



WORK STUDY REPORT
ON
REVIEW OF TRACKMAINTAINER STAFF
WORKING UNDER SSE-'P' WAY
CONTROLLED BY SR.DEN/C
OVER
AMBALA DIVISION
2019-20

WORK STUDY TEAM

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Central Planning Cell
Northern Railway,
Headquarters Office,
Baroda House, New Delhi

EXECUTIVE SUMMARY

This study was allotted to Central Planning Cell, HQ Office on the directives of SDGM/NR ON "Review of trackmaintainer staff under SSE/P Way controlled by Sr. DEN-C/UMB over Ambala Division" with a view to achieve economy and manpower productivity.

STAFF POSITION

The sanctioned and on roll strength of trackmaintainer staff under SSE/P Way controlled by Sr.DEN/C/UMB over Ambala Division is as under:-

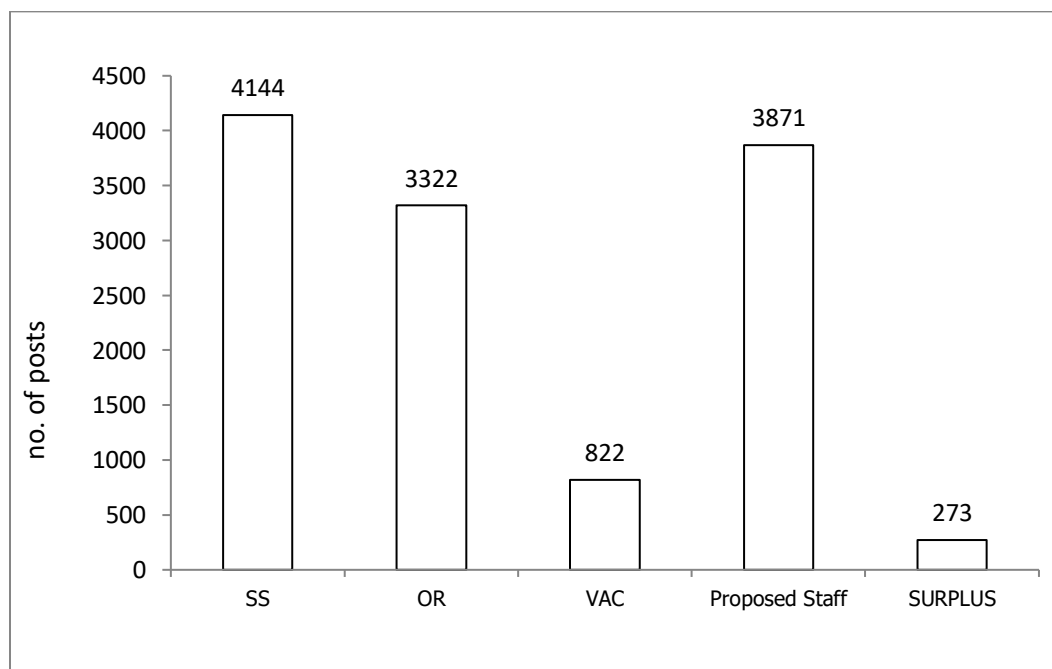
S.N.	Category	S/S	O/R	Var.
1	trackmaintainer	4144	3322	822
Total		4144	3322	822

No. of posts identified as surplus and recommended for surrender: -

Gr. 'C' = NIL
Gr. 'D' = 273 posts
Total = 273 posts

FINANCIAL IMPLICATIONS

Anticipated recurring savings = ₹ 795.34 lakh per annum.
Capital saving = Nil
Total = ₹ 795.34 lakh per annum



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SYNOPSIS

Permanent way plays a vital role in safe running trains on railway track. Indian Railway spread over the nation from North to South and East to West. A huge manpower is deployed to maintain the track within the prescribed tolerances so as to enable the trains to run at an optimum level of safety, security, reliability and punctuality.

It has become inevitable to run heavier trains at high speeds, which has necessitated to introduce modernized track structure and its improvised maintenance system. Even after the introduction of improvised track and track machines for maintenance, the trackmaintainer staff are still being deployed on conventional pattern. Taking into consideration the activities based upon improvised track and mechanized maintenance as per manpower and cost norms for trackman (MCNTM) was assigned to be conducted by the Central Planning Cell, HQ Office, by SDGM/NR.

The team collected the SSE 'P' way wise trackmaintainer staff position and activity wise workload being maintained by the trackmaintainer staff. The team critically analyzed the data supplied by SSE P.Way and assessed the requirement of trackman staff accordingly.

The requirement of trackmaintainer staff comes to 3871 posts against the sanctioned strength of 4144 posts. Hence 273 posts of trackman are identified as surplus and recommended for surrender.

The zealous acceptance and implementation of the recommendations contained therein the work study report will result in recurring saving to the tune of worth ₹ 795.34 lakh per annum to the administration.

SUMMARY OF RECOMMENDATIONS

S. N.	Recommendations	Refer para No.	Accepting/ implementing authority.
1	It is proposed that 273 posts of trackmaintainer staff in Gr. ₹ 5200-20200-1800 identified as surplus under the administrative control of Sr.DEN/C/UMB over Ambala Division and recommended for surrender.	2.6.0	ADRM/Admn/UMB Sr.DEN/C/UMB Sr.DPO/UMB
2	It is proposed to explore the possibilities of outsourcing the activities without compromising safety with a view to achieve economy and increased manpower productivity.	2.7.0	-do-

ACKNOWLEDGEMENT

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1.0 INTRODUCTION

1.1.0 The Permanent way is the backbone of any railway system. The safety and comfort of rail users depend upon the proper maintenance of track. The permanent way is maintained by Civil Engineering Department by deploying huge manpower. Mechanized maintenance technology is being used to maintain heavy and modernized track structure to cope up increased of faster traffic needs. to cope with heavier and faster traffic needs. By virtue of heavy/modernized track structure and mechanized maintenance of track, the workload trackman category is supposed to be reduced significantly. However, the trackmen are still being deployed arbitrarily based upon conventional pattern. Thus with the introduction of track machine, still trackmaintainer category strength either remains same or increased.

1.2.0 In view of above, SDGM/NR desired to conduct "Review of trackmaintainer staff over UMB Division" with a view to effect optimum utilization of advance track maintenance technology thereby reducing wastage to improve productivity of organization.

1.3.0 TERMS OF REFERENCE:

The following terms of reference were adopted for conducting the study:-

1. Review of staff strength vis-à-vis existing workload.
2. Suggest ways and means to identify redundant/unproductive activities to eliminate wastages.
3. Suggest ways and means to improve the system economic in view of modernization and system development.

1.4.0 METHODOLOGY ADOPTED

The following method study and work measurement techniques of work study were applied for conducting the review:-

1. Data collection and its critical analysis to assess the factual position
2. Application of yardstick in vogue, if any
3. Held discussions at various levels.

- 2.0.0 BRIEF DESCRIPTION, STAFF POSITION, WORKLOAD, CRITICAL ANALYSIS, PROPOSED STAFF AND RECOMMENDATIONS.
- 2.1.0 BRIEF DESCRIPTION
- 2.1.1 UMB Division is an important Division of Northern Railway. It is a strategic division with trains operations point of view. It is spread over the states of Uttar Pradesh, Haryana, Punjab and Himachal Pradesh.
- 2.1.2 Permanent Way or track is the real head upon which the trains run. Track is the backbone of any railway system, which is maintained effectively by track engineers and trackmaintainer staff within the prescribed tolerances.
- 2.1.3 Modernization in railway system has become necessity of today so as to haul heavier and longer trains at faster speeds safely and conveniently to achieve better productivity and render better consumer service to rail users. Modernization of track involves use of heavier track structure, long welded rails, modern mechanized methods of track maintenance and quick renewals of track structure etc.
- 2.1.4 The Indian Railway track is mainly maintained by permanent way gangs of 10/20 men each having a beat of about 6 to 10 km. Depending upon various local/tropical/working conditions, the gangs normally carry out thorough packing of their beat every year and deep screening once in five years. Besides, trackman, mates, keymen, blacksmiths and welders are also utilized for track maintenance.
- 2.1.5. Activities carried out by departmental staff and norms.
The activities performed by departmental staff and norms as per MCNTM formula is tabulated as under:-

	Activities	Norms
T	Activities 'T' affected by Traffic Density	
T.1	Slack attention to	
a.	Bad spots	12 sleepers/head, 1/4 length
b.	Low joints (F for welded) Glued joints	10 GJs attended 4 times/year
c.	SEJ (1 no. per km)	6 times/year, 8SL/SEJ, 12 SL/Head.
d.	Minor curve realignment	As required 10% of gang length.
T.2	For tie tamper work	
a.	Pretamping operations	(2 years cycle) 20 men/km
b.	Alongwith tamper	10 men for week/gang length of 10 km.
c.	Post tamping operations	28 men/km (includes boxing needed).
T.3	Casual renewal of	
a.	Rails	60 mandays/gang length of 10 km.
b.	Track sleepers	60 mandays/gang length of 10 km.
c.	Fasteners (alongwith re-gauging)	100 mandays/gang length of 10 km.
T-4	Repair Welding	12 men/failure/year
R	ACTIVITIES 'R' UNAFFECTED BY TRAFFIC DENSITY	
R.1	Lubrication of ERCs	Keyman duty (occasional)
R.2	Shallow screening (1/5 length)	6 SL/Head
R.3	Loading, leading, unloading	Inferred from field data anlysis.
R.4	Overhauling of level crossing	1 LC per 1.5 km, 20 men/LC

R.5	Watching caution spots and misc.	Inferred from field data analysis.
R.6	Tree cutting for visibility	-do-
R.7	Lubrication of rails in curves	-do-
R.8	Accident relief & carcass removal in run over case.	-do-
R.9	Bridge sleeper attention and renewal.	-do-
R.1	Pre monsoon attention, such as cleaning of drains and water ways, cess repairs, deweeding of track and attention to cuttings and trolley refuges.	Referred from field data analysis.
R.1	Creep pulling (approaches of bridge turnout)	-do-
R.1	Rectifying damage to L/C posts and gates.	-do-
M	ACTIVITIES 'M'	
M.1	Monsoon patrolling	Total no. of patrol man in 24 hrs. No. of days for which patrolling is required.
M.2	Hot weather patrolling	30xlength of LWR in km
M.3	Cold weather patrolling	12 x length of LWR
M.4	Vulnerable locations	Total no. of stationery watchman no. of days for which locations is watched.
M.5	Waterman duty	No. of beatx1 man/ beatx294
M.6	Site store chowkidar	No. of site store x shifts x 365
M.7	Rest Givers to gate keepers (No. of manned level xing.	Xingx2x365- S/S of gate keeper x 294
'S'	ACTIVITIES SITE SPECIFIC	
S1	Tunnel maintenance = length of tunnel in kmx no. of line in tunnel)x1.2 x 294	
S2	Bridge structure maintenance =(length of bridge in km. x no. of line on bridge) 1.1 x 294	
S3	Long girder bridge maintenance = $6 \times 4 \times 4 / 56 = 0.64 \times$ total lineal water way.	
S4	Extra for very sharp curve= (Length of track in km x 1 x 294)	
S5	Extra for very bad formation =(Length of bad formation meter x 10 x 4 x 3/200)	
S6	Look out man duty= length of poor visibility/length of gang length x 294	
S7	Fog signal man duty Ist year IInd Year IIIRD year Avg.	
S8	Filth removal= 1 man /beat	
S9	Security patrolling Ist Year IInd Year IIIRD Year Avg.	

2.1.6 Activities that can be outsourced

During the conduct of study, the activities which can be outsourced on contract basis was discussed at various levels. The work done on contractual basis is economical and better in quality when compared with departmental staff. Indian Railway has out sourced certain activities in some departments like cleaning of coaches, cleaning of drains, platform surface cleaning, washing line cleaning, picking up slag/rag/poly bag from railway lines, cleaning work in Medical Department, box porter work in mechanical/operational departments etc. Some activities in P.Way can be outsourced which will not only improve economy but also increase productivity and standard of work. The activities which can be outsourced are listed below:-

Lubrication of elastic rail clips (ERCs)

1. Shallow screening.
2. Loading, leading and unloading of material
3. Cleaning of drains and waterways.
4. Heavy cess repair and attention to cuttings and trolley refuges.
5. Rectifying damage of L/C posts and gates.
6. Painting of weld collars and rails.
7. Destressing LWR when planned with track renewed.
8. USFD testing.
9. Creep pulling and overhauling of turn outs.
10. Reconditioning of tongue rails and crossings.
11. Unloading ballast.
12. Muck removal from yard.

2.1.7

This study is limited to review the trackmaintainer staff working under SSE (P.Way) controlled by Sr. DEN-C/UMB over UMB Division. The head quarters station of SSE (P.Way) under their respective ADENs are given below:-

ADEN	SSE/ P Way
UMB	Ambala Cantt (UMB)
	Ambala Cantt (USFD UMB)
	Ambala Cantt (UMB TD)
CDG	Chandigarh (CDG)
	Sahibzada Ajit Singh ngr (SASN)
RPJ	Rajpura (RPJ)
SML	Shimla (SML)
	Kalka (KLK)
PTA	Patiala (PTA)
	Dhuri (DUI)
	Uklana (UKN)
SIR	Sirhind (SIR)
	Roop Nagar (RPAR)
	Doraha (DOA)
SRE	Saharanpur (SRE)
	Yamuna Nagar (YJUD)
JUDW	Jagadhri Workshop (JUDW)
BTI	Bathinda (BTI)
	Bathinda USFD BTI
	Barnala (BNN)
	Abohar (ABS)

2.2.0

STAFF POSITION

During the course of study, the team collected the staff position from Divisional Headquarters office. The detailed staff position is depicted as annexure No.II in the report and the summarized position of the trackmaintainer staff is tabulated below:-

S No	ADEN	SSE/P Way	S/S	O/R	Vac
1	UMB	UMB	345	279	66
		USFD UMB	50	50	--
		UMB TD	25	24	1
2	CDG	CDG	242	190	52
		SASN	89	68	21
3	RPJ	RPJ	246	188	58
4	SML	SML	126	109	17
		KLK	127	123	4
5	PTA	PTA	233	175	58
		DUI	323	265	58
		UKN	240	221	19
6	SIR	SIR	303	245	58
		RPAR	319	249	70
		DOA	246	168	78
7	SRE	SRE	242	215	27
8	JUDW	YJUD	216	186	30
		JUDW	45	36	9
9	BTI	BTI	257	209	48
		USFD BTI	9	9	--
		BNN	258	171	87
		ABS	203	142	61
Total			4144	3322	822

The above table reveals that the on roll strength of trackmaintainer staff is **3322** posts against the sanctioned strength of **4144** and **822** posts are lying vacant under Sr.DEN/C/UMB over UMB Division.

2.3.0

WORKLOAD

During the course of study, the team collected the workload in terms of track kilometer being maintained by track maintenance staff and also the mandays per year for activity M & S as per MCNTM norms. The effective working days in one year are taken as 294 days.

The depot wise workload in terms of the kilometer is depicted as Annexure III in the report and the summarized position of the same is tabulated below:-

SN	ADEN	SSE (P.Way)	Track kilometer			Annual GMT	Average
			On PRC sleeper in KM	On other lay outs in Km.	Total		
1	UMB	UMB	SRE-UMB-57.4 UMB-RPJ-5.4 DUK -16.6 UMB-KLK-3.3	152.92	235.62	SRE-UMB-32.35 UMB-RPJ-62.72 DUK -32.25 UMB-KLK-6.43	
		UMB-USFD	-	-	-	-	
		TD/UMB	-	-	-	-	
2	CDG	CDG	73.0	27.00	100.00	6.431	
		SASN	47.00	1.80	48.8	2.22	
3	RPJ	RPJ	M/L 103.507 B/L 23.0	98.97	225.477	M/L 65.72 B/L 8.94	
4	SML	KLK	BG-1.69	34.23 NG-48.72	84.64	BG=6.43 NG=0.52	
		SML	NG-50.22 On steel sleeper	8.53	58.75	0.52	
5	PTA	PTA	67.06	26.347	93.407	8.94	
		DUI	LDH-DUI-55.8 DUI-JHL-63.96	34.350	154.11	LDH-DUI -9.67 DUI-JHL -3.07	
		UKN	84.691	7.747	92.438	3.07	
6	SIR	SIR	M/L 26.473 SIR-NLDM-39.0	23.04	88.503	M/L 57.54 SIR-NLDM-9.52	
		RPAR	72.13	59.98	132.11	9.52	
		DOA	86.48	22.76	109.24	42.70	
7	SRE	SRE	54.909	76.59	131.499	32.25	
		YJUD	93.089	25.347	118.436	32.25	
8	JUDW	JUDW	-	74.70	74.70	JUDW W/SHOP ONLY	

2.4.0 CRITICAL ANALYSIS

The modernization of track has resulted in introduction of modern infrastructure, equipments and devices etc. involving heavy costs in commissioning but on the other hand wastages of manpower specially manual labour viz utilization of trackman is still persisting. In this dynamic age, the track maintenance are being used exclusively and intensively not only to minimize the working expenses but also to improve safety standards.

To economize the track maintenance system due to effect of various modernization of tracks assessing requirement of trackman has become imperative.

Consequently, SDGM/NR desired to conduct a study on "Review of trackman over UMB Division" with a view to improve economy and manpower productivity. The team collected relevant data/information from respective SSE (P.Way) offices and assessed the requirement of trackman as per MCNTM norms.

2.5.0 REQUIREMENT OF TRACKMAN STAFF & YARDSTICK

The team collected the workload in terms of track kilometers and mandays per year for various activities i.e. T, R, M & S etc. from respective SSE (P.Way) offices working under Sr. DEN-C/UMB over UMB Division. The work study team has considered the GMT, Track kilometers, other layout and MCNTM committee formula while calculating the requirement of staff.

The activities 'T' for machine maintenance track kilometers

$T = 80 + 2.3 \times \text{GMT mandays/km/year}$

$R = 159 \text{ mandays/km/year}$

The activities T & R for manual track taken as

$T = 223 + 8.24 \text{ GMT mandays/km/year}$

$R = 159 \text{ mandays/km/year}$

The activities R for running yard line and non running yard line

$R \text{ for mechanized and running yard line} = 177 \text{ mandays/km/yr}$

$R \text{ for non running yard line} = 297 \text{ mandays/km/yr.}$

As per MCNTM formula.

For Narrow Gauge (NG)- $R = 153 \text{ mandays/km/year}$, Activity $T + R = 271 \text{ mandays/km/year}$ for NG Yardstick(Manual packed)

2.5.1 SSE/P.Way/Ambala:

Gang strength as per MCNTM formula:-	GMT	Track in km	
Annual Avg.GMT for Section SRE-UMB	32.350	57.400	Length of LWR
Annual Avg.GMT for Section UMB-RPJ	62.720	5.400	Length of LWR
Annual Avg.GMT for Section DUK	32.250	16.600	
Annual Avg.GMT for Section UMB-KLK	6.430	3.300	
Total track in kilometer		82.700	
Track on other layout including Running yard line etc. in km		152.920	
Mandays/km/yr. for mechanized track			

For activity 'T'

i. Annual Avg.GMT for Section SRE-UMB:

$$80+2.3*GMT= 80+2.3*32.35$$

$$154.405*57.4$$

$$154.405 \text{ mandays/km/yr}$$

$$8862.847 \text{ mandays/yr}$$

$$\text{For activity 'R'} \quad 159*\text{Track on PRC (Mech)} \quad 159*57.4$$

$$9126.6 \text{ for } 57.4 \text{ track km Mandays/yr.}$$

ii Annual Avg.GMT for Section UMB-RPJ:

$$80+2.3*GMT= 80+2.3*62.72$$

$$224.26*5.4$$

$$224.26 \text{ mandays/km/yr}$$

$$1211.0 \text{ mandays/yr}$$

$$\text{For activity 'R'} \quad 159*5.4 \text{ Track on PRC (Mech)}$$

$$858.6 \text{ for } 5.4 \text{ track km Mandays/yr.}$$

iii Annual Avg.GMT for Section DUK:

$$80+2.3*GMT= 80+2.3*32.25$$

$$154.175*16.6$$

$$154.175 \text{ mandays/km/yr}$$

$$2559.30 \text{ mandays/yr}$$

$$\text{For activity 'R'} \quad 159*16.6 \text{ Track on PRC (Mech)}$$

$$2639.4 \text{ for } 16.6 \text{ track km Mandays/yr.}$$

iii Annual Avg.GMT for Section UMB-KLK

$$80+2.3*GMT= 80+2.3*6.43$$

$$94.79*3.3$$

$$94.79 \text{ mandays/km/yr}$$

$$312.8 \text{ mandays/yr}$$

$$\text{For activity 'R'} \quad 159*3.3 \text{ Track on PRC (Mech)}$$

$$524.7 \text{ for } 3.3 \text{ track km Mandays/yr.}$$

$$\text{Activity 'R' for Other Layout and running yard lines} \quad 177*152.92=27066.84 \text{ mandays/yr}$$

$$\text{Total Activity 'T' : } 8862.847+1211.0+2559.30+312.80=12945.947 \text{ Mandays/yr.}$$

$$9126.6+858.6+2639.4+524.7+27066.84 = 40216.14$$

Total activity 'R' for mechanized: mandays/yr

Activity miscellaneous 'M'

Length of LWR	82.7 KM	Mandays/yr
i Monsoon patrolling	30 days*8 beats*2men*2shifts	960
ii Hot weather patrolling	30x82.7	2481
iii Cold weather patrolling	12x82.7	992.4
iv Vulnerable locations	2*2*30	120
v Site store chowkidar	2x2x365	1460
vi Rest giver gate keepers	(LC*2*365-SS*294)	3*2*365-6*294 426
Total M		6439.4

Activity site specific 'S':-

i	Tunnel maintenance		--
ii	Bridge structure maintenance		--
iii	Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge	--
iv	Extra for every sharp curve	4.5 km*365	1642
v	Extra for bad formation		--
vi	Look out man duty	4*60 days	240
vii	Fog signal men duty		900
viii	Filth removal		--
ix	Security patrolling		19
	Total S		2801

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)
12945.947	40216.14	6439.4	2801	62402.48752	212.25
Total		212.25			
Gateman		6			
A gang for misc work		20			
A gang for other misc worklike keyman, trolleyman, mate etc		38			A gang for other misc work
Total		276.25			
LR @ 12.5%		34.53			
			Say		
Proposed staff		310.78	311		
Sanctioned strength		345.00			
Surplus Posts		345-311=	34		

2.5.2 SSE/P.Way/Ambala/USFD:

SSE/USFD/UMB is functioning for detecting of flaw, crack in the track and joints build up by the thermit welding plant. Their schedule and frequency of checking is fixed keeping in view the aspect of GMT. For the ease of work, UMB division is divided into USFD-I, II, III & IV supervised by the SSE/USFD in their respective jurisdiction. The checking detail as per USFD manual is as under:

Workload:

S No	SSE/USFD	Section	GMT	Frequency of testing		Total Testing Of Track in km
1	UMB-I	UMB-RPJ	72.96 - 58.47	1.5 - 2.0	--	865
		RPJ-SIR	62.89 - 52.19	1.5 -2.0	--	
		SIR-LDH	44.37 - 41.03	2.0 - 2.0	--	
		UMB-RPJ	72.96 - 58.47	1.5 - 2.0		
		RPJ-SIR	62.89 - 52.19	1.5 -2.0	Loop Lines	
		SIR-LDH	44.37 - 41.03	2.0 - 2.0		
		KLK-SML	0.52 - 0.52	--	--	
2	UMB-II	SRE-UMB	33.52 - 30.98	--	--	945
		MB-SRE	36.55 - 24. 96	--	--	
		DLI-SRE	11.40 - 10. 09	--	--	
		SIR-LDH	44.37 - 41.03	2.0 - 2.0		
		SIR-LDH	41.03	2.0 -2.0	Loop Lines	
		RPJ-DUI	17.85	4	--	
		SIR-NLDM	19.4	4	--	
3	UMB-III	NLDM-AADR	4.4	27	--	
		API-DUI	17.19	4	--	
		SIR-NLDM	19.4	4	Loop Lines	

Proposed requirement of staff:

At present 50 track maintainer staff are working under SSE/USFD to cope up the existing work load. This matter was discussed at various level and the SSE I/C of USFD apprised the work study team that the existing on roll staff strength including LR is sufficient to cope up the existing work load. The work study team is of the opinion that the existing system hold good and may continue.

2.5.3 SSE/P.Way/Ambala/Track Depot:

Track depot UMB is functioning as a store for various SSE/P Way over UMB division and procure material as per need of the entire division related to P Way. At present 25 Trackmaintainer are sanctioned to cope up the existing workload. The requirement of Trackmaintainer staff discussed at various levels found sufficient and may continue.

2.5.4 SSE/P.Way/Chandigarh:

Gang strength as per MCNTM formula:-

Annual Avg.GMT

Track on PRC in kilometer

GMT Track in km

6.43

73.00

Length of LWR

Track on other layout including Running yard line etc. in km	27.00	
Total track in kilometer	100.00	
Mandays/km/yr. for mechanized track		
For activity 'T'		
Annual Avg.GMT:		
80+2.3*GMT= 80+2.3x6.43	94.789 mandays/km/yr	
94.789*73	6919.6 mandays/yr	
For activity 'R' 159*Track on PRC (Mech) 159x73	11607 for 73 track km Mandays/yr.	
Activity 'R' for Other Layout and running yard lines	177x27=4779 mandays/yr	
Total Activity 'T' : = 6919.6 Mandays/yr.		
Total activity 'R' for mechanized 11607+4779 = 16386 mandays/yr		
Activity miscellaneous 'M'		
Length of LWR 73 km		Mandays/yr
i Monsoon patrolling	8*30days*2*4	1920
ii Hot weather patrolling	30x73	2190
iii Cold weather patrolling	12x73	876
iv Vulnerable locations	2*2*30	120
v Site store chowkidar	2x2x365	1460
vi Rest giver gate keepers (LC*2*365-SS*294)	3*2*365-6*294=	426
Total M		6992

Activity site specific 'S':-

i Tunnel maintenance		--
ii Bridge structure maintenance		--
iii Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge 0.64*315*1	201
iv Extra for every sharp curve	2.953 km*294	868.18
v Extra for bad formation		--
vi Look out man duty	4*60 days	240
vii Fog signal men duty		--
viii Filth removal		--
ix Security patrolling		--
Total S		1309.18

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength(T+R+M+S/294)
6919.6	16386	6992	1069.18	31366.78	106.69
Total					106.69
Gateman					12
A gang for misc work					20
A gang for other misc work like keyman, trolleyman, mate etc					38
Total					176.69
LR @ 12.5%					22.09
Proposed staff					198.78
Sanctioned strength		242.00			
Surplus Posts		242-190 = 43			

2.5.5 SSE/P.Way/SAS Nagar:

Gang strength as per MCNTM formula:-	GMT	Track in km
Annual Avg.GMT	2.22	
Track on PRC in kilometer		47.00 Length of LWR

Track on other layout including Running yard line etc. in km 1.80
Total track in kilometer 48.80
Mandays/km/yr. for mechanized track
For activity 'T'
Annual Avg.GMT:
 $80 + 2.3 \times \text{GMT} = 80 + 2.3 \times 2.2$ 85.06 mandays/km/yr
 85.06×47 3997.82 mandays/yr
For activity 'R' 159*Track on PRC (Mech) 159x47 7473 for 47 track km Mandays/yr.
Activity 'R' for Other Layout and running yard lines 177x1.8=318.6 mandays/yr
Total Activity 'T' : = **3997.82** Mandays/yr.
Total activity 'R' for mechanized 7473+318.6= **7791.6** mandays/yr

Activity miscellaneous 'M'

Length of LWR	47 km	Mandays/yr
i Monsoon patrolling	30days*8beats*2shift*4men	1920
ii Hot weather patrolling	30x47	1410
iii Cold weather patrolling	12x47	564
iv Vulnerable locations	2*2*30	120
v Site store chowkidar	2x2x365	1460
vi Rest giver gate keepers	(LC*2*365-SS*294) 3*2*365-6*294=	426
Total M		5900

Activity site specific 'S':-

i Tunnel maintenance		--
ii Bridge structure maintenance		--
iii Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge 0.64*315*1	201
iv Extra for every sharp curve	2.953 km*294*1 man	868.18
v Extra for bad formation		--
vi Look out man duty	4*60 days	--
vii Fog signal men duty		--
viii Filth removal		--
ix Security patrolling		--
Total S		1069.18

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength(T+R+M+S/294)
3997.82	7791.6	5900	1069.18	18758.6	63.80
Total		63.8			
Gateman		6			
A gang for other misc work like key-man, trolleyman, mate etc				8	
Total		77.8			
LR @ 12.5%		9.73			
Proposed staff		87.53	Say 88		
Sanctioned strength		89.00			
Surplus Posts		89-88=	01		

2.5.6 SSE/P.Way/Rajpura:

Gang strength as per MCNTM formula:-
Annual Avg.GMT

GMT Track in km

Gateman	4	
A gang for other misc work like key man, trolleyman, mate etc		8
Total	254.96	
LR @ 12.5%	31.87	
Proposed staff	286.83	Say 287
Sanctioned strength	246.00	
Surplus Posts	246-287 = 41	

2.5.7 SSE/P.Way/Shimla:

Gang strength as per MCNTM formula:-	GMT	Track in km
Annual Avg.GMT	0.52	
Track on Steel Sleeper in kilometer		50.22

Track on other layout including Running yard line etc. in km					8.53	
Total track in kilometer					58.75	
For activity 'T' for mechanized track = Nil						
Mandays/km/yr. for manual maintenance of N/G track						
For activity 'R' 271*Track	271*50.22			13609.62 for 50.22 track km	Mandays/yr.	
Activity 'R' for Other Layout and running yard lines	153*8.53			1305.09 Mandays/yr.		
Total activity 'R' for manual maintenance				13609.62+1305.09=14914.71		
Activity miscellaneous 'M'						
Length of LWR	Nil				Mandays/yr	
i Monsoon patrolling	2shift*30days*16beats					960
ii Hot weather patrolling					--	
iii Cold weather patrolling					--	
iv Vulnerable locations						640
v Site store chowkidar	1x2x365					730
vi Rest giver gate keepers	(LC*2*365-SS*294)			6*2*365-4*294		852
Total M						3182
Activity site specific 'S':-						
i Tunnel maintenance						522
ii Bridge structure maintenance						100
iii Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge			0.64*200*1		--
iv Extra for every sharp curve	1.0 km*294*1 man					3455
v Extra for bad formation						90
vi Look out man duty						100
vii Fog signal men duty						--
viii Filth removal						--
ix Security patrolling						30
Total S						4297.00
T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)	
--	14914.71	3182	4297	22393.71	76.17	
Total					76.17	
Gateman					12	
A gang for misc work					10	
A gang for other misc work like key man, trolleyman, mate etc					10	
Total					108.17	
LR @ 12.5%					13.52	
Proposed staff					121.69	Say 122
Sanctioned strength					126.00	
Surplus Posts					126-122 = 04	

2.5.8 SSE/P.Way/Kalka:

Gang strength as per MCNTM formula:-	GMT	Track in km
Annual Avg.GMT	6.43	
Track on PRC in kilometer		1.69

Track on other layout including Running yard line etc. in km BG	34.23
Track on Steel Sleeper in kilometer	48.72
Total track in kilometer of BG/NG	84.64

For activity 'T' for BG Annual Avg.GMT:

$$80 + 2.3 \times \text{GMT} = 80 + 2.3 \times 6.43$$

$$94.789 \times 1.69$$

$$94.789 \text{ mandays/km/yr}$$

$$\mathbf{160.19} \text{ mandays/yr}$$

$$\text{For activity 'R' for B/G} \quad 159 \text{ manys/km/yr} \times 1.69$$

$$268.71 \text{ man days/yr}$$

$$\text{Activity 'R' for BG} \quad 177 \times 34.23$$

$$6058.71 \text{ man days/yr}$$

Total Activity 'R' for BG Other Layout and running yard lines

$$\mathbf{6327.42} \text{ man days/yr}$$

For NG 48.72 km

$$\text{For activity 'R' for manual maintenance of NG} \quad 271 \text{ man days/km/yr} = 271 \times 48.72 = 13203.12$$

$$\text{Total activity 'R'} \quad 6327.42 + 13203.12 = \mathbf{19530.54}$$

Activity miscellaneous 'M'

Length of LWR	NIL	Mandays/yr
i Monsoon patrolling	15*120	1800
ii Hot weather patrolling		--
iii Cold weather patrolling		--
iv Vulnerable locations	2*4*30	200
v Site store chowkidar	1x2x365	730
vi Rest giver gate keepers	(LC*2*365-SS*294) 3*2*365-6*294	426
Total M		3156

Activity site specific 'S':-

i Tunnel maintenance		1220
ii Bridge structure maintenance		120
iii Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge	--
iv Extra for every sharp curve		2205
v Extra for bad formation		100
vi Look out man duty		100
vii Fog signal men duty		31
viii Filth removal		--
ix Security patrolling		--
Total S		3776.00

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)
160.19	19530.54	3156	3776	26622.73	90.55
Total					90.55
Gateman					6
A gang for misc work					6
A gang for other misc work like key man, trolleyman, mate etc					8
Total					110.55
LR @ 12.5%					13.82
Proposed staff					124.37
Sanctioned strength					127.00
Surplus Posts				127-124 = 03	

2.5.9 SSE/P.Way/Patiala:

Gang strength as per MCNTM formula:-

Track on PRC in kilometer

GMT	Track in km	Length of LWR
8.94	67.060	
		26.347

Track on other layout including Running yard line etc. in km

Total track in kilometer						93.407
Mandays/km/yr. for mechanized track						
For activity 'T' for main line						
Annual Avg.GMT:						
80+2.3*GMT= 80+2.3x8.94				100.502 mandays/km/yr		
100.502*67.06					6739.66 mandays/yr	
For activity 'R' 159*Track on PRC (Mech)	159x67.06			10662.570 for 67.06 track km	Mandays/yr.	
80+2.3*GMT= 80+2.3x8.94				100.562 mandays/km/yr		
100.562*23				2312.92 for 23 km	mandays/yr	
Activity 'R' for Other Layout and running yard lines				177x26.347=4663.42	mandays/yr	
Total Activity 'T' : =	6739.66	Mandays/yr.				
Total activity 'R' for mechanized	10662.57+4663.42=	15325.96	mandays/yr			
Activity miscellaneous 'M'						
Length of LWR	67.06 km					Mandays/yr
i Monsoon patrolling						1780
ii Hot weather patrolling				30x67.06		3795.21
iii Cold weather patrolling				12x67.06		804.72
iv Vulnerable locations						--
v Site store chowkidar				2x2x365		1460
vi Rest giver gate keepers	(LC*2*365-SS*294)			8*2*365-16*294		3488
Total M						11327.9
Activity site specific 'S':-						
i Tunnel maintenance						--
ii Bridge structure maintenance						--
iii Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge	0.64*286.27*1				183.21
iv Extra for every sharp curve	1 curve*6.23 km*294					1831.62
v Extra for bad formation						--
vi Look out man duty						1200
vii Fog signal men duty						--
viii Filth removal						--
ix Security patrolling						--
Total S						3214.83
T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength(T+R+M+S/294)	
6739.66	15325.96	11327.93	3214.83	36608.38	124.52	
Total					124.52	
Gateman					16	
A gang for misc work					20	
A gang for other misc work like key man, trolleyman, mate etc					20	
Total					180.52	
LR @ 12.5%					22.57	
Proposed staff					203.09	Say 203
Sanctioned strength					233.00	
Surplus Posts			233-203	-30		

2.5.10 SSE/P.Way/Dhuri:

Gang strength as per MCNTM formula:-	GMT	Track in km	
Annual Avg.GMT			
Track on PRC in Km LDH-DUI section	9.67	55.800	Length of LWR

Track on PRC in Km DUI-JHL section	6.14	63.960	
Track on other layout including Running yard line etc. in km		34.350	
Total track in kilometer		154.110	
Mandays/km/yr. for mechanized track			
LDH-DUI section:			
For activity 'T' for main line			
80+2.3*GMT= 80+2.3x9.67	102.241 mandays/km/yr		
102.241*55.8	5705.048 mandays/yr		
For activity 'R' 159*Track on PRC (Mech)	159x55.8	8872.2 for 55.80 track km Mandays/yr.	
DUI-JHL section:			
80+2.3*GMT= 80+2.3x6.14	94.122 mandays/km/yr		
94.122*63.96	6020.043 for 63.96 km mandays/yr		
Activity 'R'	159*63.96	10169.64 mandays/yr	
Track on other layout including Running yard line etc. in km	177*34.35	6079.95 mandays/yr	
Total Activity 'T' : = 5705.048+6020.043 =	11725.523 Mandays/yr.		
Total activity 'R' for mechanized	8872.2+10169.64+6079.95=25121.79mandays/yr		
Activity miscellaneous 'M'			
Length of LWR	119.76 km		Mandays/yr
i Monsoon patrolling			3592.8
ii Hot weather patrolling	30x119.76		3592.8
iii Cold weather patrolling	12x119.76		1437.12
iv Vulnerable locations			--
v Site store chowkidar	2x2x365		1460
vi Rest giver gate keepers	(LC*2*365-SS*294)	8*2*365-16*294	1136
Total M			11218.7
Activity site specific 'S':-			
i Tunnel maintenance			--
ii Bridge structure maintenance			1200
iii Long Girder Bridge maintenance	0.64*365.28*2		467.4
iv Extra for every sharp curve	2 curve*km*365*1		730.00
v Extra for bad formation			900
vi Look out man duty			1200
vii Fog signal men duty			1515
viii Filth removal			--
ix Security patrolling			900
Total S			6912.40
T	R	M	S
11725.523	25121.79	11218.72	6912.4
Total			187
Gateman			16
A gang for misc work			20
A gang for other misc work like key man, trolleyman, mate etc			30
Total			253
LR @ 12.5%			31.63
Proposed staff			284.63
Sanctioned strength			233.00
Surplus Posts			323-285 =38

2.5.11 SSE/P.Way/Uklana:

Gang strength as per MCNTM formula:-				GMT	Track in km	
Annual Avg.GMT S/L						
Track on PRC in Km				3.07	84.691	Length of LWR
Track on other layout including Running yard line etc. in km					7.747	
Total track in kilometer					92.438	
Mandays/km/yr. for mechanized track						
For activity 'T'						
80+2.3*GMT= 80+2.3x6.14				94.122 mandays/km/yr		
94.122*84.691				7971.286 mandays/yr		
Activity 'R'				159*Track on PRC (Mech)	159x84.691	13465.87 for 84.691 track km Mandays/yr.
						1371.22
Track on other layout including Running yard line etc. in km				177*7.747		mandays/yr
Total Activity 'T' : = 7971.286 Mandays/yr.						
Total activity 'R' for mechanized				1371.22+13465.87 =	14837.09	mandays/yr
Activity miscellaneous 'M'						
Length of LWR				84.691 km		Mandays/yr
i Monsoon patrolling						450
ii Hot weather patrolling				30x84.691		2540.73
iii Cold weather patrolling				12x84.691		1016.292
iv Vulnerable locations						156
v Site store chowkidar				2x2x365		1460
vi Rest giver gate keepers				(LC*2*365-SS*294)	10*2*365-20*294	1420
Total M						7043.02
Activity site specific 'S':-						
i Tunnel maintenance						--
ii Bridge structure maintenance						--
iii Long Girder Bridge maintenance						122
iv Extra for every sharp curve				2 curve*km*365*1		730.00
v Extra for bad formation						180
vi Look out man duty						652
vii Fog signal men duty						430
viii Filth removal						--
ix Security patrolling						--
Total S						2114.00
T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)	
7971.286	14837.09	7043.022	2114	31965.398	108.73	
Total		108.73				
Gateman		20				
A gang for misc work		25				
A gang for other misc work like key-man, trolleyman, mate etc		40				
Total		193.73				

LR @ 12.5%	24.22	
Proposed staff	217.95	Say 218
Sanctioned strength	240.00	
Surplus Posts	240-218 = 22	

2.5.12 SSE/P.Way/Sirhind:

Gang strength as per MCNTM formula:-

	GMT	Track in km	
Annual Avg.GMT Main Line	57.540	26.473	Length of LWR
Section SIR-NLDM	9.520	39.000	Length of LWR
Section SMRL	2.220	55.950	Length of LWR
Total LWR in kilometer		121.423	
Track on other layout including Running yard line etc. in km		27.660	
Total track in kilometer		270.506	

Mandays/km/yr. for mechanized track

i. Main Line:

$$80+2.3*GMT= 80+2.3*57.54$$

$$212.342 \text{ mandays/km/yr}$$

$$212.342*26.473$$

$$5621.33 \text{ mandays/yr}$$

Activity 'R' 159*Track on PRC (Mech) 159x26.4731 **4209.207** for 26.473 track km Mandays/yr.

ii. Section SIR-NLDM:

For activity 'T'

$$80+2.3*GMT= 80+2.3*9.52$$

$$101.16 \text{ mandays/km/yr}$$

$$101.16*39.0$$

$$3945.24 \text{ mandays/yr}$$

Activity 'R' 159*Track on PRC (Mech) 159x39.0 **6201** for track 39.0 km Mandays/yr.

Track on other layout including Running yard line etc. in km 177*23.03 **4076.31** mandays/yr

iii. Section SMRL:

$$80+2.3*GMT= 80+2.3*2.2$$

$$85.106 \text{ mandays/km/yr}$$

$$85.106*55.95$$

$$4761.68 \text{ mandays/yr}$$

Activity 'R' 159*Track on PRC (Mech) 159x55.95 **8896.05** for track 55.95 km Mandays/yr.

Track on other layout including Running yard line etc. in km 177*4.63 **819.51** mandays/yr

Total Activity 'T' : = 5621.33+ 3945.24+4761.68 = **14322.25** Mandays/yr.

Total activity 'R' for mechanized 4209.207+6201+4076.31+8896.05+819.51 = **24202.077**

Activity miscellaneous 'M'

Length of LWR	121.423 km	Mandays/yr
i Monsoon patrolling	2*22*30	1320.000
ii Hot weather patrolling	30x121.423	3642.690
iii Cold weather patrolling	12x121.423	1457.076
iv Vulnerable locations		--
v Site store chowkidar	2x2x365	1460.000
vi Rest giver gate keepers	(LC*2*365-SS*294)	6*2*365-12*294
Total M		8731.766

Activity site specific 'S':-

i Tunnel maintenance	--
ii Bridge structure maintenance	--
iii Long Girder Bridge maintenance	1528.000

iv	Extra for every sharp curve		5230.000
v	Extra for bad formation		410.000
vi	Look out man duty	6*30	180.000
vii	Fog signal men duty		--
viii	Filth removal		--
ix	Security patrolling		152.000
	Total S		7500.00

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)
14322.25	24202.077	8731.766	7500	54756.093	186.25
Total		186.25			
Gateman		12			
A gang for misc work		10			
A gang for other misc work like key-man, trolleyman, mate etc		20			
For Container Depot		30			
Total		258.25			
LR @ 12.5%		32.28			
Proposed staff		290.53	Say 291		
Sanctioned strength		303			
Surplus Posts		303-291=12			

2.5.13 SSE/P.Way/Doraha:

Gang strength as per MCNTM formula:-

Annual Avg.GMT	GMT	Track in km	
	42.7		
Track on PRC in kilometer		86.480	Length of LWR
Track on other layout including Running yard line etc. in km		22.760	
Total track in kilometer		109.240	
Mandays/km/yr. for mechanized track			
For activity 'T' for main line			
Annual Avg.GMT:			
80+2.3*GMT= 80+2.3x42.7	178.21 mandays/km/yr		
178.21*86.48	15411.60 mandays/yr		
For activity 'R' 159*Track on PRC (Mech) 159x86.48	13750.32 for 86.48 track km	Mandays/yr.	
Activity 'R' for Other Layout and running yard lines 177x22.76	4028.52 Mandays/yr.		
Total Activity 'T' : =15411.60 Mandays/yr.			
Total activity 'R' for mechanized 13750.32+4028.52=	17778.84 mandays/yr		
Activity miscellaneous 'M'			
Length of LWR	86.48 km		Mandays/yr
i Monsoon patrolling			90
ii Hot weather patrolling	30x86.48		2594.4
iii Cold weather patrolling	12x86.48		1037.76
iv Vulnerable locations			--
v Site store chowkidar	1x2x365		730
vi Rest giver gate keepers			--
Total M			4452.16

Activity site specific 'S':-

i	Tunnel maintenance		--
ii	Bridge structure maintenance		210
iii	Long Girder Bridge maintenance	0.64*water ways in mtrs*no of bridge 0.64*200*1	140
iv	Extra for every sharp curve	1.0 km*294*1 man	--
v	Extra for bad formation		--
vi	Look out man duty		1070
vii	Fog signal men duty		--
viii	Filth removal		--
ix	Security patrolling		--

Total S **1420.00**

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)
15411.6	17778.84	4452.16	1420	39062.6	132.87

Total 132.87

Gateman 8

A gang for misc work 20

A gang for other misc work like
key-man, trolleyman, mate etc 20

Total 180.87

LR @ 12.5% 22.61

Proposed staff 203.48 Say 203

Sanctioned strength 246

Surplus Posts 246-203 -43

2.5.14 SSE/P.Way/Roop Nagar:

Gang strength as per MCNTM formula:-

Annual Avg.GMT

GMT

9.52

Track in km

Track on PRC in kilometer

72.130 Length of LWR

Track on other layout including Running yard line etc. in km

59.980

Total track in kilometer

132.110

Mandays/km/yr. for mechanized track

For activity 'T'

$80 + 2.3 \times \text{GMT} = 80 + 2.3 \times 9.52$

101.90 mandays/km/yr

101.90×72.13

7350.05 mandays/yr

For activity 'R' $159 \times \text{Track on PRC (Mech)} = 159 \times 72.13 = 11468.67$ for 72.13 track km Mandays/yr.

Activity 'R' for Other Layout and running yard lines $177 \times 59.98 = 10616.46$ Mandays/yr.

Total Activity 'T' : = **7350.05** Mandays/yr.

Total activity 'R' for mechanized:

$11468.67 + 10616.46 = \mathbf{22085.13}$ mandays/yr

Activity miscellaneous 'M'

Length of LWR

72.13 km

Mandays/yr

i Monsoon patrolling

$2\text{men} \times 8\text{beats} \times 90\text{days}$

1440

ii Hot weather patrolling

30×72.13

2163.9

iii Cold weather patrolling

12×72.13

865.56

iv Vulnerable locations

6×90

540

v Site store chowkidar

$2 \times 2 \times 365$

1460

vi Rest giver gate keepers

$6 \times 2 \times 365 - 12 \times 294$

852

Total M

7321.46

Activity site specific 'S':-

i Tunnel maintenance

--

ii Bridge structure maintenance

1152

iii Long Girder Bridge maintenance

2520

iv Extra for every sharp curve

$10\text{men} \times 2\text{curve} \times 12\text{days}$

240

v Extra for bad formation

--

vi Look out man duty

4×365

1460

vii Fog signal men duty

--

viii Filth removal

--

ix Security patrolling

300

Total S

5672.00

T

R

M

S

Total (T+R+M+S)

Calculated Gang Strength
(T+R+M+S/29)

7350.05

22085.13

7321.46

5672

42428.64

144.32

Total

144.32

Gateman

12

A gang for misc work

20

A gang for other misc work like key-man, trolleyman, mate etc

40

For NFL & POL siding

30

For new section AADR

30

Total

276.32

LR @ 12.5%

34.54

Proposed staff

310.86

Say 311

Sanctioned strength

319

Surplus Posts

$319 - 311 = \mathbf{08}$

2.5.15 SSE/P.Way/Saharanpur:

Gang strength as per MCNTM formula:-					GMT	Track in km	
Annual Avg.GMT					32.25		
Track on PRC in kilometer						54.909	Length of LWR
Track on other layout including Running yard line etc. in km						76.590	
Total track in kilometer						131.499	
Mandays/km/yr. for mechanized track							
For activity 'T'							
80+2.3*GMT= 80+2.3x32.25					154.175 mandays/km/yr		
154.175*54.909					8465.60 mandays/yr		
For activity 'R' 159*Track on PRC (Mech) 159x54.909					8730.53for 54.909 track km		Mandays/yr.
Activity 'R' for Other Layout and running yard lines 177x76.59					13556.43		Mandays/yr.
Total Activity 'T' : = 8465.60 Mandays/yr.							
Total activity 'R' for mechanized 8730.53+13556.43 = 22286.96 mandays/yr							
Activity miscellaneous 'M'							Mandays/yr
Length of LWR					54.909 km		
i Monsoon patrolling					3man*8beats*90days		2160
ii Hot weather patrolling					30x54.909		1647.27
iii Cold weather patrolling					12x54.909		658.908
iv Vulnerable locations					5*90		450
v Site store chowkidar					2x2x365		1460
vi Rest giver gate keepres					6*2*365-12*294		852
Total M							7228.178
Activity site specific 'S':-							
i Tunnel maintenance							--
ii Bridge structure maintenance							1152
iii Long Girder Bridge maintenance					1*0.64*2000 mt		1280
iv Extra for every sharp curve					2*2*365		1460
v Extra for bad formation					2*365		730
vi Look out man duty					2*365		730
vii Fog signal men duty							120
viii Filth removal							--
ix Security patrolling							--
Total S							5472.00
T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength T+R+M+S/294)		
8465.6	22286.96	7228.178	5472	43452.738	147.80		
Total					147.8		
Gateman					12		
A gang for misc work					20		
A gang for other misc work like key-man, trolleyman, mate etc					30		
Total					209.8		
LR @ 12.5%				26.23			
Proposed staff					236.03	Say 236	
Sanctioned strength					242		
Surplus Posts					242-236= 06		

2.5.16 SSE/P.Way/Jagadhari:

Gang strength as per MCNTM formula:-

Annual Avg.GMT	GMT	Track in km	
	32.25		
Track on PRC in kilometer		93.089	Length of LWR
Track on other layout including Running yard line etc. in km		25.347	
Total track in kilometer		118.436	

Mandays/km/yr. for mechanized track

For activity 'T'

$$80 + 2.3 \times \text{GMT} = 80 + 2.3 \times 32.25$$

154.175 mandays/km/yr

$$154.175 \times 93.089$$

14351.99 mandays/yr

For activity 'R' 159*Track on PRC (Mech)

$$159 \times 93.089$$

14801.15 for 93.089 track km Mandays/yr.

Activity 'R' for Other Layout and running yard lines

$$177 \times 25.347$$

4486.42 Mandays/yr.

Total Activity 'T' : = **14351.99** Mandays/yr.

Total activity 'R' for mechanized 14801.15+4486.42 = **19287.57** mandays/yr

Activity miscellaneous 'M'

Mandays/yr

Length of LWR

93.089 km

i Monsoon patrolling

$$2 \times 6 \times 90$$

1080

ii Hot weather patrolling

$$30 \times 93.089$$

2792.67

iii Cold weather patrolling

$$12 \times 93.089$$

1117.068

iv Vulnerable locations

As per deployment

850

v Site store chowkidar

$$2 \times 2 \times 365$$

1460

vi Rest giver gate keepers

$$4 \times 2 \times 365 - 8 \times 294$$

568

Total M

7867.738

Activity site specific 'S':-

i Tunnel maintenance

--

ii Bridge structure maintenance

$$4 \times 365$$

1460

iii Long Girder Bridge maintenance

$$1 \times 0.64 \times 1800 \text{ mt}$$

1152

iv Extra for every sharp curve

$$3 \times 365$$

1095

v Extra for bad formation

$$2 \times 365$$

730

vi Look out man duty

$$2 \times 365$$

730

vii Fog signal men duty

1920

viii Filth removal

--

ix Security patrolling

26

Total S

7113.00

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength
14351.99	19287.57	7867.738	7113	48620.298	165.38

Total 163.2

Gateman 8

A gang for misc work 10

A gang for other misc work like key-man, trolleyman, mate etc 10

Total 191.2

LR @ 12.5% 23.90

Proposed staff 215.10 Say 215

Sanctioned strength 216

Surplus Posts 216-215 = **01**

2.5.17 SSE/P.Way/Jagadhari Workshop:

Gang strength as per MCNTM formula:-

Annual Avg.GMT

GMT

Track in
km

--

Track on PRC in kilometer

74.700

Total track in kilometer

74.700

Mandays/km/yr. for mechanized track

For activity 'T'

$80 + 2.3 \times \text{GMT} = 80 + 2.3 \times 0$

0 mandays/km/yr

--

0 mandays/yr

Activity 'R' for Other Layout and running yard lines $177 \times 74.70 = 13221.9$ Mandays/yr.

Total Activity 'T' : -- Mandays/yr.

Total activity 'R' for mechanized **13221.9** mandays/yr

Activity miscellaneous 'M'

Length of LWR

--

Mandays/yr

i Monsoon patrolling

--

ii Hot weather patrolling

--

iii Cold weather patrolling

--

iv Vulnerable locations

3×365

1095

v Site store chowkidar

$1 \times 2 \times 365$

730

vi Rest giver gate keepers

--

Total M

1825

Activity site specific 'S':-

i Tunnel maintenance

--

ii Bridge structure maintenance

--

iii Long Girder Bridge maintenance

--

iv Extra for every sharp curve

--

v Extra for bad formation

--

vi Look out man duty

2×365

730

vii Fog signal men duty

--

viii Filth removal

--

ix Security patrolling

--

Total S

730.00

T

R

M

S

Total (T+R+M+S)

Calculated Gang Strength
(T+R+M+S/294)

--

13221.9

1825

730

15776.9

53.66

Total

53.66

Gateman

2

A gang for misc work

10

A gang for other misc work like key-man, trolleyman, mate etc

5

Total

70.66

LR @ 12.5%

8.83

Proposed staff

79.49

Say 79

Sanctioned strength

45

Required staff

$45 - 79 = -34$ Shortage

2.5.18 SSE/P.Way/Bathinda:

Gang strength as per MCNTM formula:-

	GMT	Track in km
Annual Avg.GMT DUI-BTI section	7.51	14.000
Annual Avg.GMT BTI-SGMR section	4.95	48.959
Track on PRC in kilometer		62.959
Track on other layout including Running yard line etc. in km		68.357
Total Track		131.316

Mandays/km/yr. for mechanized track

For activity 'T' DUI-BTI section:

$$80+2.3*GMT= 80+2.3*7.51$$

97.273 mandays/km/yr

$$97.273*14.0$$

1361.822 mandays/yr

For activity 'R' 159*Track on PRC (Mech) 159x14

2226 for 14.0 track km Mandays/yr.

For activity 'T' BTI-SGMR section:

$$80+2.3*GMT= 80+2.3*4.95$$

91.385 mandays/km/yr

$$91.385*48.959$$

4474.12 mandays/yr

For activity 'R' 159*Track on PRC (Mech) 159x48.959 7784.481 for 48.959 track km Mandays/yr.

Activity 'R' for Other Layout and running yard lines 177x68.357 =12099.189 Mandays/yr.

Total Activity 'T' : =1361.822+4474.12= **5835.942** Mandays/yr.

Total activity 'R' for mechanized 2226+7784.481+12099.189 = **22109.67** mandays/yr

Activity miscellaneous 'M'

Mandays/yr

Length of LWR

62.959 km

i Monsoon patrolling

3*6*90

1620

ii Hot weather patrolling

30x62.959

1888.77

iii Cold weather patrolling

12x62.959

755.508

iv Vulnerable locations

2*4*60

480

v Site store chowkidar

2x2x365

1460

vi Rest giver gate keepers

12*2*365-24*294

1704

Total M

7908.278

Activity site specific 'S':-

i Tunnel maintenance

--

ii Bridge structure maintenance

4*365

1460

iii Long Girder Bridge maintenance

--

iv Extra for every sharp curve

2*3*365

2190

v Extra for bad formation

2*9*60

1080

vi Look out man duty

2*365

730

vii Fog signal men duty

4*3*60

720

viii Filth removal

--

ix Security patrolling

--

Total S

6180.00

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)
5835.942	22109.67	7908.278	6180	42033.89	142.97

Total 142.97

Gateman

24

A gang for misc work

20

A gang for other misc work like
key-man, trolleyman, mate etc

20

For NFL/BTI siding

10

Total	216.97	
LR @ 12.5%	27.12	
Proposed staff	244.09	Say 244
Sanctioned strength	257	
Surplus Posts	257-244= 13	

2.5.19 SSE/P.Way/Bathinda USFD:

SSE/BTI is functioning for detecting of flaw, crack in the track and joints build up by the thermit welding plant. Their schedule and frequency of checking is fixed keeping in view the aspect of GMT. The checking detail as per USFD manual is as under

GMT	Frequency	Remarks
Up to 5	24 month	
> 5 up 8	12 month	
> 8 up to 12	09 month	
> 12 up 16	06 month	
> 16 up 24	04 month	
> 24 up 40	03 month	
> 40 up 60	02 month	
> 60 up 80	1.5 month	
> 80	01 month	
Aluminium Thermit welding (ATW Testing)		
Acceptance Test	Immediately after test	
First Periodic test	01 yr	
Further tests	Based on GMT	
Up to 15	60 month	
> 15 up to 30	48 month	
> 30 up to 45	36 month	
> 45	24 month	
Workload:		
Following is the jurisdiction of SSE/USFD/BTI		
DLI-BTI	79.1 - 173.38 km	Total 964.642 km
BTI-SGNR	79.1 - 125 km	
LDH-DUI	4.0 -61.990 km	
DUI-JHL	61.990 _ 127.120 km	
JHL-HSR	1.16 - 99.40 Km	

Proposed requirement of staff: At present 09 trackmaintainer staff are deputed to cope up the existing work load. This matter was discussed at various level and the SSE I/C of USFD apprised the work study team that the existing on roll staff strength including LR is sufficient to cope up the existing work load. The work study team is of the opinion that the existing system hold good and may continue.

2.5.20 SSE/P.Way/Barnala:

Gang strength as per MCNTM formula:-

	GMT	Track in km
Annual Avg.GMT	7.51	
Track on PRC in kilometer		92.400 S/L
Track on other layout including Running yard line etc. in km		9.550
Total Track		101.950

Mandays/km/yr. for mechanized track

For activity 'T' :

$$80+2.3*GMT= 80+2.3*15.02 \quad 114.546 \text{ mandays/km/yr}$$

$$114.54*92.40 \quad 10584.05 \text{ mandays/yr}$$

For activity 'R' $159*Track \text{ on PRC (Mech)} \quad 159*92.40 = 14691.6$ for 92.40 track km Mandays/yr.

Activity 'R' for Other Layout and running yard lines $177*9.55 = 1690.35$ Mandays/yr.

Total Activity 'T' : = **10584.05** Mandays/yr.

Total activity 'R' for mechanized $14691.6+1690.35=$ **16381.95** mandays/yr

Activity miscellaneous 'M'

	Length of LWR		Mandays/yr
i	Monsoon patrolling	3*4*60	720
ii	Hot weather patrolling	30*92.40	2772
iii	Cold weather patrolling	12*92.40	1108.8
iv	Vulnerable locations	2*6*60	720
v	Site store chowkidar	2*2*365	1460
vi	Rest giver gate keepers	12*2*365-24*294	1704
	Total M		8484.8

Activity site specific 'S':-

i	Tunnel maintenance		--
ii	Bridge structure maintenance	4*365	1460
iii	Long Girder Bridge maintenance	0.64*2200 mt	1408
iv	Extra for every sharp curve	2*4*365	2920
v	Extra for bad formation	2*9*60	1080
vi	Look out man duty	2*365	730
vii	Fog signal men duty	4*3*60	720
viii	Filth removal		--
ix	Security patrolling		--
	Total S		8318.00

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength (T+R+M+S/294)
10584.05	16381.95	8484.8	8313	43763.8	148.86
Total		148.86			
Gateman		24			
A gang for misc work		20			
A gang for other misc work like key-man, trolleyman, mate etc		30			
Total		222.86			

LR @ 12.5%	27.86	
Proposed staff	250.72	Say 251
Sanctioned strength	257	
Surplus Posts	258-251 =	07

2.5.21 SSE/P.Way/Abohar:

Gang strength as per MCNTM formula:-

Annual Avg.GMT	GMT	Track in km
Track on PRC in kilometer	4.915	86.000 S/L
Track on other layout including Running yard line etc. in km		17.200
Total Track		103.200

Mandays/km/yr. for mechanized track

For activity 'T' :

$$80 + 2.3 * \text{GMT} = 80 + 2.3 * 9.83$$

$$102.609 \text{ mandays/km/yr}$$

$$102.609 * 86.0$$

$$8824.374 \text{ mandays/yr}$$

For activity 'R' 159*Track on PRC (Mech) 159x86.0 13674 for 86.0 track km Mandays/yr.

Activity 'R' for Other Layout and running yard lines 177x17.20 3044.4 Mandays/yr.

Total Activity 'T' : = **8824.374** Mandays/yr.

Total activity 'R' for mechanized 13674+3044.40 = **16718.40** mandays/yr

Activity miscellaneous 'M'

Length of LWR	86 km	Mandays/yr
i Monsoon patrolling	3men*4beats*60days	720
ii Hot weather patrolling	30x86.0	2580
iii Cold weather patrolling	12x86.0	1032
iv Vulnerable locations	2men*6location*30days	360
v Site store chowkidar	2x2x365	1460
vi Rest giver gate keepers	9*2*365-18*294	1278
Total M		7430

Activity site specific 'S':-

i Tunnel maintenance		--
ii Bridge structure maintenance	2*365	730
iii Long Girder Bridge maintenance		--
iv Extra for every sharp curve	2*2*365	1460
v Extra for bad formation	2*4*60	480
vi Look out man duty	--	--
vii Fog signal men duty	--	--
viii Filth removal		--
ix Security patrolling		--

Total S **2670.00**

T	R	M	S	Total (T+R+M+S)	Calculated Gang Strength
8824.374	16718.4	7430	2670	35642.774	121.23
Total			121.23		
Gateman			18		
A gang for misc work			20		
A gang for other misc work like key-man, trolleyman, mate etc			20		
Total			179.23		

LR @ 12.5%	22.40	
Proposed staff	201.63	Say 202
Sanctioned strength	203	
Surplus Posts	203-202 =	01

2.6.0 ADEN WISE AND SSE/P.Way wise, the summarized position of existing S/S proposed staff and surplus/required position of trackmaintainer over UMB Division is given below:-

	SSE/ P Way	S/S	Proposed staff	Surplus (+) Shortage (-)
UMB	Ambala Cantt (UMB)	345	311	+34
	Ambala Cantt (USFD UMB)	50	50	--
	Ambala Cantt (UMB TD)	25	25	--
CDG	Chandigarh (CDG)	242	199	+43
	Sahibzada Asngr (SASN)	89	88	+1
RPJ	Rajpura (RPJ)	246	205	+41
SML	Shimla (SML)	126	122	+4
	Kalka (KLK)	127	124	+3
PTA	Patiala (PTA)	233	203	+30
	Dhuri (DUI)	323	285	+38
	Uklana (UKN)	240	218	+22
SIR	Sirhind (SIR)	303	291	+12
	Roop Nagar (RPAR)	319	311	+8
	Doraha (DOA)	246	203	+43
SRE	Saharanpur (SRE)	242	236	+6
	Yamuna Nagar (YJUD)	216	215	+1
JUDW	Jagadhri Workshop (JUDW)	45	79	-34
BTI	Bathinda (BTI)	257	244	+13
	Bathinda USFD BTI	9	9	--
	Barnala (BNN)	258	251	+7
	Abohar (ABS)	203	202	+1
Total		4144	3871	+273

The above table reveals that the proposed requirement of trackman comes to **3871** against the sanctioned strength of **4144** posts thus **273** posts of trackmaintainer staff are identified as surplus and recommended for surrender.

RECOMMENDATION NO.1

It is proposed that 273 posts of trackmaintainer staff in Gr. ₹ 5200-20200-1800 identified as surplus under the administrative control of Sr.DEN/C/UMB over Ambala Division and recommended for surrender.

2.7.0 During the conduct of work study, it was discussed at various levels and apprised that the work done on contractual basis is economical and better in quality when compared with departmental staff. Some activities like Shallow screening, Loading, leading and unloading of material, Cleaning of drains and waterways, Heavy cess repair and attention to cuttings and trolley refuges, Rectifying damage of L/C posts/ gates, Painting of weld collars and rails, Destressing LWR when planned with track renewed, USFD testing, Creep pulling and overhauling of turn outs, Reconditioning of tongue rails and crossings, Unloading ballast, Muck removal from yard and Lubrication of elastic rail clips (ERCs) can be outsourced which will not only improve economy but also increase productivity and standard of work.

RECOMMENDATION NO.2

It is proposed to explore the possibilities of outsourcing the activities without compromising safety with a view to achieve economy and increased manpower productivity.

2.8.0

GENERAL OBSERVATIONS

During the conduct of study, the team was apprised that there is shortage of track tie tamping (TTM) and track maintenance machines in the division which should be procured immediately. On some branch line some of the track is still on steel sleeper which is not only uncomfortable to the rail users but also the journey is time consuming. The track with steel sleepers should be renewed with PRC sleeper so that punctuality and speed can be maintained in the section.

RECOMMENDATION NO.3

It is proposed that the steel sleeper track on branch lines should be renewed with PRC sleeper track. This will definitely increase the manpower productivity and economy of the railway.

FINANCIAL IMPLICATIONS

After the implementation of the work study recommendations following are the financial implications.

SN	Category	Grade Rs.	Refer Recom. No.	No. of surplus posts	Monthly value per posts ₹	Anticipated annual recurring saving ₹
1	Trackmaintainer	5200-20200 +1800	1	273	24278	79534728/-
		Total		273	24278	7,95,34,728/-

No. of posts identified as surplus: -

Group 'C' = NIL posts

Group 'D' = 273 posts

Total = 273 posts

Anticipated recurring saving = ₹ 795.34 lakh per annum

Capital saving _ Nil

Total saving = ₹ 795.34 lakh per annum

4.0.0 PRODUCTIVITY

4.1.0 The total annual expenditure on the sanctioned strength of P.Way staff working under SSE/P.Way controlled by Sr.DEN/C/UMB over UMB Division is tabulated as under:-

S N	Category	Pay Scale + Grade Pay	Monthly value per posts in ₹	Sanctioned strength	Total annual expenditure in ₹
1	T-maintainer-I	5200-20200+2800	39371	110	51969720
2	T-maintainer-II	5200-20200+2400	34398	398	164284848
3	T-maintainer-III	5200-20200+1900	26852	1051	338657424
4	T-maintainer-IV	5200-20200+1800	24278	2585	753103560
Total				4144	1308015552

The above table reveals that Ambala division is expending ₹1308015552/- on the sanctioned posts of 4144 trackmaintainer staff every year.

4.1.2. The annual expenditure on the proposed trackmaintainer staff working under SSE/P.Way controlled by Sr.DEN/C/UMB.

S N	Category	Pay Scale + Grade Pay	Monthly value per posts in ₹	Sanctioned strength	Total annual expenditure in ₹
1	T-maintainer-I	5200-20200+2800	39371	110	51969720
2	T-maintainer-II	5200-20200+2400	34398	398	164284848
3	T-maintainer-III	5200-20200+1900	26852	1051	338657424
4	T-maintainer-IV	5200-20200+1800	24278	2312	673568832
Total				3871	1228480824

The above table reveals that after the implementation of the work study report, the expenditure on the proposed staff will come to ₹1228480824/-. Therefore the expenditure will be reduced from ₹1308015552/- to ₹1228480824/-.

WORK STUDY REPORT DETAILED CHART

Department : - Engineering

Name of study: - Review of P. Way staff working under SSE/P. Way controlled by Sr.DEN/C/UMB over Ambala Division.

Activity Centre: - UMB, USFD UMB, UMB TD, CDG, SASN, RPJ, SML, KLK, PTA, DUI, UKN, SIR, DOA, RPAR, SRE, YJUD, JUDW, BTI, USFD BTI BNN and ABS

S N	Sub activity	Brief description of workload	Actual staff deployed	Work Study recommendation	Representative workload
1	UMB, USFD UMB, UMB TD, CDG, SASN, RPJ, SML, KLK, PTA, DUI, UKN, SIR, DOA, RPAR, SRE, YJUD, JUDW, BTI, USFD BTI BNN and ABS	Maintenance of track through various maintenance practices, security hot/cold patrolling, bad spots, welding, black smithy, watching and vulnerable locations etc.	S/S= 4144 O/R=3322 Vac =822	S/S =4144 posts Proposed staff= 3871 Surplus posts Gr 'C' = Nil Gr 'D' = 273	To maintain the track maintenance by adopting various activities of maintenance as per MCNTM formula.

LIST OF ANNEXURES

S.N.	Description	Annex. No.
1	Letter of authority No. 16-CP/40/2019-20 dt. 13.12.2019.	I
2	Statement showing category wise, the sanctioned strength of P. Way staff working under SSE/P. Way controlled by Sr.DEN/C/UMB over Ambala Division.	II
3	Statement showing workload of track kilometer being maintained by the track maintainer staff working under SSE/P. Way controlled by Sr.DEN/C/UMB over Ambala Division.	III

Annexure- No. II

STATEMENT SHOWING GRADEWISE, SSE/P WAY WISE SANCTION, ON ROLL & VACANCY POSITION OF TRACK MAINTAINER STAFF OVER UMB DIVISION

S. No	ADEN	SSE/P Way	T-maintainer-I Level-4			T-maintainer-II Level-3			T-maintainer-III Level-2			T-maintainer-IV Level-1			Total		
			S/S	O/R	Vac	S/S	O/R	Vac	S/S	O/R	Vac	S/S	O/R	Vac	S/S	O/R	Vac
1	UMB	UMB	2	2	--	4	3	1	93	83	10	246	191	55	345	279	66
		USFD UMB	--	--	--	--	--	--	11	11	--	39	39	--	50	50	--
		UMB TD	--	--	--	--	--	--	2	2	--	23	22	1	25	24	1
2	CDG	CDG	1	1	--	28	23	5	43	38	5	170	128	42	242	190	52
		SASN	--	--	--	3	3	--	24	20	4	62	45	17	89	68	21
3	RPJ	RPJ	3	3	--	20	12	8	90	67	23	133	106	27	246	188	58
		DOA	5	5	--	28	12	16	103	75	28	110	76	34	246	168	78
4	SKL	SML	6	6	--	21	19	2	28	28	--	71	56	15	126	109	17
		KLK	8	8	--	11	10	1	32	31	1	76	74	2	127	123	4
5	PTA	PTA	--	--	--	18	10	8	107	81	26	108	84	24	233	175	58
		DUI	3	3	--	37	37	--	108	108	--	175	117	58	323	265	58
		UKN	2	2	--	34	33	1	19	19	--	185	167	18	240	221	19
6	SIR	SIR	14	14	--	31	28	3	50	46	4	208	157	51	303	245	58
		RPAR	14	14	--	44	44	--	78	76	2	183	115	68	319	249	70
7	SRE	SRE	9	9	--	37	31	6	58	53	5	138	122	16	242	215	27
8	JUDW	YJUD	6	6	--	32	31	1	49	44	5	129	105	24	216	186	30
		JUDW	3	3	--	5	4	1	10	8	2	27	21	6	45	36	9
9	BTI	BTI	13	13	--	23	12	11	58	55	3	163	129	34	257	209	48
		USFD BTI	--	--	--	--	--	--	--	--	--	9	9	--	9	9	--
		BNN	11	11	--	10	2	8	61	17	44	176	141	35	258	171	87
		ABS	10	10	--	12	9	3	27	27	--	154	96	58	203	142	61
Total			110	110	0	398	323	75	1051	889	162	2585	2000	585	4144	3322	822

Statement showing workload of track kilometer being maintained by the track maintainer staff working under SSE/P. Way controlled by Sr.DEN/C/UMB over Ambala Division

SN	ADEN	SSE (P.Way)	Track kilometer			Annual GMT	Average
			On PRC sleeper in KM	On other lay outs in Km.	Total		
1	UMB	UMB	SRE-UMB-57.4 UMB-RPJ-5.4 DUK -16.6 UMB-KLK-3.3	152.92	235.62	SRE-UMB-32.35 UMB-RPJ-62.72 DUK -32.25 UMB-KLK-6.43	
		UMB-USFD	-	-	-	-	
		TD/UMB	-	-	-	-	
2	CDG	CDG	73.0	27.00	100.00	6.431	
		SASN	47.00	1.80	48.8	2.22	
3	RPJ	RPJ	M/L 103.507 B/L 23.0	98.97	225.477	M/L 65.72 B/L 8.94	
4	SML	KLK	BG-1.69	34.23 NG-48.72	84.64	BG=6.43 NG=0.52	
		SML	NG-50.22 On steel sleeper	8.53	58.75	0.52	
5	PTA	PTA	67.06	26.347	93.407	8.94	
		DUI	LDH-DUI-55.8 DUI-JHL-63.96	34.350	154.11	LDH-DUI -9.67 DUI-JHL -3.07	
		UKN	84.691	7.747	92.438	3.07	
6	SIR	SIR	M/L 26.473 SIR-NLDM-39.0	23.04	88.503	M/L 57.54 SIR-NLDM-9.52	
		RPAR	72.13	59.98	132.11	9.52	
		DOA	86.48	22.76	109.24	42.70	
7	SRE	SRE	54.909	76.59	131.499	32.25	
		YJUD	93.089	25.347	118.436	32.25	
8	JUDW	JUDW	-	74.70	74.70	JUDW W/SHOP ONLY	

Salient features of work study report No. 16-CP-40/WS/2019-20

Sub: "Review of track maintainer staff working under SSE 'P' way controlled by Sr. DEN-C over Ambala Division"

1. Staff Position:

i)	Sanctioned strength	= 4144
ii)	On roll strength	= 3322
iii)	Vacancy	= 822
iv)	Proposed staff	= 3871
v)	Identified as surplus for surrender	= 273

2. The work study team has considered the GMT, Track kilometers, other layout and MCNTM committee formula while calculating the manpower.

3. Some of the track maintenance activities like thorough packing, deep screening, screening of ballast, tempting and lining work of track, spot tempting of concrete sleeper, tempting of newly laid turn outs, special SEJ, Glued joints, level crossing and curves etc; being maintained by track machines which was previously being done by track maintainer staff. Use of track machines has reduced the workload of track maintainer staff to great extent.

4. Extra cushion has been provided for other miscellaneous activities and for Keyman, mate, trolleyman, gateman etc

Financial implication:

Anticipated recurring saving	= ₹ 795.34 lakh per annum
Capital saving	= Nil
Total saving	= ₹ 795.34 lakh per annum