

SOUTHERN RAILWAY

Headquarters Office,
Planning Branch,
Chennai – 600 003.

No.G.275/WSSR-152021/2020-21

Dated : 22.3.2021.

CWM/CWS/GOC

Sub: Work Study to review the staff strength in Electrical Millwright Shop
CWS/GOC –Reg.

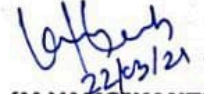
Ref: SDGM's D.O.letter No.G.275/ANNUAL PROG./2020-21 Dated 13.07.2020.

A work study on the above subject was conducted by Headquarters Planning Branch and a report on the same is attached.

As the report is to be finalised within eight weeks, it is requested to take expeditious action and advice this office in this regard.

A copy of the work study report may be given to organized labour.

This has the approval of SDGM.


22/3/21.

(M.VAMSIKANTH)

Dy.Chief Planning Officer
for Senior Deputy General Manager.

Copy to : PCME/MAS
(Copy sent through e-office)

The Director (E&R) Rly.Board/NDLS - For kind information.
(e-copy of the Study Report)



**WORK STUDY TO REVIEW THE STAFF
STRENGTH OF ELECTRICAL
MILLWRIGHT IN CENTRAL WORK
SHOPS /GOC
EXTRA DIVISION**

SOUTHERN RAILWAY

PLANNING BRANCH

G.275 / WSSR-152021/ 2020-21

WORK STUDY TO REVIEW
THE STAFF STRENGTH OF
ELECTRICAL MILLWRIGHT
IN CENTRAL WORK SHOPS/GOC
EXTRA DIVISION

STUDIED BY

**WORK STUDY TEAM
OF
PLANNING BRANCH**

MARCH 2021



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ACKNOWLEDGEMENT

Work study team conveys its sincere thanks to CWM/GOC, Dy.CEE/S/GOC Co-ordinating officer, SSE/EMW and other staff of electrical wing for their valuable guidance and co-operation in conduct and completion of the study.

(ii)
TERMS OF REFERENCE

Work Study to review the staff strength of Electrical Millwright in CWS/ GOC - Extra Division.

(iii)
METHODOLOGY

The work study team has applied the following techniques in conducting the above work study:

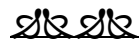
- 1) Collection of datas.
- 2) Interaction with Officers and Supervisors.
- 3) Critical examination of the collected data, existing system of working and on need basis.

(iv) SUMMARY OF RECOMMENDATIONS

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

Recommendations

Sl. No.	Category	Pay Level	No. of Post
1	Senior Section Engineer	L-7	1
2	Office Superintendent	L- 6	1
3.	Tech. Gr.I/ELF/P	L-5	10
4.	Tech. Gr.III/ELF/P	L-2	13
5.	Tech.Gr.I/Arm Winder	L-5	4
6	Tech.Gr.III/Arm Winder	L-2	3
Total		-	32



CHAPTER – I

1.0 INTRODUCTION

1.1 CENTRAL WORKSHOP/GOC

This central workshop was set up in 1897 by South Indian Railways at Nagapattinam to maintain steam locomotives. South Indian Railways decided to move the workshop to Trichinopoly (present-day Tiruchirappalli) because of its better location. The foundation stone of the Tiruchchirappalli workshop was laid by Mrs. R.P. Munro on 20 December 1926, and work was completed in 1928

The workshop had state of the art facilities, including a powerhouse which generated electricity for the workshop and the colony. Golden Rock's railway colony was one of Tiruchirappalli's first locations with electric lighting. The workshop repaired Royal Air Force planes during World War II.

This is a well-designed workshop laid with mixed gauge tracks to carry out repairs to both MG and BG rolling stocks. The layout lends itself easily for any changes in GOC operation viz. from Steam to Diesel.

The workshop covers about 200 acres (81 hectare), of which 26 acres (11 hectare) is under cover.

Golden Rock is having 4,043 employees approximately. The workshop primarily maintains coaches and diesel and heritage steam locomotives and manufactures wagons.

Important Milestones - CWS/GOC

1926	Foundation stone laid by Mrs. R.P. Munro on 20.10.1926
1928	Steam loco and C & W POH activities commenced.
1962	Wagon Construction started
1966	Manufacture of improved Ticket Printing Machine
1969	Locomotive POH started
1976	Heavy Electrical Repair Shop Commissioned
1977	Cylinder Liner Plating Shop Commissioned
1979	Coil Manufacturing Shop Commissioned
1985	Workshop Modernization started
1986	Steam Loco POH Activity closed
1987	System Development Group Started

1988	Engine Block Reclamation Shop commissioned
1996	PSU Locos POH undertaken
1996	MM's Quality Shield for Best Diesel Shop in Indian Railways was received
1996	Obtained ISO 9002 Certification for CLP, CMS & EBR shops (Phase I)
2000	ISO 9002 recertification for all the shops
2002	Flagging off of 100 th PSU Loco
2002	Won the award from MM/NDLS/RB for Refurbishing of Coaches with Crash Worthy Feature
2002	Platinum Jubilee Celebrations inaugurated by Shri. A.K.Moorthy, Hon'ble MOSR
2006	Flagging off of 1000 th BLC Wagons to CONCOR / NDLS
2007	Flagging off 100th loco export to Mozambique
2007	ISO 14001 Environmental Management System Certification
2008	Flagging off last rake of 990 BLC Wagon
2008	23 MG Coaches exported to Tanzania Through RITES
2009	Highest volume of wagon dispatch – 1005 wagons in a single year
2009	Flagging off 51st Rake of BLC Wagon by Shri. E. Ahamed, Hon'ble MOSR
2009	Rolling out of first stainless steel wagon of BOX-N HL Type
2009	Manufacturing of first WDS6 loco
2009	Commissioning of High Horse Power Loco Overhauling facilities
2009	Bagged the first Green Shield Award instituted by GM/S.Rly.in the year 200809.
2010	Bagged Green Shield Award for the Second Time, for the year 2009-10.
2010	Obtained BEE 4 Star Rating for CWM's Office Administrative Building
2011	1 st Newly in-house manufactured X-Class Steam Loco No. 37396 rolled out.
2011	IMS Certification obtained amalgamating ISO 9001- 2008, ISO 14001 - 2004, OHSAS 18001 - 2007
2012	2 nd Newly in-house manufactured X-Class Steam Loco No. 37397 rolled out by MM/RB.
2012	3 rd Newly in-house manufactured X-Class Steam Loco No. 37398 rolled out by MM/RB.
2012	Proto Type Wagon BOX-N 25 M and BLC 25 M with capacity 25 T Axle manufactured.
2012	Bagged State Safety Award for the year 2009 from Hon'ble Minister of Labour, Government of Tamil Nadu
2013	First Proto Type BTFLN Wagon manufactured.
2013	Coal fired B Class Locomotive B-794 converted into oil fired and dispatched to NeralMatheran, Maharashtra.
2014	GOC Shop has bagged Three STATE LEVEL SAFETY Awards for 2012.
2015	Bagged Green Shield Award given by GM/S.RLY.
2016	EnMS 50001 Energy Management certification.

2017	Implementation of 5S
2017	Welding quality Management System- ISO:3834 certifications.
2017	Got the First Prize from Hon. President of India in National level Energy conservation competition – 2017 conducted by BEE, New Delhi.
2018	LHB Coach SS1 & SS2 schedule commenced
2018	Five Star rating for Administrative building by BEE
2018	Green Co-Gold certification by CII
2018	First LHB Coach maintenance started
2020	50 th LHB Coach maintenance completed in 5 th December 2020



CHAPTER – II

2.0 PRESENT SCENARIO

2.1.0 Staff Details

Sanction, Actual, Vacancy and Excess statement of the staff as on 1.12.2020 of EMW shop/GOC

S. No.	Category	Trade	Level	Sanctioned Strength			Total	Act	Vac.	Excess
				Per.	Ty.	WC				
1.	SSE	Supr.	VII	08	02	-	10	07	03	-
2.	JE	Supr.	VI	04	-	-	04	01	03	-
3.	Ch. OS	Minis.	VII	01	-	-	01	01	0	-
4.	OS	Minis.	VI	02	-	-	02	01	01	-
5.	Sr. Tech	ELF (P)	VI	34	-	-	34	35	0	01
6.	Sr. Tech	Arm. Winder	VI	04	-	-	04	04	0	-
7.	Tech. Gr. I	ELF/P	V	67	01	-	68	48	20	-
8.	Tech. Gr. I	Arm. Winder	V	08	-	-	08	03	05	-
9.	Tech. Gr. II.	ELF/P	IV	11	-	-	11	16	0	5
10.	Tech. Gr. II.	Arm. Winder	IV	01	-	-	01	01	0	-
11.	Tech. Gr. III	ELF/P	II	18	01	-	19	04	15	-
12.	Tech. Gr. III	Arm. Winder	II	03	-	-	03	0	03	-
13.	Helper	Helper	I	19	-	-	19	01	18	-
Total				180	04	-	184	122	68	6

2.2.0 No. of Batches available and the brief description of work for each batch.

EMW shop of Electrical Wing/GOC is a supporting shop for all shops in GOC by the way of

- Extension of LT power supply to all M&Ps, T&Ps and office buildings of all individual shops.
- Electrical maintenance of M&Ps, T&Ps and power supply installations.
- Ensuring Electrical safety.
- Implementation of Electrical energy conservation methods.

2.3.0 There are 9 sections available in EMW viz.

- LOCO section
- C&W section
- Crane Section
- Welding Plant Section
- Starter Section (Control Gear Section)

- f. Electronics Lab
- g. Motor
- h. Winding
- i. Stores

Nature of work of each section along with staff details are appended below.

2.3.1 LOCO section: (27 staff) (Connected Load: 8600 KW)

1. Electrical maintenance of WS, EBR, BS, UT, ES, FY/BFY, HERS, DSL POH, MS, FSS, CMT lab, TR, EMW & MMW shops.
2. Extension of LT power supply to M&Ps, lighting circuit and SSE office in all the above shops.
3. "Fuse of call" attention to electrical portion of M&Ps, T&Ps and other assets.
4. Maintenance of Earth pits.
5. Power shut down to BRI & MMW.
6. Commissioning of new M&Ps through joint verification, Extension of power supply and checking of critical parameters, etc.
7. Provision of Energy meters to Energy intensive machines.
8. Implementation of Energy conservation proposals like LED light fittings provision, Extension of power supply to new compressors and welding plants... etc
9. Implementation of safety measures like Earth pit maintenance, Earth continuity provision to M&Ps & ELCB/RCBO provision...etc.
10. X class locomotive lighting circuit wiring.
11. LAW work (viz, WS extension bay electrification).
12. Extension of power supply to out siders
13. Condemnation of Released and defective switch gears.

In general, 27 staff are allotted for this section for day to day electrical maintenance and other works as defined above.

Staff are distributed by the Supervisors on day to day basis, based the nature of maintenance /failure.

Normal distribution is detailed below,

Shop name	No.of staff
WS-(Wheel shop)	5
EBR -(Engine Block Reclamation) shop	1
DCS-(Diesel Component shop)	4
(Traction motor Shop (TMS), Boiler shop(BS), Under Truck(UT), Foundry shop (FDY), CMT lab HERS-(Heavy Electrical Repair shop)	3
Diesel POH	5
Machine shop	3
FSS&TL (Fabrication & Smithy shop)	3
EMW&MMW	3

2.3.2 C&W section: (25 staff) (Connected Load: 7500KW)

1. Electrical maintenance of CBS, CMS, WCS,WAS,WBS,CRS,BRS,PS,TLS & AC shops.
2. Extension of LT power supply to M&Ps, lighting circuit and SSE office in all the above shops.
3. “Fuse of call” attention to electrical portion of M&Ps, T&Ps and other assets
4. Maintenance of Earth pits.
5. Power shut down to BRI & MMW.
6. Commissioning of new M&Ps through joint verification, Extension of power supply and checking of critical parameters, etc.
7. Provision of Energy meter to Energy intensive machines.
8. Implementation of Energy conservation proposals like LED light fittings provision, extension of power supply to new compressor and welding plants.. etc
9. Implementation of safety measures like Earth pit maintenance, Earth continuity provision to M&Ps and ELCB/RCBO provision...etc
10. LAW work- (viz. Bio toilet, AC extension area electrification).
11. Extension of power supply to out siders.

Condemnation of Released and defective switch gears

In general, 25 staff is allotted for this section for the day to day maintenance and other works as defined in Chapter II para 2.3.2 in this report.

Staff are distributed by the Supervisors daily, to attend maintenance and failures.

Usually distribution is done based on the failures, priority to be given and nature of failure/maintenance.

Distribution of staff is done as follows,

Shop name	No. of staff
CBS/CMS (Carriage body shop/Coil manufacturing shop)	3
WCS (Wagon Component shop)	4
WAS (Wagon Assembly shop)	4
WBS (Wagon Body shop)	2
CRS/BRS (Carriage repair shop/Bogie repair shop)	6
TLS/AC/PS (Train lighting/Air conditioning/Paint shop)	6

2.3.3 CRANE: (14 staff)

No. of Cranes: 73 No. of traversers: 05

1. Breakdown maintenance of cranes & traverser in all shops. (Contactor replacement, DSL attention, safety guard, control wiring, festoon cable & trolley attention, EM/Thruster brake).
2. Preventive maintenance of all the cranes.
3. Modification of DSL arrangement, cable trolley, pendent provision, brake modification and cabin height adjustment...etc
4. Commissioning of new cranes.
5. Crane driver certification.
6. Anti-collision device attention.
7. Outstation crane maintenance at TVC, ERS, ED, VM and TBM.
8. Issuing of certificates to crane drivers.

2.3.4 WELDING PLANT: (8 Staff)

Total No.of Welding plants.323

1. Breakdown maintenance of WPs. (Replacement of PCBs, potentiometer, wire feeder, IGBTs/SCRS/ etc).
2. Verification of WPs.
3. Validation of WPs.
4. Commissioning of WPs.
5. Preventive maintenance of WPs.
6. Condemnation of WPs.

2.3.5 STARTER (CGS): (9 staff)

1. Breakdown maintenance of M&Ps with relay logic & contactor control.
2. Preventive maintenance of oil starters of compressors, power hammers and sunken pit motors...etc
3. Power contactor attention to all crane & other M&Ps.
4. Calibration of electrode baking ovens & flasks.

2.3.6 ELECTRONIC LAB: (8 Staff)

1. Breakdown maintenance of M&Ps with advanced control system like VFDs, CNCs/PLCs & computer controls.
2. Breakdown maintenance of T&Ps with advanced control PCBs.
3. POH/repair attention of TL/AC components like 25 KVA inverter, 2.5 KVA inverter, Emergency light PCBs, BLDC fan, PCBs & mobile charger PCB & RBCs.
4. Pit Wheel lathe/TVC- Electrical breakdown attention

2.3.7 MOTOR: (10 Staff)

Overhauling and repair attention of motors received from various shop M&Ps (bearing replacement, shaft attention, Key way attention, pulley attention and terminal block attention).

1. Overhauling and repair attention of motors received from other divisions like TPJ, SRPM pump hose, ED and TVC.
2. Unloading of motors from M&Ps and transporting of them to EMW.
3. Loading of motors to M&Ps after attention.
4. Development & maintenance of scrap garden.
5. Condemnation of motors from condemned M&Ps.
6. In situ preventive maintenance of crane motors.

2.3.8 WINDING: (7 staff)

Rewinding of motors of M&Ps, T&Ps, Man cooler, Air circulators, Exhaust fans and Pump motor of GOC Workshop and other divisions like TPJ, SRPM, TVC etc

2.3.9 STORES: (4 staff)

1. Arrival of AAC (EAR) for stock items.
2. Generation of NS indents.
3. Co-ordination with stores & Dy.CEE(O) for releasing of P.O
4. Collection of materials from stores.
5. Issuing of materials.

6. Accounting of materials.
7. Condemnation of materials.
8. Stock verification and accounts audit reply.

2.4.0 PREVENTIVE MAINTENANCE MANHOURS-EMW-GOC 2019-20

MONTH of 2019-2020	MAN HOURS
APRIL	390
MAY	5272
JUNE	390
JULY	382
AUGUST	716
SEPTEMBER	382
OCTOBER	388
NOVEMBER	2012
DECEMBER	390
JANUARY	382
FEBRUARY	716
MARCH	382
TOTAL	11802

2.4.1 No. of failures attended during the last 2 years (April 2018 to March2020.)

Sl.No	Break down/ failures	2018-19	2019-20
1.	Fuse of call and other general failures	9025	11789
2.	Crane and Traverser failures	952	850
3.	Welding plant failures	482	610
4.	Validation of WPs	103	63
5.	Control gear failures	208	193
6.	Electronic controlled machine failures	964	1108
7.	Motor failures & POH	123	101
8.	Rewinding of motors	208	322
9.	No.of ovens/ flasks calibrated	69	66
10.	No.of earth pits checked	136	133

2.5 Details of contract activities for maintenance if any.

Out of 1158 M&Ps as on 12.09.2020, CNC BG surface Wheel Lathe(WL65/WS) is the only M&P under Annual Maintenance contract (vide LOA No CW/M&P/1656/CNC Wheel lathe-CAMC-2nd instance dt.07.12.2019) for five years at a total cost of Rs. 1,48,02,162/- and all others M&Ps are being maintained departmentally.

2.6 Assets maintained by the shop.

Assets maintained by EMW/GOC includes

1. No. of M&Ps	: 1158 (as on 15.09.2020)
2. No. of F.L light fittings	: 1860
3. No. of high bay light fittings	: 434
4. No of side light fittings	: 834.
5. No. of ceiling fans	: 621
6. No. of Man cooler/Air circulators	: 642
7. No of Exhaust and wall Mounting Fans	: 90
8. No. of Earth pits	: 135
9. No. of T&Ps of all shops	: Around 1000

2.7 Details of warranty Assets.

90 M& Ps are under warranty at present.

2.8. Details of innovations made recently.

Innovation: In house development of IOT Based Energy Monitoring system and commissioning of the same in Wheel shop to monitor the Energy consumption of individual machines dynamically to implement Energy Conservation Measures at a cost of Rs.25000/.

Other system Improvement Measures implemented during April 2018 to March 2020 are as follows;-

April 2018

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches. (Hose and glands are received & under provision)
- % of safety check completed for April 2018 = 35%
- Safety check completed for 358 Nos. of ceiling fans.

Energy conservation:

- Energy meters provided in B 14, B15, B28, AL 18, AL 19/WS, OVEN No.4, 6 & 7/TMS, AC 31, AC 44, OTC (SAC 58), CNC-02 for micro level monitoring of energy consumption.

- 09 Nos. of BLDC ceiling fan have been provided at CRS, WAS, CMT LAB, HERS, WS & MS. (Total: 30 Nos.)

Others:

- Crane control circuits, V3F drive kid, Series and parallel wiring circuit, staircase wiring circuit, star-delta circuit, Circuit for cold testing of motor winding are ready for trail.

May 2018

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision). Safety audit completed in BS/UT for 6 Nos. of 200A ICTP, 32 Nos. of 63A ICTP & 30Nos. of 32A ICTP switches.
- % of safety check completed for May 2018 = 38 %
Safety check completed for 512 Nos. of ceiling fans.

Energy conservation:

- Energy meters provided in AC54 & AC56/DSL for micro level monitoring of energy consumption.

Others:

- Wiring work completed (for 34 Points) in CGS room & store room/DSL.
- LT panel alteration work completed in ELF room/TLS
- Power supply segregation work completed in WAS 4th bay.

June 2018

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision). Safety audit completed for 20 Nos. of ICTP switches at FSS & 20 Nos. of ICTP switches at MS
- % of safety check completed for June 2018 = 43 %

Energy conservation:

- 2 Nos. Energy meters provided in B-23/MS & B-30/MS for micro level monitoring of energy consumption.
- 26 Nos. of 60W LED flood light fitting have been provided in cranes of WS, WAS, WBS, WCS, EBR, CRS, TLS & FSS in place of 250W MH fitting

Others:

- 4Nos of 24 V(DC) LED lamps provided for hand lamp purpose, to ensure safety of staff working in DSL loco cabin.
- New earth pit provided at EMW & MMW and earth value measured.
- 13 Nos. of air circulator fans provided in DSL, WCS, WBS, TLS & EMW.

July 2018

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- Safety audit completed for 20 Nos. of ICTP switches at DSL & 10 Nos. of ICTP switches at MS
- % of safety check completed for June 2018 = 48 %

Energy conservation:

- 100 Nos. of 60W LED flood light fitting have been provided in cranes of WS, WAS, WBS, WCS, EBR, CRS, TLS, MS, BRS, EMW, PH, FSS & Bhiloy yard in place of 250W MH fitting

Others:

19 Nos. of air circulator fans provided in DSL, WCS, WBS, TLS, EBR, PS, BRS & EMW.

Aug 2018

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- Safety audit completed for 10 Nos. of ICTP switches at DSL, 05 Nos. of ICTP switches at MS & 05 Nos. of ICTP switches at HERS
- % of safety check completed for August 2018 = 51 %

Energy conservation:

- 24 Nos. of 60W LED flood light fitting have been provided in cranes of WS, WAS, WBS, WCS, EBR, CRS, TLS, MS, BRS, EMW, PH, FSS & Bhiloy yard in place of 250W MH fitting
- 60 Nos. of 100W LED flood light fitting have been provided in place of 250W MH fitting

Others:

- 04 Nos. of air circulator fans provided in PS, BRS & MS.
- 12 Nos. of RCBO metal plug 20Amps provided in TLS & WBS

Sep 2018

Energy conservation:

- 4 Nos. of 60W LED flood light fitting provided at ES, FSS in place of 250W MH fitting
- 33 Nos. of 100W LED flood light fitting at WBS in place of 250W MH fitting

Others:

- 5 Nos. of air circulator fans provided in CRS & PS.
- 7 Nos. of energy meters provided at WS, EBR, BS, WBS, CBS, WCS & CRS
- 2 Nos. of new Earth pits provided at the backside of Electronics lab, exclusively for newly provided Anti-static mat.
- Power supply segregated from MS ring main supply for DSL store.

Oct 2018

Energy conservation:

- 17 Nos. of 60W LED flood light fitting provided at PS, TR, EBR, FSS, DCS, BRS, TLS, WS, CRS, EMW & WAS in place of 250W MH fitting.
- 5 Nos. of 100W LED flood light fitting provided at WAS in place of 250W MH fitting.

Others:

- 6 Nos. of air circulator fans provided in CRS, WS, UT & PS to improve ventilation
- 9 Nos. of energy meters provided in UT, EBR, EMW, MS, PH & BRS to assess Enpl for welding
- 3 axis DC feed drives provided in zayer m/c @ MS

Nov 2018**Safety:**

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- % of safety check completed up to NOVEMBER 2018 = 53%

Energy conservation:

- 5 Nos. of 60W LED flood light fitting provided at FSS, WS in place of 250W MH fitting
- 2 Nos. of 100W LED flood light fitting provided at WBS in place of 250W MH fitting

Others:

- 5 Nos. of air circulator fans provided in WS & FSS to improve ventilation

Dec 2018**Safety:**

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- % of safety check completed up to DECEMBER 2018 = 55 %

Energy conservation:

- 150 Nos. of 80W LED flood light fitting provided at TLS, EMW, WCS, FSS, WS, HERS, DSL, HERS, BTC, MS & TMS in place of 250W MH fitting
- 8 Nos. of Energy meters provided in new shearing m/c @ CRS, TRS 03, HP2 @ WCS, AC53 @ WAS, swagging m/c @ CMS.

Others:

- Model depicting Energy conservation is erected in the front wall of EMW
- 6 Nos. of defective BLDC fan PCBs of TL coaches attended at Electronics lab

Jan 2019**Safety:**

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- safety Audit completed for 37 Nos. of ICTP switches at FSS
- % of safety check completed up to JANUARY 2019 = 65 %

Energy conservation:

- 38 Nos. of 30W BLDC fan provided at DSL, WCS, LAB in place of 60W ceiling fan
- 29 Nos. of Energy meters provided in CRS, WCS, MS, HERS, WS, FSS & EBR for various machineries.

Others:

- Solar water pump of capacity 2KWP commissioned at CWM office
- 2 Nos. of laptops procured for storage of software & parameters of M&Ps with sophisticated control & VFDs

Feb 2019

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- safety Audit completed for 37 Nos. of ICTP switches at FSS
- % of safety check completed up to FEBRUARY 2019 = 65 %

Energy conservation:

- 26 Nos. of 30W BLDC fan provided at DSL, WBS, WAS in place of 60W ceiling fan Others:
- 6 Nos. of Air circulators provided in TLS, PH & WS
- 8 Nos. of Exhaust fan provided in DSL / Battery room.

Mar 2019

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- % of safety check completed up to MARCH 2019 = 68 %

Energy conservation:

- 5 Nos. of 30W BLDC fan provided at DSL, EMW & MMW in place of 60W ceiling fan

Apr 2019

Safety:

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches (Hose and glands are received & under provision).
- % of safety check completed up to APRIL 2019 = 73 %

May 2019

Safety

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches. Safety audit completed for 19 Nos. of 100A ICTP switches, 18 Nos. of 63A ICTP switches, 18 Nos. 32A ICTP switches, 6 Nos. of welding LT board at DSL & 01 No. of LT board @ FSS.
- % of safety check completed up to MAY 2019 = 76 %

OTHERS:

- 360 mtrs. of LT UG 240 sq.mm aluminium cable laid between 'C' substation & Paint shop to segregate and strength the power supply of PS to meet out bogie cleaning activities.

Jun 2019

Safety

- 150 mtrs of shrouded DSL replaced in place of angle iron to eliminate unsafe condition since Both crane No. 794 & 704A /BRS are working in one angle iron DSL and while lifting the BG coaches, lifting tackle is infringing with the angle iron DSL and DSL is getting earthed causing the tripping of circuit breaker many times.
- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches. Safety audit completed for 3 Nos. of 100A ICTP switches, 4 Nos. of 63A ICTP switches, 18 Nos. 3 ICTP switches @ DSL & FSS.
- % of safety check completed up to JUNE 2019 = 76 %

ENERGY CONSERVATION:

- 10 Nos. of IGBT based Welding plant commissioned at WCS, 6 Nos of IGBT based Welding plant commissioned at BS, 1 No at WS, 1 No at MMW, 2 Nos at MS.

OTHERS:

- 1 No. of welding plant validator procured & commissioned for Validation of Power source's voltage and current values and Validation of Wire feed speed.

Jul 2019

Safety

- Safety check conducted at electrical installations like switches, MDBs & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches. Safety audit completed for 4 Nos. of 100A ICTP switches, 4 Nos. of 63A ICTP switches, 4 Nos. 32A ICTP switches @ DSL.
- % of safety check completed up to JULY 2019 = 80 %

ENERGY CONSERVATION:

- 150 Nos. of 30W LED flood light fitting provided at DSL POH shops, WCS, TLS in place of 250W MH fitting

OTHERS:

- 2 supervisors and 3 staff of Electronics Lab/EMW are undergoing training at M/s. AGIIT, Trichy on PLC, VFD, SCADA & HMI.

Aug 2019

OTHERS:

- 2 supervisors and 3 staff of Electronics Lab/EMW have completed training at M/s. AGIIT, Trichy on PLC, VFD, SCADA & HMI.
- 86 mtrs of 240 sq.mm LT UG aluminium cable laid from TLS maintenance room to AC sec to improve the reliability of supply.
- 226 mtrs of 185 sq.mm LT UG aluminium cable laid from TLS maintenance room to BG pit line.
- 66 mtrs of 35 sq.mm cable laid to steel yard for R.O plant/WCS

Sep 2019

ENERGY CONSERVATION:

- 66 Nos. of 30W BLDC fan provided at CMT lab, HERS, TLS, HERS& DSL in place of 60W ceiling fan

Oct 2019

ENERGY CONSERVATION:

- In CBS & CRS, 10 Nos. of IGBT based Welding plant provided in place of conventional welding plant.

OTHERS:

- 2.5 Ton DC crane retrofitted at Saw mill and commissioned on 01.10.19.

Nov 2019

Safety

- Machine identification stickers pasted on main switch of machines @ MS/GOC , Traction motor & EBR shops for identification of machines as per IE rules to ensure electrical safety

ENERGY CONSERVATION:

- Energy meters have been provided for 16 Nos. of identified energy intensive machines.

SYSTEM IMPROVEMENT:

- Auto Transformer (415/850V, 3 phase) made ready for LHB coach contactor test bench.

OTHERS:

- 2 Nos. of Auto height control & XD motor received and commissioned on 12.11.19.
- 6 Nos. of wall mounting fans provided at WAS meeting hall.

Dec 2019

Safety

- Safety check conducted at electrical installations like switches & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches.
- Safety audit completed for 11 Nos. of 100A ICTP switches, 2 Nos. of 63A ICTP switches, 3 Nos. 32A ICTP switches & DSL/GOC and 8 Nos. of panel board at WS, HERS, TMS.
- % of safety check completed up to DECEMBER 2019 = 85 %
- Machine identification stickers pasted on main switch of machines @ BS, UT, TMS, ES, HERS, TG, DSL POH, HHP, DSL store, FSS, BRS, WCS, WAS, WBS, EMW & TR for identification of machines as per IE rules to ensure electrical safety

ENERGY CONSERVATION:

- Energy meters have been provided for 21 Nos. of identified energy intensive machines (5 Nos. @ MMW/GOC, 3 nos. @ FSS/GOC, 2 Nos. @ TR/GOC, 5 Nos. @ MS/GOC, 2 Nos. @ TMS/GOC, 2 Nos. @ HERS/GOC, 2 Nos. @ DSL/GOC, 2 Nos. @ AC/TLS/GOC)

OTHERS:

- 7 Nos. of 40W solar LED street light fitting received and fixed at different locations (4 Nos. at bogie yard behind WBS, 1 No. at near West Gate, 1 No. at CLP fire hydrant area and 1 No. at pit line near rail gate.)

Jan 2020

Safety

- Safety check conducted at electrical installations like switches & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches. Safety audit completed for 02 Nos. of 100A ICTP switches, 1 No. of 63A ICTP switches, 2 Nos. 32A ICTP switches @ DSL/Aux sec and 3 Nos. of panel board at WS, 2 Nos. of panel board at EBR & 1 No. of panel board at HERS.
- % of safety check completed up to JANUARY 2020 = 90 %
- Machine identification stickers pasted on main switch of machines @ EMW & MMW/GOC for identification of machines as per IE rules to ensure electrical safety

ENERGY CONSERVATION:

- Energy meters have been provided for 4 Nos. of identified energy intensive machines @ Sunken pit/ AC sec.

Feb 2020

- Safety check conducted at electrical installations like switches & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches.
- Safety audit completed for 02 Nos. of MDBs @ DSL and 2 Nos. of panel board at WS, 1 No. of panel board at EBR & 1 No. of panel board at HERS.
- % of safety check completed up to FEBRUARY 2020 = 92 %

- 80 Nos. of Industrial plug & socket DB 20A with 30mA ELCB have been received and under provision at Carriage pit line to ensure safety of staff using portable hand tools.

ENERGY CONSERVATION:

Description	No. of fittings provided during this month	Already provided	Total no. of fittings provided till date	Target	Location	Replaced in place of
30W LED flood light fitting	100 Nos.	--	100	100	DSL	MH 250W

- Modbus Signal cable laid for 14 Nos. of Energy meters of Individual machines at WS for installation of IOT based energy monitoring systems.

Mar 2020

Safety

- Safety check conducted at electrical installations like switches & LT boards of various shops and corrective action taken by providing glands and hoses for the cables, caution sticker and earth connection for switches.
- Safety audit completed for 03 Nos. of Main switch boards @ FSS.
- % of safety check completed up to MARCH 2020 = 94 %
- 20 Nos. of Industrial plug & socket DB 20A with 30mA ELCB have been provided at Carriage pit line to ensure safety of staff using portable hand tools.
- 6 Nos. of 50W High bay light fitting newly provided at PS

ENERGY CONSERVATION:

- Modbus Signal cable laid for 14 Nos. of Energy meters of Individual machines at WS for installation of IOT based energy monitoring systems.
- 4 Nos. of EMS SCADA unit for energy monitoring received and provided at A, C, D & F substation.
- IOT based Energy Monitoring System installed at WS for collection of Energy consumption data of 14 machines, for micro level monitoring of Energy to comply with EnMS & Green co rating (Platinum)

2.9.0 . Details of maintenance schedule of assets i.e. weekly, monthly, quarterly, half yearly and annually.

Out of 1158 M&Ps, all Machineries and plants which affects the quality of Products, Process, Environment, Health and safety of workman are identified as critical machines.

For these machines Preventive Maintenance will be carried out on monthly basis viz Monthly, Quarterly, Half yearly and yearly.

At present 163 M&Ps under EMWs Maintenance are figuring in the critical

Machines list.

M&Ps other than those identified as Critical Machines, are termed as Non-Critical Machines. Preventive Maintenance will be carried out on Annual Basis.

At present 90 M&Ps under EMWs Maintenance are figuring in the Non-critical Machines list.

For other Non-Critical Machines only breakdown, Maintenance will be carried out.

2.9.1 Details of proposed extension and new assets

In the coaching side, New Corrosion Repair shop and fiat bogie repair shops will be commissioned.

- i) Process Automation will be carried out in Wagon Production.
- ii) 11 M&Ps sanctioned under HQ M&P and 14 M&Ps Sanctioned under DMP Programme 2019-20 will be commissioned.

2.10 Stores details.

STORES DETAILS FOR 2018-2020 NS INDENT POSITION

	2018-2019	2019-2020
INDENT PLACED	114	88
P.O. RELEASED	89	80
MATERIAL RECEIVED	89	73
BILL PASSED	88	71
BILL PENDING	1	2
PENDING INDENT/PO	14	15
DROPPED NS	11	3

2.11 **STOCK INDENT POSITION**

Description	2018-2019	2019-2020
STOCK ITEMS	54	48
GSD/GOC	43	28
GSD/PER	44	48
MATERIAL COLLECTED	45	50

2.11.1 SCRAP DETAILS

DESCRIPTION	2018-2019	2019-2020
FERROUS	13.601 T	11.585 T
NON FERROUS	24.856 T	16.831 T
MISC	0.355 + 0.494 (E-waste)	0.459 + 0.857 (E-waste)

2.11.2 LP DETAILS

Year	2018-2019	2019-2020
No. of bills	123	180

2.12 Details of present and proposed outsourcing activities

In the core activity, there is no proposal presently under process for outsourcing of Electrical Maintenance of M&P.

Proposal for cleaning of shop floor of EMW is under processing.

2. 13. Details of O.T sanctioned for the staff for the last 2 years. April 2018 to March 2020.

MONTH	NOT Hours	FOT Hours
APRIL 2018	202.88	3112.12
MAY	4782.32	3485.62
JUNE	185.21	3492.84
JULY	96.48	3183.52
AUG	131.84	3371.16
SEP	172.64	2869.36
OCT	178.88	2830.12
NOV	168.8	2919.2
DEC	133.44	3493.78
JAN 2019	154.56	2531.44
FEB	169.44	3138.56
MAR	113.82	3095.18
APRIL	168.32	3192.68
MAY	4378.44	2853.56
JUNE	194.08	3162.92
JULY	122.72	3151.88
AUG	98.24	2910.76
SEP	141.48	2464.52
OCT	219.52	2599.48
NOV	133.12	2900.96
DEC	108.48	3042.56
JAN 2020	215.04	2977.1
FEB	149.28	2696.22
MAR	98.44	2638.56

2.13.1 Details of staff covered under incentive scheme.

None of the staff of EMW is covered under incentive scheme

2. 14. Details of man hour lost/idle hours due to failure/ break down activities for the last 2 years. i.e April 2018 to March 2020.

Breakdown hours recorded in WISE against total machine hours are appended below.

Period	Total Machine hours	Breakdown hours on electrical account	Percentage	Average %
2018-2019	43,15,694	19,061	0.44	0.45
2019-2020	43,33,873	19,720	0.46	

2.15 Other activities and details

Power supply installations of GOC workshop including overhead ring mains of each shop, power supply feeding cables, oil circuit breakers and back feeding arrangements of all the shops are around 40 to 80 years old and LT UG cables are not replaced even after completion of codal life of 30 years. This leads to frequent failure/tripping of LT UG cable terminations at tapping points from overhead ring main lines, main switches etc., Due to which it is unable to maintain power supply during the complete working hours of the shift, which causes concern to the output of carriage and wagon shops as well as POH of DSL locos, power cars and DEMUs. Hence the workload at EMW is being maintained through OT and Saturdays Sundays working. Since there are around 59 staff vacancies at EMW at present, maintenance of these power supply installations along with breakdown maintenance of M&Ps have become a critical task.

2.16 Abbreviations used in this report.

Abbreviation	Expansion
WS	Wheel Shop
EBR	Engine Block Reclamation
BS	Boiler Shop
UT	Under Truck shop
ES	Erection Shop
FY/BFY	Foundry/Brass Foundry
HERS	Heavy Electrical repair shop
DSL- POH	Diesel-Periodical Over Hauling
MS	Machine shop
FSS	Fabrication & Smithy Shop
TR	Tool Room

EMW	Electrical Millwright
MMW	Mechanical Millwright
CBS	Carriage Body Shop
CMS	Coil Manufacturing Shop
WCS	Wagon Component Shop
WAS	Wagon Assembly Shop
WBS	Wagon Body Shop
CRS	Carriage Repair shop
BRS	Bogie Repair Shop
PS	Paint Shop
TLS	Train Lighting Section
AC	Air Conditioning
ELCB	Earth Leakage Circuit Breaker
RCBO	Residual Current Circuit Breaker with Overload Protection
M&P	Machinery & Plant
T&P	Tools & Plant
LAW	List Of Approved Works
CGS	Control Gear Section
WP	Welding Plant
VFD	Variable Frequency Drive
PLC	Programmable Logic Control
BLDC	Brushless Direct control (motor –Fan)
RBC	Regenerative Battery Charger (In LHB Coach)
SCR	Silicon Controlled Rectifier (Thyrister)
IGBT	Insulated Gate Bi-Polar Transistor
EM Thruster	Electro Mechanical Thruster
PCB	Printed Circuit Board
AAC	Annual Average Consumption
EAR	Estimated Annual Requirement
LOA	Letter Of Acceptance
CNC	Computer Numerical Control
FL	Flash Light/Fluorescent lamp/Flood

	light
LT	Low Tension
MDB	Main Distribution Board
TMS	Time multiplier System(Power system protection System)
OTC	Output Transformer Coupled
SAC	Service Accounting Code
V3F (VVVF)	Variable Voltage & Variable Frequency
IOT	Internet Of Things
ICTP	Iron Clad Triple Pole
LED	Light Emitting Diode
KVA	Kilo Volt-Ampere
MH Fitting	Metal Halide Fitting
EOT	Electric Overhead Travel
DSL	Direct Supply Line
Enpl	Energy Performance Indicator
AGIIT	Axis Global Institute of Industrial Training.
SCADA	Supervisory Control And Data Acquisition
HMI	Human Machine Interface
IE rules	Indian Electricity rules(IE-1956-57)
EMS	Energy Management system



CHAPTER – III**3.0 CRITICAL ANALYSIS:**

3.1 At present ,1158 M&Ps are overall maintained by EMW shop.

In 1158 M&Ps,163 M&Ps are identified as Critical machines under EMW maintenance. Preventive maintenance is carried out monthly/Quarterly/Half Yearly/Yearly.

3.2 Other than critical M&Ps, some will be classified as Non Critical machines. Around 90 M&Ps are in Non critical machines under warranty.

For these Preventive maintenance are carried out on annual basis and specified in the warranty. Even though they are under warranty, EMW staff are also carrying out the maintenance activities under emergency circumstances.

Other non-critical machines routine maintenance and break down maintenance are carried out.

The failure percentage is reduced to minimum due to appreciable Preventive maintenance Works are carried out by EMW staff regularly.

Staff of EMW are distributed to various areas daily by the Supervisors to attend failures, preventive maintenance and schedules.

3.3.1 LOCO section

27 staff are deputed to this section for performing duties described in Chapter II in para 2.3.1. 1 SSE is heading this section to supervise EMW staff available and he is retiring in March 2021. Existing staff are justified for the requirement on need base.

3.3.2 C&W section:

25 staff are headed by one SSE to maintain all the works described in Chapter II in para 2.3..2

Note: 1. Earth pits are checked by Loco and C&W section.

No. of Earth pits checked by both section

2018-19=136

2019-20=133

Average in two years= $269/24=11.2$ say 12 per month.

2.Fuse call attention and general failures also performed by Loco section & C&W section of EMW shop.

No. of fuse call and other general failures

2018-19=9025

2019-20=11789

Average in two years $=20814/24=867.25$ say 868 per month.(Both Loco & C& W section)

Total no. of staff=1 SSE+25 staff. (SSE is going to be superannuation on May 2021 to be suitably replaced) are justified for the requirement. on need base.

3.3.3 **CRANES and TRAVERSER**

Number of Cranes and Traverser available in GOC workshop are 73 and 05 respectively.

In general, 1 SSE and 14 staff are available in this section to maintain all Cranes and Traverser.

For this, Technicians and Helpers are distributed daily by the concerned supervisor to the shops require maintenance/repair attendance.

Cranes and Traverser failures

2018-19=952;

2019-20=850;

Average failures in two years= $1802/24=75/\text{month}$ and 2.5 approximately 3 failures per day.

Good maintenance of Cranes and Traverser reduced the failure rates and improves the feeding of materials to the machines and the movement of finished items without affecting the process cycle.

Works performing by Crane section staff are given in Chapter II of Para 2.3.3 in this study report.

Total no. of staff=1 SSE+14 Staff (SSE is going to be retired on March 2021 to be suitably replaced) are allowed to the requirement considering number of cranes and traverser maintenance on need base.

3.3.4 **WELDING PLANT:**

Total Number of Welding plants available in GOC Workshop is 323 .

At present, 1 SSE and 8 staff are available for attending breakdown maintenance, Preventive maintenance, verification and validation of welding plants etc.

Based on the complaints, schedule, maintenance priority is decided by concerned Supervisor and distributed accordingly on daily basis.

Welding plants failures

2018-19=482

2019-20=610

Average in two years; $1092/24=45.5$ say 46/month and 1.5 say 2 failures per day in 323 welding plants.

Validation of Welding plants

2018-19=103

2019-20=63

Average in two years; $166/24=7$ /month

Appreciable work done by this section, resulting overall failure rate of welding section comes to very minimum.

Works carried out by the Welding plant staff of EMW are given in Chapter II. para 2.3.4.

Existing Staff is allowed to continue on need base.

3.3.5 STARTER (CGS)(Control Gear Section):

In general, 1 SSE and 8 staff are allotted for this section.

Control gear failures

2018-19=208

2019-20=193

Average failures in two years= $401/24=16.7$ say 17/month and 0.56 say 1 per day.

Calibration of Ovens/Flasks

2018-19=69 nos

2019-20=66 nos

Average in two years= $135/24=5.6$ say 6 nos /month

In this section, Breakdown, preventive maintenance of starters like electrical DOL starters, Star delta starters. Auto transfer starter, Rotary rheostat in conventional machines are well maintained.

Detailed work done by the staff of Starter section is described in Chapter II in para 2.3.5 of this work study report.

Existing Staff is allowed to continue on need base.

3.3.6 ELECTRONIC LAB:

Electronic controlled machines failures.

2018-19=964

2019-20=1108

Average in two years= $2072/24=86.3$ say 87/month and 3 per day.

It shows the maintenance of Electronic controlled machines are well maintained by EMW staff. At present 1 SSE and 8 staff are allotted to this section to perform duties described in Chapter II in para 3.3.6

Total no. of Staff=1 SSE+8 Staff are justified and allowed to continue on need base.

3.3.7 **MOTOR:**

Repair to be attended motors are unload from M&Ps, transport, attention, and load again to M&Ps. Most repair works are brought to the shop and attended by the staff of EMW shop without delay and not affecting the normal works in the failure area. In situ some of the preventive works are done.

Motor failures and POH

2018-19=123

2019-20=101

Average failures in two years= $224/24=9.3$ say 10/month.

The failure reduction is achieved due to appreciable preventive maintenance done by EMW staff.

1 JE is looking after Motor and Winding section.

This section is allotted 10 staff for doing the works described in Chapter II in para 2.3.7.

The existing staff requirement is justified and allowed on need base.

3.3.8 **WINDING:**

Rewinding of motors of M&Ps of GOC workshop T&Ps of GOC workshop, Man cooler, Air circulators, Exhaust fans and Pump motor of GOC Workshop and other divisions like TPJ, SRPM, TVC etc. are performing by the staff of this section.

Rewinding of Motors

2018-19=208

2019-20=322

Average in two years= $530/24= 22$ /month and 1 per day.

Available staff of 7 is justified for the requirement. And allowed to continue on need base.

3.3.9 **STORES:**

Activity	2018-19	2019-20	Average in two years	Average per month
NS Indent placed	114	88	$202/24=8.41$	9
Material received	89	73	$162/24=6.75$	7
Stock Items	54	48	$102/24=4.25$	12
GSD/GOC	43	28	$71/24=2.9$	
GSD/PER	44	48	$92/24=3.8$	
Material Collected	45	50	$95/24=3.9$	4

SCRAP DETAILS

Scrap Description	2018-19 in MT	2019-20 in MT	Average in two years	Average per month in MT
Ferrous	13.601	11.585	$25.186/24=1.049$	1.049
Non Ferrous	24.856	16.831	$41.687/24=1.736$	1.736
Miscellaneous	$0.355+0.494$ (E-Waste)	$0.459+0.857$ (E-Waste)	$0.814/24=0.033+$ $1.351/24=0.056$	$0.033+0.056$ (E-Waste)

LP Details

Activity	2018-19	2019-20	Average in two years	Average per month
No.of Bills	123	180	$303/24=12.625$	13

1 SSE, 1 Ch.OS and 4 staff are looking after the activities in the store/EMW.

For material collection additional staff required is allowed.

3.3.10 PREVENTIVE MAINTENANCE MANHOURS-EMW-GOC 2019-20

MONTH	MAN HOURS
APRIL 2019	390
MAY 2019	5272
JUNE 2019	390
JULY 2019	382
AUGUST 2019	716
SEPTEMBER 2019	382

OCTOBER	2019	388
NOVEMBER	2019	2012
DECEMBER	2019	390
JANUARY	2020	382
FEBRUARY	2020	716
MARCH	2020	382
TOTAL		11,802

Total man hours utilised for Preventive maintenance in 2019-20 (One year)

=11802/12=983.5 man hrs per month.

=983.5/26 =37.82 man hours per day.

=37.82/8=4.72 say 5 men .

3.3.11 Overtime particulars of the staff EMW/GOC April-2018-March 2020

MONTH	NOT Hours	FOT Hours
APRIL 2018	202.88	3112.12
MAY	4782.32	3485.62
JUNE	185.21	3492.84
JULY	96.48	3183.52
AUG	131.84	3371.16
SEP	172.64	2869.36
OCT	178.88	2830.12
NOV	168.8	2919.2
DEC	133.44	3493.78
JAN 2019	154.56	2531.44
FEB	169.44	3138.56
MAR	113.82	3095.18
APRIL	168.32	3192.68
MAY	4378.44	2853.56
JUNE	194.08	3162.92
JULY	122.72	3151.88
AUG	98.24	2910.76
SEP	141.48	2464.52
OCT	219.52	2599.48
NOV	133.12	2900.96
DEC	108.48	3042.56
JAN 2020	215.04	2977.1
FEB	149.28	2696.22
MAR	98.44	2638.56
Total	12517.47	72114.1

12517.47 Normal OT Hours

72114.1 Factory OT or Full OT Hours

So, $72114.1/2=36570.5$ Hours

Average OT hours in two years ($12517.47+36570.50=49087.97$)

$49087.97 / 24=2045.3$ say 2046 hrs/month

3.3.12 Manpower (Supervisor & Staff) available

Sl.No	Section	Supervisors Available		Ministerial staff	Staff available
		SSE	JE		
1	EMW Incharge	1	-	1 OS	-
2	Loco	1	-	-	27
3	C&W	1	-	-	25
4	Crane	1	-	-	14
5	Welding plant			-	8
6	Starter(Control gear)	1	-	-	9
7	Electronic lab	1	-	-	8
8	Motor	-----	1	-	10
9	Winding			-	7
10	Stores	1	-	1 Ch. OS	4
Total		7	1	2(Ch.OS+1OS)	112

3.3.13 In EMW shop, 8 Supervisors, 112 technical Staff and 2 Ministerial staff are available in various categories to maintain all M&Ps and other assets in GOC workshop.

3.3.14 (1) 7 SSEs are available against the sanction strength of 10 and 3 vacancies are there. At present, 9 sections are in GOC. It is essential for 1 SSE in each section and 1 in charge for whole. But, Motor and Winding section can be managed by one SSE. Crane and Welding plant sections can also be managed by 1 SSE.

So, 7 SSEs+1 In charge SSE, total 8 SSEs are allowed to the requirements and to maintain forthcoming assets if any in future.

i-e.1 SSE post additionally allowed.

3.3.14(2) 1 JE is available to look after Motor and winding section. Sanctioned strength is 4 and 3 vacancies are there.

a) In Coaching side, New corrosion repair shop, Fiat bogie repair shop will be commissioned.

b) Process automation will be carried out in wagon production.

c) 11 M&Ps (HQ sanction) and 14 M&Ps sanctioned DMP programme 2019-20 will be commissioned.

Duly Considering the above and the existing works in EMW shop ,2 JE posts are additionally allowed to meet out the present needs and maintain the new coming assets in future also.

3.3.14(3) SSE & JE Requirement

Total Sanction of SSE and JE (10+4) = 14

Requirement (8+3) = 11

LR 12.5% = 1.375 say 2

Total no. of SSE & JE requirement = (8+1=9) + (3+1=4) = 13

1 post of SSE is found excess to the requirement.

Category	Sanction	Actual	Requirement	Surplus
SSE	10	7	9	1
JE	4	1	4	0
Total	14	8	13	1

3.3.15 Requirement of Ministerial staff: 2 Ministerial staff are in EMW shop against sanctioned strength of 3.

1 OS is in EMW office to look after the daily position of the staff working under SSE/EMW and assisting SSE in charge in clerical works and 1 Ch. OS is available in stores.

1 OS in EMW office and 1 Ch. OS in store are enough to meet the requirements.

Hence, 1 vacant post of OS is identified as surplus.

Category	Sanction	Actual	Requirement	Surplus
Ch. OS	1	1	1	0
OS	2	1	1	1
Total	3	2	2	1

3.3.16 Requirement of Technicians and Helpers

Due to old age LT UG cables (around 40 to 80 years old) frequent failures occurs. To prevent/reduce failures, Saturday, Sunday and overtime works are done by the EMW staff.

From para 3.3.11 of this work study report, 2046 hrs/ month O.T worked by the staff of EMW .

Preventive maintenance is appreciably done by EMW staff resulting that average breakdown percentage is 0.45 in last two years (2018-19 &2019-20).

Total preventive man hours in 2019-20 =11802 man hours.

Very much concentration is required while winding in counting of wound.

For Night shift working EMW staff are deputed for maintenance work additionally. More craftsman work in all electrical maintenance work to safe guard the machinery and tools from water in rainy season making arrangements like metal cover works etc

.New corrosion repair shop, Fiat bogie repair shop commissioning, Process automation will be carried out in wagon production, and additional M&Ps commissioning etc are considered and additional staff allowed in this report.

8 Women staff are available in EMW shop. Maternity leave, Child care leave are availed by the women staff in long period.

Work study team consider the privilege and welfare of Women employees additional staff allowed in this report.

Helper- It is the entry category and helper's services are very much required for handling materials from stores to EMW shop , EMW shop to the machinery& Plant and to help in all the ways to attend maintenance and failures.

Collection of materials from GSD/GOC and GSD/ PER

In addition to that SJAB, SCOUT, Territorial Army, Sports persons are to be relieved in time for their contribution of their service.

Duly considering above points, the following staff are allowed to the requirement on need base.

Requirement Of Technicians & Helpers

Sl. No	Category	Sanction	Actual	Requirement
1	Sr. Tech/ELF(Power)	34	35	34
2	Sr. Tech/Arm winder	4	4	4
3	Tech. Gr-I/ELF/P	68	48	52
4	Tech. Gr-II/ELF/P	11	16	11
5	Tech. GIII/ELF/P	19	04	06
6	Tech. Gr-I/Arm winder	8	3	4
7	Tech. Gr-II/Arm winder	1	1	1
8	Tech .Gr-III/Arm winder	3	0	0
9	Helper	19	1	10
Total		167	112	122

Technicians & Helpers requirement =122

LR 12.5% =122*12.5/100 =15

Total Technicians & Helpers requirement =137

3.4.0 Summary of Requirement of EMW Shop/GOC

Sl. No	Category	Sanction	Actual	Requirement	Surplus
1	Sr.SE	10	7	9	1
2	JE	4	1	4	0
3	Ch.OS	1	1	1	0
4	OS	2	1	1	1
5	Sr.Tech/ELF(Power)	34	35	34	0
6	Sr. Tech/Arm winder	4	4	4	0
7	Tech. Gr-I/ELF/P	68	48	58	10
8	Tech. Gr-II/ELF/P	11	16	11	0
9	Tech. GIII/ELF/P	19	04	06	13
10	Tech. Gr-I/Arm winder	8	3	4	4
11	Tech. Gr-II/Arm winder	1	1	1	0
12	Tech .Gr-III/Arm winder	3	0	0	3
13	Helper	19	1	19	0
Total		184	122	152	32

3.4.1 Sanction Vs Requirement

Sanction	Actual	Requirement	Surplus
184	122	152	32

3.4.2 RECOMMENDATIONS

The following posts are identified as surplus to the requirement. The same is to be surrendered and credited in to the Vacancy bank.

Sl. No.	Category	Pay Level	No. of Post
1	Senior Section Engineer	L-7	1
2	Office Superintendent	L- 6	1
3.	Tech. Gr.I/ELF/P	L-5	10
4.	Tech. Gr.III/ELF/P	L-2	13
5.	Tech.Gr.I/Arm Winder	L-5	4
6	Tech.Gr.III/Arm Winder	L-2	3
Total		-	32

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

Dy.CEE/S/GOC Lr.No. K/E/150/Note dated, 20.02.2021 the following views on the work study report to review the staff strength in Electrical Millwright shop/CWS/GOC has been received.

Co-ordinating officer's views;

The Work study for the year 2020 in EMW. SSE/EMW Shri. S.Ganesan has been nominated (Since he is incharge SSE) for giving all details and OT hours etc. to the work study team. Finally work study inspector discussed and submitted the "Work study" report on 29.12.2020 submitted. Now remainder has come from SDGM office on 11.02.2021 to submit reply from our side on or before 26.02.2021. As per CWM's approval the EMW shop position is enclosed herewith.

1. EMW/GOC is responsible for all Electrical maintenance of all the M&P's around 1126 machines as on 19.02.2021 inside GOC and to ensure the electrical safety of all staff of GOC ie around 4500 staff/Supervisors and contract workers working on daily basis.
2. Implementation of Safety measures, provision of solar panels to improve Quality, Electrical utilization and environment safety, weld process quality testing certification and Energy Conservation as required by BEE and CII
3. Since there were lot of staff unfilled/unable to promote/shortage for long time lot of maintenance works are pending which are leading to defective maintenance or delayed maintenance or affecting outturn of Wheel Shop, Bogie Repair Shop and Carriage and Wagon Shop etc., by which the total outturn of GOC carriage & Wagon, DSL Locos, Wagon production is hampered. The reoccurrences will be viewed seriously by the HQ giving way to adverse remarks to GOC shops.
4. The Balance/Long Pending works of EMW on hand are
 - a) Replacement of shrouded DSL in place of bare copper or Angle iron DSL in fifteen cranes to ensure overall Safety and reliability.
 - b) Provision of CT festoon cable in Crane No. 767 and Cr no. 766/WS to improve reliability
 - c) Modification of DSL current collector arrangement in G&F traversers to enhance reliability
 - d) Modification of DSL current collector arrangement in E & H traverser for trouble free operation

- e) Provision of Master Control with Dead Man Switch in Cr 767/WS and Cr No. 780 and Cr No. 782/DSL to ensure safety of staff working.
- f) Replacement of LT Switch boards in Switch Room of various shops with MDB to implement logout/Tag out system to ensure electrical safety.
- g) Releasing of old power supply installation like cables, main switches, LT boards and MDB's which are not in service and infringing electrical safety.
- h) Replacement of Defective LT earth pits 5 Nos. with new one upgraded version (Copper rod Earthing).
- i) Bay wise segregation of power supply in Paint shop, MS and FSS to pave the way for bay wise shutdowns and BRI maintenance works.
- j) Provision of RCBO in various shops for portable hand tools for ensuring staff safety.
- k) Bhilai yard and SSG ward in area wise increased many folds and maintenance has to be done by EMW shop to ensure reliable power supply. Which is very important and critical for scrap disposal and material handling for stores department for ensuring timely disposal in lorries and trucks at weighing machine which needs un interrupted power supply.
- l) EMW liasoning with SSE/Gen/CN works being carried out inside GOC at various levels in the way of power cable laying (440v 3 Phase AC) new building construction works, supervisors and its coordination, maintaining liasoning with BRI and SSE works for timely completion.
- m) EMW SSE's to certify crane drivers for DSL shed Erode and SSE to spend sufficient accountable working day for their training as well as certification.
- n) Co-coordinating ISO 9001/2015, ISO 14001/2015:ISO 50001/2018, ISO 45001/2018 and 5S integrated MNGT systems.
- o) Booking of OT in EMW was analyzed in field as per CWM Lr.No.CWM/GOC/Internal note dt:
22.06.2020, During the period Apr 2019-Jan2020 and Apr 2020-Jan 2021 OT hours.
2019 Apr to 2020 Jan – 20494 Hrs.(Rs.1,45,98,533 /-)
2020 Apr to 2021 Jan-3464 hrs. (Rs.22,52,801 /-)
OT hours also reduced which directly and indirectly increases the work load.
- p) There was a fatal accident on 20.09.2020 which was eye opener for all deficiencies in safety in GOC shop. Due to which there was stringent inspection by Assistant director industrial safety and Health Tiruchchirappalli and brought out lot of discrepancies, all to be attended in short span of time and on Long term also, which requires lot of manpower to improve in all shops concerned.

Due to the points from (a) to (P) lot of works which are not reflected in SSE/Works study; requires lot of man power hence it is not feasible to surrender the posts as submitted by work study report. It is requested to surrender the posts as identified by WPO without affecting any staff/Supervisor career and to maintain proper progress of GOC shops outturn directly or indirectly through EMW shop.

Hence Posts to be surrendered:

Tech. Gr.I Armature winder /EMW – 4 Posts

Tech. Gr.II Armature winder /EMW – 1 Post

Tech. Gr.III Armature winder /EMW –3 Posts

Electrical Assistant /EMW –8 Posts

Total 16 posts can be surrendered and work study report may be closed. This has the approval of CWM/GOC.

Planning Branch Remarks:

Work study team has analysed the current and future work load while on collection of datas and at the time of discussion are reflected in this report.

Contract activities (para 2.5), Asset maintenance (para 2.6), Proposed Extentions (2.9.1), Stores details (2.10) are shown in this work study report.

Regarding pending works of 4 (a) to (m) are shown in para 2.3.3 in this work study report as works carried out by crane section.

4(n)- It is the duty of SSE/EMW/GOC to co-ordinate with ISO agencies to implement and execute System , procedures and records. Duly consider the all direct and indirect activities additional SSE and JEs are allowed in this work study report para 3.3.14

4(o)-3.3.11 OT particulars given in this report.

4(p)-There was enquiry going on at the time of Work study, Hence the fatal accident was not shown in this report.

Requirement of SSE, JE and other staff are explained in 3.3.13 to 3.3.16. It all deals with Old age cable maintenance, OT works, Preventive maintenance works, Night shift working, Corrosion repair shop, Fiat bogie repair shop commissioning, Process automation will be carried out in wagon production and additional M&Ps commissioning, Collection of materials from GSD/GOC and GSD/ PER etc are considered and additional staff allowed in this report.

Maternity leave, Child care leave are availed by the women staff.

Work study team consider the privilege and welfare of Women employees additional staff allowed in this report.

Actual staff working in EMW/GOC is 122 against the sanctioned strength of 184 and the work study team already allowed 155 staff to the requirement.i-e.33 additional posts.

These posts can be utilised for the above said additional /Forth coming activities.

Hence , all the 32 posts recommended for surrender is justified.

CHAPTER – V**5.0 FINANCIAL SAVINGS:**

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

Sl. No.	Category	No. of Post	Pay Level	Money Value (Rs.)	Annual Financial savings (Rs.)
1	Senior Section Engineer	1	L-7	109571	1314852
2	Office Superintendent	1	L-6	86463	1037556
3.	Tech. Gr.I/ELF/P	10	L- 5	71078	8529360
4.	Tech. Gr.III/ELF/P	13	L-2	48614	7583784
5.	Tech.Gr.I/Arm Winder	4	L-5	71078	3411744
6	Tech.Gr.III/Arm Winder	3	L-2	48614	1750104
Total		32	23627400		

S.A.V.E STATEMENT - EMW/CWS/GOC

Sl. No	Category	Sanction	Actual	Vacancy	Surplus
1	Sr.SE	10	7	3	0
2	JE	4	1	3	0
Sub Total (A)		14	8	6	0
3	Ch. OS	1	1	0	0
4	OS	2	1	1	0
Sub Total (B)		3	2	1	0
5	Sr. Tech/ELF(Power)	34	35	0	-1
6	Sr. Tech/Arm winder	4	4	0	0
7	Tech. Gr-I/ELF/P	68	48	20	0
8	Tech. Gr-II/ELF/P	11	16	0	-5
9	Tech. GIII/ELF/P	19	04	15	0
10	Tech. Gr-I/Arm winder	8	3	5	0
11	Tech. Gr-II/Arm winder	1	1	0	0
12	Tech .Gr-III/Arm winder	3	0	3	0
13	Helper	19	1	18	0
Sub Total (C)		167	112	61	6
Grand Total (A+B+C)		184	122	68	6

SOUTHERN RAILWAY

Office of the
Deputy Chief Electrical Engineer
Central Workshop, Golden Rock
Trichy-620004

Lr.No .K/E/150/Note
20-02-2021

SDGM/MAS

Sub: work study to review the staff strength in Electrical Millwright Shop
CWS/GOC-reg.

Refl (i) SDGM/MAS Ir.No. G.275/WSSR-152021/20-21 date 11-02-2021

(ii) SDGM Ir.No.G275/WSSR-162021/20-21 dt.14-07-2020

With reference to the above letter cited, the Work study for the year 2020 in EMW. SSE/EMW Shri.S.Ganesan has been nominated (Since he is in charge SSE) for giving all details and OT hours etc. to the work study team. Finally work study inspector discussed and submitted the "Work study" report on 29.12.2020 submitted. Now remainder has come from SDGM office on 11.02.2021 to submit reply from our side on or before 26.02.2021. As per CWM's approval the EMW shop position is enclosed herewith.

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Dy.CEE/S/GOC