GENERAL INFORMATION ABOUT SURFACES. CREATION OF SURFACES AND THEIR DRAWING

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Abstract
In this article, the formation of surfaces in the "Drawing geometry" lessons and their presentation in the drawing is an important factor in shaping the students' creative spatial imagination. formation of skills to improve their activity, what methods and technologies today's youth should have.

Keywords: Drawing geometry, surface, method, drawing, plane, exact spreading plane, geometric figure, auxiliary cutting spheres-spheres, spatial curve, etc.

In this article, drawing geometry is one of the general engineering disciplines, in which the methods and rules for making three-dimensional geometric figures (points, straight lines, planes, surfaces) and mainly two-dimensional projections of objects on a plane are studied. That is, drawing geometry is a bridge tool between three-dimensional space and a two-dimensional plane, and its main purpose is to teach the following:

1. Teaches the methods, rules and order of making two-dimensional projections of three-dimensional geometric figures and objects on a plane, that is, their drawings.
2. Based on two-dimensional images of geometric figures and objects on a plane, it teaches the methods, rules and order of mentally imagining their features in three-dimensional space, that is, reading their drawings.
3. Teaches how to solve positional and metrical problems related to their intersection and location in graphic ways based on the images of geometric figures and objects on the plane.
4. Drawing geometry develops students' spatial imagination and logical thinking, which are necessary for mastering applied sciences and engineering activities.

The words "projection", "imaging" and "image" are derived from the French words "projeter" and "projection", which literally means: "to draw a reflection", "to depict", "to throw forward". The science of drawing geometry has its own history, like any other science. The buds of this science have developed as a result of the practical activity of man, that is, from the period of the construction of houses, temples, defense fortifications and water structures, as well as the production of various tools, ships and household items. In 1795, the famous French scientist and engineer Gaspar Monge put all the knowledge of drawing geometry into a single system and created his work "Drawing Geometry". This work laid the foundation for the science of drawing geometry and caused it to spread very quickly to Europe and other countries. Since 1810, drawing geometry was taught in Russia (until 1921, this subject was taught in French). In our republic, this subject was first taught in Russian, and later, from the 1940s, in our native language. The textbooks created by Yusufjon Kyrgyzboev in 1951, Rakhimjon Khorunov in 1961, Erkin Sobitov in 1972, Ikromjon Rakhmanov in 1984, and Schmidt Murodov in 1988, 2006 and others are very important. Students are encouraged to use these textbooks.

The science of drawing geometry begins with the description of a very simple, but important geometric figure - a point, which determines the size and shape of machines, mechanisms and their details.

Method of auxiliary cutting balls-spheres

Determination of the line of intersection of surfaces by the method of auxiliary spheres-spheres can be of two types:

In the first, the center of the cutting balls is in the same place, that is, they can be concentric balls. This method is called concentric sphere method.

In the latter, the center of the cutting balls may not be in the same place, that is, there may be eccentric balls. This method is called eccentric ball method.

Figure 1. Figure 2.

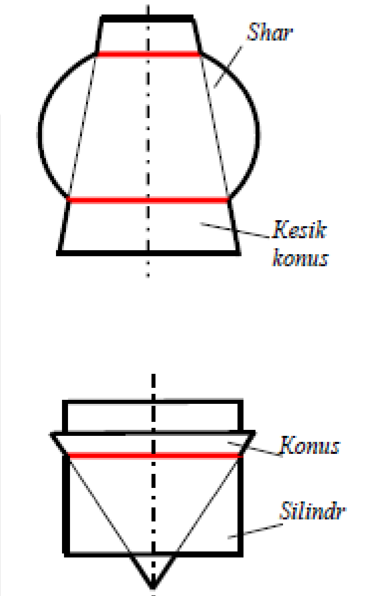
The line of intersection of a sphere centered on the axis of a surface of revolution with this surface of revolution is also a circle. Because the ball has multi-axis properties, one of the axes of such a centered ball overlaps with the axis of the rotating surface. Therefore, if the axis of any surface of revolution passes through the center of the sphere, then the sphere has axes that have one common axis with the axes of each surface, and the lines of intersection of these surfaces with the sphere are circles ladi, Fig. 2.

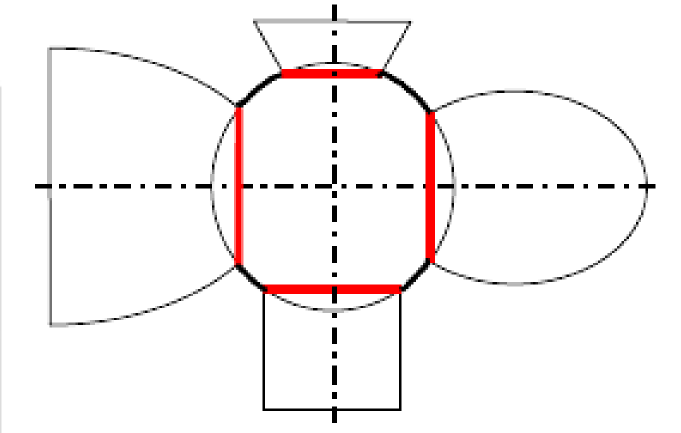
Since this feature is unique to the rolling surfaces of the sphere, it is used as cutting surfaces.

Based on this, if the axes of intersecting surfaces of revolution intersect, and they are parallel to a plane of projections, the method of auxiliary cutting spheres can be used to find the line of intersection of two surfaces of revolution.

Example: Determine the line of intersection of the surfaces of a cone and a cylinder whose axes intersect, Fig. 3.

Step 1: First, the base points of the intersection line are found, i.e., points 1 and 2 that intersect the prime meridians of the surfaces. Then, centering the point O intersecting the axes of the surfaces, spheres with radii R1 and R2 are transferred and intermediate points are found. A sphere of radius R1 is placed on the surface of the cone from the center O". With each transferred sphere, intersecting circles-parallels of the surfaces intersect and form 3 points. By connecting the horizontal and frontal projections of these points with a smooth curve, the projections of the intersection of the given surfaces are made.





1-rasm. 2-rasm.

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A pair of 4 points lying on the edge generators of the horizontal projection of the cylinder divides the intersection line into visible and invisible parts. Its frontal 4" projection is determined by intersecting the frontal projection of the intersecting line with the generator overlapping the axis of the cylinder. Then its horizontal 4' projection is determined. From this

4' point on the horizontal projection of the intersection line, the right side becomes invisible. Because this part of the intersection line is blocked by the body of the cylinder in the top view of surfaces like 2 points.

Now let's consider solving the problem using the method of auxiliary cutting eccentric balls.

This method is used to find the line of intersection of surfaces of revolutions whose axes are intersecting and intersecting, and whose constituent is a circle. For example, let's consider finding the line of intersection of narrow and conic surfaces with a circle, using this method, Fig. 4.

1. The points 1(1',1") and 2(2',2") intersecting the main meridian lines of these surfaces are found. In order to find intermediate points, between points 1 and 2, forming circles of string a1", a2" are passed. Considering each of them as an infinitesimal cylinder, the point of intersection with the surface of the cone is found. To do this: the points O1 and O2 intersecting their axes i1 and i2 with the axes of the cone are determined. These nuggets will be the center of the cutting balls. As the radius of the cutting spheres, the distance between A" and B" and the center O1" and O2" is taken as the intersection of the forming circles and narrow equator: R1=A"O1", R2=A"O2"; The transferred spheres form a pair of two overlapping vertices 3 and 4 common to the given surface. That is, these spheres intersect the net through the circles forming a1", a2", and the cone along the parallels r1", r2". 4',4") nuggets are formed. The horizontal projections of points 3 and 4 are found using the parallels r1" and r2" of the cone.

2. By connecting points 1, 2, 3 and 4 with a smooth curve, the intersecting line of the desired torus and cone surfaces is made. All parts of this line in the horizontal image will be invisible. Because the found nuggets were blocked by the base of the cone.

Thus, the given problem is solved using cutting spheres with centers O1 and O2, i.e. eccentric spheres

Summary

Surface, surface formation, generating line, guide line, parallels, meridian line, prime meridian, equator line, neck line, cone, cylinder, pyramid, prism, torus, sphere, torus, ellipsoid, paraboloid, one- and two-section hyperboloid.

Intersection of surfaces with a plane, intersection line, characteristic points of an intersection line, intermediate points, intersection of surfaces with a straight line, entry and exit points.

Intersection of surfaces, states of intersection, characteristic points of intersection, intermediate points, method of cutting planes, method of cutting spheres, concentric and eccentric spheres.

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