WORK STUDY TO REVIEW THE STAFF STRENGTH AT SSE/ELECTRICAL/M/GOC TPJ DIVISION.

SOUTHERN RAILWAY

PLANNING BANCH

G.275 / WSSR- 301718 / 2017-18

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STUDIED BY

WORK STUDY TEAM
OF
PLANNING BRANCH

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(i)
ACKNOWLEDGEMENT

The work study team acknowledges the valuable guidelines rendered by ADEE/G/TPJ (Co-ordinating Officer), SSE/E/M/GOC (Co-ordinating Supervisor), JE and other staff of the unit for their valuable guidelines in conducting the work study.

(ii)
AUTHORITY

Annual programme of work studies approved for the year 2017-18.

(iii)
TERMS OF REFERENCE

Work Study to review the staff strength at SSE/E/M/GOC unit, TPJ Division.

(iv)
METHODOLOGY

The following methodology has been applied while conducting the study.

1. Collection of data
2. Observing the present Working system and Staff strength
3. Discussion with SSE/E/M/GOC.
4. Applying Bench marking and need basis to identified optimum Man power

SUMMARY OF RECOMMENDATIONS

The following 20 posts are found ***excess*** to the requirement and the same may be surrendered and credited to the vacancy bank.

Sl. No.	Category	Grade pay (Rs.)	No. of posts
1	Tech III Power	1900	4
2	Tech II Power	2400	4
3	Tech I Power	2800	12
Total			**20**

Total No of posts :20

CHAPTER – I

1.0 INTRODUCTION

1.1 Indian Railways is a Part and Parcel of Indians life. We cannot imagine the India without Railways, since the Railway Transportation system is the backbone of our economy and one of the Pillar of our Nation's every development.

1.2 Indian Railways is one of the longest rail networks in the world. Indian Railways is transporting 20 million passengers and 2 million tons of freight daily. The Indian Railways has 17 zones and subdivided into 67 Divisions. We the Indian Railway, are maintaining rail around 63,320kms length and 6909 stations.

1.3 Among the 17 zones of Indian Railways, Southern Railway was formed on 14th of April, 1957 by amalgamation of Southern India Railway, Madras and Southern Maratha Railway and Mysore State Railway. It spreads to Tamilnadu, Kerla, Karnataka and Puducherry to the route kilometerage of 5080.

1.4 The Operation ratio for the year 2016-17 is at 147.82% showing an increase of 12.93 points compared to the figure of 134.89% of the year 2015-16.

1.5 The total staff strength of Southern Railways, as on 01.04.2017, was 93,381.

1.6 The Indian Railways Statistical publication 2015-16 denotes that the percentage of expenditure for staff cost was 30% in total and 18% for pension fund.

1.7 The estimation of staff cost for the running year 2017-18 is at Rs. 71,879 crore, whereas it was Rs. 56,817 crore during the year 2015-16.

1.8 The Committee on restructuring Railways had observed that the expenditure on staff is extremely high and unmanageable. This expense is not under the control of Railway and keeps increasing in the VII Pay Commission. It has also been observed that employee cost is the major key component, that reduces the Railways ability to generate surplus.

1.9 Effecting saving in manpower costs, increased productivity and developing skilled human resources is essential for any organization. Efficiency and Research directorate of Indian Railway monitoring the man power available in each zone, to the division level comparing the work load viz Man power.

1.10 Planning Branch/SR conducting continuous Work studies over the zone on unit basis, to identify the optimum man power, by which the operation ratio of our zone can be moved to the satisfactory region in future.

1.11 This Work study is conducted to review the Staff strength at SSE/Electrical/M/GOC unit of TPJ Division-Electrical branch.

CHAPTER-II

2.0 PRESENT SCENARIO

2.1 Electrical Department plays a vital role in Railway System is responsible for operation & maintenance of the all Electrical assets of Railway, various assets include Locomotives, Electrical Multiple Unit, Traction & distribution, Train lighting, air conditioning and general electrical services. Furthermore, also it is meant for operation and maintenance of power supply to electrified stations, for operation and maintenance of lighting and ventilation in AC & Non-AC coaches, In addition, water coolers at stations, offices, running rooms, hospitals etc. for operation and maintenance of electrical power supply for lighting, ventilation and air-conditioning in station areas, residential areas, Passenger Reservation System (PRSs), offices, hospitals, running rooms and rest houses, water supply pumps for stations and railways' residential colonies etc.

2.2 In Electrical Department of Railways, **'Electrical Power & General Service'** deals with the arrangement of Electrical Power right from receiving point from State Electricity Board and to the end using points. The Electrical General Services department consists of three wings namely **electrical power maintenance, train lighting and air conditioning & refrigeration.** The Electrical Department is headed by the Chief Electrical Engineer and he is ex-officio Electrical Inspector to Central Government for the zonal Railway. He is assisted by Chief Electrical Services Engineer, Chief Electrical General Engineer, Junior Administrative Grade, Sr.Scale & Jr.Scale officers and Supervisory officials like SSEs, JEs, etc.

2.3 The work Study is confined to the SSE/E/M/GOC unit is located at GOC colony area near GOC workshop western gate.

2.4 **Scalar Chain of Authority:**

DEE/Electrical/TPJ is the general in charge for the Electrical Branch of the Division and ADEE/G/TPJ is the overall in charge for all the Electrical wing execution. SSE/E/M/GOC is the supervisory in charge of the unit, is responsible for day to day maintenance activities. Two more supervisors available to manage the depot and one ministerial staff also available, reaming are Technocrats and assistants.

2.5 Electrical Power is availed from local electricity board at 11KV/33KV volts which is stepped down to 440 volts and 230 volts for feeding three phase and single phase supply (at Sub-stations) to various types of loads. The **General electrical services include** Power supply & Distribution systems, principles of earthing, operation and maintenance of pumps, lighting and its sources, Design, Energy conservation & promotion of non-conventional renewable sources of energy, Operation & maintenance of standby DG sets, Lifts and Escalators and their maintenances.

2.6 **Work profile and responsibilities in General Elec. Service section:-**

The functions and responsibilities at large cover the following aspects:-

2.6.1 **Operations (Electrical) :-**

The process of performing work through the controlled application of electrical power. This process includes:

Operating means, switching, adjusting, controlling and supervision,

2.6.2 **Maintenance:-**

Maintenance means work to be done generally prior to failure of the equipments/installation by checking the same time to time. **Necessity of Maintenance is to** reduce the faults in installation in normal & abnormal conditions. **There are two types of Maintenance** viz.,

i. **Preventive Maintenance-** Maintenance done prior to onset of Monsoon and after end of Monsoon. The Organized preventive

ii. maintenance is essential to ensure; Un-interrupted service, No break-down, Safety, no mishaps, Economic operation, Lower energy bills, Long useful life. Fixing Fuse Grading of L.T. Line of different capacities at different locations of line in the proportionate of load. Periodical maintenance work on the electrical installations such as transformers, circuit breakers, lifts and D.G. sets as preventive maintenance activities.

iii. **Breakdown Maintenance-** Maintenance done on breakdown in the installation.

2.6.3 Therefore, due importance is to be given for maintenance. Persons engaged in maintenance works should be competent for the type of work involved and should possess necessary knowledge to ensure the following:-

- No loose wiring and No overloading.
- Preventive maintenance of switchboards, DBs every six months.
- Maintenance of logs records and history sheet of events and breakdown.
- Ensure working of all measuring and indicating instruments.
- Annual inspection to ensure system adequacy, safety, efficiency and take remedial measures. Replacement of old/outlived equipments.
- No short circuit to problem like patchy repairs.
- Annual painting of poles, 3 monthly cleaning of fittings. Weekly check of working of all fittings.
- Periodical check & proper record of such work shall be maintained for Earth testing once in a year and insulation test once in a year.
- Oiling and greasing of fans as and when required.
- Checking of regulators, replacement of carbon brushes etc. once in a yr.
- Polarity test once in 5years.

2.6.4 **Maintenance of Sub-station:-**

Substation is a building or outdoor area location where various electrical accessories are connected together from where electric supply is distributed to the different end usage load centers. In a substation there are numbers of incoming and outgoing circuits each having electrical equipment installed and electrically connected with High Voltage Cables/ Conductors & Distribution Transformer, Circuit Breaker, Isolators & Lightning Arrester, Distribution panel board, Insulators & Protective Relays, Feeder Energy meters, Fuse section pillars, LT Boards, LV Cable feeders, Earthing, Bus couplers / Bus-bar Section. Maintenance of a sub-station is essential to ensure un-interrupted electric supply to the using points through periodic schedule maintenance, regular inspections, testing and rectification of defects etc.

The following as are written documents to be maintained in sub-station.

1) Permit to Work Book
2) Electrical Inspector for charging Permission.
3) Authorization Chart
4) Office Record

a) Log Book, Log Sheet
b) Site Test Report
c) Factory Test Reports
d) Tripping Register
e) Equipment maintenance Register/Maintenance Schedules/Safety Audit.
f) Inspection Register/Record.

2.6.5 **Maintenance of Transformer:-**

Checking and cleaning oil testing, oil filtration & earth testing, megger value, all electrical panel, ACBs/MCBs with blower, tighten the nuts & bolts in the HT transformer etc.

Distribution Transformer Maintenance Schedule

(Maintenance Work to be done) as laid down in the norms by

Ministry of Power, Government of India's, Rural Electrification Corporation Limited

Sl. No.	Duration	Maintenance work to be done
1.	Daily	Nil
2.	Monthly	i. Check the oil level and top up to correct level. ii. Rectify Oil leakage if any, iii. Tighten all the connection of Phase, Neutral, Earthing. iv. Cleaning the transformer tank from outside. v. Silica Gel in the breather to be replaced if necessary. vi. Similarly check for oil in the breather and ensure air passage. vii. Connect and lighten correct size fuse wire. Replace broken fuse base.
3.	Three Months	i. Measure & note down a load current in all 3 phases (at peak hrs.) ii. If Load current is unbalanced take action for balancing. iii. Measure & note down all phase to neutral voltages iv. Measure & note down the voltage at the fag end of all feeders.
4.	Six Months	i. Measure and note down earth resistance. ii. Measure and note down meggar test result of transformer and lightning arrestors. iii. If meggar value of LA is less replace it.
5.	Annual	i. Obtain oil samples, take dielectric test and note down. ii. AB Switch alignment check & greasing and oiling to be done. iii. Correct direction of arcing horns. iv. Maintenance of earthing rod and earthing pits.
6.	2yrs.	i. Acidity test of oil
7.	3Yrs.	i. Filtration of oil.
8.	5Yrs.	i. Overhauling of transformer in transformer work shop.

2.6.6 **Maintenance of DG sets:-**

Necessary preventive maintenance & adjustments of DG sets will ensure reliable standby supply in case of failure of mains supply. Checking and maintaining engine oil level, coolant level etc., before starting the operaion every day and maintain daily log book/log sheet, recording all performance

parameters of the DG set. Maintenance is the most important factor for keeping the electrical gadget ready for best operating conditions. Preventive Maintenance is more economical than corrective repairs. Maintenance of Diesel Generator set once in a year.

2.6.7 **Maintenance of Lighting Equipment:-**

Poor maintenance and the accumulation of dirt and dust reduces the useful light output and results in waste of energy. Regular maintenance in Lighting systems operate efficiently and therefore cost effectively. Dirt and dust accumulate on luminaire reflectors and diffusers whilst the lumen output of the lamps decreases with age. Keeping the luminaires clean and reducing the time between lamp changes means a higher maintenance factor when considering the design of the lighting system. A higher maintenance factor consequently results in less luminaires (and energy) to provide the required task of luminance.

2.6.8 **Maintenance of Pumps:-**

At times the pump locations require cleaning of bushes in and around the pump houses for free access. Pumps over hauling (Centrifugal)once in 2 yrs. Submersible pumps doesn't require maintenance and centrifugal pump are easy to operate and relatively low initial maintenance.

2.6.9 **Maintenance of testing gadgets:-**

Periodic calibration of meters (ammeter, voltmeter, relays, temperature gauges) and test instruments (insulation resistance megger, earth resistance megger, multi-meters, etc.) are regularly done.

2.6.10 **Maintenance of UPS:-**

In Railways, there are several applications such as PRS, UTS, EDP centers etc., where even a short/ temporary power supply failure can cause a great inconvenience to public/ passengers and also may lead to financial loss to the railways. The UTS is an important service to the passengers and

simultaneously it is revenue generating area for Indian Railways. The UPS (Uninterrupted Power Supply) is used to provide uninterrupted continuous power for UTS is necessary to provide smooth service to passengers and for earning revenue. An uninterrupted power supply (UPS) is a device that has an alternate source of energy (battery) that can provide power when the primary power source is temporarily disabled. The function of an UPS is to supply uninterrupted power to the critical load, such as Computers, vital alarm systems, surgical/ medical equipment and process control systems etc. are the advantages of **'on line'** UPS prescribed by CAMTECH and it requires, minimum maintenance. However a regular periodic maintenance schedule should be followed which will ensure a trouble free service.

2.6.11 As per the norms stipulated in CPWD, for proper **Preventive maintenance** of electrical installation, the following items of work shall be carried out regularly as per periodicity stated below and a proper records of such work shall be maintained. Day to Day Repairs arising in case Lift, escalators and Pump/motors, Special occasional Repair in case of wiring/Switches/Light/Power points, fittings & fixtures, distribution boards, panels, controls etc. Electrical system like main boards etc. should be checked annually.

Sl. No.	**Schedule of Maintenance prescribed in CPWD**	**Frequency /Schedule of Inspection**
1.	Earth testing	Once in a year
2.	Insulation test	Once in a year
3.	Cleaning of Electrical installations:- Residential Building Non – Residential Buildings	 Once in a year Once in a year
4.	Painting of Electrical Installations:- (i) Residential Buildings (ii) Office Buildings (iii) Important Public Buildings (iv) Spray painting of Ceiling fans	 Once in 3 years Once in 2 years Once in a year Once in 5 years
5.	Painting of outdoor metallic items like MS Poles, feeder pillars etc.	Once in a Year
6.	Oiling and greasing of fans	As and when required
7.	Checking of regulators, replacement of Carbon brushes etc.	Once in a year
8.	Polarity test	Once in 5 years.

Schedule of Maintenance as per Railway Board:-

Sl. No.	Description of General Services	Number of Inspections per month				Coverage of Beat			
		JA	SS	JS	Sr. Sup.	JA	SS	JS	Sr. Sup
1	Inspection of TL/ AC depot	2	2	2		Once in 6 months	Once in 6 months	Once in 6 months	
2	Trains/ Rakes Pri/Sec	2+2	3+3	4+4		Once in 6 months	Once in 3 months	Once in 2 months	Once in a month
3	Sick Line facilities					Once in a year	Once in 6 months	Once in 4 months	
4	Inspection of power station/ substation/ DG sets	1	1	2				Once in a year	
5	Major AC plants	1	1	1		Once in a year	Once in a year	Once in a year	
6	Major pump houses	1	1	2	2			Once in a year	Once in a month
7	Station A	1 in 2 months	1	1	1				Once in a month
8	Major colonies / Hospitals/ Health Units	1 in 2 months	1	1	1				Once in a month
9	Major Service Buildings	1 in 3 months	1 in 2 months	1	1				Once in a month

2.6.12 The electrical works and their maintenace are to be carried out as per the laid down instrcutions in the following rules and Codes.

(i) Indian Electricity Rules and BIS references

(ii) Energy Conservation Building Code (ECBC)-2007

(iii) National Building Code (NBC)

The Railway Board vide its Lr.No.2007/Elect.(G)/113/5/Safety/Pt. Dt.25-06-2012 emphazises, the following safety checks and parameters to ensure safety in all spheres of electrical installations:-

1. Checking of distribution panels/boards, MCB's etc. for proper rating.
2. Cable meggering including checking for damaged insulations, cut chords, splices, and tapes wrapped around the taped cables/wires.
3. Special emphasis to remove clutter/debris/unused furnitures etc. near electrical equipments/rooms, Segregation of power circuits and light circuits & Telecom. Cables, Ensuring electrical earthing.
4. Checking for loose connection and electrical joint and tightening it.
5. Availability of proper schematic diagram for distribution of power supply to various floors with sub-circuits.
6. Ensuring avilability of fire buckets filled with sand and Fire Extinguishers ad its refilling at vulnerable locations such as power houses, Electrical sub-stations, base kitchens, diesel installations and ensuring proper working of fire alarm system.
7. Regular inspection of power appliances. Switching off lights, fans, AC's & other electical gadgets that are not in use/beyond office hours and Provision of occupancy sensors.

2.6.13 **Duties & role of SSE/Elec. & JE/Elec.:-**

The supervisors are carrying out overall supervision, rendering technical guidance, monitoring staff distribution, ensuring overall safety in the electrical working systems.

2.6.14 **Duties & role of Technicians & Helpers:-**

The technicians and helpers are working in roster timings at the nominated locations for the various regular maintenance and breakdown maintenance. Operating the good water and sewage water pumps in various locations is also the part of Electrical Technicians work. Sarkarpalayam Pump House is

an unique in Indian Railways to cater drinking water for the GOC Workshop Colony and TPJ Station. Staff exclusively deployed in the SRPM Pump house round the clock.

2.6.15 **Jurisdiction of SSE/E/M/GOC:**

i) No of Stations covered : 4 Stations
ii) No of LC gates covered : 7 Gates
iii) No of Colonies available : 1111 qtrs.
iv) No of Service buildings : 14 Building
v) Tools & Plants Depot. : 1
vi) RCCB Depot. : 1
vii) Divisional Railway hospital : 1
viii) No of Outsiders , Plot & stall : 70
ix) No of Power line crossings : 15 Crossing
x) No of Clear water pump house : 5 Pump houses
xi) No of Sewage water pump house : 3 Pump houses

i) STATIONS

Sl.NO	Stations
1.	Ponmalai (GOC)
2.	Manjatidal (MCJ)
3.	Thiruverumbur (TRB)
4.	Thondamanpatti (TOM)

ii) LC GATES:

Sl.No	LC GATE NO
1.	LC 324
2.	LC 323
3.	LC 322
4.	LC 321
5.	LC 319
6.	LC 317
7.	LC 316A

iii) Colonies:

The total available Quarters is 1520 as on October 2017

Sl.No	Type of Qtrs	Occupied Nos	
		GOC	TRB
1.	Type I	185	-
2.	Type II	580	8
3.	Type III	268	-
4.	Type IV	39	-
5.	Type V	30	-
6.	Spl Type	1	-
	Total Qtrs	1111	

iv) Service buildings

Sl.No	Service Buildings covered
1	General stores depot
2	RE stores
3	SSE/W/A
4	SSE/W/B
5	Dy.FAOoffce
6	APO/Colony office
7	SSE/BRI office
8	Railway institue
9	Dog Kennel
10	Railway English Medium School
11	CHI office
12	Hill Reservoir
13	Nursery Garden
14	Officer Club and Rest house

v) Tools& Plant Depot.

vi) RCC Depot.

vii) Divisional Railway Hospital.

viii) Outsiders & Plot and stall

Sl. No	Outsider / Stall Name	Bill No:
1	Udaya School	G-497
2	RLY Institue	G-508
3	RLY Institue	G-509
4	G-15 AC OFFICE	G-545
5	W Police	G-524A
6	RVNL	G-553
7	RVNL	G-554
8	951/C	G-559
9	F 10/4	G-560
10	AIOBC Union	G-521
11	TN POLICE	G-524
12	Ration Shop	G-486
13	F Post Office	G-541
14	F Post Office	G-541A
15	F Post Office	G-532
16	RLY Mandapam	G-510
17	RH Canteen	G-502
18	ND Post Office	G-542
19	936/4	G-562
20	Reading Room	G-506
21	SC/ST Union	G-519
22	SRMU Union	G-520
23	SD Post Office	G-539
24	SD Post Office	G-540
25	C Ration Shop	G-487
26	GOC PF 1	343/B
27	SRMU Union	311
28	KV School	G-565
29	KVS Principal	959/1
30	Officer Club	G-466
31	Officer Club	G-467
32	SRMU Union	G-514
33	SRMU Union	G-515
34	SRMU Union	G-516
35	Balu Store	G-413
36	IOW Opp Store	G-416

Sl. No	Outsider / Stall Name	Bill No:
37	St Church	G-481
38	St Church	G-482
39	Bank	G-491
40	ATM	G-491A
41	Saratha Samathi	G-492
42	Baskar Hotel	G-552
43	A1 Tea Stall	G-445
44	Flower Stall	G-461
45	KL Store	G-462
46	Royal	G-468
47	S.Market	G-488
48	Amaravathi "F ''	G-488-A
49	AIBBS	G-494
50	Cycle Store	G-403
51	Danil Milk Store	G-390
52	MM 3	G-440
53	MM 4	G-454
54	CSI Church	G-477
55	P.Amman Kovil	G-551
56	Amaravathi "ND"	G-563
57	Anatha Store	G-433
58	M.Amman Store	G-439
59	Flower Stall	G-461
60	Mariamman Temple	G-476
61	MOSQUE	G-483
62	Kumar Store	G-368
63	Aruna Milk Shop	G-435
64	Raju Tea Stall	G-442
65	Raju Tea Stall	G-463
66	Sd Church	G-478
67	Church House	G-479
68	Prayer Hall	G-480
69	E.School	G-495
70	Hr. School	G-496

ix) Power line Crossings

Sl.No	Location	System voltage
1.	LC 321 (394/15 -395/1 km)	415V
2.	LC 321 (395/100 km)	11KV
3.	LC 321 (396/600-500 km)	11KV
4.	LC 324 (399/900-400/000 km)	11KV
5.	LC325-LC324 (400/200-100 km)	11KV
6.	LC325 (400/11-12 km)	11KV
7.	LC325 (401/600-700 km)	11KV
8.	LC323 (399/600-500 km)	11KV
9.	LC323 (399/600-500 km)	11KV
10.	LC323-LC322 (399/100-200 km)	11KV
11.	LC323-LC322 (399/100-200 km)	11KV
12.	LC323-LC322 (399/100-200 km)	11KV
13.	GOC-MCJ (401/500 km)	110KV
14.	GOC-MCJ (400/000 km)	110KV

x) Clear water pump houses

Sl.No	Location
1.	SRPM water pump house
2.	Old Diesel colony
3.	South D Colony
4.	Ananda bakery
5.	Nursery garden

xi) Sewage water pump houses:

Sl.No	Location
1.	Main Sewage pump (MSP)
2.	Sewage Treatment plant (STP)
3.	Sub Sewage pump

2.6.16 **Assests under SSE/E/M/GOC**

i) No of Transformer :19 Transformer
ii) No of DG sets : 6 DG sets
iii) No of Portable DG sets : 2 DG sets
iv) No of clear water pumps : 34 Nos
v) No of sewage pumps : 5 Nos
vi) No of HT feeders, Structures and Earth pits : 96
vii) No of total outdoor and indoor light : 9778 Nos
viii) Total No of LT earth pits : 685
ix) No of total fans : 3392
x) No of UPS available in PRS/UTS : 10 Nos

i) Transformers :-

Sl. No	Location	Capacity in KVA
1.	SS I TR I	250
2.	SS I TR II	400
3.	SS II TR I	400
4.	SS II TR II	400
5.	SS III TR I	250
6.	SS III TR II	250
7.	SS IV TR I	250
8.	SS IV TR II	250
9.	SS V TR I	250
10.	SS V TR II	250
11.	SS VI TR I	250
12.	SS VI TR II	250
13.	SS VII TR I	250
14.	SSVI I TR II	400
15.	T&P and RCC Depot	315
16.	Diesel Loco Shed TR I	500
17.	Diesel Loco Shed TR II	500
18.	SRPM TR I	630
19.	SRPM TR II	630

ii) DG Sets

Sl.No	Location	Capacity in KVA
1.	SRPM DG 2	250
2.	SRPM DG 3	250
3.	RH GOC DG 1	125
4.	RH GOC DG 2	160
5.	Dy.FAO office	30
6.	General Stores Depot	15

iii) Portable DG sets :

Sl.No	Location	Capacity in KVA
1.	TRB Station UTS	1.2
2.	MCJ Station UTS	1.2

iv) Details of Clear Water Pumps:

Sl.No	Pump name	Location	Capacity (H.P)
1.	LL. PUMP 1	SRPM	50
2.	LL. PUMP 2	SRPM	50
3.	LL. PUMP 3	SRPM	50
4.	LL. PUMP 4	SRPM	50
5.	LL. PUMP 5	SRPM	40
6.	HL.PUMP 6	SRPM	40
7.	HL.PUMP 7	SRPM	150
8.	HL.PUMP 8	SRPM	150
9.	HL.PUMP 9	SRPM	150
10.	HL.PUMP 10	SRPM	170
11.	HL.PUMP 11	SRPM	170
12.	HL.PUMP 12	SRPM	150
13.	NCW PUMP 1	SRPM	25
14.	NCW PUMP 2	SRPM	25
15.	NCW PUMP 3	SRPM	25
16.	WASH OUT PUMP	SRPM	50
17.	Open wells.pump	Old Dsl colony	7.5 x 2
18.	Open well S.pump	South D colony	7.5 , 5
19.	Ananda bakery pump	Ananda bakery	7.5
20.	Open well S.pump	Dy.FAO office	3

21.	Open well S.pump	954 block	3
22.	Bore well pump	Cwm house opp	3
23.	Monoblock	Cwm house	0.5
24.	Monoblock	Cwm house	0.5
25.	Open well S.pump 1	RH GOC	2
26.	Bore well pump 2	RH GOC	5
27.	Bore well pump 3	RH GOC	2
28.	Bore well pump 4	RH GOC	2
29.	Open well S.pump1	TRB	2
30.	Bore well pump2	TRB	2
31.	Bore well pump	TOM Station	2
32.	Bore well pump	Nursery garden	5

v) Details of Sewage pumps:

Sl.No	Location	Capacity (H.P)
1.	MSP	12.5 x 2
2.	Sub sewage	7.5
3.	STP	12.5, 5
Total pumps		5

vi) Details of HT feeders, Structures and Earth pits:

Sl. No	Feeder Name	No: Structures	Earth pits
1.	HT feeder I	4 nos 2 pole	12
2.	HT feeder II	4 nos 2 pole	12
3.	HT feeder III	4 nos 2 pole 12 nos 4 pole 1 no 6 pole 1 no 8 pole	8 36 3 4
4.	HT Dsl feeder I & II	2 nos 2 pole 2 nos 6 pole	4 15
5.	Srpm	2 nos 2 pole	2
Total		32 structures	96

vii) Details of total outdoor and indoor lights:

Sl.No	Location	No: lights
1.	Colony	9778
2.	Colony Street lights	550
3.	Railway hospital	850
4.	GOC Station	106
5.	MCJ Station	25
6.	TRB Station	85
7.	TOM Station	30
8.	Other service buildings	110
Total		11534

viii) Details of LT Earth pits :

Sl.No	Location	No: Earth pits
1.	New Dsl Colony	52
2.	Old Dsl Colony	24
3.	H type colony	50
4.	F type Colony	156
5.	South D colony	84
6.	North D colony	74
7.	I type colony	20
8.	Type IV qtrs.	80
9.	TRB qtrs.	6
10	Service buildings	60
11.	Railway Hospital	65
12.	Railway stations	30
13.	LC gates	14
14.	Pump houses	15
Total		685

ix) Details of total fans:

Sl.No	Location	No: fans
1.	Colony	3392
2.	Railway hospital	449
3.	GOC Station	15
4.	MCJ Station	6
5.	TRB Station	15
6.	TOM Station	5
7.	Other service buildings	60
Total		3942

x) Details UPS available in PRS/ UTS:

Sl.No	Location	Capacity	Nos
1.	GOC	1 kVA	2
2.	MCJ	1 kVA	2
3.	TRB	1 kVA	2
4.	PRS/ GOC	1 kVA	2
5.	BHEL	1KVA	2

2.6.17 **SARKARPALAYAM PUMP HOUSE:**

Sarkarpalayam Pumping House is a unique system in Indian railways to feed drinking water for the Railway usage for GOC Colony and TPJ Station. It is located on the banks of the River Cauvery which is 8km away from Ponmalai Railway Station. It is supplying 1 crore litres of good water in a day to GOC Workshop, GOC colony, Railway Hospital GOC and Truchirappalli station. This Unit was established in 1925. There are three Collectors to 17' ft dia digged in the River bed and the water collected into it and fed to the low lift collection well in the Pump house. Two 50HP pumps pumped the water to pre-settlement tanks, the water from this tank flow by gravity to the Secondary settlement tanks. The water from the Secondary settlement tank flow to WACH Gravity Filters by gravity and filtered through Sand and pebble.

The final clear water from WACH Gravity Filter is collected in the High lift collection well, is pumped to Hill Reservoir at Ponmalai, GLRs available in GOC area, Workshops and TPJ area.

TOTAL PUMP CAPACITY:-

- Total capacity of Low lift pump : 280HP
- Total Capacity of High Lift pumps : 980HP
- Washout pumps : 40HP
- Total Capacity of NCWL (New collector well pump) : 75HP
- Temporary pumps provided for summer : 85HP

In general, out of 6 Low lift pumps to the capacity of 50 HP, 2 only working and the rest kept as reserve. Also, 2 High Lift Pump to the capacity of 150HP or 170HP only working and the rest kept as Reserve.

During summer period, water flow in the Cauvery River is very low, while temporary arrangements are being made through 8 nos of additional bore to cater the required water for this 10 Nos. of 5 HP submersible pump, 1 No of 12.5 HP submersible pump and 3 Nos. of 7.5HP submersible pump installed.

Man power is additionally required to operate and monitor the pumps during the said season.

Details of Pumps available at SRPM Pump House:

1. Low Lift Pumps – 280HP

Pump	Type	Capacity	Installed
Low Lift 1	Vertical Shaft Centrifugal Pump	50HP	2009
Low Lift 2	Vertical Shaft Centrifugal Pump	50HP	2009
Low Lift 3	Turbine pump	50HP	2008
Low Lift 4	Turbine Pump	50HP	2008
Low Lift 5	Split Case Centrifugal pump	40HP	1999
Low Lift 6	Split case Centrifugal pump	40HP	1992

2. High Lift Pumps – 980HP

Pump	Type	Capacity	Installed
High Lift 7	Split Case Centrifugal pump	150HP	2008
High Lift 8	Split Case Centrifugal pump	170HP	1997
High Lift 9	Split Case Centrifugal pump	170HP	1997
High Lift 10	Split Case Centrifugal pump	170HP	1997
High Lift 11	Split Case Centrifugal pump	170HP	1992
High Lift 12	Split Case Centrifugal pump	150HP	2008

3. Washout Pump – 40HP

Pump	Type	Capacity	Installed
Washout pump	Split Case Centrifugal pump	40HP	2004

4. New Collector Well Pump – 75HP

Pump	Type	Capacity	Installed
NCWL pump 1	Turbine pump	25HP	2004
NCWL pump 2	Turbine pump	25HP	2004
NCWL pump 3	Turbine pump	25HP	2016

Total Pump Capacity in SRPM Pump House : 1460 HP

2.6.17 SPECIAL WORKS :

- Summer Watering arrangement in Sarkarpalayam Pumping station – Erection of Submersible pumps / Operation round the clock
- Replacement of High Lift Pump pipelines and Motor bearings.
- Providing new Tubular wells
- Replacement of Sewage Motors
- Automation of Sewage Motors by GSM Technology – Cell phone
- Cleaning of Rank vegetation and pruning tree branches hindering supply
- Replacement of Defective Energy meters
- Replacement of Energy efficient street lights.

- Replacement of old copper OH lines into Al lines.
- Ensuring Electric safety in Railways quarters by providing syntax SMC box with Aerial fuse.
- providing earth leakage relays for substations.
- Providing LED Retrofit fittings in place of T5 fittings at stations.
- Providing new FT switches for old SPDT switches
- Conducting Seminars and quiz Competitions to emphasise the use of Electrical safety gadgets among the Employees as well as awareness about the energy conservations among families in colony.

2.6.18 Staff distribution :

The sanctioned strength of Unit is 74 and 11 for Sarkarpalayam Pump House together, total **sanction is 85**, the total actual is 64 and the **Net vacant is 21**. The detailed statement of Sanction, Actual, vacancy & Excess is furnished as Annexure I.

The available Actual of 63 staff is distributed as below:

1. SSE – Incharge :1
2. JE :2
3. Ministerial Staff :1
4. Railway Hospital GOC :4
5. Maintenance Staff – Shift for SS1 & SS2 :6

   (Shift – Round the clock)

6. Maintenance Staff- Shift for SS3, SS4, SS5, SS6 & SS7 :6

   (Shift - Round the clock)

7. Colony Committee : 1/day
8. Fan overhauling : 2/day
9. Pump operator – South D Colony : 1/day
10. Pump Operator – Old Diesel colony : 1/day
11. STP – Shop Sewage Pump : 1/day

12. Sub-sewage pump-Near CWM, Bungalow : 1/day
13. Stores : 2/day
14. Recording Energy Meter at Quarters : 2/day
15. Sarkarpalayam Pump House :10/shift
–Round the clock
16. Maintaining Schedules regular inspections Surveys, repair attention, special works, summer special works at Sarkarpalaym Pump House, Reserve for Staff in shift :23

Total staff Distribution :64

CHAPTER-III

3.0 CRITICAL ANALYSIS:

3.1 The Railway Board has regularly issued the instructions on Man power cost savings. The recent circular of RB, No E(MPP)2016/1/59, Dt.: 10.01.2017 stated that GM/DRM shall carry out a zero based review of all posts appearing in the Sanction.

- Total quantum of the work being carried out in that particular work unit/depot as of a fixed date every year, say 1st of April
- How much manpower is required for carrying out these activities given the present state of equipment /tools/procedures and yardsticks, etc.
- Comparison of the above required manpower with the existing men on roll in that work unit / depot.
- Possibility of meeting the shortage if any by redeployment of posts from elsewhere.
- The total departmental cost of this shortfall in available manpower even after redeployment if the entire requirement were to be met departmentally.
- Possibility of outsourcing, by limiting the total outsourcing cost not exceeding 40%-50% of the total departmental cost of shortfall in man power.

- **Multi-skilling** : It can be planned from the initial stage itself in new activities and new workshops. The new activites would include sections being electrified, new lines, new sheds and maintenance depots. Even in the older establishments it can be encouraged by calling for suggestion from employees and employee unions.

- **Benchmarking:** The benchmarking data are issued regularly by the E&R directorate. The bench marking data needs to be worked out by taking total activities and total manpower (Departmental plus outsourced.) The effort to bring the divisions higher than the All India Average to the AIBM level has to be followed up more rigorously. This will lead to huge reduction in costs and increased productivity.

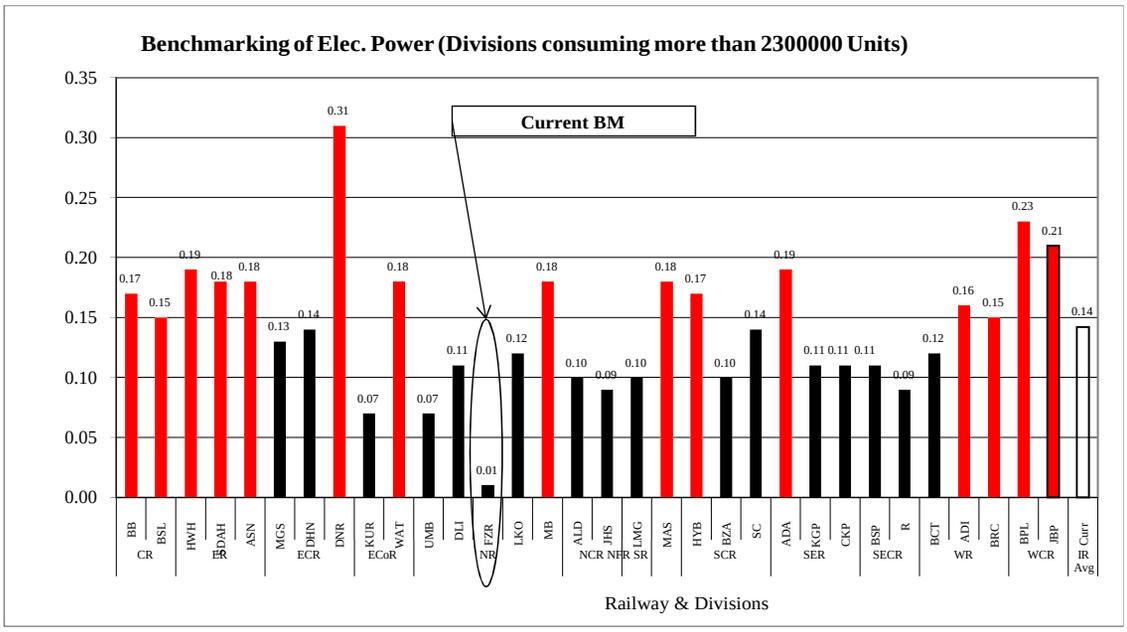
- **Outsourcing:** More non-core activities, which are not directly related with train operations and safety can be outsourced.

3.2 The Bench marking is a key tool to set optimum manpower. The E&R Directorate regularly publishing the Bench Marking for various Department Staff Viz. load. The current Bench Marking is 0.08/1000 units (October 2017 Bulletin) is taken as reference for arriving man power for this unit.

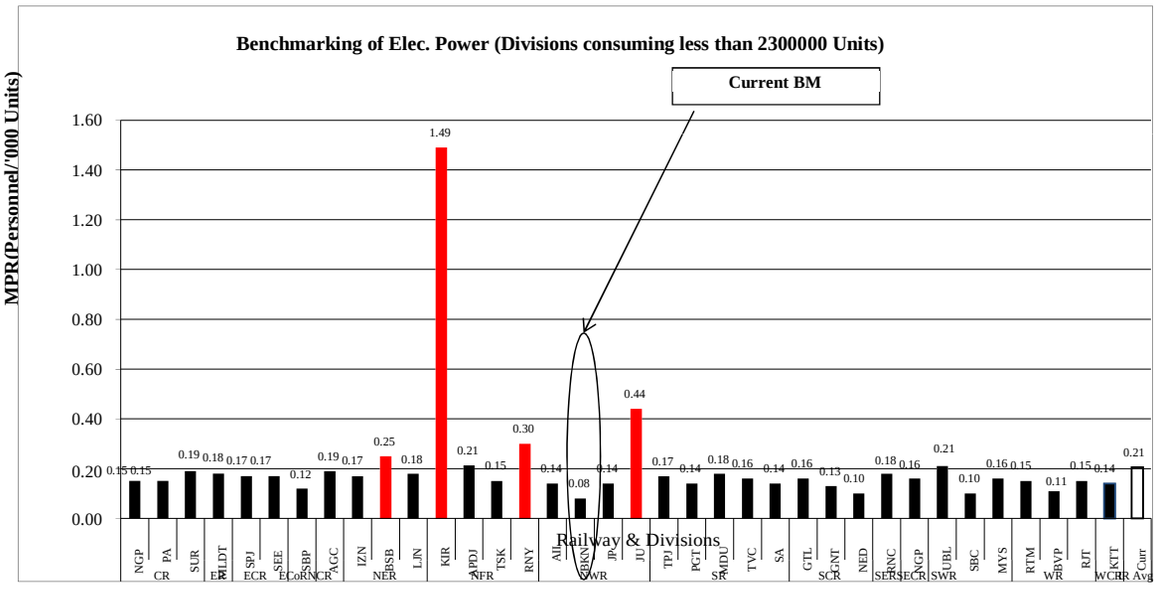
3.3 Bench Marking of Electric power has been classified in 2 groups viz. Divisions consuming more than 23,00,000 units per month and the Divisions consuming less than 23,00,000 units per month. TPJ Division comes under consuming less than 23,00,000 units per month and the current electric power staff of TPJ division is 0.17 Men / 1000 Unit consumed.

Current IR Average	: 0.21 Men per 1000 units
Current Bench Mark	: BKN Division of NWR is 0.08

ELEC. POWER STAFF IN DIVISIONS



CURRENT IR AVERAGE: 0.14 Men per '000 Units.
CURRENT BENCHMARK: Firozpur division of NR is at 0.01
EXCEEDING THE AVERAGE: 15 Divisions are above the current IR average



CURRENT IR AVERAGE: 0.21 Men per '000 Units.
CURRENT BENCHMARK: BKN div. of NWR is 0.08
EXCEEDING THE AVERAGE: 4 Divisions are above the current IR average.

3.4 The power consumption of the Unit SSE/E/M/GOC for the year 2017 is furnished below:

Month	Consumption unit of HT SC .34	Consumption Unit of HT SC.129
January	223280	80444
February	230864	96768
March	231776	84256
April	284960	92044
May	261312	93428
June	272680	99268
July	255200	90236
August	255144	94848
September	239840	89508
October	226728	101868
November	214128	100888
December	183120	99420
Total	2879032	1122976

HT SC.34 is the consumption area of Railway Hospital & GOC Colony.

Monthly Average consumption (28,79,032 ÷12) = 2,39,919 units.

HT SC.129 is the consumption area of SRPM Pump House

Monthly Average consumption (11,22,976 ÷12) = 93,851 units

Total Average consumption for SSE/E/M/GOC Unit

(2,39,919 + 93,851) = 3,33,500 units

Man Power requirement:

By applying,

IR Average **=**0.21MPR **=** 0.21x3,33,500 ÷ 1000 = 70 Men

Bench Marking =0.08 MPR =0.08x3,33,500 ÷1000 = 27 Men

Apart from the above IR Average and Bench Marking, Southern Railway using another Parameter by applying the Divisions of Southern Railway Manpower Ratio.

The Manpower Ratio of the Division of Southern Railway consuming less than 23,00,000 units are as :-

1. TPJ : 0.17 Men
2. PGT : 0.14 Men
3. MDU : 0.18 Men
4. TVC : 0.16 Men
5. SA : 0.14 Men

Total : **0.79** Men

Average Man Power Ration of the Divisions (0.79÷5) **= 0.158**

say **0.16**

The TPJ Division Man power Ratio for Electrical Power Staff is 0.17 where as the Bench Marking is 0.08 MPR (personal / 1000 units). There is a standing order of RB that wherever, the Divisions are already performing at IR Average, it should progress further towards the best performing Bench Mark.

If the Bench Marking is applied in this Unit, the total staff requirement is 27Men only, where as the actual available staff strength is 64. The field observation and various location of staff requirement given a clarity that, if 27 Men only allowed for this unit as per the Bench Marking will confront maintenance activities. Hence, on the interest of enhancing the operation Ratio performance of Southern Railways as well as the unit optimum Man power requirement for the current work load, applying the Division average will give some better result. The requirement is arrived on the basis of Southern Railway Divisions average (0.16MPR)

- 0.16 x 3,33,500÷1000 = 53.36 Men or

Say 53 Men

Total Requirement for the Unit SSE/E/M/GOC=53 Staff
(Supervisor Ministerial Staff, Technician & Helpers)

Discussion with DEE/TPJ :-

The Methodology adopted and the status of the Draft study was appraised to DEE/TPJ and the remarks highlighted by the Officer are furnished as :-

- The work study approached the benchmarking by referring the power consumption of the unit for the year 2017, whereas the power consumption was reduced in the past 2 years, after replacement of Energy efficient fittings, provision of Timers for Street light, segregation of pumping hours etc., Though the replacement taken place, the structure, pattern of maintenance and other equipments are same as that of the year 2015. Hence, consumption of 2015 has to be referred to identify the required Man power.
- About 21 kms length of HTOH and cable in HT Feeder is being maintained in this Unit which is normally not covered in the Benchmarking. Required additional staff may be allowed on need basis.
- There are 21 vacancies yet to be filled up, which affecting the regular maintenance and challenging the safety. During break down at Sarkarpalayam Pump House, the staff tend to move from GOC colony which delay the schedules and regular maintenance in GOC colony. Hence, the unit demands to fill up the 21 vacant posts, which need to be considered in the Study.

The consumption during the years 2015,2016 & 2017 is taken as datum and man power requirement is arrived :-

Sl. No	Year	Consumption Unit HT SC 34	Consumption Unit HT SC 129
1	2015	3779860	1309768
2	2016	3389328	1297056
3	2017	2879032	1122976
	Total	**13778020**	

- ❖ Average consumption / year = 4592673 units
- ❖ Average consumption / month = 382723 units

- By applying,

The average Man power ration of the Division of 0.16 personal / 000 unit = 0.16 x 382723 /000 = 61

Requirement of Staff = 61 (Supervisors, Ministerial Staff, Technician & Helpers)

On need basis, for the maintenance of HT OH lines, stations, LC gates allowed = 4 staff

Total Staff Requirement for SSE/Elec/M/GOC unit : 65

Sanction Vs Requirement:

Sanction	Actual	Requirement	Surplus
85	64	65	20

SUMMARY OF RECOMMENDATIONS

The following 20 posts are found ***excess*** to the requirement and the same may be surrendered and credited to the vacancy bank.

Sl. No.	Category	Grade pay (Rs.)	No. of posts
1	Tech III Power	1900	4
2	Tech II Power	2400	4
3	Tech I Power	2800	12
Total			**20**

Total No of posts :20

CHAPTER – IV

4.0 PLANNING BRANCH'S REMARKS ON CO-ORDINATING OFFICER'S VIEWS:

The work study was opened on 08.06.2017 and commenced on 30.11.2017.

The details of the Work study was appraised to DEE/G/TPJ on 16.02.2018 and the copy of draft work study report was sent on 21.02.2018 to offer the Division's views within 15 days from the date of receipt of the study report.

A reminder was also sent on 09.03.2018, to offer the views or Nil views positively before 19.03.2018.

Even after a lapse of 40 days, the views of the Co-ordination officer have not been received.

In view of the above, the Final report on the work study is released, without the remarks of the co-ordination officer.

CHAPTER – V

5.0 FINANCIAL SAVINGS :

5.1 If the recommendations made in the study report are implemented, the annual recurring financial savings will be as under:

Sl. No.	Category	Grade Pay/Level	No.of post	Money value (Rs)	Annual Financial Savings (Rs.)
1	Tech III Power	1900 / L2	4	43628	2094144
2	Tech II Power	2400 / L3	4	55965	2686320
3	Tech I Power	2800 / L4	12	63788	9185472
Total			**20**		**1,39,65,936**

ANNEXURE –I

S.A.V.E STATEMENT OF SSE/ELEC/M/GOC

CATEGORY	GOC			SARKARPALAYAM		
	San	Act	Vac	San	Act	Vac
SSE	1	1	0	0	0	0
JE	2	2	0	0	0	0
MINISTERIAL STAFF	1	1	0	0	0	0
Sr.TECH POWER	7	9	+2	1	3	+2
TECH I- POWER	23	4	19	3	2	1
TECH II -POWER	9	9	0	2	1	1
TECH III -POWER	9	4	5	1	0	1
HELPER - POWER	22	24	+2	4	4	0
TOTAL	74	54	20	11	10	1

TOTAL SANCTION	TOTAL ACTUAL	NET VACANT
85	64	21

ANNEXURE –II

DEPLOYMENT OF STAFF VS NO OF COMPLAINTS ATTENDED (FOR 22 STAFF) FROM 01.11.2017 TO 19.01.2018

Sl. No	Date	No of Staff Distributed	Total No of Complaints
1	01-11-2017	16	14
2	02-11-2017	16	12
3	03-11-2017	20	14
4	04-11-2017	18	12
5	06-11-2017	14	10
6	07-11-2017	16	10
7	08-11-2017	20	17
8	09-11-2017	21	21
9	10-11-2017	22	16
10	11-11-2017	21	15
11	13-11-2017	22	13
12	14-11-2017	22	12
13	15-11-2017	22	23
14	16-11-2017	20	13
15	17-11-2017	20	15
16	18-11-2017	20	17
17	20-11-2017	18	15
18	21-11-2017	20	10
19	22-11-2017	19	18
20	23-11-2017	12	10
21	24-11-2017	17	15
22	25-11-2017	17	13
23	27-11-2017	19	16
24	28-11-2017	17	17
25	29-11-2017	14	14
26	30-11-2017	16	23
27	01-12-2017	18	16
28	02-12-2017	16	13
29	04-12-2017	17	19
30	05-12-2017	15	14
31	06-12-2017	21	23
32	07-12-2017	18	22
33	08-12-2017	17	17
34	09-12-2017	17	22
35	11-12-2017	18	18

36	12-12-2017	15	10
37	13-12-2017	17	15
38	14-12-2017	16	16
39	15-12-2017	16	13
40	16-12-2017	24	10
41	18-12-2017	14	10
42	19-12-2017	13	33
43	20-12-2017	15	13
44	21-12-2017	15	21
45	22-12-2017	13	12
46	23-12-2017	15	13
47	26-12-2017	14	11
48	27-12-2017	14	11
49	28-12-2017	13	7
50	29-12-2017	13	3
51	01-01-2018	18	16
52	02-01-2018	16	5
53	03-01-2018	18	12
54	04-01-2018	21	9
55	05-01-2018	15	8
56	06-01-2018	20	5
57	08-01-2018	19	5
58	09-01-2018	18	7
59	10-01-2018	17	10
60	11-01-2018	22	11
61	12-01-2018	19	10
62	13-01-2018	18	8
63	14-01-2018	15	11
64	17-01-2018	14	6
65	18-01-2018	15	11
66	19-01-2018	16	9
	Total	**1144**	**890**
	Daily Average	**17.33**	**13.4**
	Avg Complaints attended / Men in a day	**0.77**	

SSE/ELECTRICAL/M/GOC : TPJ Division

Work Study No	: G.275-WSSR-301718/2017-18
Sanction	: 74 +11 = 85
Actual	: 54 +10 = 64
Net Vacant	: 21
Average Power consumption	: 3,33,500 Units/Month
SSE/E/M/GOC Actual MRP(Men/000 Unit)	: 0.19
Bench Marking	: 0.08 = 27Men
IR Average	: 0.21 = 70 Men
Southern Railway Division Average	: 0.16 = 53Men
TPJ Division MPR (Men/000 Unit)	: 0.17

On Draft level, Applied Southern Railway Division average and arrived the Man power requirement to 53, added 6 more on need basis :

Total requirement is 59 and found 26 as surplus.