



GOVERNMENT POLYTECHNIC JAJPUR

Lecture Note on

Mine Survey-2

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CURVES

Curves are usually employed in lines of communication in order that the change of direction at the intersection of the straight line shall be gradual.

The lines connected by the curves are tangential to it and are called as tangents or straights.

NECESSITY OF CURVES:-

Straight route of road or track is always desirable, since it provides economy in construction, transportation and maintenance.

But when there is change in alignment or gradient of road or track, then it becomes a need to provide curves under following circumstances

1. Excessive cutting and filling can be prevented by providing the change in alignment by curves.
2. The obstruction which came in the way of straight alignment can be made easier by providing by pass with the help of curves.
3. In the straight route gradient are made more comfortable and easy providing diversions with help of curves.
4. In the straight route costly land comes in the way then it can avoided by providing diversions with the help of curves.

TYPES OF CURVES:-

HORIZONTAL CURVES

- SIMPLE CURVE
- COMPOUND CURVE
- REVERSE CURVE
- TRANSITION CURVE
- COMBINED CURVE

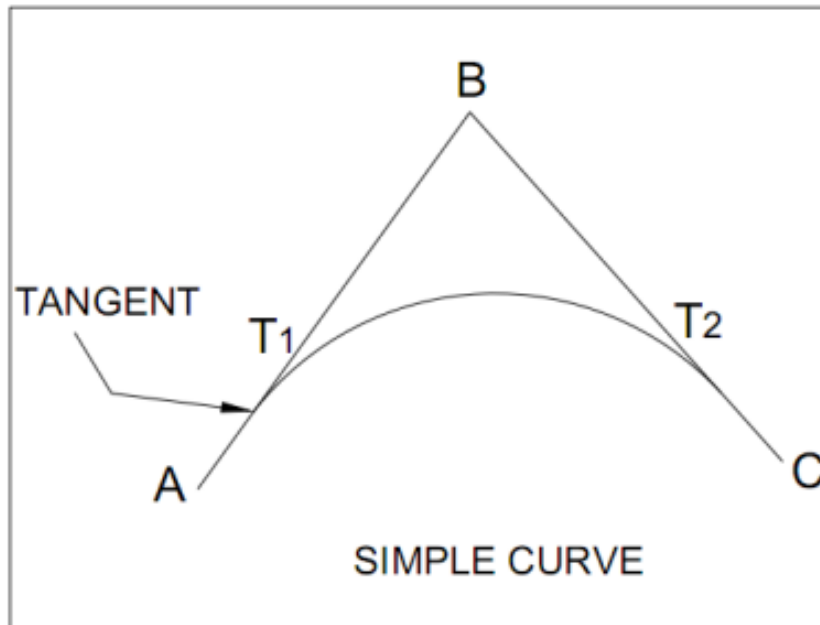
VERTIAL CURVES

- SUMMIT CURVE
- VALLEY CURVE

1. SIMPLE CURVE;-

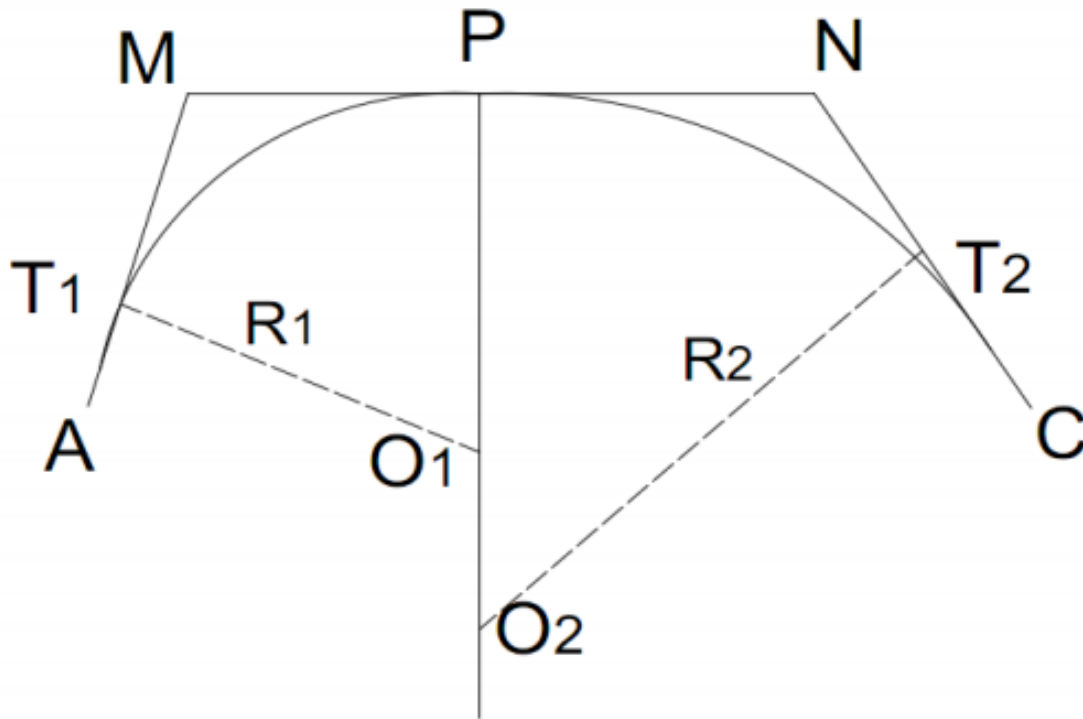
A simple curve consist of a single arc connecting two straights or tangents.

simple curve is normally represented by the length of its radius or by the degree of curve.



2. COMPOUND CURVE;-

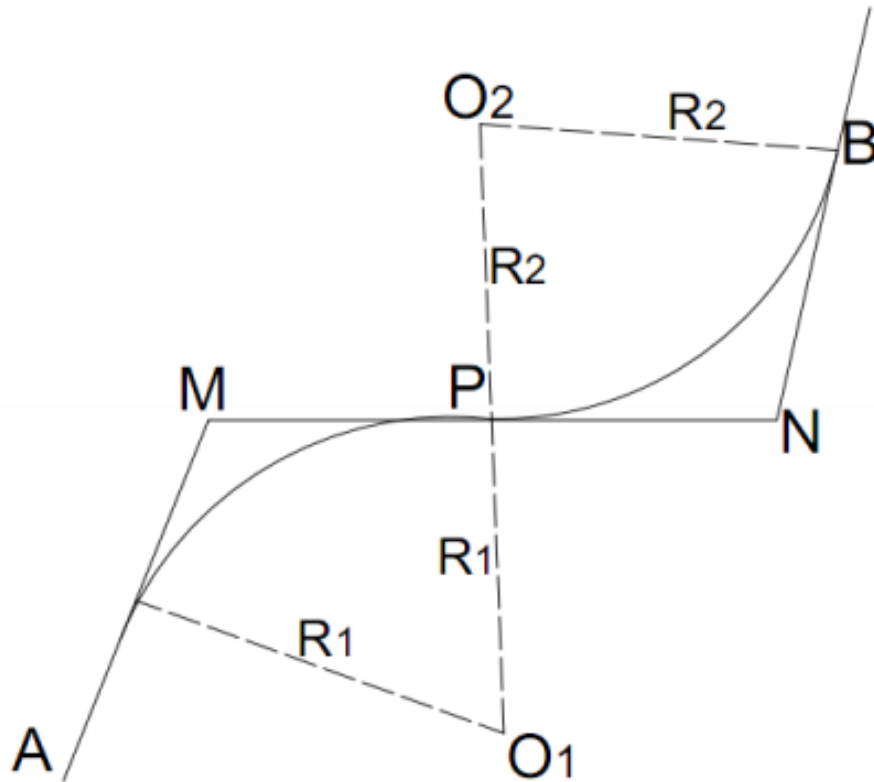
A compound curve consist of two arcs of different radii curving in the same direction and lying on the same side of their common tangent , their centers being on the same side of the curve



COMPOUND CURVE

3. REVERSE CURVE:-

A reverse curve is composed of two arcs of equal or different radii bending or curving in opposite direction with common tangent at their junction, their centers being in opposite sides of the curve.

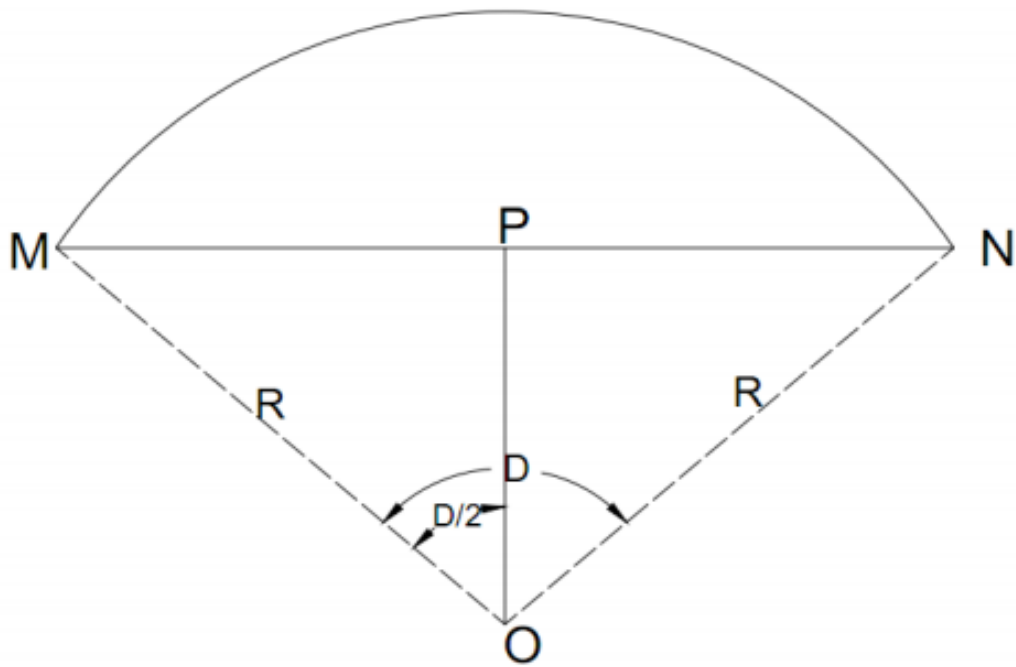


NOMENCLATURE OF CURVE

A curve is designated by the angle subtended by a chord of a specified length or by the radius.

In England the usual method of designating the curve is by its radius e.g. 400 m radius curve. Sometimes it is designated by a number of degrees subtended at the centre by a chord of 100 links e.g. 2° curve.

In India so far the standard chord was 100ft. With metric conversion this may be changed to 30 m. However the length of 20 m is more convenient.



Let ,

R = the radius of a curve in m

D = the degrees of the curves

MN = the chord 30 m long

P = its mid point

IN the Δ OMP, $OM=R$; $MP=1/2MN= 15$ m. $MOP= D/2$

Then,
$$\sin \frac{D}{2} = \frac{MP}{OM} = \frac{15}{R} \quad \text{or} \quad R = \frac{15}{\sin \frac{D}{2}} \quad \dots\dots\dots(1)$$

When D is small, $\sin (D/2)$ may be taken approximately equal to $D/2$ in radians.

$$R = \frac{15}{\frac{D}{2} \times \frac{\pi}{180}} = \frac{15 \times 360}{\pi D} = \frac{1718.89}{D}$$

$$R = \frac{1719}{D}$$

If $MN = 100$ links (20m) and R is expressed in links degree of the curve can be shown as
$$D = \frac{5729.6}{R}$$

With $R= 600\text{m} = 3000$ links

$$D = \frac{5729.6}{3000} = 1.909^{\circ} = 1.91^{\circ}$$

A curve of 600 m radius is equivalent to 1.91° curve.