

Note # 1

Sub: 651920 - Works study to review the Electrical Staff strength of AC Loco-LW/PER.

A draft work study was sent with recommendation of surrender of 37 surplus posts. Remarks were received from WM/LW/PER on 17.12.2020. After considering the remarks now it is proposed to surrender 16 posts as surplus. Papers are submitted for kind approval please for release of work study.

12/02/2021 1:26 PM

P.T.MALARVANNAN
(CWSI/S/PLG/HQ/SR)

Note # 2

Respected Madam,

The work study to review the staff strength of Electrical wing at AC Loco / PER has identified 16 posts as surplus for surrender.

Submitted for approval please.

12/02/2021 4:13 PM

D.JAYARAMAN
(DYCPLO/SR)

Note # 3

Approved

15/02/2021 2:14 PM

V.G.BHOOMA
(SDGM&CVO/SR)



WORK STUDY TO REVIEW THE STAFF
STRENGTH OF ELECTRICAL WING AT
AC LOCO/PER

SOUTHERN RAILWAY

PLANNING BRANCH

G.275/WSSR-651920/2019-20

**WORK STUDY TO REVIEW
THE STAFF STRENGTH OF
ELECTRICAL WING AT AC LOCO/PER**

STUDIED BY

**WORK STUDY TEAM
OF
PLANNING BRANCH**

FEBRUARY 2021



INDEX

CHAPTER NUMBER	CONTENTS	PAGE NUMBER
(i)	ACKNOWLEDGEMENT	1
(ii)	TERMS OF REFERENCE	1
(iii)	METHODOLOGY	1
(iv)	SUMMARY OF RECOMMENDATIONS	2
CHAPTERS		
I	INTRODUCTION	3-4
II	PRESENT SCENARIO	5-14
III	CRITICAL ANALYSIS	15-21
IV	PLANNING BRANCH'S REMARKS ON CO- ORDINATING OFFICER'S VIEWS	22
V	FINANCIAL SAVINGS	23
ANNEXURES		
I	SANCTION, ACTUAL & VAC GIVEN BY WPO/LW & WM/LW/PER	24



(i)
ACKNOWLEDGEMENT

Work Study Team conveys its sincere thanks to CWM/LW/PER, Dy.CEE/E/LW, WM/E/LW, WPO/LW, SSE/GENL.AC LOCO/LW and other section Supervisors and 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 wing at AC LOCO/Loco Works/Perambur - Extra Division.

(iii)
METHODOLOGY

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

- 1) Collection of details.
- 2) Interaction with Officers and Supervisors.
- 3) Critical examination of the collected data and existing system of working.
- 4) Application of yardstick.



(iv)

SUMMARY OF RECOMMENDATIONS**Revised Recommendation:****Recommendation No.1**

8 posts of Tech-III / Mechanical in Level-3 (GP Rs.1900) are found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total - 8 posts)

Recommendation No.2

8 posts of Tech-III /Electrical in Level-3 (GP Rs.1900)are found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total - 8 posts)

(Net Total - 16 Posts)

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CHAPTER – I

1.0 INTRODUCTION

1.1 Loco Works/PER workshop is a vital and historical workshop of Mechanical department in Southern Railway. It caters not only the division of Southern Railway but also the most of the Indian Railways by giving its service in terms of Periodical Overhauling, POH/RC and other repair work for Locos and Coaches.

Loco Works/PER was established in the year 1856 for POH activities of Loco, Carriages and Wagon. Subsequently, in the year 1932 Carriage and Wagon POH is bifurcated as Carriage and Wagon Works/PER.

This is one of the composite workshops undertaking POH of Electric Locos, Diesel Shunting Locos, Coaches, Diesel Electric Multiple Units and Self Propelled ARTs. This workshop has also carved a niche for itself by successfully manufacturing ICF and EMU bogies and Elastic Rail Clips.

POH and POH/RC activities done for the AC Locos viz., WAG5, WAP1, WAP4 & WAG7. Of this, WAG5 and WAP1 are moderately old locos which require implementation of most of the RDSO modification and SMI's which are beyond regular POH or POH/RC activities. Most of the locos under POH will have lot of additional work as detailed below:

- heavy corrosion,
- centre pivot replacement in WAP1/WAP4 Locos.
- Crew friendly cab modification in RC Locos.
- CBC operating handle modification,
- PU painting,
- conversion of ARNO to SIV,
- provision of FDSCS,
- provision of SS pipe,
- conversion of Pneumatic panel to tri-plate panel,

- Hand brake modification,
- Centre pivot modification in WAG5 Locos.
- Conversion of FDCS Ver.2 to Ver.3
- Crew friendly cab modification in POH locos,
- modification to head light & marker light,
- TFP cooling pipe modification,
- SL modification,
- current sharing measurement on compact RS1,
- SJ base modification.
- Partial reconditioning of TM yoke,
- A9 trap modification,
- BP/FP extension pipe line modification,
- BP gauge modification etc.,

Loco Works workshop caters to the periodical overhauling and other needs of rolling stock AC locos of Southern railway as well as other railways.

1.2 The Loco Works workshop has brought several laurels in recent years. The prestige achievements by LW/PER workshop are mentioned as below:

- ✓ LW/PER has obtained ISO 9001:2000 & ISO 14001:2004 workshop.
- ✓ The role played by Loco Works in production of bio-diesel (pilot plant) is unique 2007-2008 was Platinum Jubilee for Loco Works, Perambur.
- ✓ Total area of Loco Works is 2,16,833 sq. mtrs. and covered area is 57,876 sq. mtrs.
- ✓ The present staff strength is around 2600.
- ✓ It is also housing the Material Technology Center of Southern Railway.

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CHAPTER – II

2.0 PRESENT SCENARIO

2.1 Office of the Dy.CEE /LW/PER

Dy.CEE/LW/PER is the head of the electrical wing who is assisted by WM and SSE/GENL./AC Loco.

2.2 The Electrical wing of LOCO WORKS/PER has basically sixteen shops/sections are as under:

Sl. No.	Section Name		Work Description
1	E1	Commissioning	Pre Testing, Commissioning of POH completed Locos
2	E2	Transformer	Transformer, Rectifier, SL, CHT, ATFEX
3	E2A	Contactor & Reverser	Electro Pneumatic, Electromagnetic contactor, Reverser, CTF, BA Panel
4	E3	Traction Motor	Traction motor 6 TM per loco
5	E3A	Auxiliary Motors	13 Auxiliary Motor consist of Arno converter, blower for TM MVRH, MPH, MVSL1,2.
6	E4	Tap changers etc.,	Relays, Meter, Tap changer, SIV, FDSCS, VCB, VCD, SPM
7	E5	Static Equipments	Switches, Head Light, Battery charger, Cab lights & Fans, RPS, Battery.
8	ERE	Erection	Cattle guard, CBC, Buffer, Draft gear, Roof, Wheeling, De-wheeling, Trench plate removal, loading HT Mesh Loading and unloading.
9	GR	General Repair	Corrosion Repair, Battery Box Overhauling, Super structure and maintenance, centre pivot, lookout glass, side wall glass sand box, foot step.
10	M1	Bogie Erection & Cleaning	Bogie (2 Nos. per loco) assembly, motor and wheel fixing and run test.
11	M2	Pneumatic	Loco Air Brake System, Pneu valves, EMU after cooler, Pantograph, HOM, pneumatic pipe lines.
12	M2A	Compressor	CP, MCP Main compressor, Auxiliary compressor.
13	RC	Re-cabing	Re-cabing work, cable attention of POH Locos
14	Paint	Painting	Cleaning & painting of Locos.
15	PPIO	Office	PPIO, AC Loco officers, Crane Drivers
16	Stores	Stores	Store, Non-stock, IDN, Bills, Scrap Disposal, AMs.

2.3 Staff Details - SAVE Statement

Category	Sanction	Actual	Vacancy	Excess
SSE	39	38	1	0
JE	18	7	11	0
Sub Total	57	45	12	0
Chief OS	1	1	0	0
OS	3	2	1	0
Jr. Clerk	1	1	0	0
Sub Total	5	4	1	0
Sr. Tech (Mech)	73	68	5	0
Sr. Tech (Elec)	82	76	6	0
Tech. Gr-I (Mech)	144	101	43	0
Tech. Gr-I (Elec)	161	116	45	0
Tech. Gr-II (Mech)	16	20	0	4
Tech. Gr-II (Elec)	18	22	0	4
Tech. Gr-III (Mech)	42	18	24	0
Tech. Gr-III (Elec)	47	21	26	0
Helper	0	3	0	3
GW staff	0	20	0	20
Crane Drivers	0	8	0	8
Sub Total	583	473	149	39
TOTAL	645	522	162	39

2.4 E1 – Commissioning Section

2.4.1 Pre-Testing, Commissioning of POH completed Locos

POH activities consists of :

- Bogie testing by Mechanical staff;
- Low Tension/High Tension testing by Electrical staff;
- Pneumatic Testing of circuits;
- Trouble shooting outside Locos to be attended at the earliest;

- Incoming Loco Testing and find out lay testing.

2.5 E2 – Transformer, Rectifier, SL, CHT, ATFEX

2.5.1 POH activities consists of

- Unloading of transfer
- Total Dismantling
- Overhauling Rectifier
- Smoothing Reactor
- SL Coil Cleaning
- ATFEX -Breaking register – Unloading, Air cleaning & Air washing
- Painting

2.6 E2A – Contactor & Reverser section

2.6.1 POH activities of Contactor and Reverser.

- Unloading of BA Panel
- Line Contactor
- Shunting contactor
- Unloading & Overhauling and Testing
- Loading to Panel
- Back to Loco
- Electro Magnetic contactor unloading from panels
- Loading
- SJ.

2.7 E3 - Traction Motor

2.7.1 POH activities for Armature:

- Motor testing
- IR Value
- Dismantling
- Armature skimming
- Under cutting

- Side cutting
- Washing
- Baking for 6 Hrs.

2.7.2 POH activities for Yoke:

- Motor testing
- IR Value
- Dismantling
- Armature skimming
- Under cutting
- Side cutting
- Washing
- Baking for 6 Hrs.
- Mechanical and Electrical Repair
- Varnishing
- Gas cutting
- Removing Linear
- Testing – VPT/MPT

2.8 E3A – Auxiliary Motors

2.8.1 POH activities consists of:

- Unloading of motors
- Auxiliary motors overhauling
- Dismantling of motors
- Cleaning of motors
- Oven baking – 120 °C - 12 to 13 Hrs.
- Vacuum pressure 60 °C
- Again baking – 130 °C – 12 to 13 Hrs.
- Slater preparation – Cleaning and tapping
- Terminal attention
- Surgical component test

- Resistance
- Rotor Removing
- Glover back checking
- Assembling of all stator and rotor
- Final pen test
- Loading in loco
- Loco testing and connection
- Earth stunt fixing
- Fixing of guard
- Surge capacitor overhauling and fixing
- Terminal cover.

2.9 E4 – Tap changers

2.9.1 POH activities:

- Tap changer overhauling
- Vacuum Circuit Breaker
- Relays five types overhauling
- Voltage meters overhauling
- Nox repeater two types
- Speedo meter overhauling
- Relay testing
- Meter testing

2.10 E5 – Static Equipments

2.10.1 POH activities:

- Loco cab equipments
- Master controller
- BL Box – Switch
- TB Board
- Headlight, Masher & flash light etc.,
- Push button, switches, pedals switches.

2.11 ERE – Erection

2.11.1 POH activities:

- Wheeling
- Dwelling
- Puffer
- Cattle Guard
- Roof
- Flashing plate
- Panel mesh
- CPC coupling.

2.12 GR – General Repair

2.12.1 POH activities:

- Corrosion attention
- Main door, HT Compartment, Sun Vizer, Repair attention and Corrosion
- Look out glass, side wall glass, corridor glass, Panel door, EMC glass, Driver Seen and all door beedings.
- Water leak testing, RTV cylicon application for all rubber beeding and glass location.
- Panel doors removal and setting, Driver desk door, Head light, Flash Light doors, Horizontal Hand break door, B.D. panel door.
- Cabin windows assembly, conventional and modifying, removal, rectification and refitting.
- Foot step, sand box covers, corrosion and lid.
- Cattle guard rework
- Air filter, media replacement and fitting
- Floor mat, carpentry work, roof ceiling, Door way packing piece
- Cleaning work.

2.13 M1 – Bogie Erection & Cleaning

POH activities:

2.13.1 - Bogie

- State plate removal
- Sandwich pad removal
- Traction Motor removal

- Break Gear dismantling
- Break cylinder removal
- Break cylinder overhauling

2.13.2 – Bogie cleaning

- Bogie frame cleaning
- Break gear components cleaning
- AC Loco total spares from all sections cleaning
- Spring - Equalising BP.

2.13.3 – Bogie Assembling

- Bogie repair
- Crade Attention
- Replacement of wear liner
- Crumbling
- Centre plate
- Bowl attention

2.13.4 – Break gear

- Replacement of old bogies from bushers
- Assembling of break gear items
- Mounting of break cylinder

2.13.5 – Assembly area

- Tractor motor assembling
- Gear case assembling and run test
- Equalizing bream assembling
- Sandwich assembling

2.13.6 – Bogie frame lowering and wheeling.

2.14 M2 – Pneumatic

2.14.1 POH activities:

- Loco air break system
- Valve overhauling

- Equipments
- Mounting
- Under frame pipelines
- Circuits
- Pantograph
- Trouble shooting
- Testing.

2.15 M2A– Compressor

2.15.1 POH activities:

- Compressor unloading
- Compressor tray cleaning and painting
- Compressor pipeline – Drain and Delivery pipe removal, cleaning and painting.
- Dismantling of CP & MCP
- CP – Erection cleaning
- Compressor bed painting
- Oil corrosion cleaning
- Measurement cylinder replacing
- Aged compressor – DS8
- Copper pipeline assembling
- Compressor full assembling
- Run test after motor assembling – 2 Hrs.
- On run test for rectification
- Gear fixing
- Full set painting
- Loading
- Loco Run Test.

2.16 RC – Recabbling

- Recabbling of entire loco

2.17 Painting

- Painting inside and outside loco
- Painting in underframe
- Painting of all fitting equipments
- Erection & Traction Motor painting
- Bogie frame painting.

2.18 PPIO – Office

- Administrative office for AL Loco wing

2.19 Stores

- Store maintenance
- Non-stock items
- IDN
- Bills
- Scrap disposal
- AMs.

2.20 Distribution of staff and their duties as on Feb-2020.

Sl. No.	Section Name		Work Description	No. of staff
1	E1	Commissioning	Pre Testing, Commissioning of POH completed Locos	11
2	E2	Transformer	Transformer, Rectifier, SL, CHT, ATFEX	32
3	E2A	Contactor & Reverser	Electro Pneumatic, Electromagnetic contactor, Reverser, CTF, BA Panel	28
4	E3	Traction Motor	Traction motor 6 TM per loco	43
5	E3A	Auxiliary Motors	13 Auxiliary Motor consist of Arno converter, blower for TM MVRH, MPH, MVSL1,2.	22
6	E4	Tap changers etc.,	Relays, Meter, Tap changer, SIV, FDCS, VCB, VCD, SPM	34
7	E5	Static	Switches, Head Light, Battery	31

		Equipments	charger, Cab lights & Fans, RPS, Battery.	
8	ERE	Erection	Cattle guard, CBC, Buffer, Draft gear, Roof, Wheeling, De-wheeling, Trench plate removal, loading HT Mesh Loading and unloading.	23
9	GR	General Repair	Corrosion Repair, Battery Box Overhauling, Super structure and maintenance, centre pivot, lookout glass, side wall glass sand box, foot step.	29
10	M1	Bogie Erection & Cleaning	Bogie (2 Nos. per loco) assembly, motor and wheel fixing and run test.	65
11	M2	Pneumatic	Loco Air Brake System, Pneu valves, EMU after cooler, Pantograph, HOM, pneumatic pipe lines.	60
12	M2A	Compressor	CP, MCP Main compressor, Auxiliary compressor.	10
13	RC	Recabbling	Recabbling work, cable attention of POH Locos	53
14	Paint	Painting	Cleaning & painting of Locos.	15
15	PPIO	Office	PPIO, AC Loco officers, Crane Drivers	18
16	Stores	Stores	Store, Non-stock, IDN, Bills, Scrap Disposal, AMs.	6
			TOTAL	480

3.0 CRITICAL ANALYSIS

The manpower requirement of AC Loco wing of LW/PER is calculated as per the norms followed in non-incentive sections.

- 3.1 Generally, Railway workshops are functioning with the incentive scheme. The methodology adopted for arriving Direct Workers requirement is as per the average monthly Allowed Time which is divided by the average monthly man hours of 267 for incentive scheme as prescribed in the Mechanical Code for Workshops. The Leave Reserve for the direct workers is worked out at the rate of 12.5%. Essentially indirect workers (EIW) and indirect workers (IW) are worked out at the rate of 15% of Direct Workers including Leave Reserve.
- 3.2 ***The present study of LW/PER is functioning under Non-incentive scheme. The methodology adopted as average monthly Allowed Time which is divided by the average monthly man hours of 200 for non-incentive to arrive at the requirement of Direct Workers and leave reserve is worked out at the rate of 12.5%. The allied activities such as material handling, office, stores etc., are considered by work study team on need basis.***
- 3.3 However, there is no fixed man hours/man days for each activity in the shop. The data given for actual working days taken for completing the each loco for POH outturn for the last three years i.e., from 2017-18 to 2019-20. Further, the given actual working days are not standardized one. Therefore, the workstudy team has not considered to calculate the man power requirement based on the given actual working days.
- 3.4 Further, the Railway Board has fixed the target for AC Loco/LW/PER for the three years from 2017-18 to 2019-20 as 63, 65 and 74 respectively. The actual Outturn given for AC Loco Vs Actual staff utilized against the

Railway Board target has been given for the above three years. Hence, the work study team has considered and calculated the man power requirement based on the Railway Board Target and actual outturn given for AC Loco wing for last two years i.e., 2018-19 & 2019-20.

The details of Artizan staff excluding Supervisors and Ministerial staff utilized for AC Loco wing is tabulated below:

For the year 2018-19		
Period	No. of Staff	Outturn
Apr - 18	506	5
May - 18	503	5
Jun - 18	494	5
July - 18	491	5
Aug - 18	494	5
Sept - 18	490	5
Oct - 18	490	5
Nov - 18	489	6
Dec - 18	493	3
Jan - 19	512	7
Feb - 19	507	7
Mar - 19	500	7
TOTAL	5969	65
Average/month	497	5.42
Average staff/AC loco	91.69 or 92 approx	
Apr - 19	497	6
May - 19	496	6
Jun - 19	490	6
July - 19	485	6
Aug - 19	483	6
Sept - 19	482	6

Oct - 19	489	6
Nov - 19	479	7
Dec - 19	480	6
Jan - 20	479	6
Feb - 20	475	7
Mar - 20	469	6
TOTAL	5804	74
Average/month	484	6.16
Average staff/month/AC loco	78.57 or 79 approx	

From the

above
table, the

average Artizan staff per loco is given below:

For the year 2018-19 - 92 per AC Loco

For the year 2019-20 - 79 per AC loco.

The manpower requirement has been deviated from the year 2018-19 and 2019-20 is 13. The said achievement of 79 staff per AC loco per month (2019-20) is possible by allowing overtime and through outsourcing activities, modernization of technology etc.,

3.5 Overtime details for the year 2019-20 (74 Locos):

Month & Year	AC Loco POH		AC Loco On-Line		Total Hours	Total Amount in Rs.
	Hours	Amount in Rs.	Hours	Amount in Rs.		
Apr – 19	10892.0	49,26,378	470	95,257	11362.0	50,21,635
May– 19	9474.5	45,09,993	510	1,04,700	9984.5	46,14,693
Jun – 19	9296.0	45,06,655	456	94,753	9752.0	46,01,408
July– 19	9273.0	45,86,714	456	93,957	9729.0	46,80,671
Aug – 19	9258.5	46,45,095	564	1,18,954	9822.5	47,64,049
Sep – 19	9255.0	46,34,449	570	1,21,311	9825.0	47,55,760
Oct – 19	9267.0	47,46,136	480	1,06,109	9747.0	48,52,245
Nov – 19	9159.0	48,00,056	686	1,52,220	9845.0	49,52,276
Dec – 19	9197.0	47,86,542	624	1,39,476	9821.0	49,26,018
Jan – 20	9595.5	48,16,572	207	50,026	9802.5	48,66,598
Feb – 20	9005.0	47,08,679	834	1,86,220	9839.0	48,94,899
TOTAL	1,03,672.5	5,16,67,269	5857	12,62,983	109529.5	5,29,30,252

Avg./month	9425	46,97,025	533	1,14,817	9957	48,11,841
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From the above table it is seen that, overtime paid is Rs.5,29,30,252 for 11 months and on an average Rs.48,11,841/- per month for POH and On-line of AC Locos.

3.6 Outsourcing of activities on contract as on 19.02.2020 pertaining to AC Loco/LW/PER

Sl. No.	Description of Estimates	No. Of men	Value in Rs.
1.	Repair of Bench vice on quotation basis Revenue A/c. – Qty. – 15 Nos. Dt.28.11.2018	--	39825
2.	Provision of top operated handle in place of bottom operated handle for conventional Locos Dt.17.07.2018.	2 men	191160
3.	Cleaning Scrubbing for 90 days at AC loco shop o quotation basis Revenue A/c.	--	298210
4.	Hydraulic pressing machine cylinder and piston repairing Dt.04.06.2018	--	39000
5.	PU paint shed for AC loco shop	--	295000
6.	Repairing of platform Trolley at AC Loco shop, E3 section dt.19.12.2018	--	10620
7.	Centre pivot and side bearer attention of WAG-5, 10 Locos and Centre pivot attention of WAP-4 – 10 Locos of AC Electric Locomotives during POH dt.03.12.2018.	3 men	148680
8.	Repairing of Hydraulic Cylinder for scissor lifting table at AC loco shop, E2 Section.	--	12980
9.	Repair of vacuum drying plant Qty.-1 No. Dt.15.10.18.	--	499140
10.	Complete repair of mini van Mahindra maximo TN-01 AT-3658 Dt.05.11.18.	--	39990
11.	Safety Ladder climbing Loco Roof 3 Nos. Dt.21.11.18.	--	84075
12.	Repairing of Hydraulic Scissor Lifting platform of M2 section cylinder	--	24190
13.	Fabrication of storage racks, multi stacking stands etc.,	--	354000
14.	Double stacking mechanical section of AC Loco shop at LW/PER	--	424800
15.	Conversion of Head Light Frames	--	47200
16.	Outsourcing of gas cutting works	2 men	98312
17.	Repair of Motor Gear for Cable cutting machine	--	24780
18.	Repair of Motor gear for Cable Rolling machine	--	24190
19.	Cleaning of Debris and Non-ferrous scrap	2 men	383500
20.	Corrosion Repair of AC loco Body at AC Loco shop LW/PER	3 men	116820
21.	Repair & Rectification Battery Box at GR section of AC Loco shop	3 men	123900
22.	Blowing booth for SL & RSI – for E-2 Section of AC Loco shop LW/PER	--	103840
23.	SL Cross bar modification	--	46020
24.	SL 30 Titing Jig	--	11800
25.	AMC for Cable cutting	--	35400
26.	AMC for Cable Rolling	--	14160

27.	Repairing of Pantograph work stand	--	17700
28.	Repairing of Blower pump at E2 section at LW/PER	--	24780
29.	Completion of incomplete safety ladder at E1 section	--	11800
30.	Modification of Hand brake assembly gear type arrangement	3 men	159300
31.	Provision of Top operated handle of CBC in place of bottom operated handle	3 men	155760
32.	Loading and unloading of Dr. Desk and AC-2 panel	3 men	177000
33.	Repair & Rectification Battery Box at GR section of AC Loco shop (60 LOCOS)	4 men	481440
34.	Corrosion repair of AC loco body at AC loco shop LW/PER (500 Mtrs.)	4 men	344560
35.	Modification in the pinion end portion of Armature shaft of Traction Motor type HS 1050Er./HS 15250 at E3 section	--	424800
36.	Repair and modify the Hydraulic lifting table from suit unloading of Reverser and CTF from BA panel for E2A section at AC loco shop LW/PER	--	21240
37.	Centre pivot and side bearer attention of AC Electric locomotives	3 men	392232
38.	Repairing of Hitachi Traction Motor top and bottom lug	3 men	339840
39.	Cleaning of TM components 444 sets.	--	445332
40.	Welder and gas cutting activity of M1 & M3 section for a period of 20 days at AC loco shop LW/PER. Dt.09.01.2019	--	37760
41.	Repair of Battery operated platform truck-4 Nos. Available at AC Loco Shop LW/PER quotation basis under Revenue A/c.	--	24544
42.	Painting of PU Paint shed structural members of AC Loco Trip Shed dt.03.09.2019.	--	47200
43.	Fabrication of material storage Rack, multi stacking etc., of AC Loco shop, LW/PER Qty. – 20 Tonne Dt.16.10.19.	--	472000
44.	Conversion of RAAPTFP panel MCR type capacitor to MSR capacitor of AC Loco Shop LW/PER.	2 men	268686
45.	Repair of Loco Nos.23807 & 23374 at GR section of AC loco shop LW/PER Dt.15.05.19.	2 men	152810
46.	Modify fabrication of safety ladder for claiming Loco Roof available at Pit No.2 of E1 Trip shed at LW/PER – QTY – No.1	--	11800
47.	Provision of modified wheel type Hand brake assembly fitment in POH AC Locomotives. Dt.16.04.19 Qty. – 30 Nos.	3 men	159300
48.	Modification of Gear wheel 77 teeth to suit Modification of Gear wheel 77 teeth to suit Taochi conversion as per RDSO Drg. No.SKDL-4456 Qty.-6 Nos. Dt.12.12.19.	--	33264
49.	Repair/Rehabilitation of Centre pivot assembly - 60 Nos. – ELWE207-2016 – Centre Pivot dt.05.07.2017.	--	18000000
50.	Up-gradation of smoothing reactor – 15 Nos. ELW-SL-30-2018 Dt.01.11.2018.	--	6841050
51.	Repair and Rehabilitation of Copper winding type 5400 KVA loco main transformer – 4 Nos. ELW-TFP-5400KVA – 2018 DT.06.09.2018.	--	8623440
52.	Provision of Crew friendly cab in AC Locos – 30 Locos ELW-CFCS-30RT-2018 dt.29.10.2018.	--	4842720
53.	Cleaning of Traction motor components – 774 sets. (3870 nos.) ELW-TM-CLEANING-2018 dt.13.11.2018.	--	1321992

54.	Annual contract for transportation of AC loco equipments -6 + 1.5 Lakh TKM. ELW-ACL-TRANSPORT-18 dt.13.11.2018.	--	2291400
55.	Removal and Refitting of flooring plates – 65 locos ELW-ACL-FLOORING PLATES -2018 dt.14.12.2018.	--	1495251
56.	Provision of SS pipes in AC electric locomotives – 65 Locos – ELW-ACL-SS PIPE-65-2018 dt.09.01.2019.	--	18676450
57.	Repair/Rehabilitation of copper winding type 3900 KVA loco main transformer 4 nos. – ELW-ACT-TFP-3900KVA-RT-2018 DT.09.01.2019.	--	8363430
58.	Repair, rehabilitation and conversion of SL-42 type smoothing reactors to SL-30 – 10 Nos. ELW-SL-30- CONVERSION-2018 DT.28.01.2019.	--	5679786
59.	Re-shafting of Auxiliary motors – 59 Nos. ELW-RESHAFT-AUX-2018, DT.02.04.2019.	--	820828
60.	Cabling works in CFC locos during POH-20 locos. ELW-RC-CFC-RT-2019 DT.02.05.2019.	--	1789942
61.	Cleaning of AC Locos during POH – 65 Locos LOA NO.ELW-ACL-CLEANING-2019 DT.10.05.2019.	--	1400000
62.	Repair/Rehabilitation/Reconditioning of Co-Co trimount Bogie- 20 Nos. LOA No.ELW-ACL-RECAB-CO-CO-2019 dt.23.05.2019.	--	12833420
63.	Re-winding of Auxillary Motors ELW-ACL-RW-RT2 dt.16.08.2019	--	1079200
64.	Polyurethane painting of Electric Locomotives at LOCO works, ELW-PER-PU-PAINT-16-2019 dt.29.08.2019.	--	1481904
65.	Stress relieving of WAP4/WAG5 casted Bogie frames – 50 Nos, casted Bolsters – 25 Nos. ELW-ACL-STRESS-RELIEVING-2019 dt.21.10.2019.	--	3318750
66.	Rehabilitation of Tap changer – 6 Nos. ELW-ACL-TAPCHANGER-2019 DT.07.11.2019.	--	11115600
67.	Transportation of material, hiring of lorry along with 6 men. ELW-ACL-MAT-TRANS-2019 dt.09.11.2019	--	2560000
68.	Implementation of Bio-metric attendance system at Loco Works, Perambur, Chennai. ELW-ACL-BIOMETRIC-2019 dt.15.11.2019.	--	2738839
69.	Removal and refitting of flooring plates ELW-FLOORING PLATES-2019 DT.03.01.2020.	--	3358564
70.	Corrosion Repair of AC Locos ELW-CORROSION-REPAIR-2019 dt.03.01.2020.	--	2179059
71.	Dismantling of Motorized Bogies of WAG7/WAG5 and WAP4 Locos	--	1646100
72.	Transportation of railway equipment by 9T/16T lorry between Loco works to other workshops/sheds across IR.	--	3056000
73.	AMC: AMC of Abro make Dynamic balancing machine – 3 yrs. ELW-PER-AMC-ABRO-19 dt.24.07.2019.	--	165200
	TOTAL	45 men	13,33,73,665

It is seen from the above table, as given by the AC Loco wing that, the Contract work for various activities of AC Loco is for a total value of Rs.13,33,73,665/-.

Since huge amount is involved for maintenance/POH activities at AC Loco Wing on contract, the work study team used to take 35% to 40% of the contract/outsourcing value of maintenance/POH activities as a generally accepted practice.

The value is taken and converted into man days for outsourced activities that can be reduced from the sanctioned strength in order to arrive the net requirement of staff strength.

3.7 However, the work study team has not taken any man power on this account. Further, it is suggested to use the man days saved on account of Contract for the future requirement such as, any increase in the target or any new activities entrusted etc.

Therefore, the work study team has concluded that the requirement of staff per AC loco per month is based on the year **2019-20 i.e., as 79 staff per AC loco per month**

3.8 Requirement of Artizan Staff:

Therefore, the manpower requirement of Artizan staff for AC Loco per month is calculated as detailed below:

Average Monthly target of AC Locos	-	6.16
Manpower per AC Loco	-	79

Staff requirement at AC Loco/PER (6.16 x 79)	-	487
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LR @ 12.5% (60.75)	-	61
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One staff for Trainee Reserve in each

Electrical and Mechanical	-	2
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Total staff	-	550
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Hence, the requirement of Artizan staff is 550 for 6.16 AC Locos per month including LR.

3.9 Supervisors:

The work study team has considered the work load of Supervisors against the existing Artizan staff and section wise and allowed the Supervisors wherever necessary as detailed below. However, the allowed Supervisors may be inter changed to the sections as per work load as desired.

Sl. No	Section Code	Section Dealt with	Actual Artizan staff	Actual Supervisors			Supervisors allowed by Work Study		
				SSE	JE	Total	SSE	JE	Total
1	E1	Commissioning	11	2	1	3	1	1	2
2	E2	Transformer	32	2	1	3	1	2	3
3	E2A	Contactor & Reverser	28	1	1	2	1	1	2
4	E3	Traction Motor	42	3	0	3	3	1	4
5	E3A	Auxiliary Motors	22	1	1	2	1	1	2
6	E4	Tap changers etc.	33	3	1	4	2	1	3
7	E5	Static Equipments	31	2	0	2	2	1	3
8	ERE	Erection	23	2	0	2	2	0	2
9	GR	General Repair	29	3	0	3	3	0	3
10	M1	Bogie Erection & Cleaning	65	3	1	4	3	2	5
11	M2	Pneumatic	55	3	1	4	2	2	4
12	M2A	Compressor	10	1	0	1	1	0	1
13	RC	Re-cabling	53	3	0	3	3	1	4
14	Paint	Painting	15	2	0	2	2	0	2
15	Stores	Stores	6	2	0	2	1	0	1
16	PPIO	PPIO, Office, Crane Driver & Welder	18	5	0	5	4	0	4
17	Overall In-charge SSE		0	0	0	0	1	0	1
	Sub-Total		473	38	7	45	33	13	46
18	LR at 12.5% (for 46 Supervisors - 5.75 say as 6)						4	2	6
19	Trainee Reserve as one Supervisor						1	0	1

	Total	38	15	53
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3.10 Ministerial Staff:

The existing sanction strength of 5 i.e., Ch.OS – 1, OS-3 & Jr.Clerk – 1 but the actual staff is 4. For the welfare measure of staff under the AC Loco wing for the day to day activities, the existing 5 ministerial staff along with the some Artizan staff is allowed on Office account. Hence the work study team has allowed continuing as such.

3.11 Trainee Reserve: The work study team has also considered 3 staff (1 for Supervisor and 2 for Artizans) the staff may attend various training regarding AC Loco, Advanced Electrical/Mechanical Courses, Refresher courses etc.,

3.12 Sanction Vs Requirement:

Category	Sanction	Actual	Requirement	Surplus
SSE	39	38	38	1
JE	18	07	15	3
Ministerial	5	4	5	0
Artizan	583	473	550	33
TOTAL	645	522	608	37

It is seen from the table, the actual strength is 522 against the sanctioned strength of 645 and the net vacancy is 123. The work study team has calculated and fixed the staff strength requirement as 608. Hence, the work study team has identified 37 posts in various categories and the detailed recommendation is summarized as below:

3.13 Summary of Recommendation Vs Requirement:

Category	Sanction	Actual	Requirement	Surplus
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SSE	39	38	38	1
JE	18	7	15	3
Total - A	57	45	53	4
Chief OS	1	1	1	0
OS	3	2	3	0
Jr.Clerk	1	1	1	0
Total - B	5	4	5	0
Artizan Mechanical				
Sr. Tech	73	68	73	0
Tech.Gr.I	144	101	136	8
Tech.Gr.II	16	20	16	0
Tech.Gr.III	42	18	31	11
Total - C	275	207	256	19
Artizan Electrical				
Sr. Tech.	82	76	82	0
Tech.Gr.I	161	116	156	5
Tech.Gr.II	18	22	18	0
Tech.Gr.III	47	21	38	9
Total - D	308	235	294	14
Others				
Helper	0	3	0	0
GW staff	0	20	0	0
Crane Drivers	0	8	0	0
Total - E	0	31	0	0
TOTAL (A+B+C+D+E)	645	522	608	37

3.14 RECOMMENDATIONS :

The following posts in various categories are identified as surplus and recommended for surrender as given below:

Recommendation No.1

One post of SSE in Level-7 (GP Rs.4600) and 3 posts of JE in Level – 6 (GP Rs. 4200) is found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total - 4 posts)

Recommendation No.2

8 posts of Tech-I / Mechanical in Level-5 (GP Rs. 2800) and 11 posts of Tech-III / Mechanical in Level-3 (GP Rs.1900) are found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total-19 posts)

Recommendation No.3

5 posts of Tech-I / Electrical in Level-5 (GP Rs. 2800) and 9 posts of Tech-III /Electrical in Level-3 (GP Rs.1900)are found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total-14 posts)

(Net Total - 37 Posts)

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CHAPTER – IV**4.0 PLANNING BRANCH'S REMARKS ON CO-ORDINATING OFFICER'S VIEWS:****Co-ordinating Officers Views:****(i) AC loco Shop Capacity: - 60 Locos / Year**

The man power details of AC loco shop for the last three years has been tabulated below,

Year	Outturn Locos (a)	Average Locos per Month (b)	Average strength per Month (c)	Over time		Men from Out sourcing (f)	Total Average Men per month (g) = c + e + f	Average Men per Loco (h)
				Average OT hrs per Month (d)	Average Men /month in terms of OT (e)			
2017-18	58 (46 + 12)	4.83	520	7862	79	18	617	127
2018-19	65 (54 + 11)	5.4	497	7560	76	24	597	110

2019-20	72 (60 + 12)	6	484	9461	95	105	684	114
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The average men per loco have been calculated duly taking OT hours and out sourced man power in to account due to short fall of man power. AC loco shop is already running short of man power. However in work study report it was taken as 79 men/loco/month.

From the above table **the average men/loco for the last three years : 117 men.**

With respect to work study draft report there is a difference of (117 – 79) = **38 men/loco. Man Power required for 6 locos out turn per month : 6 x 117 = 702 men.**

Supervisors required (For non incentive shop) is 1:11. As such for 702 men : 63 Supervisors are required. Short fall in Supervisor : 63 – 45 = **18 supervisors.**

Planning Branch Remarks:

It is seen from the above table, there are lot of variation about Out turn, Average Loco per month, Average strength per month, Total average men per loco. The work study team is analysed briefly on Co-ordinating Officers views as follows:

- 1) In 2017-18 average loco per month is 4.83 against the staff strength of 520 per month and total average men per month is 617 including Average men per month in terms of OT 79 and Men from outsourcing is 18 and Average men per loco is 127.
- 2) In 2018-19 average loco per month is 5.4 against the staff strength of 497 per month and total average men per month is 597 including Average men per month in terms of OT 76 and Men from outsourcing is 24 and Average men per loco is 110.

The difference between average loco per month is 0.57 (5.4 – 4.83 for the year 2017-18 & 2018-19).

3) In 2019-20 average loco per month is 6.00 against the staff strength of 484 per month and total average men per month is 684 including Average men per month in terms of OT 95 and Men from outsourcing is 105 and Average men per loco is 114.

The difference between average loco per month is 0.6 (6 – 5.4 for the year 2018-19 & 2019-20).

From the above two differences, the real actual ratio of man power requirement of average men per loco as:

A) For 2017-18, Average loco per month	-	4.83
Total Average strength per month	-	617
Average men per loco	-	127

For 2018-19, Average loco per month	-	5.4
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Therefore, Average men per loco (5.4 x 127/4.83)	-	142
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But the actual average men per loco is 110 as per the views of Co-ordinating Officer.

B) For 2017-18, Average loco per month	-	4.83
Total Average strength per month	-	617
Average men per loco	-	127

For 2019-20, Average loco per month	-	6.0
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Therefore, Average men per loco (6 x 127 /4.83)	-	158
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But the actual average men per loco is 114 as per the views of Co-ordinating Officer.

From the above consequences, there is no standardized Yardstick/Benchmark for man power requirement. The man power arrived by Co-ordinating Supervisor as well as Work study team is arbitrarily from

monthly out turn against the target. It shows that the unit has able to achieve the target by manning the available staff, along with OT works, Outsourcing, efficient management/supervision etc., The work study team appreciated for the achievement of Board's target with the available source.

Even though, the actual staff strength of 522 against the sanction of 645 and the net vacancy is 123, whatever the Railway Board target given the unit has been achieved the target with the actual staff only with the O.T. and Outsourcing activities. Since, the work study team may take the actual staff strength of 522 as yardstick/benchmark, but the work study team has arrived as 608 for all category of staff is enhanced for future out turn. The OT and Outsourcing value as given below:

Total OT value per year	-	Rs.5,29,30,252/-
Outsourcing value per year	-	Rs.13,33,73,665/-

Co-ordinating Officers Views:

(ii) The man power calculation restricted only to AC Loco shop.

In which there are also associate shops for assisting POH of AC Locos which are Wheel & Tyre shop, Mill wright shop, M&PR shop, Electrical shop, CMT etc., The man power calculated above is not taking this shop activities and of exclusively for AC loco shop only.

Planning Branch Remarks:

The monthly out turn represent all the activities associate with POH/RC of AC Loco.

Co-ordinating Officers Views:

(iii) As per RB direction, the time taken for POH of WAP4 & WAG7 is 24 working days and for WAG5 & WAM4 is 28 working days.

By considering last three years out turn data, the total number of locos as per target was achieved, however the average number of days taken is 34 days for POH and 53 days for POH+RC which was due to inadequate number of staff strength.

Planning Branch Remarks:

The Unit may enhance the staff for OT and Outsourcing to follow the Railway Board direction accordingly.

Co-ordinating Officers Views:

Further to the above, there is no designated supervisor for PCO wing of AC Loco shop which is being handled by the shop supervisors. As on date, from AC Loco account total 5 supervisors (2 supervisors are working in progress section and 3 supervisors are working in Dy.CEE office for RSP, contracts and CTA).

All the above supervisors are being deputed from AC Loco shop.

In AC Loco shop, being a non-incentive shop, there is no designated inspection supervisors. Hence the inspection work of entire AC Loco shop (consist of 14 sections) is being handled by the section supervisors, which further enhance the requirement of supervisors.

Planning Branch Remarks:

CWM/LW/PER and HOD's may take decision for separate designated Supervisors for AC Loco PCO Wing.

The individual shop Supervisors has to inspect the day to day activities of the concerned section regularly.

However, the work study team is allowed the Supervisors Sanction and Actual as 57 & 45 respectively.

Co-ordinating Officers Views:

POH Shop capacity is 60 Locos. However, 72 locos were turned out during 20-21 and these excess 12 locos over shop capacity was managed by booking overtime and out sourcing some activities.

Planning Branch Remarks

As per views of Co-ordinating Officers 72 Locos for the year 2020-21 and the average per month is 6. These are already discussed in para No.3.8.

Co-ordinating Officers Views

The target for 2021-22 is fixed as 81 Locos during the POH co-ordination meeting by Railway Board. AC Loco targets are being increased due to POH demand of AC Locos across IR. This necessitates further requirement of Artizan staff and supervisors to meet the revised target. Some works are already outsourced due to shortage of man power. The outsourcing has been done by showing the vacancies.

Hence it is not possible to surrender any post in Supervisor as well as in Technician category.

In view of the above, it may please note that the reduction of 4 supervisors post and 33 post of Artizan will not possible to surrender and it is requested that the reduction of staff & supervisor may be reviewed.

Planning Branch Remarks:

Railway Board revised target letter not provided by CO's remarks for the year 2021-22. However, necessary action may be taken by the administration to fill up the vacant posts.

The work study team has considered and arrived the man power of 629 (608 + 4 Supervisors + 17 Artizans) instead of 608 in the draft work study report to achieve the revised Railway Board target of 81, against the

sanction strength of 645. But, the actual man power on date is 522. The difference between man power arrived and actual staff strength is 107. Still there are 107 vacancies for provision of Outsourcing. Further, OT may also be enhanced to the staff as required to achieve the target.

Therefore, the work study team is revised the recommendation for surrender of posts from 37 to 16.

Summary of Revised Recommendation Vs Requirement:

Category	Sanction	Actual	Requirement	Surplus
SSE	39	38	39	0
JE	18	7	18	0
Total - A	57	45	57	0
Chief OS	1	1	1	0
OS	3	2	3	0
Jr.Clerk	1	1	1	0
Total - B	5	4	5	0
Artizan Mechanical				
Sr. Tech	73	68	73	0
Tech.Gr.I	144	101	144	0
Tech.Gr.II	16	20	16	0
Tech.Gr.III	42	18	34	8
Total - C	275	207	267	8
Artizan Electrical				
Sr. Tech.	82	76	82	0
Tech.Gr.I	161	116	161	0
Tech.Gr.II	18	22	18	0
Tech.Gr.III	47	21	39	8
Total - D	308	235	300	8
Others				

Helper	0	3	0	0
GW staff	0	20	0	0
Crane Drivers	0	8	0	0
Total - E	0	31	0	0
TOTAL (A+B+C+D+E)	645	522	629	16

Revised Recommendation:

Recommendation No.1

8 posts of Tech-III / Mechanical in Level-3 (GP Rs.1900) is found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total - 8 posts)

Recommendation No.2

8 posts of Tech-III /Electrical in Level-3 (GP Rs.1900) is found excess to the requirement and the same may be surrendered and credited to the Vacancy Bank.

(Total - 8 posts)

(Net Total – 16 Posts)



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	Grade pay (Rs.)	No. of post	Money value (Rs.)	Annual Financial savings (Rs.)
1.	Technician/Gr.III - Mechanical	1900	8	48,614	46,66,944
2.	Technician/Gr.III - Electrical	1900	8	48,614	46,66,944
Total			16		93,33,888

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ANNEXURE-I**SANCTION, ACTUAL & VACANCY OF AC LOCO/LW/PER GIVEN BY
WPO/LW/PER & WM/LW/PER:**

Category	Sanction	Actual	Vacancy	Excess
SSE	39	38	1	0
JE	18	7	11	0
Total Supervisors	57	45	12	0
Chief OS	1	1	0	0
OS	3	2	1	0
Jr. Clerk	1	1	0	0
Total Ministerial Staff	5	4	1	0
Artizan Mechanical				
Sr. Tech	73	68	5	0
Tech.Gr.I	144	101	43	0
Tech.Gr.II	16	20	0	4
Tech.Gr.III	42	18	24	0
Total	275	207	72	4
Artizan Electrical				
Sr. Tech.	82	76	6	0
Tech.Gr.I	161	116	45	0
Tech.Gr.II	18	22	0	4
Tech.Gr.III	47	21	26	0
Total	308	235	77	4
Others				
Helper	0	3	0	3
GW staff	0	20	0	20
Crane Drivers	0	8	0	8
Total	0	31	0	31
Grand Total	645	522	162	39

* NET VACANCY – 123

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