Interlocking and Isolation

Q-1 Define Interlocking

Answer:

Means an arrangement of signals, points, and other appliances, operated from a panel or lever frame. So inter connected by mechanical locking or electrical locking or both that their operation must take place in proper sequence to ensure safety;

Q-2. What are the essentials of Interlocking?

Ans: Lever frames and other apparatus provided for the operation and control of signals, points etc., shall be so interlocked and arranged as to comply with the following essentials.

(a) It shall not be possible to take off a fixed signal unless all points including isolation are correctly set, all facing points locked and all interlocked level crossing gates are closed and locked against the road traffic for the line on which the train will travel including the overlap.

(b) After the signal has been taken 'Off' it shall not be possible to move any points or locks on the route including isolation nor to release any interlocked gates unless the signal is replaced to the 'ON' position.

(c) It shall not be possible to take 'OFF' at a time, any two fixed signals which can lead to any conflicting movements.

(d) Where feasible, points shall be so interlocked as to avoid any conflicting movement.

Q-3. Why interlocking is necessary.

1. A Device to ensure correct setting of route and route cannot be changed after signal has been taken 'OFF' - Detector".

2. A device to hold a route property at a diverging point in spite of the stresses caused by the train moving over it.

3. A device to ensure that route cannot be changed while the train is on the points even after putting back the signal - ('Lock Bar').

4. Points and Signal levers locking and releasing are another in different position, so as to ensure correct routing, setting and avoiding conflicting movements (Slotting)

Necessity:

1. To ensure more Safety
2. To increase speed
3. To run high speed trains.

Q-4 What are the apparatus that are interlocked in train operation?

Ans : Explanations:

For interlocking, two things are necessary. The very word will convey the meaning that locking arrangement is the meaning between two things. At present, in railway operation normally interlocking arrangement is between:

(a) Signal and signal
(b) Points and points
(c) Signal and points
(d) Signal and gate
(e) Signal and Block instrument
(f) Point and Block Instrument
(g) Lever and lever
(h) Key and key
(i) Slide and signal
(j) Block Instrument and Bridge
(k) Signal and track

Description - Example:

Signal and Signal: Only when the home is taken off, outer can be taken off.

Points and Points: Only when the mainline points are operated for a turn out, the other points can

be operated.

Signal and Points: Only when the points are set for a particular line, the signal can be taken off for the said line.

Signal and gate: Only when the gate is closed the gate signal can be taken off.

Signal and Block Instrument:
Only when the line clear is obtained, LSS can be taken off

Point and Block Instrument:
Only when the line clear is obtained, slip siding points can be set to main line.

Lever and Lever: Only when the 'C' key lever or unlock lever is operated, other levers can be operated.

Key and Key: Only when the route key is inserted and operated, home key can be extracted.

Slide and Signal: Only when the concerned slide is operated, it will be possible to take of signal.

Block Instrument and Bridge (Pamban):
Only when the bridge is closed, it will be possible to obtain line clear.

Signal and Track: Reception signals can be taken off only when the track is clear of obstruction in the track circuited area.

Q-5. What is Isolation?

Ans: Isolation: means an arrangement secured by the setting of points or other approved means to protect the line so isolated from the danger of obstruction from other connected line or lines.

In other words, a train or 'vehicle which is standing on one line should 'not come into contact with the running train on the other line and cause accident. It means separation of line or lines from other connected line or lines.

Q-6. What are the various isolation devices?

Ans: Isolation devices:

1. Scotch block
2. Hayes Derail
3. Trap switch
4. Derailing switch
5. Sand hump
6. Snag Dead end.

Devices which are used to isolate running line from non- running line:

1. Scotch block
2. Hayes Derail
3. Trap switch

Devices which are used to isolate main line from loop line:

1. Trap switch
2. Derailing Switch
3. Sand hump
4. Snag dead end

Among the above Derailing Switch, Sand hump, and Snag dead end are efficient substitute for Adequate Distance. (Signal overlap)

Q-7. How many kinds of Isolations?

Ans: Kinds of Isolation: Two kinds

1. Isolation of running line from non-running line.
2. Isolation of main line from loop line.

What is running line?

1. Must be governed by one or more signals.
2. Must be used by a train for entering, or leaving or running through and the line between two block stations.

What is non- Running line?

1. Will not be governed by a signal.
2. Will not be used by a train for entering or leaving or running through.

Q-8, Explain the various isolation devices

Ans: Description of Isolation devices:

Scotch Block:

1. A lump of log covered with iron sheets and coloured red.
2. This will be connected with a chain and tied up on the earth.
3. This is place across the rail and locked to prevent vehicles moving away.
4. If the vehicle moves the vehicle will derail.
5. This is used normally to isolate running line from non-running line.

Hayes Derail:

1. This is a lump of iron piece worked by a lever, coloured red.
2. When the lever is operated this will rest on the rail and prevent vehicle from moving away.
3. In some cases this will work in conjunction with a trap point.
4. When the vehicle moves, the vehicle derail when the Haye derail is on the rail.
5. This is normally provided to isolate running line from non-running line.
6. The normal setting of points is open condition.

Trap switch:

1. This is a single rail cut.
2. This rail cut will be away from the adjacent line.
3. To provide isolation, the trap point will be open.
4. When it is open and if a vehicle moves the vehicle will derail.
5. This is provided to isolate running line from non-running line and main line from loop line.
6. In some areas, Trap indicators will be provided and in some area not provided.

Derailing Switch:

1. This is an extended portion of track ending with few rail.
2. The distance from the point is about 15 feet.
3. This is used to isolated main line from loop line
4. This is an efficient substitute for signal overlap under approved special instructions.
5. The normal setting of points is for derailing switch.
6. If the vehicle moves, the vehicle will derail on the sand at the end of derailing switch.
7. Simultaneous reception is possible with CRS permission.
8. This should not be obstructed.

Sand Hump:

1. This is an extended portion of track with sand at the end.
2. The length is 170 feet on the rising gradient ending with sand.
3. Starting from the point, first 50 feet is 1 in 50 and the next feet is 1 in 30 and the last 60 feet is level.
4. This is an efficient substitute for a signal overlap.
5. This is used to isolate main line from loop line where simultaneous reception is possible.
6. This should not be obstructed.

Snag Dead end:

1. This is also an extended portion of track with an erected obstruction at the end instead of sand.

2. This is also an efficient substitute for signal overlap and provided to isolate main line from loop line.
3. This should not be obstructed.

Note: If this efficient substitute is obstructed, it ceases to be an efficient substitute for an adequate distance (Signal overlap)

Q-9 What are the standards of interlocking of stations?

Ans: Based on Isolation and interlocking stations are divided into many standards and some are not brought under any standard. They are:

Standard – I Standard - II Standard - III and stations with no standard