¡ðØððÜ 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 Electrical Department of Secunderabad 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 workload particulars.
2. Interaction with all the Staff and Officers on the Division.
3. Critical examination of the existing system of working and
4. Assessment of manpower requirement for existing workload.

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ÞÑðÜ÷®ðð S Y N O P S I S

- Subject: Review of Staff strength of Electrical TRD wing over SC division
- Authority: Railway Board's Annual Programme of Work studies 2018-19.
- Study No: WSSCR-45/2018-19
- Reference File No: G.276/2/WSSCR-45/2018-19.
- Area of Activity: Secunderabad Division.
- The Central Planning cell of South Central Railway has taken up the Work study on the "Review of staff strength of Electrical TRD Wing over SC Division" in order to study the available manpower in comparison with the current IR Average Bench Marking and to thus identify if any excess staff is available, with a view to right size the manpower.
- **Summary of SAVE position of Electrical TRD Wing :**

Sl. No.	Sanction	Actual	Vacant
1	0	0	0

- It is observed from the scale check of Electrical TRD staff of Secunderabad Division, there is 752 sanctioned staff 637 staff on roll with 160 vacancies existing in different grades.
- It is seen that the technological development in Electrical 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 and also requires least or no maintenance or at the most maintenance consisting of replacing of a unit/module completely.
- It may be pertinent to mention that the maintenance activities wherein high sophisticated professionalism is involved have been outsourced; hence IR Average Benchmarking is taken into consideration.

- September-2018 IR average and Bench Marking is as follows:

S No	Department	IR Average	IRBM
1	TRD	0.30	0.11

- Application of Benchmarking Norms: Benchmarking is based on dynamic and comparative analysis and is a very useful tool to manage efficient deployment of staff and monitor effects of improvement in working practices, use of new technologies and level of outsourcing. Board also insisted all units to achieve Indian Railway Average Benchmarking.
- Keeping the above in view, the Work-study team made an analysis on the requirement of staff based on the following references:
  - Lr.No.2011/E&R/2800/Rly.imp.vol VI/(Corr) dated 09.06.2016 wherein it is stated to bring down the manpower ratios for activities which are above the IR Average at least to the current IR Average.
  - No. of activities under outsourcing/AMC.
  - Requirement of Staff as per IR Average/Bench Marking
  - AGM DO Letter No. SCR/P-HQ/MPP/156/Right sizing/VIII dated 23.01.2017
- **Recommendation**: it has been recommended to surrender 7 'vacant' posts from the category of Helpers (KHP).

CHAPTER – I

1.0 INTRODUCTION

- Manpower planning is a process which aims to have the right number of staff at right places with right type of skills at right times to enable the organisation to achieve its short term and long term goals. In other words, manpower planning is the system, which ensures the manpower availability at a given point of time.
- Manpower planning means establishment of job specifications or qualitative requirements of jobs to determine the number of people required and to find supply source.
- Manpower recruitment is related to matching the personal qualities of employees with the job requirements.
- There have been dynamic change in the technology and modernisation, electrification, computerisation, mechanisation etc. are taking place at fast rate to meet the challenges of traffic requirements in Indian railways. To meet the challenges of the changing environment, systematic manpower planning is essential. Therefore a category-wise analysis of staff should be carried out, to identify the surplus and to arrange manpower in the areas of need. This adjusts the surplus in one category to other categories, where there is demand. Manpower planning ensures that the existing manpower is utilized to the maximum extent.

1.1 The duties of the different officials in TRD section is as follows:

Sr.DEE/DEE (TRD) is the officer in immediate charge of the Traction Distribution section in a Division, responsible for all technical and organizational matters connected with the efficient maintenance and operation of the power supply installations, OHE and RC equipment. He is acquainted with the technical details, performance rating and operating and maintenance problems of the installations under his charge.

His chief duties are as under :- a) General planning and supervision to ensure efficient and safe maintenance and operation of the installations under his charge in accordance with prescribed schedules and regulations;

b) Study of the day-to-day technical and organizational problems of operation and maintenance and initiation of appropriate measures to deal with these;

c) Man-power planning for effective maintenance at minimum cost;

d) Careful statistical analysis and compilation of details of all defects and failures occurring and initiation of appropriate remedial steps if these are attributable to inadequate or improper operation or maintenance or mismanagement by staff. Where defects are attributable to improper design or manufacture, or where modifications or proposed remedial measures require CEE's approval, prompt submission of detailed analysis together with recommendations, seeking such approval;

e) Watch on the progress and completion of all approved modifications as well as the efficacy of such modifications;

f) Watch on the availability of spare parts and stores required for maintenance and initiation of stores action well in advance for procurement of items involving prolonged delivery and effective follow-up action to ensure timely procurement. Also watch the behaviour of equipment to assess their anticipated life and timely programming of replacements;

g) Overall co-ordination at the divisional level with the operating and other departments to plan power blocks required for maintenance of OHE and careful planning of maintenance work to make the best use of such blocks

h) Inspection of his jurisdiction as i) Liaison with power supply authorities in regard to important matters that cannot be dealt with at lower levels;
j) Preparation of plans and estimates for works involving the traction distribution system and scrutiny of plans and estimates for works of other departments affecting the traction distribution system.

1.2 Divisional/Assistant Electrical Engineer (TRD) DEE/AEE(TRD) : is the officer in immediate charge of the maintenance, operation and safety of all power supply installations, overhead equipment (OHE) and RC equipment in his jurisdiction and is answerable to Sr.DEE(TrD) in all matters connected therewith. In addition to assisting Sr.DEE (TrD) in his duties, his chief duties are as under:-

a) Efficient and safe upkeep and operation of the installations under his charge in accordance with the prescribed schedules including detailed planning of all maintenance works;

b) He should ensure that Traction Power Controller (TPQ takes effective and prompt action to restore services in the event of power supply interruptions or other failures of the distribution system affecting train services;

c) Close liaison with power supply authorities to ensure continuity of power supply;

d) Careful and prompt investigation of all recurring or major power supply interruptions and equipment failures and initiation of appropriate remedial measures;

e)Preparation of preliminary plans and estimates called for by Sr.DEE(TrD) for works involving the traction distribution system, and scrutiny as called for by Sr.DEE(TrD) of plans and estimates for works of other departments in the section so far as they affect the system;

f) Personal and periodical checking of the break-down organization to ensure that it is in good fettle to deal with all break-downs;

g) Prompt implementation of instructions received from time to time including those contained in Inspection Notes of superior officers and keeping record of action taken against each item;

h) Careful scrutiny of statistical and other periodical returns before submission to Sr.DEE(TrD) and taking appropriate corrective action; i) Effective co-ordination with officers and staff of other departments in matters that warrant joint action and similar co-ordination with officers of contiguous sections;

j) Inspection of his jurisdiction

1.3 Chief Traction Power Controller (CTPC) : shall perform the following duties:- 1. Study of all failure reports of OHE, switching stations etc. daily specially in so far. as they affect the operation of trains and submit connected periodical reports to AEE (TrD). He shall maintain complete statistical data relating to operation of RC equipment and ensure that the schedules of maintenance are carried out regularly;

2. Scrutiny of traffic delays shown against the Traction Distribution Branch and liaison with the Chief Controller, as necessary, for ensuring the correctness of the records; 3. Maintenance of close contact with the Chief, Deputy and Section Controllers, TPC and ATPC, TLC Sr DEE (TrD) and AEE (TrD) and study of all problems relating to train operations, as far as the Traction Distribution Branch is concerned, to seek solutions;

4. Scrutinize the Log Book and the Shift Duty Register once a day and ensure that they are properly maintained and action as necessary is taken;

5. In an emergency or disorganization be in direct touch with the Traffic Control Office and help in every way to restore and maintain the train services and take over operation of power control himself, if required;

6. Ensure that TPCs and ATPCs are adhering to the rules and instructions in force. Study all the rules in force and suggest amendments, modifications, corrections as may be found necessary in practice.
7.Co-ordinate the Weekly Power Block Programme of all traction staff and other department and finalize it in consultation with the Traffic Department. Take steps to adhere to the agreed programme as far as practicable.
8. Compile periodical statistics from the data collected on SCADA system and as per instruction of Sr. DEE/TrD including the analysis of failures on the SRC system, and submit them to Sr. DEE/TrD.
9. Report daily to the CEE's office all matters as laid down by the CEE.
Duties of Traction Power Controller: He is the official in direct charge of the control of 25 kV power supply for electric traction and shall be fully acquainted
with all the traction power supply installations, and sectionalizing arrangements.

1.4 TPC/ATPC: 1. When taking over shift duty, he should acquaint himself with the prevailing position of the entire section including working of the RC equipment, condition of all transformers, circuit breakers, interrupters and isolators, sections under power block, any special instructions to be carried out, movements or important officials connected with the traction distribution system, position of the OHE Inspection Cars and breakdown vehicles etc.;
2. Maintain continuous contact with the Power Supply Authorities;
3. Maintain continuous contact with the Traffic Section Controllers in regard to power supply affecting train movements, imposition of power blocks etc.;
4. In the event of power supply interruptions or other failures, take prompt action in accordance with prescribed rules and local instructions for restoration of supply;
5. Imposition of and removal of power blocks as required, following the prescribed procedure and safety rules.
6. In the event of power supply failures, OHE break-downs, accidents etc. in the electrified section, advise promptly the concerned Foreman, AEE, DEE/Sr. DEE (and other officials in accordance with local instructions), and keep them posted with ail important developments;
7. Record in the Log Book, on prescribed proforma, full details of all switching operations carried out, power blocks imposed or refused (or delayed) and other occurrences in the distribution system;
8. Maintain the following registers and records in the proforma prescribed :-
(i) Shift Duty Register indicating points of importance including messages, movements of ODC involving power blocks and other details to be noted by following shifts.
(ii)Record of standing instructions.
(iii) Register of temporary instructions.
(iv) Register of Staff Movements;
(v) Emergency Telephone Testing Register.
(vi) Register of train delays due to failures of signal supply.
(viii) Weather forecast register.
9. By 10 hrs each day submit the following reports to Sr. DEE/ DEE (TrD) and other officials as laid down in local instructions:-
(i) List of power blocks availed.
(ii) Particulars of telecommunication failures.
(iii) Particulars of RC failures.
(iv) Power Supply failures.
(v) Maximum demand and energy consumption at each traction sub-station.
(vi) Condition of traction sub-station equipment.

(vii) All unusual occurrences, if any.

1.5 Senior Section Engineer, Power Supply Installations (PSI) : He is the senior supervisor working under the control of DEE/AEE (TrD) and directly responsible for the safe and efficient operation and maintenance of traction power supply installations including sub-stations (when owned by the railway), switching stations, booster transformers and auxiliary transformers in his jurisdiction. He shall be thoroughly conversant with all technical details of the equipment under his charge including their rating, trend of power demand as also correct methods of their operation and maintenance. In particular, he shall- 1. supervise the maintenance of installations under his charge in accordance with the prescribed schedules to keep them fully serviceable at all times and in a state of good repair;

2. maintain proper co-ordination with the Traction Power Controller. Chief Traction Foreman (OHE). Supply Authorities and render assistance when required to ensure reliability of power supply;

3. Keep his organisation in constant readiness to deal promptly with any breakdowns and failures of equipment;

4. Ensure that the programme of testing and maintenance of protective relays is adhered to and ensure that other safety equipment including bonding and earthing are functioning effectively. At the ground level, these supervisory officials are assisted by skilled and unskilled Technicians/Artisans.

The present study on the review of staff strength in the Electrical wing (TRD) over SC Division has been taken up for the year 218-18 as proposed by SDGM/SC.

CHAPTER – II

2.0 EXISTING SYSTEM OF WORKING :

2.1 The Organisation is headed by Sr.DEE , and assisted by sub-divisional Officers at Dornakal, Kazipet, Sirpurkhagaznagar, Secunderabad and Tandur. The division consists of 17 Over Head Maintenance(OHE) depots and 18 Power System Installations(PSI) depots/ sub-stations. The OHE depots carry-out preventive maintenance of the traction installations i.e. the wires over the track from which the Locomotive pantograph draws the current. The PSI depots maintain the Railway traction sub-stations which feed the OHE with 25KV A.C. Power.

2.2 The PSI and OHE activities are monitored by the Traction Power Controller (TPC), who monitors the voltages of the system and advises the Section Traffic Controller to regulate trains when there is bunching of trains leading to low voltage and stalling of trains.

The equipment at traction sub-stations and switching stations is controlled remotely by TPC. The monitoring of the Remote control equipment is also being.

- The activities of this department are maintenance of Traction power supply installations, Over head equipment, SCADA, construction activities pertaining to the section, and monitoring of energy conservation in electric traction.
- The Power to OHE required for hauling of electric locos is fed from the 18 Traction sub-stations maintained by Railways, with fool proof protective equipment. A 100% standby Power supply arrangement is designed for feeding un-interrupted power to traction. Railways takes supply from Supply authorities i.e. MSEB/APTRANSCO/TSTRANSCO/GESCOM at 220/132/110kV for more reliability. The 220/132/110 kV is stepped down to 25kV and fed to the Locos via the overhead equipment.

2.3 The Population of important Power supply installation are furnished under:

No. of Traction Sub-stations	No. of Power Transformers	No. of 132kV CB's	No. of 25kV CB's	No. of 25kV BM's	No. of 132kV CT's	No. of 25kV CT's	No. of 25kV PT's	No. of kV LA's	No. of AT's	No. of Isolators
18	35	35	109	309	70	170	255	400	546	475

The Over Head Equipment is built on state of art technology, and designed to cater to Loco speeds of 160kmph.

2.4 POWER PURCHASE FROM ALTERNATIVE SOURCES, THROUGH OPEN ACCESS: Availing of cheaper power from Ratnagiri Gas and Power Private Limited (RGPPL) at Wirur/TSS From November 26th 2015, power to WIRR/TSS is being supplied from RGPPL.Purchase of power through Open access, for supply to other Traction sub-stations fed by GESCOM, APTRANSCO and TSTRANSCO is also being pursued.

2.5 Innovations / Improvements:

Computerized Current collection and Stagger Checking equipment (Oliver 'G') with GPS mapping is being used for detecting sparking in OHE which removes any scope of errors which was prevailing in the earlier conventional method.

Thermal images of the jumper connections are taken for monitoring the conditions of the connections, since it is not always practically possible to check the same physically under power block conditions

Isolation of fault in sidings without effecting the main line traffic is ensured by providing CB/BM at SNF/TSS (to isolate AMQ by-pass Line), KZJ/TSS (to isolate ELS/ KZJ & KZJ Yard), MTMI/SSP (to isolate JPTN-MACU section), RRPM/SSP (to isolate Zuvari Cements and Jaypee Balaji Cement sidings), DKJ/TSS (to isolate DKJ-KRA section), CHZ/SSP (to isolate FCI siding at CHZ), NPL/SSP (to isolate SAIL, RINL, CONCOR sidings), GDCR/SSP (to isolate Manikgarh Cement siding).

Levelers have been erected at all coal loading points to prevent heaping of coal in the wagons which was causing breakdown of OHE.

2.6 Replacement of Aluminium Catenary with Copper catenary wire:

2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18 (Upto Sept 17)	Total - 659.9TKM
28.142	19.532	62.03	59.764	90.21	143.98	58.517	15.90	Balance – 235.24 TKM

2.7 Bifurcation of Communication channels to avoid delay in SCADA response time /Speeding up of SCADA:

Bifurcation of SCADA Communication Channels			
Earlier		Present	
Channels	No. of RTU's	Channels	No. of RTU's
KZJ-KI	24	BPQ/SP - RECH/SSP	9
KZJ-BPQ	22	BPA/TSS - KZJ/TSS	10
		KZJ/SSP - PGP/SSP	11
		KMT/SP - KI/TSS - JPTN/SSP	17

Speeding up of SCADA	Earlier	Present
Baud Rate	600 Bauds	1200 Bauds
Increase of Baud rate in KZJ-WD section, by up gradation of CPU software to 1200 Baud rate by M/s Synergy Systems. Modem setting of RTU's and front end processor increased to 1200 Baud rate. (For other sections, CMC/RTU's of old version are not compatible).		

Because of bifurcation of the channels and improvement in baud rate, response time of SCADA has improved and TPC can carry out feed extension / fault isolation in less time.Revised relay settings at all Traction sub-stations to avoid damage to OHE during monkey

2.8 Electrocution / faults:

Consequent to snapping of Aluminium catenary wire at WP on 9.8.15, and bracket insulator breakage at metal cap in DKJ-GUU section on 18.8.15 due to monkey menace, over current relay settings are revised as advised by CEE/SCR. The over current settings are revised to avoid chances of fault

current passing for more time, so that OHE snapping/ damage does not take place. The revised settings are as follows:

Instantaneous OCR		Definite Time OCR	
Old setting	New setting	Old setting	New setting
200% i.e. 1600A	160% i.e. 1200A	1350A for 200m sec	1050A for 120m sec

Delta-I

TSS	Old Settings		New Settings	
	Delta-I	X-Blinder	Delta-I	X-Blinder
NKD & BKL	400A	12-18Ω	210A*	50Ω
Other TSS's	400A	12-18Ω	300A	50Ω

* NKD and BKL TSS's are provided with PTFE Neutral sections and hence Delta-I settings could be reduced.

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CHAPTER – III

3.0 CRITICAL ANALYSIS AND RECOMMENDATIONS

3.1 SAVE POSITION OF ELECTRICAL (TRD) OF SC DIVISION AS ON 1.11.2018

S.No	Department	Post Name	Sanction	Actual	Vacancy
1	Elec.TRD	SSE	62	45	17
2	Elec.TRD	JE	34	24	10
3	Elec.TRD	SSE(Drg)	4	2	2
4	Elec.TRD	JE(Drg)	1	1	0
5	Elec.TRD	TW.Dr	17	14	3
6	Elec.TRD	Sr.Tech/OHE	58	39	19

7	Elec.TRD	TechGr.I/OHE	116	52	64
8	Elec.TRD	TechGr II/OHE	32	74	0
9	Elec.TRD	TechGr.III/ OHE	38	22	16
10	Elec.TRD	Sr.Tech/PSI	19	16	3
11	Elec.TRD	TechGr.I/PSI	44	30	14
12	Elec.TRD	TechGr II/PSI	7	10	0
13	Elec.TRD	TechGr.III/PSI	13	6	7
14	Elec.TRD	Helper	300	295	5
15	Elec.TRD	Peon	7	7	0
		Total	**0**	**0**	**0**

3.2 The Central Planning cell of South Central Railway has taken up the Work study on the "Review of staff strength of Electrical TRD Wing over SC Division" in order to study the available manpower in comparison with the current IR Average Bench Marking and to thus identify if any excess staff is available, with a view to right size the manpower.

3.3 Summary of SAVE position of Electrical TRD Wing :

Sl. No.	Sanction	Actual	Vacant
1	0	0	0

3.4 It is observed from the scale check of Electrical TRD staff of Secunderabad Division, there is 752 sanctioned staff 637 staff on roll with 160 vacancies existing in different grades.

3.5 It is seen that the technological development in Electrical 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 and also requires least or no maintenance or at the most maintenance consisting of replacing of a unit/module completely.

3.6 It may be pertinent to mention that the maintenance activities wherein high sophisticated professionalism is involved have been outsourced; hence IR Average Benchmarking is taken into consideration.

3.7 September-2018 IR average and Bench Marking is as follows:

S No	Department	IR Average	IRBM
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3.8 Application of Benchmarking Norms: Benchmarking is based on dynamic and comparative analysis and is a very useful tool to manage efficient deployment of staff and monitor effects of improvement in working practices, use of new technologies and level of outsourcing. Board also insisted all units to achieve Indian Railway Average Benchmarking.

3.9 Keeping the above in view, the Work-study team made an analysis on the requirement of staff based on the following references:

- Lr.No.2011/E&R/2800/Rly.imp.vol VI/(Corr) dated 09.06.2016 wherein it is stated to bring down the manpower ratios for activities which are above the IR Average at least to the current IR Average.

- No. of activities under outsourcing/AMC.
- Requirement of Staff as per IR Average/Bench Marking
- AGM DO Letter No. SCR/P-HQ/MPP/156/Right sizing/VIII dated 23.01.2017

3.10 Recommendation: it has been recommended to surrender 7 'vacant' posts from the category of Helpers (KHP).

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C H A P T E R – 4

4.0 ¡ðâðð÷÷µðÐððÃÙð¨î òãðäâð÷æðÂð FINANCIAL IMPLICATIONS:

4.1 If the recommendation is accepted, the recurring savings on surrender of the under mentioned posts in Electrical General Services over Secunderabad Division would be as follows:

Sl.No	Category	Scale		No. of posts	Mean Pay	DA @ 9 %	(in Rs.)Emoluments P.M	Rs.)Total Emoluments P.A
		From	To					
1	KHP	18000	56900	7	(18000+ 56900)/2 =37450	3370.5	285743.5	34,28,922

- On implementation of the recommendations brought out in the Work-study report an annual savings of **Rs. 34.29 lakhs** can be achieved.

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C H A P T E R – 5

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R E C O M M E N D A T I O N	Para No.
It has been recommended to surrender 7 'vacant' posts from the category of helper.	**3.10**

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