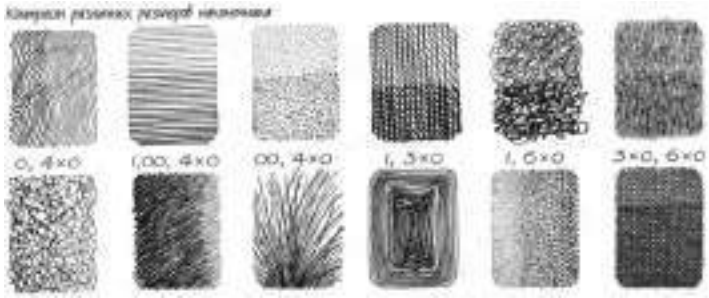


Figure 3.12 - Application of liners of different thicknesses

Figure 3.13 - Samples of the lines of various instruments

Figure 3.14 - Sketch of an individual house. Felt-tip pens

3. Adapters, by means of which linear graphics are modeled from ready-made elements - years-olds, special stencils and templates (Figure 3.15).

Figure 3.15 - Font Yearnet

All listed tools and materials can be used both individually and in combination.