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# BLOCK WORKING MANUAL

for

## DEDICATED FREIGHT CORRIDOR RAILWAY

(For official use only)

Dedicated Freight Corridor Corporation of India Limited

A Government of India (Ministry of Railways) Enterprises

2020

## PREFACE

The Block Working Manual contains detailed instructions regarding block working on single line / double line sections of Dedicated Freight Corridor Railway. The rule in this manual is to be read in conjunction with General & Subsidiary rules of Dedicated Freight Corridor Railway 2018 and other instructions issued from time to time on the subject.

A copy of this manual is to be kept at all stations and all staff connected with the operation of Block instruments shall make themselves thoroughly acquainted with the rules enumerated therein and he will be responsible for compliance with all the rules concerning his working. A copy of these rules or translation of the said rules or such portion, thereof as related to the duties of the railway employee, as may be prescribed under special instructions shall be provided further, in case of any discrepancies in Hindi version, the English version of the same shall prevail.

Amendment to the Block Working Manual will be issued in the form of page replacement and it is the responsibility of the staff to whom this Manual is supplied to keep them up-to-date. It is hoped that the procedures and practices envisaged in this Manual will help the staff in carrying out their duties efficiently and safely.

New Delhi

**(VIVEK SRIVASTAVA)**
**DIRECTOR/OP&BD**
**DFCCIL**

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## CHAPTER I

## GENERAL INSTRUCTIONS

**1.1 Issue of Block Working Manual:** This book of rules and regulations for working trains on Double & Single Line by means of Electrical Instruments on the ABSOLUTE BLOCK SYSTEM shall be issued to all staff concerned as directed by the Director/Operations & Business Development, Dedicated Freight Corridor Railway.

**1.2 Knowledge of Rules:** Every Railway Servant supplied with this book must make him/her self thoroughly acquainted with the rules pertaining to his/her duties, and he/she will be held responsible for the knowledge of and compliance with all the rules that concern him. Nothing in this book shall be accepted as modifying or amending the Dedicated Freight Corridor Railway General and Subsidiary Rules, in conjunction with which, this book should be carefully studied.

**1.3 Addenda and Corrigenda:** All alterations or corrections that may from time to time be notified, shall be neatly posted and shall be recorded on the pages provided for the purpose.

**1.4 System of Working:** The Automatic Block system is in force on the Dedicated Freight Corridor Railway except the following sections where Absolute Block System in force.

The Absolute Block System is in force on the following sections**:**

a) **Eastern Corridor**

New Khurja-New Chawapail (Single Line)

New Boraki-New Dadri (Twin Single Line)

b) **Western Corridor**

New Rewari-New Dadri (Double Line)

**Note**: The sections where Automatic & Absolute Block system are in force are shown in the Working Time Table of the Corridor concerned, which may be updated time to time.

### 1.5 Objective of Electrical Block Instruments:-

The objective of signaling trains by electrical block instruments is to provide at all times a visual indication of the block sections to which they refer and to guard against two trains being admitted into a block section at the same time.

a) Each instrument is connected to a similar instrument at the next block station and the two block instruments work together. The pair of instruments is used for working both Up & Dn Trains over the block section so that each is used both for sending train to the next station or for receiving train from the next station. Each station controls the line by which trains approach it, and the line by which trains leave, it is controlled from the station at the other end of the block section.

### 1.6 Fixed, Hand, Fog and warning signals:-

Signaling trains by electrical block instruments does not in any way do away with the use of fixed, hand, fog and **warning** signals, whenever and wherever such signals may be required.

**1.7 Block instruments (Double Line):** These instruments in addition to giving visual indication of the state of the block sections to which they refer are provided with locking which prevents the block instruments to be brought to 'Line Closed' position unless the train to be received has cleared the section clearing track circuit or the axle counter.

The following block instruments are in use on Dedicated Freight Corridor Railway –

a) Block proving with Axle counter using SSDAC & UFSBI.
b) Controlled Manual Block

**1.8 Block instruments (Single Line):** The following block instruments are used on the single line –

a) Block Panel with Axle counter using SSDAC & UFSBI.

b) Controlled Manual Block

**1.9 Use of Instruments:** Block Instruments shall only be operated by the Station Master (SM)/ASM on duty and shall be used exclusively for the purpose of signaling trains strictly in accordance with the rules & regulations laid down. Every train in its progress from one block station to another shall be signaled on the block instruments.

Station staff must not interfere with any part of a block instrument when it is out of order, or at any other time. Block instrument must be kept free of dust, grease, etc. and no article must be placed on the Block Instrument and battery boxes.

**1.10 Training of Staff:** When the block instruments are in actual use for train working, they shall not be used for the purpose of imparting training to staff.

**1.11 Extra care during repairs to cable and equipment:**

(i) Whenever the person in charge of Other than Signaling or Telecommunication Department working party intends to work at a station or in block section, he shall advice the 'S&T Department of DFC' indicating the section or station where work is to be carried out. This information should be conveyed by the 'S&T Department of DFC' to the Section Controller concerned, giving the name of the person in charge of the working party and the exact kilometreage where the work will be undertaken. The section controller on receipt of this advice shall intimate the station concerned. On completion of the work by the other department, the information in writing should be given to the section controller by the 'S&T Department of DFC' cancelling previous message.

(ii) In the event of interruption when such an advice is not possible or failure of controlled sections, the person in charge of the working party should intimate in writing to the Station Master of the station concerned. The Station Master during the period of repairs shall work with extra care and vigilance.

On receipt of such advice the Station Master shall advice the station at the other end of the block section to exercise care and vigilance during the period of repair work is in progress.

**1.12 Entry into Station Master Room:** Entry of unauthorized persons into Station Master Room is strictly prohibited. No person shall enter at any Station Master room except when required to do so in connection with his / her regular duties.

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## CHAPTER II

### PART-I
### CODE OF BELL SIGNAL AND MODE OF SIGNALLING TRAINS

**2.1 Bell coding for signalling of trains between stations**:-

(1) For the signalling of train operation, the prescribed code of bell signals, as detailed below, shall be used and exhibited in each block station near the place of operation of the block working equipment.

| Sr. No. | Indication | How signalled | Number of beats | How to acknowledge the signal |
|---|---|---|---|---|
| 1 | Call attention or attend telephone | 0 | One | 0 |
| 2 | Is Line Clear or enquiry about Line Clear | 00 | Two | 00 |
| 3 | Train entering block section | 000 | Three | 000 |
| 4 | (a) Train out of block section | 0000 | Four | 0000 |
| | (b) Obstruction removed | 0000 | Four | 0000 |
| 5 | (a) Cancel last signal | 00000 | Five | 00000 |
| 6 | Emergency danger signal. Attend block telephone immediately. | 000000 | Six | 000000 |
| 7 | Testing | 0000000000 | Ten | 0000000000 |

Note: (a) '0' INDICATES A STROKE OR A BEAT OF BELL.

(b) EACH SIGNAL SHALL BE GIVEN SLOWLY AND DISTINCTLY.

(2) Provided further that exchange of bell codes under item 3 and 4 are not required between stations provided with block proving axle counter or track circuit having complete track circuiting of station yard excluding non-running lines on either end.

(3) Unless otherwise specified, it shall be mandatory to use the authorised code of bell signals along with attached telephone when operating block instrument.

**2.2 Call Attention and/or Attend Telephone (one beat):-**

This bell code shall be used for 'Call Attention' as well as for 'Attend Telephone' signal. Whenever it is necessary to direct attention to the block instrument, 'Call attention' signal shall be given. This signal must always precede any operation of the block instrument or when an operation in the course of being carried out is to be interrupted requiring the Station Master at the next station on block telephone or when an operation partly carried out has to be resumed.

**2.3 'Attend Telephone' signal (one beat)**:-

When a Station Master wants to call the Station Master of adjoining stations to attend the block telephone, he must send one beat first to serve as 'Call Attention' signal and after receiving the acknowledgment send again one beat to serve as 'Attend Telephone' signal. The Station Master at the adjoining stations will acknowledge it by sending one beat and attend telephone.

**2.4 Sending of 'Is Line Clear' signal (two beats)**:-

(a) After the 'Attend Telephone', signal has been sent to the next block station in advance and acknowledged the 'Is Line Clear' signal shall be sent to that station.

(b) The 'Is Line Clear' signal shall not be sent until the 'Train out of Section' signal has been received for the last preceding train from the station in advance.

**2.5 Acceptance of the 'Is Line Clear' signal and sending of a 'Line Clear' signal (two beats):-**

(a) If, on the receipt of a 'Is Line Clear' signal, the conditions under which 'Line Clear' can be given are complied with, the block station in advance shall accept the signal by sending the prescribed signal to indicate 'Line Clear' on the particular block instruments in use.

(b) Except in case of failure of the block instruments, a train shall not be allowed to leave a block station unless the instrument for the block section into which it is about to proceed shows 'Line Clear'.

(c) When 'Line Clear' is so shown, the last Stop signal applying to the train may be taken 'off' to allow the train to proceed up to next block station.

**2.6 Train stopping in section:-**

(a) When it is necessary for a train to stop in a block section, the train must be stopped at the station before it and the Guard must be informed by the Station Master of the intended stoppage and its probable duration.

(b) The Station Master must obtain the Controller's permission on the controlled areas and then advise the Station Master at the other end of the block section the description of the train that it will stop in section and the duration of halt.

(c) The Station Master will then obtain 'Line Clear' by sending' Is line clear signal if 'Line Clear' has not already been obtained before the arrival of the train.

(d) A Caution Order must also be issued to the Loco pilot and Guard giving particulars of the kilometre or kilometres of stoppage and the time by which the section should be cleared.

**2.7 The 'Emergency Danger' signal (six beats)** :-

(a) If it is necessary to prevent the approach of a train from the station in rear, the 'Obstruction Danger' signal must be given to that station, whether the 'Is Line Clear' signal for a train from that station has been accepted or not.

(b) The Station Master who sends the 'Obstruction Danger' signal must keep all the fixed signals at danger to protect the obstruction.

(c) The Station Master receiving the 'Obstruction Danger' signal must immediately acknowledge it and keep at danger the fixed signals controlling the entrance into the obstructed section and must not allow any train to proceed towards the station from which he/ she has received the 'Obstruction Danger' signal until he /she has received the 'Obstruction Removed' signal and a fresh 'Is Line Clear' signal has been accepted by the station in advance. Whenever, it becomes necessary to allow a train to enter an obstructed section to render assistance, such train must be signalled in accordance with **DFCR-GR rule 229.**

(d) The Station Master who receives the 'Obstruction Danger' signal, after stopping the train for which 'Is Line Clear' signal has been accepted by the station in advance, must advise the station in advance by giving the 'Cancel Last Signal' signal, this must be acknowledged. On removal of the cause for which the 'Obstruction Danger' signal was

given, the station in advance will give the 'Obstruction Removed' signal to the station in rear and indicators brought to show 'Line closed' position whenever it is possible.

(e) If the Station Master who receives the 'Obstruction Danger' signal is unable to stop the train, he must immediately send 'Train entering section' Signal and inform the Station Master of the station in advance on telephone also. The Station Master at the station in advance must immediately use all means to stop the approaching train.

(f) When the obstruction has been removed and the block section is clear, the 'Obstruction Removed' signal must be sent to the station in rear.

**2.8 The 'Train Entering Section' signal (Three beats)** :-

On departure of a train from a block station, the 'Train Entering Section' signal shall be sent to the block station in advance, the same signal shall be acknowledged by the SM of station in advance.

**2.9 The 'Cancel Last Signal' signal (Five beats):-**

This signal shall be sent to cancel the previous signal or when the previous signal has to be altered. Before sending this signal, the Station Master shall inform to the Station Master of the station concerned on the block telephone, of the circumstances, under the exchange of Private Numbers. The last Stop signal, if taken 'off', shall be replaced to 'on' 'by putting the signal button and the controlling slide, if any, to normal. Both Station Masters shall note what necessitated the cancellation of the signal as well as the Private Number exchanged in the Train Signal Register.

**2.10 The 'Testing signal"(Ten beats):-**

This signal must only be used for testing the block instruments, and must be acknowledged each time by an exact repetition of the beats received. The testing must only be done when the block instruments are in the 'Line Closed' position.

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**PART-II**

## 2.11 Issue of Private Number:

(a) Every 'Line Clear' message shall be supported by a Private Number by the Station Master giving 'Line Clear".

(b) The Private Number shall form part of the 'Line Clear' message and shall be signalled as the last word in it. When a Private Number is given or exchanged, it must be given as one number thus 28, and also as two eight. The receiving station will repeat the same number to assure the sending station that the number has been correctly understood.

(c) A Private Number, given while granting 'Line Clear' which is subsequently, cancelled shall not be given again. A fresh number shall be given to each 'Line Clear'.

(d) The entry of a Private Number will be held to certify that the 'Line Clear' has been given, by the Station Master on duty.

(e) Record of all the Private Numbers issued and obtained must be made in the Train Signal Register.

(f) When a Private Number has been used, the figures are to be scored out by drawing in ink a diagonal line through them, care being taken that the number thus cancelled is not obscured or obliterated. The train number for which the Private Number is used must be entered by Station Master/ASM in the column provided for the purpose.

(g) After taking over charge, the Station Master/ASM should draw a horizontal line below the last Private Number issued, and enter the date and duty hours thus

For example:

Date 12.06.2019

Duty 00-08

BE/N Dn.

FD/N Dn.

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Date 12.06.2019

Duty 08-16

LDH/N Up

MD/N Up

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Date 12-06-2019

Duty 16-24

**2.12 Private Number Sheets:-**

(a) Private Number Sheets will be supplied by the DGM/OP & Safety or equivalent officer of operating department of DFC. Private Number Sheets of the same series are not to be issued to adjoining stations, i.e. if A series is supplied to station 'Y', different series should be supplied respectively to station 'X' on one side and to station 'Z' on the other side. Private Number sheets of the same series are also not to be supplied to the same station in succession.

(b) Only one Private Number sheet will be supplied for use to each station or block cabin at a time, and when not in use, it will be kept under lock and key by the Station Master. No other person will be allowed to have access to it, except an authorised official for the purposes of enquiry or inspection. When in use it must

be in the personal custody of the Station Master on duty.

(c) Station Master shall ask for a fresh Private Number sheet from DGM/OP & Safety when the one in use is nearly exhausted. If for any reason a fresh Private Number Sheet is not available, when the one in use has expired, the Station Master will prepare a manuscript Private Number sheet in the same form as the printed sheet, inserting his own numbers (which are not to follow a serial order or the series in the expired sheet), and this manuscript sheet should be cancelled immediately on receipt of the fresh Private Number sheet and sent to the Corridor Office for record with an explanation for its use.

(d) Should it occur from any cause ( such as misprint or the changing from one series to another ) that a Private Number is the same as the last one issued, the issuing station will cancel this number in his sheet, add the remark 'Same as last Private Number', sign it and issue the next different number. Should the messages have been completed before the duplication of numbers is discovered, it shall be cancelled and entirely re-written with a fresh and different Private number.

**2.13 In case of failure of Block instrument, Line Clear is obtained on other means of communication (GR-90):**

Following procedure will be applied :-

(a) Both Station Masters after confirming the identity by verifying the Private numbers issued/received for the last three trains with timings between the said two stations as per train signal register shall ensure the concerned block section is clear and line clear can be granted to a train.

(b) Controller after satisfying that condition for granting line clear by Station in Advance are fulfilled will take

name and Private number of Station in Advance in token of Line Clear and record the particulars in remarks column of control chart. He will then call and advise Station in rear giving his name and Control number along with private number of the station in advance in token of Line Clear granted and allow the train to leave.

(c) On receipt of the above advice from the Controller, (supported by his name and control order number and private number issued by the station in advance) the Station Master will issue necessary authority and take 'Off' the concerned signals for the train to leave.

(d) Station Master shall record the controllers name and control order number and Private Number received in the train signal register and the Line Clear transaction in FORM 2 as the case may be.

**Note:** A remark must be entered in the train signal register at both the stations to the effect that "Line Clear" was asked or granted on Telephone attached to Block Instrument/ Station to Station fixed telephone/Fixed Land line telephone,/ Control telephone/any other secured means of communication approved in accordance with special instructions.

Whenever the need for using anyone of the means of communication it shall be used in order of preference as given above.

(e) Provided further that if only the telephone of block instrument has become defective but not the instrument itself the Station Master on duty on both ends of the block station shall continue to obtain or grant line clear through the block instrument and communicate with each other using any means of communication in that order. The condition under

which the block instrument is treated as failed are described in DFCR-GR rule 217.

(f) After the block instruments are again put in working order and as soon as the last train, for which 'Line Clear' was obtained on Electrical communication instrument, has arrived complete, the Station Master at the station in advance must give the 'Train out of Section' signal to the station in the rear supported by his Private Number and resume block signaling working system of trains in the usual manner.

**2.14 Measures to rectify defective instruments:-**

(a) Whenever the block instruments are out of order, the Station Master must inform the S&T official in writing and maintain record.

(b) When a block instrument fails or is defective, it shall not be brought into use again until certified to be in working order by a S&T official who shall pass a remark in the Train Signal Register and S&T failure register as follows and sign :-

'Fault on block section _____ rectified and block instrument tested and now found in good working order at _____ hours.'

(c) The S&T officials of the section concerned and section controller and S&T official in control office will be advised as follows :-

Token less working with

_____

Station _____ suspended cause

_____Train working on Paper Line Clear.

In the above message, the Station Master must as far as possible state the cause of failure.

(d) The Station Master receiving advice that block working is suspended shall acknowledge the message by repeating it and making a record in his Train Signal Register.

(e) When the failure has been rectified, and an entry to that effect in the Block Failure Register by the block maintenance staff has been made the Station Master will countersign the entry in the register.

(f) Block working shall not be resumed while there is a train in the block section.

(g) Before resuming Block working the Station Master at the station where the instrument was defective shall advise the Station Master at the other end of the section over control phone/other authorized means of communications available, where provided, and obtain his acknowledgement. He should also exchange practice Line Clear with the Station Master at the other end. Practice Line Clear will be in the form of taking a Line Clear, and then cancelling the Line Clear by the Station Master.

(h) The Station Master receiving advice that Block working has been resumed shall acknowledge the message by repeating it and make a record in his Train Signal Register.

(i) When the Block instruments are brought into use again the advice issued must be cancelled by the Station Master who reported the failure.

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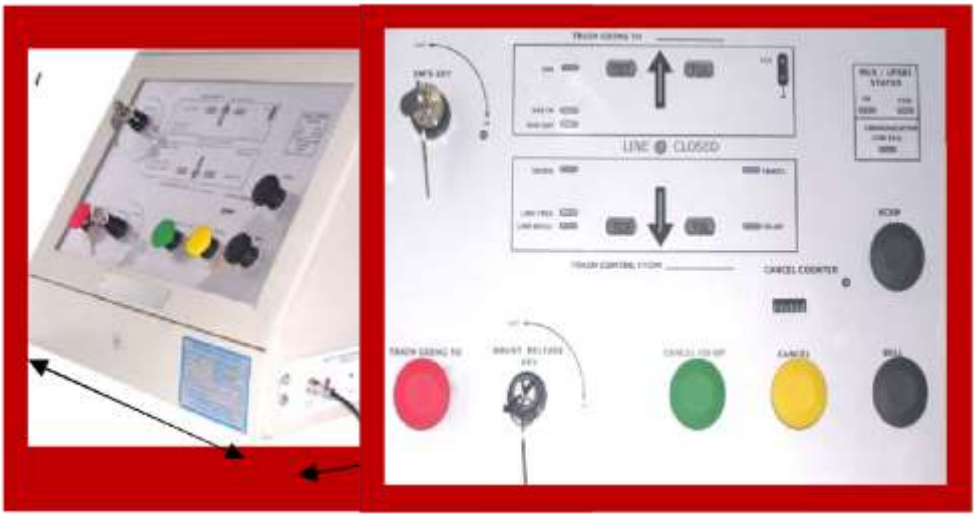
## CHAPTER-III

## BLOCK PROVING WITH AXLE COUNTER USING SSDAC & UFSBI ON SINGLE LINE

**3.1** This system works in Single Line Absolute Block Section territory and is used to control the movement of trains on single line block section from one block station to another.

### 3.2 Block Panel:

Block panel is used to operate, control & regulate the movement of trains on single line block section from one block station to another. The Block Panel is provided with Indications, Push Buttons, Keys, Counters and Buzzers for providing audio visual indications and alarms to facilitate the train movement in the block section.



**BLOCK PANEL FITTED WITH BLOCK TELEPHONE (SINGLE LINE)**

**BLOCK PANEL FACE PLATE (SINGLE LINE)**

### 3.3 Principle of working:

(i) The trains are worked on Absolute Block system.

(ii) Each block section is provided with an Axle Counter to verify the occupation or clearance of block section which is indicated on Block Panel.

(iii) It is not possible to take the Last Stop Signal to 'OFF' unless "LINE CLEAR" has been obtained from the station in advance.

(iv) It is not possible to obtain "LINE CLEAR" unless block section i.e. not only up to first stop signal but an adequate distance beyond it of station in advance is clear of trains.

(v) The Last Stop Signal assumes 'ON' aspect automatically on entry of train into block section and when so replaced, is maintained in its 'ON' position, till a fresh "LINE CLEAR" is obtained through Block Panel.

(vi) Block section shows automatically "TRAIN ON LINE" on block panel when a train enters into the block section on "LINE CLEAR".

(vii) Audio – Visual alarms for Train entry/exit to/ from block section are provided and are to be acknowledged.

(viii) "LINE CLOSE" feature is automatic after complete arrival of train.

(ix) "LINE CLEAR" cannot be taken without taking consent of receiving station.

(x) "LINE CLEAR" cancellation is Co-operative.

### 3.4 Description of Block Panel:

Block Panels work in pair as a set between adjoining stations. Following are the various parts of the block panel & their functions:-

**(A) <u>Indications:</u>**

(a) **"LINE CLOSED" Indication (Yellow):** The indication is provided to indicate the Block Section is free from vehicles and "LINE CLEAR" is not granted / received at train receiving / sending station respectively. It is provided as a circular indication in between the directional arrowheads.

(b) **"TRAIN COMING FROM" Indication (Green):** The indication is provided to indicate that a "LINE CLEAR" has been granted by the station in rear. The indication flashes when the Block section has been cleared after arrival of train at receiving station, but associated Signals and their controls are not put back to normal or unintentional insertion of Shunt Release Key "IN" at either station. It also flashes when a Cancellation of "LINE CLEAR" is done before entry of a train in the Block Section. It is provided as arrowhead indications pointing downward for incoming traffic at train receiving station and a rectangular indication named TCF.

(c) **"TRAIN GOING TO" Indication (Green):** The indication is provided to indicate that a "LINE CLEAR" has been received. The indication flashes when the Block section has been cleared after arrival of train, but associated Signals and their controls are not put back to normal or unintentional insertion of Shunt Release Key "IN" at either station. It also flashes when a Cancellation of "LINE CLEAR" is done before entry of a train in the Block Section. It is provided as arrowhead indications pointing Upward for Outgoing traffic at train sending station and a rectangular indication named TGT.

(d) **"TOL" Indication (Red):** The indication is provided to indicate that a train has entered into the Block Section on "LINE CLEAR". It is provided as arrowhead and rectangular indications named TOL pointing downward or

upward for incoming or outgoing traffic respectively at both Train receiving and sending stations.

(e) **"Cancel CO-OP" Indication (Yellow):** The indication is provided to indicate that Co-operation is extended by the station at other end for cancellation of "LINE CLEAR".

(f) **"Cancel" Indication (Yellow):** The indication flashes to indicate that cancellation of "LINE CLEAR" is in progress and would last for 120 seconds. After that it's got steady until the line is closed.

(g) **"SNK" Indication (Yellow):** The indication is provided to indicate that all signals and their controls are at On/Normal position. It is provided near TGT directional arrowhead.

(h) **"SNOEK" Indication (Yellow):** The indication is provided to indicate that at other end the LSS and its controls are at On/Normal position, Shunt Release Key is in "OUT" position and Shunt key of "EKT" is in "IN" position. It is provided near TCF directional arrowhead.

(i) **"LSS" Indication (Red):** The indication is provided to indicate that LSS is at "ON" condition. It is provided in monogram of signal.

(j) **"LSS" Indication (Green):** The indication is provided to indicate that LSS is at "OFF" condition. It is provided in monogram of signal.

(k) **"LINE FREE" Indication (Green):** The indication is provided to indicate that there is no train in the block section. It is provided near the TCF arrowhead.

(l) **"LINE OCCUPIED" Indication (Red):** The indication is provided to indicate that there is train in the block section or axle counter failure. It is provided near the TCF arrowhead.

(m) **"SHUNT KEY" Indication (Red):** The indication is provided to indicate that Shunt Key of EKT is "OUT" or Shunt release key is in "IN" position. It is provided near the TGT arrowhead.

(n) **"SHUNT KEY" Indication (Green):** The indication is provided to indicate that Shunt Key of EKT is "IN" or Shunt release key is in "OUT" position. It is provided near the TGT arrowhead.

(o) **"ACKN" Indication (Yellow):** The indication is provided to indicate section buzzer ON status. It is provided near the ACKN button.

(p) **"MUX / UFSBI Status OK" Indication (Green):** The indication is provided to indicate that UFSBI is functional.

(q) **"MUX / UFSBI Status Fail" Indication (Red):** The indication is provided to indicate that UFSBI is in failure mode.

(r) **"Communication Link Fail" Indication (Yellow):** The indication is provided to indicate communication link failure. It glows steady YELLOW when link fails otherwise flickering.

(s) **"SM's Key IN" Indication (Green):** The indication is provided to indicate SM's Key 'IN' condition.

**(B) <u>Push Buttons & Keys:</u>**

(a) **"Bell" Button (Black):** It performs a number of functions.

(i) To transmit call attention & bell code to station at other end of block section.

(ii) To take Line Clear when Pressed along with "Train Going To" button.

(iii) To cancel line clear when pressed along with Cancel button.

(b) **"Train Going To" Button (Red):** The Push button is provided to receive "LINE CLEAR" when pressed along with "Bell" button.

(c) **"ACKN" Button (Black):** The Push button is provided to acknowledge audio visual indications for occupation/clearance of the train in the block section. It silences the 'SECTION OCCUPIED/CLEAR' buzzer.

(d) **"Cancel Co-op" Button (Green):** The Push button is provided to extend co-operation from sending station to cancel "LINE CLEAR" at receiving station.

(e) **"Cancel" Button (Yellow):** The Push button is provided to cancel the "LINE CLEAR" when pressed along with "Bell" button under following conditions:-

(i) Train has not entered the block section & line clear cancellation has to be done.

(ii) Complete train has been pushed back at train sending station.

(f) **"SMs" Key:** The key when OUT prevents following operations:-

(i) Transmission of BELL code.

(ii) Transmission of IS LINE CLEAR inquiry request.

(iii) Cancellation of LINE CLEAR.

(g) **"Shunt Release" Key:** Shunt Release Key is normally OUT. To take out Shunt Key, Shunt release Key must be IN. Following operations are not possible when the Shunt Release key is IN:-

(i) To take "LINE CLEAR"

(ii) To take "LINE CLEAR" by other station.

(iii) To close the block.

(iv) To take "Last Stop Signal" to OFF.

(h) **"SM's Back Cover Lock" Key:** To open or lock the back cover by SM/ASM, when required by signal staff for maintenance or repairs.

(i) **"Maintainer's Back Cover Lock" Key:** To open or lock the back cover by authorized signal staff, for maintenance or repairs, provided SM's back cover lock key as per (h) above is also applied.

**(C) Counter & Buzzers**:

(a) **Counter:** The counter is provided to register the number of "LINE CLEAR" Cancellation.

(b) **Buzzer:** Audio alarm is provided for call attention sent by other end SM & to register the occupation and clearance of the train.

### 3.5 Shunt Key of EKT:

This is provided with SM's Block Panel to serve as SHUNTING authority. The key of this transmitter is normally 'IN' and used as tangible authority to be given to Loco Pilot of a train to perform shunting up to opposing First Stop Signal (FSS). Shunt Key is released when "SHUNT RELEASE KEY" is turned to 'IN' position.

### 3.6 BLOCK TELEPHONE:

This is provided for speech communication with SM at other end of Block Section. Separate block telephone is provided for separate block section.

### 3.7 HIGH AVALABILITY SINGLE SECTION DIGITAL AXLE COUNTER:

This is provided for verification of Train in the block section as well as last vehicle verification.

### 3.8 OPERATING PROCEDURE:-

**(A) Sequence of operations of sending & receiving a train between two stations:-**

If the block section is clear and the "'LINE CLOSED" indication is displayed on Block Panel at both the stations, the action is taken by the sending station SM as under:-

| **AT SENDING STATION** | | **AT RECEIVING STATION** | |
|---|---|---|---|
| ***Under LINE Closed condition, following indications are ON***:-<br><br>***"LINE CLOSED" –*** *Yellow****, SNK****- Yellow****, SNOEK****-Yellow****, LINE FREE*** *– Green****,***<br>***Shunt Key*** *- Green****, Last Stop Signal –*** *Red****, BI OK –*** *Green****,***<br>***Communication Link Fail –*** *OFF* | | ***Under LINE Closed condition, following indications are ON***:-<br><br>***"LINE CLOSED" –****Yellow****,*** ***SNK****- Yellow****,*** ***SNOEK****-Yellow****,*** ***LINE FREE****-Green****,*** ***Shunt Key****- Green****,*** ***Last Stop Signal –*** *Red****,*** ***BI OK –*** *Green****,*** ***Communication Link Fail –*** *OFF* | |
| 1 | The SM at sending station inserts<br>its SM key and turns it to IN position. **SM Key – Green.** | | |
| 2 | SM sends 'Call Attention' signal to receiving station by 'BELL' button. | 3 | The SM at receiving station inserts its SM key and turns it to IN position.<br>SM acknowledges by pressing 'BELL' button and attends Telephone. |
| 4 | SM advises station at other end about the intended | 5 | SM at receiving station accord his consent |

| | | | |
|---|---|---|---|
| | movement of the train on telephone and asks for LINE CLEAR after prescribed BELL code under exchange of Private Number. | | after exchanging information regarding train movement and simultaneously ensuring that following indications are appearing on block panel:- ***"LINE CLOSED" –*** *Yellow****, SNK****-Yellow****, SNOEK****-Yellow****, LINE FREE****-Green****, Shunt Key****-Green****, Last Stop Signal –* *Red****, BI OK –*** *Green****,*** ***Communication Link Fail –*** *OFF* |
| 6 | SM presses BELL & TRAIN GOING TO buttons until 'TRAIN GOING TO' arrowhead indication lights up GREEN and 'LINE CLOSED 'indication turns off. | 7 | 'LINE CLOSED' indicator turns off and 'TRAIN COMING FROM' arrowhead indication lights up GREEN. |
| 8 | Releases BELL and TRAIN GOING TO buttons. | | |
| 9 | Takes LSS to 'OFF'.<br>Train enters the Block Section.<br>LSS replaces to 'ON'.<br><br>LINE FREE indicator turns to RED.<br>SECTION buzzer starts ringing and 'TRAIN GOING TO' | 10 | <br><br><br><br>LINE FREE indicator turns to RED.<br>SECTION buzzer starts ringing and 'TRAIN |

| | | | |
|---|---|---|---|
| | arrowhead indication turns RED. ACKN indication lights up.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.<br><br>Puts back the LSS controls to Normal.<br><br>Ensures SNK lights up YELLOW. | | COMING FROM' arrowhead indication turns RED. ACKN indication lights up.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.<br><br>SNOEK lights up YELLOW.<br><br>Takes reception signal 'OFF' to receive the train.<br>Train passes the Home Signal.<br>Home Signal replaces to 'ON'.<br>Train clears the Block Section. |
| 11 | SECTION buzzer starts ringing. ACKN indication lights up.<br>LINE FREE indicator turns to GREEN.<br>`TRAIN GOING TO' arrowhead indication turns to FLASHING GREEN. | 12 | SECTION buzzer starts ringing. ACKN indication lights up.<br>LINE FREE indicator turns to GREEN.<br>'TRAIN COMING FROM' arrowhead |

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|---|---|---|---|
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | indication turns to FLASHING GREEN.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 13 | SNOEK lights up yellow.<br><br>`TRAIN GOING TO' arrowhead indication turns off.<br><br>`LINE CLOSED' indicator lights up. | 14 | Replaces all controls pertaining to reception of train to Normal.<br><br>SNK lights up YELLOW.<br><br>`TRAIN COMING FROM' arrowhead indication turns off.<br><br>'LINE CLOSED' Indicator lights up. |

**(B) Conditions of Refusal to '"LINE CLEAR" Enquiry:**

When a block section is blocked by the presence of a train in the section or train parting or shunting or opening of level crossing in mid-section or for any other reason, the SHUNT key of EKT shall be taken out and kept in safe custody.

If the block station at other end refuses the "IS LINE CLEAR" enquiry signal, no train shall be allowed to leave until a fresh "IS LINE CLEAR" enquiry signal has been given to block station at other end and accepted.

On removal of obstruction, the Shunt Key of EKT shall be inserted and turned to IN position and the Shunt Release Key should be taken OUT. SM shall immediately inform SM of

other end about the fact so as to enable him to send a fresh "IS LINE CLEAR" enquiry.

**(C) Sequence of operations of "LINE CLEAR" Cancellation:**

After a train sending station has taken "LINE CLEAR", the receiving station can carry out "LINE CLEAR" cancellation with the consent of other end station.

| **AT SENDING STATION** | | **AT RECEIVING STATION** | |
|---|---|---|---|
| 1 | Puts back LSS to `ON', if already taken `OFF, ensures that SNK indication is YELLOW.<br><br>Advises receiving end station SM about cancellation on telephone after prescribed BELL code under exchange of Private Number. | 2 | Agrees to the request of LINE CLEAR cancellation, ensures that SNK indication is YELLOW and SNOEK indication is YELLOW and gives his consent on telephone after prescribed BELL code. |
| 3 | Presses CANCEL CO-OP button and releases on receipt of bell code. | 4 | Waits for CANCEL CO-OP indication lights up yellow and presses BELL & CANCEL button with SM key 'IN'.<br><br>CANCELLATION COUNTER increments.<br><br>TRAIN COMING FROM indication turns to flashing green. CANCEL |

| | | | |
|---|---|---|---|
| | | | indication lights up flashing yellow & continues flashing for 120 seconds. |
| 5 | 'TRAIN GOING TO' indication turns flashing green. | | |
| 7 | 'TRAIN GOING TO' Indication turns off.<br><br>"LINE CLOSED" indication lights up. | 6 | On expiry of 120 seconds, TRAIN COMING FROM Indication & CANCEL indication turns off.<br><br>"LINE CLOSED" indication lights up. |

**(D) Sequence of Operations for Closing of Block after a "Push back" operation:**

After a train has been pushed back at the sending station, the sending station advises the receiving station. The receiving station can close the section by pressing BELL and CANCEL button after getting cooperation from the other end station.

| **AT SENDING STATION** | | **AT RECEIVING STATION** | |
|---|---|---|---|
| 1 | Train clears the Block Section. LINE FREE indicator turns GREEN.<br><br>SECTION buzzer starts ringing. ACKN indication lights up. | 2 | Train clears the Block Section. LINE FREE indicator turns GREEN.<br><br>SECTION buzzer starts ringing. ACKN indication lights up. |
| | 'TRAIN GOING TO' arrowhead | | 'TRAIN COMING FROM' arrowhead indication |

| | | | |
|---|---|---|---|
| | Indication turns to FLASHING GREEN. | | turns to FLASHING GREEN. |
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 3 | Advises receiving end station SM about cancellation on telephone after prescribed BELL code. | 4 | Agrees to request, ensures that SNK indication is YELLOW, SNOEK indication is YELLOW and SHUNT KEY indication is GREEN and gives his consent on telephone after prescribed BELL code. |
| 5 | After verbal consent from other end SM Ensure SNK indication is YELLOW, SNOEK indication is YELLOW and SHUNT KEY indication is GREEN. | | |
| 6 | Presses CANCEL CO-OP button and releases on receipt of BELL code. | 7 | Waits for CANCEL CO-OP indication lights up yellow and presses BELL & CANCEL button with SM key 'IN'.<br><br>CANCELLATION COUNTER increments.<br><br>CANCEL indication lights up FLASHING YELLOW & |

| | | | |
|---|---|---|---|
| | | | continues flashing for 120 seconds. |
| 8 | 'TRAIN GOING TO' Indication turns off.<br><br>"LINE CLOSED" indication lights up. | 9 | On expiry of 120 seconds, TRAIN COMING FROM Indication & CANCEL indication turns off.<br><br>"LINE CLOSED" indication lights up. |

**(E) Sequence of Operations for Block Back Operation:**

The SM, who intends to Block Back the line, shall inform the SM of station at other end on telephone for permission to Block Back, who will acknowledge the message and grant permission supported by a private number. SM takes SHUNT key of EKT OUT and keeps in safe custody. The SM will then issue necessary authority to Loco Pilot of train to perform shunting in Block Section. On completion of shunting, section clear message will be sent to SM of station at other end on telephone about obstruction removed supported by a private number, who in turn will acknowledge the same supported by a private number. Thereafter SM will insert SHUNT key of EKT and turn to `IN' position and takes out the SHUNT RELEASE KEY.

All the entries in Train Signal Register (TSR) for this operation should be made in RED ink. The reasons for BLOCK BACK shall be recorded in remarks column against each entry.

| STATION INTENDING BLOCK BACK | | STATION IN REAR | |
|---|---|---|---|
| 1 | ***Ensure that following Block Panel displays are lit up;***<br><br>"LINE CLOSED" - YELLOW<br>LINE FREE - GREEN<br>SNOEK - YELLOW<br>SHUNT KEY Indication – GREEN | 2 | ***Ensure that following Block Panel displays are lit up;***<br><br>"LINE CLOSED" - YELLOW<br>LINE FREE - GREEN<br>SNOEK - YELLOW<br>SHUNT KEY Indication - GREEN |
| 3 | The SM inserts its SM key and turns it to IN position.<br><br>Gives call attention / attend telephone signal. | 4 | Acknowledges call attention / attend telephone signal. |
| 5 | Attends telephone. | 6 | Attends telephone. |
| 7 | Inform intention to perform shunting in Block Section. | 8 | Acknowledges & gives consent by exchanging private number. |
| 9 | Takes Shunt Key 'OUT' from EKT and keeps in safe custody. SHUNT KEY indication turns to RED.<br><br>Issue necessary authority to Loco Pilot | 10 | SNOEK turns off. |

| | | | |
|---|---|---|---|
| | of train to perform shunting in Block Section. | | |
| 11 | On entry of train in Block Section, SECTION buzzer starts ringing & ACKN indication lights up. | 12 | On entry of train in Block Section, SECTION buzzer starts ringing & ACKN indication lights up. |
| | LINE OCCUPIED indication turns to RED.<br><br>"LINE CLOSED" indication turns off. | | LINE OCCUPIED indication turns to RED.<br><br>"LINE CLOSED" indication turns off. |
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 13 | On clearing of Block Section,<br>SECTION buzzer starts ringing & "LINE CLOSED" indication lights up, ACKN indication lights up. | 14 | On clearing of Block Section, SECTION buzzer starts ringing & "LINE CLOSED" indication lights up, ACKN indication lights up. |
| | LINE FREE indication turns to GREEN.<br><br>"LINE CLOSED" indication lights up YELLOW. | | LINE FREE indication turns to GREEN.<br><br>"LINE CLOSED" indication lights up YELLOW. |

| | | | |
|---|---|---|---|
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 15 | On completion of shunting, SM verifies the line between opposite STARTER (if any)/ Shunt signal or Stop Board/ Fouling mark and FSS that the same is free from any vehicle.<br><br>Inserts SM key & turns it to IN position.<br><br>Gives call attention / attend telephone signal. | 16 | <br><br><br><br><br><br><br><br>Acknowledges call attention /attend telephone signal. |
| 17 | Attends telephone. | 18 | Attends telephone. |
| 19 | Inform shunting is completed supported by exchange of a private number. | 20 | Acknowledges completion of shunting supported by exchange of a private number. |
| 21 | Inserts SHUNT KEY of EKT & turns it to `IN' position.<br>SHUNT KEY indication turns to GREEN. | 22 | SNOEK lights up YELLOW. |

### 3.9 Shunting of train:

Where shunt signals are not provided for shunting on line leading towards Block section, the Loco Pilot of shunting train shall be given shunting order at the foot of STARTER SIGNAL /STOP BOARD/FOULING MARK before allowing any shunting. While shunting, the LAST STOP SIGNAL should be kept at ON.

### 3.10 Shunting of Train up to Last Stop Signal:

SHUNT KEY of EKT shall be taken OUT and kept in safe custody. The Loco Pilot of shunting train shall be given shunting order to shunt up to LSS. On completion of shunting, the line between STARTER/ Shunt Signal/ Stop Board/ Fouling mark and LSS should be checked free from any vehicle. SHUNT KEY of EKT shall be inserted and turned to IN position.

When an IS "LINE CLEAR" enquiry is received from Block Station at other end of block section, permission for shunting up to LSS shall be granted only after compliance of rule 84 of DFCR-GR and as permitted by Station Working Rules (SWR).

### 3.11 Shunting behind a train:

Shunting behind a train should be performed with message to station at other end. SM shall take out SHUNT KEY of EKT after entry of train beyond LSS and hand over to Loco Pilot of shunting train along with shunting order.

On completion of shunting, Loco Pilot of shunting train hands over SHUNT KEY of EKT to SM. SM ensures clearance of line between STARTER/ Shunt Signal/ Stop Board / Fouling mark and LSS from any vehicle. The message regarding completion of shunting shall be sent to station at other end.

SM inserts SHUNT KEY of EKT and turns it to IN position.

In case train arrives at station at other end before completion of shunting, TRAIN GOING TO/ TRAIN COMING FROM arrowhead indication will remain at RED, till shunting train clears the section. During such period line shall be BLOCKED BACK as per extant procedure laid down.

### 3.12 Shunting Of Train Beyond Last Stop Signal:

The shunting is done under protection of Block Back only.

### 3.13 Shunting Of Train in face of an approaching Train:

Shunting in face of an approaching train, towards LSS, where permitted in SWR by special instructions, can be performed. The Loco Pilot of shunting train shall be given shunting order to shunt up to LSS. On completion of shunting, the line between STARTER/ SHUNT SIGNAL/ STOP BOARD / FOULING MARK and FIRST STOP SIGNAL should be checked free from any vehicle.

Shunting in face of an approaching train, beyond LSS and up to FSS can be performed only, when approaching train has been brought to a stop at FSS of the station. Whenever such shunting is to be performed, SM key shall be taken OUT and kept in safe custody. The Loco Pilot of shunting train shall be given shunting order to shunt up to FSS. On completion of shunting, the line between STARTER/ SHUNT SIGNAL/ STOP BOARD / FOULING MARK AND FSS SIGNAL should be checked free from any vehicle and only then SM key shall be inserted and turned to IN position.

### 3.14 Shunting of Train beyond LSS in cases other than shunting behind a train or shunting in face of approaching train:

The shunting should be done under protection of Block Back only.

### 3.15 BLOCK FAILURES:-

The block failures can be categorized into the following:-

**(A)** Failure of Block Panel.

**(B)** Failure of Last stop signal.

**(A) Failure of Block Panel:-**

The Block Panel must be considered to be defective in the following cases.

(i) When no indication of any sort at all, is available on the block Panel.

(ii) When none of the indications viz. 'Train Coming From'/Train Going To' appears on the Block Panel except 'Line Free' or 'Line Occupied'.

(iii) When no train has entered into the Block section but the Block Panel shows 'Line Occupied' Red indication and this indication persists even after resetting has been tried as the procedure for resetting the Axle Counter.

(iv) When "Train Going To" or "Train Coming From" indications do not appear by appropriate action though condition for asking "Line Clear" and granting 'Line Clear' are fulfilled.

(v) When "Train Going To" or "Train Coming From" indicator does not turn to "RED" to give "Train on Line" indication on the entry of train into Block section at either of the stations.

(vi) When a train has arrived at the receiving station but the block panel still shows "Train on Line' Red indication or shows 'Line Occupied' Red indication and the indications persists even after resetting has been tried as the procedure for resetting the Axle Counter.

(vii) When a train has arrived at the receiving station but the Block Panel shows "FLASHING GREEN"/"GREEN" indication even after ensuring "SNKE LOCAL" indicator & "SNKE OTHER END" indicators are lit at either of the stations.

(viii) Total failure of communication during which trains shall be worked as per extant rules described in Block Working Manual.

(ix) Any damage is seen or reported to Block Equipment i.e. Block Panel, Axle Counter Equipment, Track Devices, UFSBI, Cables etc.

(x) When last stop signal cannot be kept at "ON" position during its suspension/disconnection.

(xi) When last stop signal of the station does not go back to 'ON' position on the entry of a train into the block section.

(xii) When the bell code signals are received indistinctly or are not received.

**Note:-**

(i) In all the above cases the block panel must be treated as defective, block working suspended and train must be dealt with by taking line clear on the Electric/Communication Equipment provided and by following provision of rule 217 of DFCR-GR and the procedure laid down in the Block working manual.

(ii) In respect of the failure indicated in the item No.(A)(viii) of the para above, train must be dealt with under the extant rules and procedure laid down in the Block working manual.

(iii) In respect of the failure indicated in the item Nos. (v), (x) and (xi) of the para (A) above, all efforts must be made to

keep the Last Stop Signal in the "ON" position. If it is not possible, then a competent staff should be deputed with red hand signal to take his position at the foot of the Last Stop Signal to warn Loco Pilots of the approaching trains. In addition, trains should be dispatched by issue of relevant authority to pass the Last Stop Signal.

(iv) The block panel should not be restored for normal working until it is tested by a competent signaling staff and certified fit by him for normal working.

**(B) Failure of Last Stop Signal:-**

The Last Stop Signal must be considered to have failed in the following cases:-

(i) The Last Stop Signal cannot be taken 'OFF' even though Line Clear has been obtained.

(ii) The Last Stop Signal can be taken 'OFF' without obtaining line clear.

(iii) The Last Stop Signal does not restore to "ON" position after the train enters the block section.

In all the cases indicated in Para's (A) and (B) above, failure should be informed to Signalling staff immediately.

**Note: -** In respect of the cases indicated in para's (B) (ii) & (iii) above, the precautions indicated in Note No. (iii) & (iv) under the para (A) above dealing with failures of the block panels should strictly be adhered to.

## 3.16 SUSPENSION OF BLOCK PANEL WORKING/LAST STOP SIGNAL:-

**(A) Suspension of Block Panel Working:-**

Block panel working must be suspended and trains dealt with in accordance with the extant instructions in the following cases:-

(i) When Materials Lorries, Motor Trolleys, Track Machines, Rail-Cum-Road Vehicles, Rail Motors, Tower Wagons has to run in the section, these shall be worked on written authority.

(ii) An Accident in mid-section.

(iii) When any part of the Block Equipment is to be opened for repairs which shall be done only under duly accepted disconnection memo. Block Panel working shall only be resumed by authorized staff as per extant rules in force on DFCCIL.

**(B) Suspension of Last Stop Signal:-**

The last stop signal shall be considered inoperative and deemed to have been suspended in the following cases:-

(i) When the Last Stop Signal has been under taken for repair by S&T staff.

(ii) During the Block Back.

(iii) Mid- section accident.

(iv) When Materials Lorries, Motor Trolleys, Track Machines, Rail-Cum-Road Vehicles, Rail Motors, Tower Wagons has to run in the section.

**Note: -** In respect of the cases listed in para (A) & (B) above, as soon as the cause of suspension of Blocking Working/Last Stop Signal are removed normal working can be restored by SM.

## 3.17 Working of Trains when there is failure of Block Panel/ Last Stop Signal.

**(A) Failure of Block Panel:-**

Whenever the Block fails, Line Clear should be obtained on the electrical/communication equipment provided and by following the provisions of rule 217 of DFCR-GR and Block

Working Manual. The Station Master will issue Paper Line Clear authority duly endorsing the Line Clear Private Number obtained from the station in advance.

**(B) Failure of Last Stop Signal when Block Panel is in working order:-**

Block Panel working need not be suspended if the Last Stop Signal cannot be taken off even after setting the instrument to 'Train Going To' condition, provided, the block panel is otherwise in working order. In such cases Line Clear should be obtained as usual through block instrument. The Station Master will issue Paper authority as an authority to pass the Last Stop Signal in 'ON' position, duly endorsing therein that Line Clear has been obtained through Block Panel. It will constitute Loco Pilots Authority for entering into the Block Section.

**3.18 Procedure for shunting during failure of SHUNT KEY:-**

When the "SHUNT-KEY" cannot be extracted and if shunting has to be necessarily performed, the Station Master shall ensure that the Block instrument concerning the direction of shunting is in 'Line Closed' condition. He shall advise the Station Master at the other end of the block section about the shunting to be performed, probable duration etc. and exchange private numbers to this effect before starting shunting operation. The Station Master at the other end of the block section shall take out the "SHUNT-KEY", keep it in his personal custody and give a categorical assurance with a private Number to the Station Master of the station at which shunting is to be done. After shunting has been completed the Station Master shall inform the Station Master at the other end of the block section, about the completion of shunting and exchange private number to this effect. Before the Station Master at the other end gives his Private Number, he shall

insert the “SHUNT KEY” in the instrument. Both Station Master shall enter in the Train Signal Register, in Red ink the time of exchange of Private Numbers and Private Numbers exchanged before and after shunting operations. The Station at which shunting is to be performed shall give a written authority to the Loco Pilot for doing shunting as well as passing the Starter/Advanced Starter Signal at ‘ON’ position up to the opposite First Stop Signal.

**********

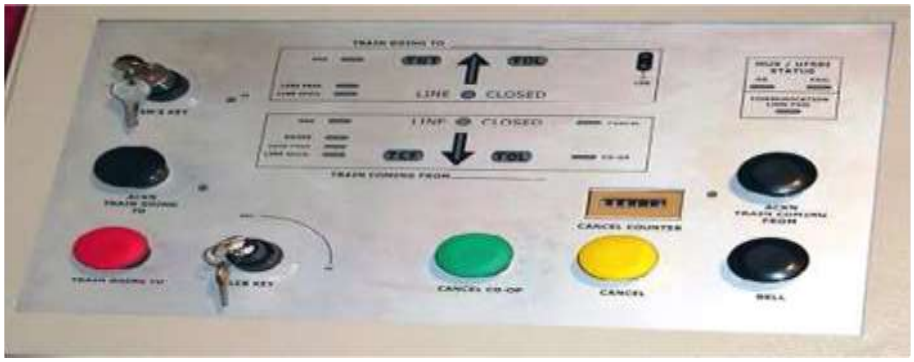
## CHAPTER-IV

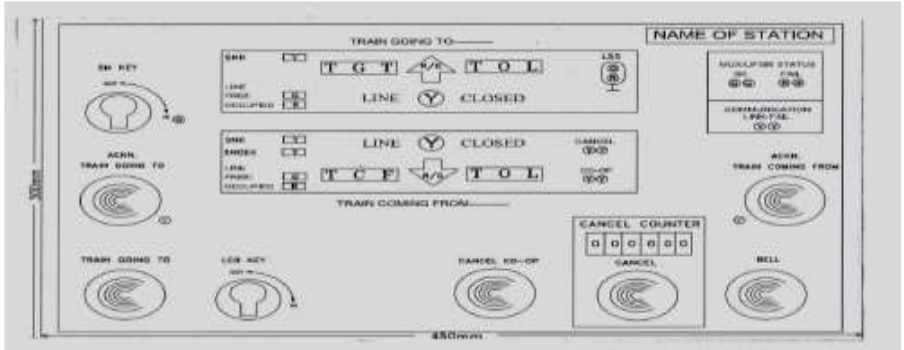
## BLOCK PROVING WITH AXLE COUNTER USING SSDAC & UFSBI ON DOUBLE LINE

**4.1** This system works in Double Line Absolute Block Section territory and is used to control the movement of trains on double line block section from one block station to another.

### 4.2 Block Panel:

Block panel is used to operate, control & regulate the movement of trains on double line block section from one block station to another. The Block Panel is provided with Indications, Push Buttons, Keys, Counters and Buzzers for providing audio visual indications and alarms to facilitate the train movement in the block section.




**BLOCK PANEL FITTED WITH BLOCK TELEPHONE (DOUBLE LINE)**

**BLOCK PANEL FACE PLATE (DOUBLE LINE)**

### 4.3 Principle of working:

(i) The trains are worked on Absolute Block system.

(ii) Each block section is provided with an Axle Counter to verify the occupation or clearance of block section which is indicated on Block Panel.

(iii) It is not possible to take the Last Stop Signal to 'OFF' unless "LINE CLEAR" has been obtained from the station in advance.

(iv) It is not possible to obtain "LINE CLEAR" unless block section i.e. not only up to first stop signal but an adequate distance beyond it of station in advance is clear of trains.

(v) The Last Stop Signal assumes 'ON' aspect automatically on entry of train into block section and when so replaced, is maintained in its 'ON' position, till a fresh "LINE CLEAR" is obtained through Block Panel.

(vi) Block section shows automatically "TRAIN ON LINE" on block panel when a train enters into the block section on "LINE CLEAR".

(vii) Audio – Visual alarms for Train entry/exit to/ from block section are provided and are to be acknowledged.

(viii) "LINE CLOSE" feature is automatic after complete arrival of train.

(ix) "LINE CLEAR" cannot be taken without taking consent of receiving station.

(x) "LINE CLEAR" cancellation is Co-operative.

### 4.4 Description of Block Panel:

Block Panels work in pair as a set between adjoining stations. Following are the various parts of the block panel & their functions:-

**(A) <u>Indications:</u>**

(a) **"LINE CLOSED" Indication (Yellow):** The indication is provided to indicate the Block Section is free from vehicles

and “LINE CLEAR” is not granted / received at train receiving / sending station respectively. It is provided as a circular indications (Two Numbers) in between the directional arrowheads.

(b) **“TRAIN COMING FROM” Indication (Green):** The indication is provided to indicate that a “LINE CLEAR” has been granted to the station in rear. The indication flashes when the Block section has been cleared after arrival of train at receiving station, but associated Signals and their controls are not put back to normal at either station or LCB Key is OUT. It also flashes when a Cancellation of “LINE CLEAR” is done before entry of a train in the Block Section. It is provided as directional arrowhead indications pointing downward for incoming traffic at train receiving station and a rectangular indication named TCF.

(c) **“TRAIN GOING TO” Indication (Green):** The indication is provided to indicate that a “LINE CLEAR” has been received. The indication flashes when the Block section has been cleared after arrival of train, but associated Signals and their controls are not put back to normal at either station or the LCB key is OUT at receiving station. It also flashes when a Cancellation of “LINE CLEAR” is done before entry of a train in the Block Section. It is provided as directional arrowhead indications pointing Upward for Outgoing traffic at train sending station and a rectangular indication named TGT.

(d) **“TOL” Indication (Red):** The indication is provided to indicate that a train has entered into the Block Section on “LINE CLEAR”. It is provided as directional arrowhead and rectangular indications named TOL pointing downward or upward for incoming or outgoing traffic respectively at both Train receiving and sending stations.

(e) **"Cancel CO-OP" Indication (Yellow):** The indication is provided to indicate that Co-operation is extended by the station at other end for cancellation of "LINE CLEAR".

(f) **"Cancel" Indication (Yellow):** The indication flashes to indicate that cancellation of "LINE CLEAR" is in progress and would last for 120 seconds. After that it's got steady until the line is closed.

(g) **"SNK (D)" Indication (Yellow):** The indication is provided to indicate that LSS and its controls are at On/Normal position. It is provided near TGT directional arrowhead.

(h) **"SNK (R)" Indication (Yellow):** The indication is provided to indicate that reception signal(s) and its controls are at On/Normal position. It is provided near TCF directional arrowhead.

(i) **"SNOEK" Indication (Yellow):** The indication is provided to indicate that LSS and its controls at the station in rear are at On/Normal position. It is provided near TCF directional arrowhead.

(j) **"LSS" Indication (Red):** The indication is provided to indicate that LSS is at "ON" condition. It is provided in monogram of signal.

(k) **"LSS" Indication (Green):** The indication is provided to indicate that LSS is at "OFF" condition and line clear has been obtained from station in advance. It is provided in monogram of signal.

(l) **"LINE FREE" Indication (Green):** The indication is provided to indicate that there is no train in the block section. It is provided near the TCF/TGT arrowhead for UP/DOWN lines.

(m) **"LINE OCCUPIED" Indication (Red):** The indication is provided to indicate that there is train in the block section

or axle counter failure. It is provided near the TCF/TGT arrowhead for UP/DOWN lines.

(n) **"ACKN" Indication (Yellow):** The indication is provided to indicate section buzzer ON status. It is provided near the ACKN button.

(o) **"MUX / UFSBI Status OK" Indication (Green):** The indication is provided to indicate that UFSBI is functional.

(p) **"MUX / UFSBI Status Fail" Indication (Red):** The indication is provided to indicate that UFSBI is in failure mode.

(q) **"Communication Link Fail" Indication (Yellow):** The indication is provided to indicate communication link failure. It glows steady YELLOW when link fails otherwise flickering.

(r) **"SM's Key IN" Indication (Green):** The indication is provided to indicate SM's Key is 'IN' condition.

**(B) <u>Push Buttons & Keys:</u>**

(a) **"Bell" Button (Black):** It performs a number of functions.

(i) To transmit call attention & bell code to station at other end of block section.

(ii) To take Line Clear when Pressed along with "Train Going To" button.

(iii) To cancel line clear when pressed along with Cancel button.

(b) **"Train Going To" Button (Red):** The Push button is provided to receive "LINE CLEAR" when pressed along with "Bell" button.

(c) **"ACKN" Buttons (Black):** Two push buttons each for dispatch line and receive line are provided to acknowledge audio visual indications for occupation/clearance of the

train in the block section. It silences the 'SECTION OCCUPIED/CLEAR' buzzer.

(d) **"Cancel Co-op" Button (Green):** The Push button is provided to extend co-operation from sending station to cancel "LINE CLEAR" at receiving station.

(e) **"Cancel" Button (Yellow):** The Push button is provided to cancel the "LINE CLEAR" when pressed along with "Bell" button under following conditions:-

(i) Train has not entered the block section & line clear cancellation has to be done.

(ii) Complete train has been pushed back at train sending station.

(f) **"SMs" Key:** The key when OUT prevents following operations:-

(i) Transmission of BELL code.

(ii) Transmission of IS LINE CLEAR inquiry request.

(iii) Cancellation of LINE CLEAR.

(g) **"LCB" Key:** The key when OUT prevents following operations:-

(i) To take LINE CLEAR by station in rear.

(ii) To close the block.

(h) **"SM's Back Cover Lock" Key:** To open or lock the back cover by SM, when required by signal staff for maintenance or repairs.

(i) **"Maintainer's Back Cover Lock" Key:** To open or lock the back cover by authorized signal staff, for maintenance or repairs, provided SM's back cover lock key as per (h) above is also applied.

**(C) Counter & Buzzers**:

(a) **Counter:** The counter is provided to register the number of "LINE CLEAR" Cancellation.

(b) **Buzzer:** Audio alarm is provided for call attention sent by other end SM & to register the occupation and clearance of the train.

## 4.5 BLOCK TELEPHONE:

This is provided for speech communication with SM at other end of Block Section. Separate block telephone is provided for separate block section.

## 4.6 HIGH AVALABILITY SINGLE SECTION DIGITAL AXLE COUNTER:

This is provided for verification of Train in the block section as well as last vehicle verification.

## 4.7 OPERATING PROCEDURE:-

**(A) Sequence of operations of sending & receiving a train between two stations:-**

If the block section is clear and the "'LINE CLOSED" indication is displayed on Block Panel at both the stations, the action is taken by the sending station SM as under:-

| AT SENDING STATION | AT RECEIVING STATION |
|---|---|
| ***Under LINE Closed condition, following indications are ON***:-<br><br>***"LINE CLOSED" –*** *Yellow****, SNK (D)-*** *Yellow****, SNOEK****-Yellow****, LINE FREE*** ***–*** *Green****, Last Stop Signal –*** *Red****, Communication Link Fail –*** *OFF* ***LCB Key -IN****,* | ***Under LINE Closed condition, following indications are ON***:-<br><br>***"LINE CLOSED" –****Yellow****, SNK (R)-*** *Yellow****, SNOEK****-Yellow****, LINE FREE****-Green****, Communication Link Fail –* *OFF****, LCB Key -IN*** |

| | | | |
|---|---|---|---|
| 1 | The SM at sending station inserts its SM key and turns to IN position. **SM Key – Green.** | | |
| 2 | SM sends 'Call Attention' signal to receiving station by 'BELL' button. | 3 | The SM at receiving station inserts its SM key and turns to IN position.<br><br>SM acknowledges by pressing 'BELL' button and attends Telephone. |
| 4 | SM advises station at other end about the intended movement of the train on telephone and asks for LINE CLEAR after prescribed BELL code under exchange of Private Number. | 5 | SM at receiving station accord his consent after exchanging information regarding train movement and simultaneously ensuring that following indications are appearing on block panel:-<br>***"LINE CLOSED"*** *–Yellow,* ***SNK (R)****-Yellow,* ***SNOEK****-Yellow,* ***LINE FREE****-Green,* ***Communication Link Fail*** *– OFF,* ***LCB Key- IN*** |
| 6 | SM presses BELL & TRAIN GOING TO buttons until 'TRAIN GOING TO' arrowhead indication lights up GREEN and 'LINE CLOSED' indication turns off. | 7 | 'LINE CLOSED' indicator turns off and 'TRAIN COMING FROM' arrowhead indication lights up GREEN. |
| 8 | Releases BELL and TRAIN GOING TO buttons. | | |
| 9 | Takes LSS to 'OFF'.<br>Train enters the Block Section.<br>LSS replaces to 'ON'. | 10 | |

| | | | |
|---|---|---|---|
| | LINE OCCUPIED indication turns to RED.<br><br>SECTION buzzer starts ringing and 'TRAIN GOING TO' arrowhead indication turns RED. ACKN indication lights up.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.<br><br>Puts back the LSS controls to Normal.<br><br>Ensures SNK (D) lights up YELLOW. | | LINE OCCUPIED indication turns to RED.<br><br>SECTION buzzer starts ringing and 'TRAIN COMING FROM' arrowhead indication turns RED. ACKN indication lights up.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.<br><br>SNOEK lights up YELLOW.<br><br>Takes reception signal 'OFF' to receive the train.<br>Train passes the Home Signal.<br>Home Signal replaces to 'ON'.<br>Train clears the Block Section. |
| 11 | SECTION buzzer starts ringing. ACKN indication lights up.<br><br>LINE FREE indicator turns to GREEN. | 12 | SECTION buzzer starts ringing.<br>ACKN indication lights up. |

| | | | |
|---|---|---|---|
| | `TRAIN GOING TO' arrowhead indication turns to FLASHING GREEN.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | LINE FREE indicator turns to GREEN.<br><br>'TRAIN COMING FROM' arrowhead indication turns to FLASHING GREEN.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 13 | SNOEK lights up yellow.<br><br>`TRAIN GOING TO' arrowhead indication turns off.<br><br>`LINE CLOSED' indicator lights up. | 14 | Replaces all controls pertaining to reception of train to Normal.<br><br>SNK (R) lights up YELLOW.<br><br>`TRAIN COMING FROM' arrowhead indication turns off.<br><br>'LINE CLOSED' Indicator lights up. |

**(B) Conditions of Refusal to '"LINE CLEAR" Enquiry:**

When a block section is blocked by the presence of a train in the section or train parting or shunting or opening of level crossing in mid-section or for any other reason, the LCB key shall be taken out and kept in safe custody.

If the block station at other end refuses the "IS LINE CLEAR" enquiry signal, no train shall be allowed to leave until a fresh "IS LINE CLEAR" enquiry signal has been given to block station at other end and accepted.

On removal of obstruction, the LCB Key shall be inserted and turned to IN position. SM shall immediately inform SM of other end about the fact so as to enable him to send a fresh "IS LINE CLEAR" enquiry.

**(C) Sequence of operations of "LINE CLEAR" Cancellation:**

After a train sending station has taken "LINE CLEAR", the receiving station can carry out "LINE CLEAR" cancellation with the consent of other end station.

| **AT SENDING STATION** | | **AT RECEIVING STATION** | |
|---|---|---|---|
| 1 | Puts back LSS to `ON', if already taken `OFF, ensures that SNK indication is YELLOW.<br><br>Advises receiving end station SM about cancellation on telephone after prescribed BELL code under exchange of Private Number. | 2 | Agrees to the request of LINE CLEAR cancellation, ensures that SNK indication is YELLOW and SNOEK indication is YELLOW and gives his consent on telephone after prescribed BELL code. |
| 3 | Presses CANCEL CO-OP button and releases on receipt of bell code. | 4 | Waits for CANCEL CO-OP indication lights up yellow and presses BELL & CANCEL button with SM key 'IN'.<br><br>CANCELLATION COUNTER increments. |

| | | | |
|---|---|---|---|
| | | | TRAIN COMING FROM indication turns to flashing green. CANCEL indication lights up flashing yellow & continues flashing for 120 seconds. |
| 5 | 'TRAIN GOING TO' indication turns flashing green. | | |
| 7 | 'TRAIN GOING TO' Indication turns off.<br><br>"LINE CLOSED" indication lights up. | 6 | On expiry of 120 seconds, TRAIN COMING FROM Indication & CANCEL indication turns off.<br><br>"LINE CLOSED" indication lights up. |

**(D) Sequence of Operations for Closing of Block after a "Push Back" operation:**

After a train has been pushed back at the sending station, the sending station advises the receiving station. The receiving station closes the section by pressing BELL and CANCEL button after getting cooperation from the sending station.

| **AT SENDING STATION** | | **AT RECEIVING STATION** | |
|---|---|---|---|
| 1 | Train clears the Block Section. LINE FREE indication turns GREEN.<br><br>SECTION buzzer starts ringing. ACKN indication lights up. | 2 | Train clears the Block Section. LINE FREE indicator turns GREEN.<br><br>SECTION buzzer starts ringing. ACKN indication lights up. |
| | 'TRAIN GOING TO' arrowhead indication | | 'TRAIN COMING FROM' arrowhead indication turns to FLASHING GREEN. |

| | | | |
|---|---|---|---|
| | turns to FLASHING GREEN. | | |
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off.<br><br>Ensures that SNK indication is YELLOW. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 3 | Advises receiving end station SM about cancellation on telephone after prescribed BELL code. | 4 | Agrees to request, ensures that SNK indication is YELLOW, & SNOEK indication is YELLOW and gives his consent on telephone after prescribed BELL code. |
| 5 | After verbal consent from other end SM, ensure SNK indication is YELLOW & SNOEK indication is YELLOW. | | |
| 6 | Presses CANCEL CO-OP button and releases on receipt of BELL code. | 7 | Waits for CANCEL CO-OP indication lights up yellow and presses BELL & CANCEL button with SM key 'IN'.<br><br>CANCELLATION COUNTER increments.<br><br>CANCEL indication lights up FLASHING YELLOW & continues flashing for 120 seconds. |

| | | | |
|---|---|---|---|
| 8 | 'TRAIN GOING TO' Indication turns off.<br><br>"LINE CLOSED" indication lights up. | 9 | On expiry of 120 seconds, TRAIN COMING FROM Indication & CANCEL indication turns off.<br><br>"LINE CLOSED" indication lights up. |

**(E) Sequence of Operations for Block Back Operation:**

The SM, who intends to Block Back the line, shall inform the SM of station in rear on telephone for permission to Block Back, who will acknowledge the message and grant permission supported by a private number. SM who intends to Block Back takes LCB key OUT and keeps in safe custody. The SM will then issue necessary authority to Loco Pilot of train to perform shunting in Block Section.

On completion of shunting, section clear message will be sent to SM of station in rear on telephone about obstruction removed supported by a private number, who in turn will acknowledge the same supported by a private number. Thereafter SM will insert LCB key and turn to `IN' position.

All the entries in Train Signal Register (TSR) for this operation should be made in RED ink. The reasons for BLOCK BACK shall be recorded in remarks column against each entry.

| **STATION INTENDING BLOCK BACK** | | | **STATION IN REAR** |
|---|---|---|---|
| 1 | Ensure that following Block Panel displays are lit up;<br><br>LINE CLOSED - YELLOW<br>LINE FREE - GREEN<br>SNOEK - YELLOW | 2 | Ensure that following Block Panel displays are lit up;<br>LINE CLOSED - YELLOW<br>LINE FREE – GREEN<br>SNK-YELLOW |

| | | | |
|---|---|---|---|
| 3 | The SM inserts its SM key and turns it to IN position.<br><br>Gives call attention / attend telephone signal. | 4 | <br><br><br><br>Acknowledges call attention / attend telephone signal. |
| 5 | Attends telephone. | 6 | Attends telephone. |
| 7 | Inform intention to BLOCK Back to perform shunting in Block Section. | 8 | Acknowledges & gives consent by exchanging private number. |
| 9 | Takes LCB Key 'OUT' and keeps in safe custody.<br><br>Issue necessary authority to Loco Pilot of train to perform shunting in Block Section. | | |
| 10 | On entry of train in Block Section, SECTION buzzer starts ringing & ACKN indication lights up. | 11 | On entry of train in Block Section, SECTION buzzer starts ringing & ACKN indication lights up. |
| | LINE OCCUPIED indication turns to RED.<br><br>“LINE CLOSED” indication turns off. | | LINE OCCUPIED indication turns to RED.<br><br>“LINE CLOSED” indication turns off. |
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |

| | | | |
|---|---|---|---|
| 12 | On clearing of Block Section.<br>SECTION buzzer starts ringing & "LINE CLOSED" indication lights up. ACKN indication lights up. | 13 | On clearing of Block Section. SECTION buzzer starts ringing & "LINE CLOSED" indication lights up. ACKN indication lights up. |
| | LINE FREE indicator turns to GREEN.<br><br>"LINE CLOSED" indication lights up YELLOW. | | LINE FREE indication turns to GREEN.<br><br>"LINE CLOSED" indication lights up YELLOW. |
| | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 14 | On completion of shunting, SM verifies the line between opposite STARTER (if any)/ Shunt signal or Block Section Limit Board, Stop Board/ Fouling mark and FSS that the same is free from any vehicle.<br><br>Gives call attention / attend telephone signal. | 15 | <br><br><br><br><br><br><br><br>Acknowledges call attention /attend telephone signal. |
| 16 | Attends telephone. | 17 | Attends telephone. |
| 18 | Inform shunting is completed supported by | 19 | Acknowledges completion of shunting supported by |

| | | | |
|---|---|---|---|
| | exchange of a private number. | | exchange of a private number. |
| 20 | Inserts LCB Key & turns it to `IN' position. | | |

**(F) Sequence of Operations for Block Forward:**

The SM, who intends to Block forward the line, shall inform the SM of station in advance on Telephone for permission to Block forward, who will acknowledge the message and grant permission supported by a private number. The SM of advance station takes LCB key OUT and keeps in safe custody. The SM of this station will then issue necessary authority to Loco Pilot of train to perform shunting in Block Section in advance.

On completion of shunting, message will be sent to SM of station in advance on telephone about obstruction removed supported by a private number, who in turn will acknowledge the same supported by a private number. Thereafter, SM of advance station will insert LCB key and turn it to IN position.

All the entries in Train Signal Register for this operation should be made in RED ink. The reasons for Block forward shall be recorded in remarks column against each entry.

| **Station intending BLOCK FORWARD** | | **Station in advance** | |
|---|---|---|---|
| 1. | Block Panel displays;<br><br>LINE CLOSED – YELLOW<br>LINE FREE – GREEN | 2. | Block Panel displays;<br><br>LINE CLOSED – YELLOW<br>LINE FREE – GREEN |
| 3. | Inserts SM key and turns it to 'IN' position.<br>Gives call attention /attend telephone signal. | 4. | <br><br>Acknowledges call attention / attend |

| | | | |
|---|---|---|---|
| | | | telephone signal. |
| 5. | Attends telephone. | 6. | Attends telephone. |
| 7. | Inform intention to perform shunting in Block Section. | 8. | Acknowledges and gives consent by exchange of private number. |
| 9. | Issue necessary authority to Loco Pilot of train to perform shunting in Block Section. | 10. | The LCB Key is taken out and kept in safe custody. |
| 11. | On entry of train in Block section, SECTION buzzer starts ringing and LINE CLOSED indication turns off. ACKN indication lights up.<br><br>LINE FREE indication turns to RED.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. | 12. | On entry of train in Block section, SECTION buzzer starts ringing and LINE CLOSED indication turns off. ACKN indication lights up Yellow.<br><br>LINE FREE indication turns to RED.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 13. | On clearing of Block Section, SECTION buzzer starts ringing and LINE CLOSED indication lights up YELLOW. ACKN indication lights up Yellow.<br><br>LINE FREE indication turns to GREEN.<br><br>Acknowledges the buzzer by pressing ACKN button. ACKN | 14 | On clearing of Block Section, SECTION buzzer starts ringing and LINE CLOSED indication lights up YELLOW. ACKN indication lights up yellow.<br><br>LINE FREE indication turns to GREEN. |

| | | | |
|---|---|---|---|
| | indication turns off. | | Acknowledges the buzzer by pressing ACKN button. ACKN indication turns off. |
| 15. | On completion of shunting, SM verifies the line between STARTER /Shunt Signal/Stop Board /Fouling mark and LAST STOP SIGNAL free from any vehicle.<br><br>Inserts SM key and turns it to 'IN' position.<br><br>Gives call attention / attend telephone signal. | 16. | Acknowledges call attention /attend telephone signal. |
| 17. | Attends telephone. | 18. | Attends telephone. |
| 19. | Inform shunting is completed supported by exchange of a private number. | 20. | Acknowledges completion of shunting supported by exchange of a private number. |
| | | 21. | Inserts LCB Key & turns it to `IN' position. |

### 4.8 Shunting of trains:

Where shunt signals are not provided for shunting on line leading towards Block section, the Loco Pilot of shunting train shall be given shunting order at the foot of STARTER SIGNAL/STOP BOARD/FOULING MARK before allowing any shunting.

### 4.9 Shunting of Train up to Last Stop Signal:

While shunting, on dispatch line the LAST STOP SIGNAL is to be kept at 'ON'. SM KEY is taken OUT. The Loco Pilot of shunting train is given shunting order to shunt up to LSS. On completion of shunting, the line between STARTER/ Shunt Signal/ Stop Board/ Fouling mark and LSS are checked free from any vehicle. SM KEY is inserted and turned to IN position.

### 4.10 Shunting up to Last Stop Signal behind a train:

Shunting behind a train is performed with a message to a station in advance. The station in advance takes LCB Key out and kept in safe custody.

Shunting is performed as per previous para. On completion of shunting, SM of sending station verifies the line between STARTER/Shunt Signal/Stop Board/fouling mark and LAST STOP SIGNAL free from any vehicle. The message regarding completion of shunting is sent to station in advance.

SM of station in advance inserts LCB Key and turns it to IN position.

### 4.11 Shunting of Train beyond Last Stop Signal:

The shunting is done under protection of Block Forward only as per DFCR-GR Rule 82.

### 4.12 Shunting of Train towards First Stop Signal:

The shunting is done under protection of Block Back only as per DFCR-GR rule 82.

### 4.13 Shunting of Train in face of an approaching Train:

No shunting in face of approaching train, towards receive line is permitted, until the approaching train has been brought to a stop at first stop signal of the station. Whenever such shunting is performed, LCB Key is taken OUT and kept in safe custody. The Loco Pilot of shunting train is given shunting order to perform shunting up to FIRST STOP SIGNAL. On

completion of shunting, the line between STARTER/SHUNT SIGNAL/STOP BOARD/FOULING MARK AND FIRST STOP SIGNAL are checked free from any vehicle and only then LCB key is inserted and turned to IN position.

### 4.14 BLOCK FAILURES:-

The block failures can be categorized into the following:-

**(A)** Failure of Block Panel.

**(B)** Failure of Last stop signal.

**(A)** **Failure of Block Panel: -** The Block Panel must be considered to be defective for UP and/or Down trains, as the case may be in the following cases.

(i) When no indication of any sort at all, appears on the block Panel.

(ii) When none of the indications viz. 'Train Coming From'/Train Going To' appears on the Block Panel except 'Line Free' or 'Line Occupied'.

(iii) When no train has entered into the Block section but the Block Panel shows 'Line occupied' Red indication and this indication persists even after Resetting has been tried as per the procedure for resetting the Axle Counter.

(iv) When "Train Going To" or "Train Coming From" indications do not appear by appropriate action though condition for asking "Line Clear" and granting 'Line Clear' are fulfilled.

(v) When "Train on Line" indication does not appear on the entry of train into Block section at either of the stations.

(vi) When a train has arrived at the receiving station but the block panel still shows "Train on Line' Red indication or shows "Line occupied" Red indication and the indications persist even after resetting has been tried as per the procedure for resetting the Axle Counter.

(vii) Total failure of communication during which trains shall be worked as per extant rules described in Block Working Manual.

(viii) Any damage is seen or reported to Block Equipment i.e. Block Panel, Axle Counter Equipment, Track devices, UFSBI, Cables etc.

(ix) When last stop signal cannot be kept at "ON" Position during its suspension/disconnection.

(x) When last stop signal of the station does not go back to 'ON' position on the entry of a train into the block section.

(xi) When the bell code signals are received indistinctly or are not received.

**Note:-**

(i) In all the above cases the block panel must be treated as defective, block working suspended and train must be dealt with by taking line clear on the Electric/Communication Equipment provided and by following provision of rule 217 of DFCR-GR and the procedure laid down in the Block working manual.

(ii) In respect of the failure indicated in the item No.(A)(vii) of the para above, train must be dealt with under the extant rules and procedure laid down in the Block working manual.

(iii) In respect of the failure indicated in the item Nos. (v), (ix) and (x) of the para (A) above, all efforts must be made to keep the Last Stop Signal in the "ON" position. If it is not possible, then a competent staff should be deputed with red hand signal to take his position at the foot of the Last Stop Signal to warn Loco Pilots of the approaching trains. In addition, all trains in the relevant directions should be

dispatched by issue of relevant authority to pass the Last Stop Signal.

(iv) The block panel should not be restored for normal working until it is tested by a competent signaling staff and certified fit by him for normal working.

**(B) Failure of the Last Stop Signal: -** The last stop signal must be considered to have failed for Up or DN direction as the case may be, in the following cases:-

(i) The Last Stop Signal cannot be taken 'OFF' even though Line Clear has been obtained.

(ii) The Last Stop Signal can be taken off without getting line clear.

(iii) The Last Stop Signal does not restore to "ON" position after the train enters the block section.

In all the cases indicated in Para's (A) and (B) above failure should be informed to Signalling staff immediately.

**Note: -** In respect of the cases indicated in para's (B) (ii) & (iii) above, the precautions indicated in Note No. (iii) & (iv) under the para (A) above dealing with failures of the block panels should strictly be adhered to.

## 4.15 SUSPENSION OF BLOCK PANEL WORKING/LAST STOP SIGNAL:-

Block Panel Working/Last Stop Signal must be suspended and trains dealt with in accordance with the extant instructions in the following cases:-

**(A) Suspension of Block Panel:-** The Block Panel shall be considered inoperative and should be suspended for Up and Down line or for both the lines as the case may be in the following cases:-

(i) When materials Lorries, Motor Trolleys, Track Machines, Rail-Cum-Road Vehicles, Rail Motors, Tower Wagons has

to run in the section, these shall be worked on written authority.

(ii) Abnormal movement i.e. Single Line Working on Double Line or mid-section accidents etc.

(iii) When any part of the Block Equipment is to be opened for repairs which shall be done only under duly accepted disconnection memo. Block Panel working shall only be resumed by authorized staff as per extant rules in force on DFCCIL.

**(B) Suspension of Last Stop Signal:-** The last stop signal shall be considered in-operative and deemed to have been suspended in the following cases:-

(i) When the Last Stop Signal has been under taken for repairs by signal staff.

(ii) During the 'Block Forward' and 'Block Back'.

(iii) During single line working on double line section due to some emergency like mid-section accident or otherwise.

(iv) When Materials Lorries, Motor Trollies, Track Machines and Rail Motors/Towers Wagons has to run in the section.

**Note: -** In respect of the cases listed in para (A) & (B) above, as soon as the cause of suspension of Blocking Working/Last Stop Signal are removed normal working can be restored by SM.

### 4.16 Working of Trains when there is failure of Block Panel/ Last Stop Signal.

**(A) Failure of Block Panel:-**

Whenever the Block fails, Line Clear should be obtained on the electrical/communication equipment provided and by following the provisions of rule 217 of DFCR-GR and Block Working Manual. The Station Master will issue Paper Line

Clear authority duly endorsing the Line Clear Private Number obtained from the station in advance.

**(B) Failure of Last Stop Signal when Block Panel is in working order:-**

Block Panel working need not be suspended if the Last Stop Signal cannot be taken off even after setting the instrument to 'Train Going To' condition, provided, the block panel is otherwise in working order. In such cases Line Clear should be obtained as usual through block instrument. The Station Master will issue Paper authority as an authority to pass the Last Stop Signal in 'ON' position, duly endorsing therein that Line Clear has been obtained through Block Panel. It will constitute Loco Pilots Authority for entering into the Block Section.

**********

## CHAPTER-V

## CONTROLLED MANUAL BLOCK

**5.1 On single line: -** A train may be given line clear by a block station to the block station in rear manually by operation of the direction switch, provided that the block section is track circuited throughout its length using conventional track circuits or axle counters or any other approved means of track vacancy detection system.

**5.2 On double line: -** A train may be given line clear by a block station to the block station in rear:

Automatically, by means of track circuits or axle counters or some other approved means of track vacancy detection system provided that:-

(a) The block section is track circuited throughout its length using conventional track circuits or axle counters or any other approved means of track vacancy detection system.

(b) The last stop signal at the block station in rear is so controlled that it cannot display "Off" aspect unless the block section in advance is shown to be clear by track circuits or axle counters, and

(c) Visual indicators are provided at each block station on the block panel showing the conditions of the block sections both in rear and in advance of the station.

In the case of Intermediate block post, visual indicators are provided only at the block station in rear and are not provided at the intermediate block post.

**5.3 Track Circuit: -** means an electrical circuit provided to detect the presence of a vehicle on a portion of track, the rails of the track forming part of the circuit.

**5.4 Axle Counter:-** means an electrical device which, when provided at two given points on the track, proves by counting axles in and counting axles out, whether the section of the track between the said two points is clear or occupied.

The axle counter is used in lieu of a track circuit in order to ensure the clearance of any particular length of track.

**5.5 Line clear working in case of single line:-**

**(A)** By means of Direction Switch.

**(B)** By means of Push Buttons.

**(A) By means of Direction Switch: -** A direction switch is provided on the panel having two positions **"N"** and **"R".** Above the direction switch there are two directional indicators 'TGT' and 'TCF' in the shape of arrows (→) which shall indicate the condition of the block section as given below:-

(a) **Train coming From: -** For granting line clear, the Station Master on duty shall first ensure from the panel that block section is clear. He shall then grant line clear to the Station Master on duty at the station in rear confirming it by a private number on block telephone and turn his direction switch to "R" position. A white light will appear in the 'TCF' indicator and similar indication will appear at the sending station in 'TGT' indicator. Then the sending Station Master may take "OFF" his last stop signal.

(b) **Train Going To: -** After ensuring from the panel that block section is clear, the Station Master on duty shall obtain line clear on block telephone from the other end supported by exchange of a private number. He should also see that his direction switch is in "N" position. After the receiving end has turned his direction switch from "N" to "R" position, the "TGT" indicator will get illuminated by a white

light indicating thereby that line clear has been granted by receiving end. Station Master may then take "OFF" his last stop signal.

(i) **Train entering Block Section: -** When the train passes the last stop signal and enters the block section, the last stop signal shall go back to "ON" position and the white light of both the directional indicators "TGT" and "TCF" of sending and receiving ends respectively shall turn to RED indicating thereby that the block section is occupied.

At the receiving end, a buzzer will sound as soon as the train enters the block section. The Station Master on duty at the receiving end shall press "Acknowledgment button" which shall stop the buzzer.

(ii) **Train out of Block Section: -** When the train has arrived complete at the receiving end and cleared the block section, white light shall again appear in the "TCF" indicator, indicating thereby that complete train has arrived and the block section is clear. Red light shall continue to appear in the 'TGT' indicator at the sending station.

(iii) The Station master on duty at the receiving end after ensuring the complete arrival of the train by visual observation of the indication regarding the clearance of the concerned section, will inform the Station Master on duty at the sending end that the train has arrived complete and then the line shall be closed. Then the Station Master on duty at the receiving end will turn the direction switch from "R" to "N" position which shall illuminate his "TGT" indicator with red

light and white light of "TCF" indicator shall disappear.

When the line is closed, the "TGT" indicator on either end shall be illuminated with red light.

**(B) By means of Push Buttons.** Following Push Buttons and indications are provided on the block-working panel. (i) 'TGT" button (ii) "TCF" button (iii) "Group" button (GN/GEN), (iv) "Cancellation" button (v) "App. Ack." Button (vi) 'TGT" direction indicator (vii) 'TCF" direction indicator (viii) Block Track Indicator "BTKE" (ix) Slot indicator ('YKE'.)

(a) **Train coming From**: - For granting line clear, the Station Master on duty at the receiving end shall first ensure from the block track indicator "BTKE" on the block working panel that block section is clear. He shall then grant line clear to the Station Master on duty at the station in rear confirming it by a private number on block telephone and press his "TCF" button along with Group button. A white light will appear in the TCF direction indicator. A white light will appear in SLOT indicator (YKE) provided on the block working panel at the block station in rear.

(b) **Train Going To: -** After ensuring from the block working panel that block section is clear, the Station Master on duty at sending end shall obtain line clear on block telephone from the other end supported by exchange of a private number.

After receiving the white indication in the slot indicator "YKE" the Station Master on duty at the sending end will press his "TGT" button along with the group button, which will illuminate the "TGT" direction indicator by a white light indicating thereby that the line clear has been

granted by receiving end. Station Master at the sending end may then take "OFF" his last stop signal.

(i) **Train entering Block Section**: - When the train passes the last stop signal and enters the block section, the last stop signal shall go back to "ON" position and the white light of both the direction indicators "TGT" and "TCF" of sending and receiving ends respectively and also the Block Track indicators "BTKE" at both sending and receiving ends shall turn to red indicating thereby that the block section is occupied. White light of the slot indicator at the sending end will extinguish.

At the receiving end, a buzzer will sound as soon as the train enters the block section. The Station Master on duty at the receiving end shall press his approach acknowledgment button which shall stop the buzzer.

(ii) **Train out of Block Section: -** When the train has arrived complete at the receiving end and cleared the block section, the "TCF" and "TGT" direction indicators at the receiving end and sending end respectively shall extinguish automatically, only after replacement of all signals to danger, behind the train. The Block Track indicators "BTKE" at both the ends shall turn to white from red, thereby indicating that the block section is closed.

**5.6 Cancellation of line clear:-**

**(A) On section where line clear working is by means of direction switch.**

(a) **By the sending station:**

(i) The Station Master on duty at the sending station shall restore departure signals to "ON" if taken "OFF". Point shall not be altered until the Loco Pilot has been

warned that his train is being detained. Thereafter he shall inform the Station Master on duty at the receiving end to cancel the line clear under exchange of private numbers.

(ii) The Station Master on duty at the receiving end shall then turn his direction switch to 'N' position and press the 'ZN' button provided below the line clear cancellation counter and keep the button pressed till the next higher number is registered in the counter.

The 'ZN' button may then be released. Red light shall appear in the 'TGT' indicator at both the stations.

(b) **By the Receiving Station:** In case the line clear has to be cancelled by the station which has given the line clear. He shall at once take action as per (a) (ii) above. This shall put back the last stop signal of the sending station to "ON", if the train has not passed the same, if the buzzer has not sounded and white indication of his "TCF" indicator has not changed to Red. He shall exchange private numbers to confirm his action.

It shall not be possible to cancel the line clear if the train has already entered the block section.

**(B) On section where line clear working is by means of Push Buttons.**

(a) **By the sending station:**

(i) The Station Master on duty at the sending station shall restore departure signals to "ON" if taken "OFF". Points shall not be altered until the Loco Pilot has been warned that his train is being detained. Thereafter he shall inform the Station Master on duty at the receiving end to cancel the line clear under exchange of private numbers.

(ii) The Station Master on duty at the receiving end shall then press his 'Line Clear' cancellation button ("CN") along with the "Group button" provided below the line clear cancellation counter and keep the buttons pressed till the next higher number is registered in the counter. The cancellation button and the group button may then be released. The 'TGT" and "TCF" indicators at the sending and receiving ends respectively shall extinguish after 120 seconds after the initiation of the cancellation operation thereby indicating that the line clear has been cancelled.

(b) **By the Receiving Station:** In case the line clear has to be cancelled by the station which had granted the line clear, the Station Master on duty at receiving station shall at once take action as per (a) (ii) above. This shall put back the last stop signal of the sending station to "ON", if the train has not passed the same, if the buzzer has not sounded/white indication of his "TCF" direction indicator has not changed to Red. He shall exchange private numbers to confirm his action.

It shall not be possible to cancel the line clear if the train has entered the block section, which will be displayed on the direction indicator and 'BTKE".

(c) **Train Parting:** In case of 'Train Parting' in the mid-block section and consequently till the entire parted train arrives at the receiving station, the concerned Block Track Indicator (BTKE) and the concerned directional Arrow (→) Light Indicators ( "TGT" or "TCF") as the case may be will keep on displaying red at both the receiving and sending stations. SM on duty will set and follow the rules as laid down in the relevant rules/paras of DFCR-GR pertaining to "Parting of Trains."

(d) **Shunting in Block Section**: The SM on duty will permit shunting in the Block Section as per rules laid down in the DFCR-GR applicable to single line working. In case if the entire load returns in full to the originating station, the Axle Counter will not fail. The Block Track Indicator/(BTKE) that was displaying red with the entrance of the shunting load into the Block Section will now turn white thereby indicating that the Block Section is clear. In case any of the wagon/wagons of the shunting load is left in the Block Section, the Axle Counter will fail and the block section will continue showing 'Red'.

**5.7 Line Clear Working in case of Double Line:-**

**(A) At Sending Station**: When it is intended to dispatch a train after ensuring that the block section track indicator is showing clear, the Station Master on duty shall obtain line clear from the Station Master on duty at the block station in advance on block telephone. The Station Master on duty at block station in advance shall also ensure that block section track indicator is showing clear before he gives private number in support of line clear given.

**(B) At Receiving Station:** On receipt of line clear enquiry for an approaching train, the Station Master on duty shall satisfy himself that the concerned block section is clear. He shall then grant line clear ensuring all conditions under DFCR-GR confirming it by exchange of a private number.

As soon as the train enters the block section, white light of the block section track indicator shall change into red and buzzer shall sound to draw the attention of the Station Master on duty. Buzzer shall go on sounding until it is acknowledged by pressing the 'Acknowledgment Button' provided on the panel.

## 5.8 Failure of Directional Indicator or Track Circuit/Axle Counter:-

**(A)** In the event of there being no light in directional indicator, at any one end, the Station Master on duty there shall enquire from the other end whether the directional indicator at the other end is giving correct indication. If so, he shall confirm this by exchange of private number and continue normal working.

**(B)** In the event of the directional indicators of both the ends having no light, the block panel shall be treated as defective and the Station Master on duty at the dispatching station shall issue on double line a Form no. 12 {Rule no. 212(1)(c)} for the last stop signal with an endorsement of line clear private number received and on single line a paper line clear ticket with an endorsement of line clear private number received, is to be issued.

**(C)** In the event of failure of block section track circuit/ axle counter (which shall be indicated by continuous red light in directional indicator in case of single line) or in case any false indication is noticed on the panel, paper line clear working shall be introduced on single line and Form no. 12 {Rule no. 212(1)(c)} with endorsement thereon of the line clear private number received shall be issued on double line section. Paper line clear ticket with an endorsement of line clear private number received shall be issued on single line.

In the event of failure of block section track circuit/axle counter, line shall not be closed after passage of a train till the Station Master on duty has ensured complete arrival of the train by personal observation of tail lamp or its authorized substitute. He shall confirm it with a private number.

### 5.9 Last vehicle Check:

In case, complete block section is not provided with Axle counters and no SSDAC/HA-SSDAC is provided for verification of last vehicle, last vehicle verification shall be undertaken manually or through any other suitable means for each trains as per extant instructions.

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## Chapter-VI

## Resetting of Axle Counters

### 6.1 Resetting of Axle Counters in Automatic Block Section:

### 6.2 Provision of Auto-resetting:

Wherever Train Detection/Track Vacancy Detection System in the Automatic Block section consists of a Main and Supervisory Axle counters system.

a) In case, a Main Axle counter track section fails with its corresponding Supervisory Axle counter track section being healthy, the Supervisory Axle counter system will automatically reset the failed Main Axle counter track section. **After Auto reset, the Main Axle counter system will come in "Preparatory reset" Mode.**

b) The first train after Preparatory reset of Main Axle counter track section will travel up to next Automatic Signal on prescribed restricted speed. After the first train passes the affected Main track section with proper in-count & out-count, normal functioning of Main Axle Counter System shall be restored with Auto taking 'OFF' of Signals.

c) In case, a Supervisory Axle counter fails with its corresponding Main Axle counter track sections being healthy, Auto reset of failed Supervisory track section will take place. **After Auto reset, the Supervisory Axle counter system will come in "Preparatory reset" Mode.**

### *6.3 Provision of Manual resetting:*

There may be a case where even though Supervisory/Main Axle counter system is healthy, it is not able to Auto reset its corresponding failed Main/Supervisory track section. Also, there may be a case where both Main and its corresponding Supervisory track section have failed.

In such cases, Manual resetting of all the track sections including supervisory track sections in a particular direction will be done by Station Masters of adjacent stations with cooperation i.e. **"Preparatory reset with cooperation" after the entire block section is made clear of trains**.

### 6.4 Resetting of Axle Counters in Absolute Block section:

In case DAC fails, **"Preparatory reset"** shall be adopted. It implies that after confirmation that there is no train in the block section, Axle counter resetting will be initiated by both Station Masters independently at either station of block section or the first train after reset will enter the block section with paper authority. The Axle counter section will become normal and clear only after the first train clears the block section completely with proper in-count at one end and out-count at the other end.

### 6.5 Resetting of Axle Counters on lines connecting IR working on Absolute block/Slot system:

In case DAC fails, **"Preparatory reset"** shall be adopted. It implies that after confirmation that there is no train in the block section, Axle counter resetting will be initiated by both Station Masters independently at either station of block section and the first train after reset will enter the block section with paper authority. The Axle counter

section will become normal and clear only after the first train clears the block section completely with proper in-count at one end and out-count at the other end.

**Note:** *The detailed procedure for resetting of Axle Counters shall have to be covered in SWRs of stations.*

## List of Operating Authorities

| FORM NOs | DFCR-GR RULE NOs | Name of Authorities /Forms | Colour |
|---|---|---|---|
| 1 | 65(a) | Disconnection or Reconnection Notice. | Black |
| 2 | 97(2)(a) | Paper Line Clear Ticket | Blue |
| 3 | 103(2) (b) | Shunting Order | Blue |
| 4 | 117(6) | Authority To Proceed during prolonged failure of signals on double line section in Automatic Block System. | Red |
| 5 | 136(2)(b) | Authority to receive a train on an Obstructed Line | Blue |
| 6 | 137(1)(d) | Authority to receive a train on a Non-signalled line | Blue |
| 7 | 138(1)(b) | Authority to start from a Non-signalled line or a line provided by common departure signal. | Blue |
| 8 | 155(1) | Caution Order | Green |
| 9 | 155(6) | Nil-Caution Order | Green |
| 10 | 211(3) (a) | Advance Authority to pass defective approach signals at 'ON" position. | Blue |
| 11 | 211(3)(b) | Authority to pass defective approach signals at 'ON" position. | Blue |
| 12 | 212(1)(c) | Authority to pass defective departing signals at 'ON" or defective position | Blue |
| 13 | 218(2) | Message to be exchanged between Station Mangers for introduction of Temporary Single Line Working on a double line section. | Black |
| 14 | 218(4)(e) | Authority for Temporary Single Line Working on a double line. | Red |
| 15 | 218(5)(b) | The Following Train System Authority To Proceed | Red |
| 16 | 218(10) | Authority to receive a train during Temporary Single Line Working on a double line approaching on wrong line. | Red |
| 17 | 218(11) ( C ) | Message to be exchanged between Station Mangers for restoration of normal working after Temporary Single Line Working. | Black |
| 18 | 227(6) | Authority To Proceed Without Line Clear and Proceed into an occupied block section. | Red |
| 19 | 257(d) | Motor Trolley Following Permit. | Blue |
| 20 | 259(1) | Working of a Motor Trolley or Lorry or Rail Dolly on full block. | Blue |

## DETAILS OF AMENDMENT SLIPS ISSUED

| S.NO. | CORRECTION NO | CORRECTION IN CHAPTER & RULE | PAGE NO. |
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