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THE INTERSECTION OF A STRAIGHT LINE AND A CIRCLE.

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Annotation. Details with surfaces are often encountered in various industries, especially in the oil production sector, in equipment, machinery, aircraft construction, automotive, ship design, and ensure high strength and reliability of equipment, its parts and assemblies. The points where one line smoothly transitions to another are called junction points. To establish a smooth transition, you need to know the radius of the junction, the center of the junction, and the location of the junction points.
Keywords: machinery, aircraft, automotive, ship design, smooth transition, point, junction, radius.

Drawing is a graphical method of solving geometric problems on a plane using drawing tools. When drawing parts, the following constructions are used: draw mutually parallel and perpendicular lines, divide a segment and a circle into equal parts, build regular polygons, shapes of equal size, and other constructions.

The outlines in the drawings of many parts that have a complex contour are represented by lines that smoothly merge into one another. Smooth transitions are determined by the design features of the parts, their manufacturing technology, functional purpose, aesthetic and other requirements.

A smooth transition from one line to another is called conjugation. The common point at which a smooth transition takes place is called the interface point.

The following types of conjugations are distinguished:

1) two arcs of circles in a straight line;
2) two straight arcs of a circle;
3) arcs of a circle with a straight second arc;
4) two arcs of a circle with a third arc.

Connections are smooth transitions from one line to another, from a straight line to a circle, and from one circle to another. Details with surfaces are often encountered in various industries, especially in the oil production sector, in the design of equipment, machinery, aircraft, automotive, shipbuilding, and in order to ensure high strength and reliability of equipment, its parts and assemblies.

The points where one line smoothly transitions to another are called junction points. To establish a smooth transition, you need to know the radius of the junction, the center of the junction, and the location of the junction points.

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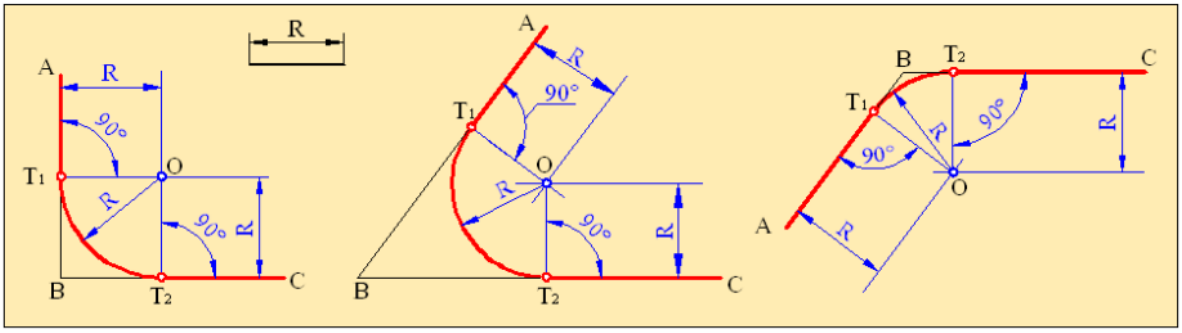
Two straight lines intersect. It is known that two straight lines can intersect at right, acute, and obtuse angles.

In the examples, the right two lines in Figure 1. show the radius of curvature R (Figure 1.a), the acute (Figure 1.b), and the obtuse angle (Figure 1.c). Consider the method of constructing a two-line concave.

First, we determine the center of the configuration. The parallel lines of each of these lines are R. The intersection of these lines is taken, and the point O is the center of the map.



а) б) в)

Figure 1

Then, starting from this point, we descend perpendicular to these lines. The points of intersection of these Perpendiculars with straight lines are the junction points T1 and T2. Using the resulting compass, draw an arc of radius R passing through points T1 and T2 from the center of the resulting radius.

Thus, the resulting arc is the intersection of two lines.

The intersection of a straight line and a circle. Let's consider an example of the intersection of the radius of a circle with a radius of R1 centered at point O with the line (AB). R is the radius of the junction (Figure 2.).

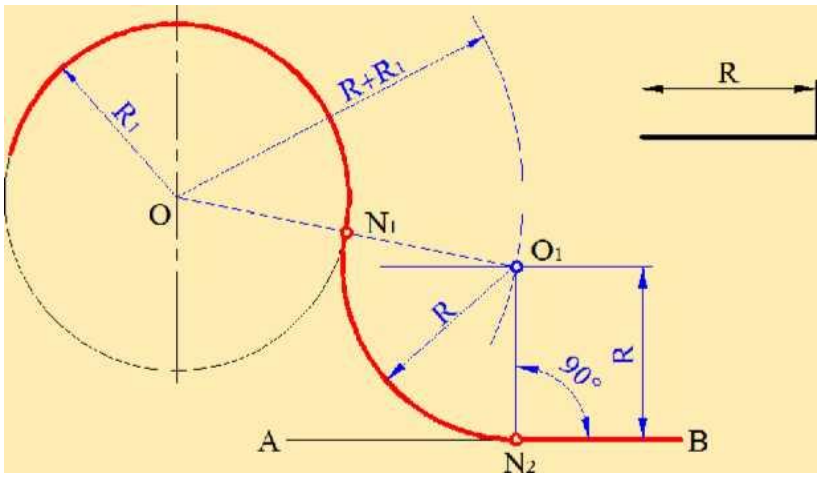


Figure 2.

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To do this, the center is connected to it by an additional parallel transfer line from AB Distance R, then the radius of the arc R + R1 is drawn, and the center, where we find the point of intersection of this line - point O1. This point is the center of the junction. After that, we find the attachment points. putting the point O and O1 and defines the first addition point N1. point O1 direction AB perpendicular and find the second insertion point-point, N2. Finally, we first point through N1 and N2 the radius of the center of the arc adjacent to point O1 and Transition Center R1.

The confluence of the two circles is. The circuit Circuit has two different external circuits and an internal circuit.

Internal junction. Given circles with centers O1O and radii R1 and R3, find the radius R of the circle that is tangent to them. To do this, the radii of the circles are subtracted from the radius of the connecting arc, that is, R–R2=R3, R2–R1=R4, and then this internal connection is performed in the same way as the external connection.

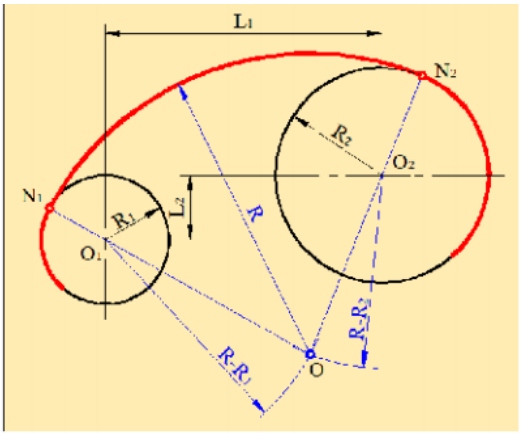

Figure 3.

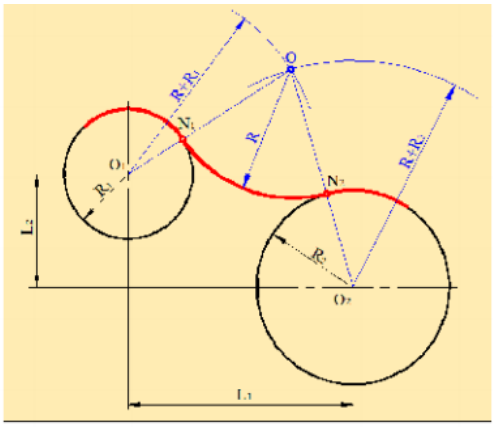

Figure 4.

External tangency. Let it be necessary to externally tangent the circles with centers O1O and radii R1R with a circle with radius R2 (Figure 3.). To do this, the radius of the circles is added to the given radius R2, that is, R1+R2=R3 R2+R=R4. An arc with radius R3 is drawn from the center O1, and a second arc with radius R4 is drawn from the center O1. The two arcs intersect to form the center of the joint, point O2. The points of contact K and K1 are formed by connecting the centers O and O1. If an arc passing through the points K and K1 is drawn to the center of the point O, the given circles will be smoothly connected by the radius R2 .

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