

**CENTRAL RAILWAY**



HEADQUARTERS OFFICE,  
ENGINEERING BRANCH,  
MUMBAI C.S.T.- 400 001

No .W.226.MPP.Misc

Date: 22.03.2022

**Sr. DEN(CO) / BB, BSL, NGP, SUR & PA**

**Sub : CE CIRCULAR NO. 173 (R1)**

\*\*\*\*\*

Please find enclosed herewith CE Circular No. 173 (R1) for strict compliance at complete level. This supersedes earlier CE Circular 173 issued on this subject.

DA: As above

*Mohit Singh*  
*22/03/2022*  
(Mohit Singh)  
DyCE/ Track-II

## **REVISION- 1 CE CIRCULAR NO. 173 R 1**

No. W.742.T-II/Track Circular

Date: 17.03.2022

### **SUB: -TRACK RENEWAL/LAYING-TOTAL QUALITY MANAGEMENT.**

#### **1. INTRODUCTION.**

All the officers and SSE PWAY In-charge of Construction/Track Renewals/Relaying shall ensure that all track laying (i.e. Track renewals, new lines, doublings, conversions and other track additions and remodeling) conform to the prescribed standards.

#### **2. QUALITY MANAGEMENT SCHEME.**

(A) When any major Track Laying work is taken up, the under noted 5-Step procedure shall be followed:-

##### **2.1 SCHEME OF TRACK LAYING**

A detailed Scheme/Project Report of track renewal/laying shall be prepared and submitted for CTE/THOD's approval. The scheme should include:-

1. Location of track depots and activities planned to be carried therein.
2. Details of existing track as per Para 657(e) & (f) along with drawings as in Annexure 6/4 & Annexure 6/7 of IRPWM.
3. Laying of LWR/CWR as per Para 336(1) of IRPWM.
4. Proposed Formation/Cess/Matting.
5. Ballast Section.
6. Longitudinal Section.
7. Sequence of Deep Screening.
8. Track Structure on Bridge & Bridge approaches.
9. Location of Glued Joints.
10. Signaling gears.
11. Type of Turnouts and their details.
12. Level Crossings.
13. Material Movement plan.
14. Engineering Time allowance.
15. Traffic blocks and work proposed to be carried out by TRT/PQRS/Contract/Deptt. Labour.
16. Requirement of machines (including small machines).
17. Stacking and disposal of II<sup>nd</sup> hand and scrap material and inspectorial manpower.
18. Scheme of rail welding, drilling, rail cutting and chamfering of holes.



## 2.2 TRACK LAYING

After the scheme of track renewal /laying is approved by CTE, THOD, the same shall be executed in the field strictly in accordance with the prescribed instructions, procedure and standard.

## 2.3 CERTIFICATION OF CORRECT TRACK LAYING

After the track renewal laying, it shall be inspected passed and certified by the ADEN and the DEN/Sr.DEN/Dy.CE(C) in charge of the work. The certificate should clearly state that the track has been renewed/laid conforming to the prescribed quality and standards and in accordance with the approved scheme.

## 2.4 RELEASED MATERIAL

Classification of released materials to be done as per Para 721 & 722 of IRPWM. Location of stacking should be pre-decided so that there is no confusion in the execution of contract. It should be ensured that scrap lots are formed near road approaches and II<sup>nd</sup> hand material is stacked near a suitable siding where it can be conveniently loaded in wagons.

## 2.5 OPENING OF THE NEWLY LAID/ RELAID TRACK TO TRAFFIC

(A) For the newly laid track (by Construction), CRS sanction shall be applied for the maximum planned sectional speed with 30 Kmph on turnouts and except with Board's approval, opened to traffic only if the CRS sanction is obtained for not less than 80 Kmph. on BG. In case of track renewals, the lowest speed restriction on any stretch shall be 20 Kmph.

### (B) TECHNICAL AUDIT BY CTE'S QUALITY MANAGEMENT CELL

In addition to the certification by the Engineers incharge of the track laying, technical audit shall be carried out by CTE's Quality Management Cell to test check and generally verify that work has been carried out according to the prescribed norms. These technical audit inspections will also help in disseminating various instructions and in collecting information on the newer and better practices being adopted by the different divisions and construction units.

## 3. IMPORTANT ITEMS OF TRACK LAYING /RELAYING SCHEME:-

### 3.1 SPECIAL ATTENTION SHOULD BE PAID TO THE FOLLOWING ITEMS :

#### (i) TRACK DEPOTS (Para 707 (1))

A track depot should be set up before taking up track renewal or new track work. The activities which can be taken up conveniently in depot will depend on whether the relaying is being done by TRT, PQRS or manually. Depending upon the sequence of unloading of material relevant operation like rail cutting and drilling (including chamfering of bolt holes), prefabrication of turnouts, SEJs and other assemblies, large scale (Flash Butt/Thermit) welding, sleepers and fittings, USFD of rails, preparation of sleepers for bridges, level crossings, repair of tools, machines, dip lorries, etc. proper stacking of P.Way materials and fittings, instruments etc. and all other such jobs which can be done in a depot are done so that the minimum possible work is required to be carried out at the site. Suitable and adequate tools and machines should be provided in the Depot. The depot in-charge shall maintain record of each work done, inspect and pass such items of work before its release for the site.



(ii) **TRACK LAYING REGISTER**

A track laying/renewal register shall be maintained at each work site by the SSE P.Way Incharge of work in the format in given in Annexure A. In this register, the SSE P.Way shall record all relevant data including particulars of approved scheme of Track renewal/laying programme of work, requirement and availability of materials, position and performance of tools and equipment, daily labour position (departmental and contractor's) and work output, traffic blocks condition and quality of the finished track work-both structural as well as geometrical.

Sr.DEN/DEN, Dy.CE(C) /XEN(C), ADEN (C)/ADEN in-charge of the work as well as the officers from HQ shall check the work and record their observations in the registers whenever they visit the site.

(iii) **LONGITUDINAL LEVELS**

Both for renewals and new track work, the proposed longitudinal section of the track (rail levels) shall be issued in advance of the laying including the final rail levels for turnouts, girder bridges, level crossings, yard lines etc. so as to avoid dips/humps in the alignment. The proposed rail level shall be pegged/marked at the site (on electric mast in electrified territory) before track laying is started. The rails levels of the finished work shall also be plotted in relation to the proposed levels and the results kept as a part of the Track Laying Register.

The proposed longitudinal section of the track for renewal sites shall be decided and approved by DEN/Sr.DEN based on existing L-Section on following considerations:

- a) Elimination of existing sags.
- b) Removal of existing humps.
- c) The final track profile.
- d) Standard ballast cushion to be provided during the execution.
- e) Relative implication of lowering or raising and elimination of unevenness in the existing track as it is not necessary that the Original L-section of the line is to be restored. Hence, efforts shall be made to derive full benefit to eliminate unevenness in the L-section on the existing track. Hectometer-wise ballast requirement should be worked out accordingly.

Under no circumstances, the old blanketing or sub-grade should be dug out to provide specified cushion. The revised levels should be transferred on Electric mast or pegs for easy reference.

Based on the revised L-Section, the extent of deep screening and raising track by lifting should be worked out for each unit length before undertaking deep screening.

(iv) **LWR/CWR TRACK**

The scheme of track renewal/track laying as mentioned in Para 2(1) shall have details of proposal for LWR/CWR for approval of CTE/THODs. All relevant information connected with the laying of welded track as per Para 336 of IRPWM shall be included in the Track Laying Register. The gap between TRR and LWR conversion should be minimum (not more than 10 days) as the free joints of Rail panel tend to get battered very easily. Speed can not and should not be released on un-welded panels.



(v) **MANUAL LAYING OF CONCRETE SLEEPERS**

Manual laying of concrete sleepers shall be carried out only in exceptional cases and with prior permission of CTE.

(vi) **LAYING OF TURNOUTS**

While laying or replacing turnout only turnouts with curved switches (ordinary or thick web) shall be installed to upgrade permissible speed of 30 Km/h through them. Deep screening of ballast and provision of full ballast cushion under the turnout is equally essential and should not be delayed under any circumstances.

(vii) **TOOLS AND EQUIPMENT**

Only proper instruments, tools and machines such as those for cutting and drilling of rails, chamfering of bolt-holes, tightening of fish bolts and nuts, fitting of keys, spikes, screws and elastic clips and the tools/equipment for handling of track materials and for lifting of track shall be used. Data and comments regarding performance of new types of tools and machines shall be duly recorded in the Track Laying Register.

(viii) **EXPANSION JOINTS**

Special attention shall be paid to the provision of correct expansion gaps at fishplated joints (including gaps on SWP) and SEJs. Rail temperatures (whether raising or falling) to which the gaps correspond shall be recorded in the Track Laying Register along with the gaps.

(ix) **BRIDGE/L-XING/POINT & CROSSING APPROACHES**

The approaches shall be strengthened as per instructions.

#### 4. **INSPECTION AND TESTING**

4.1 After the completion of track renewal/laying, sleeper by sleeper foot inspection shall be done by the SSE (P.WAY) Incharge and ADEN, who will record the following in the Track Laying Register.

- a) All structural deficiencies with respect to the prescribed standard and approved scheme and
- b) Track geometry including ballast cushion achieved as compared to the Standards recommended for track renewal/laying.

The deficiencies shall be made up and the final condition again recorded in the register.

#### 4.2 **INSPECTION OF TRACK VERIFICATION OF STRUCTURAL REQUIREMENT:**

The track shall be checked particularly in respect of the following :

- a) All rail and sleeper fittings are complete (Zero Missing Fittings) are of proper specification and correctly fixed.
- b) The fish plated, welded and Glued joints conform to approved drawings and circulars. The fish plated joints are oiled and greased and bolt holes chamfered. Welds and Glued joints have identification mark.
- c) Rail welding tolerance conform to the prescribed limits.
- d) There is no defective rail or weld as tested ultrasonically.
- e) Track drainage arrangements (including correct formation profile, cess levels. Side drains, clean ballast and platforms sloping away from track, no discharge by a X-drain



from a platform on a run through line etc.) have been provided in strict accordance with the approved instructions both inside and outside the yards.

- f) Structural requirements of Permanent Way on bridges, level crossings and turnouts are fully satisfied. Bearings on girder bridges have been attended at the time of track renewals. In the station yards, distance pieces have been provided between the platform wall and the adjacent track.
- g) LWR track is laid strictly as per approved plan. Expansion arrangements consist of SEJs with prescribed sleepers/fittings and no buffer rails are used as a permanent arrangement. Destressing has been correctly done.
- h) The ballast section is correctly profiled (Boxing) and any excess in the shoulders is removed (as it blocks drainage) and stacked neatly on the berm. On the LWR/ CWR track, there is no deficiency in ballast section in shoulder or in depth of cushion below sleepers, and the shoulders are compacted with compactors or prescribed heavy hand rammer.
- i) The specified cushion is available at all the spots and there is no settlement due to improper packing, resulting in loss of cushion.
- j) In case of execution by contractor, the system of handing over/taking over completed works should be well defined. There should be a prescribed period in the form of cutoff date within which the contractor has to finish various rounds of packing after which the track should be taken over for maintenance by permanent gang. Track should not be allowed to deteriorate due to lethargy of contractor.
- k) Prescribed reference Pillars, Post and Boards are provided correctly.

#### 4.3 REQUIREMENT OF TRACK GEOMETRY (Para 520(1), (2)&(3) of IRPWM)

- 1) Utmost care should be taken during linking of track to ensure good quality of work. As a good practice, the laying standards of track geometry for track laid with new Material are as under (To be measured three months after speed is raised to normal).
- 2) For measurements recorded by TRC.
  - a) SD Values for Unevenness and Alignment:

Sl. No.	Parameter	Speed upto 100 kmph	Speed above 100 Kmph and up to 160 Kmph
1.	UN-1	2.0 mm	1.4 mm
2.	UN-2	-	1.9 mm
3.	AL-1	1.4 mm	1.1 mm
4.	AL-2	-	1.3 mm

- b) Peak Values for Unevenness and Alignment:

Sl. No.	Parameter	Speed upto 100 Kmph	Speed above 100 Kmph and upto 160 Kmph
1.	UN-1	6.0 mm	4.0 mm
2.	UN-2	-	6.0 mm
3.	AL-1	4.0 mm	3.0 mm
4.	AL-2	-	4.0 mm




- 3) For measurements recorded in floating conditions:
- (a) Gauge: For new track and through renewal of track, following tolerances would be applicable-
- For straight including curves of radius up to 350 m and more-**5 mm to +3 mm**
  - For curves of radius less than 350 m **Up to +10 mm**
- (b) Other parameters:

S. No	Parameter	Description of Measurement	Value
1.	Gauge	Sleeper to sleeper variation	2 mm
2.	Expansion gap	Over average gap worked out by recording 20 successive gaps	$\pm 2$ mm
3.	Joints	Low joints not permitted. High joints not more than Squareness of joints on straight	$\pm 2$ mm $\pm 10$ mm
4.	Spacing of sleepers	With respect to theoretical spacing	$\pm 20$ mm
5.	Cross level	To be recorded on every 4th sleeper	$\pm 3$ mm
6.	Alignment	On straight on 10 m Chord	$\pm 2$ mm
7.		Variation over theoretical versines: (On 20 m Chord). On curves of Radius more than 600 m	5 mm
8.		Variation over theoretical versines: (On 20 m Chord). On curves of Radius less than 600 m	10 mm
9.	Longitudinal level	Variation with reference to approved longitudinal sections.	50 mm

The track geometry parameters in floating conditions shall be recorded for all track laying, including where recording has been done by TRC/TRRC in the Track Laying Register, as per proforma given in Table 8 of the Annexure.

5. All primary track renewal shall also be inspected by the THODs and the officers of HQ for quality and they should record their observation in the register.

  
 (Ashwani Saxena)  
 Principal Chief Engineer

## TRACK LAYING REGISTER

Name of work

Sanction Reference

From

Under SSE PWAY

ADEN/AEN(C)

DEN/Sr. DEN/Dy. CE(Con.)

### INDEX

Sr.	Item	Table
1	Important Points relating to approved scheme of laying	1
2	Longitudinal sections	2
3	Formation/Cess widths & Ballast Cushions	3
4	LWR Plans	4
5	Daily Record of work	5
6	Summary of the TRC OMS – 2000 Results	6
7	Lists of deficiencies noticed during inspection	7
8	Record of Track Geometry (floating)	8
9	Longitudinal Rail levels	9
10	Particulars of Deficient fittings	10



**Table for item 1: IMPORTANT POINTS RELATING TO APPROVED SCHEME OF LAVING:**

**Table 1.1**

Sl. No.	Stretch Kms.		Track Plan No.	Ref. to CTE's approval
	From	To		

NB:-Specific approval for manual laying of concrete sleepers is needed.

**Table 1.2**

Stretch Km.		Details of welding				Details of rail cutting, drilling and chamfering			Other Details
From	To	Type	Length of FBW panes & Name of supply plant	CTE's sanction ref. for TW, if any		Cutting	Drilling	Chamfering	
		F B W	T W						

**Table 1.3: TRACK STRUCTURE ON BRIDGES/BRIDGE APPROACHES, LEVEL CROSSINGS AND TYPES OF TURNOUTS.**

Item	Location(Km.)	Details of proposed track Structure/ Type of Turnouts	Remarks
Bridge/Level X-ing/point No.			

**Table 1.4 TRACK DEPOTS- LOCATION AND ACTIVITIES PLANNED.**

**Table 1.5 CERTIFICATES OF TRACK QUALITY LAYING.**

1. Certificates that I have inspected the track stretch between Km. \_\_\_\_\_ to Km. \_\_\_\_\_ and the same has been laid conforming to the prescribed quality and standard to accordance with approved scheme. The track between Km. \_\_\_\_\_ to Km. \_\_\_\_\_ requires further attention as per my inspection.

NB: Similar CFT to be recorded after deficiencies are rectified.

**AEN/DEN/Sr.DEN**

**Table 1.6****TECHNICAL AUDIT BY CTE'S CELL**

Date \_\_\_\_\_ Stretch inspected \_\_\_\_\_

Items regarding quality of work \_\_\_\_\_

Action taken for rectification \_\_\_\_\_

**Signature of PWI Incharge****Table 2 :****DETAILS OF LOGITUDINAL SECTION**

Total Section: From \_\_\_\_\_ To \_\_\_\_\_

Sl.No.	Stretch		Longitudinal Section Plan No.
	From	To	

NB: 1. The plans must show the proposed rail levels including the final levels for Turnouts, girder bridges, level crossings, yard lines etc.

2. The rail levels of the finished work shall also be plotted in relation to the proposed levels.

**Table 3 DETAILS OF FORMATION WIDTH/CESS WIDTHS AND BALLAST SECTION**

(To be taken at every 100m or closer intervals)

Total Section : From \_\_\_\_\_ To \_\_\_\_\_

Sl.No.	Km.	Formation Width/Cess Width and Ballast Section Plan No.

**Table 4 DETAILS OF LWR PLANS.**

Sl. No.	Location		Approved Plan No.	Date of conversion	Date of distressing
	From	To			

**NB:** The LWR plans should indicate the details of the completed work including details of rail temperature, particulars of welding , distressing and expansion arrangements.

**Table 5 DAILY RECORD OF PROGRESS OF WORK OF CTR/TRR/TSR/NEW TRACK**

Date	Name of PWI Incharge/Supervisor	Location of work done		Labour available	
		From	To	Dept.	Contractor
1	2	3	4	5	6

Traffic Block	Item of work like TSR/TRC welding	Progress	Remark of Supervisor	Remark of Inspecting Officer	Signature
7	8	9	10	11	12

**Table 6 SUMMARY OF TRACK RECORDING CAR RESULTS**

**Table 6.1**

Km.	Date of run	Summary of Classification

**Table 6.2 OMS 200 RESULTS**

Date of run	Speed	Max. peak value		Peaks of over 0.15 g. (Nos.)		Remarks
		V	L	V	L	

V = Vertical L = Lateral

**Table 7 LIST OF DEFICIENCIES NOTED DURING INSPECTION**

Date of Inspection	Deficiencies Noted	Date of Rectification	Signature of Inspector



**Table 8 RECORD OF TRACK GEOMETRY (FLOATING St. CONDITION)**

Location from \_\_\_\_\_ to Km. Between \_\_\_\_\_ and \_\_\_\_\_  
 Stations \_\_\_\_\_ PWI \_\_\_\_\_ AEN \_\_\_\_\_  
 Sr. DEN/DEN \_\_\_\_\_ Division \_\_\_\_\_

Date of Inspection	Particulars of location inspected (Telegraph post)	Date of laying	Joint No. & Sleeper No.	Gauge
1	2	3	4	5

Alignment				Cross Levels				Sleeper Spacing & Squareness
Stn. No.	Straight/ Curved	Versine	Variation from Standard	After first packing	After second packing	After third packing	After M/c. packing	

**Table 9 LONGITUDINAL RAIL LEVELS**

Peg. No./Memo No.	Variations with reference to proposed levels	Ballast cushion in mm.
1	2	3

**Table 10 PARTICULARS OF DEFICIENT FITTINGS**

Particulars of deficient fittings			Sleeper packing	
Missing	Incorrect Fittings	Incorrectly Fitted	Sound/Loose	% Loose Sleepers/Rails length
1	2	3	4	5