## bjðØððÜ A C K N O W L E D G E M E N T

The Central Planning organization takes this opportunity to express hearty thanks to the officials and staff of Signal and Telecommunication Department and Personnel department of Hyderabad Division for their valuable guidance and co-operation in compilation of the report.

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## òãðòÏð M E T H O D O L O G Y

The Work Study department has applied the following techniques for completion of the Work Study.

1. Collection of the details of work Load particulars.
2. Interaction with the field officials and Branch Officers.
3. Critical examination of the existing system of working and
4. Assessment of manpower requirement for existing work Load, duly applying available IR Benchmarking concept etc.,

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## ÞÑðÜ÷®ðð/ S Y N O P S I S

- **Subject:** Review of Staff Strength of Signal and Telecommunication Department over Hyderabad Division.
- **Authority:** Annual Programme of Work Studies 2018-19.
- **Study No:** WSSCR-18/2018-19.
- **Reference File No:** G.276/2/WSSCR-18/2018-19.
- **Area of Activity:** Signal & Telecommunication organization over Hyderabad Division.

**1.** The Central Planning cell of South Central Railway has taken up Work study on the "Review of staff strength of S&T Department over HYB Division" in order to study available manpower in comparison with the current IR Average Benchmarking and to identify if any excess staff is available, with a view to right size the manpower.

**2.** The work-study team approached Sr.DSTE/HYB in order to conduct Work-study on S&T department over HYB Division.

**3.** On critical examination of the scale check of S&T department over HYB division, it can be seen that out of sanctioned strength of 433 staff, 359 staff are working at present with 74 vacancies in different grades.

**4.** July-2018 IR average and Bench Marking of HYB Division is as follows:

| S No | Department | MPR of HYB Division | IR Average | IRBM |
|---|---|---|---|---|
| 1 | Signal | 3.81 | 3.91 | 2.45 |
| 2 | Telecomm | 1.03 | 1.68 | 0.78 |

It is observed from the above table that the Telecom wing of S&T department of HYB Division is below IR average. But, MPR of Signal wing is nearer to IR average Bench Marking. Hence, work study team is confined to Signal wing only. While calculating the requirement of staff basing on IR average, the work-study team is focused on redundant categories/vacancies and need based calculation by Practical Observation.

**5.** In order to have first hand information the Work-study team visited all the Signal & Telecom units, sections, yards and offices of the S&T department of HYB division and observed the working pattern, various processes involved in maintenance of activities. The Work-study team made an analysis on the requirement of staff based on the Practical Observation and following parameters.

1) Work Load (DESUs) of Signal wing of S&T organization
2) Work Load under Contracts/AMC in Signal wing of S&T organization
3) Requirement of staff in Signal wing of S&T dept duly taking the AMC/ARC contracts in to consideration.
4) Lr. No E(M&P)2016/1/59 dated 10.01.2017 wherein it is stated to bring down the Divisions nearer to the IR Average level.
5) Recommendation to surrender signal helper (Group D staff) due to Contract works/AMC and posts are lying vacant/ redundant.

**6.** The work Load (DESUs) of Signal wing of S&T department of HYB division is 66199. Some of the activities are given for Contracts/AMC.

**7. Work Loads under Contracts/AMC in Signal wing of S&T organization**

| SN | CONTRACTS | Units | Qty | Total units |
|---|---|---|---|---|
| 1 | AMC of 95 Diesel Generators. | 25 | 95 | 2375 |
| 2 | AMC for Efftronics make Data Loggers @ 42 stations. | 20 | 42 | 840 |
| 3 | AMC for 15 Data logger, 33 RTUs & 20 SAP. | (20+10) | (15+33) | 660 |
| 4 | AMC for IPS for 51 Systems & 2 Mini IPS. | (20+10) | (51+2) | 1040 |
| 5 | AMC for 3 IPS Systems & 1 Mini IPS System. | (20+10) | (3+1) | 70 |
| 6 | AMC for IPS at MBNR. | 20 | 1 | 20 |
| 7 | AMC for 34 RTUs | 10 | 34 | 340 |
| 8 | AMC for IPS at DKC | 20 | 1 | 20 |
| | | | Total | 5365 |

Above mentioned Contract/AMCs are under working at present. Hence, The Work Load under Contracts/AMC in Signal wing of S&T department/HYB is calculated to 5365 Signal units.

**8. Requirement of Staff in Signal wing of S&T department duly taking the AMC/contracts in to consideration:**

The man power requirement of Signal wing will be calculated basing on DESUs and IR average Bench Marking. Some of the activities of Signal wing of S&T department in HYB division are under Contracts/AMC. Therefore, the work study team decided to deduct the Contract Signal units (DESUs) from total work Load units (DESUs) of Signal wing. However, the departmental staff has to supervise the activity and preliminary maintenance is to be done in case of break down or faults. Therefore, work study team decided to deduct 40% of Contract Signal units from Total Signal units.

- **The requirement of staff calculated as follows**

| | | |
|---|---|---|
| 1 | Total Contract/AMC Units (These Signal units are to be maintained by Contract staff) | 5365 |
| 2 | 60% of Contract/AMC Signal units are allocated for supervision of departmental staff even though Signal units are under contract | 5365x60/ 100=3219 |
| 3 | 40% of Contract/AMC Signal units | 5365x40/ 100=2146 |
| 4 | Basic Signal units (Actual DESUs) | 50396 |
| 5 | 40% of AMC Contract units deducted from basic telecom units(A1) | 50396-2146= 48250 |
| 6 | Total route km of the Division (G)= | 622.89 |
| 7 | A1/G | 77.46 |
| 8 | Asset Disposal Factor Y (if A1/G >25, Y=0; else Y=0 to 8.3 as per value of A1/G) | Y=0 |
| 9 | Weightage for quality control maintenance of signaling equipments A2= A1 (F/G - 7.3)*2.74/100 [if (F/G - 7.3) is -ve, A2 = 0) | A2=8064.505 |
| 10 | Weightage for disposal of equipments A3 = A1*Y/100 | A3=0 |
| 11 | Weightage for interference during inspection & testing A4 = A1*Z*0.94/100 | A4=6077.57 |
| 12 | Weightage of FP inspection A5 = 1.67*G | A5=1040.23 |
| 13 | Divisional Equated Signal Units DESU : A = A1+A2+A3+A4+A5 | A=63432.305 |

As above, the Signal staff requirement is calculated to 248 based on IR average Bench Mark of July, 2018.

- **Summary of SAVE position of Signal staff:**

| S.N | Category | Sanction | Actual | Vacancy |
|---|---|---|---|---|
| 1 | Supervisor | 48 | 39 | 09 |
| 2 | Technician staff | 72 | 53 | 19 |
| 3 | Ministerial Staff | 10 | 10 | 0 |
| 5 | Group 'D' Staff | 131 | 114 | 17 |
| | **TOTAL** | **261** | **216** | **45** |

The work study team analyzed the work Load based on the above factors and the brief details are as follows:

1) Actual DESUs of the S&T department of HYB division is 66199
2) The Work Load under Contracts/AMC in Signal wing of S&T department/HYB is calculated to 5365 Signal units.
3) 40% of AMC Contract Signal units (i.e. 2146) are only deducted from total Signal basic units because the preliminary maintenance and supervision of Signal units are to be done by departmental staff.
4) After deducting 40% of AMC Contract Signal units, the staff requirement is calculated basing on DESUs & IR average.

**Summary of Staff requirement:**

| Dept. | Sanction | Actual | Requirement | Excess staff |
|---|---|---|---|---|
| Signal wing | 261 | 216 | 248 | 13 |

## 9. <u>òçðÒîðòÜäð</u>/Recommendation:

- It is recommended to surrender 13 posts from sanctions of Signal Wing of S&T department over HYB division.

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## ¡ÏÚððÚð- 1
## CHAPTER - I

# 1.0 ÑßçðÃððãðÐðð/I N T R O D U C T I O N

1.1 **RAILWAY'S ROLE**: Indian Railways is a premier transport service provider to the nation and is vested with the responsibility of carrying bulk of freight and passenger traffic across the country at economical rates. The Indian Railways operates through 17 Zones with 68 Divisions to serve the above objective.

1.2 **GENESIS OF THE REPORT:** It is evident that the Operating/working expenses are increasing year after year. It is therefore imperative that to keep the working expenses within financially viable limits, the Railways have to reduce the expenses from all corners. The major portion of expenses being staff expenses, all out efforts have to be made to contain it.

1.3 It is seen that the technological development in S&T department of the Railway is going in leaps and bounds and day by day modernized equipment are pressed into service which are not only having technologically improved features but requires least or no maintenance or at the most maintenance through AMC/ARC. In fact with modern equipment nothing more can be done, except replacement of a defective unit/module, thus considerably lessening the onerous task of repairing each and every portion of any circuit.

1.4 In view of the above, the Central Planning Organization under control of SDGM conducted Workstudy of S&T department over Hyderabad Division of South Central Railway and humbly presents this report

1.5 **Work and Importance of Signal & Telecommunication department:**
Trains, unlike other types of vehicular traffic, are rigidly confined to the track. There are various types of trains: fast express trains , which run through several stations at high speeds and have precedence over all other trains; passenger services stopping at several stations; long distance freight trains, which run at lower speeds but haul heavier loads and run through way side stations etc. It is obvious that the characteristics of these trains especially in regard to speed, acceleration, and deceleration and brake power are dissimilar. It should be obvious, therefore, that an efficient system of control over the movement of trains, in which human element is reduced to a safe minimum is indispensable to the efficient operation of trains with varying characteristics over a given section. It is the purpose of Railway Signal Engineering and Telecommunications to provide this control as well as to ensure that a high degree of safety prevails over all movements, whether at low or high speeds.

1.6 Just as Signaling provides a link between the moving trains and the track, Telecommunications provide the link between stations; between the Divisional and Railway Hqrs and between other operational centers of gravity so vital to the safe and expeditious movement of traffic.

1.7 The means of transport and communications are the lifelines of the nation. The Post, the Telegraph, the Telephone wireless, the Fax, the Electronic Mail, Intra-net, and Internet are the means of communications since they provide most effective network of communication in any country. These communication have become indispensable in day to day life as well as in their absence it is inevitable to run the Railways, which is a prime mode of transport of the nation.

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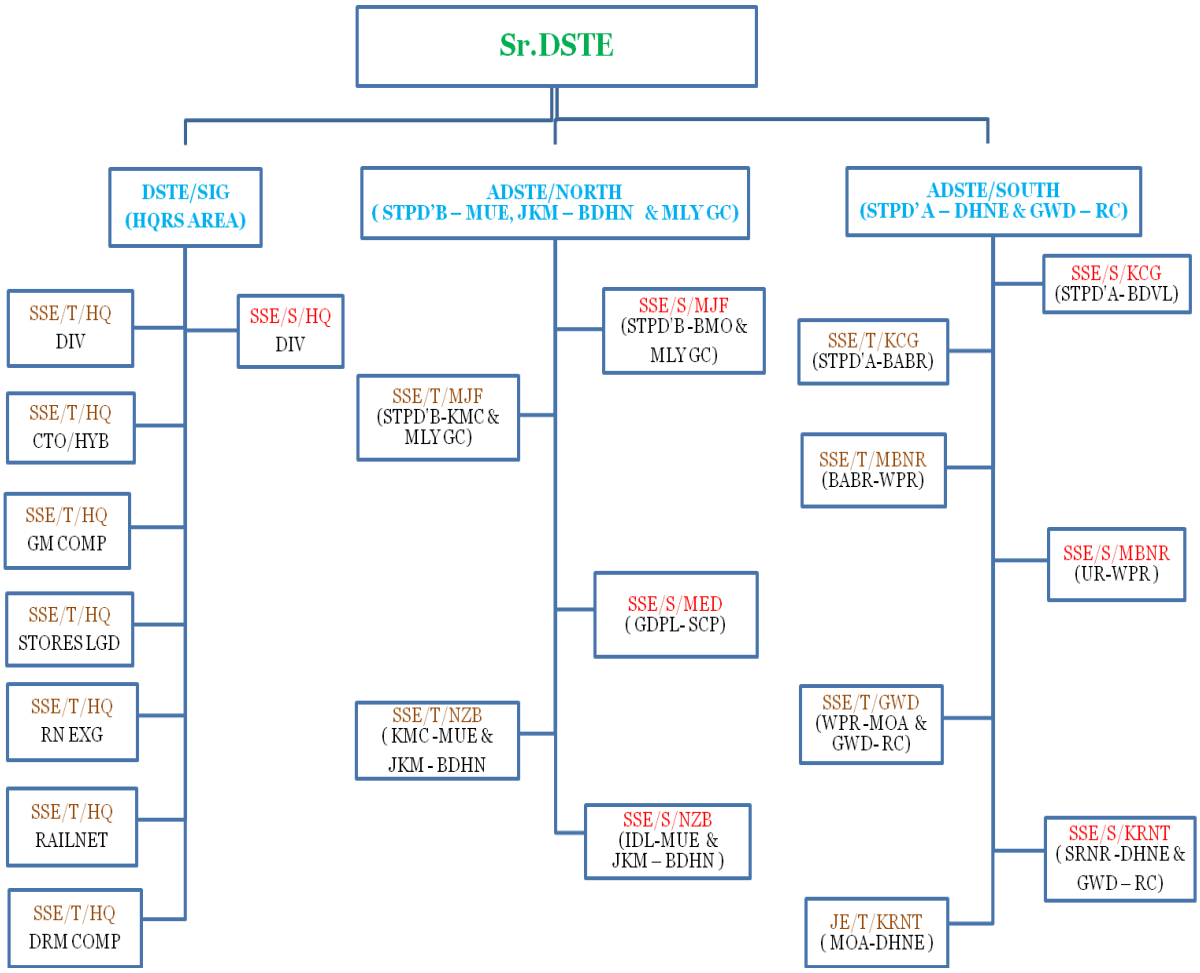
**C H A P T E R - 2**

## 2.0 ãðÃðáÙððÐð çðü±ð¿ÐððÃÙð¨î Áðûµðð/EXISTING SCENARIO:

2.1 Normally a Signal & Telecom Engineer in Junior Administrative grade is In-charge of all the Signal & Telecommunication equipments on the Division and works under the administrative control of Divisional Railway Manager.

2.2 The Signal & Telecommunication Engineer In-charge of a Division is also responsible to the Chief Signal & Telecommunication Engineer for the efficient maintenance and correct installation of all the Signal & Telecom equipments on the Division.

2.3 Authority of control**:** Sr.DSTE of HYB Division is the over all in- charge of the department. The authority of control of Signaling and Telecom assets of HYB division is as under:



**2.4 SAVE statement of S&T department of HYB Division is follows**:

| Scale check of S&T Department in Hyderabad Division | | | | |
|---|---|---|---|---|
| **Signalling staff** | | | | |
| 1 | SSE/S | 11 | 10 | 01 |
| 2 | JE/S | 11 | 07 | 04 |
| 3 | SSE/Drg | 01 | 01 | 0 |
| 4 | JE/Drg | 01 | 0 | 01 |
| 5 | MCM/SM | 24 | 21 | 03 |
| 6 | SM/I | 46 | 17 | 29 |
| 7 | SM/II | 12 | 16 | -4 |
| 8 | SM/III | 07 | 14 | -7 |
| 9 | MCM/BS | 01 | 01 | 0 |
| 10 | MM/MCM | 01 | 01 | 0 |
| 11 | PAINT/MCM | 01 | 01 | 0 |
| 12 | CARP/I | 01 | 01 | 0 |
| 13 | PAINT/I | 02 | 01 | 01 |
| 14 | TS/I | 01 | 01 | 0 |
| 15 | TS/II | 0 | 0 | 0 |
| 16 | Group 'D' staff | 131 | 114 | 17 |
| 17 | Ministerial staff | 10 | 10 | 0 |
| **Total** | | **261** | **216** | **45** |
| **Telecom staff** | | | | |
| 1 | SSE/T | 16 | 16 | 0 |
| 2 | JE/T | 7 | 6 | 1 |
| 3 | MCM/TCM & WTM | 15 | 12 | 03 |
| 4 | TCM/I | 29 | 13 | 16 |
| 5 | TCM/II | 7 | 05 | 02 |
| 6 | TCM/III | 4 | 18 | -14 |
| 7 | Tele Supdt | 01 | 01 | 0 |
| 8 | CTO & HTO | 08 | 07 | 01 |
| 9 | CABLE Jt. I , II & III | 06 | 03 | 03 |
| 10 | Group 'D' staff | 70 | 63 | 07 |
| 11 | Ministerial staff | 09 | 10 | -1 |
| **Total** | | **172** | **154** | **18** |
| **Grand Total** | | **433** | **370** | **63** |

- **Summary of SAVE position of Signal staff:**

| S.N0. | Category | Sanction | Actual | Vacancy |
|---|---|---|---|---|
| 1 | Supervisor | 48 | 39 | 09 |
| 2 | Technician staff | 72 | 53 | 19 |
| 3 | Ministerial Staff | 10 | 10 | 0 |
| 5 | Group 'D' Staff | 131 | 114 | 17 |
| | **TOTAL** | **261** | **216** | **45** |

- **Summary of SAVE position of Telecom staff:**

| S.N0. | Category | Sanction | Actual | Vacancy |
|---|---|---|---|---|
| 1 | Supervisor | 38 | 34 | 04 |
| 2 | Technician staff | 55 | 47 | 8 |
| 3 | Ministerial Staff | 09 | 10 | -1 |
| 5 | Group 'D' Staff | 70 | 63 | 07 |
| | **TOTAL** | **172** | **154** | **18** |

**2.5 Staff Duties:** The duties of staff of Signal & Telecom wings are provided below:

2.5.1 **Signal Department:**

**(A) Duties and Responsibilities of SSE/SE:**

**i) Technical duties:**

a) Exercising supervision over the maintenance or work done by the sectional Signal Inspectors and staff in accordance with the instruction contained in Signal Engineering Manual
b) Testing, overhauling and carrying out of alteration to the existing signal and interlocking gears in accordance with approved plans.
c) Providing assistance to the sectional Signal Inspectors to attend works, which are normally beyond the scope of the maintenance staff under the section SI
d) Submit an annual report of all apparatus in service on his section to DSTE/ASTE.

**ii) Other duties:**

a) Stores matters,
b) Staff matters,
c) Footplate Inspection,
d) Scheduled Safety Meetings,
e) Enquires &Inspection,
f) Un Scheduled works like attending to Break down, major failures and accidents, accompanying etc.

**(B) Duties of JEs in charge of a section are as follows:**

a) Efficient and proper maintenance of all signaling and interlocking equipments under his charge as per the safety rules and regulations in force and instructions issued from time to time.
b) Assist the SE in execution of works incidental to the maintenance of the equipments under his charge, additions and alterations to existing

installations and new works in accordance with the approved plans and circuit diagrams.

c) To assist SE in overhauling and carrying out alterations to the existing locking of interlocking frames in accordance with the approved Interlocking table and interlocking charts.
d) To carry out Footplate Inspection of all Signals in his jurisdiction by day and night once in a month.
e) To Scrutinize all the S&T gear failures in his section and to take remedial action against the failure of S&T gears.
f) To check thoroughly the S&T gears under his jurisdiction to ensure that the equipment functions satisfactorily, safely and with minimum failures.

**(C) Technical Duties of Signal Maintainers:**

The duties of Signal Maintainer are detailed in the following paras:

**I. Maintenance**:

(a) Efficient maintenance and testing of all equipment under his charge such as Mechanical signaling equipment, Electrical and Electronic signaling equipment, telecommunication equipment, etc, so as to keep them properly adjusted and in good working condition, in accordance with instructions stipulated or as may be issued from time to time. The term electrical signaling equipment includes all types of Block instruments.

(b) Carrying out works and alterations to the existing installations under the instructions of the SSE/SE/JE (Signal).

(c) To bring to the notice of the SSE/SE/JE (Signal) any emergency and situation that may be beyond his competence or control by a message on control phone or by a telegram or by a messenger or personally.

(d) Ensuring that the safety appliances like Safety Belts, lifting tackles etc. are in good condition and are always made use of in order to ensure his safety and the safety of staff working under him.

(e) Deploying men for look out duties as and when necessary.

**II. Locking of Interlocking Frames and Interlocking Circuits:**

a) The Signal Maintainer shall not remove the covers of interlocking frames and midway release locks or disconnect or alter any connection in the interlocking circuits of electrical interlocking systems except with the approval of and in the presence of his SSE/SE/JE (Signal). Any action, which will violate interlocking, shall be done only after disconnection notice has been issued and accepted.

b) A Signal Maintainer shall, however, attend to the locking failures promptly to permit safe passage of trains till the arrival of the SSE/SE/JE (Signal). If the locking is jamming, efforts shall be made to release the jam, as far as possible, by external means, such as, by tapping and oiling, without opening the covers or making any locking disconnection. If the jam cannot be released in this manner, he shall suspend all the signals operated or controlled from the interlocking frame before opening the covers or disconnecting any locking.

c) A Signal Maintainer shall also ensure that, once the signals have been suspended normal working shall not be restored until the locking has been attended to, tested and certified by the SSE/SE/JE (Signal) and the locking trays have been closed, pad locked and sealed.

**III. Maintenance Programs:**

a) Each Maintainer, as far as possible, adheres to the program laid down for him by his SSE/SE/JE (Signal) and shall maintain a record of his visits on form S&T/MR

b) Signal Maintainer shall not normally leave any gear in disconnected condition and in unavoidable eventuality; a specific advice to ASM, duly acknowledged by him shall be obtained.

c) Each Maintainer shall maintain and test all the equipment under his charge at least once a fortnight.

d) Each Maintainer shall submit a fortnightly report of his maintenance rounds to his Inspector on Form S&T/MR

e) A Maintainer before leaving his Headquartered station, shall record his movements in the Movement Board kept at the stationmaster's office.

**IV. Disconnection of Apparatus:**

a) Each Maintainer shall have in his possession a book of Disconnection Notices – Form S&T/Div. A Maintainer who is in possession of a Competency Certificate cum Training History book only shall independently undertake works necessitating issues of Disconnection Notices.

b) Disconnection Notices need not be issued in situations without suitable precautions. In situations, when it is necessary to disconnect any equipment in his charge for repairs, replacement or adjustment, the Maintainer shall advise the Station Master on duty in writing on Form S&T/DN and obtain the later's signature before work is started and after it has been completed.

c) When it is necessary to disconnect point equipment switches or signals for repairs, replacement or alteration, Warner/Distant and Stop Signals governing the lines in question shall be kept in the 'ON' position and made in-operative until the work is completed.

d) The Maintainer must seal the equipment opened by him under his competence.

**V. Attending Failures:**

a) A Maintainer shall attend to all failures in his section promptly proceeding by the first available means on receipt of information. Before taking up work, he shall first obtain failure report/message from SM/ASM in writing in accordance with provision of G.R.3.68 for each failure recorded in the signal failure register and then issue disconnection notice. He shall make every endeavor to rectify the failures expeditiously and take all possible steps to prevent recurrence. If a gear has failed on the unsafe side and the ASM has been unable to put the relevant signal to 'ON' the Signal Maintainer shall take steps to disconnect/disable the relevant signal and bring it to 'ON'.

b) All failures which are beyond his competence or control must be brought to the notice of the SSE/SE/JE (Signal) in-charge by a message on control phone or by a telegram or by a messenger or personally.

c) Record of the date and time of rectification and the nature of the fault removed must be recorded in the Signal Incidence and Inspection Register provided at each interlocked station.

**VI. ACCIDENTS:**

On receipt of advice about any accident in his jurisdiction, the Maintainer shall proceed to the site of accident by first available means. He shall not

interfere with any equipment on his own but shall act upon the orders given by the senior most officials at the site of accident.

**VII General Duties of Maintainers:**

I. Knowledge of Rules and Instructions:
A Maintainer shall be conversant with rules, regulations and instructions concerning his work contained in the following books of reference as well as other instructions issued from time to time.
i) General and subsidiary rules;
ii) Signal Engineering Manual;
iii) Safety First Book

A copy of those portions of each of the books mentioned above as also all circulars and he shall maintain instructions concerning his work, for his reference and information. He shall keep them up to date in respect of Correction Slips issued from time to time.

A Maintainer shall not permit any artisan or Class-IV staff to do any adjustment to the gear in use, except under his personal supervision and he shall ensure that the staff under him clearly understands this rule.

II. Maintenance of Muster Sheets:

A Maintainer shall mark his own attendance and that of his staff on the muster sheets received from the SSE/SE/JE (Signal) before starting his work. Erasing and over-writing is not permitted. Loss of muster sheet shall be brought to the notice of the SSE/SE/JE (Signal) at the earliest.

A Maintainer shall work to the duty rosters provided and see that the staff under him also works according to the roster.

III. Materials and Tools and Plant:

A Maintainer shall, where necessary, give his requirement of materials for maintenance and repair work to the SSE/SE/JE (Signal), with full particulars of station, location and the gears to be replaced. Released materials shall be returned to the SSE/SE/JE (Signal) immediately. There shall absolutely be no wastage of any material.
A Maintainer shall always take his tools with him when on duty. All tools shall be kept in good condition fit for immediate use.

IV Co-Operation between Electrical and Mechanical Signal Maintainers:
Electrical and Mechanical Signal Maintainers shall co-operate in testing all signals operated mechanically and controlled electrically.

Electrical and Mechanical Signal Maintainers shall extend full co-operation to each other in their day to day work.

V. Artisan staff:

**a) Black Smith:** Duty of the Black Smith in the SSE/SE's is fairly wide. The main duties of Black Smith is as under:
Preparation of tools, attention and compliance of points and crossing inspection, smithy work in signal post, points and crossing zone as per the requirement and other allied time to time.

**b) Carpenter:** Preparation of battery box, preparation and alteration work in relay rake, Location boxes and other allied carpentry works in the section.

**c) Painter:** He is responsible for all the painting works in the concerned jurisdiction. Painting works includes painting of signal posts,

numbering of track circuits and other allied painting works in the section of SSE/SE.

**d) Artisan Staff:** In brief Artisan staff perform their duties both in Signal and Telecom Wings and their duties are relevant to that trade/designation i.e., assisting/carrying out the work of Painters doing Painting works, Blacksmith doing Smithy works, Carpenter doing Carpentry works etc.,

2.5.2 **TELECOMMUNICATION DEPARTMENT:**

The Telecommunications on the Railways can be broadly classified into two categories as shown below:

1) Telecommunications directly connected with train operations.
2) Telecommunications for administrative control and data transmission.

**Duties of staff**: The Maintenance Organisation for Telecom maintains different types of equipments like wireless Microwave, PA Systems, Exchanges, control circuits, clocks, Train indicators, SPT Machines etc.

1) **Telecom Supervisors:**
   a) They are over all in charge for maintenance of Telecom. Assets viz., Exchanges, Outdoor, Indoor maintenance attending complaints, testing, looking after repeater stations, and Data loggers.
   b) Maintenance of Control, TPC, Train Indication Boards, Coach Indication Boards, IVRS, Call Centers, VHF Sets, Phones in the L.C. Gates, Group Phones, UTS, PRS, Rail net, FOIS, COIS, CMS Video Surveillance, Microprocessor announcements, WILL Phones, CUG, VHF5W, PT EEC Sockets, Data Loggers, Microwave, OFC, U/G Cables 4\6 quad, RE Cable, MMTS, PA System for Railway official functions with the assistance of artisans and Khalasis and other Telecom assets.
2) **Wireless Instrument Mechanic**: Microwave Organisation is a part of Telecom Department. A **WIM** has to work in wireless and Microwave station. He has to maintain and monitor.
   a) VHF like Walkie-talkie sets, Public Announcement systems, Yard paging, Talkback, Display systems, Touch screen Systems, Surveillance Cameras LED based Display Boards, Coach Indication Boards
   b) In addition to this he attends emergencies.
3) **Telecom Maintainer:** The Telecom Maintainer has to maintain:
   a) Electronic exchanges, FOIS, COIS, Unified Ticketing System
   b) RE Cables, Voice Frequency Repeaters
   c) Way side stations Telecom equipments, PRS
   d) Maintenance and coordination with BSNL in case of hired channels

**2.6 WORK LOAD:** The total workload of S&T Department represents the total assets, equipments and their maintenance pertaining to the jurisdiction. This is in terms of total unit including with respective weightage through which this organization helps in proper functioning of entire Signal and Telecom system on its each and every equipment available at each station/depot. The workload for Signal Engineering Dept. is given in terms of DESUs i.e. Divisional Equated Signal Units and the workload for Telecom Engineering Dept. is given in terms of DETUs i.e. Divisional Equated Telecom Units.

### 2.6.1 Workload Calculations - HYB Division

**2.6.2** Requirement of staff to maintain S&T assets is broadly based on these units.

| SN | As on 31-03-2018 | | HYB |
|---|---|---|---|
| 1 | Total no. of stations | | 57 |
| 2 | Total annual train km (000) all gauges:- | | |
| | a) Total annual train km(000) of passenger and passenger proportion of mixed train **H**= | H | 6492 |
| | b) Total annual train km(000) of Goods and Goods proportion of mixed train **J**= | J | 1415 |
| | c) Total annual train km(000) of Departmental train **K**= | K | 60 |
| | d) Total annual train km(000) of EMU as train are run **L1**= | L1 | 25 |
| | e) Total annual train km(000) of MMTS as train are run **L2**= | L2 | 352 |
| 3 | **F=H+J+K+L1+L2** | F | 8344 |
| 4 | Total route km of the Division **G** = | G | 622.89 |
| 5 | Train density Z = F / G | Z | 13.40 |
| 6 | **Basic Signal Units A1 =** | A1 | **50396** |
| 7 | A1/G | | 80.91 |
| 8 | Asset Disposal Factor Y (if A1/G >25, Y=0; else Y=0 to 8.3 as per value of A1/G) | Y | 0 |
| 9 | Weightage for quality control maintenance of signaling equipments A2= A1 (F/G - 7.3)*2.74/100 [if (F/G - 7.3) is -ve, A2 = 0) | A2 | 8417.14 |
| 10 | Weightage for disposal of equipments A3 = A1*Y/100 | A3 | 0 |
| 11 | Weightage for interference during inspection & testing A4 = A1*Z*0.94/100 | A4 | 6345.81 |
| 12 | Weightage of FP inspection A5 = 1.67*G | A5 | 1040.23 |
| **13** | **Divisional Equated Signal Units DESU : A = A1+A2+A3+A4+A5** | A | **66199** |
| 14 | Basic Telecom units : B1 | B1 | 114292 |
| 15 | Divisional Work load index : N=F*100/8460 | N | 98.63 |
| 16 | Weightage or quality control of maintenance of telecom equipment B2 = B1 * (N-120)*0.0027 | B2 | 0 |
| **17** | **Divisional Equated Telecommunication Units DETU : B = B1 + B2** | B | **114292** |
| **18** | **Divisional Equated Signal & Telecom Units DESTUS = A + B** | | **180491** |
| 19 | Production of Workshop : E | E | 0 |
| | Zonal Workshop units C = E x 450 | C | 0 |
| 20 | Multiplying factor for calculating Divisional integrated Units : (A + B) / (A1 + B1) | | 1 |
| 21 | DESTU's incl. Work Shop (A+B+C) | | 180491 |

The consolidated units of HYB Division as on 31.03.2018 are furnished below.

a) DESUs for 2017-18: (a) = **66199**
b) DETUs for 2017-18: (b) = **114292**
c) DESTUs for 2017-18: (a) + (b) = **180491**

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**C H A P T E R – 3**

## 3.0 ¡ðâðð÷÷µðÐððÃÙð¨î òãðäâð÷æðÂð/CRITICAL EXAMINATION:

### 3.1 Work and Importance of Signal & Telecommunication department:

Trains, unlike other types of vehicular traffic, are rigidly confined to the track. There are various types of trains: fast express trains , which run through several stations at high speeds and have precedence over all other trains; passenger services stopping at several stations; long distance freight trains, which run at lower speeds but haul heavier loads and run through way side stations etc. It is obvious that the characteristics of these trains especially in regard to speed, acceleration, and deceleration and brake power are dissimilar. It should be obvious, therefore, that an efficient system of control over the movement of trains, in which human element is reduced to a safe minimum is indispensable to the efficient operation of trains with varying characteristics over a given section. It is the purpose of Railway Signal Engineering and Telecommunications to provide this control as well as to ensure that a high degree of safety prevails over all movements, whether at low or high speeds.

3.2 The work-study team approached Sr.DSTE/HYB in order to conduct Work-study on S&T department over HYB Division.

3.3 On critical examination of the scale check of S&T department over HYB division, it can be seen that out of sanctioned strength of 433 staff, 359 staff are working at present with 74 vacancies in different grades.

3.4 July-2018 IR average and Bench Marking of HYB Division is as follows:

| S No | Department | MPR of HYB Division | IR Average | IRBM |
|---|---|---|---|---|
| 1 | Signal | 3.81 | 3.91 | 2.45 |
| 2 | Telecomm | 1.03 | 1.68 | 0.78 |

It is observed from the above table that the Telecom wing of S&T department of HYB Division is below IR average. But, MPR of Signal wing is nearer to IR average Bench Marking. Hence, work study team is confined to Signal wing only. While calculating the requirement of staff basing on IR average, the work-study team is focused on redundant categories/vacancies and need based calculation by Practical Observation.

3.5 In order to have first hand information the Work-study team visited all the Signal & Telecom units, sections, yards and offices of the S&T department of HYB division and observed the working pattern, various processes involved in maintenance of activities. The Work-study team made an analysis on the requirement of staff based on the Practical Observation and following parameters.

1) Work Load (DESUs) of Signal wing of S&T organization
2) Work Load under Contracts/AMC in Signal wing of S&T organization
3) Requirement of staff in Signal wing of S&T dept duly taking the AMC/ARC contracts in to consideration.
4) Lr. No E(M&P)2016/1/59 dated 10.01.2017 wherein it is stated to bring down the Divisions nearer to the IR Average level.

Recommendation to surrender signal helper (Group D staff) due to Contract works/AMC and posts are lying vacant/ redundant.

## 3.6 Work load calculation:

| SN | As on 31-03-2018 | | HYB |
|---|---|---|---|
| 1 | Total no. of stations | | 57 |
| 2 | Total annual train km (000) all gauges:- | | |
| | a) Total annual train km(000) of passenger and passenger proportion of mixed train **H**= | H | 6492 |
| | b) Total annual train km(000) of Goods and Goods proportion of mixed train **J**= | J | 1415 |
| | c) Total annual train km(000) of Departmental train **K**= | K | 60 |
| | d) Total annual train km(000) of EMU as train are run **L1**= | L1 | 25 |
| | e) Total annual train km(000) of MMTS as train are run **L2**= | L2 | 352 |
| 3 | **F=H+J+K+L1+L2** | F | 8344 |
| 4 | Total route km of the Division **G** = | G | 622.89 |
| 5 | Train density Z = F / G | Z | 13.40 |
| 6 | **Basic Signal Units A1 =** | A1 | **50396** |
| 7 | A1/G | | 80.91 |
| 8 | Asset Disposal Factor Y (if A1/G >25, Y=0; else Y=0 to 8.3 as per value of A1/G) | Y | 0 |
| 9 | Weightage for quality control maintenance of signaling equipments A2= A1 (F/G - 7.3)*2.74/100 [if (F/G - 7.3) is -ve, A2 = 0) | A2 | 8417.14 |
| 10 | Weightage for disposal of equipments A3 = A1*Y/100 | A3 | 0 |
| 11 | Weightage for interference during inspection & testing A4 = A1*Z*0.94/100 | A4 | 6345.81 |
| 12 | Weightage of FP inspection A5 = 1.67*G | A5 | 1040.23 |
| **13** | **Divisional Equated Signal Units DESU : A = A1+A2+A3+A4+A5** | A | **66199** |
| 14 | Basic Telecom units : B1 | B1 | 114292 |
| 15 | Divisional Work load index : N=F*100/8460 | N | 98.63 |
| 16 | Weightage or quality control of maintenance of telecom equipment B2 = B1 * (N-120)*0.0027 | B2 | 0 |
| **17** | **Divisional Equated Telecommunication Units DETU : B = B1 + B2** | B | **114292** |
| **18** | **Divisional Equated Signal & Telecom Units DESTUS = A + B** | | **180491** |
| 19 | Production of Workshop : E | E | 0 |
| | Zonal Workshop units C = E x 450 | C | 0 |
| 20 | Multiplying factor for calculating Divisional integrated Units : (A + B) / (A1 + B1) | | 1 |
| 21 | DESTU's incl. Work Shop (A+B+C) | | 180491 |

The work Load (DESUs) of Signal wing of S&T department of HYB division is **66199**. Some of the activities are given for Contracts/AMC.

### 3.7 Work Loads under Contracts/AMC in Signal wing of S&T organization

| SN | CONTRACTS | Units | Qty | Total units |
|---|---|---|---|---|
| 1 | AMC of 95 Diesel Generators. | 25 | 95 | 2375 |
| 2 | AMC for Efftronics make Data Loggers @ 42 stations. | 20 | 42 | 840 |
| 3 | AMC for 15 Data logger, 33 RTUs & 20 SAP. | (20+10) | (15+33) | 660 |
| 4 | AMC for IPS for 51 Systems & 2 Mini IPS. | (20+10) | (51+2) | 1040 |
| 5 | AMC for 3 IPS Systems & 1 Mini IPS System. | (20+10) | (3+1) | 70 |
| 6 | AMC for IPS at MBNR. | 20 | 1 | 20 |
| 7 | AMC for 34 RTUs | 10 | 34 | 340 |
| 8 | AMC for IPS at DKC | 20 | 1 | 20 |
| | | | Total | 5365 |

Above mentioned Contract/AMCs are under working at present. Hence, The Work Load under Contracts/AMC in Signal wing of S&T department/HYB is calculated to 5365 Signal units.

### 3.8 Requirement of Staff in Signal wing of S&T department duly taking the AMC/contracts in to consideration:

The man power requirement of Signal wing will be calculated basing on DESUs and IR average Bench Marking. Some of the activities of Signal wing of S&T department in HYB division are under Contracts/AMC. Therefore, the work study team decided to deduct the Contract Signal units (DESUs) from total work Load units (DESUs) of Signal wing. However, the departmental staff has to supervise the activity and preliminary maintenance is to be done in case of break down or faults. Therefore, work study team decided to deduct 40% of Contract Signal units from Total Signal units.

- **The requirement of staff calculated as follows**

| | | |
|---|---|---|
| 1 | Total Contract/AMC Units (These Signal units are to be maintained by Contract staff) | 5365 |
| 2 | 60% of Contract/AMC Signal units are allocated for supervision of departmental staff even though Signal units are under contract | 5365x60/ 100=3219 |
| 3 | 40% of Contract/AMC Signal units | 5365x40/ 100=2146 |
| 4 | Basic Signal units (Actual DESUs) | 50396 |
| 5 | 40% of AMC Contract units deducted from basic telecom units(A1) | 50396-2146= 48250 |
| 6 | Total route km of the Division (G)= | 622.89 |
| 6 | A1/G | 77.46 |
| 7 | Asset Disposal Factor Y (if A1/G >25, Y=0; else Y=0 to 8.3 as per value of A1/G) | Y=0 |
| 8 | Weightage for quality control maintenance of signalling equipments A2= A1 (F/G - 7.3)*2.74/100 [if (F/G - 7.3) is -ve, A2 = 0) | A2=8064.505 |
| 9 | Weightage for disposal of equipments A3 = A1*Y/100 | A3=0 |
| 10 | Weightage for interference during inspection & testing A4 = A1*Z*0.94/100 | A4=6077.57 |
| 11 | Weightage of FP inspection A5 = 1.67*G | A5=1040.23 |
| 12 | Divisional Equated Signal Units DESU : A = A1+A2+A3+A4+A5 | A=63432.305 |

As above, the Signal staff requirement is calculated to 248 based on IR average Bench Mark of July, 2018.

- **Summary of SAVE position of Signal staff:**

| S.N | Category | Sanction | Actual | Vacancy |
|---|---|---|---|---|
| 1 | Supervisor | 48 | 39 | 09 |
| 2 | Technician staff | 72 | 53 | 19 |
| 3 | Ministerial Staff | 10 | 10 | 0 |
| 5 | Group 'D' Staff | 131 | 114 | 17 |
| | **TOTAL** | **261** | **216** | **45** |

The work study team analysed the work Load based on the above factors and the brief details are as follows:

1) Actual DESUs of the S&T department of HYB division is 66199
2) The Work Load under Contracts/AMC in Signal wing of S&T department/HYB is calculated to 5365 Signal units.
3) 40% of AMC Contract Signal units (i.e. 2146) are only deducted from total Signal basic units because the preliminary maintence and supervision of Signal units are to be done by departmental staff.
4) After deducting 40% of AMC Contract Signal units, the staff requirement is calculated basing on DESUs & IR average.

**Summary of Staff requirement:**

| Dept. | Sanction | Actual | Requirement | Excess staff |
|---|---|---|---|---|
| Signal wing | 261 | 216 | 248 | 13 |

### 3.9 <u>òçðÒîðòÜäð</u>/Recommendation:

- It is recommended to surrender 13 posts from sanctions of Signal Wing of S&T department over HYB division.

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**¡ÏÚððÚð-4**
**CHAPTER – 4**

## 4.0 òãðÃÃðóÚð ÑðòÜÂððÙð /FINANCIAL IMPLICATIONS:

4.1 If the recommendations are accepted, the recurring savings on surrender of the following posts in S & T Organization over HYB Division would be as follows:

| S. NO | Cate-gory | Scale | | No. of posts | Mean Pay | DA @ 7 % | Emoluments P.M (in Rs.) | Total Emoluments P.A (in Rs.) |
|---|---|---|---|---|---|---|---|---|
| | | From | To | | | | | |
| 1 | Signal Helper/ Gr. 'D' | 18000 | 56900 | 13 | 37450 | 2621 | 520923 | 6251076 |
| | **TOTAL** | | | **13** | | | | **6251076** |

For calculation purpose only initial grades are taken into account.

On implementation of the recommendations brought out in the Workstudy report an annual savings of **Rs. 62.51 Lakhs** can be achieved.

**¡ÏÚððÚð-5**
**CHAPTER – 5**

## çðüçÃðôôÃðó/ R E C O M M E N D A T I O N

| Sl. No. | Description | Para No. |
|---|---|---|
| 1 | ➢ It is recommended to surrender 13 posts from sanctions of Signal Wing of S&T department over HYB division which is excess from requirement and lying vacant. | 3.9 |

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SOUTH CENTRAL RAILWAY

WORK STUDY REPORT
ON
REVIEW OF STAFF STRENGTH
OF
S&T DEPARTMENT
OVER
HYDERABAD DIVISION

**Ùðð±ðáÇäðá¨î**
**GUIDED BY**

**(SHRI JAYACHANDRA NAIK)**
**ãðòÜæ¾.¨îðÚðá.¡ÏÚðÚðÐð ¡òÏð¨îðÜó**
Sr. Work study Officer,

¡ÏÚðÚðÐð ¨Ãððá
STUDIED BY

ए.कोटि रेड्डी
A. Koti Reddy
**¨îðÚðá¡ÏÚðÚðÐð òÐðÜóêð¨,**
WORKSTUDY INSPECTOR

बी. पवन प्रसाद
B. Pavan Prasad
¨îðÚðá¡ÏÚðÚðÐð òÐðÜóêð¨,
WORKSTUDY INSPECTOR

¨ü÷ÎÍóÚð Úðð÷¸ðÐðð çðü±ð¿Ðð, òçð¨üîÇÜð×ððÇ
CENTRAL PLANNING ORGANISATION
SECUNDERABAD.
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