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SOLVING GEOMETRIC ISSUES WITH NEW METHODS

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As you know, metric questions include such issues as determining the distance between two geometric figures or the true view of the angle and flat polygons. The main reference metric questions are the questions of determining the actual size and length of the section of a straight line, the distance between points and a straight line, the angle between two crossed straight lines and the actual view of a flat shape (figure). All other metric issues will be resolved based on these metric issues.

Consider using the example of determining the true section length of a straight line. The question of finding the true cut length of a straight line has been addressed in virtually all of the literature analyzed. Only in the textbook of S.A. Frolov "Descriptive Geometry" the solution to this issue is given. The analysis shows that this question is solved in the general section of geometry using the method of constructing a right triangle, which can be seen in Figure 1. ABC in the figure is a triangle with a triangular angle, the hypotenuse of which AC = AB, equal to the original section, of the horizontal projection of the first AS leg. The second leg VS is equal to the distance from the plane of projections on which the first legs lie, that is, ΔZ=ZB -ZA. Sangular straight line between the first leg and the hypotenuse has an angle formed with accuracy H.

Such opinions and reasoning can also be given with respect to wheels V and W. In this case, the first leg of the right triangle is the cut AV A "B"; And projections "B" will be obtained, and the second - and slices. The angle between the first leg with hypotenuse will be and Sangles, respectively. Thus, this question will be solved on the basis of the creation of a right triangle (Appendix, Figure 38):

1. Any projection of the cut is occupied by the first leg of the right triangle, which is perpendicular to the external direction to the line at either end of which the second leg passes.
2. In this perpendicular, the length of the second leg is determined and measured: If the first leg AB, then the second will be if "B" is the first leg, and the second will be and if A "B" is the first leg, and the second will be equal to the slice.
3. A straight line passes through the ends of the first and second legs, from which a right triangle hypotenuse is made. This will be the true length of the straight line

being sought. The angle between the first leg with the hypotenuse, a straight line, is the projection angle on which its first floor lies.

This algorithm can be expressed using symbolic characters:

$1. A'B'$ ёки $A''B''$ёки $A'''B''' : B' \supset p \perp A'B'$

ёки $B'' \supset p \perp A''B''$ ёки $B''' \supset p \perp A'''B'''$

$2. p \ni [B'B_0] = \Delta Z$ ёки $p \ni [B''B_0] = \Delta Y$

ёки $p \ni [B'''B_0] = \Delta X$

$3. A' \cup B_0 = [A'B_0]$ёки $A'' \cup B_0 = [A''B_0]$ ёки $A''' \cup B_0 = [A'''B_0]$

$[A'B_0] = [A''B_0] = [A'''B_0] = [AB]$

$A'B_0 \wedge A'B' = \alpha;\ A''B_0 \wedge A''B'' = \beta;\ A'''B_0 \wedge A'''B''' = \gamma$

In all the literature analyzed, this issue was solved on the basis of an algorithm (Appendix, Figures 31,32) using the methods of converting the drawing and bringing the slice into a horizontal or frontal state:

How to replace the projection plane:

$\frac{V}{H} \to \frac{V}{H_1}$, бунда $H_1 \parallel AB$ ва $O_1X_1 \parallel A''B''$ ёки

$\frac{V}{H} \to \frac{V_1}{H}$, бунда $V_1 \parallel AB$ ва $O_1X_1 \parallel A'B'$

Method of rotation:

$i \perp V \Rightarrow AB$ ⓘ A_1B_1 ва $A_1B_1 \parallel H$

ёки $i \perp H \Rightarrow AB$ ⓘ A_1B_1 ва $A_1B_1 \parallel V$

Also, some (20), (25), (27) sources indicate that this question can be solved using the method of auxiliary direct projection. We will consider this method in detail, since it is not given in most literature. The essence of this method is that an additional projection plane is made through the thread (or parallel to it) (Figure 2).

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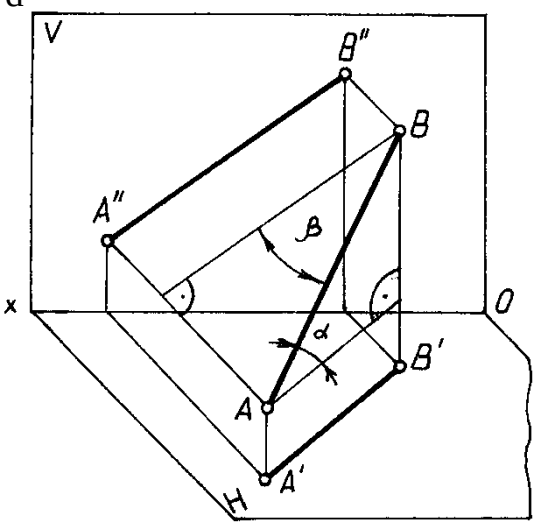
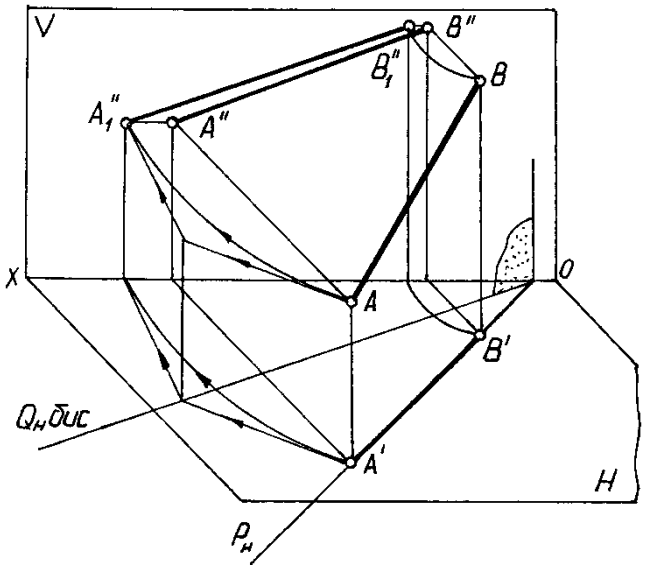


1- расм



2-расм

If this wheel is fastened by plane V, then all lying geometric figures, in particular sections AV, will be depicted on plane V in their real magnitude. To do this, R rotates the wheel around its front print and is fastened by the V wheel. You can do this using parallel transfer.

For this purpose bisector plane of planes R and V is used. Bisector projects angle between horizontal traces of planes R and V by two or angle between main direction of projection with direction of projection. The line of the bisector separating the angle Pн and Bн will be shown in the line.

R is now projected onto the bisector plane of its points in the direction of the additional projection perpendicular to the R plane, and then onto the V plane in the direction of the main projection. This can be seen in the example of point A in the image. For example, by rotating point A about Rv, its situation with V. It is this point that is projected onto the bisector plane in the direction of the additional projection of point A, and then onto the V plane in the direction of the main projection. These projection directions are indicated by numbers 1 and 2. The result is a situation of point A with a V-plane.

Thus, by means of an auxiliary rectilinear projection, it is possible to easily adapt all points of the R plane to the V plane.

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