

CE Circular – 92

Sub :- Quality Control of track renewal and other works.

1. **Introduction :-** Quality control of track laying at the time of renewal is very important as well laid track needs less attention later on.

- 1.1 All Officers and PWI In charge of Construction / Open Line track renewal shall ensure that all track laying (i.e. track renewals, New Lines, Doublings, Conversion and other track works) conform to prescribed standard.

2. **Quality Management Scheme :-** When any major track renewal works is taken up the under noted five steps procedure shall be followed :-

- i) Scheme of track laying.
- ii) Track laying.
- iii) A certification of correct track laying.
- iv) Opening of the newly laid / re-laid track to traffic.
- v) Handing over the track to maintenance unit.

- 2.1 **Scheme of track laying :-** A detailed scheme of track laying shall be prepared and submitted to CTE's approval. The scheme would include details of track as per para 211 (V & VI) along with the diagram in Annexure 2/4 of IRPWM and para 5.1 of LWR Manual 1996 also including proposed formation profile sections, scheme of rail, welding, drilling & cutting, track structure on bridge approaches and on bridges, level crossings, type of turnouts, location of track depots and activities planned to be carried out there in.

- 2.2 **Track laying :-** After the scheme of track laying is approved by CTE the same shall be executed in the field strictly in accordance with the prescribed instructions, procedure and standards.

- 2.3 **Released materials :-** Location of stacking should be pre- decided so that scrap lot are formed near road approaches and second hand material is stacked near a suitable siding where it can be conveniently loaded in wagons.

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

(B) Technical audit by CTE's quality assurance cell :- In addition to the certification by the Engineer in charge of track laying, technical audit shall be carried out by CTE's quality assurance 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 different TILUs.

- 2.5 **Opening of the newly laid / re-laid track to traffic :-** For this CRS sanction shall be apply 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 60 Kmph on BG and 45 Kmph on MG with 30 Kmph on turnouts. In case of track renewal the lowest speed restriction on any stretch shall be 20 kmph.

3. **Important Items of track laying / re-laying scheme :-**

- 3.1 (i) **Track depots :-** Before taking of any track renewals or new track work track depot should be setup. In this depot various type of such as rail cutting, drilling (including chamfering of bolt holes), prefabrication of turnouts, SEJs and other assemblies, large scale thermit welding, reconditioning of second hand rails, sleepers & fittings, USFD testing of rails, preparation of sleepers for bridges, level crossing, pre assembly of CST-9 sleepers, 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. Tools and machines should be provided in the depot. The depot in charge shall maintain the record of each work done, and inspection & pass such items of works before its release from the site.

(ii) **Track laying Register :-** A track laying register shall be maintained at each work site by track laying PWI in charge in the format given in Annexure 'A'. In this register the PWI shall record all relevant data including particulars of approved scheme of track laying programme of work, requirements in availability of material, position and performance of tools and equipment, daily labour (Departmental and Contractors) and work output, traffic block, condition and quality of the finished track, work both structural as well as geometrical.

Sr. DEN / DEN, Dy. CE (C), XEN (C), AEN (C), Incharge of the work as well as the Officers from HQ shall check the work and record their observations in the register whenever they visit the site.

These register should be handed over to the TMUs.

(iii) **Longitudinal levels :-** In advance of the laying track renewal following work to be done -Proposed longitudinal section of track, final rail levels for turnouts, girder bridges, level crossings, yard lines etc. so as to avoid dips / humps in the alignment. The proposed rail levels shall be pegged / marked at the site before track laying is started.

The rail levels of the finished work should also be plotted in relation to the proposed levels & the results kept as a part of the track laying register.

(iv) **LWR / CWR Track :-** The relevant information connected with laying of welded track such as rail temperature records particulars of welding & distressing and expansion arrangements should be included in the track laying register as per para 5 of IWR Manual 1996

(v) **Manual laying of concrete sleeper :-** It should be carried out only in exceptional cases & with the prior permission of CTE.

(vi)**Thermit Welding :-** For carrying out of any thermit welding (other than repair welding) CTE's prior approval shall be obtained.

(vii) **Laying of Turnout** :- While laying of or replacing turnouts, only turnouts with curved switches (ordinary or thick web) shall be installed so as to give a permissible speed of 30 Kmph.

(viii) **Tools & Equipment** :- Only proper instruments, tools and machines such as those for cutting & drilling of rails, auguring of wooden sleepers, splitting of cotters, chamfering of bolt holes, tightening of fish bolts and nuts, fitting of keys, spike screws & ERC and the tools / equipments for handing of track materials and for lifting of track shall be used. Data & comments regarding performance of new type of tools & machines shall be duly recorded in track laying register.

(ix) **Expansion Joints** :- Special attention shall be paid to the maintenance of correct expansion gaps at fish plated joints (including gaps on SWP) and SEJs. Rail temperature (whether rising or falling) to which the gaps correspond shall be recorded in track laying register along with the gaps.

4. **Frequency of Inspection and Level** :-

4.1 After the completion of track renewal, sleeper by sleeper foot inspection shall be done by the PWIs & AEN in charge, who will record the following in track laying register :-

- (a) All structural deficiencies with respect to the prescribed standard and approved scheme and
- (b) Track geometry achieved as compared to the standard recommended for track laying. The deficiencies shall be made up and the final condition again recorded in the register.

4.2 **Inspection of track** :-

Verification of structural requirements :- 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 (including correct splitting of CST-9 cotters).
- (b) The fish plated, welded and glued joints confirm to approved drawings and circulars. The fish plated joints are oiled and greased and nut bolt chamfered.
- (c) Rail welding tolerances confirms to prescribed limits.
- (d) All welded joints should be USFD tested
- (e) Track drainage arrangements including correct formation profile , cess level, side drains, clean ballast and platform sloping away from track. No discharge by cross drains from a platform on a run through line etc. have been provided in strict accordance with the approved instruction, both inside and outside the yards.
- (f) Structural requirements of permanent way of bridges, level crossings and turn - outs are fully satisfied. bearings on girder bridges have been attended at the time of track renewal. In station yard the 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 consists of SEJ with prescribed sleeper fittings and no buffer rails are used even as a temporary arrangements distressing has been correctly done.
- (h) The ballast section is correctly profiled (boxing) and any excess in the shoulders is removed as it block drainage and stacked neatly on the berm on the LWR / CWR track, there is no deficiency in ballast section in shoulders or in depth of cushion below sleepers and the shoulders are compacted with compactors or prescribed heavy hand rammers (earth master type).

Requirement of track geometry

Track laid with new materials.

3.1 The following limits of track geometry should be observed as a desirable initial standard for track laying with new materials :-

(i) As recorded by TRC the track parameters should generally confirm to category A values as stipulated in para 607 of IRPWM.

(ii) As recorded by portable accelerometer / OMS 2000

No location with vertical or lateral acceleration value exceed 0.15 g.

(iii) As measured in following condition ('applicable' in all cases) :- The track parameter should confirm to the standard prescribed in para 316 of IRPWM.

The track geometry parameters in following condition shall be recorded for all track laying, including where recording has been done by TRC / TRRC in track laying register as per Proforma given in table 8 of the Annexure.

4.3.2 Track laid with second hand materials :-

Even though it may not be possible to achieve all the stipulation of track geometry given in para 4.3.1. These shall be brought as close to the recommended standard as possible. The value of vertical & lateral acceleration as recorded by accelerometer / OMS - 2000 should not exceed 0.20 g in order that desirable standard of track geometry are obtained on track laid with second hand materials. Released rails should be matched for wear, re-profiled or re-profiling plant is available, end cropped, ultrasonically tested and welded in to longer lengths before being taken to the relaying site, similarly re-conditioning of CST-9 plates with worn seats should also be done in depots.

5. Picking up of released materials :-

Instruction regarding classification and disposal of released materials as contained in para 320, 321 & 323 (1) of IRPWM should be followed with regard to classification and loading of released materials. No released rails or other track materials should remain in the section in PWI (Maintenance) takes over the section from TLU.

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.

It is desired that the instructions contained in this circular should be implemented with immediate effect.

Chief Engineer

(ONKAR SINGH)

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Tables for item 1 : Important points relating to approved scheme of laying :

Table 1.1

Details of Track

SL No.	Stretch Kms. From To	Track Plan No.	Ref. to CTR's approval

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

Table 1.2

Details of rail welding, cutting, drilling etc.

Stretch Km.		Details of welding			Details of rail cutting drilling and chamfering			Oth. details
From	To	Type	Length of FBW panels & 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 crossing 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

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

AEN/DEN/Sr.DEN

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

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 longitudinal 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 100 m 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 detail of rail temperature, particulars of welding and distressing and expansion

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	Deptt	Contractor
1	2	3	4	5	6

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

Table 6
Table 6.1

Summary of Track Recording Car Results

km.	Date of run	Summary of Classification

Table 6.2

OMS 2000 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 GEONOMETRY (FLOATING SL CURVES)

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 Ispacking	After second packing	After third packing	

Table 9.

CONDITION OF JOINTS

Joint No.	Out of Squared	Gap	Variation of Gap from the standard	Value if any, of high/low joints	Oiling/Greasing done
1	2	3	4	5	6

10
18/8

1/6
2

104e-10

LONGITUDINAL RAIL LEVELS

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

Table 11.

Particulars of deficient fittings

1	2	3

Sleeper packing
Sleeper/Bed length

5

Any other data

Table 12.

(To be either tabulated or given in narrative form)

Table 8.

Location for

PT-1

D