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Subject :

Surveying II

Q No 02:-

what is the difference between central angle, angle of deflection and angle of intersection?

Ans:- **Central angle:-**

The angle T_1OT_2 subtended at the center of the curve by the arc $T_1 T_2$ is called central angle and is equal to the deflection angle.

Angle of deflection:-

Then angle $B'BC$ by which the forward (head tangent deflect from the Rear tangent).

Angle of intersection:-

The angle ABC between the tangent lines AB and BC. Denoted by I.

Q No 02 :-

Two tangents intersect at chainage of 5+35.57. It is Proposed to insert a circular curve of radius 8000ft. The deflection angle being 16°48'. calculate the chainage of tangents points.

Ans Solt

Tangent length = $BT_1 = BT_2 = R \tan\left(\frac{\phi}{2}\right)$

$BT_1 = BT_2 = 8000 \times \tan(16°48'/2)$

$= 1181.33$ ft

Length of curve $L = \frac{\pi R \phi}{180}$

$L = \frac{3.142 \times 8000 \times 16°48'}{180}$

$= 2345.72$ ft

chainage of point of intersection	= 5 + 35.57 ft
Minus tangent length	= -11 + 81.33 ft
chainage of T_1	= -6 + 45.76 ft
plus L	= +23 + 45.72 ft
chainage of T_2	= 16 + 99.96 ft.

Q No 03:-

What is the difference between Camber and super elevation? How can we calculate the super elevation of a curve?

Ans Camber and superelevation is that camber is a slight convexity, arching or curvature of a surface of a road, a beam, roof deck, ship's deck etc. So that liquids will flow off the sides while superelevation is the angle that a gun must be elevated above the line of its target to allow for the effect of gravity on the projectile.

Superelevation calculation:-

Let
W = weight of the vehicle
P = centrifugal force

v = Speed of the vehicle, m/s

g = Acceleration due to gravity, m/s^2

R = Radius of the curve, m

h = Super elevation, m

b = width of the road, m

G = Distance between the centre of the rail

$$P = \frac{mv^2}{R} = \frac{Wv^2}{gR} \quad \because W = mg$$

$$\frac{P}{W} = \frac{v^2}{gR}$$

$$\tan\theta = \frac{h}{b} = \frac{de}{ac} = \frac{P}{W}$$

$$\tan\theta = \frac{h}{b} = \frac{P}{W} = \frac{v^2}{gR}$$

$$h = b \tan\theta$$

$h = b \tan\theta$ ..... on highway

$h = b \frac{Gv^2}{gR}$ ..... on railway

Q No 04 :-

Find the length of vertical curve connecting two uniform grades from the following data.

a) + 0.7 % and - 0.5 %, rate of change of grade is 0.15 per 40 m.

b) - 0.6 % and + 0.9 %, rate of change of grade is 0.1 per 32m.

Ans :-

a) Sol:-

$$L = \frac{(G_1\% - G_2\%)}{S\%}$$

$$L = \frac{(0.7 - (-0.5))}{0.15} \times 40$$

$$L = 320\ m$$

b)

$$L = \frac{(G_1\% - G_2\%)}{S\%}$$

$$L = \frac{(-0.6 - (+0.9))}{0.1} \times 32$$

$$L = -480\ m$$