

ROLE OF SIGNAL & TELECOMMUNICATION

1.0 SIGNALLING

1.1 Multiple Aspect Colour Light Signalling (MACL)

Mechanical signals of Semaphore type are progressively replaced by Electrical signaling with Multiple Aspect Colour Signals (MACL). MACL signals have better visibility, quick operation and less maintenance.

1.2.1 Route Relay Interlocking (RRI) and Central Control Panels in signal control system

By mere operations of knobs and route buttons, routes are set automatically and signals are cleared with absolute safety. The entire station is track circuited. Points and signals are operated by individual knobs/slides in small yards.

1.2.2 Panel Interlocking system

Unlike Route relay interlocking, in panel interlocking points and signals are operated individually. This is being adopted in smaller way side stations.

1.2.3 Solid State Interlocking

As a technological development, the solid state with electronics system having software programming, solid-state interlocking signaling control system is being now inducted to achieve economy and flexibility. This sophisticated microprocessor based interlocking system works through Microprocessor devices and software programming. In this system there is less number of relays, and alterations/additions in the yard is possible without much extra wiring.

1.3 Automatic Block Signalling with Continuous Track Circuiting

Automatic Block signaling systems are mostly used when the train traffic become more congested and busy, especially in suburban area and to increase line capacity. This eliminates block working and trains are signaled automatically without much dependence on human element. This ensures train safety, speed and also detects any rail discontinuity.

1.4 Token less Block working

In the absolute block system in single line, Token Block instruments are used. The token will be handed over to the driver of train after granting line clear to enter in the Block section. The process of handing over of token at every station is time consuming and laborious resulting in token missing. The system of token less block working helps to increase line capacity on single line sections.

1.5 LED signals for colour light signalling (LED)

Earlier in the colour light signals light aspects were lit by incandescent bulbs. These bulbs have limited hours of working and get fused due to ageing and voltage fluctuations. The bulbs have to be replaced frequently. As an improvement, incandescent bulbs had been replaced with LED lit signals all over Vijayawada Division. LED signals are having longer life and better visibility. This type of signal has enhanced the reliability by reducing the incidences of signal lamp fusing. It also affords good visibility to the drivers and more signals are likely to be converted to LED signals.

1.6 Track circuiting

Track circuit detects the presence or absence of the train on the track. This is the backbone of the signaling system. This ensures complete safety to the train in case of human failure. Due to high utilization of the track capacity, this ensures safe, speedy and punctual movement for train services.

1.7 Level crossing

All unmanned gates were taken up for manning where telephone facilities are provided from the nearest station so that gate will be closed well in advance before the train approaches the manned gates. LC gates are being taken up for interlocking on the basis of train vehicle units (TVUs) to ensure safety for both trains and road users.

1.8 Networking of Data Loggers

This is modern equipment used for monitoring the operation of important functions like Track circuits, Points, Signals, Battery chargers, Batteries etc. installed in Panel

interlocked/RRI installations. These are microprocessor-based equipment logging the events of the change of status of the various functions in field and relay rooms and recording the precise time also. The data loggers are useful devices for detecting the cases of passing the signal at danger by the driver and give important clues in case of accidents. The data loggers are also used as predictive maintenance tools regarding deterioration of the performance of signaling gadgets.

1.9 Integrated Power Supply System (IPS)/ Non-conventional energy sources

With the introduction of more and more modern Electrical Signalling Systems, the dependency on the power supply becomes more essential. To get reliable power supply, the concept of Integrated Power Supply (IPS) has been introduced wherein, the different signal power supplies like 110 AC, 110 V DC, 24DC etc. are derived from the common system, which works on common battery, i.e. DC-DC converter, modular power packs. This IPS will enhance the working of the signaling system especially in RE (Railway Electrification) area.

2.0 TELECOMMUNICATION

2.1. Train Control Communication:

Movement of each and every train is monitored by a controller at the nearest divisional Headquarters. Facility is also provided to the driver or guard to communicate with divisional Headquarters through portable telephone which can be easily connected to the Emergency Telephone sockets provided at every KM in the section where controls are working through underground cables. An emergency portable telephone is kept in the Guard's compartment of each and every train.

2.2 Optical Fiber Cable network

Optical Fiber Cable is laid along the track to provide a reliable and noise free communication. OFC network is widely used for Railway Control Communication taking advantage of its all long haul high bandwidth circuit interconnecting Railway Telephone Exchange. Passenger Reservation System, Unreserved Ticketing System, Network Freight Operating Management system have been transferred through railway OFC.

2.3 Railway Telephone Network

There is an in-house Railway Telephone Network connecting all important offices, officials, Way stations, Divisional Headquarters & Zonal Head Quarters. Railway telephone exchanges are inter-connected through Railway OFC network and supported by rented BSNL channels as standby.

2.4 Wireless communication System

Driver, Guard, Supervisors & officers of permanent way, Mechanical, Electrical and Signal & Telecom departments are provided with 5 watts handheld walkie-talkies, which can be used to establish communication between moving train & adjacent stations. Every railway station is provided with 25 watts VHF set for this purpose.

2.5 Data network

There is an exclusive PRS network connecting Secunderabad with all the PRS centers of South Central Railway and other Metros. The centers are connected either through Railway OFC network or hired channels from BSNL. Similarly there is a Freight Operating Management System network for monitoring the movement of freight transport. Coach Operation Information System is a network for coach management and this is under implementation.

2.6 Passenger Amenities

Safety, security and comfortable journey of the passengers are the aims of Railways in train operation. To meet this objective, the following facilities have been provided in almost all-important stations.

- Continuous announcement through public address system
- Electronic display board

2.7 Railnet

Railway has its own data network for management purpose called "RAILNET". This is widely used for file transfer, e-mail and public information. This network spreads through

entire Railway system connecting divisional headquarters, Zonal headquarters, workshops and hospitals.

2.13 BSNL Telephone:

BSNL telephones have been provided at all Railway stations for giving train information to the public.