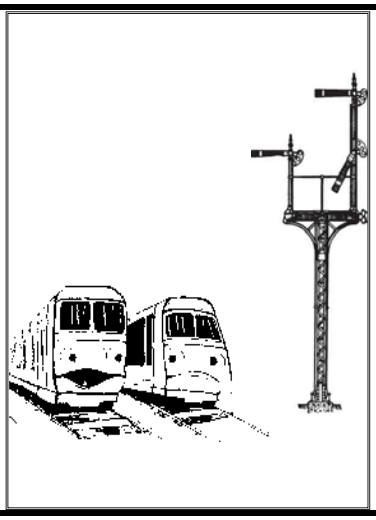
159147/2020/O/oDYCPLO/PLG/HQ/SR



G.275/WSSR/441920/2019-20

WORK STUDY TO REVIEW THE SIGNAL STAFF STRENGTH IN SSE/SIG/PGT & PGTN PGT - DIVISION

SOUTHERN RAILWAY

PLANNING BRANCH

G.275/WSSR-441920/2019-2020

WORK STUDY TO REVIEW THE SIGNAL STAFF STRENGTH IN SSE/SIG/PGT & PGTN PGT - DIVISION

STUDIED BY

WORK STUDY TEAM

OF

PLANNING BRANCH

JULY – 2020

(i)

INDEX

(i)
ACKNOWLEDGEMENT

The work-study team conveys its sincere thanks to DRM/PGT, ADRM/PGT, Sr.DSTE/PGT, DSTE/PGT, SSE/Signal/PGT & PGTN, other SSEs/JEs and all staff of Signal Branch of PGT Division for their valuable guidance and co-operation in conducting and completing the study in time.

(ii)
AUTHORITY

Annual programme of work studies for the year 2019-20

(iii)
TERMS OF REFERENCE

Work study to review the staff strength at SSE/Signal/PGT & PGTN unit of PGT Division.

(iv)
METHODOLOGY

The following methodology has been adopted while conducting the study:

1. Collection of data.
2. Discussion & interaction with Co-ordinating Officer, supervisors and staff.
3. Field observation.
4. Working out the requirements on need base duly considering yardstick, benchmarking average and quantum of outsourcing and modernization.

(v)

SUMMARY OF RECOMMENDATIONS

-NIL-

CHAPTER – I

1.0 INTRODUCTION

1.1 **Southern Railway** was formed on 14th April 1951 by the Amalgamation of Southern India Railway, Madras and Southern Maratha Railway and Mysore State Railway. It spreads to Tamil Nadu, Kerala, Karnataka and Pudhucherry to the Route Kilometerage of 5075.

1.2 **Palakkad Division** was formed on 31st August 1956. Historically, the beginning of the Railways in this Region started with the laying of the line from Podanur to Pattambi in 1860. The first Railway line was started between Beypore and Tirur on 12th March 1861 for a length of 30.5KM, followed by Tirur-Kuttippuramline (14.5KM) on 1st May 1861 & Pattambi–Podanur (105KM) on 14thApril 1862. The left over portion of Kuttippuram–Pattambi Line (37 KM) was completed on 23rd September 1862. The line was extended in phases to Mangalore by the year 1907.

When Trivandrum Division was formed on 2nd October 1979, the Shoranur-Cochin Harbour Terminus section was handed over to Trivandrum Division. With the formation of the new Salem Division on 1st November 2007, the present Palakkad Division has a Route kilometre of 577.74 Kms.

1.3 The route kilometers of Palakkad Division at different periods from its formation

Period	Route Km
31.08.1956 to 01.10.1979	1,247.58
02.10.1979 to 31.10.2007	1,132.98
01.11.2007 onwards	577.74

(Kerala-473.87Km Tamil Nadu–64.93 Km & Karnataka–38.94 Km)

1.4 **STATE WISE OPERATIONAL**

List Of States, Union Territory And Civil Districts Served By Palakkad Division				
STATE		DISTRICT	STATIONS	KMs
Karnataka	(1)	Dakshin Kanara	MAJN TO ULL	38.94
Kerala	(2)	Kasaragod	MJS TO WRA	473.87
	(3)	KANNUR		
	(4)	KOZHIKODE		
	(5)	WAYANAD		
	(6)	MALAPPURAM		
	(7)	PALAKKAD		
Tamilnadu	(8)	Coimbatore	ETMD,MDKI & POY	64.93
Puducherry	(9)	Mahe	MAHE	
			Total	577.74

1.4 The Signal and Telecommunication Department plays a vital role in the operation of trains. The **Signal Branch** is responsible for the Signal work of entire Indian Railways for safe and speedy movements of trains by the operations of signals and points. The **Telecommunication Branch** is responsible for the communication between the controller and the way side stations for the effective operation of trains and for Inter Divisional and Intra Divisional communication with other Zonal Railways and Railway Board.

1.5 **The Signalling system** over Indian Railways has evolved tremendously over the years. Signalling helps in punctual running of trains. The olden days **semaphore signalling**, has now been replaced with fully automatic signalling reducing dependence on human element greatly. There are a lot of innovations introduced

in this signalling system of Indian Railways. Tokenless Block Instruments, track circuiting, Block Proving Axle counters (BPAC), Panel Interlocking, Route Relay Interlocking, Solid state Interlocking, Data loggers, LED lamps, have all now been in use which has vastly improved the signalling system in Railways together with Anti-collision Device (ACD), Integrated Power supply (IPS), Integrated surveillance system etc. which have greatly ameliorated safety, and security in train operations providing better customers interface.

1.6 An analysis is made to study the present system of working in Signal & Tele-communication wing of S&T Department / SPE & NYP unit of MAS division. **The existing DESUs DETUs & DISTUs are the, factors used for calculating the man power requirements**.

1.7 The S&T department is headed by CSTE in the zone and level. Sr.DSTE in the Branch head of Signaling & Telecommunication department in the division. The study is confined to Signal/SPE & NYP unit only. The **S**tation **W**orking **R**ules (**SWR**) of stations is prepared by operating department, an engineering department duly coordinating with Signaling Branch. SWR is a very important working guide for the field staff to adhere to, wherein all relevant details, peculiarities at the stations, precautions to be taken in to consideration, procedure for reception and despatch of trains, procedure for working of LC Gates, working of trains during abnormal conditions of Working such as total interruption of communication, signals, point failures, etc. Visibility Test object, Limits of station section & Block section etc. are elaborated. Apart from the SWR, the **General Rules, Signal manual, Block working manual Vol. I & II** and other **day today circulars** are the governing rules and instructions related to S&T department.

1.9 The requirement and rightsizing of man power is critically examined through the tool of bench marking in the subsequent chapters.

CHAPTER – II

2.0 PRESENT SCENARIO

2.1 The Signal & Tele-Communication Department / PGT & PGTN unit of **PGT Division** is within the **overall control of Sr.DSTE/PGT**. The DSTE, ADSTE, Supervisors, Technician and Helpers, extend cordial co-operation for smooth functioning of the department.

2.2 STATION WISE SAVE STATEMENT – (SSE/SIGNAL/PGT & PGTN)

Designation	SAVE	MDKI to PGT	PGTN to POY	PGTN			PGT								Total
				PGTN	KLGD	POY	MDKI	WRA	KJKD	PGT	Test Room	SRM PGT	HQ PGT	PLL	
SSE	S	2	1	-	-	-	-	-	-	-	-	-	-	-	3
	A	2	1	-	-	-	-	-	-	-	-	-	-	-	3
	V	0	0	-	-	-	-	-	-	-	-	-	-	-	0
	E	0	0	-	-	-	-	-	-	-	-	-	-	-	0
JE	S	1	1	-	-	-	-	-	-	-	-	-	-	-	2
	A	1	1	-	-	-	-	-	-	-	-	-	-	-	2
	V	0	0	-	-	-	-	-	-	-	-	-	-	-	0
	E	0	0	-	-	-	-	-	-	-	-	-	-	-	0
Sr.Tech	S	-	-	0	1	2	1	1	1	2	1	0	0	1	10
	A	-	-	0	1	1	1	1	0	1	1	0	0	1	7
	V	-	-	0	0	1	0	0	1	1	0	0	0	0	3
	E	-	-	0	0	0	0	0	0	0	0	0	0	0	0
Tech I	S	-	-	2	2	3	2	2	2	4	1	0	0	1	19
	A	-	-	1	0	2	1	2	2	4	0	0	0	1	13
	V	-	-	1	2	1	1	0	0	0	1	0	0	0	6
	E	-	-	0	0	0	0	0	0	0	0	0	0	0	0
Tech II	S	-	-	1	0	1	0	1	0	1	1	0	0	1	6
	A	-	-	0	1	0	2	0	0	1	3	0	0	0	7
	V	-	-	1	0	1	0	1	0	0	0	0	0	1	4
	E	-	-	0	1	0	2	0	0	0	2	0	0	0	5
Tech III	S	-	-	1	1	1	1	0	1	2	1	1	0	1	10
	A	-	-	1	0	0	0	2	1	4	0	1	0	0	9
	V	-	-	0	1	1	1	0	0	0	1	0	0	1	5
	E	-	-	0	0	0	0	2	0	2	0	0	0	0	4
Helper	S	-	-	2	2	4	2	1	1	7	0	4	3	1	27
	A	-	-	1	2	3	0	0	1	5	0	4	3	1	20
	V	-	-	1	0	1	2	1	0	2	0	0	0	0	7
	E	-	-	0	0	0	0	0	0	0	0	0	0	0	0
Total	S	3	2	6	6	11	6	5	5	16	4	5	3	5	**77**
	A	3	2	3	4	6	4	5	4	15	4	5	3	3	**61**
	V	0	0	3	3	5	4	2	1	3	2	0	0	2	**25**
	E	0	0	0	1	0	2	2	0	2	2	0	0	0	**9**

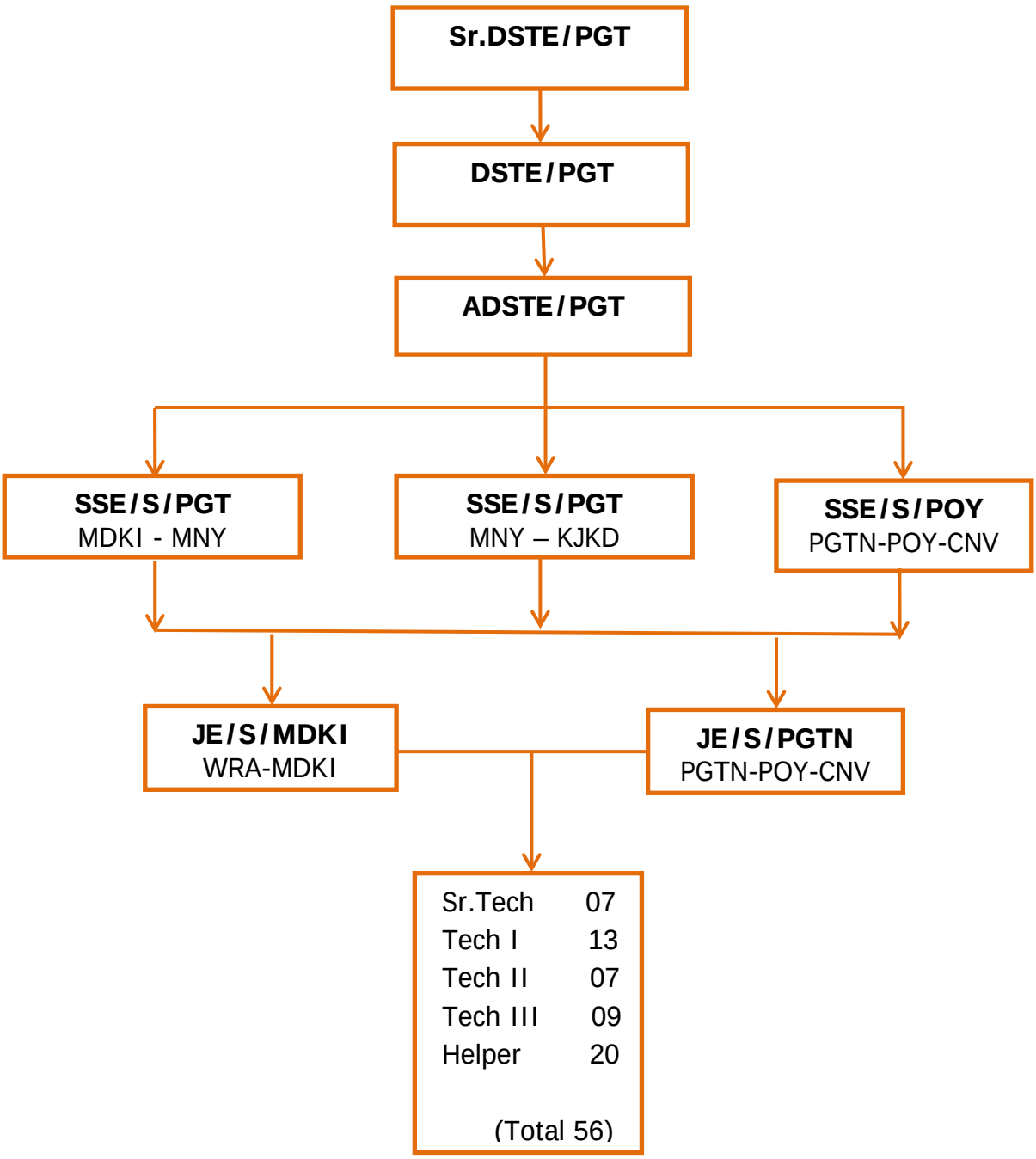
2.2.1 SUMMARY OF SAVE STATEMENT – (SSE/SIGNAL/PGT & PGTN)

Category	Sanction	Actual	Vacancy	Excess
SSE	3	3	0	0
JE	2	2	0	0
Sr.Tech	10	7	3	0
Tech - I	19	13	6	0
Tech - II	6	7	4	5
Tech - III	10	9	5	4
Helper	27	20	7	0
TOTAL	**77**	**61**	**25**	**9**

2.3 JURISDICTION OF SSE/SIGNAL/PGT & PGTN

Jurisdiction Details			**Staff**
SSE/S/PGT (In-charge)		MDKI - MNY Including MNY - LDY Block at LDY & MDKI - PTJ Block at PTJ	1
SSE/S/PGT (In-charge)		MNY – KJKD Including MNY – LDY Block at LDY	1
SSE/S/POY (In-charge)		PGTN-POY-CNV	1
JE/S/PGTN		PGTN-POY-CNV	1
JE/S/MDKI		WRA-MDKI Including MDKI – PTJ Block at PTJ	1
PGT	PGT Yard	PGT Yard and LC 52, 53 & 160	15
PLL	MNY-PLL	MNY – LDY Block at LDY and LC 164	3
KJKD	KTKU-KJKD	Twin Single Line, Including MDKI–PTJ Block at PTJ and LC 155 & 156	4
WRA	WRA-CLMD	Twin Single Line and LC 153 & 154	5
MDKI	ETMD-MDKI	MDKI-PTJ Block at PTJ and LC 152	4
PGTN	PGTN-PDGM	LCs 44, 46, 48, 51, 52 & 53	3
KLGD	KLGD-MMDA	LC 29 & 33	4
POY	KXM-POY-CNV	3 Stations along with 18 LCs (LC, 4, 5, 6, 7, 9, 13, 14, 18, 20, 117, 121, 122,123, 129, 130, 133, 134 & 136)	6
Test Room			4
SRM/PGT			5
HQ/PGT			3
		Total (SSE – 3, JE– 2, Technicians & Helpers – 56)	61

2.4 ORGANIZATIONAL CHART



2.5 TYPE OF SIGNAL & SYSTEM OF WORKING AT STATIONS

STATION	Standard of inter locking	Class	Type of signaling	Standby power supply	Type of Inter locking	Track circuits
KJKD	IIR	B	MACL	KSEB, IPS	Route Relay	Fully
kOTTEKAD	IIR	C	MACL	KSEB, IPS	Panel	FVT, LVT only
PGT	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
PGT-PLL-IBP	IIR	C	MACL	KSEB, IPS	IBP	FVT, LVT only
PLL	IIR	B	MACL	KSEB, IPS	Electronic	Fully
MNY-IBP	IIR	C	MACL	KSEB, IPS	IBP	FVT, LVT only
PGTN	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
PDGM	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
KLGD	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
MMDA	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
MXM	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
POY	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully
CNV	IIR	B	MACL	KSEB, IPS, Generator	Electronic	Fully

2.6 DUTY ROSTER OF SSE/S/PGT & PGTN

DUTY TYPE	TIME
General Duty	08.00 to 13.00 Hrs 14.00 to 17.00 Hrs
Shift Duty (Only at PGT yard)	07.00 to 13.00 Hrs 13.00 to 21.00 Hrs 21.00 to 07.00 Hrs
Section Night Duty	20.00 to 24.00 - 00.00 to 07.00 Hrs

2.7 Nature of Work:

2.7.1 Duties of In-charge SSE

The signal and telecommunication engineer incharge of maintenance or construction is generally responsible for

1. The installation and maintenance of all signaling and telecommunication equipment under his charge in a satisfactory and safe condition.
2. Ensuring that all important inspection notes of higher authorities receive prompt action.
3. Co-ordination with Engineering and other branches in case of combined works.
4. Co-ordination with concerned branches in case of accidents for speedy restoration of traffic and for investigation into the cause of accidents.
5. Co-ordination with Officers and staff of other branches in all other matters to ensure smooth functioning of signaling and telecommunication system.
6. Ensuring supply of approved quality materials and tools, for the installation and maintenance of the equipment.
7. Ensuring strict discipline amongst his staff within the frame work of the rules.
8. Dealing promptly with appeals and representations from and looking after the welfare of his staff.
9. The incharge SSE shall carry out all the inspection over his jurisdiction at intervals not exceeding three months.
10. He shall carry out the quarterly foot plate inspection preferably jointly with the loco inspector / traffic inspector.
11. Indenting, collection, issue and accountal of stores.

2.7.2 Duties of section SSE / JE.

1. Efficient and proper maintenance of all signaling and interlocking equipment under his charge in accordance with the provisions of manual, rules and regulations in force and instructions issues from time to time.
2. Assist the incharge SSE in execution of works incidental to the maintenance of equipment under his charge, additions and alterations to existing installations and new works in accordance with approved plans and circuit diagrams under open line working condition.
3. Assist the incharge SSE in overhauling and carrying out alterations to the existing locking of interlocking frames in accordance with approved interlocking tables and interlocking charts, as also carrying out alterations to electrical signaling and interlocking systems in accordance with approved interlocking and selection tables and circuit diagrams when authorized to do so in writing by the divisional signal and telecommunication engineer.

4. Carrying out works in an emergency on his own initiative and responsibility, in such cases intimation must be given to his incharge SSE by a message on control phone or by a telegram.
5. The SSE / JE shall carry out inspection and testing of all the equipments in his incharge at intervals not exceeding one month.
6. The SSE / JE shall monitor daily all failures on his section and take necessary action.

2.7.3 **Duties of Technicians**

1. Efficient maintenance and testing of all equipment under his charge such as mechanical signaling equipment, electrical and electronic signaling equipment, etc, os as to keep them properly adjusted and in good working condition in accordance with instructions contained in this manual and such circulars or instructions, as may be issued from time to time.
2. Carrying out works and alterations to the existing installations under the instructions of the SSE / JE.
3. Bringing to the notice of the SSE / JE any emergency and situations that may be beyond his competence.
4. Ensuring that the safety appliances like safety jacket, safety shoe etc. are in good condition and are always made use of in order to ensure his safety and the safety of staff working under him.
5. Each maintainer shall maintain and test all the equipment under his charge atleast once in a fortnight.
6. Co-ordination with other departments for Joint works, Joint Inspections, attending of Joint Inspection notes, planning and corrections joint work under the Black & Disconnection.

2.7.4 **SSE- Quarterly Inspections at stations and LC gates**

- Inspection of all signals.
- Inspection of all track circuits
- Inspections of all block instruments.
- Inspection of all point machines.
- Inspection of all LC gates, boom locking, E-type locks and RKT.
- Inspection of relay room and measuring of relay voltage values.
- Inspection of all BPAC installations.
- Inspection of SM panel at all stations.
- Inspection of IPS and battery bank
- Inspection of SM panel at stations.
- Inspection of earthing of signalling gears, RDSO/Maintenance free earth.

- Certification of installation of new S&T gears.
- Preparation of inspection reports.
- Assisting officer for inspection

2.7.5 **Monthly Inspections at stations and LC gates**

- Inspection of all signals.
- Inspection of all track circuits
- Inspections of all block instruments.
- Inspection of all point machines.
- Inspection of all LC gates, boom locking, E-type locks and RKT.
- Inspection of relay room and measuring of relay voltage values.
- Inspection of all BPAC installations.
- Inspection of SM panel at all stations.
- Inspection of IPS and battery bank
- Inspection of SM panel at stations.
- Inspection of earthing of signaling gears, RDSO/Maintenance free earth.

2.7.6 **Special works**

- Carrying out special works like replacement of point machines
- Interlocking of new LC gates.
- Monitoring the contract works like defective cable replacement, relay alterations etc**.**
- Replacement of block instruments.
- Overhauling of SM slide box
- Carrying out cable meggering.
- Carrying out directed maintenance as per schedule.
- Renewal of signal post and signals.
- Carrying out circuit alteration as per headquarters directives.
- Earth value checking of all signals and locations and station equipment.
- Monitoring works involving civil (casting of foundations), electrical (IPS, inverter, chargers etc), telecom (Annunciates, SPT, magneto phone etc), mechanical (point machines, mechanical points etc) and electronics (data logger, EI, axle counter etc)
- Data logger exception report
- Carrying out safety drives from headquarters and sending its compliance.
- Replying letters issued from division office.

2.8 **Failures**

- Monitoring of failures and guiding staff for quick restoration.
- Arranging sufficient spares and materials to restore failure quickly.
- Coordinating with data logger section to identify cause of failure through data logger analysis.
- Attending failures if it is beyond the scope of Technician to attend.
- Monitoring of failure and remedial action to avoid recurrence.

2.8.1 **FAILURE STATISTIC**

Station	MDKI			WRA			KJKD			PGT			PLL		
Year & Month	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019
Jan	6	1	2	1	0	1	3	0	2	6	7	2	3	3	1
Feb	8	2	1	5	0	0	2	4	1	5	2	5	0	2	0
Mar	1	1	5	6	1	1	0	2	0	10	7	1	4	2	3
Apr	3	2	3	0	1	0	2	6	2	4	3	2	0	2	0
May	0	3	4	4	3	1	4	1	1	9	13	3	1	5	1
Jun	1	2	6	1	2	7	2	7	1	5	9	4	1	1	2
Jul	4	0	0	1	2	3	0	0	4	8	10	2	2	1	1
Aug	4	8	3	3	1	1	6	7	2	3	4	4	2	4	0
Sep	3	1	-	2	0	-	4	4	-	2	4	-	3	0	-
Oct	3	2	-	2	0	-	1	5	-	3	7	-	3	3	-
Nov	3	1	-	1	0		0	3	-	3	3	-	1	1	-
Dec	0	3	-	3	0	-	4	3	-	3	1	-	3	3	-
Total	36	26	24	29	10	14	28	42	13	61	70	23	23	27	8
Summary of Signal & Other Failures															
Signal	29	15	17	16	9	7	17	31	10	36	46	14	17	22	8
Others	7	11	7	13	1	7	11	11	3	25	24	9	6	5	0

2.8.2 **AVERAGE FAILURES AT SSE/S/PGT & PGTN**

Station & Year	MDKI	WRA	KJKD	PGT	PLL	**Total**
2017	36	29	28	61	23	177
2018	26	10	42	70	27	175
2019	24	14	13	23	8	82
Total	86	53	83	154	58	434
Avg /Month (÷32)	2.69	1.66	2.59	4.81	1.81	13.56
Average failures per month at SSE/S/PGT & PGTN is 13.56 say 14						

2.9 **Staff matters**

- Preparing details for payment of staff.
- Verification of diary and TA journals of staff.
- Preparation of TA statement of staff.
- Verification of night duty allowance sheet of staff.
- Preparation of NDA statement.
- Verification of national holiday allowance of staff.
- Preparation of NHA statement.
- Arranging special training and counseling for staff at office.
- Preparation and issue of privilege pass for staff.
- Maintaining leave records of staff.
- Maintain daily work details of staff.

2.10 SPECIAL WORKS DETAILS

Sl.No	Work	Company / Contractor
1	Provisional track feed chargers having potential free contacts with improvements to track circuits	M/s. Mectron control 7 panels Pvt. Ltd.
2	Signalling re-arrangements in connection with through turnout renewal of points and crossings work	V.K. Govindraju

2.11 Introduction of modern equipment / Electronic interlocking at PGT section

S.No.	Stations	New Systems	Remarks
1	PGT	Electronic Interlocking –WESTRACE commissioned on 02.06.2016	
2	PLL	Electronic interlocking – MEDHA commissioned on 13.10.15	System updated10 1.2 Ver on 30.07.19.
3	MNY	Electronic Interlocking – Combination of MEDHA & KYOSAN commissioned on 17.10.17	
4	MDKI	Electronic interlocking – KYOSAN commissioned on 13.05.2019	
5	POY	Electronic Interlocking – WESTRACE commissioned on 02.09.2015 (Stage – I) & 17.07.17 (Stage -2)	
6	MXM	Electronic Interlocking – WESTRACE commissioned on 28.10.2015	
7	MMDA	Electronic interlocking – WESTRACE commissioned on 28.10.2015	
8	KLGD	Electronic interlocking – WESTRACE commissioned on 28.10.2015	
9	PDGM	Electronic interlocking – WESTRACE commissioned on 28.10.2015	
10	PGTN	Electronic interlocking – WESTRACE commissioned on 28.10.2015	
11	CNV	Electronic interlocking – WESTRACE commissioned on 17.07.2017	

2.12 SIGNAL ASSET OF SSE/Signal/PGT & PGTN

2.12.1

1	SSE/PGT section		MDKI		ETMD		WRA		CLMD		LC 154		KJKD	
S. No	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	250	250	26	26	200	200	20	20	14	14	215	215
10	Colour Light Signal 2 Aspect	5	10	50	8	40	13	65	4	20	6	30	12	60
11	Colour Light Signal Multiple Aspect	6	12	72		0	10	60		0		0	14	84
12	Route Indicator Per Route	5	32	160		0	12	60		0		0	32	160
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4	19	76		0	17	68		0		0	14	56
14	Calling On Signal in Colour light area	0.5	14	7		0	16	8		0		0	14	7
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10		0	0	0		0		0	4	40	0	0
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's -Level Crossing Gate Mechanical or Electrical	2	55	110	4	8	56	112	4	8	2	4	104	208
19	Single Rail D C Track circuits	4	36	144	4	16	32	128	4	16		0	38	152
23	Electrical Switch Lock	3	9	27		0		0		0		0		0
24	Key Locked Points	3	6	18		0	13	39		0		0		0
25	Rod worked facing point with lock	3		0		0		0		0		0	2	6
26	Rod worked FPL without lock/lock retaining bar	2		0		0		0		0		0	2	4
29	Electrically operated point and lock	20	24	480		0	19	380		0		0	20	400
30	Outlying siding point	28	1	28	0	0		0		0		0		0
34	LC Gate LB winch operated within station limit	4		0	1	4	1	4		0		0	1	4
37	LC Gate LB winch operated outside station limit	20		0		0	0	0		0	1	20	1	20
40	Single line Tokenless Block Instruments per pair	6	2	12	2	12	2	12	1	6		0	2	12
42	Extra weightage for RE area	1	2	2	2	2	2	2	2	2	1	1	2	2
43	Key Transmitter per pair	1	3	3	4	4	2	2	2	2		0	2	2
45	Block Proving Axle Counter	50	4	200	4	200	4	200	2	100		0	4	200
46	Route Relay/Panel Interlocking Equipment Complete per route	2	141	282	4	8	89	178	2	4	2	4	124	248
48	Indicator Boards-shunting/block limit, sighting etc	0.5	8	4	4	2	14	7	2	1	2	1	8	4
49	Data logger (a)up to 256 Ports	10		0	1	10		0	1	10		0		0
50	Data logger (b) Beyond 256 Ports	20	1	20		0	1	20		0		0	1	20
51	Generator	25		0		0		0	1	25		0		0
52	Solar Panel per location	1	4	4	3	3	12	12	2	2		0	12	12
53	Point to point Communication	1	8	8	1	1	8	8	1	1	1	1	8	8
	TOTAL UNITS			**1957**		**336**		**1565**		**217**		**115**		**1884**

2.12.2

2	SSE/PGT section Stations		KTKU		LC 156		PGT		PGT-PLL IBS		PLL		LC 164	
S. NO	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	34	34	20	20	392	392	20	20	75	75	14	14
10	Colour Light Signal 2 Aspect	5	8	40	8	40	20	100	4	20	4	20	4	20
11	Colour Light Signal Multiple Aspect	6		0		0	10	60		0	6	36	2	12
12	Route Indicator Per Route	5		0		0	39	195		0	2	10		0
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4		0		0	34	136		0	4	16		0
14	Calling On Signal in Colour light area	0.5		0		0	22	11		0	2	1		0
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10		0	4	40		0		0		0	3	30
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's-Level Crossing Gate Mechanical or Electrical	2	6	12	4	8	34	68	6	12	8	16	4	8
19	Single Rail D C Track circuits	4	4	16		0	78	312	4	16	20	80	2	8
20	Double Rail DC Track circuits	5		0		0		0		0		0	2	10
24	Key Locked Points	3		0		0	5	15		0		0		0
26	Rod worked FPL without lock/lock retaining bar	2		0		0	0	0		0	4	8		0
29	Electrically operated point and lock	20		0		0	37	740		0	10	200		0
31	LC Gate telephone only within station limit	2		0		0	2	4		0		0		0
33	LC Wing gates interlocked within station limit	3		0		0	7	21		0		0		0
34	LC Gate LB winch operated within station limit	4		0		0	1	4		0		0		0
36	LC Wing gates interlocked outside station limit	15		0		0	1	15		0		0		0
37	LC Gate LB winch operated outside station limit	20		0	1	20	2	40		0	1	20	1	20
40	Single line Tokenless Block Instruments per pair	6	2	12		0	1	6		0		0		0
41	Double Line Block Instruments per pair	6		0		0	0.5	3		0	1	6		0
42	Extra weightage for RE area	1	1	1	2	2	2	2		0	1	1		0
43	Key Transmitter per pair	1	1	1	2	2	5	5		0	4	4	2	2
45	Block Proving Axle Counter	50	4	200		0	4	200	4	200	4	200		0
46	Route Relay/Panel Interlocking Equipment Complete per route	2	4	8	4	8	224	448	2	4	22	44	2	4
48	Indicator Boards-shunting/block limit, sighting etc	0.5	4	2		0	22	11	4	2	5	2.5	2	1
49	Data logger (a)up to 256 Ports	10	1	10		0		0	1	10	0	0		0
50	Data logger (b) Beyond 256 Ports	20		0		0	1	20		0	1	20		0
51	Generator	25		0		0	1	25		0		0		0
52	Solar Panel per location	1	3	3		0		0		0	4	4		0
53	Point to point Communication	1	1	1	1	1	11	11		0	6	6	1	1
	T O T A L UNITS			**340**		**141**		**2844**		**284**		**770**		**130**

2.12.3

3	SSE/PGT section Stations		MNY IBP		PGTN		LC 51		LC 52		LC 53		LC 46	
S. NO	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	20	20	110	110	14	14	14	14	14	14	14	14
10	Colour Light Signal 2 Aspect	5	4	20	6	30	4	20	4	20	4	20	6	30
11	Colour Light Signal Multiple Aspect	6	0	0	8	48	2	12	2	12	2	12	0	0
12	Route Indicator Per Route	5		0	6	30		0		0		0	0	0
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4		0	9	36		0		0		0	0	0
14	Calling On Signal in Colour light area	0.5		0	2	1		0		0		0	0	0
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10		0		0	4	40	3	30	3	30	4	40
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's -Level Crossing Gate Mechanical or Electrical	2	6	12	5	10	4	8	4	8	4	8	2	4
19	Single Rail D C Track circuits	4	4	16	42	168		0	2	8	2	8		0
20	Double Rail DC Track circuits	5		0		0		0	2	10	2	10		0
23	Electrical Switch Lock	3		0		0		0		0		0		0
29	Electrically operated point and lock	20		0	14	280		0		0		0		0
32	LC Gate telephone only outside station limit	10	0	0	1	10		0		0		0		0
36	LC Wing gates interlocked outside station limit	15		0	2	30	0	0		0		0	0	0
37	LC Gate LB winch operated outside station limit	20	0	0		0	1	20	1	20	1	20	1	20
40	Single line Tokenless Block Instruments per pair	6		0	0.5	3		0		0		0		0
42	Extra weightage for RE area	1	1	1	1	1		0		0		0		0
43	Key Transmitter per pair	1		0	3	3	2	2	2	2	2	2	1	1
44	Block panel including different types of interface equipment	4		0	1	4		0		0		0		0
45	Block Proving Axle Counter	50	4	200	1	50		0		0		0		0
46	Route Relay/Panel Interlocking Equipment Complete per route	2	2	4	45	90	2	4	2	4	2	4	2	4
48	Indicator Boards-shunting/block limit, sighting etc	0.5	2	1	2	1		0	2	1	2	1	2	1
49	Data logger (a)up to 256 Ports	10	1	10		0		0		0		0	1	10
50	Data logger (b) Beyond 256 .Ports	20		0	1	20		0		0		0		0
51	Generator	25		0	1	25		0		0		0		0
52	Solar Panel per location	1	0	0	2	2		0		0		0	2	2
53	Point to point Communication	1		0	4	4	1	1	1	1	1	1	1	1
	TOTAL UNITS			**284**		**956**		**121**		**130**		**130**		**127**

2.12.4

4	SSE/PGT section Stations		LC 44		LC 41		PDGM		LC 36		LC 35		LC 34	
S. No	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	14	14	14	14	110	110	14	14	14	14	14	14
10	Colour Light Signal 2 Aspect	5	6	30	6	30	6	30	6	30	6	30	6	30
11	Colour Light Signal Multiple Aspect	6		0		0	6	36		0		0		0
12	Route Indicator Per Route	5		0		0	4	20		0		0		0
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4		0		0	2	8		0		0		0
14	Calling On Signal in Colour light area	0.5		0		0	2	1		0		0		0
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10	4	40	4	40		0	4	40	4	40	4	40
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's -Level Crossing Gate Mechanical or Electrical	2	2	4	2	4		0	2	4	2	4	2	4
20	Double Rail DC Track circuits	5		0		0	23	115		0		0		0
29	Electrically operated point and lock	20		0		0	8	160		0		0		0
32	LC Gate telephone only outside station limit	10		0		0	1	10		0		0		0
37	LC Gate LB winch operated outside station limit	20	1	20	1	20		0	1	20	1	20	1	20
40	Single line Tokenless Block Instruments per pair	6		0		0	1	6		0		0		0
43	Key Transmitter per pair	1	1	1	1	1		0	1	1	1	1	1	1
44	Block panel including different types of interface equipment	4		0		0	1	4		0		0		0
45	Block Proving Axle Counter	50		0		0	2	100		0		0		0
46	Route Relay/Panel Interlocking Equipment Complete per route	2	2	4	2	4	30	60	2	4	2	4	2	4
48	Indicator Boards-shunting/block limit, sighting etc	0.5	2	1	2	1	4	2	2	1	2	1	2	1
49	Data logger (a)up to 256 Ports	10	1	10	1	10		0	1	10	1	10	1	10
50	Data logger (b) Beyond 256 .Ports	20		0		0	1	20		0		0		0
51	Generator	25		0		0	2	50		0		0		0
52	Solar Panel per location	1	2	2	2	2		0	2	2	2	2	2	2
53	Point to point Communication	1	1	1	1	1	3	3	1	1	1	1	1	1
	TOTAL UNITS			**127**		**127**		**735**		**127**		**127**		**127**

2.12.5

5	SSE/PGT section Stations		KLGD		LC 31		LC 29		LC 27		LC 23		MMDA	
S. No	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	110	110	14	14	14	14	14	14	14	14	110	110
10	Colour Light Signal 2 Aspect	5	5	25	6	30	6	30	6	30	6	30	6	30
11	Colour Light Signal Multiple Aspect	6	7	42		0		0		0		0	6	36
12	Route Indicator Per Route	5	4	20		0		0		0		0	4	20
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4	3	12		0		0		0		0	2	8
14	Calling On Signal in Colour light area	0.5	2	1		0		0		0		0	2	1
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10		0	4	40	4	40	4	40	4	40		0
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's -Level Crossing Gate Mechanical or Electrical	2		0	2	4	2	4	2	4	2	4		0
19	Single Rail D C Track circuits	4		0		0		0		0		0		0
20	Double Rail DC Track circuits	5	23	115		0		0		0		0	23	115
29	Electrically operated point and lock	20	8	160		0		0		0		0	8	160
31	LC Gate telephone only within station limit	2		0		0		0		0		0	1	2
32	LC Gate telephone only outside station limit	10	4	40		0		0		0		0	2	20
34	LC Gate LB winch operated within station limit	4	1	4		0		0		0		0	1	4
35	LC Gate LB motor operated within station limit	6		0		0		0		0		0		0
36	LC Wing gates interlocked outside station limit	15		0		0		0		0		0		0
37	LC Gate LB winch operated outside station limit	20	2	40	1	20	1	20	1	20	1	20	2	40
40	Single line Tokenless Block Instruments per pair	6	1	6		0		0		0		0	1	0
43	Key Transmitter per pair	1	1	1	1	1	1	1	1	1	1	1	1	1
44	Block panel including different types of interface equipment	4	1	4		0		0		0		0	1	4
45	Block Proving Axle Counter	50	2	100		0		0		0		0	2	100
46	Route Relay/Panel Interlocking Equipment Complete per route	2	30	60	2	4	2	4	2	4	2	4	30	60
48	Indicator Boards-shunting/block limit, sighting etc	0.5	9	4.5	2	1	2	1	2	1	2	1	4	2
49	Data logger (a)up to 256 Ports	10		0	1	10	1	10	1	10	1	10		0
50	Data logger (b) Beyond 256 .Ports	20	1	20		0		0		0		0	1	20
51	Generator	25	2	50		0		0		0		0	2	50
52	Solar Panel per location	1		0	2	2	2	2	2	2	2	2		0
53	Point to point Communication	1	9	9	1	1	1	1	1	1	1	1	9	9
	TOTAL UNITS			**824**		**127**		**127**		**127**		**127**		**792**

2.12.6

6	SSE/PGT section Stations		LC 20		LC 18		MXM		LC 14		LC 13		LC 9	
S. NO	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	14	14	14	14	110	110	14	14	14	14	14	14
10	Colour Light Signal 2 Aspect	5	6	30	6	30	6	30	6	30	6	30	6	30
11	Colour Light Signal Multiple Aspect	6		0		0	6	36		0		0		0
12	Route Indicator Per Route	5		0		0	4	20		0		0		0
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4		0		0	2	8		0		0		0
14	Calling On Signal in Colour light area	0.5		0		0	2	1		0		0		0
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10	4	40	4	40		0	4	40	4	40	4	40
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's - Level Crossing Gate Mechanical or Electrical	2	2	4	2	4		0	2	4	2	4	2	4
20	Double Rail DC Track circuits	5		0		0	23	115		0		0		0
29	Electrically operated point and lock	20		0		0	8	160		0		0		0
32	LC Gate telephone only outside station limit	10		0		0	2	20		0		0		0
37	LC Gate LB winch operated outside station limit	20	1	20	1	20	3	60	1	20	1	20	1	20
40	Single line Tokenless Block Instruments per pair	6		0		0	1	6		0		0		0
41	Double Line Block Instruments per pair	6		0		0	2	12		0		0		0
42	Extra weightage for RE area	1		0		0		0		0		0		0
43	Key Transmitter per pair	1	1	1	1	1	0	0	1	1	1	1	1	1
44	Block panel including different types of interface equipment	4		0		0	1	4		0		0		0
45	Block Proving Axle Counter	50		0		0	2	100		0		0		0
46	Route Relay/Panel Interlocking Equipment Complete per route	2	2	4	2	4	30	60	2	4	2	4	2	4
48	Indicator Boards-shunting/block limit, sighting etc	0.5	2	1	2	1	4	2	2	1	2	1	2	1
49	Data logger (a)up to 256 Ports	10	1	10	1	10		0	1	10	1	10	1	10
50	Data logger (b) Beyond 256 .Ports	20		0		0	1	20		0		0		0
51	Generator	25		0		0	2	50		0		0		0
52	Solar Panel per location	1	2	2	2	2		0	2	2	2	2	2	2
53	Point to point Communication.	1	1	1	1	1	10	10	1	1	1	1	1	1
	TOTAL UNITS			**127**		**127**		**824**		**127**		**127**		**127**

2.12.7

7	SSE/PGT section Stations		LC 7		LC 6		LC 5		LC 4		POY		LC 122		LC 123	
S. NO	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	14	14	14	14	14	14	14	14	136	136	14	14	14	14
10	Colour Light Signal 2 Aspect	5	6	30	6	30	6	30	6	30	12	60	4	20	6	30
11	Colour Light Signal Multiple Aspect	6		0		0		0		0	7	42		0		0
12	Route Indicator Per Route	5		0		0		0		0	17	85		0		0
13	Colour/Position Light Shunt Signal and Shunt Permit indicator	4		0		0		0		0	14	56		0		0
14	Calling On Signal in Colour light area	0.5		0		0		0		0	8	4		0		0
17	I.B.S Signal/Mid-Section L.C Gate Stop Signal	10	4	40	4	40	4	40	4	40	3	30	4	40	4	40
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's - Level Crossing Gate Mechanical or Electrical	2	2	4	2	4	2	4	2	4	1	2	2	4	2	4
20	Double Rail DC Track circuits	5		0		0		0		0	35	175		0		0
29	Electrically operated point and lock	20		0		0		0		0	11	220		0		0
31	LC Gate telephone only within station limit	2		0		0		0		0	2	4		0		0
34	LC Gate LB winch operated within station limit	4		0		0		0		0	2	8		0		0
37	LC Gate LB winch operated outside station limit	20	1	20	1	20	1	20	1	20	1	20	1	20	1	20
40	Single line Tokenless Block Instruments per pair	6		0		0		0		0	1	6		0		0
43	Key Transmitter per pair	1	1	1	1	1	1	1	1	1		0	1	1	1	1
45	Block Proving Axle Counter	50		0		0		0		0	2	100		0		0
46	Route Relay/Panel Interlocking Equipment Complete per route	2	2	4	2	4	2	4	2	4	90	180	2	4	2	4
48	Indicator Boards-shunting/block limit, sighting etc	0.5	2	1	2	1	2	1	2	1	6	3	2	1	2	1
49	Data logger (a)up to 256 Ports	10	1	10	1	10	1	10	1	10		0	1	10	1	10
50	Data logger (b) Beyond 256 .Ports	20		0		0		0		0	1	20		0		0
51	Generator	25		0		0		0		0	2	50		0		0
52	Solar Panel per location	1	2	2	2	2	2	2	2	2		0	2	2	2	2
53	Point to point Communication.	1	1	1	1	1	1	1	1	1	17	17	1	1	1	1
	T O T A L UNITS			**127**		**127**		**127**		**127**		**1218**		**117**		**127**

2.12.8

8	SSE/PGT section Stations		LC 129		LC 130		LC 133		LC 134		LC 136		CNV		LC 144	
S. No	Description	Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units	Nos	Total Units
9	Panel Indication each	1	14	14	14	14	14	14	14	14	14	14	110	110	14	14
10	Colour Light Signal 2 Aspect	5	6	30	6	30	6	30	6	30	6	30	6	30	6	30
11	Colour Light Signal Multiple Aspect	6		0		0		0		0		0	6	36		0
12	Route Indicator Per Route	5		0		0		0		0		0	4	20		0
13	Colour/Position Light Shunt Signal and Shun tPermit indicator	4		0		0		0		0		0	2	8		0
14	Calling On Signal in Colour light area	0.5		0		0		0	2	1		0	2	1		0
17	I.B. Signal/Mid-Section L.C Gate Stop Signal	10	4	40	4	40	4	40	4	40	4	40		0	4	40
18	Slot or Control for Signal, Point, Siding, Crank-Handle, Inter cabin, station Master's - Level Crossing Gate Mechanical or Electrical	2	2	4	2	4	2	4	2	4	2	4		0	2	4
20	Double Rail DC Track circuits	5		0		0		0		0		0	23	115		0
29	Electrically operated point and lock	20		0		0		0		0		0	8	160		0
32	LC Gate telephone only outside station limit	10		0		0		0		0		0	3	30		0
34	LC Gate LB winch operated within station limit	4		0		0		0		0		0	1	4		0
37	LC Gate LB winch operated outside station limit	20	1	20	1	20	1	20	1	20	1	20	3	60	1	20
40	Single line Tokenless Block Instruments per pair	6		0		0		0		0		0	1	6		0
43	Key Transmitter per pair	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
45	Block Proving Axle Counter	50		0		0		0		0		0	2	100		0
46	Route Relay/Panel Interlocking Equipment Complete per route	2	2	4	2	4	2	4	2	4	2	4	32	64	2	4
48	Indicator Boards-shunting/block limit, sighting etc	0.5	2	1	2	1	2	1	2	1	2	1	4	2	2	1
49	Data logger (a)up to 256 Ports	10	1	10	1	10	1	10	1	10	1	10		0	1	10
50	Data logger (b) Beyond 256 .Ports	20		0		0		0		0		0	1	20		0
51	Generator	25		0		0		0		0		0	2	50		0
52	Solar Panel per location	1	2	2	2	2	2	2	2	2	2	2		0	2	2
53	Point to point Communication.	1	1	1	1	1	1	1		0	1	1	8	8	1	1
	TOTAL UNITS			**127**		**127**		**127**		**127**		**127**		**824**		**127**

2.12.9 **SUMMARY OF LSU OF SSE/Signal/PGT & PGTN**

S.No	Station	Total Units		S.No	Station	Total Units
1	MDKI	1957		26	LC 31	127
2	ETMD	336		27	LC 29	127
3	WRA	1565		28	LC 27	127
4	CLMD	217		29	LC 23	127
5	LC 154	115		30	MMDA	792
6	KJKD	1884		31	LC 20	127
7	KTKU	340		32	LC 18	127
8	LC 156	141		33	MXM	824
9	PGT	2844		34	LC 14	127
10	PGT-PLL-IBP	284		35	LC 13	127
11	PLL	770		36	LC 9	127
12	LC 164	130		37	LC 7	127
13	MNY-IBP	284		38	LC 6	127
14	PGTN	956		39	LC 5	127
15	LC 51	121		40	LC 4	127
16	LC 52	130		41	POY	1218
17	LC 53	130		42	LC 122	117
18	LC 46	127		43	LC 123	127
19	LC 44	127		44	LC 129	127
20	LC 41	127		45	LC 130	127
21	PDGM	735		46	LC 133	127
22	LC 36	127		47	LC 134	127
23	LC 35	127		48	LC 136	127
24	LC 34	127		49	CNV	824
25	KLGD	824		50	LC 144	127
	Total	**14,525**			**Total**	**6,315**

LSU of SSE/Signal/PGT & PGTN (14525 + 6315) = **20,840**

2.12.10 **DIVISIONAL EQUATED SIGNAL UNITS (DESU) OF PGT unit**
As on 31.03.2019

S.No	DESCRIPTION		
I	Total No of Signal Units	**A1**	68098.000
II	Annual Train Kms (**F)**		
i)	Passenger & Proportion of Mixed Trains	**H**	8218.112
ii)	Goods including Goods proportion of Mixed Trains	**J**	1190.509
iii)	Department Trains	**K**	74.407
iv)	EMU Trains	**L**	112.072
v)	Total H+J+K+L	**F**	9595.100
III	Calculation of **A2**		
i)	Total Route kms	**G**	577.000
ii)	F/G		16.629
iii)	F/G – 7.3		9.329
iv)	A2 = A1 x (F/G-7.3) x 3.42/100	**A2**	21727.464
IV	Calculation of **A3**		
i)	Total No of Signal Units/Total Route kms (A1/G)		118.021
ii)	Value of Y		0
iii)	A3 = Signal Units x Y/100	**A3**	**0**
V	Calculation of **A4**		
i)	Z= F/G		16.63
ii)	A4 = A1 x Z x0.94/100	**A4**	10644.761
VI	Calculation of **A5**		
	A5= 1.67 x G	**A5**	963.590
	DESU = A1 +A2+A3+A4+A5		**101433.81**

CHAPTER- III

3.0 CRITICAL ANALYSIS

3.1	DESU of PGT Division **(From table 2.12.10)** 1,01,434 Divisional Signal Units of PGT **(From table 2.12.10)** 68,098 Section Signal Units of PGT & PGTN **(From table 2.12.9)** 20,840
3.1.1	**Based on Bench Marking** The prime task of the work study is to rightsizing the man power in the general interest of productivity of the Indian Railways. Right sizing of Man power is a continuous and comprehensive measure referring with the current work load and the present processes methods. Also RITES recommended the concept of zero based budgeting in man power planning on regular basis as in such to justify the presence of every employee. There are lot of tools available to measure the Man power requirement, normally the activities are split up into small groups and analyzed into micro level to arrive the required Man power. In Indian Railways, the work study conducted to the unit basis level, hence Macro level study is only possible and it is being carried out with the help of Yardstick, Bench Mark & Need basis **CALCULATION:** **DESU of the Section = (Section Signal Unit of PGT & PGTN X DESU of PGT Division) / Total No. of Signal Unit of PGT Division**
3.1.2	DESU of the Section $\frac{20840 \times 101434}{68098} = 31041.8$ Say 31042
3.1.3	As per the current bench marking issued by RB in the Month of January 2020, (Placed as Annexure – II) PGT division falls under the classification 'Divisions less than 120 DISTUs' PGT division is 2.38 per 1000 DESUs. Whereas the division comes first in performing signal units with less than 120 DISTUs is RNC/SER have manpower of 1.53 per 1000 DESUs.
	If the best performing signal unit is adopted, Then **As Per Bench Marking** The man power required for SSE/Sig/PGT & PGTN is (31042 /1000 X 1.53)= 47.49 Say **48 staff**
3.1.4	**Based on IR Average:** As per the current IR Average issued by RB in the Month of January 2020, manpower of 3.39 per 1000 DESUs
	The man power required for SSE/Sig/PGT & PGTN is (31042/1000 X 3.39) = 105.23 Say **105 staff**
3.1.5	**Based on SR Bench mark:** As per the current SR Bench mark issued by RB in the Month of January 2020, MDU 3.94, TPJ 3.4, SA 2.11, PGT 2.38 & TVC 2.45 (3.94+3.4+2.11+2.38+2.45=14.28) the SR Average = 14.28/5 = 2.85 Manpower of 2.85 per 1000 DESUs
	The man power required for SSE/Sig/PGT & PGTN is (31042/1000 X 2.85) = 88.46 Say **89 staff**

3.2 **BASED ON YARD STICK:**

Manpower Calculation based on RB Norms /Yardstick for signaling staff Ref: RB Lr. No. 2007/Sig/Non-Gaz./1/Norms, dated 16.08.2010. The Yard stick worked out on the basis of Divisional Equated Signal Unit (DESU) is the sole parameter where in the man power to be calculated as 1500 DESU = 1 Maintenance Staff Unit (MS

3.2.1 **The Total Number of DESU of SSE/Sig/PGT & PGTN unit is 31042**

1. Basic Maintenance Requirement **(1500 DESU)** 31042/1500 = 20.69 Say **21 MSU**									**Total**
	SSE	JE	Technician	Helper	Black smith	Hammer man	Trolley man	Mason	
For 1 MSU			2	2					
For 21 MSU			42	42					**84**
2. Complement for monthly Maintenance **(3000 DESU)** 31042/3000 = 10.35 Say 10 MSU									
For 1 MSU	1		1	1					
For 10 MSU	10		10	10					**30**
3. Night Failure Gang **(3000 DESU)** 31042/3000 = 10.35 Say 11 MSU									
For 1 MSU			2	1					
For 10 MSU			20	10					**30**
31042/6000 = 5.17 Say 5 MSU									
For 1 MSU	1	0.5	2	4	1	1	4		
For 5 MSU	5	2.5	10	20	5	5	20		**67.5**
In addition to this Basic Maintenance Requirement following Gangs will be provided									
4. Locking Gang/Cable Setting Gang									
under Sr.DSTE / DSTE	1		2	4	1	1			(16% of 9=1.5) **1.5**
5. Emergency L-xing Repair Gang									
For every 50 intrerlocking LC gates		1	1	4	1	1		1	(16% of 9 = 1.5) **1.5**
									210.5

3.4 **Summary of Findings**

Desciption		Total
Book of Sanction	(2.2.1)	77
Actual Staff on roll	(2.2.1)	61
Man Power as per current best Bench mark	(3.1.3)	48
Man power per IR average	(3.1.4)	105
Man power per SR average	(3.1.5)	89
Man power as per yardstick	(3.2.1)	211

There is lot of contradiction to view the above figures where in the yardstick method arrived to enhance the Man power to 274% from the sanction, the Bench mark refer to reduce the Man power to 62% from sanction post and the IR average arrived to increase 136% from the sanction staff strength with the vacancy of 16 posts in this section.

3.5 The existing norms / yardstick related the calculation of signaling staff, projecting the requirements is very high end, whereas the actual staffs at the field is minimum. Hence, the Railway Board formed a Committee having the Members CSTEs of ER, NR SR, WR, Sr.ED /Signal/RDSO and CSTE/SR as convener, to settle the issue mentioned, by reviewing the yardstick. **(Ref: RB Lr. No. 2014/Sig/WG/Yardstick, Dt.: 09.02.2016)** and various level meetings were held, the report of the same is under progress.

By considering the above facts, the Work Study team feels the present Book of Sanction of this Unit is optimum to meet out the scheduled and break down maintenance in this PGT & PGTN sections.

In this juncture, the present sanction strength may be continued. Hence the number of posts identified as surplus is **NIL.**

<u>Sanction Vs Requirement</u>:

Sanction	Actual	Requirement	Surplus
77	**61**	**77**	**NIL**

CHAPTER - IV

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

CHAPTER – V

5.0 FINANCIAL SAVINGS:

- NIL-

Annexure I

Vacancy position of S&T department of PGT & PGTN (Ref.No.G.272/WSSR-41920/2019-20 dt.17.9.2019

Jurisdiction	Depot.	Category	Sanction	Actual	Vacancy
	MDKI & PGT	SSE	2	3	-1
		JE	1	1	0
	PGTN & POY	SSE	1	1	0
		JE	1	1	0
	PGTN	Sr.Tech.	0	0	0
		Tech.I	2	1	1
		Tech.II	1	0	1
		Tech.III	1	1	0
		Helper	2	1	1
PGTN	KLGD	Sr.Tech.	1	1	0
		Tech.I	2	0	2
		Tech.II	0	0	0
		Tech.III	1	0	1
		Helper	2	2	0
	POY	Sr.Tech.	2	1	1
		Tech.I	3	1	2
		Tech.II	1	1	0
		Tech.III	1	0	1
		Helper	4	3	1
	MDKI	Sr.Tech.	1	1	0
		Tech.I	2	1	1
		Tech.II	0		
		Tech.III	1	2	-1
		Helper	2	0	2
	WRA	Sr.Tech.	1	1	0
		Tech.I	2	1	1
		Tech.II	1	1	0
		Tech.III	0	1	-1
		Helper	1	2	-1
	KJKD	Sr.Tech.	1	0	1
		Tech.I	2	2	0
		Tech.II	0	1	-1
		Tech.III	1	1	0
		Helper	1	1	0
PGT	PGT	Sr.Tech.	2	1	1
		Tech.I	4	2	2
		Tech.II	1	1	0
		Tech.III	2	4	-2
		Helper	7	4	3
	Test Room	Sr.Tech.	1	1	0
		Tech.I	1	0	1
		Tech.II	1	3	-2
		Tech.III	1	0	1
	SRM/PGT	Helper	4	4	0
		Tech.III	1	1	0
	HQ/PGT	Helper	3	3	0
	PLL	Sr.Tech.	1	1	0
		Tech.I	1	1	0
		Tech.II	1	0	1
		Tech.III	1	0	1
		Helper	1	1	0
	Total		77	60	17

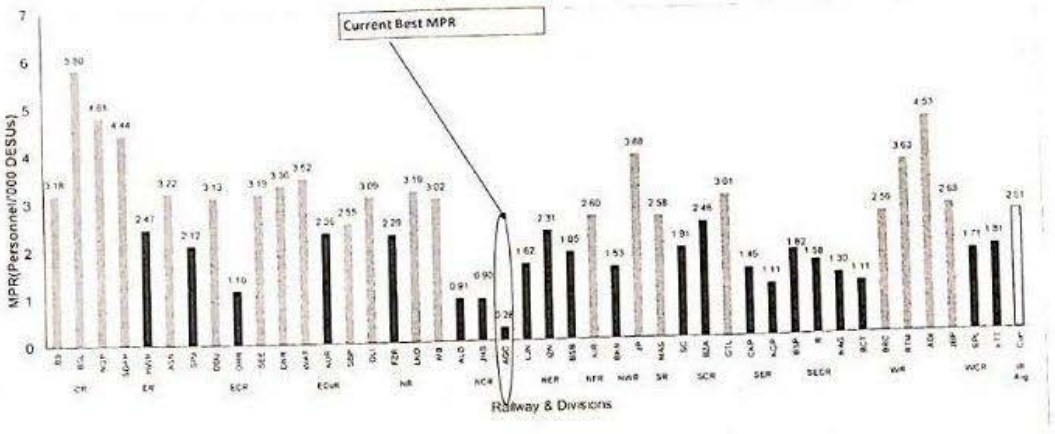
19/9/19

for Ch.OS/MES

Annexure II

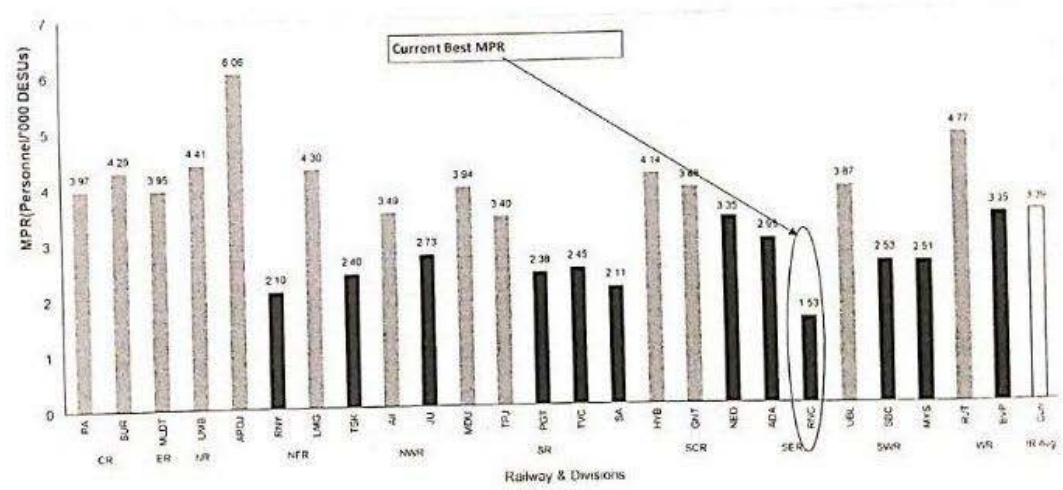
SIGNALLING STAFF IN DIVISIONS

Man Power Ratio of Signal-Divisions more than 120 Divisional Integrated Signalling & Telecom Units(DISTUs)



CURRENT IR AVERAGE: 2 51 Men per thousand DESU(Divisional Equated Signal Units).
Best Man Power Ratio: Agra cantt (AGC) of NCR at 0.28
EXCEEDING THE AVERAGE: 21 Divisions are above the current IR average

Man Power Ratio of Signal-Divisions less than 120 Divisional Integrated Signalling & Telecom Units(DISTUs)



CURRENT IR AVERAGE: 3.39 Men per thousand DESU(Divisional Equated Signal Units)
Best Man Power Ratio: RNC of SER is at 1.53
EXCEEDING THE AVERAGE: 13 Divisions are above the current IR average