Engineering Graphics

Topic : Curves

Lecture No : 4

CONIC SECTIONS :

Cone is formed when a right angled triangle with an apex and angle θ is rotated about its altitude as the axis.

Following are some important conic sections.

1. Circle
2. Ellipse
3. Parabola
4. Hyperbola

CIRCLE :

When a cone is cut by a section plane A-A making an angle α= 90° with the axis, the section obtained is a circle.

ELLIPSE :

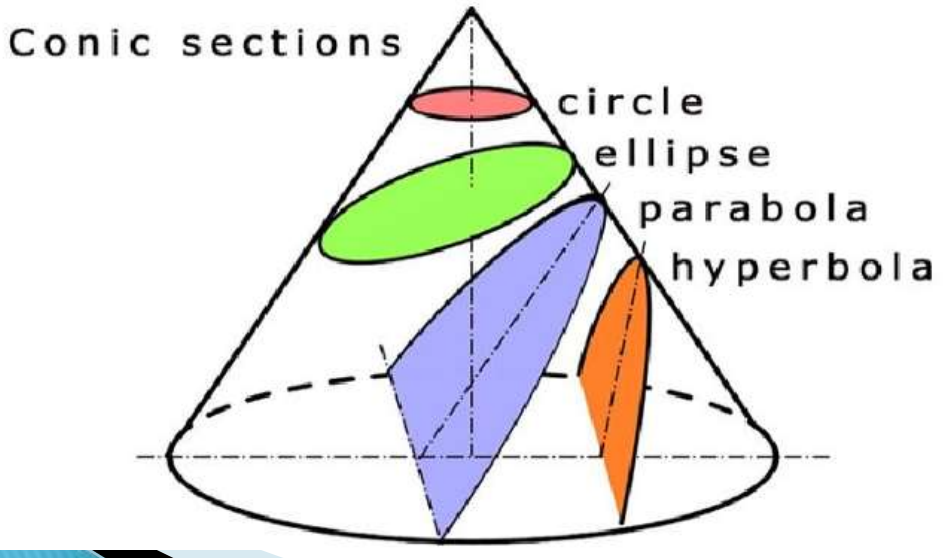
When a cone is cut by a section plane B-B at an angle, αmore than half of the apex angle i.e., θ and less than 90°, the curve of the section is an ellipse. Its size depends on the angle α and the distance of the section plane from the apex of the cone.

PARABOLA :

If the angle α is equal to θ i.e., when the section plane C-C is parallel to the slant side of the cone the curve at the section is a parabola. This is not a closed figure like circle or ellipse. The size of the parabola depends upon the distance of the section plane from the slant SCTE&VT Learning Materials "Engineering Drawing" Page 37 side of the cone.

HYPERBOLA:

If the angle α is less than θ (section plane D-D), the curve at the section is hyperbola. The curve of intersection is hyperbola, even if $\alpha = \theta$, provided the section plane is not passing through the apex of the cone.



SOME IMPORTANT DEFINITIONS:

Major axis :

It is the longest distance which passes through the centre, at right angle to the fixed lines called the directrix. AB is the major axis.

Minor axis :

It is the maximum distance which bisects the major axis at right angle. It will be parallel to the directrix. CD is the minor axis.

Directrix :

It is a straight line perpendicular to the major axis.

Eccentricity:

The ratio between the distances from the vertex to focus and vertex to the directrix is called the eccentricity.

Vertex :

The end points of the major axis on the curve are called vertex. (A, B)

Practice Purpose :

1. Different Type Of Ellipse
2. Different Type Of Parabola,Hyparbola.

Questions :

1. The major and minor axes of an ellipse are 80 mm and 50 mm respectively. Construct the curve.
2. Draw an ellipse whose major and minor diameters are 150 mm and 100 mm respectively. Use concentric circle method.
3. Draw a parabola whose focus is at a distance of 50 mm from the directrix. Draw a tangent and normal at any point on it.
4. Construct an ellipse with major axis and minor axis measuring 120 mm & 70 mm respectively by rectangular or box method.
5. Construct a parabola whose base is 90 mm and axis is 80 mm using the following methods: a. Rectangular method b. Tangent method

Thank You

Best of Luck Our Future Engineers