


INTER PLANT STANDARD IN STEEL INDUSTRY		
 IPSS	METHOD OF PERMANENT WAY INSPECTION AND MAINTENANCE PRACTICES OF RAIL TRACK	IPSS:3-02-013A-18 (Part-A)
	Corresponding IS does not exist	Formally : IPSS:3-02-013A-03 (Part-A)

0. FOREWORD

0.1 Interplant standardization in steel industry was initiated under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). This IPSS was prepared by the standard committee on Operation and Maintenance, IPSS 3:2 and firstly published in 2003. Lastly, this has been revised by the standard committee in July 2018 with the active participation of the representatives from major Indian steel plants and leading consultants.

1. SCOPE

1.1 This Inter Plant Standard enumerates the method of permanent way inspection schedule for preventive maintenance and maintenance practice of all the rail tracks inside steel plant. This standard shall involve two parts (A) & (B). Part-A shall deal with inspection and part-B shall deal with maintenance practice.

2. SAFETY PROCEDURE

- 2.1 Personnel protective equipment i.e. helmet, boot, fluorescent jacket must be worn at all times while inspecting the track. A watch is to be kept for moving wagons/locos on that track.
- 2.2 Safety procedures like red flag / caution boards and stopper should be put before start of the job.

3. PART-A INSPECTION

3.1 EQUIPMENT/TOOLS REQUIRED

SI No.	Item with specification	Quantity
1. *	Rail gauge	1 Number
2. *	Wooden cant	1 Number
3. *	Level board	1 Number
4.	Spirit level 10"/12"	1 Number
5.	Steel tape 15 meters	1 Number

SI No.	Item with specification	Quantity
6.	Steel tape 2 meters	1 Number
7.	Chalk piece	1 Number
8.	Cord 30 meters	1 Number
9.	Cord 11.8 meters	1 Number

* A combined gauge cum level board can be used in place of SI No. 1, 2, 3. Electronic measuring instruments can also be used.

3.2 **METHOD** - The methodology to be practiced is described below :

3.2.1 The PWI must divide the zone in convenient number of areas and keep the information in a written form in the inspection file.

3.2.2 Sectional officer shall make inspection schedule for PWI/Sub.PWI or relevant designate after finalizing the category of tracks depending upon its criticality/importance.

Category A	-	Daily
Category B	-	Once in a week
Category C	-	Twice in a month
Category D	-	Once in a month

Area under the jurisdiction of a Keyman/Oilman must be covered in two days and to be recorded.

3.2.3 Permanent Way Rail Track Section Officer shall inspect category-A and B – once in a month and category C & D once in a four months.

3.2.4 For inspection PWI must walk from one end of the area to the other end checking one track at a time as per check list in **Annexure-IA & IB**.

3.2.5 Gauge must be checked after every ½ rail length or 6m whichever is less and level after each one rail length or 13 m whichever is less.

3.2.6 On a turnout the gauge and level must be checked at stock joint, 150 mm behind toe of tongue rail, at heel of tongue rail, every half of intermediate rails, nose of crossing, heel of crossing.

3.2.7 Defect noticed by the PWI must be entered in the inspection form and put in inspection file (**Annexure-II**). Inspection reports shall also be stored in the SAP system / data management system.

3.2.8 For major jobs (likely to take more than 3 days), plan to be made as per PM-IC. Sample of a job enclosed in **Annexure-III**.

3.2.9 Final rectification of the defects to be done as per SMPs for various jobs and entered in inspection report.

3.2.10 Daily status report to be submitted to the officer in-charge by the PWI (Refer **Annexure-IV**) regarding the man power position, derailment details, etc. The inspection to be recorded in the PWI Log Book maintained by PWI.

3.2.11 Weekly report of pending jobs to be submitted to officer incharge by the PIW (**Annexure-V**).

- 3.2.12 Applicable documents – PWI inspection report file of **Annexure-II**.
- 3.2.13 Reference documents – All SMPs of P/W.

ANNEXURE-IA

CHECKLIST FOR TRACK INSPECTION

1. GAUGE

Rail Gauge

On straight +12 mm (1/2") Slack, On curve +18mm (3/4") slack

- 6 mm (1/4") Tight, - 3mm (1/8") tight.

Twist not to exceed 1" (25mm) in 1 rail (13 m). (Refer Appendix-B) shall be checked with the latest railway norms.

2. LEVEL

Check with straight edge cant and spirit level.

On straight max. difference 18 mm (3/4")

On curve, cant to be checked as per degree/radius of curve. +/- 3/4".

3. LOW JOINTS

Check with string about 11.8 m long.

On straight – dip less than 25 mm (1")

On curves – Outer rail dip less than 12 mm (1/2")

- Inner rail dip less than 25 mm (1")

4. FISH PLATES & BOLTS

Fish plates shall fit smoothly with rail with two bolts facing one side and other two the opposite side less than 6 mm gap between rails. No expansion gap in case of junction fish plates. Rails shall match end to end. Clearance between rail & fish plate due to wear to be less than 3 mm.

5. RAIL/SLEEPER FITTINGS

Dog spikes/loose jaws and keys, elastic clips and modified loose jaws shall be well fixed.

No. of dog spikes – 2 per rail seat on straight track

3 per rail seat (2 outside 1 inside) on curves

4 per rail seat in turnouts and joints.

On straight track keys shall be driven equally. On curves inner keys shall be driven more than outer keys. On one rail seat keys shall be driven in opposite direction.

6. CHECK RAILS

All bolts to be tight, check rail gap is generally 47 – 51 mm (17/8"-2") for wooden/steel / concrete sleeper.

Spacing of bolts shall be 500 mm distance from either end of the rail and in between it shall be 1 m – 1.5 m centre to centre (C/C).

7. ALIGNMENT

Check horizontal deviation with 30 m string. Rail edge shall be less than 10 mm from string as shown in **Appendix-A**.

8. SLEEPERS/RAILS

Sleepers shall not be broken, bent or cracked at Rail seat. Hole dia of IRS sleepers not to exceed 40 mm. Wear level acceptability for sleeper < 4 mm and for rail head < 9 mm. Rail shall not be cracked or broken.

9. BALLAST CUSHION

Ballast shall be tight under sleepers (No muck pumping).

10. DRAINAGE

Track area shall be free from water logging. Drain shall be clean.

11. JAMMING/OBSTRUCTION

Track area shall be clear as per Indian Railways Specifications (IRS) schedule of dimensions.

ANNEXURE-IB

CHECKLIST FOR TURNOUT INSPECTION
(POINT & CROSSING INSPECTION)

1. GAUGE

Inspect from one rail length before stock joint to one rail length behind crossing using rail gauge.

On straight +12 mm (1/2") slack to - 6 mm (1/4") tight,

On curve +18mm (3/4") slack to - 3mm (1/8") tight.

On switch and crossing EXACT (with tie plates in position)

2. LEVEL

Inspect from one rail length before stock joint to one rail length behind crossing using straight edge, cant & spirit level.

On straight max. difference 18 mm (3/4")

On curve +18 mm (3/4") outer rail higher

- 6 mm (1/4")

At toe of tongue rail outer rail shall be 1/2" high.

3. OPERATING LEVER

Equal throw of lever, spring shall be intact, pullover rod adjusting nut to be locked, bracket bolts, lug bolts tight, stretcher bar straight, holding down, bolt / round spikes of lever box shall be tight. Play of all moving parts shall not exceed 2 mm. Throw of tongue rail shall be 75 mm to 112 mm.

4. TONGUE RAIL/STOCK RAIL

Check tongue rail rests equally on all chairs (pack sleepers with loose chairs), switch stop in position, check throw of tongue rail with gauge, stock rail wear less than 10 mm (25%), chair straight, chair bolts and round spikes tight.

5. HEEL BLOCK

Front two heel bolts loose, rear two heel bolts tight. Wear of heel block less than 3 mm (1/8"). Replace if block is worn out more than norm.

6. CROSSING

Check wear of Crossing 'V' and wing rail by gauge to be less than 1".

7. **CHECK RAILS**

All bolts to be tight. Check rail gap 1 3/4" to 1 7/8" to 2"(45-47mm)

8. **ALIGNMENT**

Deviation on straight road less than 1" in 2 rails by using string of 26 m length. Check alignment 15 m on either side of turn out. Check offsets of turnout curve.

9. **SLEEPERS**

Sleepers shall not be broken, burnt, split or hollow at rail seat. Dog spikes to be well anchored, bearing plates in position.

10. **BALLAST CUSHION**

Ballast shall be tight under sleepers (No muck pumping). Ballast shall be 300 mm from sleeper edge.

11. **DRAINAGE**

Point shall be free from water logging.

12. **JAMMING/OBSTRUCTION**

Area shall be clear 50 cm from rail.

13. Squaring of stock joint shall be checked.

APPENDIX – A
ALIGNMENT CHECKING

PROCEDURE	KEY POINTS
1. Check alignment of straight track.	<ol style="list-style-type: none"> 1. Check alignment using 30 m chord. Important : Always ensure that alignment does not differ by more than 10 mm within distance of 30 m in straight track. 2. Pull the chord 30 m along the gauge face of track engaging 2 men. 3. Mark all spots more than 10 mm away from chord with chalk on rail. 4. Remove ballast from sleeper ends in direction of slewing. 5. For alignment, slew the rail in desired direction by using crow bars placed under rail foot at an angle of 35 degree to vertical. 6. Repeat 2,3,4 & 5 till track alignment is within norms. 7. Pack all loosened sleepers. 8. Box sleepers with ballast as before.
2. Check for alignment of curve.	<ol style="list-style-type: none"> 1. Establish tangent points roughly by standing on straight track 30 m away from start of curve. 2. Mark stations 0, 1, 2, 3, 4 With 1, 2, 3, 4 from tangent point and 'O' before tangent point at intervals of 5.9 m. 3. Stretch a chord between stations 0 and 2 and measure the distance between rail and chord in cms, at stations –1. This is the versine and gives degree of curve at this spot. 4. Continue with other stations till the end of curve. 5. Establish area with more than 6 degree difference in consecutive stations and chalk / mark these spots & direction of slewing. 6. Remove ballast from sleepers ends in direction of slewing. 7. Repeat steps 5,6,7 & 8 of procedure-1 as stated above.

ANNEXURE-II
INSPECTION REPORT OF RAIL TRACKS

PWI/INSP NO.
PWI/TECHNICIAN

ZONE :
AREA :
DATE :

SL NO.	NAME OF TRACK	DEFECTS NOTICED	TO BE ATTENDED BY	TIME LIMIT	REMARKS

SIGNATURE OF PWI / TECHNICIAN.

ANNEXURE – III
SCHEDULE FOR REPAIR OF TRACK NO. _____
(Length Meters)

S/ NO	ACTIVITY	SPECIAL MATERIALS/E QUIPMENTS REQUIRED	MAN POW- ER	DAYS DURA- TION	DAYS															RE- MARKS	
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1	DISMANTLING OF 170 M TRACK AT B/E OF BF DUMPING #4																				
2	REDUCING GROUND LEVEL AND CRANE WORKING AREA (BY DOZING)	DOZER																			
3	RELAYING & PACKING OF TRACK #4 (BUFFER END)	JCB/ POCLAIN																			
4	MATERIAL ACCUMULATION AND LEVELLING OF TRACK #4 APPROACH ALSO CRANE AREA	DOZER																			
5	LIFTING & SHIFTING 120 M OF #4 APPROACH & ABOUT 70M OF DUMPING AREA	JCB/ POCLAIN																			
6	BUILDING OF BACK TOWARDS LAGOON SIDE OF #4 APPROACH	DOZER																			
7	CHECKING OF LEVEL BY D/LEVEL	DUMPY LEVELLING INSTRUMENT																			
8	LOCO TESTING	LOCO																			
9	PACKING LOW JOINTS/ TRACK AFTER LOCO TESTING																				
	PLANNED MAN POWER																				
	ACTUAL MAN POWER																				

Note: This is mere a sample, to be filled-in by the individual concerned.

ANNEXURE – IV
DAILY STATUS REPORT

ZONE :

DATE :

STAFF

POSITION :

PRESENT :

ABSENT :

Inspection done including critical areas and defects noticed.

AREA	DEFECTS
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Defects attended

- 1.
- 2.
- 3.
- 4.
- 5.

Pending jobs

Dormant

Track block

Program for tomorrow

ANNEXURE – V
WEEKLY REPORTS OF PENDING JOBS

ZONE :

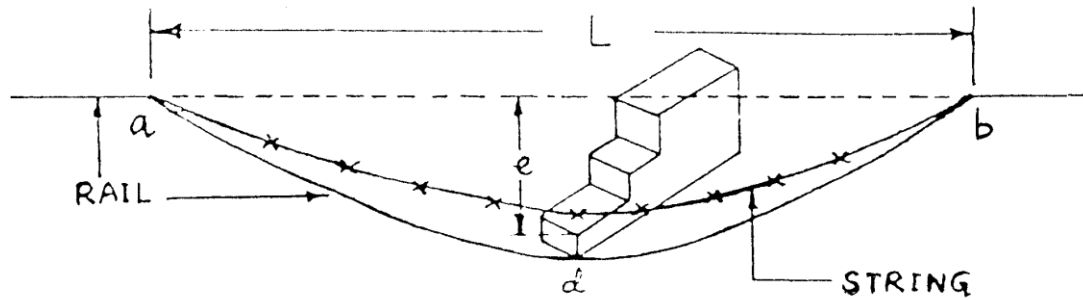
DATE :

PW/INSP. NO.	LOCATION	DEFECTS NOT ATTENDED	REASON OF NOT ATTENDING	REMARKS

SIGNATURE OF PWI : _____

NAME : _____

i) **UNEVENNESS**



$$e = \frac{A+B}{2} - D$$

e = Unevenness in inches / centimeters

A = Absolute level of a in inches / centimeters

B = Absolute level of b in inches / centimeters

D = Absolute level of d in inches / centimeters

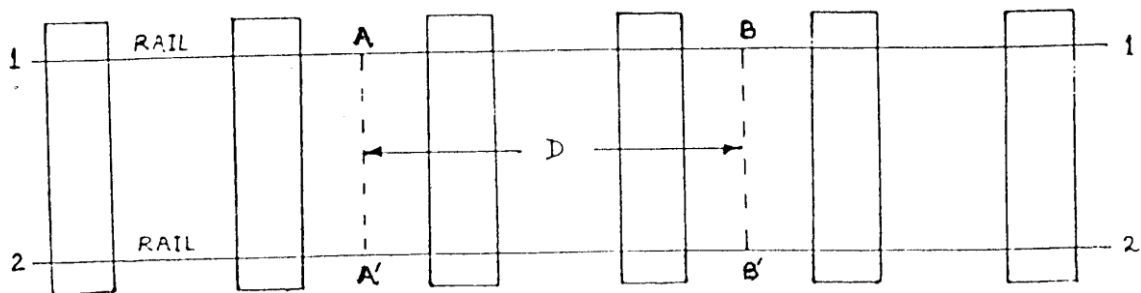
L = Length of dip in meters

É' shall not exceed 1.5'(38mm) over a length of 13meters

The unevenness can be accurately measured using leveling instrument or string. In the latter, there is a natural sag of 1"(25mm) in 13 meters.

STRING METHOD : - Stretch a chord / string from a to b. At centre of dip d measure the distance between the string and rail using wooden cont. Add 1"(25 mm) for sag of string in 13 mtrs. (proportionate for other lengths) to get line unevenness at point d.

ii) **TWIST**



ON RAIL 1, point A is high and ON RAIL 2, point B' is high.

TWIST = Level difference at A + Level difference at B1

Twist on a base D of 13 m shall not exceed 1"(25mm)

iii) **CANT GRADIENT** – Max. cant inside plant: Not to exceed 3", Cant shall not increase / decrease by more than 1" (25 mm). In trail length (30 m) or 1:520