



International Journal for Innovative Engineering and Management Research

A Peer Reviewed Open Access International Journal

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IJEMR Transactions, online available on 27th Feb 2021. Link :

<https://ijiemr.org/downloads/Volume-10/Special>

DOI: 10.48047/IJEMR/V10/I03/61

Title: **DESIGN PRINCIPLES IN THE SCIENCE OF DRAWING**

Volume 10, Issue 03, Pages: 266-269.

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DESIGN PRINCIPLES IN THE SCIENCE OF DRAWING

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Abstract. The development of spatial imagination and thinking is of great importance in the acquisition of knowledge by students in the direction of drawing, in this case - the development of spatial imagination through spatial thinking.

Keywords. Drawing, Spatial imagination, engineer, perspective, Forms, design principles, geometric body, image.

I. Introduction.

When we talk about a geometric object, for example a cube, we are asked how it looks, what elements it consists of and how it is shown in the drawing. Thinking begins to find answers to such questions. Thinking helps in the thinking process. Then it becomes clear that the sides of the cube are composed of the same squares, and there are six of these squares, and an attempt is made to draw a clear image of the cube. Then proceed to projection.

Thus, to learn about a cube, one must first use spatial thinking and spatial imagination. Now let's take a look at some cube examples.

1. Projections of equal squares are plotted on Я and F. Determine what it is by its projection on W (Fig. 1.1).

-A straight section is described, lying at an angle of 45° to H and V (Fig. 1.1, a);

- legs are described in the form of an equilateral triangle (Fig. 1.1 b);

-Shown is a square equal to the square –H and V (Fig. 1.1. c).

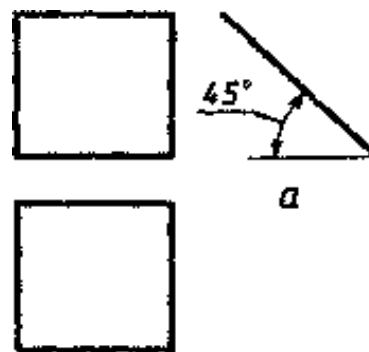


Figure 1.1.

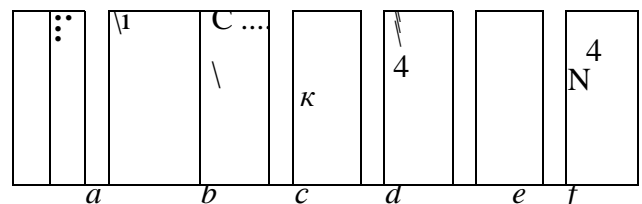
Considering that the a-shape is a rectangular plane;

If a b-shape is obtained, it is considered a half cube, and if a c-shape is obtained, it is considered a full cube.

2. Draw a line at points V and H with the same projections and a line dividing it in half (Fig. 1.2). Find out what's it.

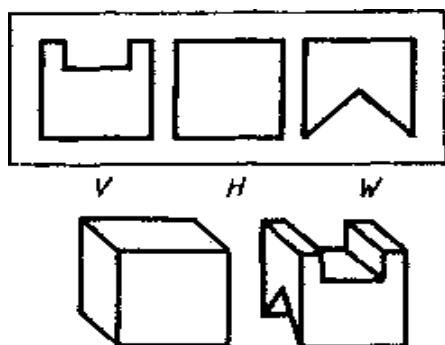
1.2. Solutions to the problem are shown with ribbons: a, b, c, d, e and / s.

Fig. 1.2





3. A clear image of three holes and a cube is given (Fig. 1.3, a).



Let the cube be tight through such a hole the project that these three absorbing pieces are formed.

From the first hole groove above, on a clear image of the cube, a cable channel is cut out in it (Fig. 1.3, b). The second hole is shown as a square. Catheters at the bottom of the third hole on a clear image of the cube, a ditch TNOS is cut out in it (Fig. 1.3, b). The second hole is shown as a square. At the bottom of the third hole, the legs are cut at right angles to each other. On the side of the cube, parallel to W, a groove is cut at the same angle (Figure 1.4, b).

4. Shown are the projections of the H and V model made from a single piece of wire (Figure 1.4). Watch its third projection and get a clear image.

Before determining the third projection of the model, a clear image of a wire cube is drawn from the given two projections. Then the image in V is drawn in oil parallel to the V cube. The protrusions of the wire are considered to be the faces of the cube. The reason is that the model is made from a single piece of wire the wire on one side of the cube cannot be repeated twice. Five model options through a clear image! is determined (Figure 1.4, a, b, c, d, e). Understandably, students

develop spatial imagination after repeating these spatial thinking exercises frequently Iodine design issues.

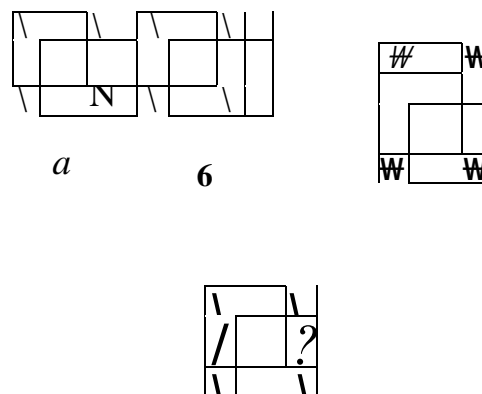


Figure 1.4.

Criative issues related to design. You can get creative with design by examining the problem the designer is involved in and trying to solve it as much as possible. Imagine what it would be like if a new structural element were added to any object of life. By slightly changing the shape of structural elements (holes, grooves, etc.), by rounding corners, etc., by adding new useful properties, you can reduce the weight of the product, increase its viscosity, simplify processing, facilitate use and appearance. It's kind of hard work that requires understanding and patience.

Various creative tasks are used to study design. In order to make a wide variety of devices, some of the rough products need to be reworked to be beautiful and attractive. For this, the link form has been changed. After that, if the product is decorated, it will be redone. When a change in a part is done through a drawing, it is called creative re-drawing. Changing the form of thought, presenting its newly formed state increases the excitability of thinking. You can solve various problems by adding creative design elements to the drawing partial processing of object geometry.

On practice

Design is the process of redesigning a part to make it more pleasing and elegant, reduce its weight and make it easier and more efficient to

use. Design In English, "Dezing" means drawing, painting, project.

It is now generally accepted that everything should be attractive, lightweight, beautiful and elegant and meet design requirements. For example, to reduce the weight of the part shown in fig. 1.5a, its geometric shape was partially changed in accordance with the design requirements. As a result, it changed in Fig. 1.9, b, c and d.

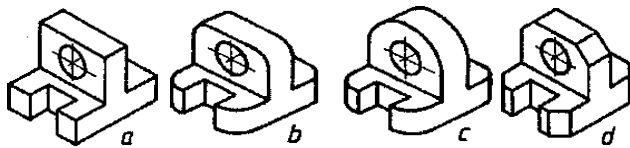
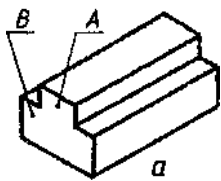


figure 1.5

When a change in a part is done through a drawing, it is called creative re-drawing. Changing the form of thought, presenting its altered state, increases the excitability of thinking. You can solve various problems by adding creative design elements to the drawing.

In fig. And the detail is the exit of A from B, and its drawing is shown in Fig. 1.6, b. AND



the output is the same as at the expense of B.

If it is necessary to change the shape and groove in the cavity by $\mathfrak{z}=a$ (groove, groove), this will be shown in Fig. 1.6, c. Here exit was replaced by a ditch.

Fig.1.6

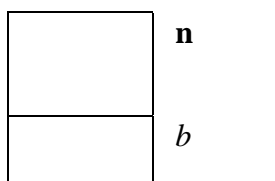


Figure 1.6

The cylindrical outlet of the part shown in Fig. A, and the notch on the left side of the base has a cylindrical opening of the same shape and size and a prismatic outlet the modified view is shown in Fig. 1.7, b. Now draw the detail of how the part will look when both a and b are paired (inserted as a cover).

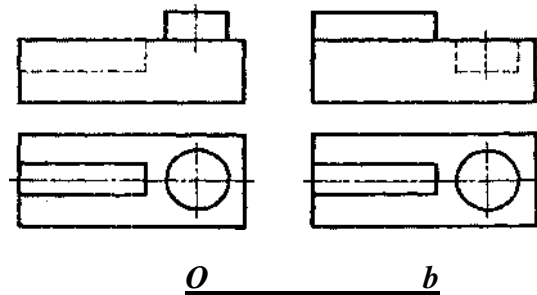
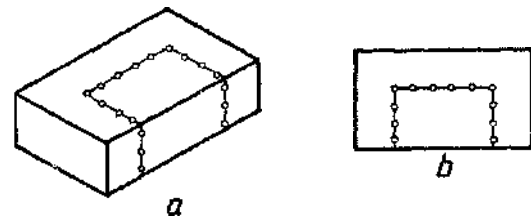


Fig.17

In Figure 1.8, if you want to change the geometric shape of the part in a and b along the marked line (points are put on the line), it will look like in Figure 1.8, c.



When a new product is invented or improved in practice, the answer is two or more, that is, there are many different reasons, in which case the problem is creative. When a designer is faced with so many different solutions in the design process, he chooses the most optimal option, taking into account the conditions of technical, technological and economic issues, using his highest level - creative activity. Then they achieve their goal using various graphics. If it is necessary to make a useful change to a part, the conditions for making changes to the part must be set out in writing and a new drawing of the part must be drawn. When inventing new objects or improving existing ones, the answer is two or more, that is, if there are many different reasons, then the problem is creative. When a designer is faced with so many different decisions in the design process, he or she uses his or her highest level

of creativity, given the technical, technological, and economic concerns selects the most optimal option. Then they achieve their goal using various graphics. If it is necessary to make a useful change to a part, the conditions for making changes to the part must be set out in writing and a new drawing of the part must be drawn.

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