Lec 9

Calculate quantity of Ballast required for 1 mile length of BG track.

1 mile = 5280 ft

Quantity of Ballast regd for 1 ft of BG = 12 c ft

" " " " " 5280 ft " " = 12 × 5280

= 63360 ft³

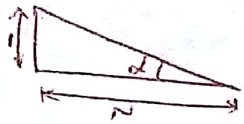
Lec 11

N=1 Find values of crossing angles for ___ By 3 methods.

a) 1:12

b) 1.8.5 Same

1) Right angle method



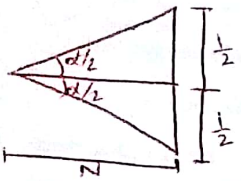
$\tan\alpha = \frac{1}{N}$

$N = 12$

$\tan\alpha = \frac{1}{12}$

$\alpha = 4°45'49''$

2) Centreline method



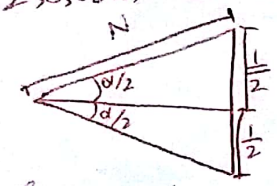
$\tan\frac{\alpha}{2} = \frac{\frac{1}{2}}{N}$

$\tan\frac{\alpha}{2} = \frac{1}{2N}$

$\tan\frac{\alpha}{2} = \frac{1}{2(12)}$

$\alpha = 4°46'19''$

3) Isosceles Method



$\sin\frac{\alpha}{2} = \frac{\frac{1}{2}}{N}$

$= \frac{1}{2N}$

$\sin\frac{\alpha}{2} = \frac{1}{2N}$

$\alpha = 4°46'34''$

Problem

- The wheel base of the vehicle moving on a broad gauge track is 6 m. The diameter of the wheel is 1524 mm and the flange project 32 mm below the top of the rail. Determine the extra width of the gauge required if the radius of the curve is 168 m.

$$W = \frac{13(6+0.446)^2}{168}$$

$$L = 0.02(3.2^2 + 1524 \times 3.2)^{\frac{1}{2}}$$

$$L = 0.446 \text{ m}$$

$$W = 3.215 \text{ cm}$$

$L = 2GN - (2Rd - d^2)^{\frac{1}{2}}$

$= 2(1.676)(8.5) - (2 \times 244.7 \times 0.12 - 0.12^2)^{\frac{1}{2}}$

$L = 20.83\text{m}$

$R = 1.5G + 2GN^2$

$= 1.5(1.676) + 2 \times 1.676 \times 8.5$

$R = 244.7\text{m}$

Problem

1) • Calculate the lead and radius of a 1 in 8.5 BG turnout using Cole's Method. Heel divergence is 120 mm.

$5.5' = 1.676\text{m}$

2) • Calculate the lead and radius of a 1 in 10.5 BG turnout using Cole's Method. Heel divergence is 100 mm.

Same

$R = 372.072\text{m}$

$L = 26.57\text{m}$

N. Find out the track material required per mile length of track. Sleeper density is n+3. The track is B.G. and length of one rail is 42 ft. Weight of section is 90 lbs.

Sol. Track material includes

1) No. of Rails
2) Sleepers
3) Fish plates
4) Fish bolts
5) quantity of ballast
6) Wt. of rails

1) No. of rails = $\frac{\text{Length of track}}{\text{Length of one rail}} \times 2$

$= \frac{5280}{42} \times 2 = 252$

2) No. of sleepers = $n + 3$ → no. of yards per rail length

$= \frac{252}{2}\left(\frac{42}{3} + 3\right)$

$= 2142$

3) No. of fish plates = No. of rails × 2 (two fish plates are used at each joint)

$= 252 \times 2$

$= 504$

4) No. of fish bolts = No. of rails × 4

$= 252 \times 4$

$= 1008$

5) Quantity of ballasts

$= 12 \times 5280$

$= 63360 \text{ ft}^3$

6) Wt. of rails = 90 lbs per yard of its length

$= \frac{\text{No. of rails} \times \text{Length of one rail} \times \text{wt. of one rail}}{\text{to convert ft to yard} \quad 3 \times 2240 \rightarrow \text{to convert into tons}}$

$= \frac{252 \times 42 \times 90}{3 \times 2240}$

$= 142 \text{ tons}$

$\frac{\text{lbs}}{\text{yard}} \times \text{yards} = \text{lbs}$