

DATE / /  
PAGE

Flashing yellow signals are cautionary signals meant to signify that drivers may proceed with caution.

44 - Hook bolt - A bolt hooked at one end and threaded at the other to receive a nut.

45 - Tie bar - Tie bars are either deformed steel bars or connectors used to hold the faces of abutting slabs in contact. Tie bars are typically used at longitudinal joints on slabs and edge joint and a curb or shoulder.

46 - Screw spike - A Railroad spike with a screw thread on the upper part of shank so that the spike can be screwed home after being driven part way in.

47 - Cotter - A cotter is a pin or wedge passing through a hole of fix parts tightly together. As in a steam engine.

Quest - Gradients - It is the rate of rise of fall along the length of the road with respect to the horizontal. It is expressed as a ratio 1 in 1 or 1 vertical unit for horizontal units. Sometimes the gradient is also expressed as a percentage i.e.  $n\%$  (in 100).

Types of Gradients

DATE / /  
PAGE

### \* Ruling Gradients -

- ① This depends on the terrain, length of the grade, speed, pulling power of the vehicle & the presence of the horizontal curve.
- ② The IRC has recommended ruling gradient value of 1 in 30 on plain & rolling terrain, 1 in 50 on mountainous terrain and 1 in 16.7 on steep terrain.

### B. Limiting Gradient -

- ① It is steeper than the ruling gradient.
- ② This gradient is adopted which the ruling gradient results in enormous increase in cost of construction.
- ③ It may be frequently necessary to limiting gradient.

### C. Exceptional Gradient -

- ① Exceptional gradient are very steep, gradients given at unavoidable situations.
- ② They should be limited for short stretches not exceeding about 100m at a stretch.

### Ques 3 Minimum Gradient -

- ① It depends on the rain fall, type of soil and other site conditions.
- ② A minimum of 1 in 500 may be sufficient for closed drain & 1 in 200 for open soil drains are found to give satisfactory performance.

Ques 6 Marshalling Yards - Yards is a place where goods trains and other loads are received sorted out according to a plan and new trains formed and dispatched onwards.