21/03/2016
CE435 – Railway Engineering
Tutorial #6

Name:	ID:

Q1: Explain approaches of railway track maintenance?

Answer:

Two approaches are basically used for Railway maintenance

1. Conventional RT maintenance done manually "Labour –based", simple tools are used.
2. Machine-based RT maintenance (mechanical appliances are used)
    - Fully mechanized
    - Mixed process (Labour + machines)

Q2: When RT maintenance becomes necessary?

Answer:

1. Reduction in strength of track structure due to [heavy axle loads, high loading frequency (repetition) and movement of high speed trains].
2. Deterioration of track structure due to environmental effects, such as: rain water, wind and sun actions.
3. Rail track exhibits other forms of defects such as on curves, crossing, and bridge approaches

Q3: What are the advantages of proper RT maintenance?

Answer:

1. Increases the life of both track and rolling stock.
2. Provides smooth riding quality which brings comfort and safety to passengers and goods.
3. Safer and more comfortable transport mode encourages more people and goods to use the rail transports leading to better earning, less damage to environment, additional economic value to goods…etc.
4. Allow savings in operation costs (e.g. reduction in fuel consumption due to reduced friction between rails & wheels).

Equation sheet

(1) **Rails.** (*i*) Number of rails per km. $= \dfrac{1000}{\text{length of rail in 'm'}} \times 2$

(*ii*) Weight of rails in tonnes per km

$= \text{Number of rails} \times \text{length of rail in m} \times \dfrac{\text{weight of rail in kg per m}}{1000}$

(2) **Sleepers.** Number of sleepers per km $= \frac{1}{2}$ (No of rails per km) $\times (M + x)$

where M = length of rail in m

x = Density factor.

Sleeper density $= (M + x)$

'x' density factor is any number which when added to a length of rail, will give sleeper density. In India $x = 4, 5, 6$ or 7 is used for main-tracks, depending upon design requirements of track.

(5) Bearing Plates. Number of plates per km of track depends upon design.

Number of Bearing plates per km of track is, either

$= 2 \times$ Number of sleepers per km of track

(6) Dog-Spikes. For use with timber sleepers.

Number of Dog-spikes per km of track

$= 4 \times$ Number of sleepers per km of track

$= 4 \times 1319 = 5276.$