SOUTH EASTERN RAILWAY

REVIEW OF STAFF STRENGTH

VIS-À-VIS WORKLOAD AT

DLS/KGP

Past

Present

EFFICIENCY CELL,
GARDEN REACH, KOLKATA – 700 043.

STUDY NO. EFF/933

S Y N O P S I S

1.	Name of the work study		Review of the staff strength vis-à-vis workload at the DLS/KGP.
2.	Terms of reference		The study has been taken up as per PCME's letter no ME/438/Misc./W.Study/MPP/Pt./38 dated 04.02.20 and approved by AGM/SER.
3.	Aim		Review staff strength vis-à-vis workload&make an assessment of the manpower required at the Shed considering the workload, yardsticks, IR Average and other factors.
4.	Projected manpower re-deployment/ surrender.		Surrender-**105 Vacant Posts.**
5.	Anticipated/projected savings		Rs 477 lakhs per annum (approx)
6.	No of recommendations made		Two
7.	Critical analysis & observations		Analysis done considering changed scenario and other factors and on that ground, calculation is done for assessing required men power based on IR's Revised Yardstick & latest benchmark
8.	Brief note on recommendations		**Rec-I** :The factors like existing workload after recent change, future planning of expansion, probable growth, activities outsourced, Revised Yardstick, latest benchmark are taken into consideration for calculating exact manpower required for smooth functioning of the shed(Para 4.0.7). It has derived that strength of 605 men power is sufficient enough to cope-up with the purpose. The present on roll strength is 633 against 710 Sanction Strength in which **108 posts are vacant** and **31 posts are excess**. **The study team is in the opinion of reducing sanction strength to 605 by surrendering 105(710-605) surplus posts from available vacancy.** **Rec–II:** At present cleaning activity and material transportation are conducted through outsource agency and as per common centralized AMC policy maintenance contracts of SIV components, MBCS gadgets including *MEDHA,* Alstom apparatus are only under AMC backup as implemented for locos of all sheds. To reduce staff cost vis-a-vis overall cost, some of the core and some non-core activities may be outsourced viz. Loco Blow-Out during schedule, Bogie maintenance work *and any other* activity whatever department think better for the shed. The shed may outsource manpower for computer Data Entry Operation in statistical section and record keeping section.
9.	Department concerned		Mechanical&Electrical.

C O N T E N T S

C H A P T E R - I

1.1 INTRODUCTION

In Railway Transportation System Locomotive is one of the most vital parts for train operations. Depending upon load and gradient of a section, appropriate powerful engine is ordered during formation of a freight train in a yard. Similarly High Speed Passenger Locomotives are used for hauling high speed mail/express trains and comparatively less powerful/old locos are utilized for passenger/local train services. Moreover, without an engine a train could hardly move an inch so, to provide smooth, efficient and hassle-free service to its users/customers and to earn productive output and lucrative revenue, maintenance and up-keeping of Engines became the foremost priority for Railway administration. With the progress of time, Railway organization is developing rapidly. The historic journey of Railway system in India, which once begun with some small Steam Locomotives have gradually upgraded to Diesel and then powerful Electric Traction Locos. At present Electric locos with 6000 Horse Power capacity are mostly used for freight service operation and in critical sections multiple of this category are utilized to generate more tractive force for clearing the steep grades when required. Coaching services are dealt with high speed locos like WAP5, WAP7 and WAP 4 category. To increase Section Capacity Right Powering is one of the crucial factors, The Railway administration in apex level is continuously focusing on augmentation of capacity and power of locomotives. Recently a great achievement bagged by Indian Railway as finally able to make the highest powerful beast with indigenous effort (make in India) having capacity of 12000 Horse Power Goods Loco at Madhepur Rail Engine Karkhana. In diesel segment WDG-6G category are the highest powerful in the country, interestingly it is world's lightest 6000 HP Diesel Locomotive. In 60's the dieselization of traction was introduced on busiest routes with a view to improve the speed of railway transport. In the year 2000, the steam locos were totally phased out and all the trains are switched either to diesel or electric locomotives. In 1962, India imported 72 WDM-4 diesel locomotives from General Motors, USA and homed at diesel shed Mugalsarai to provide necessary maintenance to these locomotives. But due to reduction of steam locos and increase in railway traffic, requirement of diesel locomotives were increased. To meet this goal, Indian Railway introduced state manufactured diesel locomotives WDM-2 at Diesel locomotives works /Varanasi. However, work for electrification of all non-electrified areas remains continued and is progressing rapidly phased wise. It's not too far when entire TKM of nation's Rail Network will became electrified. Day by day use of diesel traction is reducing and a day in near future will come when service of Diesel Locomotive may come to an end as same as it was happened with steam loco in past. However, even in the high time of electrification, the importance of Diesel loco cannot be ignored at least in the present scenario as it is still providing service in main lines of non-electrified section and used specifically for shunting purposes in yards of even electrified sections due to its ability of conducting fast shunting operations. In our zone, electrification is almost covered the entire portion except Bhanjapur to Bangripusi in Rupsa-Bangripusi section of KGP division (will be electrified very soon) and Tata-Badampahar Section of CKP division. The requirement of diesel locomotives are decreasing in our zone and numbers of electric locos are increasing, interestingly our zone is holding 961 Electric Locos which is highest in IR at present.
The diesel loco sheds are gradually converted into electric loco sheds. This study which deals with Review of staff for Diesel Loco shed at KGP is also turned into Electric Shed. However, same staff are utilized to perform work for Electric Locos in place of Diesel Locos. The competent staff those were efficient in mechanical work are gradually becoming skillful in electrical work too. The present study on DLS/KGP is having holding of 150 Electric Loco, 01 Diesel Loco, 15DEMU& 01 SPIC at present.
The study has been taken up as per PCME's letter no ME/438/Misc./W.Study/MPP/Pt./38 dated 04.02.20 and approved by AGM/SER.

Methodology

The following methodology is taken into consideration during conducting the Study:

i) Data collection and its critical analysis.

ii) Work sampling, analytical estimation, and yardstick in vogue, if any, to assess the performance of staff.

iii) Held discussions at various levels including Officer & Sr. Supervisors

iv) Assess the manpower required for achieving targets under holding and out-turn

v) IR Benchmark analysis & Revised Yardstick of Railway Board.

C H A P T E R - II

BRIEF HISTORY &STAFF STRENGTHOF DIESEL LOCO SHED/KGP:

2.1 BRIEF HISTORY :

In the beginning it was an old steam shed converted to diesel loco shed on 01-09-1986. Total Area of the shed is 85,840 sq.mts. (Approx.) & Covered Area is 14,500 sq.mts. (Approx.)

The Initial homing capacity of the shed was 60 during 1987 which was enhanced to 100 in 1995. One of the important mile stone is that of the shed is commissioning of Bio-diesel plant of 2 KL per day capacity was commissioned in June 2006. Further augmentation of facilities of maintenance of DEMUs undertaken from 2010. At present the shed is completely working on Electric loco with holding of 150 Nos (100 WAG7 & 50 WAP4), 01 Diesel Loco, 15 DEMU (DPC) & 01 SPIC. Present On Roll position of Staff is 573& 60 Supervisors who are working under guidance of Sr DME(D)/KGP.

The Diesel loco shed KGP provides reliable locos for hauling mail/exp, passenger and freight trains over South Eastern Railway. To keep the locos in good running condition, this shed carried out inspection as well as periodic schedules and out of course repairing. The periodicity of maintenance schedules have been enhanced and notable innovations/modifications are being incorporated time to time along with replacement of components & parts.

2.2 STAFF STRENGTH(As on 01.03.21):

A. Supervisors:

Sl	Category	Level	Sanction			Existing			Vacancy			Excess		
			Mech	Elec	Tot	Mech	Elec	Tot	Mech	Elec	**Tot**	Mech	Elec	Tot
1	Sr.Section Engineer	L-7	29	22	51	21	16	37	8	6	**14**	--	--	--
2	Jr. Engineer	L-6	15	10	25	10	13	23	5	0	**5**	--	3	3
Total			44	32	76	31	29	60	**13**	**6**	**19**	--	3	**3**

B. Skilled Artisan:

Sl	Category	Level	Sanction			Existing			Vacancy			Excess		
			Mech	Elec	Tot	Mech	Elec	Tot	Mech	Elec	Tot	Mech	Elec	Tot
1	Sr.Tech	L-6	65	43	108	59	38	97	6	5	11	0	0	0
2	Tech I	L-5	125	84	209	107	73	180	18	11	29	0	0	0
3	Tech II	L-4	18	12	30	24	19	43	0	0	0	6	7	13
4	Tech III	L-2	51	35	86	59	31	90	0	4	4	8	0	8
Total			**259**	**174**	**433**	**249**	**161**	**410**	**24**	**20**	**44**	**14**	**7**	**21**

C. Ancilliary Artisan:

Sl	Category	Level	Sanction	Existing	Vacancy	Excess
1	Sr.Tech	L-6	14	11	3	0
2	Tech I	L-5	27	26	1	0
3	Tech II	L-4	4	6	0	2
4	Tech III	L-2	10	10	0	0
Total			**55**	**53**	**4**	**2**

D. Unskilled:

Sl	Category	Level	Sanction	Existing	Vacancy	Excess
1	Kh Helper	L-1	106	75	31	0
Total			**106**	**75**	**31**	**0**

E. Laboratory Staff:

Sl	Category		Sanction	Existing	Vacancy	Excess
1	CMS	L-7	5	6	0	1
2	CMA	L-6	2	1	1	0
3	Lab Asst	L-2	8	6	2	0
Total			**15**	**13**	**3**	**1**

F. Ministerial Staff:

Sl	Category		Sanction	Existing	Vacancy	Excess
1	Chief OS	L-7	04	04	0	0
2	OS	L-6	08	9	0	1
3	Sr Clerk	L-4	02	01	1	0
4	Jr Clerk	L-2	02	0	2	0
5	Sr Steno	L-6	1	0	1	0
6	Peon	L-1	04	02	2	0
7	Typist	L-6	0	1	0	1
8	SSE(DRG)	L-7	1	1	0	0
9	TADK	L-1	1	0	1	0
Total			**23**	**18**	**7**	**2**

G. Canteen Staff:

Sl	Category	Level	Sanction	Existing	Vacancy	Ecxess
1	Bearer cum W/boy cum Tea maker	L-1	02	04	0	2
Total			**02**	**04**	**0**	**2**

H. SUMMERY OF CADRE STRENGTH:

Sl	Category			Sanction	On Roll	**Vacant**	Excess	Clear Vacancy
A	Supervisors	Mech	SSE	29	21	**8**	**0**	8
			JE	15	10	**5**	**0**	5
		Elect	SSE	22	16	**6**	**0**	6
			JE	10	13	**0**	**3**	-3
B	Skilled Artisan	Mech	Sr Tech	65	59	**6**	**0**	6
			Tech-I	125	107	**18**	**0**	18
			TechII	18	24	**0**	**6**	-6
			TechIII	51	59	**0**	**8**	-8
		Elect	Sr Tech	43	38	**5**	**0**	5
			Tech-I	84	73	**11**	**0**	11
			TechII	12	19	**0**	**7**	-7
			TechIII	35	31	**4**	**0**	4
C	Ancillary Artisan		Sr Tech	14	11	**3**	**0**	3
			Tech-I	27	26	**1**	**0**	1
			TechII	04	6	**0**	**2**	-2
			TechIII	10	10	**0**	**0**	0
D	Un-Skilled			106	75	**31**	**0**	31
E	Laboratory			15	13	**3**	**1**	2
F	Ministerial Staff			23	18	**7**	**2**	5
G	Canteen Staff			02	04	**0**	**2**	-2
Total				**710**	**633**	**108**	**31**	**77**

C H A P T E R – III

3.0 EXISTING SYSTEM OF WORKING

3.0.1 Section wise Workload vis-a-vis distribution/assignment of Staff :

Section	Description of Duty	Supervisr		Break up of Staff					Tot
		SSE	JE	Technician				Hel per	
				Sr	I	II	III		
M1 & M2	Checking & inspection of i) Bogie Frame, vertical and lateral damper, centre pivot and rubber bush, side bearer bolts. ii) Helical springs, damper for oil leakage, Equalizer beam and Compensating beam. Horn stay bolts iii) Brake Block, Brake Shoe, Brake shoe bolt/nuts , Split pins, & Washer. iv) CBC, side buffer, cattle guard, yoke pin plate, draft gear plate, striker casting & their bolts. v) fixing bolts of motor suspension unit, nose pin vi) nose pad, cardium compound level and adding vii) Hand brake, Axle box, Sand box viii) wheel for flat Tire, skidding marks, damage of flange & crackness ix) Brake block changing, brake adjustment, pouring cardium compound, loco placement and MU formation etc. x) out of course repairing xi) Attention to Diesel locomotives working in KGP Divn as and when required xii) Liasoning with various divisions through HQrs and TLCs.	5	1	10	18	5	8	5	**52**
M3	Checking/Attention/ Maintenance Schedule to : I) Both Pantos, servo motors, materialize carbon skip, main spring, Roof Equipment, II) Lubrication of all articulation Joints III) Over hauling of Panto & Servomotors IV) DP testing of PT at Critical locations V) All maintenance schedule work VI) Testing & Operation of Servo motors VII) Spring Tension VIII) Removal, overhauling and fitment of Pantos IX) All out of course repairing X) various modification work.	1	2	9	13	1	8	6	**40**
M4 (ANC)	i) Preventive and brake down maintenance of plant and machineries ii) Welding and Gas Cutting iii) Wheel turning iv) Loco Superstructure work, Roof Checking, Cab Room Checking, and necessary attention v) Painting work and development work vi) Machine work vii) crane operation/supervision viii) whiting jack maintenance and operation ix) Development work.	3	1	12	16	5	8	4	**49**
M5A (Compressor)	i) Preventive /brake down maintenance of compressor ii) alignment CP/MCP iii) Greasing the coupler iv) overhauling of CPs v) Testing of over hauled CPs vi) Taking measurement of LP & HP Cylinders: Bore, piston, ring gap, Clearance in Cylinder, Gudgeon pin size, Connecting rods with crank shaft assembly viii) Alignment ix) out of course repair.	2	1	5	14	0	4	7	**33**
M5B (Air Brake)	i) Checking/ Attention to : CDC wiper servo motors (both cab), rubber houses (BP, FP, MU hose, Bogie hose), Brake application and releasing time by A-9 (Goods position) (from both cabs), all angle cock, ii) Overhauling of Air brake valve (A9, SA9, MU2B, Air Dyer etc.) Horn filters, BA1+2 (SA9 & A9) 1+2 SMGR, DJ/VCB, magnetic unload-er valve RGCP, Horn1+2, PT 1+2, Sander, Wiper 1+2 SB filter and fitment. iii) CP 1+2+3, CR, MR 2+3, MR 3+4, CPA, DJ-NRV OH, and (CP 1+2+3) NRV Changing in OH and Horn valve overhauled gauge to fit. v) Checking/attention to : D1, D2, R6, AFMV, C3W, VEF(M), F1 & Auto drain valve. vii) Overhauling of Both cab MRBC & BP , angle cock, ACC NRV. viii) Trouble shooting ix) Multi unit formation and testing etc.	1	2	10	16	1	4	5	**39**

Section	Description of Duty	Supervisor		Break up of Staff					Tot
		SSE	JE	Technician				Helper	
				Sr	I	II	III		
MSC Pipeline	i) Checking all pneumatic pipe lines and its maintenance ii) leakage checking and repair iii) Removal of pipe lines for removing pneumatic items iv) Fitting of all the pipe lines after schedule attention /fitment of overhauled pneumatic items v) initial and final testing.	1	1	3	5	1	2	0	**13**
M6 Under Gear	i) overhauling of bogie frame, Provision of T-Type TIE Bar ii) Attention to TRACTION MOTORS, NOSE SUSPENSION BOGIE PIVOT CASTING & SIDE MOUNTING PAD SEQUILIZER BEAMS, SUSPENSION SPRINGS, CBC COUPLER AND TRANSITION SCREW COUPLING, MOTOR SUSPENSION UNIT, AXLE BOXES, GEAR CASE, BRAKE GEAR SLACK ADJUSTER, HAND BRAKE, SANDER, RAIL GUARD, CATTLE GUARD iii) DPT of WHEEL & AXLE, CBC iv) Wheel Dia/profile monitoring v) T/Motor changing wheel changing coupling buffer, break cylinder etc maintenance and changing vi) Derailment checking and repair.	3	2	9	21	2	12	9	**58**
E1 & E2	i) Checking of BA box, battery box & battery electrolytes level and top up, proper fitment of packing, BA cable conduct pipe, Specific Gravity, Battery Voltage. ii) Battery Charger iii) TRANSFORMER BLOCK, TFP oil, A33 bushing, TAP CHANGER, RGR, CGR, RPGR, Coils iv) SMGR v) contacts of EMC (C101, C102, C103, C105, C106, C107, C108). contractors and Aux assembly. Interlocks. Vi) Connection and foundation of capacitors across ARNO & CP 1+2+3 terminals, arc chutes, power cables and control cables, C118 copper shunt , mobile contact, Split pin, and fixation of Arc chutes. Vii) cleaning of armatures back portion, viii) Inspection of rotating switches, HVSI-1&2, HVSL-1&2, HPH, ZCPA ix) Continuity of interlock with continuity tester, BD coupler, mobile & fixed contacts of reverser & CtF, J/CTF servomotors, Auxiliary (BDC) contacts of CTF & reverser, mobile contacts of shunting & line BL boxes, contactors, SHF & SHA /SHTM, R118 and its power cables x) inspection & schedule attention of i) DBR-BA Panel-2. ii) BL Boxes iii) SB Panel iv) Master Button Switches v) Foundation Checking vii) Grating fitment viii) CGR1, CGR2 & CGR3 ix) TAP CHANGER x) SMGR xi) ZSMGR xii) Rotating Switches I.e., HPH, HVSL-1&2, HVRH, HVMT-1&2, HMCS-1&2, HCP, HSIV, HRVT, HVCD, HBA xii) Fuse Board xiii) RSI SB Head Light, MU, JUMPER, & Fix Couplers xiv) All electro valves () VESA-1&2 of both cab, VEPT-1&2, VEUl 1,2,3, VEA, VEF, IP MV-4 xv) BL Boxes, Master Controller(MP), ZPT, SI, PC & MP Couplers, Push Button Switches, SB Terminals, Paddle Switches, Marker Lamps & Gauge Lamps, CAB Heaters xvi) Transformer Block: (Bushing Checking), Grating Fitment.	7	5	12	20	8	23	9	**84**

Section	Description of Duty	Supervisor		Break up of Staff					Tot
		SSE	JE	Technician				Helper	
				Sr	I	II	III		
E3	Checking/Inspection : Duct, Cables, bearing oil leakage from MPH, cleat, grommet & its proper fitment, condition of cables & lugs (MVSI & MVSL), carbon brush, commutator, MVRF (SMI 199 & 152) for MVMT, motor cooling fan (MVMT & MVRH), MVSI, MVSL ii) Greasing all bearings iii) checking of all CE & Grease Cover & Pinion end Shield iv) Dressing/Cutting of Traction motor cables v) Examination of commutator surface for flash mark, grooves, fusion crashed segments, high mica. Vi) Mica cutting & chamfering vii) cleaning brush holder insulators, vii) Overhauling Traction Motor, Auxiliary motors, ARNO viii) Testing and fitting of overhauled TM, AM and ARNO ix) All light schedule, Heavy Schedules, and out of course repair/attention of TM, AM & ARNO	4	0	14	28	4	7	7	**64**
E4	i) Centre hood disconnection ii)VCB:- fitting roof equipment inspection , ET 1+2, Measurement , incoming and Air drier incoming pipe changing, HOM Valve overhauling & fitting, BV I/L inspection, RC Network value checking, Air Dryer Molecular Sieve Changing, Coupler,/ Cable lugs inspection. Iii) VCD: Main unit and cab unit Insp, Terminal Board Insp. Cable Lugs tightness and bunching, resetting switch Inspection, removal of main unit, cab unit during IOH overhauling. Iv) MPCS:- Control unit insp, coupler and cable Lugs tightness, earthling shunt connection and bunching, TMCSU 1+2, Display unit 1+2, SCU & PT Inspection v) Pressure Switches: QPDJ changing and cable bunching, RGEB-2 changing and cable bunching, RGCP Changing and cable bunching P1&P2 changing and cable bunching, RGAF changing and Cable bunching, SWC changing & cable bunching, QPH changing & Cable bunching vi) C118: RC-Net. Value, chronometer relay changing and OH Fitting, vii) BLOWER RELAYS: QVMT1+2 fitting and Cable bunching, QVSI 1+2 Flitting & Cable bunching, QVSL 1+2 Fitting & Cable bunching, QVRH Fitting & cable bunching, QVRF with pipe line fitting. Viii) Sequential Relays: Q45, Q46, Q 49, Q 50, Q51,! 52, changing with cable bunching, QRS, QVCD, QEMS, QFL, QSIT, Q100, QWC changing with cable bunching. Ix) SAFETY RELAYS: QOP1+2, QOA, QLM, QLA, Q30, QE, QF 1+2, QRSI 1+2, changing with cable bunching x) SIGNALLING RELAYS: QV60, QV61, QV62, QV63, QV64, QVLSOL, changing with cable bunching xi) TIME DELAY RELAY: Q44, Q118, Q119, PR1 & PR, QTD101, QTD105, QTD106, Q48, QSVM, QCON, changing and cable bunching xii) OTHER RELAYS: QD1+2, Q20, QCVAR, changing with cable bunching. Xiii) FLASHER LIGHT: Remove both Cab Flasher and light control unit for O/H , cable for Flasher light unit, both cab flasher light LED Hood, Remove both cab flasher light LED Hood ivx) Cab Meters: UBA meter changing with O/H, Both cab UA, KA Meter, UMT Changing with O/H and cable bunching. Xv) CHBA AMMETER inspection and Calibration, RU value. Xvi) OHE VOLTAGE SENSOR: Condition of sensor unit at Roof and cleaning of Control unit and display unit and their connectors xvii) VISUAL INDICATION PANEL xviii) CAB BUZZER inspection xix) CENTER HOOD RECONNECTION.	2	1	9	10	3	4	7	**36**

Section	Description of Duty	Supervisor		Break up of Staff					**Tot**
		SSE	JE	Technician				Helper	
				Sr	I	II	III		
E5	Inspection : Transformer & Oil Circuit: 1. removal of oil circuit from Transformer top including RPS, MPH, Radiator, Flanges Priming pipe 2. checking of all bushings and its cables, Gasket and 'v' cock, MPH cock and Three way cock copper washer, A33 bushing , Turret inspection and silicon Grease iv) Oil Leakage fro TFP Tank, TFP safety valve, TFP Breather,.v) Checking: Continuity across A0-A33, a3-a4, a5-a6, a0-a1,a7-a8, IR Value to all bushing winding resistance of A-A33, A0-A3, a3-a4, a5-a6, a0-a1, a7-a8apply 230V AC supply to A0-A33, Voltage appearing at the a3-a4, a5-a6, a0 - a1, a7 - a8 terminals, auxiliary bushing capacitance value. ii) Changing of silica Gel, Silica Gel pot Gasket, TFP Drain Cock Gasket iii) FITMENT:- TFP OI Circuit , oil Cooler radiator and RPS, centrifuging of TFP Oil, DGA, BDV, Acidity and water contents iv) Maintenance of GR (1. checking: Head Shaft Oil Leakage, Contact Arm, Lantern Gear Electrical Glow discharge, Load test, 2. Making and braking of CGR 1,2, 3 CGR1 CLOSE/OPEN CGR2, CLOSE/OPEN CGR3 deflection o contact Arm. 3. changing:- all pipe line copper washer, silica gel and cork grain 4. RGR: Cleaning, Checking of resistance value, m- value, short link cable connection) v) RPGR checking of resistance value vi) SMGR (1. Dismantling main Cylinder, 2. Control Cylinder, 3. Control Block, 4. Control Lever, 5. MG6/6 and MG4/5 Valves/A&B valves for O/H) vi) Changing of main Cylinder Bucket 'U' Section Ring vii) Greasing viii) Control Block O/H and re-fitment, cylinder O/H ix) Cleaning of control lever and lubricating Guide Pin portion with Transformer oil, x) MG 6/6A and MG4/5 or A&B valves cleaning and lubrication of spring Guide with TFP Oil, xi) O/H of control unit , Resetting the control Unit, xii) Checking of AUX. BBC interlocks and cleaning xiii) Changing of selector lever, guide pen and spring, xiv) Checking of Sector lever guide pin play, fly wheel play, Gap between fly wheel and intermediate gear, xv) Pipe line copper washer changing , xvi) Greasing in the manual operating mechanism (MOM) Box. Xvii) Checking of cleeve or bunching or grommet xviii) Lubrication of Air Motors, xix) Blowing out dust of RSI Block and 2 Block: Cleaning of all the Diod and RC Components , DBR, RPS, R118, SL, Master Controller, BA1 Panel, BA2, BA3 Panel, BA1, BA2/BA3 Piston , Auxiliary and control cable, Traction motor cable, Misc. 1, Misc 2, Misc3 xx) Over Hauling and Testing: Electromagnetic Contactor , line contactor Shunting Contactor, C145/S118 contactor , REVERSER/CTF, Naster Controller MP, BL Switch Box, NC4 Electro valve , PHGR, Notch Repeater SI and Notch Transmitter SG, C-118 Electromagnetic contactor, Load Switch CGR, ZSMGR/ Reducing Valve, programme Switches, SMGR Control Block, Twin Bim Head Light, DC/DC converter, TFVT	1	2	9	13	4	13	7	**49**
DEMU Elect + Mech	**15 nos of DEMU DPC Maintenance:** All Preventive and Brake down maintenance of i) Power pack ii) Generator iii) power transmission system iv) Traction Motors, V) Gear Case vi) Suspension bearings Vii) Truck frame maintenance, brake rigging, CBC, Cattle Guard, ,, viii) Air Brake system ix) Wheel And Axles x) Rake formation and testing xi) Maintenance of SPIC	2	0	0	5	3	2	0	**12**

Section	Description of Duty	Supervisor		Break up of Staff					Tot
		SSE	JE	Technician				Helper	
				Sr	I	II	III		
Speedometer	I) Maintenance of Microprocessor based electronic speed cum Energy Monitoring system (ESMON) II) Removal & O/H and fitment III) Testing of ESMON IV) Downloading of Recorded data rand it its keeping.	1	1	0	4	2	0	0	**8**
Material	Material collection from different Electric & Distribution	2	0	2	3	0	0	3	**10**
Tool Room	I) Record keeping of all Tool & Plans II) Record keeping of all Plant & Machinery. III) Issuance of Tools to Staff on day to day basis. IV) Procurement of tools as warranted time to time V) Condemnation of Tools & Plants and its disposal.	0	0	2	3	2	1	0	**8**
Statistical Section	I) Statistical data recording like Loco History ii) Schedule positioning and planning iii) failure analysis and its corrective measure. Iv) Loco movement and utilization.	2	0	2	0	1	1	0	**6**
Bk Down Crane	Maintenance and operation of 140 Ton Bk Down Cranes of KGP Division	0	0	2	2	0	0	0	**4**
CRD	Posted I central Received and dispatch section of DLS/KGP	0	0	0	0	0	0	1	**1**
DPC	Deputed in power control office for monitoring of proper movement of loco motive and liasoning with the division	0	0	0	0	0	0	0	**1**
Sports	Deputed in Sport cell of KGP Divn	0	0	0	0	0	0	0	**1**
STC (Trg.JE)	6 (Six) Staff have been selected for undergoing INT. JE Training at STC/KGP. On Completion of successful training they will be promoted to JE.	0	0	0	1	3	2	0	**6**
DRM Driver	Deputed for driving the inspection car of DRM/KGP	0	0	0	0	0	0	0	**1**
Office	Being managed: I) Mechanical imprest Stores ii) electrical imprest stores iii) Establishment office iv) SR. DME(D)'s office v) Material Vi) Tender and Contracts	1	0	2	4	0	0	5	**28**
				Ch OS	OS	CTypist	Sr Clerk	Peon	
				3	9	1	1	1	
Laboratory	I) Ultrasonic testing ii) Dye Penetrant / Zyglow test iii) Bk Down Voltage test of Transformer oil , GR Oil Etc iv) Oil quality dissolved gas content in transformer oil v) Test , Material Testing Vi) Ferrogram of Grease etc of Electric Locos	CMS	CMA	Lab Asst-I	Lab Asst-III	2	0	1	**16**
		6	1	1	5				
Canteen	About 200 out station staff perform duty at DLS/KGP. Staff canteen is run on No Profit and No Loss basis for providing Tiffin/Tea & Lunch. 4 Staff are deputed for Cooking & Washing.			Wash boy: 3 Jr Masalchi:1					**4**
STC & BTC	1Selected for the post of Instructors at STC and BTC on deputation (I.e., for 5-8 Years tenure).	1	2	0	5	1	1	0	**9**
Accounts	Posted in Budget section of KGP Divisional Accounts Office	Ch OS:1							**1**
Total		**60**		**573**					**633**

3.1 **Training:**

The shed being converted recently from Diesel loco shed to Electric Loco Shed, a drastic change has been taken place in view of staff & supervisors working in this shed. The mechanical staff, so far had worked for Diesel Loco maintenance work are suddenly assigned to perform activities for Electric Loco maintenance. The job is different and new to them. In this type of situation training plays a crucial role to make staff acquainted with the new work and make them competent to perform those works. For training, both supervisors and staff of this shed were sent to ELTC/TATA phase wise. Meanwhile, due to Covid-19 pandemic situation Training are conducted through online.

Status of Training at present:

(Till 31.05.21)

Sl	Category	Existing	Trg Completed	Trg Due
1	SSE	36	36	Nil
2	JE	21	21	Nil
3	Sr.Tech	112	59	53
4	Tech-I	199	122	77
5	Tech-II	47	26	21
6	Tech-III	99	66	33
7	Helper	75	35	40
Total		589	365	224

3.2 **Performance vis-a-vis Output:**

At present KGP Loco Shed is holding 150 Electric Loco, 15 DEMU, 01 SPIC & 01 Diesel Loco. In addition to maintain stocks under holding, those have been attended and trouble shooting done for sudden failure locos at different locations within the division. In few occasion even major repair work has been done for rectifying the fault of such failure locos.
After conversion, the holdings of Electric Locos have gradually increased from 100 to 125 and finally 150.

The Performance (outturn) of last 6 month is as under:

A) Electric Locomotive:

Month	Loco Holding	Outturn					SCH Attention/Repair (Other Shed's Locomotives)			
		IA	IB	IC	Major sch. (TOH)	Total	Major Repair	Minor Repair	SCH	TOTAL
Nov'20	100	15	13	9	1	38	1	3	0	4
Dec'20	100	14	18	11	2	45	2	3	1	6
Jan'21	125	15	9	8	2	34	3	9	1	12
Feb'21	150	17	11	16	2	46	1	3	13	17
Mar'21	150	17	19	18	2	56	1	4	6	11
Apr'21	150	25	16	16	2	59	1	1	6	8
	TOTAL	**103**	**86**	**78**	**11**	**278**	**9**	**23**	**27**	**59**

B) Self-propelled Inspection Car (SPIC): 01

Trip (Every 7 days) and monthly (Ones in a month) schedule attended as per schedule arising in last six months. Trip inspection - 19, monthly inspection- 06.

C) DEMU Maintenance:

15 nos. DEMU DPC (1400 HP-12 & 1600 HP-03) are maintained in Kharagpur loco Shed.

Their due/arising schedule are attended on regular basis. 41 nos. trip schedule and 06 nos. monthly schedules attended in last six months.

D) Diesel Loco Maintenance:

01 No. WDS6 loco is under holding of ELKP for shunting use in shed premises. T40, T80 & quarterly schedule inspection done of this loco in last six months.

76 Nos. diesel locomotives (WDG3A & WDM3A) were stabled at Kharagpur Loco shed from Sept'2020, Some of these locos were attended for special trip schedule for their operation-ability as per Diesel HQ guidelines. Meanwhile the stable locos are gradually shifted to BNDM Diesel Loco Shed clearing scope for holding more electric locos in KGP Shed.

Apart from the above, other shed's diesel locomotives were attended (trouble shooting) at yards of KGP division as demanded by Divisional Power Controller through order numbers. 49 such locos are being attended in last six months.

3.3**FUTURE PLAN** :

(i) New Pit lines, OHE expansion work is in progress within the shed premises forhoming of Electric Locos.

(ii) Bench Setup for Electric Loco Maintenance is on progress

(iii) There is possibility of future expansion and enhance loco holding capacity.

3.4**ACTIVITIES OUTSOURCED**:

Being newly changed setup, outsourcing of activities has not been done yet for any segment except cleaning including garbage clearance and Transportation of materials. However, as per existing AMC policy for all Loco sheds, maintenance contracts for SIV components, MBCS gadgets including *MEDHA*, Alstom apparatus and other equipment are put under AMC for locos of this shed as well.

CHAPTER-IV

4.0 CRITICAL ANALYSIS:

4.0.1 The procedureadopted for maintenance of Electric as well as Diesel Locos, SPIC and DEMUs which are under holding and the other failure locos that arrived out of course for trouble shooting or for other reason includes a vast network of activities. Such activities are carried out regularly in this shed. In the workaholic environment, beside daily activities, some other out of track activity of innovating nature are also attempted time to time to ease ongoing system of working thus increasing efficiency & productivity of the shed. The recent attempt of producing Bio-Diesel using vegetable fats (from Jatrofa plant) is one of the remarkable efforts done in this shed and is remembered as a historical attempt yet failed to yield desired result.

The DLS at KGP has been converted into Electric Loco Shed in recent past but the workforce remains as it is.The workload of the shed has drastically changed after conversion into Electric Shed. Prior to conversion only a meagre number of Diesel Locos and DEMUs were under holding and were maintained by the shed, but after conversion initially 100 electric locos were put into holding which has gradually increased to 125 and then stand at 150 (125 of WAG7 category &25 of WAP4 category). In addition to that 01 Diesel Loco, 15 DEMU (DPC) & 01 SPIC are also under holding. Apart from this, some of the Diesel locos among the lot of 76 diesel locos stabled in the shed (*The stable locos are gradually shifted to BNDM phase by phase) are also attended as special trip schedule for checking up their operational-ability. Maintenance staff are also sent from the shed to attend failure locos for trouble shooting and rectify the fault in different place within the division including fueling point at KGP Yard. Some time even major repair has been undertaken to rectify the fault.

After conversion, a drastic change has taken place for existing staff specially staff from mechanical wing. Due to change they are assigned to work for an unknown Engine. In this scenario, to became acquaintance with the new work, they are imparted with training facility in phase wise from ELTC/Tata (at present training is conducted online due to covid-19 pandemic situation) Beside this, the staff are gaining knowledge day by day through practical working and gradually becoming competent in working. The existing electrical staff are playing as roll model as they are not only working but providing practical work experience to the diesel staff also. The ability of the existing staff are quite significant and praiseworthy as most of them are conversant with the new work comfortably. However, there are some aged staff from core mechanical wing those are yet to cope up with the new work, they are still fit only for diesel maintenance portion of activities but the workload in this portion is insignificant. The present On Roll strength of the shed is 633(573 Staff & 60 Supervisor), whoare working under Sr DME(D)/KGP.

4.0.2 CONTENT OF LOCO HOLDING : Within 6 month of conversion, the shed has assigned with workload of 150 conventional electric loco holding. This is undoubtedly very high and uncommon if, compared with past records of any converted loco shed in IR. SER being one of the high yielding zone in Indian Railway network, more numbers of locos are nominated for this zone to fulfil the requirement. The present electric loco holding of our zone is 961 which is highest in IR. To cope up with the workload and create space for newly added locos especially of WAG-9 & WAP-7category in existing Electric sheds, it was required to shift the load of WAG-7 & WAP-4 to any other place. This is one of the basic reason behind origin of an Electric Shed at KGP which has done by converting the existing DLS.Due to rapid increase in number of electric locos in our zone, there might be more such conversion would took place in near future. In view of this scenario, it is expected from every mechanical based staff to make a mind set to upgrade themselves with multi-skilling knowledge and became competent in all round activities to fulfill the demand of the day.

A comparative figure of the Electric Loco Sheds from where KGP shed has received the Locos:

TRS (Loco Shed)	Number of loco transferred	category	Holding before transfer (as on Aug'20)	Staff Strength		Holding after transfer (as on May'21)	Staff Strength	
				Sanc	OR		Sanc	OR
TATA	50	WAG 7	194	684	604	211	679	649
BNDM	75	WAG 7	204	703	592	191	703	608
SRC	25	WAP 4	110	303	308	86+18 D/Loco	344	346
Total	150		**508**	1690	1504	**506**	1726	1603

From the table it is clear that even after shifting of locos, the holding of the sheds remain almost same. More to this at TATA the holding cross the previous figure yet it had transferred 50 locos to KGP Shed.

4.0.3 PRESENTWORKLOAD AFTER CONVERSION: The existing workload of DLS/KGP could be segmented for Electric Locomotives & Diesel Locomotives including SPIC.

Electric Locomotives: The maintenance is carrying out various schedules like IA, IB, IC (Minor schedule) and TOH for Home Shed Locos and repairingof foreign shed locos come out of course due to failure.The average numbers of home loco handled (outturn) during last 6 months is 46.33 (278/6) (Para 2.0.2.A)in which holding was changing time to time and gradually increasing from 100 to 150. During this period, it had attended 59 foreign shed locos for repair averaging 10 (59/6) per month.

Diesel Loco: T40, T80 & Quarterly Schedule Inspection is conducted for maintaining Diesel Locos. At present the shed is maintaining only a single Diesel Loco which used for shunting purpose within the shed premises. Additionally the shed staff had attended 49 Diesel Locos i.e., 8.1 (49/6) per month for trouble shooting of such failure /Tripped locos in different locations within the division. The shed staff also conduct special trip schedule for checking operational ability of some of the diesel locos stabled in the shed, which is considered as 2 per month.

SPIC: 1 (one) SPIC is under holding in the shed. For its maintenance, 19 Trip inspections and 06 Monthly inspections are made in last 06 months.

DEMU: 15 nos. are under holding. 1400 HP-12 & 1600 HP-03.41 nos. trip schedule and 06 nos. of monthly schedule have been attended in last six months as a maintenance measure.

Moreover the heavy work in diesel section pertains to (i) Traction Motors (ii) Gear Case (iii) Suspension bearings (iv) Truck frame maintenance (v) brake rigging (vi) CBC (vii) Cattle Guard (viii) Air Brake system (ix) Wheel And Axles (x) Rake formation and testing are done as universal activity as same as done for electric locos.

4.0.4 PROCEDURE: The maintenance activities in the shed are primarily conducted in 14 sections viz M1, M2, M3,M4, M5A, M5B, M5C, M6, E1, E2, E3, E4, E5, DEMU section in addition to that Speedometer Section, Material Section, Tool Room and Statistical Section are present for managing the entire activity.

4.0.5 NORMS FOR ASSESSING MANPOWER: The shed at present have converted into a full-fledged Electric Loco Shed. Staff are conversant with new work and practically working for Electric Loco maintenance as primary work. For assessment of manpower Benchmarking is taken into consideration as it is based on dynamic and comparative analysis and thus is a very useful tool to manage efficiency, staff deployment and monitoring effects of improvement in working practice considering new technologies and level of outsourcing. Railway Board therefore directs all the units to achieve average of the Indian Railway Benchmark. However, RB's Yardstick certainly has been considered as the pattern of working has changed and staff are assignedwith new job in this shed.

4.0.6 APPLIED BENCH MARKING NORMS/YARDSTICK: E&R Directorate of Rly. Bd provides the benchmarking figures. As per RB's Man Power Ratio Report for Quarter Ending Jan-March'2021. Rly Bd. No. 2021/E&R/2(1)/1. The IR average benchmarking norms for Electric Loco Shed is 2.73 men per Electric Loco, 4.56 men per D/Loco (for DLS>80 holding) & 4.96 men per DEMU (DEMU Car Shed). At the same time Rly Bd. Last circular on MPP vide No E(MPP)2019/1/12 dated 30.9.19 yardstick for electric loco maintenance in loco sheds are distinguished in accordance to Type of loco viz for WAG-9 & WAP-7, 2.5 men per loco, for Conventional Passenger loco required manpower is 3.5 per loco and for WAG-7 it is 3.0 per loco. Considering newly conversion of the shed that holding all conventional locos and no outsourcing activities applied yet, the yardstick of MPP as per Bd's letter as above have been taken for calculating required manpower for Electric loco maintenance and for the DEMUs and D/loco, latest IR Benchmark is considered. There is a SPIC is also under holding however separate bench marking is not available for SPIC, so, it is consider as one DEMU for calculation purpose.

4.0.7 CALCULATION FACTOR:

(A) Electric Locos: The present work load as per performance of last 6 months figure (Para 3.2, A), the average outturn per month for Electric Loco is 46.33 (Home Shed) and 10 (Foreign Shed). During this time the shed experienced capacity augmentation and the holding has been gradually changed from 100 to 125 &then 150. For calculating the requirement of manpower for the part "Electric Loco" The revised yardstick of Rly Bd's on MPP vide No E(MPP)2019/1/12 dated 30.9.19 is taken into consideration :

Total No. of Electric Loco Holding	: 150
Number of WAG-7	: 125
Revised yardstick for WAG-7	: 3 per loco
Requirement	: 125 x 3 = 375 men.
Number of WAP-4	: 25
Revised Yardstick for WAP-4	: 3.5 per loco
Requirement	: 25 x 3.5 = 87.5 say 88 men
Men required for all 150 Locos	: 375+88= 463

(B) Regarding Diesel Loco : Only 1 D/Loco is under holding. For calculating requirement of men power in the shed for Diesel segment, latest IR benchmark is taken into considered.

No of Diesel Locos	: 1 (Holding)
Staff per loco (as per BM)	: 4.56
Requirement of staff	: 1x 4.56 = 4.56 or say 5 men.

(C) Regarding DEMU & SPIC : There are 15 DEMUs and 01 SPIC is under holding. Staff requirement:

No of DEMU + SPIC	: 15 +1 =16 (Holding)

*Separate Benchmark for SPIC is not available so, the SPIC is considered as one DEMU for calculation purpose.

Staff per DEMU (as per BM)	: 4.96
Requirement of staff	: 16 x 4.96 = 79.36 or say 80 men.

At present only 12 men are nominated for the DEMU DPC maintenance section (Para 3.0.1) however as per prevailing work setup the heavy maintenance portion like work of Traction Motors, Gear Case, Suspension bearings, Truck frame maintenance, brake rigging, CBC, Cattle Guard, Air Brake system, Wheel And Axles, Rake formation and testing etc are done in common platform with involvement of staff already deputed in those section. As such based on benchmark requirement of 5+80=85 men are considered

(D) Efficiency Factor, Training, Future Planning and other factors:
(i) All the 150 Electric locos under holding are either WAG-7 or WAP-4 and they both are conventional type and thus required more effort and time for maintenance. (ii) The portion of mechanical based staff are maximum as the shed was actually a diesel shed as such things are new to them. (iii) Due to covid-19 pandemic training are conducted through online process which has some limitation. (iv) A good proportion of staff are gradually capable in gaining competency however some of them specially aged people are

yet to cope up with the new work. (v) attendance for trouble shooting of outside locos (vi) Staff involvement for initial training (vii) Future expansion planning including IOH (Major sch.) which is supposed to be added as workload in near future.
Considering the above factors as applicable in the present situation a backup of 12% additional staff especially for Electric Loco maintenance is considered.

No of required staff for E/Loco maintenance	:	463 (as above 'A')
Staff (12%)	:	12 % of 463 = 55.56 or say 57
Requirement of staff	:	57 men.

(E) **TOTAL REQUIREMENT OF MENPOWER : (A+B+C+D) = 463+5+80+57 = 605**

C H A P T E R - V

RECOMMENDATIONS

The staff costs for IR is over 60% at present. To make Indian Railway a viable organization it is required to modernize the structure by grabbing most upgraded technology and consider outsourcing of some activities and ensure reduction in staff cost by proper man power planning. It is required to introduce multi-skilling for all staff and supervisors to improve productivity as well as to cope up with the enhanced work load without adding up new staff. In view of present scenario after recent change in the unit, following recommendation is made:

Recommendation – I :

The factors likeexisting workload after recent change, future planning of expansion, probable growth, activities outsourced, Revised Yardstick, latest benchmark are taken into consideration for calculating exact manpower required for smooth functioning of the shed(Para 4.0.7). It has derived that strength of 605 men power is sufficient enough to cope-up with the purpose. The present on roll strength is 633 against 710 Sanction Strength in which **108 posts are vacant** and **31 posts are excess**. **The study team is in the opinion of reducing sanction strength to 605 by surrendering 105(710-605) surplus posts from available vacancy.**

Recommendation – II:

At present cleaning activity and material transportation are conducted through outsource agency and as per common centralized AMC policy maintenance contracts of SIV components, MBCS gadgets including *MEDHA,* Alstom apparatus are only under AMC backup as implemented for locos of all sheds. To reduce staff cost vis-a-vis overall cost, some of the core and some non-core activities may be outsourced viz. Loco Blow-Out during schedule, Bogie maintenance work *and any other* activity whatever department think better for the shed. The shed may outsource manpower for computer Data Entry Operation in statistical section and record keeping section.

CHAPTER-VI

5.0 Financial Evaluation

In reference to the recommendations made in the study report the financial evaluation on the basis of surrender of 105 vacant posts is as under:

Sl	Desgn		Level	No. of posts	Mean Pay (1+10/2)	Avg. Pay	DA @ 17%	Monthly cost per staff	Total cost per month
1	SSE		7	14	44900-58600/2	51750	8798	60548	847672
2	SSE (DRG)		7	1	44900-58600/2	51750	8798	60548	60548
3	JE		6	5	35400+46200/2	40800	6936	47736	238680
4	Sr. Tech	SKILLED	6	12	35400+46200/2	40800	6936	47736	572832
5	Tech-I		5	29	29200-33300/2	31250	5313	36563	1060327
6	Sr.Tech	ANCLR	6	3	35400+46200/2	40800	6936	47736	143208
7	Tech-I		5	1	29200+38100/2	31250	5313	36563	36563
8	Kh.Helper		1	31	18000+23500/2	20750	3528	24278	752618
9	CMA		6	1	35400+46200/2	40800	6936	47736	47736
10	Lab Asst		2	2	19900+26000/2	22950	3902	26852	53704
11	Sr. Clerk		4	1	25500+33300/2	29400	4998	34398	34398
12	Jr.Clerk		2	2	19900+26000/2	22950	3902	26852	53704
13	Peon		1	2	18000+23500/2	20750	3528	24278	48556
14	TADK		1	1	18000+23500/2	20750	3528	24278	24278
TOTAL				**105**					**3974824**

The annual savings on account of surrender of 101 Posts = Rs. 3974824/- x 12

= **Rs. 4,76,97,888/-**

Say **Rs. 477 lakhs per annum approx.**

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