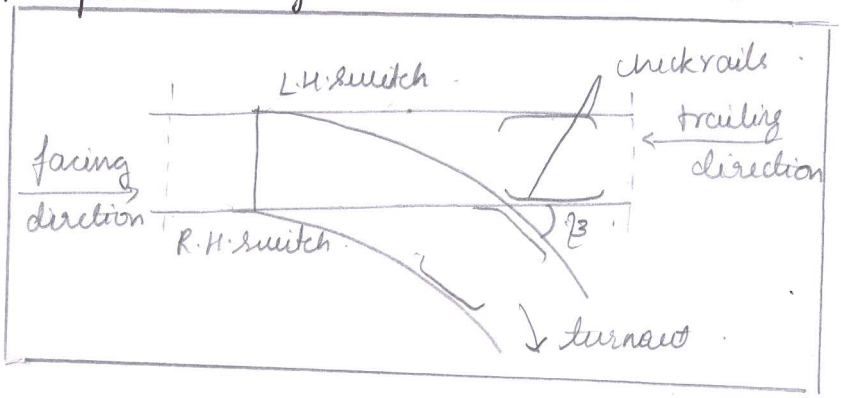
2.

① Draw and Explain a right hand turn-Out.



- point / Switch:

If train has to turn left.

- push the stretcher bar to right Gap is created b/w stock rail and toe
- train has to turn left.
- push the stretcher bar to left. Gap is created between stock rails and toe.

During the Sheduled maintainance it was Noticed by the gang men that the rail has moved around 8.5cm in the direction of movement of the trains.

a. what is the posible reason for this movement

creep:

b. Whet might be the theory behind the problem? Explain any 1?

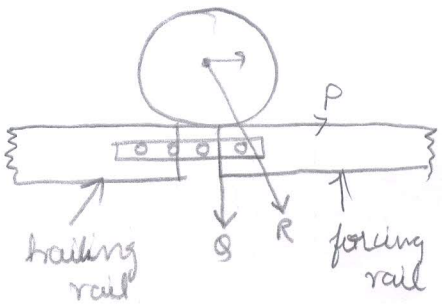
percussion theory:

This theory states that the creep is due to impact of wheels at the rail end ahead at joints. The Horizontal Component 'p' of 'R' tends to cause creep while the Vertical Component tends to bend down the rails end Vertically.

when the wheels leave the trailing rail and strike the facing rail end at each joints, it pushes the rail forward resulting in creep.

The creep by this theory will increase due to following factors:

- Due to weak and loose fish bolts.
- Due to worn out fish plates.
- Due to loose packing at joints.
- Due to wide expansion gap.



c) Can you suggest any 3 good solutions for this problem?

pulling Back the rails:

If creep is distinctly visible, the remedy is to pull back the rails to their original position. For doing this, first inspect the track, note the extent of pulling back distance and determine the point form which to begin.

pulling back the rails is a very slow and tedious process and is only possible when a small length is to be dealt.

provision of Anchors or Anticreepers:

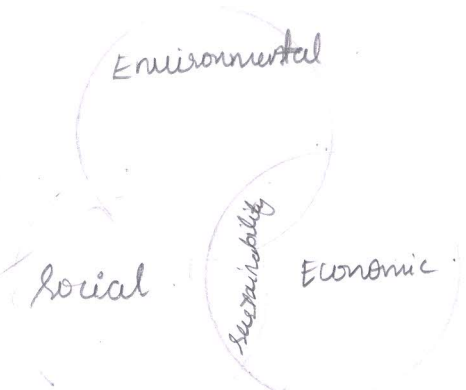
Anchors are fastened to the foot of rail and kept in perfect contact with the side of the sleeper being the side opposite to the direction of creep. If creep occurs in both directions, anticreepers are provided on both the sides of sleepers, starting from the centre of the rail and should never be fixed near the joints.

- Use of steel sleepers:

Sleepers should be of such a type and with such fittings that they effectively prevent the rail from creeping on them. Secondly, the sleepers must have a good grip with the ballast to resist the movement of the sleepers in the ballast.

---

a) what are the 3 spheres of Sustainability?



b) How can sustainability in transport system be achieved? Explain with an example.

- transport system diversity.
- System Integration
- Affordability
- Resource efficiency
- land use accessibility
- Operational efficiency
- Comprehensive and inclusive planning.

---

a) Write any 4 functions of rails.

- To provide Continuous and level surface from movement of train.
- To provide a smooth pathway so that rail and wheel become less
- Transferring the load into the sleepers.

- To resist breaking force caused due to stopped of train.

b) Write any 4 requirements of an ideal rail.

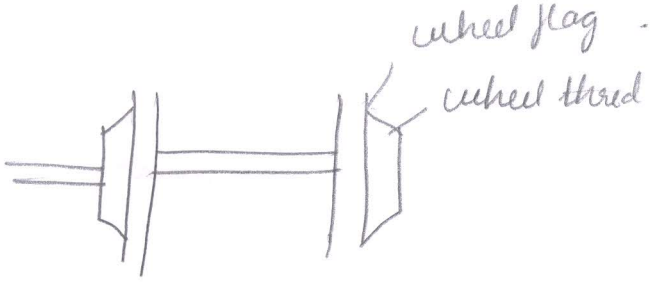
- They should be of proper composition of steel as given above and should be manufactured by open hearth or duplex process.
- Foot should be wide enough so that rails are stable against overturning, especially on curves.
- The head must be sufficiently deep to allow for an adequate margin of vertical wear.
- Rails should be capable of withstanding lateral forces.

---

5) a) Draw and explain about Coning of wheels.

The distance between the inside edges of wheel flanges is gen-lly kept less than the gauge of the track. So there is a gap between the wheel flange and running edge of the rails, nearly to 1 cm. (3/8") on either side.

The thread of wheels is absolutely dead centre of the head of the rail, as the wheel is coned to keep it in this central position automatically.



a) Compare bull headed and flat footed rails.

bull headed:

Merits: They keep better alignment and give more solid and smoother track.

- The rails are easily disconnected from sleepers as they have no direct Connection with the latter

Demerits: They have less strength and stiffness

flat footed:

Merits: They have more strength and stiffness, both Vertically and laterally, than B.H. rails.

- No chairs or keys are required as in case of B.H. rails.

Demerits: The straightening of bent rails, replacing of rails and dehogging of battered rails are difficult.

---

b) what do you mean by preliminary surveying and detailed surveying. Explain.

preliminary survey:

objective.

To determine the details of different alternative routes of land and drawn in reconnaissance survey and at the same time economic of different routes are studied.

equipment used.

- The adalite.
- A tacheometer.
- A dumpy level.

Detailed Survey:

Objectives:

The objects of the final location survey is to transform the final location of alignment from paper to the ground, in Order to Carryout the ground survey of the alignment in detail.

Equipment used:

- A theodolite.