



WORK STUDY REPORT ON  
REVIEW OF TRACKMAN STAFF OF  
ENGINEERING DEPARTMENT  
OVER  
LUCKNOW DIVISION  
2020-21

WORK STUDY TEAM

SH. LALIT KUMAR	AWSO	LEADER
SH. RAJIV YADAV	CWSI	MEMBER
SH. YOGESH BADHWAR	CWSI	MEMBER

DATE OF START: 07.09.2020  
DATE OF COMPLETION: 16.09.2020

GUIDANCE

BY

SH. ASHOK KUMAR AGARWAL  
SWSO

NO.16-CP/16/WS/2020-21

CENTRAL PLANNING CELL  
NORTHERN RAILWAY  
BARODA HOUSE  
NEW DELHI.

## EXECUTIVE SUMMARY

This study was allotted to the Central Planning Cell, HQ Office, to identify redundancies in the working of trackman staff over Lucknow Division. The improvised track and mechanized track maintenance have been taken into consideration while calculating the trackman staff requirement over Lucknow Division

### STAFF POSITION

The sanctioned and on roll strength of Trackman staff over LKO Division station is as under: -

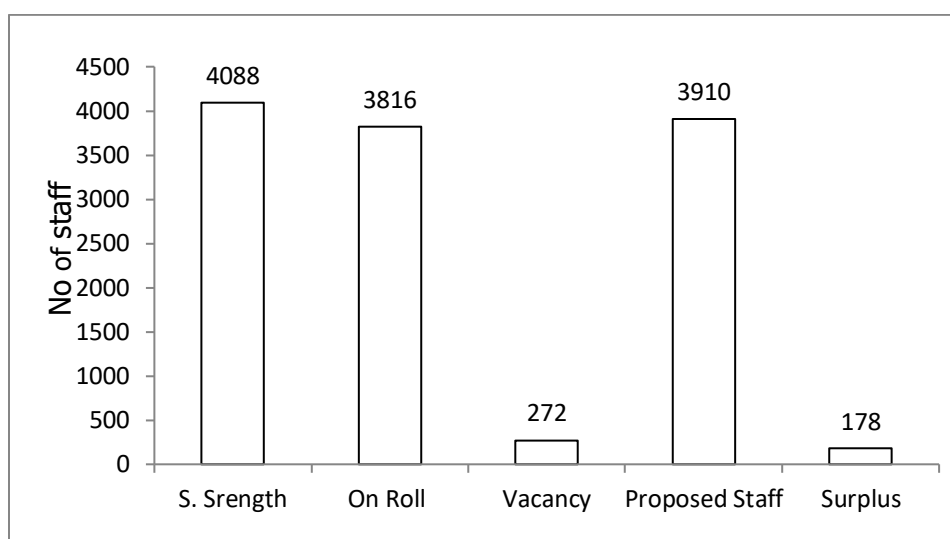
S.No.	Category	S/S	O/R	Variation
1	Track man	4088	3816	272
Total		4088	3816	272

The no. of posts identified as surplus and recommended for surrender.

Group 'C'	=	Nil
Group 'D'	=	178 posts
Total	=	178 posts

### FINANCIAL IMPLICATIONS

Anticipated recurring saving	=	₹ 518.57 lakh per annum
Capital Saving	=	Nil
Total recurring saving	=	₹ 518.57 Lakh per annum.



\*\*\*\*

## INDEX

SN	Chapter No	Contents	Pages	
			From	To
1		Synopsis	4	
2		Summary of recommendations	5	
3		Acknowledgement	6	
4		Introduction	7	
5		Brief description, staff position, workload, critical analysis, requirement of staff, recommendations & observations	8	17
6		Financial Implications	18	
7		Productivity	19	
8		Work study report detailed chart	20	
9		List of annexures	21	

\*\*\*\*\*

## **SYNOPSIS**

The Railway is one of the cheapest mode of surface transport for upper, middle and lower class people. The prime aim of railway network is to provide safe, secure, reliable and punctual transportation of traffic from place to place in the country. A huge manpower in different department under a roof are engaged to upkeep the flow of rail traffic. Engineering Department is the biggest department functioning under two heads i.e., Permanent way and Works Department. The P.Way department is looking after track fitness and on the other hand the works department looks after infrastructure and maintenance work of engineering assets.

The introduction of large voluminous traffic has made it inevitable to lay improved track structure and mechanized system. The improved methods with technological up-gradations, changing patterns of work by multi skilling in trades, closure of redundant activities etc. are being progressively improvised but manpower is still being deployed.

Keeping in view above, SDGM/NR assigned this study to Central Planning Cell, HQ Office on the directives of Railway Board under the approved terms and references to "Review of working trackman Staff over Lucknow Division". The work study team, accordingly picked up SSE/P.Way/ADEN wise ETKM and staff position and critically analysed the data by applying the special committee formula to assess the requirement of trackman. The requirement of trackman to maintain 3529.709 ETKM comes to 3910 posts against the sanctioned strength of 4088 posts. Thus 178 posts of trackman have been identified as surplus and recommended for surrender.

The implementation of recommendations will achieve a net recurring saving to the tune of ₹ 518.57 lakh per annum.

\*\*\*\*\*

## SUMMARY OF RECOMMENDATIONS

S. N.	Recommendations	Refer para No.	Accepting/ implementing authority.												
1	<p>It is proposed that 178 posts of Trackman staff in Gr. ₹ 5200-20200-1800 identified as surplus under the administrative control of Sr. DEN-C/ LKO over Lucknow Division and recommended for surrender as under.</p> <table border="1"> <thead> <tr> <th>S No</th><th>Category</th><th>Grade in Rs</th><th>No of posts</th></tr> </thead> <tbody> <tr> <td>1</td><td>Trackmaintainer</td><td>5200-20200-1800</td><td>178</td></tr> <tr> <td colspan="3">Total</td><td>178</td></tr> </tbody> </table>	S No	Category	Grade in Rs	No of posts	1	Trackmaintainer	5200-20200-1800	178	Total			178	2.6.0	ADRM/Admn/LKO Sr.DEN/C/LKO Sr.DPO/LKO
S No	Category	Grade in Rs	No of posts												
1	Trackmaintainer	5200-20200-1800	178												
Total			178												

\*\*\*\*\*

## ACKNOWLEDGEMENT

The work study team is highly grateful to Smt Veena Verma, ADRM/Admn/LKO, Sh. S.K. Singh, Sr.DEN/C/LKO and Sh. M.B. Singh, Sr.DPO/LKO for their valuable guidance and other functionaries for extending full cooperation in providing requisite data/information during the conduct of study.

\*\*\*\*\*

## 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 Trackman category strength either remains same or increased.

1.2.0 In view of above, SDGM/NR desired to conduct "Review of Trackman staff working under SSE/P Way of Engg Deptt over LKO 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, CRITICAL ANALYSIS, REQUIREMENT OF STAFF STRENGTH AND RECOMMENDATIONS.

### 2.1.0 BRIEF DESCRIPTION

Lucknow Division is an important Division of Northern Railway connecting Northern and Eastern region of the country. Besides being passenger traffic orientation, a lot of freight traffic is also dealt over Lucknow Division and as such it is said to be the busiest operational Division.

There are 24 SSE/P.Way incharges working under 10 different ADENs to offer road worthy services to up keep the permanent way (Track) round the clock. Lucknow Division comprises of 2217.14 route kms and 3529.709 ETKMs. The ETKM is prepared by SSE/P.Way/ADEN are sent to Divisional Headquarter Office, where it is compiled by the Planning Cell of Engineering Department.

The Organizational set up of Engineering Department over Lucknow Division is as under:-

S.No.	Category	Remarks
1	Sr.DEN/C	Head of Engg. Deptt. in Division
2	Sr.DEN	Sr. DEN-II. III & IV
3	DEN	DEN-I & V
4	ADEN under Sr. DEN-II	ADEN, RBL & PBH
5	ADEN under Sr. DEN-II	ADEN, BSB & JNU
6	ADEN under Sr.DEN IV	ADEN SLN & PRG
7	ADEN under DEN-I	ADEN HQ/LKO & ADEN- I/LKO
8	ADEN under DEN-V	ADEN-II/LKO & FD.

### 2.1.1 The SSE/P.Way units and their ETKMs of Engineering Department over LKO Division is as under:-

S.No.	SSE/P.Way Units	ETKM
1	SSE/P.Way –I/LKO	155.202
2	SSE/P.Way-II/LKO	123.113
3	SSE/P.Way-III/LKO	64.404
4	BLN	130.423
5	RBL	152.041
6	PBH	135.157
7	BOY	113.012
8	JNH	101.181
9	Line LKO	160.397
10	ON	145.835



11	NHH	187.121
12	I/SLN	161.430
13	II/SLN	85.393
14	SKN	229.935
15	BBK	164.282
16	RDL	91.957
17	FD	121.868
18	SHG	140.350
19	JNU	214.241
20	BSB	286.260
21	PRG	164.900
22	DMW	125.157
23	UCR	166.407
24	CIL	107.643
Total		3529.709

2.1.2 The Permanent Way (Track) on which the trains run is maintained by trackman under the vigilant supervision of SSE/SE (P.Way) controlled by ADEN. A group of Trackman is called as gang. The gang normally comprises of about 10/20 men and about 6/10 kms beat over Indian Railway is allotted to them for its maintenance. Normally, one round of "Through packing" and 1/3<sup>rd</sup> round of overhauling are carried out in every gang beat in a year. Conventional gang strength used to be based upon modified "Maffin formula" which has the following limitations.

- i) The number of men is fixed arbitrarily which should actually be fixed upon more rational basis.
- ii) The type of track structure and system of maintenance are not taken into considerations.
- iii) It is in FPS system, which should preferably be in MKS system.

## 2.2.0 YARD STICK

The Railway Board appointed a Special Committee (Vide Railway Board's letter No. 60/WI/TC/19 Vo. II dated 23/1/1976) to go into the details of gang strength issue and evolve new norms. The Railway Board accepted the Committee's recommendations vide Railway Board's letter No, E(NG)77/CL/46/E dated 12/1/1983, with the provision that gang strength should be assessed as per special committee formula less 5% thereof.

The Special Committee Formula is:-

N- 0.95 MKE where N- Number of trackman/Gangman

K-Correction factor due to modernization and mechanization

M-Manpower factor

E-Equated track kilometer (ETKM)=  $L \times U (1+A+B+C)$  where

L-Length of single track (KM)

U-Traffic density

A-Formation factor  
 B-Alignment factor  
 C-Rainfall factor

MANPOWER FACTOR 'M':- Depending upon number of man days required for track maintenance, manpower factor "M" varies from 1.43 to 1.47 in BG and from 1.20 to 1.21 in MG.

CORRECTION FACTOR 'K': Correction factor "K" is required to be taken due to modernization of track which can roughly be taken as follows:-

SN	Type of track	Correction factor	
		Conventional maintenance	Mechanical maintenance
1	Fish plated track	1.00	0.80
2	SWR track	0.95	0.75
3	LWR track metal/wooden sleepers	0.85	0.75
4	LWR track on PRC sleeper	-	0.50

The new formula is more rational and can help track engineers to maintain track more efficiently and economically.

ETKM is calculated for each segment and the total ETKM is obtained by summing up the ETKM of all segments.

The values of U, A, B and C for various field conditions and enumerated in Railway Board's letter No. FB/65/Statistics/CE dated 27/1/1971. The value of traffic density factor U is gauge specific.

#### 2.3.0 STAFF POSITION:

The detailed position of trackman over Lucknow Division is annexed as Annexure-II in the report and the same is tabulated below:-

S.N	Category	Grade	S/S	O/R	Var.
1	Trackman	5200-20200-1800	4088	3816	272
Total			4088	3816	272

#### 2.4.0 WORK LOAD

The workload in terms of Equated Track kilometer (ETKM) is annexed as Annexure-III in the report and the total ETKM maintained by each ADEN office over Lucknow Division is given as under:-

S.N	ADEN Unit	ETKM
1	HQ/LKO	-
2	I/LKO	342.719
3	II/LKO	470.514
4	FD	213.825
5	SLN	663.878
6	PRG	440.950

7	RBL	407.621
8	PBH	349.350
9	BSB	286.260
10	JNU	354.591
Total		3529.709

The above table reveals that the total track being maintained by Lucknow Division in terms of Equated Track kilometer is 3529.709 ETKM.

## 2.5.0 CRITICAL ANALYSIS

As the study is confined to review utilization of trackman working over Lucknow Division, the team collected relevant information from Engineering Department of the Divisional Headquarter office to assess the requirement of trackman. The data collected is critically examined and reproduced below:-

SN	Name of track	Workload			
		Type of maintenance	ETKM E	Correction factor K	E * K
1	LWR on PRC	Mech. Maint	923.305	0.5	461.652
		Conv.Maint	-	-	-
2	LWR other than PRC	Mech.Maint	5.247	0.6	3.148
		Conv.maint	199.910	0.85	169.923
3	SWR	Mech.Maint	-	0.75	-
		Conv.Maint	563.910	0.95	535.714
4	Fish plated track	Mech. Maint	-	0.8	-
		Conv.Maint	343	1.0	343.00
5	Other track & Sidings				
	i)Yard	-	100.440	1.0	100.440
	ii)Sidings	-	134.35	1.0	134.35
	iii)Turnouts	-	266.09	1.0	266.09
Total			2536.252		2014.317

A) % age reduction in workload=  $EXK/E=2014.317/2536.252= 20.5\%$

B) Existing manpower factor against the sanction strength of trackman=  
Sanctioned Strength/E\*K =  $4088/2014.317= 2.02$

## FACTUAL STATUS

- The overall reduction of workload noticed is about 20.5% after applying correction factor as per Special Committee Formula.
- The staff utilization factor is 2.02 instead of 1.47 which is uneconomical due to wastage of manpower.

## 2.6.0 REQUIREMENT OF TRACKMAN

The above analysis reveals that the reduction on workload after application of factor (due to modernization in track and maintenance) Special Committee Formula comes to 20.5%, which means utilization of trackman is @ 2.02 instead of 1.47 as prescribed in the manpower factor. This indicates uneconomical utilization of trackman over Lucknow Division.

The trackman are required to carry out additional/miscellaneous activities like – Attending rail fractures, unloading/loading of permanent way material, Fog Duty, keyman, gatekeeper and track patrolling duties etc. The team worked out the requirement of trackman considering all these additional duties by providing extra trackmans as Rest Givers of gate keepers and 10% extra cushion for misc. activities.

### SANCTIONED, PROPOSED AND SURPLUS IDENTIFIED:

The requirement of trackman over Lucknow Division to maintain 3529.709 ETKM comes to 3865 total trackman after applying Special Committee Formula. The calculation is elaborated in detail as under:-

Total ETKM(FXK) of LKO Division is	2014.317
Total trackman BG @ 1.47 x 2014.317	2961.054
Total trackman	2961.05
Rest Giver trackman for gate keepers on	184.00
Total	3145.05
As required by Division	
Add extra cushion for total trackman	330.00

Total	3475.05
Add LR @ 12.5%	<u>434.38</u>
Final trackman required	3909.43 or say 3910

The existing sanctioned strength, proposed requirement and surplus post are given in the table below:-

S.N	Category	S/S	Proposed requirement	Surplus posts
1	Trackman	4088	3910	178

The above table reveals that the actual requirement of trackman comes to 3825 posts against the sanctioned strength of 3965 posts, thus 140 posts of trackman are identified as surplus for surrender.

### RECOMMENDATION NO.1

It is proposed that 178 posts of trackman in Gr. ₹ 5200-20200-1800 identified as surplus over Lucknow Division be surrendered.

### 3.0 FINANCIAL IMPLICATIONS

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

SN	Category	Grade in ₹	Refer Recom. No.	No. of surplus posts	Monthly value per posts in ₹	Anticipated annual recurring saving in ₹
1	Trackman	5200-20200+ 1800	1	178	24278	5,18,57,808/-
Total			1	178		5,18,57,808/-

No. of posts identified as surplus: -

Group 'C' = NIL

Group 'D' = 178 posts

Total = 178 posts

Anticipated recurring saving = ₹ 518.57 lakh per annum

Capital saving = Nil

Total saving = ₹ 518.57 lakh per annum

\*\*\*\*\*

#### 4.0. PRODUCTIVITY

4.1. The total annual expenditure on trackman working over LKO Division is as under:-

S N	Category	Pay Scale + Grade Pay	Monthly value per posts in ₹	S/S	Total annual expenditure in ₹
1	Trackman	5200-20200- 1800	24278	4088	1,19,09,81,568/-
Total				4088	1,19,09,81,568/-

The above table reveals that total annual expenditure being incurred on 4088 sanctioned posts of trackman comes to ₹ 1,19,09,81,568/-

4.2. The annual expenditure on the proposed strength of trackman is as under:-

S N	Category	Pay Scale + Grade Pay	Monthly value per posts in ₹	Proposed staff	Total annual expenditure in ₹
1	Trackman	5200-20200- 1800	24278	3910	1,13,91,23,760/-
Total				3910	1,13,91,23,760/-

The above table reveals that total annual expenditure on 3825 proposed sanctioned strength of trackman will be reduced to ₹ 1,13,91,23,760/- instead of ₹ 1,19,09,81,568/-and net annual saving will be ₹ 5,18,57,808/-.

## WORK STUDY REPORT DETAILED CHART

Department : - Engineering

Name of study : -Review of Trackman Staff over LKO Division.

Activity centre :- Over Lucknow Division.

S N	Sub activity	Brief description of workload	Actual staff deployed	Work Study recommend- ations	Representative workload
1	Trackman do maintenance of track and multiple type of duties	Trackman maintain track through mechanical and conventional practices. They also do additional activity like patrolling of track in hot/ cold/rainy season, keyman, fogmen, gate keeper duties at different locations under P.Way units.	SS=4088 OR=3816 Vac=272	SS=4088 Proposed = 3910 surplus = 178	To maintain track equivalent to 3529.709 ETKM and due to introduction of TT machines and out sourcing the representative workload has reduced.

\*\*\*\*\*

LIST OF ANNEXURES

S.N.	Description	Annex. No.
1	Letter of authority No. 16-CP/16/WS/2020-21dt. 27/08/2020.	I
2	Statement showing SSE/P.Way wise divisional ETKM over LKO Divn.	II

\*\*\*\*\*



## ANNEXURE-II

## STATEMENT SHOWING SSE/P.WAY WISE ETKM OVER LKO DIVISION:

S.No.	SSE/P.Way Units	ETKM
1	SSE/P.Way –I/LKO	155.202
2	SSE/P.Way-II/LKO	123.113
3	SSE/P.Way-III/LKO	64.404
4	BCN	130.423
5	RBL	152.041
6	PBH	135.157
7	BOY	113.012
8	JNH	101.181
9	Line LKO	160.397
10	ON	145.835
11	NHH	187.121
12	I/SLN	161.430
13	II/SLN	85.393
14	SKN	229.935
15	BBK	164.282
16	RDL	91.957
17	FD	121.868
18	SHG	140.350
19	JNU	214.241
20	BSB	286.260
21	PRG	164.900
22	DMW	125.157
23	UCR	166.407
24	CIL	107.643
Total		3529.709