Chapter 7: Essentials of Signalling

Section 1: Signals in General

7.1.1 Multiple Aspect Colour Light Signalling (MACLS) is covered in this chapter.

7.1.2 All signals shall be electrically Lit. The signals shall be free from the possibility of phantom indication.

7.1.3 All Main signals shall be colour light multi-unit type and shunt signals shall be of the Position Light type. Calling on signals may be provided as per Operational needs.

7.1.4 **Uniformity of Signalling:** It is desirable that;

(a) The signalling at all stations and interlocked level crossing gates in a section conforms to the same type & standard as per maximum Permissible speed of the section.

(b) Signalling at a station at either end(s), shall also be uniform as far as possible.

7.1.5 **Signals – Location**

(a) The number of signals and their height shall be limited to what is necessary for Safety and operational requirements.

(b) Signals shall normally be on the left of, or above the line to which they apply, unless authorized by special instructions to the contrary.

(c) Where signals are erected on right hand side, they shall be provided with an arrow, pointing towards the applicable line.

(d) Signals shall be so located and aligned so as to;

(i) Display the best possible view of their aspects to Loco Pilot of approaching trains.

(ii) Avoid, as far as possible the possibility of the aspect of one signal being mistaken for the aspect of another, and

(iii) Avoid confusion between the lights of Main signals and the lights of Subsidiary signals or any other lights. The size of lamps/LEDs of Subsidiary Signals shall be smaller than that of Main signals. Subsidiary signals shall not be brighter than Main signals.

7.1.6 All equipments shall be so designed, located and secured as to obviate, as far as possible, any outside interference.

7.1.7 Non-Operational Signal(s) shall be turned away from Track.

Note: (i) when a signal is not in use, it shall be distinguished by two crossed bars across it, each bar being not less than one metre long and 10 cm wide (GR 3.18)

(ii) Signals not in use, shall not be lit (GR 3.18(3))

7.1.8 **Block Overlap:** Shall not be less than 180 meters in case of multiple-aspect signalling.(Ref: GR.8.01(2)(b))

Relevant extract of GR is given below.

GR 8.01: (2) Unless otherwise directed by approved special instructions, the adequate distance referred to in clauses (b) and (c) of sub-rule (1) shall not be less than-

(a) 400 meters in case of two-aspect lower quadrant signalling or two-aspect colour light signalling, and

(b) *180 meters in case of multiple-aspect signalling or modified lower quadrant signalling.*

7.1.9 **Signal Overlap:** Shall not be less than *120 meters

* Method of reckoning of 120 meters signal overlap (adequate distance) is given below - GR extract;

GR 3.40. Conditions for taking 'off' Home signal.—

(1) When a train is approaching a Home signal otherwise than at a terminal station, the signal shall not be taken 'off' until the train has first been brought to a stand outside it, unless

(a) on a double line, the line is clear for an adequate distance beyond the Starter; or

(b) on a single line, line is clear for an adequate distance beyond the trailing points, or for an adequate distance beyond the place at which the train is required to come to a stand.(G.S.R 1168(E) Dt 05-12-18)

(2) Where a train has first been brought to a stand outside the Home signal, the signal may be taken 'off', if-

(a) on a double line, the line is clear upto the Starter, or

(b) on a single line, the line is clear upto the trailing points or under approved special instructions up to the place at which the train is required to come to a stand.

(3) Except under approved special instructions, the adequate distance referred to in sub-rule (1) shall never be less than-

(a) 180 meters at stations equipped with two-aspect lower quadrant or two-aspect colour light signals, or

(b) 120 meters in the case of stations provided with multiple aspect signals or modified lower quadrant signals.

(4) Where a sand hump of approved design, or under approved special instructions a derailing switch, has been provided for the line on which a train is to be received, they shall be deemed to be efficient substitutes for the adequate distance referred to in sub-rule (3).

7.1.10 **Overlap beyond IB signal** (Class C station): shall not be less than 400 meters beyond IB home.

GR 8.04: At a class C station on single line or double line, in two aspect, multiple aspect or modified lower quadrant signalling, the line shall not be considered clear and line clear shall not be given, unless-

(a) *the whole of last preceding train has passed complete at least 400 meters beyond the home signal and is continuing it`s journey and…..*

7.1.11 **Visibility of Signals:** The minimum visibility distance of various signals shall be as under;

(a) **Distant Signal -** 400 meters.

Note: (i) Where it is not possible to obtain 400 meters of continuous visibility (due to site constraints), then imposition of a suitable speed restriction may be considered.

(ii) An Inner Distant Signal (where provided), shall be continuously visible from a minimum distance of 200 meters.

(b) **All Stop Signals** - 200 meters.

Note: Where it is not possible to obtain 200 meters of continuous visibility of any stop Signal (due to site constraints), then a suitable speed restriction shall be imposed.

7.1.12 **Aspects of Signals**

(a) **Aspects of Distant Signals**

(i) In Single Distant Territory:

- The Distant signal shall display; a yellow light (bottom) in the 'ON' position for the 'Caution' aspect, Two yellow lights in a vertical line (Distinguishably apart) for the 'Attention' aspect and one green light for the 'Proceed' aspect.

(ii) In Double Distant Territory:

- The Distant signal shall display; two yellow lights in a vertical line (Distinguishably apart) in the 'ON' position for the 'Attention' aspect, and one green light for the 'Proceed' aspect.
- Inner Distant signal shall display; a yellow light (bottom) in the 'ON' position for the 'Caution' aspect, two yellow lights in a vertical line (Distinguishably apart) for the 'Attention' aspect and one green light for the 'Proceed' aspect. Inner Distant signal shall display the same aspects as that of Distant signal in Single Distant territory.

Note: Under approved special instructions, a colour light Distant signal may be combined with the last Stop signal of a station in rear or with an Intermediate Block signal or with a Stop signal protecting a level crossing. When a colour light Distant signal is combined, (i) with the last Stop signal of a station in rear or (ii) with an Intermediate Block signal or (iii) with a Stop signal protecting a level-crossing, arrangements shall be such that the signal shall not display a less restrictive aspect than the stop aspect till Line Clear has been obtained from the station ahead as in case of (i) and (ii) above and until the level-crossing gates have been closed and locked for the passage of trains as in case of (iii) above (Ref: GR: 3.07(7) , G.S.R. 157(E).-Dated-05-3-21)

(b) **Aspects of Stop Signals**

The signal shall display, a red light for the 'Stop' aspect, a yellow light for the 'Caution' aspect, two yellow lights in a vertical line (Distinguishably apart) for the 'Attention' aspect and one green light for the 'Proceed' aspect.

Note: In a typical station(in Double Distant Territory), signals display as under.

Table-1

S.No.	***Distant signal***	**** Inner Distant signal***	***Home signal***	***Main Line Starter***	***Loop Line Starter***	***Advanced Starter***	***Indication to Loco Pilot***
1.	*Double Yellow*	*Yellow*	*Red*	*-*	*-*	*-*	*Stop dead at Home*
2.	*Green*	*Double Yellow*	*Yellow*	*Red*	*-*	*-*	*Stop dead at Main line Starter*
3.	*Green*	*Green*	*Green*	*Green*	*-*	*Green*	*Run through on Main Line*
4.	*Double Yellow*	*Double yellow*	*Yellow with Route indicator*	*-*	*Red*	*-*	*Stop dead at loop line starter*
5.	*Double Yellow*	*Double Yellow*	*Yellow with Route indicator*	*-*	*Yellow*	*Green*	*Run through via loop line*

** Or Distant Signal in Single Distant Territory*

Signal Aspect	***Lamp lit***
Stop	*Red*
Caution	*Yellow*
Attention	*Double Yellow*
Proceed	*Green*

7.1.13 Placement of Distant Signal

(a) Distant Signal shall be placed at an *adequate distance in rear of the first Stop Signal.

**Note: Such an adequate distance shall not be less than 1 kilometre in Single Distant Territory*

(b) In Double Distant territories: On sections, where Emergency Braking Distance (EBD) of more than 1.0 km is to be catered for, a second Distant signal shall be provided. Such a Distant signal shall be placed at an adequate distance of not less than 2 kms in rear of First Stop signal and Inner Distant Signal shall be placed at a distance of not less than 1 km in rear of First Stop signal.

Note: Both Distant and Inner Distant Signals shall be provided with a marker consisting of a white coloured disc with letter 'P' in black.

7.1.14 Placement of Stop Signals

(a) **Home Signal:** The Home Signal shall be placed in rear of all connections, if any, on the line to which it refers. The Home Signal shall be placed at not less than *180 meters in rear of the points up to which the line may be obstructed, after line clear has been granted to the station in rear.

**Note:*

(i) Where there is a continuous down gradient towards station steeper than 1 in 260 between Distant and Home signal in single distant territory and between Inner Distant and Home Signal in Double Distant territories, the Home signal may be placed at a distance of sum of Block Overlap and Signal Overlap from BSLB (Block Section Limit Board) or the outer most Facing Point, as the case may be (i.e 180 + 120 = 300 m in MACLS).

(ii) If there is rising gradient in between or there is no emergency crossover for criss-cross movement cutting across the main line, then this shall not be applicable.

(b) **Routing Signal:** A Routing Signal shall be placed in rear of the Points, which it protects.

(c) **Starter Signal:** When one Starter Signal is provided for each converging line, it shall be so placed as to protect the adjacent running line or lines.

Note: For long/curved platforms, a Starter Indicator may be provided to repeat the aspect of the Starter as an aid to the Guard to enable him to know the aspect of the Starter. The Starter Indicator shall exhibit no light when concerned Starter is at 'ON' and yellow light when it is 'OFF'. This Indicator may be provided only where essentially required.

(d) **Intermediate Starter Signal:** An Intermediate Starter Signal shall be placed clear of fouling marks in rear of the points, if any, which it protects.

(e) **Advanced Starter Signal:** Unless approved under special instructions, an Advanced Starter Signal shall be placed outside all connections on the line to which it applies;

It shall be located at a distance of not less than 120 meters from the outermost points in the case of Single Line section. This distance shall be reckoned from the starter in case of Double Line Section.

(f) **Gate Stop Signal**: shall be located at not less than 180 meter (in MACLS territory) in rear of the gate, which it is protecting. Gate Signal shall be provided with a marker consisting of a yellow coloured disc with letter 'G' in black.

(g) **Intermediate Block Stop (IBS) signal:** Is the Home signal provided at an Intermediate Block post on a Double Line or Single Line. IB Signal shall be provided with a marker consisting of a white coloured disc with letter 'IB' in black.

Note: IB Signal shall be located in such a way, to split the block section into near halves, subject to other criteria & guidelines in force.

(h) **Automatic Block Signals**: They shall be normally located with a spacing of one km from each other, subject to other criteria and headway required. Automatic Signal shall be provided with a marker consisting of a white coloured disc with letter 'A' in black.

7.1.15 **Aspects-Sequence**

(a) When a Signal is displaying the 'Stop' aspect, the signal next in rear shall not display a less restrictive aspect than 'Caution'.

(b) Every Multiple Aspect Signal, whether automatic, semi-automatic, or manually operated which, is required to display 'caution' aspect to a train shall normally be placed at an adequate distance from the next signal in advance. This adequate distance shall not be less than 1 kilometre. Where the adequate distance cannot be provided and the 'caution' aspect is being displayed, the next signal in rear shall display the 'attention'/'caution' aspect.

(c) If necessary, the 'Attention'/'Caution' aspect shall be repeated back on successive signals in rear, until the adequate distance is obtained.

(d) In all cases the signal next in rear of a Signal protecting diverging lines shall display 'Attention'/'Caution' aspect in the 'OFF' position, when the points are set for any line other than the line over which the higher speed is permitted. When this signal cannot be placed sufficiently in rear of the 'STOP' signal protecting the Points to permit the Loco pilot of an approaching train to reduce to the permitted speed, the 'Attention'/'Caution' aspect shall be repeated back on successive signals in rear, until the required adequate distance is obtained.

(e) For Metro Services, every Multiple Aspect Signal, whether automatic, semi-automatic, or manually operated which, is required to display 'Caution' aspect to a train, it shall normally be placed at an adequate distance from the next signal in advance. This adequate distance shall not be less than the maximum emergency braking distance of the trains running on the section at the maximum permissible speed on the ruling gradient. Where the adequate distance cannot be provided and the 'caution' aspect is being displayed, the next signal in rear shall display the 'attention/'caution' aspect. The 'attention'/'caution' aspect shall be repeated back on successive signals in rear, until the adequate distance is obtained.

7.1.16 **Combined Signals:** When owing to their location, it is necessary to combine any two signals, one Stop Signal only may be provided under approved special instructions, capable of displaying any or all the following aspects:

(a) Stop

(b) Caution

(c) Attention

(d) Proceed

Note: Under approved special instructions, a colour light Distant signal may be combined with the last Stop signal of a station in rear or with an Intermediate Block signal or with a Stop signal protecting a level crossing. (Ref: GR: 3.07(7), G.S.R. 157(E). Dated-05-3-21)

7.1.17 **Distinction between Signals:**

(a) **Diverging Lines**: Unless otherwise permitted by approved special instructions, where two or more lines diverge, a route indicator of approved design shall be provided.

(i) Route Indicator - The type of Route Indicator to be provided, shall be as under -

- For speeds in excess of 15 kmph: Direction type Route Indicator for up to 3 diversions in any side of the main line or Direction Type Route Indicator with LED Matrix for more than 3 diversions on any side of the main line.
- For speeds not exceeding 15 kmph: Any Route Indicator of approved design.

(b) **Converging lines**: Unless otherwise permitted by approved special instructions, when two or more lines converge, the signals shall be fixed on separate posts.

7.1.18 **Subsidiary Signals - Calling-on Signal**

(a) **Function:** A Calling-on signal when taken 'OFF' calls on the Loco Pilot of a train to draw ahead with caution, after the train has been brought to a stop even though the Stop Signal above it is at 'ON'. Such 'OFF' position indicates to the Loco-pilot that he should be prepared to stop short of any obstruction.

(b) **Aspects:** A Colour Light Calling-on signal has no independent aspect in the 'ON' position and shall display no light in the 'ON' position and a miniature yellow light in the 'OFF' position.

(c) The colour light Calling-on signal shall be provided with a marker consisting of a white enamelled disc with letter 'C' in black.

(d) **Placement of Calling-on Signal:** Calling-on signal shall be placed below a Stop Signal governing the approach of a train. Under approved special instructions, a Calling-on Signal may be provided below any other Stop Signal except the last Stop Signal.

(e) **Working of Calling-on Signal**

(i) Calling-on Signal shall neither be capable of being worked at the same time as the Stop signal above nor shunt signal below it (if any).

(ii) Calling-on signal shall lock and detect all the points in the route including isolation points (if any), which the Main signal above it detects excluding those in overlap.

(iii) Calling-on signal requires all the level crossing gates in the route to be closed and locked against road traffic.

(iv) At stations where Station Master controls the reception and dispatch of trains, such control shall be extended to Calling-on Signals also.

(v) It is required to provide track circuits at a *suitable distance and a time delay circuit to ensure that the Calling-on Signal is taken 'OFF' only after the train has been brought to a stop.

**Note:*

(i) For reception signals, 5 rail length (65 meters) Calling-on track circuit and 60 seconds time delay shall be provided.

(ii) For dispatch signals, no time delay is required for taking off Calling-on Signal. However provision for ensuring that the train has stopped shall be covered in Station Working Rules (SWR) and to be ensured by operating staff.

(vi) Provision for manual replacement of Calling-on Signal shall be included in concerned Station working Rules(SWR).

7.1.19 **Subsidiary Signals - Shunt Signal**

(a) Shunt movements shall, as far as possible, be controlled by Shunt Signals. The Shunt Signals shall lock and detect all the points in the Route and prove that the tracks in the route excluding the berthing track are clear and that the level crossing gates in the Route are closed and locked against the road traffic.

(b) Shunt Signals shall be of the Position Light type. The lights of a Position Light Signal shall be white. Two lights of a Position Light signal shall be horizontal in the 'ON' position and 45° above the horizontal in the 'OFF' position.

(c) **Placement and aspects of Shunt Signals**

(i) Shunt Signals may be separately located on posts or close to the ground or may be fixed below Stop Signals other than the First Stop Signal of a station.

(ii) Where a Shunt Signal is required to be fitted on a Signal post on which a Calling-on signal is also fitted, the Shunt Signal shall be fitted below the Calling-on Signal.

(iii) A Shunt Signal placed below a Stop Signal or a Calling-on Signal shall not be capable of being worked at the same time as the relevant Stop Signal or Calling-on signal.

(iv) Where a Shunt Signal is fixed below a Stop Signal, it shall show no light in the 'ON' position.

Section 2: Warning Boards

7.2.1 A Warning Board to warn the Loco-pilot of his approaching a Stop Signal shall be provided at a distance of 1.4 km in rear of the First Stop Signal of a station, Intermediate Block Stop Signal and Gate Stop Signal. This distance may be increased suitably to cater for gradients.

Note: (i) On Broad Gauge and Metre Gauge, Passenger Warning Board should be provided at not less than 1000 m in rear of the first stop signal of a station, intermediate block stop signal and gate stop signal. The Passenger Warning Board need not be provided where the distance between distant signal and stop signal is 1000 m or more.

(ii) Goods warning board shall be provided at a distance of 1400 m in rear of the first stop signal of a station, intermediate block stop signal and gate stop signal.

(iii) In Double Distant Territory, no warning board is required.

7.2.2 In those cases, where Gate Signals and station signals happen to be located close to each other, only one warning board shall be provided at a distance of not less than 1.4 km from the First Stop Signal.

7.2.3 Where inter-signal distance between two signals is less than the distance required for warning Board, the signals in rear shall either be controlled by the signal in advance or they shall be combined.

7.2.4 Self-reflecting sheets of approved type or reflectors shall be provided, on the warning board as per approved drawings.

7.2.5 The warning board shall normally be on the left of the line to which it applies unless there are special reasons to the contrary.

Section 3: Indication Boards

7.3.1 Indication Boards are provided to give warning to Loco Pilots about changes in type of signalling or type of Block Working or Automatic Train Protection Territory.

7.3.2 Where a Block station, which is provided with two aspect signalling without a Warner signal in rear of the First Stop Signal, is approached from a section provided with Multiple Aspect Signalling or with two aspect signalling with a Warner signal in rear of the First Stop Signal, an Indication Board bearing alternate yellow and black diagonal stripe shall be fixed at not less than 1.4 km. in rear of the First Stop Signal. The Board shall have a legend "Approaching unwarned Stop Signal".

7.3.3 When a station provided with single line Token block is approached from a Double Line or a Single Line section equipped with Tokenless block working, an indication board with a legend "Entering Token Territory" shall be provided at the First Stop Signal of the station.

7.3.4 Where the block working at one end of a station is automatic and the other end is absolute, an indication board with suitable legend shall be provided at the First Stop Signal of the station. The legend on the board shall be “Entering Absolute Block Territory” or “Entering Automatic Block Territory” as appropriate.

7.3.5 **Shunting Limit Board:** A Shunting Limit Board shall be provided at Class 'B' stations over a single line section worked on Absolute Block System where shunting in the face of an approaching train is permitted and where an Advanced Starter is not provided. The Shunting Limit Board shall be fixed at a distance of 180 meters in advance of the First Stop Signal.

7.3.6 **Block Section Limit Board (BSLB)**

(a) At Class 'B' stations worked on Double Line Absolute Block System (with multiple aspect signalling) a Block Section Limit Board shall be provided where there are no points or the Outermost points are trailing.

(b) The Block section Limit Board shall be located at 180 meters in advance of the Home Signal and protecting the fouling mark of the trailing points, if any.

(c) The Block section Limit Board or the Shunting Limit Board shall be so located that the legend is facing towards the station. They shall be fitted with lamps showing white light in both directions during night or shall be painted with Retro-reflective type coating.

7.3.7 **Miscellaneous Indication Boards**

(a) An indication board shall be provided at the foot of Gate signal if it is protecting more than one mid section LC gate with appropriate legend.

(b) An indication board shall be provided at the foot of the IB signal if it is protecting mid section LC gate with legend "Look out for LC gate when passing IB signal at ON".

(c) Any other indication boards as required.

Section 4: Points, Operation, Indicators & Isolation

7.4.1 The points shall be operated by Point machines (approved type). Points leading to un-signalled lines or sidings may be manually operated with suitable electrical controls.

7.4.2 **Obstruction Test:** Insertion of a 5 mm obstruction between the switch rail and the stock rail of a Facing Point, at approximately 150 mm from the toe of the switch shall prevent the Point from being locked and the relevant signal(s) being taken 'OFF' for movements over them.

7.4.3 **Crank Handles for Point Operation:** where power operation of Point Machine is not functional, provision for manual cranking shall be done through interlocked crank handles.

7.4.4 Where required, provision may be made for emergency operation of points during track circuit failures. Each such individual operation shall be recorded on a suitable non-resettable Counter.

7.4.5 **Point Indicators** (For Non-Interlocked points)

(a) They shall be provided at all Points on running lines which are not interlocked with Signals, unless the position of Points is otherwise proved. Point Indicators shall be of the target type.

(b) Indications:

(i) When the points are set for the straight line, the indicator shall display a white target by day and a white light by night, in each direction.

(ii) When the points are set for the diverging line, the indicator shall display the edge of the disc by day and a green light by night, in each direction.

(iii) At Points where a green light would give a misleading indication to a Loco pilot, a red light may be permitted under special instructions.

Refer to Drg No: 12-D1

7.4.6 **Trap Indicators** (For Non-Interlocked Trap points)

(a)**Trap Indicators** shall be provided at all Trap Points on running lines which are not interlocked with signals, unless the position of trap points is otherwise proved. Trap indicators shall be of the target type.

Note: Points leading to a short dead end and used solely for the purpose of trapping the running line or sidings shall be treated as derailing switch.

(b) **Indications** -

(i) When the Trap Points or derailing switches are open, the Indicator shall display a red target by day and a red light by night in each direction

(ii) When the trap Points or derailing switches are closed, the indicator shall display the edge of the disc by day and a green light by night, in each direction. At trap points where a green light would give a misleading indication to a Loco pilot, a white light may be permitted to indicate trap 'CLOSED' position only.

Note: Points and trap Indicators shall be provided with miniature lights and be placed as close to the ground as possible.

7.4.7 **Shunting Permitted Indicator (SPI)**

(a) Shunting Permitted indicator may be provided to permit uninterrupted to and fro movements towards shunting neck or other connected lines. Shunting Permitted Indicator may be of the Disc or Light type.

(b) Indications of SPI: Day and night indications of the Shunting Permitted Indicator shall be as follows :

Table-2

Type	Indication when shunting is permitted in the direction to which it refers		Indication when shunting is not permitted in the direction to which it refers	
	Day Indication	Night Indication	Day Indication	Night Indication
Disc Type	Black disc with a yellow cross painted on it	Yellow cross light	Edge of disc	No light
Light Type	Yellow cross light	Yellow cross light	No light	No light

(c) **Operation of SPI:** Shunting permitted Indicator may be operated by a ground lever/EKT which works in conjunction with a Stop Signal, so that either the shunting permitted indicator or the associated stop signal can be taken off at a time.

(d) Sidings shall be so arranged that shunting operations upon them involve the least possible use of, or obstruction, to running lines.

7.4.8 Spring Points

(a) Spring points shall be used only in exceptional cases where the same purpose cannot be achieved conveniently by other means.

(b) Spring Points if used in the facing direction must be fitted with facing point locks. They may be operated from a Cabin or from a ground lever. In the latter case, the ground lever shall be of such a type that it will not move when the Points are being trailed through.

7.4.9 Provision of Isolation

(a) At block stations where trains are permitted to run at speed in excess of 50 kmph, the line on which that speed is permitted, shall be isolated from all connected lines during the passage of the train.

(b) Such isolation need not be provided at Block stations where trains are permitted to run at a speed of 50 kmph or below, provided GR. 4.11(2) is complied with.

Note:- The provisions of Para no. 7.4.9 (a) do not apply to

(i) Junctions where two block section lines meet at the same end of a station and system of Block Working with adjacent stations on both lines is done by one of the approved means and the junction is equipped with full complement of signals.

- *At such junctions, the First Stop Signal on Single Line sections shall be placed at an adequate distance from the outermost facing point/fouling mark, the adequate distance not being less than the sum total of the adequate distances prescribed in GR. 8.01 in regard to condition for granting Line Clear and GR. 3.40 in regard to the condition for taking off the Home Signal.*
- *On Double Line section, the First Stop Signal shall be placed at an adequate distance from the outermost facing point/fouling mark, this distance not being less than the adequate distance prescribed in GR. 8.01 in regard to the conditions for granting Line Clear.*

(ii) Block stations where track circuits or other appliances have been provided to prove whether the connected non-isolated lines are clear or occupied and the signalling is such that a distinctive aspect is given to the Loco Pilot of a run through train, restricting the speed to 50 kilometers per hour when a connected line is occupied.

(iii) Catch and Slip Sidings and Sidings provided for isolation purposes only.

7.4.10 Means of Isolation

(a) Sand humps, trap points, or other approved means of isolation shall be provided on all goods lines and sidings at their junctions with passenger lines, the normal setting being such as to prevent the passenger lines from being fouled.

(b) At interlocked layouts, the means of isolation shall be interlocked with the relevant signals.

(c) **Derailing Switches on main or through line**: In order to maintain safety for through running, Points for *trap sidings/derailing switch shall not be inserted in the main or through line. However in exceptional circumstances, they may be allowed under approved special instructions, only in those cases where;

(i) Owing to grades in or near stations, it is necessary to prevent -

- Trains being brought to a stand at a Stop Signal on a rising grade, or
- Vehicles running away from the station.

(ii) It is operationally required to receive trains from different directions at the same time.

(d) At stations where Points for trap sidings/derailing switch are inserted on Main lines or through line for reasons given at (c) above, through running shall be permitted only under approved special instructions.

**Note: Points leading to a short dead end and used solely for the purpose of trapping the running line or sidings shall also be treated as derailing switch.*

7.4.11 Please refer to Annexure: 7-A1 on Extract from "Rules for Opening of Railway Lines" for Isolation for more details.

7.4.12 **Siding Points on Passenger running lines outside station limits**

(a) Facing Points: Where Siding Points take off a running line in a facing direction, the following minimum equipment shall be provided:-

(i) A gauge tie plate and a facing point lock which shall lock each switch independently.

(ii) The control of the points shall be made by means of a key or other suitable device which shall secure the bolting mechanism of the Points in the plunged or locked positions, i.e., when the Points are set and locked for the running line. The means for control of the Points shall be interlocked with the block system in force.

(iii) Where Siding Points are provided only with the minimum equipment as specified above, an appropriate speed limit over the facing points shall be imposed for all trains passing over such Points in the facing direction only and an 'S' marker at the Points and a speed indicator at not less than 30 meters from the Points shall be provided, neither of which, need be lighted. In addition a caution and termination indicator shall also be provided as for open line speed restrictions. Where the sanctioned speed of the section does not exceed 50 kmph, the 'Marker' at the points and the Indicators need not be provided.

(iv) The siding points on passenger lines outside the station limit shall be detected for permitting speeds of up to 50 kmph in facing direction. In case the detection is not provided, speed restriction of 15 kmph shall be imposed.

(b) Trailing Points (Double Line): Where Points take off a running line in a trailing direction, the following minimum equipment shall be provided for unrestricted speed:

(i) A gauge tie plate.

(ii) A suitable type of key lock or equivalent mechanism, the key of which can only be extracted when the Points are set and locked for the running line. The points shall be controlled through the block system in force.

(iii) A 'S' Marker at the Points, which need not be lighted.

Note: Some provisions given in this section may be applicable for Mechanical/Electro mechanical Signalling (where existing) only.

Section 5: Interlocking of Catch Siding and Slip Sidings

7.5.1 At stations where *Catch and Slip Sidings are provided in accordance with the Rules for opening of a Railway, interlocking arrangements and other safeguards shall be provided as given in this section.

**Note: Catch Siding is provided to protect the Station Section, if the gradient is steeper than 1 in 80 falling towards the station section. Slip Siding is provided to protect Block Section, if the gradient is steeper than 1 in 100 falling towards the Block Section*

7.5.2 **Reception of Trains**

(a) Either a minimum of two Stop Signals shall be provided in rear of the Catch Siding points or the First Stop Signal shall be at an adequate distance equal to Block overlap from the catch siding points.

(b) A train shall first be brought to a stop at the First Stop Signal, before the Catch Siding points are set for the main line and the reception signals shall not be taken 'OFF' unless the following conditions are satisfied:

(i) The line on which the train is to be received is clear and the train is to be received on the main line.

(ii) The points leading to the Catch Siding as well as all the Points required for a run through train are set for the main line immediately after granting Line Clear to the Block station in rear.

(iii) Line clear has been obtained from the Block section in advance.

(iv) The gradients in the block section ahead are such that the train can be brought under control easily.

7.5.3 **Setting of Catch Siding/Slip Siding:** The take off points of a Catch/Slip siding shall normally be set and locked for the siding and interlocking between the points and block instruments shall be provided as in Para 7.5.4 and other safeguards as in paras 7.5.5 to 7.5.7.

7.5.4 **Interlocking of Catch/Slip Siding points with Block Instruments**

The interlocking shall be such that the key required to set the siding points is released from the instruments in the "Train Going to" / "Train Coming from" position and once the key is removed from the block instruments, the instrument gets locked in the relevant position. The instrument can be normalised only after the points are set for the Slip Siding/Catch siding and the "Train Going To" / "Train Coming from" key is released from the Points and brought back to release the instrument.

Where a Slip Siding is located at the departure end of a Double Line Station, the interlocking shall be such that the Points can be set towards the Block section only when the block instrument is set to “Line Clear".

Note: Please refer to SEM Chapter 18 for Block working.

7.5.5 **Audible Indication:** An audible indication shall be provided at the place of operation of Points as an aid to the Operating staff, indicating that the train has been received or despatched and that the points shall now be normalised for the Catch Siding/Slip Siding. This indication would continue till the points are normalised for the Catch Siding/Slip Siding.

7.5.6 **Safeguards in working:** In all cases where interlocking arrangements stipulated in Para 7.5.4 are provided between the Slip/Catch Siding and the block instrument, the following safeguards shall also, *inter alia* be provided in the Station working Rules:

(a) Shunting on non-isolated lines shall cease once Line Clear has been granted.

(b) Points shall remain set and locked for the Catch Siding until Home Signal has been taken 'OFF'.

(c) Before normalising the block instrument the Station Master/Assistant Station Master, shall verify the complete arrival or despatch of the train, even though he is getting an audible warning, which may be due to reception or despatch of a complete train or part thereof.

7.5.7 An Emergency Key of the Catch/Slip Siding shall be kept in a sealed box under the custody of the Station Master. This is used for operating the Slip Siding/Catch Siding points when either the block instruments have failed, or when the train is still in the Block section and another train is required to be despatched into the Block section.

Section 6: Interlocking of Signals with Points and other Equipments

7.6.1 **Essentials of Interlocking:** Equipments 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 Main stop signal or a Subsidiary signal, unless all points in the route, including overlap and isolation (as applicable), are correctly set and locked and all interlocked level crossing are closed and locked against public road, and relevant tracks are unoccupied by vehicles and clear for the line on which the train will travel.

(b) After such signal has been taken 'OFF', it shall neither be possible to move any points nor unlock the route, including overlap and isolation, nor to open any interlocked gates until the concerned signal is replaced to 'ON' position.

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

7.6.2 **Route Holding (Approach Locking & Back Locking)**

(a) The route (including overlap, isolation as applicable), locked by a signal, shall be released normally on passage of train or by Emergency Route Release with specified Time Delay. For such route holding, it is essential to provide continuous track circuit/Axle Counters from the signal up to the end of the route at all class of stations.

(b) Overlap shall be released with, either the passage of Train or with specified Time delay on arrival of Train on berthing Track or Emergency Route Release.

(c) Approach locking and back locking shall be provided for all routes governed by Main Stop signals and Subsidiary signals. Approach and back locking shall be continuously effective from the approach track which shall commence from an adequate distance in rear of the signal. In the absence of approach track circuit, Dead Approach Locking shall be provided with suitable Time Delay.

7.6.3 **Route Locking/Holding at Stations having Lever Operated Points & Signals**

(a) Points shall be so interlocked where feasible, as to avoid any conflicting movement.

(b) At a station, where trains run through at speeds more than 50 kilometers per hour, such arrangements to hold the route are also required in case of trailing points situated more than 180 meters from the signal controlling them. However, such arrangements are not required, if the Points are locked in either position by the signal in advance.

(c) Stop Signals which are next in advance of trailing points operated from the same cabin, when taken off, lock such point in either position unless route locking is provided or the distance between the Points and the signal is such that the locking interferes with traffic movement.

7.6.4 Train Detection - Track Circuiting/Axle Counters

(a) Where continuous track circuiting/Axle Counters are provided, the occupation by a vehicle of any track circuited/Axle Counter section shall control the signals leading to the same line and shall also lock the Points on the route.

(b) At stations where points and signals are operated through Relay Interlocking/Electronic Interlocking, track circuiting/Axle Counters shall be provided, for entire station section for all lines, where direct reception is provided.

(c) In case of Cabins with mechanically operated signals & points, all passenger lines or where light engine crossing and shunt movements are frequent or where stop Signals are at a considerable distance from the Cabin, or where the view of the Operator is likely to be obstructed, the provision of track circuits or Axle Counters is essential.

7.6.5 Clearance at Junction Point

(a) Where it is difficult under normal conditions of visibility for an Operator to estimate clearance, track circuiting/Axle counter shall be provided in order to define the *fouling points of junctions, loops, siding connections, crossings etc.

(b) Where the movement of trains over the Points is not visible to the Operator operating the Points - Occupation of the track between Stop Signal reading over the Points up to the fouling mark ahead of such Points shall be electrically indicated at the place of operation.

*Note (i) *Fouling means the marks at which the infringement of two fixed Standard Dimensions fouling block occurs, where two lines cross or join one another. (GR).*

It shall be placed at a location, where centre to centre distance is less than 4265 mm for existing works and 5300 mm for new works/Alteration to existing works. (Reference: SOD for BG Track – Chapter-II-item-1).

(ii) Whenever the term Track circuit is used, it shall automatically cover the use of axle counter or any other approved means of train detection.

7.6.6 Slot controls on signals

(a) Where a signal is controlled through slots, it shall not be possible to take 'off' a signal unless all the controls have been exercised by the controlling agencies. But it shall be possible for any one of the controlling agencies to replace the signal to 'ON' position by withdrawal of the control.

(b) Slot circuits shall be so designed, that a slot once given is effective for only one train and a fresh slot has to be given for a subsequent train.

(c) Station Master's Slot Control on Reception & Dispatch signals.

(i) The Station Master shall be provided slot control, over the Home, Last Stop Signals, and on Calling-on Signals (where provided);

(ii) The Station Master's control over Home Signals can be dispensed with only if all the following conditions are satisfied;

- All reception lines are fully track-circuited from Home Signal to corresponding Last Stop Signal in double line and Home Signal to Home Signal in Single line; or all reception lines are track-circuited from the fouling mark to fouling mark and the non-track circuited portion of the line from the fouling mark to the Home Signal is within the range of visibility of the Cabin, from where signals & points are operated.
- Station Master does not allot the line; and
- Assistant Station Master working in the Cabin operates the Points, Block instruments and receptions/despatch signals.

7.6.7 **Interlocking of Last Stop Signal and First Stop Signal with Block Working:** Where Absolute block working is in use;

(a) The Last Stop Signal shall not be capable of being taken 'OFF' until Line Clear has been obtained from the block station in advance;

(b) It shall not be possible to close the line and grant or receive 'Line Clear' unless the 'ON' aspect of the relevant First Stop Signal is proved.

7.6.8 **Replacement of Stop Signals on passage of Train**

(a) A stop signal in the 'OFF' position shall be replaced to 'ON' position automatically by the passage of a train.

(i) Advanced Starter Signal shall be automatically replaced to 'ON' position by the entry of a train into the block section.

(ii) Home Signal shall be automatically replaced to 'ON' position by the passage of a train in advance of the Home Signal.

(iii) Starter Signal shall be automatically *replaced to 'ON' by the passage of train.

(with delay if replacement glued Joint/Insulation joint is close to signal, please refer to Para no. 21.1.21 (Table-1))*

(b) It shall also be possible to replace a manually controlled signal in the 'OFF' position to the 'ON' position manually.

7.6.9 **Signal Passing at Danger (SPAD) mitigation**

To mitigate the adverse effects of a Train Passing Signal at Danger, appropriate devices, circuits, methods may be provided as necessary such as;

(a) Station staff shall set the relevant facing points to unoccupied line, soon after the arrival of a previous Train, through a provision in Station Working Rules (SWR).

(b) Train Protection Devices (Refer to Chapter 13 of SEM).

(c) Any other approved type of method/Equipment.

7.6.10 **Fail safe Features:** Signal and interlocking circuits (including hardware and software as applicable), shall be so designed and equipment so installed and maintained with it`s connections, that the relevant signal shall remain at or return to its most restrictive aspect and Points shall remain locked in their last operated positions in the event of failure of any part of its connections and circuits.

Section 7: Operation of Signals & Points - Control Panel

7.7.1 The Interlocking installations are of two types, Route Setting Type i.e. on the basis of Entry/Exit principle, Non-route Setting Type i.e. Route is set with individual operation of points.

(a) The points and Signals shall be operated from a:-

(i) Control panel for Relay Interlocking.

or

(ii) Control panel and/or Control Terminal (Video Display Unit (VDU)) for Electronic Interlocking.

Note: Dual VDU shall be provided in lieu of Control Panel and VDU in all future Installations. However, in those existing Installations having one VDU and one Control the same may continue.

(b) Based on size, complexity of the yard or operational reasons more than one Control panel/Control terminal may be provided for operation of the points and signals. In such cases, necessary inter-slotting controls shall be provided.

7.7.2 **Control Cum Indication Panel (CCIP)/Control Panel**

(a) The display of the layout on the front of the Control Panel shall be well proportioned, and each track circuit shall be clearly distinguished by different colours.

(b) A Control cum operations panel with Indications (CCIP or control panel) for route switches/buttons, point switches etc. shall be provided in Geographical order. However a separate Indications panel and a separate operating panel may also be provided for large installations for convenience.

(c) The Route setting shall be on "Entry/Exit" principle for installations of Route Setting type. Each route shall be controlled by means of two push buttons-one at the entrance and the other at the exit of the route. In Non-route setting type installations, after setting of the route by individual operation of points is completed, signal can be cleared by an individual push button in conjunction with a group button or by an individual switch controlling each signal or a common switch for conflicting signals which are not required at the same time, or one push button at the entrance and other at the exit end.

(d) SM's Key control arrangement shall be provided on Control panel/VDU, to prevent any unauthorised operation.

(e) Provision for emergency route release shall be provided on control panel/VDU. This emergency operation shall be recorded through a Non resettable Counter incrementing for every such operation.

(f) All Emergency operations shall be two-step process, to safe guard against unintended operations.

(g) Locking and sealing arrangements shall be provided for the covers of Control Panels/Block Instruments etc. to secure against unauthorised opening. Relay Rooms at stations shall be provided with double lock arrangements.

Further details are given in Para 21.1.2

7.7.3 Arrangement for switches/buttons for operation of points &signal in Control Panel is given at Para 21.1.3.

7.7.4 **Control Panel Indications:** The control panel shall be provided with; Point Indications, Route Indications, Signal Indications, Track Circuit Indications, Power Supply Indications and other Indications as required. Refer to Para 21.1.4 for details.

7.7.5 **Control Terminal – (Video Display Unit (VDU)):**

(a) Control Terminal/multiple Control Terminals shall be of appropriate size to display layout of the Yard in well-proportioned dimensions and shall display all functions clearly distinguishable. Control Terminal/multiple Control Terminals shall be provided in redundant mode.

(b) Operation of Signals, Points and other Controls such as Gate, Crank handle, Siding, Slot etc. shall be carried out through appropriate dropdown menus or other approved means.

(c) When embedded block working in Electronic Interlocking is used, all indications like TGT, TCF, LC etc required for block working shall also be displayed.

(d) Same indications as given in Para 7.7.4 above for Control panel, shall be provided for Control Terminal also.

Further details on Control Terminal (Video Display Unit (VDU)) are given at Para 21.1.15.

Section 8: An overview – Design, Installations, Testing, Commissioning & Maintenance of Signalling Equipment

7.8.1 **Design & Installations**

(a) The signalling and interlocking arrangements for the yard shall be in accordance with the approved signalling plans, Control Table, detailed wiring diagram including Control Panel diagram, Relay contact analysis and relay rack arrangements.

(b) Criteria for Design of Signalling circuit is given in Chapter 21, Section 1.

7.8.2 **Outdoor signalling equipment to be Installed, Tested & Maintained as given below**

(a) LC Gates as per Chapter 14 of SEM.

(b) All signalling cables shall be laid, Tested as per Chapter 15 of SEM.

(c) Train Detection: Track circuits, AFTC, Axle Counters as per Chapter 17 of SEM.

(d) Signals, IRS Point Machines, Thick web switches as per Chapter 19 of SEM.

7.8.3 **Power Supply & suitability for RE area for equipment and circuitry shall be as given below:**

(a) Power Supply Arrangements: Power supply systems for Signalling Installations shall be as per Chapter 16 of SEM.

(b) All signalling equipment and circuitry shall comply with stipulations given in Chapter 22 of SEM on "Requirements of signalling in 25 KV AC electrified areas".

7.8.4 **Block Instruments, Lightning and surge protection & Earthing, General Arrangements as given below:**

(a) Block Instruments (where separately required) shall be Installed, Tested, Commissioned & Maintained as per Chapter 18.

(b) Lightning and surge protection shall be provided to protect Electrical & electronic signalling equipments from lightning & surges as per Chapter 21, Section 7.

(c) Earthing for Outdoor signalling equipment as per Chapter 19, Section 11.

(d) General Arrangements in Relay Room: Air conditioning, 'Automatic Fire Detection and Alarm System', Automatic Fire Suppression System' etc shall be as per Para 21.3.4.

7.8.5 Commissioning of Relay Interlocking

On completion of Outdoor signalling works as per Chapter 19 and Relay Interlocking works as per Chapter 21, System Integrity Tests (SIT) shall be done as per Para 19.8.8 before commissioning. Recommended Pre-commissioning check list is given at Annexure: 21-A2.

7.8.6 Commissioning of Electronic Interlocking

On completion of Outdoor signalling works as per Chapter 19 and Electronic Interlocking works as per Chapter 21, System Integrity Tests (SIT) shall be done as per Para 19.8.8 before commissioning.

7.8.7 Drawings for Guidance on Installation are given at Appendix II. These may be customised as per site conditions or as per equipment sizes or as per Zonal Railway`s prevailing practices duly keeping in view principles of Reliability, Availability, Maintainability & Safety, Industry`s best Practices and extent RDSO/Board`s Schemes/Guidelines.

7.8.8 Maintenance Schedules are given at Appendix I for various signalling equipments. If required, these may be supplemented duly keeping in view Traffic Patterns, principles of Reliability, Availability, Maintainability & Safety, Industry`s best Practices and extent RDSO/Board`s guidelines.

7.8.9 Important Minimum Signalling Features which shall be provided at various stations based on standard of interlocking are given in Table-3.

Note: This Chapter has under mentioned Annexures

S.No	Annexure	Description
1	7-A1	*Extract from "Rules for Opening of Railway Lines" for Isolation (Rule 36)*

Para No: 7.8.9 of IRSEM (Issue - July 2021): Table-3: Important Minimum Signalling Features					
S.No	**DETAILS**	**STD I**	**STD II**	**STD III**	**STD IV**
1	Maximum permissible speed	Up to 50 Kmph	Up to 110 Kmph	Up to 140 Kmph	Up to 160 Kmph
2	Isolation	See Notes below	Required	Required	Required
3	Point Operation, Locking & Detection	Point Machine	Point Machine	Point Machine	Point Machine & Direct Clamp type with Thick web switches
4	Train Detection (Track circuit/Axle Counters)	On all Run through Lines	On all Running Lines	On all Running Lines	On all Running Lines
5	MACLS Signalling, Movement authority	MACLS	MACLS	MACLS	MACLS, Movement Authority
6	Block Working (Absolute/Automatic Signaling)	Permitted (Including Token Working)	Permitted (Excluding Token)	Permitted (Excluding Token) or 4A Automatic Signalling	Permitted (Excluding Token) or 4A Automatic Signalling
7	Double Distant/Automatic Signalling	Not Compulsory	Required (On sections where Trains have a Emergency Braking Distance of more than 1 Km)	Required or 4A Automatic Signalling	Required or 4A Automatic Signalling
8	Last Vehicle verification	Not Compulsory	Required at stations with centralized operation or in high density routes	Required	Required
9	Relay/Electronic Interlocking (RI/EI)	RI/EI	RI/EI	RI/EI	RI/EI
10	Mobile Train radio communication (MTRC) or LTE or any other Technology	Not Compulsory	Desirable	Desirable	Required
11	ATP (ETCS/TCAS/TPWS) with Cab Signalling for SPAD mitigation	Not Compulsory	Desirable	Desirable	Required
12	Centralised Traffic Control (CTC)	Not Compulsory	Desirable	Desirable	Desirable

(Contd..)

S.No	Notes for Table 3
1	**Isolation:** Isolation is not compulsory. Extract from "Rules for Opening of Railway Lines – Rule 36" is given below
	(2) At no station at which isolation has not been provided through running trains shall be permitted unless the conditions laid down in the second paragraph of the rule 4.11 of the General Rules are complied with. *Extract of GR 4.11. Limits of speed while running through stations.-* *(1) No train shall run through an interlocked station at a speed exceeding 50 kilometers an hour or such less speed as may be prescribed by approved special instructions unless the line on which the train is to run has been isolated from all other lines by the setting of points or other approved means and interlocking is such as to maintain this condition during the passage of the train.* *(2) In every case in which trains are permitted to run through on a non isolated line, all shunting shall be stopped and no vehicle unattached to an engine or not properly secured in accordance with General Rule 5.23 may be kept standing on a connected line which is not isolated from the through line.* (5) All Passengers running Lines shall be isolated from all Goods lines or Sidings connected thereto. (6) All goods running Lines may be isolated from all sidings connected there to. (7) It is not necessary to isolate one goods receiving line from another. Refer to Annexure: 7-A1 for full extract of "Rules for Opening of Railway Lines – Rule 36" along with Diagrams on methods of providing isolation.
2	**General**
	(i) The provisions of the above Table shall apply to future Signalling and Interlocking Installations. Wherever existing installations do not fulfill these requirements, existing speed of operation may be permitted to continue. (ii) In case Block working is achieved directly through Electronic Interlocking, provision of separate block instrument is not required. (iii) This Table does not cover Semaphore Signalling (LQ,MAUQ, MLQ), 2 Aspect Colour Light Signalling, Mechanical Signalling/FPL, Key Locking/Rudimentary Interlocking etc, where existing equipment & mode of operations may continue till their replacement. (iv) Those existing Installations/Plans showing STD I (R), STD II (R), STD III (R), STD IV (R) (as per Previous SEM Part 1, 1988 edition) may continue to show them till their replacement. (v) Wherever Thick web Switches are provided, Direct Clamp Type Point Machines shall be provided. (vi) 'Attention' aspect on Home signal shall be provided for run through with speed more than 30 kmph on Loop Lines. (vii) In automatic territory where emergency braking distance is more than 1.0 km is to be catered for, 4 aspect automatic signalling shall be provided. If not provided, suitable speed restriction shall be imposed.

Extract from "Rules for the Opening of a Railway Lines" for Isolation (Rule 36)

35. Junctions: ……

36. Provisions for isolations at stations:

(1) The speed of trains running through stations shall be governed by the General Rules for all open lines administered by the railway administrations, both Government and the non-Government railways and shall be subject also to the restrictions relating to standards of interlocking prescribed in the Signal Engineering Manual.

(2) At no station at which isolation has not been provided through running trains shall be permitted unless the conditions laid down in the second paragraph of rule 4.11 of the General Rules are complied with.

(3) At any station where there is a speed restriction for through running trains different from neighbouring stations, a speed restriction board should be erected at the first approach signal or where no signals are provide, at full braking distance outside the first facing point.

(4) In order to maintain safety for through running, points for trap sidings must not be inserted in the main line or through line, except under approved Special Instructions in accordance with the Signal Engineering Manual, Part I.

(5) All passenger running lines shall be isolated from all goods lines or siding connected thereto.

(6) All goods running lines may be isolated from all sidings connected thereto.

(7) It is not necessary to isolate one goods receiving line from another.

(8) Isolation may be accomplished by –

(a) Connection to another line or long siding;
(b) The provision of short dead end siding; or
(c) The provision of trap.

Note: (i) Whichever may be the method for isolation, a starter signal shall be provided, except when omitted under approved special instructions.

(ii) When a trap is provided, the trap switch should be located with the heel of the switch in rear of the fouling mark and preferably on the straight. The switch should be in the rail away from the line to be protected.

(9) The various methods of isolation are illustrated in the diagrams given in Appendix A attached to these rules and the following instructions shall apply to their use in the case of running lines, namely :-

Method A: This method shall apply to cases in which the line on which the train will run when the points are set for isolation of the through line, is kept clear for the adequate distance prescribed in Rule 3.40 of the Indian Railways (Open Lines) General Rules, 1976.

Method B: When a short dead end siding is provided, it shall not ordinarily be long enough to permit of vehicles being stabled thereon. To obtain the adequate distance prescribed under rule 3.40 of the General Rules the points of the dead end siding shall be set for the across over and against the siding, before a train is admitted on a line trapped by this method. Where it is necessary for the short dead end siding to be extended for the purpose of stabling vehicles, the above rule shall apply, unless a trap is provided on the dead end siding at a distance of not less than 180 meters (120 meters in case of stations provided with multi aspect signalling) from the starter signal where provided or from points leading to the main or through line. A train must be admitted on the running line unless the trap is set and locked against vehicles occupying the further part of the dead end siding.

Method C: When a trap is used, a train must not be admitted on to the trapped line unless the trap has been closed, so that the train will not be derailed if the driver over shoots the trap.

(10) When Method A cannot be used, and for any reason it is not convenient to use Method B or Method C and to provide adequate distance by setting the points of the short dead end siding or trap for the cross over and against the siding or trap, a sand hump of approved design should be used as a substitute for adequate distance as provided in rule 3.40(4) of the Indian Railways (Open Lines) General Rules, 1976. In that case the length of the siding should be at least one rail length and formation should be made up for a short distance beyond the hump.

APPENDIX A
[See rule 36(9)]
DIAGRAM ILLUSTRATING METHODS OF
PROVIDING ISOLATION