

ACKNOWLEDGEMENT

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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ॐॐॐॐॐ METHODOLOGY

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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- Subject: Review of Staff Strength of Electrical General Services over Secunderabad Division.
- Authority: Railway Board's Annual Programme of Work studies 2018-19.
- Study No: WSSCR-20/2018-19
- Reference File No: G.276/2/WSSCR-20/2018-19.
- 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 General Services over SC Division" in order to study the available manpower in comparison with the current IR Average and to thus identify if any excess staff is available, with a view to right size the manpower.
- The primary responsibility of General Electrical branch is multi dimensional ranging from maintenance of electric power supply to various railway establishments, air-conditioning of various assets to primary and secondary maintenance of trains.
- The job of General Electrical Service branch is divided into two major wings i.e. (a) Power maintenance and (b) Air Conditioning & Train lighting.
- **Summary of SAVE position of General Electrical Service Staff:**

Sl. No.	Sanction	Actual	Vacant
1	1192	1088	104

- It is observed from the scale check of Electrical General Services staff of Secunderabad Division, there is 1192 sanctioned staff 1088 staff on roll with 104 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.
- The activities which are outsourced /covered under AMC of electrical power maintenance and TL&AC is as follows:
 1. Maintenance of DG sets.
 2. Maintenance of Chillers.
 3. Maintenance of AC and Water coolers.
 4. Maintenance of non-core activities of Batteries, Lights, Fans and their cleaning in TL coaches.
 5. Maintenance of Inverters of AC coaches.
 6. Maintenance and operation of DG sets of power cars.
 7. CMC for RMPUs provided in AC coaches
- April-2018 IR average and Bench Marking is as follows:

S No	Department	IR Average	IRBM
1	Power Maintenance	0.15	0.03
2	TL&AC	0.46	0.18

- 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.

a) Power Maintenance:

Work load of Power maintenance is measured in terms units of power consumed and the following are the details of power consumed and requirement of staff:

A	Electrical Power consumption for 12 months (2017-18)	26570000
B	Average Electrical power consumption per month	2214166
C	Solar power consumed for the 12 months(2017-18)	1111121
D	Average Solar power consumption per month	92593
E	60% of Average Solar power consumption per month	55555
F	60% of AT power consumption(60% of 805478.4 Units) per month	483287
G	Average power consumption (Electrical+ Solar+ AT) per month=B+E+F	2753008
H	IR average for the month of April-2018	0.15
I	Staff required as per IR Avg. (0.15 per 1000 units) = $G \times H/1000 = 2753008 \times 0.15/1000$	412.95 say 413 Men

b) Train Lighting and Air Conditioning:

- **Coach holding of the Division:**

S No	Type of coaches	No.of coaches
1	Train Lighting	1098
2	AC coaches	471
3	Power cars	30
	Total	0

- Staff required to attend TL/AC failures and turn round attention at nominated way side stations as follows:

S No	Station	Required staff
1	Parli	3(one in each shift)
2	Vikarabad	3(one in each shift)
3	Bidar	3(one in each shift)
4	Warangal	3(one in each shift)
5	Dornakal	3(one in each shift)
6	Bhadrachalam Road	3(one in each shift)
7	Bare requirement	18
8	LR/RG (12.5%)	2.25
	Total (18+2.25)	20.25 say 21 Men

- Requirement of staff:

A	Total holding of coaches	1569
B	IR average for the month of April-2018	0.46
C	Manpower required as per IR average - 1569×0.46	721.74 say 722
D	Men required at way side depots to attend turn round and pass through Trains	21
E	Total men required for AC&TL (C+D)=722+21	743 Men

c) Requirement of total staff in Electrical General Services:

A	Men required for Power maintenance	413
B	Men required for AC&TL	743
C	Total requirement of men in PM and TL&AC(A+B)=413+743	1156
D	Total Sanctioned strength of (PM+TL&AC)	1192
E	Staff excess to the requirement (D-C) =1192-1156	36 Men

- The requirement of staff strength of Electrical General Services Department is 1156 and found 36 staff is excess with reference to IR Average.
- AC posts transferred to BZA division=18
- Excess staff=36-18=18

Recommendation: It is recommended to surrender **18** posts of Electrical General Services Department from book of sanctions which are excess to the requirement.

Annexure- 1

1.0 INTRODUCTION

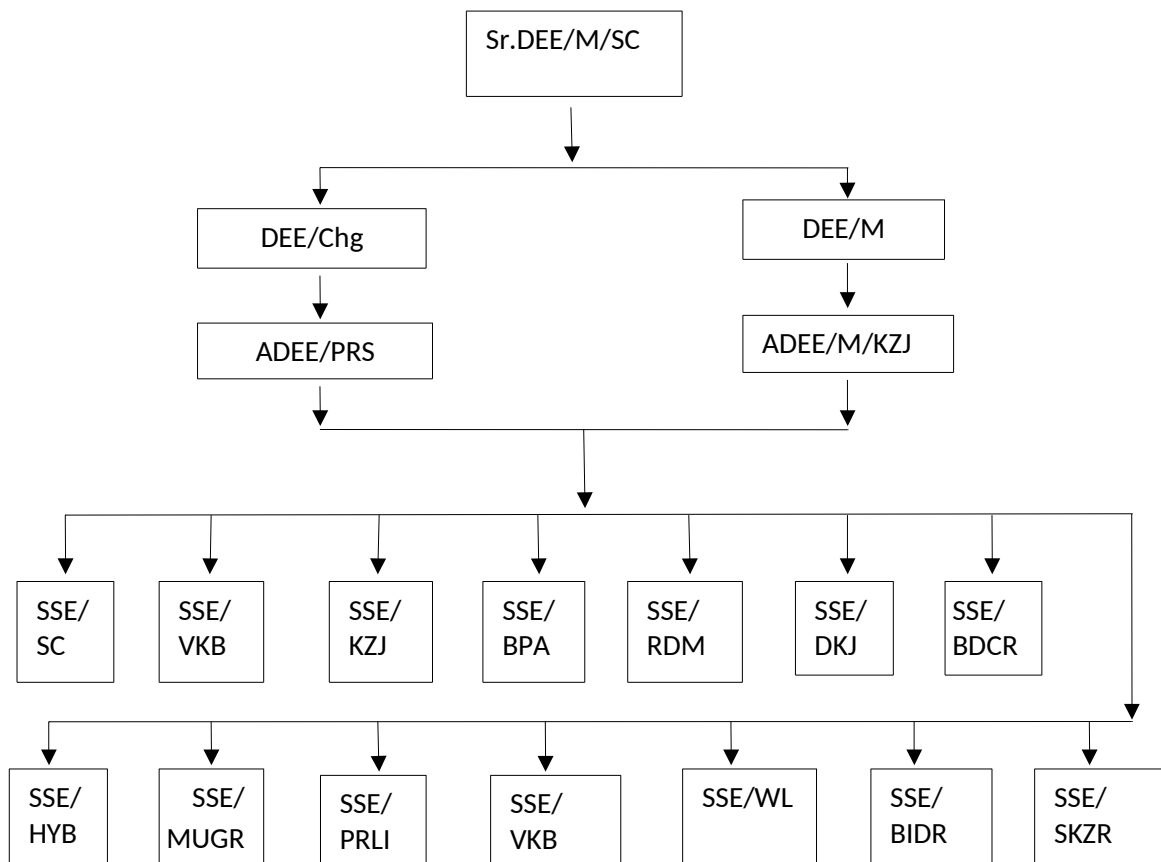
- 1.1 **RAILWAY'S ROLE:** Indian Railways is a premier transport service provider to the nation and is vested with the responsibility of carrying bulk of freight and passenger traffic across the country at economical rates. The Indian Railways operates through 16 Zones with 68 Divisions to serve the 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 the same.
- 1.3 With a view to right size the manpower, Railway Board have chosen a few select areas and are monitoring the manpower available in those activities on all divisions of Indian Railways. This includes the study of "*Electrical General Services*".
- 1.4 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 but requires least or no maintenance or at the most maintenance consisting of replacing of a unit/module completely. 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.
- 1.5 In view of the above, the Central Planning Organization conducted Work study of Electrical General Services (PM) of Secunderabad Division over South Central Railway.
- 1.6 Secunderabad division is one of the important Divisions in which Electrical Department plays an important role in smooth running of trains and providing services. Its jurisdiction includes the following B.G Section with various Industrial sidings etc.

a) SC-HYB-WADI	200.82 kms	} including various industrial sidings viz. Ghatchandur, Pandar Pawani etc.
b) SC-KZJ-DKJ-BDCR-MUGR	327.79 kms	
c) DKJ- KI	107 kms	
d) KZJ-BPQ	231.86 kms	
e) VKB-PARLI	267.77 kms	

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2.0 EXISTING SCENARIO:

- 2.1 ORGANISATION:** An Electrical Engineer in Junior Administrative scale i.e. Senior Divisional Electrical Engineer is in-charge of all the Electrical assets on the Division and works under the administrative control of Divisional Railway Manager
- 2.2** The Electrical Engineer in-charge of the Division is responsible to the Chief Electrical Engineer for the efficient maintenance and upkeep of installations and maintains of all Electrical assets on the Division. He is assisted by DEE/Chg, DEE/M, ADEE-I, ADEE-II and further assisted by supervisory officials as follows:



- 2.3 Jurisdiction:** On Secunderabad Division under the General Services of Electrical Department there are 8 Units/ Depots, headed by respective SSEs/ SEs. The extent of their jurisdiction with the contingents of staff and material for maintenance is detailed below:

1. SSE/M/SC: Overall in charge for all units on the Division. Handles procurement and distribution of Stores and attends major repairs to AC units,

pumps and D.G. Sets and other associated electrical equipments, EM&PRS/SC, EM&PRS/HYB, EM/SNF and EM/BG.

2. SSE/M/VKB: Jurisdiction comprises of Staff quarters at VKB, TDU, CT, BIDAR, BHLK and PARLI. In addition to the staff quarters and station/office buildings in the section SKP-WD-VKB-PRLI.
3. SSE/M/KZJ: Jurisdiction comprises of Staff quarters at KZJ, LA, RGP, WL, NKD and OPL. In addition to the staff quarters and station/office buildings in the section KZJ-MCI.
4. SE/M/BPA: Jurisdiction comprises of Staff quarters at BPA, MCI, RECH, SKZR, SRUR and MAGH including various Industrial sidings. In addition to the staff quarters and station/office buildings in the section MCI-BPQ.
5. SE/M/RDM: Jurisdiction comprises of Staff quarters at RDM, JMKT and KRMR. In addition to the staff quarters and station/office buildings in the section RDM-JKMT & PDPL-LPJL.
6. SE/M/BDCR: Jurisdiction comprises of Staff quarters at BDCR. MUGR and KRA. In addition to the staff quarters and station/office buildings in the section BDCR-MUGR-KRA.
7. SE/M/DKJ: Jurisdiction comprises of Staff quarters at DKJ. MABD, KMT, BKL and MDR. In addition to the staff quarters and station/office buildings in the section DKJ-MDR.
8. SE/M/PRS/SC: this Supervisor, who is directly under SSE/M/SC, is looking after Satellite centers UTS/PRS installation.

2.4 **SAVE position of Electrical General Services is furnished below:**

Supervisor staff			
SSE	17	12	5
SE	17	14	3
JE.I	2	2	0
JE.II	11	12	-1
JE.I/AC	2	2	0
JE.II/AC	3	3	0
Supervisor staff Total	52	45	7
Ministerial staff			
Ch.OS	4	4	0
OS	11	8	3
Sr.Clerk	3	0	3
Jr.clerk /Typist	1	5	-4
Hd.Typist	1	1	0
Sr.Typist	1	0	1
Jr.Steno	1	1	0
SSE(D)	2	2	0
SE(D)	1	1	0
JEI(D)	2	0	2

JElI(D)	2	0	2
Vehicle Driver	3	1	2
Group 'C' Total	32	23	9
Sr. RS	1	1	0
Peons	4	4	0
Group 'D' Total	5	5	0
Ministerial staff Total	37	28	9
Power Maintenance			
Sr.Tech/PM	53	49	4
TECH.I	131	81	50
TECH.II	21	20	1
TECH.III	39	24	15
Tr.TECH.III	0	9	-9
Total Gr.C	244	183	61
KH. HELPER	95	3	92
KHALASI	3	168	-165
Total Gr.D	98	171	-73
TOTAL	342	354	-12
Train lighting			
Sr.Tech/TL	52	46	6
TECH.I	116	63	53
TECH.II	18	11	7
TECH.III	34	18	16
Tr.TECH.III	0	1	-1
Total Gr.C	220	139	81
Kh.Helper	107	9	98
KHALASI/TL	3	63	-60
Total Gr.D	110	72	38
TOTAL	330	211	119
Air-conditioning			
MCM/AC	56	41	15
TECH.I	118	101	17
TECH.II	17	40	-23
TECH.III	37	19	18
Tr.TECH.III	0	1	-1
Total Gr.C	228	202	26
ACCA.I	4	1	3
ACCA.II	102	85	17
ACCA.III	0	7	-7
Kh.Helper	68	45	23
Khalasi	3	87	-84
Total Gr.D	177	225	-48
Staff at Stationary Units	26	23	3
TOTAL	431	450	-19
Grand Total	1192	1088	104

2.5 **ACTIVITIES:** The main activities of Electrical Branch General Services (Power) are as follows:

- a. Power supply installations – HT/LT lines and maintenance of lighting in residential buildings, service buildings, welfare buildings etc.
- b. Power supply and maintenance of water pumping sets.
- c. Maintenance of standby Diesel Generating sets.
- d. Maintenance of Air conditioning equipments.
- e. Maintenance of fans, water coolers, air coolers, streetlights, decorative lights and any other electrical equipment in divisional and other offices & quarters.
- f. Conservation of Energy.

2.5.1 General Services covers the maintenance of the following:

(a) Maintenance of Staff Quarters:

Cleaning of fittings once in a month, replacement of fused bulbs, attending to emergency failure and repairs to wiring and fittings. Taking Meter reading once in six months, and keeping track of the occupation and vacation of Railway Quarters.

(b) Maintenance of Pumps:

The Maintainer has to pay attention to the following -

1. Replacement of glands, bearings, foot valves, non-return valves, Carbon Bushes and general repairs.
2. Slip ring cleaning and bowering the Motor.
3. Attending to leaks/ replacement of leather to the foot valves oiling.
4. Greasing of motor pumps, replacement of bearings, checking of bushes, slip rings, checking of single-phase protector.
5. Replacement of water seals, transformer oil and dashpot oil and replacement of Gland Packings for pumps and valves.
6. Maintenance of the electrical panel board/switch gears in the pump house"

(c) Maintenance of Fans and Plug points:

This includes "Checking of the fans, sending them for periodic overhauling, Plug points, have to be replaced with new ones.

(d) Maintenance of Sub-Stations:

The staff are required for maintenance of transformers such as cleaning, checking oil levels and safety devices like bus bars, circuit breakers and record the reading shown in the voltmeter and ammeter for every hour, where the supply should be step down to the domestic purpose/ step up to the AC plant and pump house. Whenever power supply is shutting down, generator set has to be switched on for continuous power supply. To oil and lubricate fittings and charge batteries on a regular basis, while attending to minor repairs.

(e) Special Activities:

In addition to the above staff are deployed for:

- 1 Modification of Officers chambers.
- 2 Provision of computer terminals in the offices.

- 3 Conference Room re-modeling.
- 4 Various railway functions at Sanchalan Bhavan and Secunderabad Divisional office.
- 5 Provision of additional supply points to Air Coolers.
- 6 Provision of sensors for AC Plants in Officers chambers.
- 7 Maintenance of PRS, UTS & installation including satellite unit centers etc.

2.6 STAFF DUTIES: The duties of staff of Electrical Power Maintenance are furnished below:

2.6.1 Duties and responsibilities of SSE/SE:

I. Technical duties:

- a) Management of men material and regular work concerning the depot maintenance.
- b) Steps for Energy Conservation.
- c) Assisting ADEE and Sr.DEE in all matters relating to smooth function of depot/ dept and improvements in installation.
- d) Execution/supervision of contractual works, if any in the section/ jurisdiction.
- e) Exercising supervision over the maintenance or work done by the Electrical Maintainers (Technicians) and staff in accordance with the instruction of the officers.
- f) Testing, overhauling and carrying out of alternation to the existing electrical installations.
- g) Submit an annual return of all apparatus in service on his section to the Sr.DEE. Maintain liaison with APSEB/MSEB for proper supply of Power.
- h) SSE(E)/HT/SC looks after maintenance of HT Substations in Secunderabad Division and maintenance of HT/LT lines like HT Meter reading, transformer maintenance and trimming of tree branches in the entire Secunderabad Division.

ii) General duties:

- Stores matters.
- Staff matters.
- Enquires & Inspection.
- Unscheduled works like attending to Break down, major failures and accidents, accompanying Officers for examinations etc.

2.6.2 Duties of Electrical Maintainers (Technicians):

- a) Efficient maintenance and testing of all Electrical equipment under his charge, so as to keep them in proper working condition, in accordance with instructions stipulated or as may be issued from time to time.
- b) Carrying out works and alterations to the existing installations under the instructions of the SSE/SE/JE (Electrical).
- c) Ensuring that the safety appliances are in good condition and are always made use of in order to ensure his safety and the safety of staff working under him.

- d)** Deploying men for look out duties as and when necessary.
- e)** Electrical Maintainers shall attend to all failures in his section promptly by the first available means on receipt of information.
- f)** 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.
- g)** Maintenance and coordination with State Electricity Board in case of failures.
- h)** Maintenance of Staff Quarters: Cleaning of fittings once in a month, replacement of fused bulbs, attending to emergency failure and repairs to wiring and fittings. Taking Meter Reading, keeping track of Occupation and Vacation of Railway Quarters.
- i)** Collection of Electricity Bills from State Authorities and submission of the same to Headquarters for payment.
- j)** Checking of earthing in all stations and vital locations

2.6.3 Duties of other Artisan staff:

Artisan staff performs their duties with relevance to their respective trade/designation. They attend to all types of failures, carrying out maintenance schedules as directed by the supervisor. They also carry out developmental works entrusted to them, if any, by the supervisor

2.6.4 Duties of Group "D" Staff:

Group "D" Staff basically assist the technical staff in the various maintenance activities

2.7 WORK LOAD:

2.7.1 Energy consumption for the last 12 months of the year 2017-18

Sl.No	Month	No. of Million Units
1	April	2.53
2	May	2.59
3	June	2.45
4	July	2.29
5	August	2.44
6	September	2.41
7	October	2.29
8	November	2.01
9	December	1.91
10	January	1.82
11	February	1.75
12	March	2.08
Total		0
Avg. units per month		26570000/12=2214166

	units
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- The Total Consumption is 26570000 Units per annum (during 2017-18). Therefore the average consumption per month is 2214166 Units.

2.7.2 Solar generated units in the Division for last 12 months in the year 2017-18:

SI No	Station/ location	capacity in Kwp	Date of Insallation	Generatd units in KWH
				During 17-18
1	BDCR/Stn	10	Feb-15	12149
2	RSB/Bldng	17.5	Oct-15	21245
3	BPA /Stn	15	Dec-15	20420
4	SC/Stn	500	Apr-16	730810
5	KMT/Stn	10	Feb-17	12330
6	HYB/Stn	227.5	Mar-17	282768
7	MABD	10	Aug-17	8225
8	RDM	10	Aug-17	8219
9	VKB	10	Aug-17	8346
10	TDU	10	Dec-17	3120
11	CT Stn	8	Dec-17	1345
12	CT R.Room	10	Dec-17	2144
	Total	830		1111121

2.7.3 AT Power Consumption in SC division:

Approximate AT Power Consumption in SC division			
As on 18-09-2018			
Details of CLS panels installed at Various Location in SC division			
S No	Capacity	Quantity (No of ATs)	Average Power Consumption/Month (Units)
1	5KVA	58	105652.8
2	10kVA	173	630273.6
3	25kVA	2	9936
4	50kVA	4	39744
5	100kVA	1	19872
Total			805478.4

2.8 STAFF DUTIES: The duties of staff of AC&TL are furnished below:

2.8.1 Duties and responsibilities of SSE/SE:

I) Technical duties

- a. Management of men material and regular work concerning the coach Maintenance.
- b. Assisting ADEE and Sr.DEE in all matters relating to smooth function of depot/dept.
- c. Execution/supervision of contractual works, if any in the section/ jurisdiction.
- d. Exercising supervision over the maintenance or work done by the Technicians and staff in accordance with schedule of maintenance.
- e. Providing assistance to the Technicians to attend works, which are normally beyond the scope of the maintenance staff.
- f. Submit an annual return of all apparatus in service on his section to the Sr.DEE.

II) General duties

- a. Stores matters
- b. Staff matters
- c. Enquires & Inspection

2.8.2 Duties of Technicians:

- a. Efficient maintenance and testing of all Electrical equipment fitted in the coach, so as to keep them in good working condition, in accordance with the schedule off maintenance.
- b. Bringing to the notice of the SSE/SE/JE (Electrical) any emergency and situation that may be beyond his competence.
- c. Ensuring that the safety appliances are in good condition and are always made use of in order to ensure his safety and the safety of staff working under him.
- d. Deploying men for look out duties as and when necessary.

2.8.3 Duties of other Artisan staff:

Artisan staff to perform their duties with relevance to their respective grade/designation. They attend to all types of failures, carrying out maintenance schedules as directed by the supervisor.

2.8.4 Duties of Group "D" Staff:

Group "D" Staff basically assist the technical staff in the various maintenance activities

2.8.5 Duties of AC Escorting Staff Before Departure:

I) Duties of Ac Coach Attendant:

- a) To be present one hour before the schedule departure of the train.
- b) To check that all internal electrical fittings in the coach provided for the comfort and safety of passengers are intact and in working order.
- c) To monitor electrical/ mechanical defects developing in the coach and call maintenance staff for attending whenever necessary.
- d) To assist the AC coach mechanic before Commencement of the journey and enroute to take readings

- e) To assist the AC coach mechanic in the rectification of minor faults in the AC coach equipment enroute.
- f) Keep doors closed during run & open at station when train is stopped.

II) Duties of Ac Coach Mechanic:

- a) Should be available in the coach one hour before schedule departure of the train.
- b) Check logbook of the coach for any entry by the maintenance staff and act accordingly.
- c) Check the condition of V-belts in stable condition.
- d) Check OFF load battery voltage.
- e) Record all parameters of the equipment in the logbook.
- f) Check all the grills inside the coach. These should be in open condition.
- g) Check all lights, emergency lights, fans, night lamps, reading lamps & mobile charging sockets.
- h) Attend complaint of passengers, if any.
- i) Should do temporary connection in TL coach also, if required.

III) General Checks in Air Conditioned Coach:

- a) Before placing the AC coach at starting station, this should be pre-cooled. The AC coach attendant should check the followings.
- b) Visually inspect, both upper and under frame and ensure all fittings are intact at their places.
- c) In under frame check alternator, axle pulley, 'V' belts of alternators, compressor & condensers (in case of under slung), battery etc. if any abnormality found rectify or inform the concerned supervisor/ mechanic, for rectification.
- d) In upper frame check control & power panels, fan and light fittings etc.
- e) Check the battery voltage.

2.8.6 Trip Schedule (Primary & Secondary Maintenance):

- a) Cleaning and testing of Lights, fans and Plug points
- b) Replace the equipment if found defective
- c) Check the Battery voltage in OFF LOAD & ON LOAD
- d) Replace battery if found defective
- e) Charge the batteries
- f) Check field fuse, replace if found blown, with approved makes Check the continuity of field and phase winding with the help of test lamp/ multi-meter to ensure that windings are not open circuited.
- g) Check that the regulator feedback loop is O.K, Check connections for tightness in alternator and rectifier regulator.
- h) Check up the condition of safety chain and availability of split pins in safety chain bolts.
- i) Check up alternator suspension bracket and tension gear for any damage and replace, if necessary.

- j) Check up and tighten loose bolts in terminals box covers. Check availability of split pin for alternator castle nut.
- k) Check the belt tension.

2.8.7 Fortnight schedule:

- a) Check the all battery connections
- b) Check the condition of battery cells like specific gravity and voltage
- c) Check the voltage in off load and on load
- d) Change the battery cells if found defective
- e) Remove all the battery cells and clean them properly.

2.8.8 Monthly Schedule:

In addition to the works mentioned in Trip & Fortnightly Examination, carry out the following:

- a) Check for tightness of terminal connections of alternators and rectifier regulators.
- b) Thoroughly clean externally the alternator and regulator
- c) Open inspection cover of regulator. Blow dust with a portable blower. Secure covers tightly after inspection.
- d) Check locking of current setting of regulator, if disturbed it should be reset/locked as prescribed.
- e) Check the alternator pulley for proper fixture and the availability of castle nut and split pin.

2.8.4 IOH Schedule:

- a) IOH schedule involves unit changing.
- b) Check the connections of alternator.
- c) Put "V" belts and check the generation of power.
- d) Remove all lights and fan units and clean and refix.
- e) Remove all the batteries for cleaning and painting.

2.9 Coach holding in the Division:

S No	Type of coaches	No.of coaches
1	Train Lighting	1098
2	AC coaches	441
Sub Total		1539
3	Power cars	30
G.Total		0

2.10 Outsourcing Activities at AC and TL/SC:

SN	Description	O.E.M.	Period
A	ON GOING MAINTENANCE CONTRACTS FOR INVERTERS		

1	Comprehensive maintenance for 25kVA static inverters of Siemens make in 238 Roof Mounted AC coaches.	M/s Siemens Ltd., Mumbai	3 years From 01-09-17 to 31-08-20
2	Comprehensive maintenance for 25kVA static inverters of Auto meters make in 88 Roof Mounted AC coaches.	M/s Auto Meters Alliance Ltd., Noida	3 years From 08-05-17 to 07-05-20
3	Comprehensive maintenance for 25kVA static inverters of Hind-rectifiers Ltd. fitted in 70 Roof Mounted AC coaches.	M/s Hind-Rectifiers Ltd., Mumbai	3 years From 01-09-16 to 31-08-19
4	Comprehensive Maintenance for 25kVA Static Inverters of Medha Servo Drives make in 24 Roof Mounted AC Coaches.	M/s Medha Servo Drives Pvt. Ltd., Hyderabad	3 years From 01-05-16 to 30-04-19
5.	Comprehensive maintenance for 25kVA static inverters of Hi-Rel make in 38 Roof Mounted AC coaches.	M/s. Hitachi Hi-Rel Power Electronics Pvt. Ltd., Gujarat.	3 Years From 01-07-17 to 30-06-20
6.	Comprehensive Maintenance Contract for 25kVA static inverters of Electro waves makes fitted in 3 Roof Mounted ACcoaches.	M/s. Electro waves Electronics Pvt. Ltd., Himachal Pradesh	3 Years From 21-05-18 to 20-05-21
7.	Comprehensive Maintenance Contract for 25kVA static inverters of Signotron make fitted in 3 Roof Mounted AC coaches.	M/s. Signotron Pvt. Ltd., Kolkata	3 Years From 01-05-16 to 30-04-19
B.	ONGOING MAINTENANCE CONTRACTS WITH OEMs FOR RMPUS IN AC COACHES.		
1	CMC for RMPUs provided in 580 AC coaches.	M/s. LEEL, New Delhi	3 years From 15-09-17 to 14-09-20
C.	ONGOING MAINTENANCE CONTRACTS WITH OEMs FOR DG SETS IN POWER		

	CARS		
1.	Maintenance and operation of DG sets of 17 power cars	M/s. Deev Gen sets, New Delhi	2 years From 06-03-18 to 05-03-20
D.	MAINTENANCE OF NON-CORE ACTIVITY OF BATTERIES, LIGHTS, FANS AND THEIR CLEANING IN TL COACHES		
1.	Hyderabad TL depot	M/s. IC Electricals, New Delhi	2 years From 31-05-16 to 30-06-18
2.	Secunderabad TL depot	M/s. Dhara Rail Projects Pvt., Ltd., Mumbai	2 years From 10-08-17 to 09-08-19

2.11 Activities under AMC in Electrical Maintenance Department/SC Division:

Status of outsourcing activities								
S. No.	Description of Work	Location	Period		Value in Lakhs	Approving authority	Name of the Contractor	Remarks
			from	to				
1	Comprehensive Annual Maintenance contract for 9 No.s of modular chilled drinking Water coolers at various locations on Secunderabad division for period of two years.	SC Div.	28.5.16	27.5.18	5.4	DRM	M/s. Blue Star Limited / Secunderabad (OEM)	New tender under process
2	Comprehensive Annual Maintenance contract for 10 No.s of modular chilled drinking Water coolers at various locations on Secunderabad division for period of two years.	SC Div.	05.10.17	04.10.19	4.53	DRM	M/s. Blue Star Limited / Secunderabad (OEM)	LOA issued on 05.10.2017
3	Annual Maintenance contract for Inflatable Lighting Towers 7+5(new) Nos. in SC division for period of two years.	SC Div.	07.02.17	06.02.19	3.68	DRM	M/s Shakthee Associates/SC (authorized dealer of the OEM)	Work in progress

4	Annual Maintenance contract for Inflatable Lighting Towers 20 Nos. in SC division for period of 2 years.	SC Div .	02.05.16	01.05.18	3.22	DR M	M/s Shakthee Associates/SC (authorized dealer of the OEM)	New tender under process
5	Comprehensive Maintenance Contract for OTIS make 2 lifts in Rail Sanchalan Bhavan, Secunderabad for a period of two years.	RS B	01.11.2016	31.10.2018	4.32	DR M	M/s OTIS Elevators / HYB (OEM)	Work in progress
6	Maintenance of Electrical assets in the MMTS stations including SC, HYB & SNF stations.	SC Div .	23.05.2018	22.05.2020	48.10	DEE	M/s. Sheetal Aircon	LOA issued on 23.5.18, work in progress
7	Secunderabad division- Electrical maintenance contract for air conditioning equipments at PRS/SC for period of 2 years	PR S/ SC	12.09.17	11.09.19	7.72	DR M	M/s. Blue Star Limited / Secunderabad (OEM)	LOA issued on 12.09.2017 work under progress
8	AMC for 2x20 KVA UPS for period of 2 years	PR S/ SC	01.11.16	31.10.18	1.18	DR M	Novatur Electrical & digital system	Work in progress
9	AMC for Air Coolers and Water Coolers for period of 2 years	SC , EL S/L GD KZ J& WL	09.02.18	09.02.20	48.05	DR M	M/s. Sairam Enterprizes	Work in progress
10	AMC for 4 x 60 KVA UPS systems for a period of 2 Years at PRS/SC	PRS /SC	22.09.17	21.09.19	6.49		M/s. Consul neowatt power systems	work in progress
11	SC Div. Elect Maintencnace Department AMC (Comphrensive) for ESKON make lifts at at Bhoiguda entrance side station building in SC stn for a period of 2 years	SC	01.07.16	30.06.18	1.87		M/s. ESKON Elevators	New tender undr process

3.0

CHAPTER – 3

3.0 CRITICAL EXAMINATION:

- 3.1 Electrical General Services Organization is mainly divided into two wings i.e. 1) Power maintenance and 2) Air Conditioning & Train Lighting.
- 3.2 Power maintenance wing basically performs the day-to-day Electrical Maintenance work of the Division. It also plays a proactive role by ensuring required power supply arrangements to various Railway establishments. Besides this it also looks after the operations and maintenance of various electrical installations including residential quarters (*maintenance + meter reading activity*), service buildings, PRS/UTS locations, stationary air

conditioning units, pumps, lifts, LC gates, maintenance of high tension lines and underground cables for electrical distribution system etc.

- 3.3 It is observed that no special training is required especially for the General electrical maintenance except on safety aspects of working and this activity can be classified as non-core activity. Keeping in view of the high staff costs on maintenance activity, requirement of manpower in the Electrical General services Department over Secunderabad Division is critically reviewed with reference to the Indian Railway Average Benchmarking. This also fetches a lot of financial viability and professionalism to the Electrical organization.
- 3.4 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.
- 3.5 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.
- 3.6 The activities which are outsourced /covered under AMC of electrical general service department are as follows :
1. Maintenance of DG sets.
 2. Maintenance of Chillers.
 3. Maintenance of AC and Water coolers.
 4. Maintenance of non-core activities of Batteries, Lights, Fans and their cleaning in TL coaches.
 5. Maintenance of Inverters of AC coaches.
 6. Maintenance and operation of DG sets of power cars.
 7. CMC for RMPUs provided in AC coaches

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

S No	Department	IR Average	IRBM
1	Power Maintenance	0.15	0.03
2	TL&AC	0.46	0.18

- 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:
- a) 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.
 - b) No. of activities under outsourced/ AMC.

3.10 WORK LOAD: Energy consumption for the last 12 months of the year 2017-18

Sl.No	Month	No. of Million Units
1	April	2.53
2	May	2.59
3	June	2.45
4	July	2.29
5	August	2.44
6	September	2.41
7	October	2.29
8	November	2.01
9	December	1.91
10	January	1.82
11	February	1.75
12	March	2.08
Total		0
Avg. units per month		26570000/12=2214166 units

- The Total Consumption is 26570000 Units per annum (during 2017-18). Therefore the average consumption per month is 2214166 Units.

3.11 Solar generated units in the Division for last 12 months in the year 2017-18:

SI No	Station/ location	capacity in Kwp	Date of Insallation	Generatd units in KWH
				During 17-18
1	BDCR/Stn	10	Feb-15	12149
2	RSB/Bldng	17.5	Oct-15	21245
3	BPA /Stn	15	Dec-15	20420

4	SC/Stn	500	Apr-16	730810
5	KMT/Stn	10	Feb-17	12330
6	HYB/Stn	227.5	Mar-17	282768
7	MABD	10	Aug-17	8225
8	RDM	10	Aug-17	8219
9	VKB	10	Aug-17	8346
10	TDU	10	Dec-17	3120
11	CT Stn	8	Dec-17	1345
12	CT R.Room	10	Dec-17	2144
	Total	830		1111121

3.12 AT Power Consumption in SC division:

Approximate AT Power Consumption in SC division			
As on 18-09-2018			
Details of CLS panels installed at Various Location in SC division			
S No	Capacity	Quantity (No of ATs)	Average Power Consumption/Month (Units)
1	5KVA	58	105652.8
2	10kVA	173	630273.6
3	25kVA	2	9936
4	50kVA	4	39744
5	100kVA	1	19872
Total			805478.4

3.13 Outsourcing Activities at AC and TL/SC:

SN	Description	O.E.M.	Period
A	ON GOING MAINTENANCE CONTRACTS FOR INVERTERS		
1	Comprehensive maintenance for 25kVA static inverters of Siemens make in 238 Roof Mounted	M/s Siemens Ltd., Mumbai	3 years From 01-09-17 to 31-08-20

	AC coaches.		
2	Comprehensive maintenance for 25kVA static inverters of Autometers make in 88 Roof Mounted AC coaches.	M/s Auto Meters Alliance Ltd., Noida	3 years From 08-05-17 to 07-05-20
3	Comprehensive maintenance for 25kVA static inverters of Hind-rectifiers Ltd. fitted in 70 Roof Mounted AC coaches.	M/s Hind-Rectifiers Ltd., Mumbai	3 years From 01-09-16 to 31-08-19
4	Comprehensive Maintenance for 25kVA Static Inverters of Medha Servo Drives make in 24 Roof Mounted AC Coaches.	M/s Medha Servo Drives Pvt. Ltd., Hyderabad	3 years From 01-05-16 to 30-04-19
5.	Comprehensive maintenance for 25kVA static inverters of Hi-Rel make in 38 Roof Mounted AC coaches.	M/s. Hitachi Hi-Rel Power Electronics Pvt. Ltd., Gujarat.	3 Years From 01-07-17 to 30-06-20
6.	Comprehensive Maintenance Contract for 25kVA static inverters of Electro waves makes fitted in 3 Roof Mounted ACcoaches.	M/s. Electro waves Electronics Pvt. Ltd., Himachal Pradesh	3 Years From 21-05-18 to 20-05-21
7.	Comprehensive Maintenance Contract for 25kVA static inverters of Signotron make fitted in 3 Roof Mounted AC coaches.	M/s. Signotron Pvt. Ltd., Kolkata	3 Years From 01-05-16 to 30-04-19
B.	ONGOING MAINTENANCE CONTRACTS WITH OEMs FOR RMPUS IN AC COACHES.		
1	CMC for RMPUs provided in 580 AC coaches.	M/s. LEEL, New Delhi	3 years From 15-09-17 to 14-09-20
C.	ONGOING MAINTENANCE CONTRACTS WITH OEMs FOR DG SETS IN POWER CARS		
1.	Maintenance and operation of DG sets of 17 power cars	M/s. Deev Gen sets, New Delhi	2 years From 06-03-18 to

			05-03-20
D.	MAINTENANCE OF NON-CORE ACTIVITY OF BATTERIES, LIGHTS, FANS AND THEIR CLEANING IN TL COACHES		
1.	Hyderabad TL depot	M/s. IC Electricals, New Delhi	2 years From 31-05-16 to 30-06-18
2.	Secunderabad TL depot	M/s. Dhara Rail Projects Pvt., Ltd., Mumbai	2 years From 10-08-17 to 09-08-19

3.14 Activities under AMC in Electrical Maintenance Department/SC Division :

Status of outsourcing activities								
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4	Annual Maintenance contract for Inflatable Lighting Towers 20 Nos. in SC division for period of 2 years.	SC Div .	02.05.16	01.05.18	3.22	DR M	M/s Shakthee Associates/SC (authorized dealer of the OEM)	New tender under process
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11	SC Div. Elect Maintencnace Department AMC (Comphrensive) for ESKON make lifts at at Bhoiguda entrance side station building in SC stn for a period of 2 years	SC	01.07.16	30.06.18	1.87		M/s. ESKON Elevators	New tender undr process

13.15 Requirement of Staff as per IR Average.

a) Power Maintenance:

Work load of Power maintenance is measured in terms units of power consumed and the following are the details of power consumed and requirement of staff:

A	Electrical Power consumption for 12 months (2017-18)	26570000
B	Average Electrical power consumption per month	2214166
C	Solar power consumed for the 12 months(2017-18)	1111121
D	Average Solar power consumption per month	92593
E	60% of Average Solar power consumption per month	55555
F	60% of AT power consumption(60% of 805478.4 Units) per month	483287
G	Average power consumption (Electrical+ Solar+ AT) per month=B+E+F	2753008
H	IR average for the month of April-2018	0.15
I	Staff required as per IR Avg. (0.15 per 1000 units) = $G \times H/1000 = 2753008 \times 0.15/1000$	412.95 say 413 Men

b) Train Lighting and Air Conditioning:

• Coach holding of the Division:

S No	Type of coaches	No.of coaches
1	Train Lighting	1098
2	AC coaches	471
3	Power cars	30
	Total	0

- Staff required to attend TL/AC failures and turn round attention at nominated way side stations as follows:

S No	Station	Required staff
1	Parli	3(one in each shift)
2	Vikarabad	3(one in each shift)
3	Bidar	3(one in each shift)
4	Warangal	3(one in each shift)
5	Dornakal	3(one in each shift)
6	Bhadrachalam Road	3(one in each shift)
7	Bare requirement	18

8	LR/RG (12.5%)	2.25
	Total (18+2.25)	20.25 say 21 Men

- Requirement of staff:

A	Total holding of coaches	1569
B	IR average for the month of April-2018	0.46
C	Manpower required as per IR average - 1569×0.46	721.74 say 722
D	Men required at way side depots to attend turn round and pass through Trains	21
E	Total men required for AC&TL (C+D)=722+21	743 Men

II. Total Requirement of staff in Electrical General Services:

A	Men required for Power maintenance	413
B	Men required for AC&TL	743
C	Total requirement of men in PM and TL&AC(A+B)=413+743	1156
D	Total Sanctioned strength of (PM+TL&AC)	1192
E	Staff excess to the requirement (D-C) =1192-1156	36 Men

- The requirement of staff strength of Electrical General Services Department is 1156 and found 36 staff is excess with reference to IR Average.
- AC posts transferred to BZA division=18
- Excess staff=36-18=18

Recommendation: It is recommended to surrender **18** posts of Electrical General Services Department from book of sanctions which are excess to the requirement.

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C H A P T E R – 4

4.0 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 @ 7 %	Emoluments P.M (in Rs.)	Total Emoluments P.A (in Rs.)
		From	To					
1.	Group "D" staff	18000	56900	18	(18000+56900)/2 =37450	2621	721278	8655336

- On implementation of the recommendations brought out in the Work-study report an annual savings of **Rs. 86.6 lakhs** can be achieved.

RECOMMENDATION

<u>R E C O M M E N D A T I O N</u>	Para No.
It is recommended to surrender 18 posts from book of sanctions which are excess to the requirement.	3.16
