EASTERN RAILWAY

WORK STUDY REPORT
ON
REVIEW OF STAFF STRENGTH VIS-À-VIS WORKLOAD OF BLACKSMITH, HAMMER MAN AND SAFAIWALA IN PWAY UNITS UNDER ENGINEERING DEPARTMENT OVER SDAH DIVISION

(STUDY NO.WSER-18/18-19)

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BY

GM'S EFFICIENCY CELL
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The study team is thankful to PCE/E.RLY, Dy. CE/G/HQ, Sr. DEN (Co-Ord.)/SDAH and all concerned staff at HQ & Division in Engineering department for their heartiest co-operation and guidance in conducting the subject work study successfully.

TERMS OF REFERENCE

The subject work-study has been conducted based on the following terms of references –

i) Existing sanctioned strength and MOR of Blacksmith, Hammer man & Safaiwala.

ii) Activities of the specific categories of Blacksmith, Hammer Man & Safaiwala.

iii) Activities of Track Machines.

METHODOLOGY

In conducting the subject work study, the study team has applied the following methodology.

i) The study team recorded the existing system of working in each section.

ii) A threadbare discussion was made with the supervisors and staff concerned.

iii) Implementations of mechanized maintenance of track.

iv) Outsourcing of Track maintenance.

v) Critically analyzed the deployment of staff against existing workload.

SUMMARY OF RECOMMENDATION

Summarizing the proposed requirement, it is recommended that 20 posts consist of Blacksmith, Hammer man and Safaiwala should be surrendered from the existing sanctioned strength of Engineering Department of SDAH division.

CHAPTER-I

1.0 **Introduction:**

1.1 Indian Railway system is one of the largest railway systems in the world under a single management having over 63000 routes Km and about 1.1 lakh track kilometres. Volume of traffic moved & its relatively low cost to common man makes Indian Railway the prime mover of the nation.

Civil Engineering department or commonly known as Engineering department of the Railways specifically performs or holds responsibility of the following three different kinds of works.

i) To upkeep the railway track under the supervision of PWI or Sr. Section Engineer (P Way)

ii) To upkeep the building, sewage, water system etc under the supervision of IOW OR Sr. Section Engineer (Works).

iii) To upkeep the bridges under the supervision of BRI or Sr. Section Engineer (Bridge).

Track maintenance in the railway has undergone a sea change during the past 30 years due to continuous developments in various track components viz sleepers, fastenings and long welded rails. The use of the machines both for mechanized track maintenance as well as track laying has increased substantially in recent past with the introduction of heavy track structures to meet the challenges of growing traffic and changed socio-economic conditions. Being fit for modern heavy track structure and giving quality output far superior than what one can achieve manually, a complete mechanization of track maintenance has become inevitable. Similarly at present track relaying is being done manually as well as by machines, but the quality and progress of machines has outplayed what we achieve manually.

1.2 With the introduction of heavy concrete sleeper tracks on Indian Railways, the use of Track machines has become inevitable. Numbers of gang men are reducing day by days and numbers of track machines are increasing progressively. Once upon a time the concept of track maintenance without gang men was a dream only. Now a day's gang men are deployed for any other job other than actual track maintenance. Time is going to come when Indian Railway Track will be maintained by Track machines only and other engineering staff will be there to help these machines. Recent development in this regard indicates such happening in coming next few years only.

1.3 Today, Indian Railways have a large fleet of different types of new generation track machines. However due to growing traffic density, axle loads and speeds on the Indian Railways, the deployment of further new generation high performance sophisticated track machines is to be thought of on Indian Railway.

Modern railway track structure on Indian Railway matches with the world-class railway track structure with PSC sleepers, 60 Kg 90 UTS rails, fan shaped turnouts, LWR/CWR, elastic fastenings etc. The sleeper density varies from 1660 to 1310 sleepers per kilometer. With the Uni-gauge policy of Indian Railway the entire MG/NG track is being converted in BG at a very fast pace.

1.4 Indian Railway is facing tremendous financial crunch after implementation of 7th Pay Commission. Operating ratio is gradually increasing. Though Indian Railway is not a business organization but to survive, it is always essential to make the organization in

profit i.e. operating ratio should be less than 100. The "Operating Ratios" from 2014-15 to 2018-19 shown in the corporate plan booklet published by the Eastern Railway are given below –

2014-2015	177.27%
2015-2016	180.75%
2016-2017	165.25%
2017-2018	181.15%
208-19 (Proposed)	168.66%

As a result, Railway Board is paying more attention to the concept of rightsizing of manpower to achieve an optimum level of productivity in the Zonal Railways keeping the revised concept of modernization in view.

1.5 In view of the above, Rly Board issued nos. of circulars, orders, etc to minimize expenses and increase earnings to Zonal Railways to achieve better Operating Ratio. The Zonal Railways also implement various measures for financial discipline.
At this juncture, the role of Railway Efficiency & Research Directorate is also very important in connection with the productivity without hampering normal progress and activity by employing technique of 'Rationalizing of Man-Power' and eliminating diminishing categories/redundant activities, etc. The Railway has also invested huge amount in capital expenditure to improve its infrastructure by adopting new technology time to time.

1.6 As the main objective of Indian Railway is to improve the operating Ratio of railway, the GM's Efficiency Cell always pays attention to curtail manpower from different wings of different departments that are found excess in all respect based on the justification drawn by the study team during period of physical observation and as a result, the productivity is increased by decreasing the inputs i.e. by surrendering the excess manpower. The prime aim of conducting the subject work study is to assess **the revised requirement of Blacksmith, Hammer man & Safaiwala in Engineering Department in SDAH division consequent upon the changed scenario in activities of these categories.** The subject work-study has been undertaken by GM's Efficiency Cell/E.Rly during the current financial year 2018-2019 to improve the productivity index of the Railway.

CHAPTER-II

2.0 EXISTING SCENARIO & CRITICAL ANALYSIS:

2.1 TRACK MAINTENANCE ACTIVITIES:

Track maintenance means the total process of maintenance and renewal required to ensure that the track meets safety and quality standards at minimum cost. For keeping any asset in the good fetal it is utmost necessary to monitor the health of the asset and to maintain it to the required level**.**
Activities involved in the track maintenance are as follows:

1. Tamping of track for correction of track geometry;
   a) Tamping of plain track.
   b) Tamping of turnouts.

2. Need based spot attention;
   a) Attention to bad spot generally on approaches of bridges, level crossing and at turnouts.
   b) Packing of glued joints, welded joints.
   c) Attention of switch expansion joints (SEJ).
   d) Minor rectification of alignment.

3. Casual renewal of track components viz. rail, sleeper, fittings etc.
4. Systematic over-hauling.
5. Ballast profiling.
6. Emergency repairs viz. rectification of rail /weld fractures etc.
7. Distressing of LWR tracks.
8. Transportations, loading and unloading of P.Way material.
9. Ultrasonic testing of rails.
10. Lubrication of elastic rail clips.
11. Maintenance of level crossings;
    a) Overhauling of level crossing
    b) Improving visibility by removing trees, bushes etc.
    c) Maintenance of road surface.

12. Patrolling
    a- Monsoon patrolling.
    b- Hot weather patrolling.
    c- Cold weather patrolling
    d- Security patrolling
    d- Key man daily patrolling

12- Manning caution and speed restriction boards.
13- Tree cutting for improved visibility.
14- Lubrication of rails and fish plated joints
15- Resurfacing of switches and crossings
16- Pre monsoon attention to drains /waterways
17- Pulling back of creep and gap adjustment
18- Attention to level crossings
19- Periodic deep screening
20- Rail welding

21- Rail cutting /drilling and chamfering
22- Minor cess repairs
23- Rail grinding

2.2 Pway units of Engg. department perform the above activities to maintain the track structure in good condition. All the P.Way units are under the overall control of Sr.DEN/Co-ord and under direct supervision of concerned DEN & AEN in divisional level. Each P.Way unit is functioning directly under SSE/P.Way in regard to maintenance of Railway track dully maintaining of safety rules.

2.4 The study team has conducted the subject work study on the activities performed by the three categories such as Blacksmith, Hammer man and Safaiwala in engineering department in SDAH division as because the activities of these categories has become redundant due to introduction of modern track machines.

2.4.1 Unit wise sanctioned and men on roll position of the above three categories are tabulated below-

SL	Unit	Black Smith (Gr.I,II,III & Sr. Tech)			Hammer man (Gr.I,II,III & Sr. Tech)			Safaiwala		
		Sanctioned strength	Men on Roll	Vacancy	Sanctioned strength	Men on Roll	Vacancy	Sanctioned strength	Men on Roll	Vacancy
1	PWI/SDAH	4	2	2	1	0	1	1	1	0
2	PWI/CP	1	0	1			0	2	2	0
3	PWI/BP	2	0	2			0	1	1	0
4	PWI/BGA	1	0	1	1	0	1	5	1	3
5	PWI/SPR	2	0	2			0	1	3	-2
6	PWI/BRR	1	0	1			0	3	2	1
7	PWI/NH	2	0	2			0	1	0	1
8	PWI/KPA	2	1	1	1	0	1	1	0	1
9	PWI/RHA	2	2	0			0	0	1	0
10	PWI/KNJ	2	0	2	1	0	1	1	0	1
11	PWI/BQG	2	1	1			0	1	1	0
12	PWI/BT	2	0	2			0			0
13	PWI/BNJ	2	1	1			0	1	1	0
TOTAL		**25**	**7**	**18**	**4**	**0**	**4**	**18**	**13**	**5**

2.4.2 The work load of P-way units in terms of ETKM is tabulated below-

Unit wise ETKM		
Unit	Total Track KM	ETKM
SDAH	112.77	148.77
BP	112.846	172.97
CP	77.352	73.05
TD/BLH	6.865	2.75
NH	144.571	182.02
KPA	156.803	185.61
RHA	164.796	239.91
KNJ	180.012	255.71
BQG	204.617	320.64
BNJ	166.047	227.21
BT	156.098	204.85
BGA	144.497	179.65
SPR	114.64	159.25
BRP	223.719	277.65
TOTAL	1965.633	2630.04

2.5 The conventional track has yielded its place to new modern track of concrete sleepers with elastic fastenings which does not tolerate manual maintenance. Every year about 3000 km of our track are getting replaced by concrete sleepers track. There is high strength and reliability on the performance of these tracks. By and large these tracks should not require frequent attention provided they are machine packed properly and the ballast and formation are sound. The high performance of modern track can be reaped fully only when management of machine maintenance is sound. The thrust of introduction of mechanized track maintenance in the Indian Railways was to improve the quality of track maintenance and to cut down track maintenance time.

2.6 **PRESENT SYSTEM OF MECHANIZED TRACK MAINTENANCE:**

As per the instructions laid down in Para 228 of IRPWM three-tier system of track maintenance shall be adopted on sections nominated for mechanized maintenance. This mechanized system of track maintenance shall consist of the following 3 tiers of maintenance:

(i) On track machines unit (OMU)
TTM, BCM, FRM, DGS, BRM, etc. for planned on track maintenance.

(ii) Mobile maintenance units (MMU)

MMU-I: Rail cum road vehicle based, for spot tamping, welding, de-stressing, casual renewal etc.

MMU-II: Road vehicle based, for reconditioning of turnouts, repair of small track machines.

(iii) Sectional gangs (SG) Regular track maintenance activities such as patrolling, pre & post tamping attention, attention to loops & bridge approaches, greasing of ERC & fish plated joints, minor cess repair and assistance to OMU & MMU

2.6.1 The mechanized maintenance of track implies the deployment of track machines for day to day track maintenance works, normally being done by manual labour. The system has also enabled the PWay men to maintain the modern track more economically and effectively to cater for higher speeds and heavier axle loads. There is no doubt that for modern track structure having LWR and concrete sleepers, the mechanical maintenance of track are considered a technical necessary. Now-a-days, the major track maintenance works are carried out by contractual agencies and track machines. At present the different types of track machines are working over Eastern Railway. The type of machine vis-à-vis output/effective hours working in SDAH division is as under:

Division	Machine Type & Number	Stipulated output/Effective hrs.
SDAH	BCM (331)	0.2
	BCM (370)	0.2
	BRM (PBR-06)	1
	FRM (1881)	0.4
	UNIMAT (8262)	1
	UTV (201407069-H)	
	WST/DUO (8050)	0.9
	WST/DUO (8143)	0.9

2.6.2 Presently major maintenance works under P.Way units have already been given to private agency. Now the contractual work has been processed through special work and yearly contract basis i.e. Zonal work. Besides of the above, some of the major maintenance works are executed by the department track machines. Existing gang are deployed to cater the regular maintenance work such as lubrication of rails, greasing of ERTC, patrolling works and slack packing etc etc. as per routine programme made by sectional PWI. The following item of works is carried out by the department gang.

i) Through fittings renewal(TFR)
ii) Ballasting
iii) Formation treatment
iv) Through bridge treatment renewal(TBTR)
v) Strengthening of major bridge approach
vi) Painting of rail/painting of weld
vii) Toc load measurement
viii) Distressing
ix) Renewal of points and crossing
x) Renewal of diamond crossing
xi) Through weld renewal
xii) Deep screening
xiii) Through rail renewal (primary/secondary)
xiv) Through sleeper renewal (primary/secondary)

2.6.3 **The activities of Blacksmith, Hammer man and Safaiwala**.

The above mentioned activities are carried out by the departmental Gang though a major portion of the above work load is handed over to outside agency through Zonal maintenance work. The Blacksmith are utilized in Distressing and renewal of Track where departmental gang is utilized. They are mainly utilized for cutting of rails.

Previously, hammer men are utilized to flatten the steel trough sleeper which are distorted due to temperature variation. But, in present days PSC sleepers are utilized in place of steel trough sleeper. Hence, the activity of Hammer man has become redundant.

The Safaiwalas are utilized to clean the track, mainly at station premises, so that the trackmen can exercise their routine maintenance work in a hygienic condition.

2.7 Excerpts of the reviewed result

On being reviewed the workings vis-a-vis effective utilization of Blacksmith, Hammer man and Safaiwala in their respective field of work, the study team has drawn conclusion in the fore coming paragraph in order to assess the actual requirement of the said category of staff.

During physical observation, the study team observed that major track maintenance work is performed by Track Machines and for this purpose a separate TMO (Track Machine Organization) wing has been introduced in Railways. The departmental gang basically assists pre & post Machine operation and minor maintenance work mentioned in the previous para. The study team critically observed the activities of Blacksmith, Hammer man and Safaiwala and their deployment. It is observed that various small track machines are utilized for maintenance of Track by the

departmental gang. These small track machines are more effective in precession work and are useful to withstand the present need of the track. The list of small track machines used by the departmental gang in SDAH division is listed below.

SN	Description of small track machines	number of Machines
1	Heavy duty Hydraulic Extractor for jammed pandrol clips	13
2	Hydraulic rail jam crow	28
3	Safety clamps & locking nut for lifting of rail panel	6
4	Toe-Load measuring device for ERC	15
5	Portable DC welding generator	12
6	Hydraulic jack 15 tone	1
7	Jack mechanical infringing type 8 tone	65
8	Rail creep adjuster	0
9	Portable track lifting & slewing device	1
10	Rail dolly	124
11	Mechanical jib crane attachable to BFR for loading/unloading PSC sleepers	0
12	Rail lifting hoist attachable to BFR	11
13	N.I. Track jack	65
14	Rail cutting machine	65
15	Grinding machine	2
16	Rail drilling machine	21
17	Insulated push trolley wheel	23
18	Abrasive rail cutter	26
19	Hydraulic Rail tensor	16
20	Electronic Toe Load measuring device	15
21	Magnetic base Rail thermometer	382
22	Track lifting & slewing machine	1
23	Bosh off track hand Tie Tamping machine	1
24	Self propelled light weight trolley	8
25	Hy. Track Jack (15 tone capacity)	20
26	Mechanized track jack (15 tone capacity)	23
27	Digital AT weld tester	3

28	Electronic weigh machine (15 tone capacity)	15
29	USFD single rail tester	7
30	Rail profile weld grinder	1
31	Mono cum road trolley	12
32	Roometer	26
33	Hooter	195

2.7.1 The above table shows that 65 numbers of rail cutting machines are utilized for track maintenance work by departmental gang in SDAH division. These machines have reduced not only the work load of Blacksmith but also it reduced the cutting time of rail and thus reduced the requirement of Blacksmith in departmental gang. Still, the study team thinks that the Blacksmith is required in each Pway unit for departmental maintenance of track. Hence, the study team opines to retain at least one Blacksmith at 14 Pway units mentioned in pra 2.4.2 including Track Depot/BLH.

Similarly, the work load of Hammer man has become nil and the category has become diminishing category.

The work load of Safaiwala has been fully outsourced by the department. Hence, the requirement of Safaiwala has become nil and the category has become diminishing category.

Consequent upon the changed scenario in the working pattern of Blacksmith, Hammer man and Safaiwala the study team thus opines to surrender the existing vacant posts and the remaining posts may be surrendered in due course. As per analysis made in the study report, it is recommended that the total actual requirement of Blacksmith, Hammer man and Safaiwala duly revised will be as under.

Division/Department	Existing			Proposed	
Engineering/P way	Sanctioned (Gr.C + Gr. D)	MOR (Gr.C + Gr. D)	Vacancy	Requirement	Surrender
Blacksmith	25	07	18	14	11
Hammer man	4	0	4	Nil	4
Safaiwala	18	13	5	13	5
TOTAL	47			**27**	**20**

2.8 **Recommendation:**

Summarizing the proposed requirement, it is recommended that 20 posts consist of Blacksmith, Hammer man and Safaiwala should be surrendered from the existing sanctioned strength of Engineering Department of SDAH division.

CHAPTER-III

3.0 **FINANCIAL APPRAISAL:**

3.1 According to recommendation made in para-2.8 the financial savings thus achieved on account of surrendering of 20 posts comprising 11 Posts of Blacksmith, 4 posts of Hammer man and 5 posts of Safaiwala is tabulated below. For easier calculation, the bottom most GP on lower Grade pay is considered.

LEVEL	G.P	PAY	MEAN PAY	D.A	NO OF POSTS	MONEY VALUE	
				9%		MONTHLY	ANNUAL
2	1900	19900-63200	41550	3739.5	20	9,05,800.00	1,08,69,600.00

Thus, consequent upon implementation of recommendation, **the annual savings will be Rs 1,08,69,600/- ≈ Rs.1.09 Cores.**