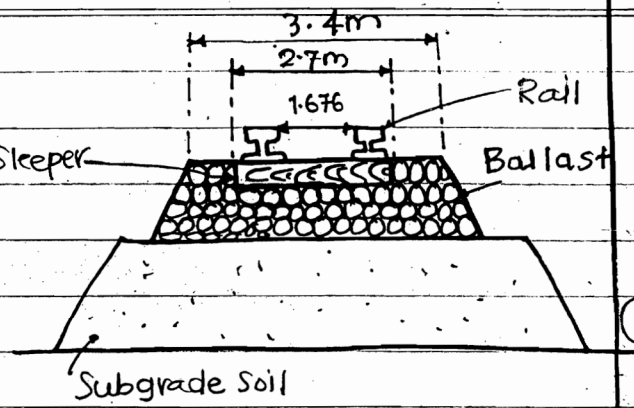

① $V_{max} = 4.35\sqrt{R-67}$

② $R = 1720/D°$

③ $e_{act}/e_{equi/avg} = \frac{G \cdot V_{max\,avg}^2}{127R}$

$e_{act} \not> 16.5cm$

④ $e_{th} = e_{act} + CD$

$C.D \not> 7.6cm$

⑤ $e_{th} = \frac{GV_{max}^2}{127R}$

⑥ $e_{BT} = -e_{MT}$ $\quad e \propto \frac{1}{R}$

⑦ $y = \frac{x^3}{6RL}$

⑧ $L = 7.2e$
$L = 0.073\, e.V_{max}$
$L\ \ 0.073\, CD.V_{max}$
} max

⑨ Gradient $= mg\sin\theta$

⑩ $CL = 2GN$
$R_0 = 1.5G + 2GN^2$
$R_1 = R_0 - \frac{G}{2}$
$SL = \sqrt{2R_0 d}$
$L = CL - SL$

⑪ Crossover → Projected
Straight → 'DE'
Curved → Triangular

⑫ Hauling Capacity $= \mu \cdot W \cdot N$

⑬ $R_{T_1} + R_{T_2} + R_{T_3} + R_g + R_c \leq (H_c/TE)_{min}$

$R_{T_1} = 0.0016W$
$R_{T_2} = 0.00008WV$
$R_{T_3} = 0.000006WV^2$
$R_g = W\tan\theta$
$R_c = 0.0004D°.W$ — BG
$0.0003D°.W$ — MG

⑭ Landing → Elevⁿ
⑮ Takoff → • Elevⁿ
• T°C
• Gradient
} Maximum

⑯ $R = \frac{V^2}{125f}$

$R = \frac{0.0388W^2}{\frac{T}{2} - S}$
} Max

$R \geqslant 180$
$R \geqslant 120m$

New series

B.G. = 1.750

1 Chain = 30.5m

$$\frac{30.5}{2\pi R} = \frac{D^\circ}{360}$$

$$\boxed{R = \frac{1750}{D^\circ}}$$

$$V_{max} = 4.4\sqrt{R-70}$$

$$e_{act}/e_{equilli} = \frac{G \cdot V_{avg}^2}{127R}$$

$$e_{th} = \frac{G V_{max}^2}{127R}$$

$$V_{max} = \sqrt{\frac{e_{th} \cdot 127R}{G}}$$

$$= \sqrt{\frac{(e_{act} + e_D)127R}{G}}$$

$$= \sqrt{\frac{(e_{act} + e_D)127R}{1.750 \times 1000}}$$

$$= 0.27\sqrt{(e_{act} + e_D) \times R}$$

Length of Transition Curve

$L = 0.72\,e$

$L = 0.008\,e \cdot V_{max}$ } max

$L = 0.008 \cdot e_D \cdot V_{max}$ }

V_{max} - km/hr

e_{act} = mm

e_D = in mm

Railway Engineering

Branch of civil Engineering which deals with construction & maintainance of Railway track for the safe & efficient movement of trains on it.

$$\text{Stress} = \frac{\text{Resisting Force}}{\text{Cross Sectional Area}} = \frac{P}{A}$$

→ Stresses are always measured in the reaction frame to design the material (we cannot control force वो तो आता ही रहेगा but we can control material)

→ C/s area is the same area which is subjected to action & reaction frame both.

→ Railway tracks are broadly devided into two parts (Life thro

Temperory Railway Tracks - These tracks are provided for the transportation of earth & construction material & maintainance.

Permenant Railway Tracks - These tracks are provided for the movement of passenger train & good's train.

Gauge Distance -

→ It is the distance betn inner faces of rails ✗ running faces of rails (stress circle)

Broad Gauge - 1.676m
Meter Gauge - 1.00m
Narrow Gauge - 0.762m
Feeder Gauge - 0.610m
Standard Gauge - 1.435m

Along the length. → Z axis & other Lateral → X
Transeverse → Y

Moving transverse load → Girder
Beams

Rails -

→ Rail sections are considerd as continuous steel girders. Rail sections converts rolling loads into point loads

→ Rail sections are made up of Cast iron or high carbon steel. (mild steel → corossion will be there)
Continuous Beam → Less deflection)
(Girder → Moving transverse load)

Buckling of Rails -

→ Due to increase in temprature if there is no sufficient amount of space is available between two rails, buckling of rails will happen & it leads to derailment.

→ Rail joints are necessary to hold together the rails in correct position & also provide required expansion & contraction space between two rails.

→ Bolted connection used because it permits moment. Min. 4 fish bolts are required to connect 2 fish plates at rail joints.

→ Fish bolt & fish plates are made up of Cast iron or high carbon steel.

Sleepers -

→ Sleepers are placed transverse to the rail

→ Sleepers are provided to generate elasticity on the railway tracks & to distribute point load from rails to ballast as UDL (Actually it is not UDL because it is not uniform)