Introduction to Infrastructural Engineering

Introduction to Railway Engineering3

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Introducing check rails

- Wear of rail on sharp curves can be reduced by introducing check rails all the way round the inner rail and parallel to it
- Hold back flange of inner wheel and prevents outer wheel to damage outer rail

Use of lubricating oil

- Lubricating oil on sides of head of rail reduces wear
- Lubrication of rail joint allows free expansion of rails & reduces wear & tear of fish plates

Advantages of coning the wheels

- To reduce wear & tear of the wheel flanges and rails, which is due to rubbing action of flanges with inside face of the rail head
- To provide a possibility of lateral movement of the axle with its wheels
- To prevent the wheels from slipping to some extent

Behavior of coned wheel

- At level surface
  - Flanges of wheels have equal circumference
  - Equal diameters on both rail
  - Equal pressure on both rail
- At curves
  - Outer rails has to cover great distance than inner rail
  - Vehicle has tendency to move sideways towards outer rail
  - Circumference of flange of outer wheel will be greater than that of inner wheel
  - Helps the outer wheel to cover longer distance than inner rail

Disadvantages of coning

- Smooth riding is produced by coning of wheels. But the pressure of the horizontal component near the inner edge of the rail has a tendency to wear the rail quickly
- The horizontal component tends to turn the rail outwardly and hence the gauge is widened sometimes
- If no base plate are provided, the sleepers under the outer edge of the rail are damaged

TILTING OF RAIL

- To minimize the disadvantages of coning
- Rails are tilted inwards
- Inclined base plates are used
- Slope of base plate is 1 in 20

Advantages

- Maintains gauge properly
- Wear of the head of rail is uniform due to tilting of rails
- Increase life of sleepers as well as rails

CREEP OF RAILS

- Longitudinal movement of rails in a track
- Rails have tendency to move gradually in the direction of dominant traffic

Indications of creep

- Closing of successive expansion spaces at rail joints in the direction of creep and opening out of joints at the point from where creep starts
- Marks on flanges and webs of rails made by spike heads by scratching as the rail slide

Causes of creep

- Brakes
- Wave action or wave theory
- Percussion theory

WAVE ACTION OR WAVE THEORY

- Creep is developed due to wave motion of wheels on rails
- Due to movement of wheel loads on rails, the rail deflects as a continuous beam and crests are formed near supports
- When wheels of train strike against these crests, creep is developed
- The wheels push the wave with a tendency to force the rail in the direction of traffic