RTI Information Pertaining to

SIGNAL & TELECOMMUNICATION DEPARTMENT

SOUTHERN RAILWAY

INTRODUCTION

Signal and **T**elecommunication Department is responsible for installation and maintenance of Signalling system essential for the safe & speedy movement of trains and Telecommunication systems required for the effective utilization of the large fleet of locomotives and other rolling stock and track as well as for the administration of the vast Railway Network. Telecommunication is a vital infrastructure for managing any transportation network. Indian Railway has an in-house Railway Telecommunication Network for managing Train operations and staff management and to offer Passenger Amenities. In terms of the sophistication in Signalling and Telecommunication installations, Southern Railway occupies the pride of place among the various Indian Railway systems.

S&T Department consists of both administrative and project offices with a workshop at Podanur. Organizational setup and duties of officers and other salient features of the department are detailed below.

A. SALIENT FEATURES

1.0 SIGNALLING

1.1 Multiple Aspect Colour Light Signalling (MACL)

Mechanical signals of Semaphore type are progressively replaced by Electrical signalling 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 wayside stations.

1.2.3 Solid State Interlocking

As a technological development, the solid state with electronics system having software programming, solid-state interlocking signalling 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. This system adopts the usage of latest CENLEC standard of software validation.

1.3 Automatic Block Signalling with Continuous Track Circuiting

Automatic Block signalling 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 signalled 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 Audio Frequency Track Circuits (AFTC)

Southern Railway has the distinction of introducing Audio Frequency Track Circuit for the first time in the Indian Railway system in 1994-95.

As the conventional DC track circuits are found vulnerable to the interference of currents generated by the thyristor/Chopper controlled locomotives, joint less Audio Frequency track circuits have been found to be the solution in such sections. The AFTC does not require insulated joints and can work for longer lengths and is suitable for AC and DC electrified areas. These track circuits are more reliable because failures due to block joint shorting are avoided, due to non-availability of joint and the train running is very smooth.

1.6 LED signals for colour light signalling (LED)

In the colour light signals light aspects of mechanical signals are 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, LED lit signals are now introduced. 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.

1.7 Replacement of over aged assets

Over aged signalling assets are normally to be replaced after a codal life of 25 years. Most of the signal systems are obsolete mechanical type and no spares are now available in the trade. The mechanical signals are operated from the mechanical lever frame from cabin. Most of the signalling systems have become over-due for replacement. With the sanction of the Special Railway Safety Fund the over aged assets are being replaced on priority basis.

1.8 Track circuiting

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

1.9 Level crossing

The unmanned gates are 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.

1.10 Train protection & Warning system

This system will give information to the driver to regulate the train speed depending upon the aspect of the signal in advance. In case, the driver fails to do so, the train will be automatically stopped by applying brake without the intervention of the driver. This

ensures that whenever any train stops on the track, the following trains stop automatically, thus ensuring safety.

1.11 Train Actuated Warning Device

Whenever train approaches an unmanned level crossing, a hooters sounds giving warning to the road users well in advance about the approach of the train thereby avoiding any accident.

1.12 Networking of Data Loggers

This is a 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 signalling gadgets.

1.13 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 VDC, 24 DC 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 Hqrs. Facility is also provided to the driver or guard to communicate with divisional Hqrs through portable telephone which can be easily connected to the overhead line wires which are running parallel to the track or connected to the Emergency Telephone sockets provided at every KM in the section where controls are working through under ground cables. An emergency portable telephone is kept in the Guard's compartment of each and every train.

2.2. Block Circuits

Running of trains in each section (between any two stations) is controlled by block circuits through which running of only one train in a section at one time is Electrically

ensured in addition to oral confirmation. Overhead lines of Railway or BSNL and underground cables are used for this purpose.

2.3 Optical Fibre Cable network

Optical Fibre 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.

In Southern Railway distribution of various media for Telecommunication is as follows

1. OFC and RE quad cable in Electrified sections
2. OFC and 4/6 quad cable
3. Only OFC.
4. Railway owned overhead line.
5. Rented overhead line/ channels/ bandwidth from BSNL

2.4 Railway Telephone Network

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

2.5 Railway Microwave Communication Network

In Southern Railway telecom network is supported by Railway Owned MW network using state of the art technology (Digital Microwave System). MW network is spread over Chennai- Jolarpettai, Erode – Palghat, Chennai - Tiruchchirappalli, Madurai - Palghat covering all divisional headquarters, mostly along the tracks.

2.6 Wireless communication System

Driver, Guard, Supervisors & officers of permanent way, Mechanical, Electrical and Signal & Telecom departments are provided with 5 watts hand held 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.

2.7 Data network

There is an exclusive PRS network connecting Chennai and all the PRS centers of Southern 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.

2.8 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
- IVRS system for giving on line information about availability of Accommodation, arrival & departure of trains.
- Call centers and integrated IVRS for giving all types of passenger Information.

2.9 Voice Recorder

Train operation information between controllers at Divisional headquarters and way stations are normally passed through control circuits. All such conversations between section controller and station Master are recorded at control office, which can be used for train management at any time of investigation in case of any accident/mishap.

2.10 Rail net

Railway has its own data network for management purpose called "RAILNET". This is widely used for file transfer, e-mail and public information. Public can visit site www.gov.railnet.in. This network spreads through entire Railway system connecting divisional headquarters, Zonal headquarters, workshops and hospitals.

2.11 Disaster Management

Telecom plays a vital role in Disaster Management. To meet the requirement of Disaster Management a universal number is provided at all control offices which can be accessed from any part of India duly pre fixing the city code. There are Accident Relief Trains and Medical Relief Vans placed at strategic locations. All such ARTs and MRVs are equipped with mobile INMARSAT telephones, walkie-talkie sets and public address system. Video conferencing equipments and wireless satellite based modems are also being added.

2.12 Video conferencing

Video conferencing facilities are available in divisional headquarters, zonal headquarters and Railway board, for administrative purpose.

2.14 Tele Medicine

A wide band connection has been established between Railway Hospital/ Perambur, Railway Hospital/Golden Rock and with major Railway hospitals in other Zonal Railways. This enables exchange of expertise opinion between hospitals.

2.14 Maintenance

Maintenance of all equipments is carried out through the maintenance set up of staff at Divisions, Way stations and in specialized laboratories. However, since the telecom technology is changing fast, Annual Maintenance Contract through reputed firms wherever necessary is being opted. Maintenance is carried out as per the schedule drawn up in Telecom Manual.

2.15 BSNL Telephone:

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

2.0 SIGNAL&TELECOMWORKSHOP/PODANUR

3.1 ISO 9001: 2000 Certified Unit

This Workshop was awarded ISO 9002/1994 certification during 1998. This certification has been upgraded to ISO 9001: 2000 version.

3.2 Achievements

The out-turn of the workshop was Rs. 30.95 Crores for the year 2005-06 and Rs. 25.02 crores in 2006-07(upto 31.12.06). Enhanced out turn is targeted in the coming years.

3.3 PRODUCtion Profile

Important products manufactured in this workshop are Q-series Relays, IRS Point Machines, TLB Instruments, Universal Axle Counters, Double line Block Instruments, Polarised Relays and Control Panels.

3.4 Developmental Activities

This workshop has developed High Thrust Point Machine 220 mm Stroke with clamp type locking and Special type Relays QTA2 and QT2.

3.5 COMPUTERIZation And Networking

The following activities of Production Control Organisation have been computerized.

- Work Order releasing
- Production control Documents.
- Estimated Annual Requirements for Stock Items.
- Bill of Materials for all manufacturing items.

- Rate Revision of manufacturing items.
- Inspection details – inspection of inward items.
- Vendor evaluation
- Demand and Dispatch position details.

4.0 S&T TRAINING CENTRE/PODANUR

4.1 Courses Conducted

Mandatory courses like initial courses for apprentices, refresher courses for working employees, foundation courses for newly promoted employees, induction course and development course for Group D staff and various equipment courses in Signal and Telecommunication and Yoga classes are regularly conducted for the employees of Southern and South Western Railways.

Pre-promotional course for supervisors for selection to Group-B and artisans for JE selections and computer appreciation for supervisors, office clerks and artisan staff of S&T department are also conducted.

4.2 Laboratories

The Out door Demonstration model yard is equipped with almost all kinds of Mechanical and Power signaling models, Universal Axle Counter and AFTC. An Electric Lifting barrier is also provided here. Outdoor Tele Lab for Overhead line is also functioning here.

The Training center is equipped with Indoor Laboratories for Mechanical Signaling, Block Signaling, Power Signaling, Route Relay Interlocking, Panel Interlocking, Electronics, Telecommunication, Electronic Exchange and Computer.

4.3 Heritage Gallery

A heritage gallery consisting of signal1ling and telecommunication gadgets used in yester years has been set up in the old hostel building.

4.4 E-learning Facility

Provision of E-learning facilities with necessary infrastructure like LAN, Video conferencing, etc at training centers as well as at IRISET has been sanctioned under SRSF and an amount of Rs.31 Lakhs is allotted for S&T Training centre, Podanur.

4.5 Hostel

The hostel can accommodate 100 trainees and is provided with a vegetarian mess. Gymnasium, facilities for Indoor Games and Outdoor games, TV with cable connection are provided for recreation to trainees.

B. POWERS, DUTIES OF OFFICERS AND EMPLOYEES

The powers of the officers are specified in "Schedule of Powers". The duties of the officers and employees are to work for achieving the objectives of efficient and safe signaling system for the SR and an efficient and modern telecommunication network to promote smooth and efficient working of the entire SR

c. DUTIES AND RESPONSIBILITIES OF OFFICERS

Sl.No.	*Designation*	*Functions and duties*
1	PCSTE	Overall in charge of signal and telecom functions of the zonal Railway.
2	CCE	In charge of telecommunication matters relating to OFC, VHF, UHF, FOIS, MW, MIS, co-ordination with BSNL officials with respect to line wire/cable circuits, /BSNL telephones, execution and progress of OFC works.
3	CSE	In charge of maintenance of signaling installations, punctuality of coaching trains, approving signaling plans & drawings, establishment matters including selection, recruitment and training, matters relating to S&T Workshop/Podanur and S&T Training center/Podanur.
4	CSTE/Plg	In charge of all planning activities of S&T, budgeting, maintenance of statistics on S&T, replying to parliamentary queries, manpower planning & Officer for Public information (PIO).
5	CWM	In charge of S&T Workshops at Podanur, in matters relating to planning and production of specialized items required for Signalling and Telecommunication applications in Indian Railways.
6	CSTE/ Project	In charge of -works in the Chennai & Tiruchirappalli Divisional jurisdictions, Budget, sanction of estimates, approval of plans & circuits, processing for CRS' sanction and Handing over of assets to open line.
7	CSTE/ Projects & Planning	In charge of -works in the Trivandrum, Palghat Divisional jurisdictions, sanction of estimates, approval of plans & circuits, processing for CRS' sanction and handing over of assets to open line.
JA Grade, Senior Scale & Assistant Scale officers assist the above PHOD/ HODs.		

D The powers for discipline & appeal matters

are as mentioned under DAR Rules, 1990.

E. The procedure followed in the decision making process, including channels of supervision

For different categories of the nature of work. The process are enumerated as under:

(1) Procurement of office furniture:

Requirement is put up by ASTE(Tele) to PCSTE. After obtaining finance concurrence (if required) from FA & CAO and administrative approval from Competent authority the indent is sent to Stores department for further procurement action.

(2) Budgeting:

The system of periodic review of budget are followed vide Railway Board's instructions. The Budget estimate and revised estimate received from field units are compiled by CSTE/Plg and after approval of PCSTE is communicated to FA & CAO for onward transmission to Railway Board.

(3) M&P

The M&P proposals for S&T are (usually) originated by end users in the field units. M&P proposals duly vetted by divisional accounts and approved by DRM and proposals of CWM/S&T duly vetted by Associate Finance are received from field units and Workshops/ Podanur in two categories:

i. Within GM's power (Costing between Rs.20 Lakh and Rs. 50 Lakhs/other than vehicles) as per GM's Delegation of Powers vide Para 39 (a) of Annexure -1 (http://10.185.71.55/sop2017/annexure-1.pdf).
ii. at Railway Board's level (Costing above Rs. 50 Lakhs/ vehicles)

After examination in the Head Office by the S&T department, these proposals are sent to CME (Planning). The proposals of all the departments received by CME (Planning) of the Railway is consolidated as the Preliminary M&P Programme and with finance concurrence processed for Competent Authority's sanction.

M&P proposals under GM's power (Costing between Rs.20 Lakh and Rs. 50 Lakhs/ other than vehicles):-

The proposals received from units are scrutinized by CSTE/Planning and after obtaining approval of PCSTE/SR, the proposals are sent to CME/Planning/SR the co-ordinating officer for M&P. CME/Planning/SR sends the proposals to

FA&CAO/S&W/PER for obtaining concurrence. After FA&CAO/S&W/PER's concurrence, proposals are put up to GM/SR by PCME/SR for obtaining approval. Considering the lump-sum budget grant, GM approves the proposals. The sanctioned M&Ps are then sent to field units for further processing and procurement. The sanctioned M&P items normally be procured through COFMOW (Central Organisation for Modernisation of Workshop) or COFMOW dispensation has to be obtained for procurement through PCMM/SR.

M&P proposals at Railway Board's level (Costing above Rs. 50 Lakhs/ vehicles):-

The proposals received from units are scrutinized by CSTE/PLG and after obtaining approval of PCSTE/SR the proposals are sent to CME/Planning/SR, the co-ordinating officer for M&P. CME/Planning/SR sends the proposals to FA&CAO/S&W/PER for obtaining concurrence. After FA&CAO/S&W/PER's concurrence, proposals are put up to GM/SR by PCME/SR for obtaining approval. After GM's approval, proposals are sent to Railway Board by PCME/SR. The Railway Board sanctions the M&Ps submitted by the zonal Railway. A list of sanctioned M&Ps is then sent to COFMOW for obtaining dispensation. If COFMOW's dispensation is obtained for certain M&P it can be procured through PCMM/SR. Otherwise field unit sends the detailed estimate to COFMOW for procurement.

(4) Works Programme (WP)

The WP proposals for S&T are (usually) originated by end users in the field units. WP proposals duly vetted by divisional account and approved by DRM are received from field units in two categories i.e. under GM's power (Costing below Rs.2.50 Crore each) and at Railway Board's level (Costing above Rs. 2.50 crore each).

Works proposals under GM power (Costing below Rs. 2.50 crore each):

The proposals received from units are scrutinized by CSTE/Plg/SR and after obtaining approval of PCSTE/SR, the proposals sent to CPDE/SR, the co-ordinating officer. CPDE/SR sends the proposals to FA&CAO/SR for obtaining concurrence. After FA&CAO's concurrence proposals are put up to GM/SR by CPDE/SR for obtaining approval and considering the lump sum budget grant, GM approves the proposals. After the approval of GM, the work features in LAW (List of approved Works) Book.

Works proposals at Railway Board's level (Costing above Rs.2.50 crore each):

From year 2018-19, the concept of Umbrella works has been introduced. The very purpose of umbrella work, in addition to have flexibility to sanction works throughout the year, is to channelize railway investments in identified focus areas.

The proposals received from units are scrutinized by CSTE/Plg/SR. With the approval of PCSTE/SR, such proposals received from units are grouped into Umbrella Works and a Nodal Division is fixed to propose the Umbrella Works.

The Umbrella proposals received from Nodal Divisions, after obtaining approval of PCSTE/SR, are sent to CPDE/SR. No finance concurrence is required at this stage. CPDE/SR obtains the approval of GM for inclusion in PWP (Preliminary Works Programme) and sends the proposals to Railway Board for sanction.

The procedure to process Works Programme in Board's office is as under:

a) The new works shall be sanctioned only as umbrella work.

b) The name and cost of each umbrella work shall be proposed by nodal directorate for finalization of the same jointly by Executive Directors of nodal directorate in consultation with associate directorates and associate finance directorate. While arriving at the name and cost of proposed umbrella works, individual works proposed by railway shall also be considered by nodal directorate.

Railway Board then publishes Pink Book for sanctioned works costing above 2.5 Crores each.

Under Plan Head 16, 17, 18, 29, 30, 32, 33, 36, 42, 51, 53, 64 & 65; individual sub-works in any umbrella work are to be processed for sanction either in the same financial year or in subsequent financial years also, till the cost limit of umbrella work is exhausted for approval of individual works.

The individual sub-works costing less than Rs.2.50 crore each with finance vetting are sanctioned by GM. Railway Board's approval is to be obtained for Works costing between Rs.2.50 Crore and Rs.50.00 Crore and sanctioned by GM. The individual sub-works costing above Rs.50.00 Crore are to be sanctioned by Railway Board.

When approval of individual sub-works under Phase I (i.e. 80% of the Total Sanctioned Cost) of an umbrella work is near completion, then only Phase II of the same name umbrella work is to be planned for sanction, if needed.

On sanction of an individual work, detailed estimate is prepared by field unit and got vetted and sanctioned by competent authority. Mode of executing the work is decided as per SOP (Works).

(5) Condemnation of overaged and damaged assets:

On certification as being beyond economical repairs, process for condemnation of the assets shall be proposed. The proposal is adjudged by concerned functional HOD and a survey committee will be set up after finance concurrence and

approval of PCSTE. On the basis of the survey committee report, the condemnation of the asset is certified.

(6) Monitoring of failures:

Reconciled data of failure received from units is compiled subject wise by concerned supervisors and then put up to PCSTE in prescribed format by functional HOD for the perusal and further action required.

(7) Procurement of spares:

Stock and non-stock requisitions duly vetted and after provision of fund certification are scrutinized by ESTE (Stores) and put up to CSE/CCE/PCSTE for countersignature as per SOPGEN and forwarded to Stores department for further necessary action.

F. The norms set for the discharge of functions

The following norms laid down for the discharge of functions mentioned below

S No	Item	Laid down Norms
1	Sending MCDO to GM	By 7th of every month
2	Sending MCDO to Rly Board	By 15th of every month
3	Revenue Budget	
4		
(i)	August Review	Target as given by Rly Board
(ii)	Revised Estimate	Target as given by Rly Board
(iii)	Final Modification	Target as given by Rly Board
5	Passing of Bills	Within 7days
6	Reply to general references	Within 30days
7	Reply to Rly Board's references	Within 157days
8	Reply to VIP references	Within 7days
9	Signal & Telecommunication Gears Performance Review	Within 7days

G. The rules, regulations, instructions, manuals and records, held or under control of PCSTE's office or used by its employees for discharging its functions.

Rules/Manuals held by S&T Branch

- General Rules 1976
- Signal Engineering Manual
- Block Working Manual
- Telecommunication Manual
- RE manual
- Finance code
- Stores code
- Establishment Manual
- Discipline & Appeal Rules etc.,
- (Track manual) way and works manual
- AC. Traction manual

H. statement of the categories of documents that are held by it or under its control

- Details of Staff
- Details of drawings for various stations
- Details of stock of materials including dead stock
- Details of works proposed, sanctioned and in progress including the targets fixed
- Details of signalling inspections done by Officers.
- Details of stations with type of interlocking provided –
- Details of level crossing gates
- Details of S&T Training Centre with Training Modules.

I. The particulars of any arrangement that exists for consultation with or representation by the members of the public in relation to the formulation of policy or implementation thereof.

Primarily, no public dealing is entertained by S & T department. However, the inputs required from S&T department for ZRUCC/DRUCC etc shall be furnished at appropriate level, through proper channel.

Matters pertain to MP/MLA and other VIP references will be replied through appropriate channel.

J. Statement of the boards, councils, committees and other bodies consisting of two or more persons constituted as part of PCSTE's office or for the purpose of its advice, and as to whether meetings of those boards, councils, committees and other bodies are open to the public, or the minutes of such meetings are accessible for public;

Not applicable

K. The monthly remuneration received by each of the offices and employees, including the system of compensation as provided in its regulations.

The information is available with CPO/SR

L. The manner of execution of subsidy programmes, including the amounts allocated and the details of beneficiaries of such programmes.

Not applicable.

M. Particulars of recipients of concessions, permits or authorization granted by PCSTE's office

Not applicable.

N. Details in respect of the information, available to or held by PCSTE's office, reduced in electronic form

Following Documents are available in electronic form:
1. General and Subsidiary Rules of SR.
2. Signal Engineering Manual
3. Telecom Engineering SR

O. The particulars of facilities available to citizens for obtaining information, including the working hours of a library or reading room if maintained for public use

At present, no reading room is available for this purpose. Office is open from 09:30 hrs to 18:00 hrs from Monday to Friday.