



SOUTH CENTRAL RAILWAY

Headquarters Office,
Works Branch,
Rail Nilayam,
Secunderabad-25.
Dt. 07-01-2020.

No.W.506/ESOs.

ENGINEERING STANDING ORDER NO.83.

Sub: Inspection/Maintenance of Bridges (Track bridges, Road Over Bridges and Road Under Bridges), Tunnels and other Steel Structures.

1.0 In supersession of instructions on Inspection and Maintenance of various types of bridges/steel structures issued vide ESO No.74 dated 19.07.2012, the responsibility of various field officials for inspection and maintenance of bridges (Track bridges, Road Over Bridges and Road Under Bridges), Tunnels and other Steel Structures shall be as given under:

2.0 SSE/SE (Works):

2.1 Maintenance:

2.1.1 Bridges (including ROB/RUBs)

a)	Foundation	of all bridges
b)	Sub Structure	
c)	Bed Blocks	
d)	Flooring	
e)	River Training & Protective Works	
f)	<u>Bridge appurtenances</u> Notice boards Name Boards Trolley/Man refuges (RCC) Pathway (RCC)	
g)	Super Structure	of Arch, Pipe, BOX, PSC slab and RCC slab bridges

2.1.2 Platform Shelters (RCC & Steel)

2.1.3 All water tanks including staging (RCC & Steel)

2.1.4 All FOBs (RCC & Steel)**

2.1.5 Steel structures of Workshops & Engine sheds, gantry girders, track over gantry.**

2.1.6 Tunnels (Structural part)

****Assistance of SSE/Br. shall be taken for any special repairs to the steel FOB & track over gantry in Workshops.**

2.2 Inspection schedule:

2.2.1	All Bridges (Items 2.1.1 (a) to (g)) listed above*	once a year (Pre-monsoon)
2.2.2	Platform shelters (Steel)	once a year
2.2.3	All Water Tanks including staging (Steel)	
2.2.4	Foot over bridges (Steel)	
2.2.5	Steel structures of Workshops & Engine sheds; gantry girders, track over gantry	
2.2.6	Tunnels (Structural part)	once a year (Post-monsoon)

* As per para 117 of IRBM, General condition of super structure of all other types of bridges and their bearings should also be inspected during the annual inspection

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2.3 The proforma for inspections shall be as given under:

2.3.1	Bridges (Items 2.1.1 (a) to (g)) listed above	As per ESO 82 dt. 05-07-19
2.3.2	Platform Shelters (Steel)	Annexure: I-A & I-B
2.3.3	Water Tanks including staging (Steel)	Annexure: II-A & II-B
2.3.4	Foot Over Bridges (Steel)	Annexure: III-A & III-B
2.3.5	Steel structures of Workshops & Engine sheds, gantry girders, track over gantry	Annexure: IV-A & IV-B
2.3.6	Tunnels (Structural part)	As per para 1003 IRBM

2.4 During the inspection of Bridges, if any distress is noticed requiring urgent attention, it shall be advised to Sectional DEN through ADEN, to enable a detailed inspection by them and to declare the bridge as distressed (ORN-1/2) if need be.

2.5 All petty repair works shall be carried out immediately and major / special repairs shall be planned and carried out on a programmed basis.

2.6 For inspection and maintenance of Arch Bridges, instructions issued by PCE vide letter no. W.71/BR/Bridge Policy dt. 25-07-2016 shall be referred to.

3.0 SSE/SE (P.Way)

3.1 Maintenance:

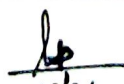
3.1.1 Bridges

a)	Track on bridges & approaches including all types of sleepers & fittings
b)	Guard rails
c)	Re-railing ramps
d)	Fittings of Gangway
e)	Clearance of Waterway
f)	Flood Records for all Important bridges
g)	Flood Level gauge, Marking HFL, DL, Foundation detail

3.1.2 Tunnels (other than structural part as detailed under para 1002 of IRBM)

3.2 Inspection schedule:

3.2.1	For items 3.1.1(a) to (d)	<ul style="list-style-type: none"> Schedule of regular track inspection and maintenance shall be followed. Through tightening of all nuts & bolts of sleeper fittings, shall be carried out once in 6 months
	(e) Waterway	Once a year (Pre-monsoon)
	(f) Flood records of bridges	<ul style="list-style-type: none"> Flood gauge readings during floods for all important bridges Sounding in mid-span and around piers and abutments at specified bridges during and after floods.
	(g) Flood Level gauge, Marking HFL, DL, Foundation detail	Once a year (Pre-monsoon)
3.2.2	Tunnels	Once a year (Post-monsoon)


08/01

3.3 Any deficiencies in Steel Trolley/Man Refuges & Steel Gangways noticed during inspection should be advised to SSE/SE (Bridges) for rectification.

3.4 Formats for pre-monsoon inspection of bridge items shall be as per ESO 82 dt. 05-07-19. Format for post-monsoon inspection of tunnels shall be as per para 1003 of IRBM.

4.0 SSE/SE (Bridges):

4.1 Maintenance:

4.1.1 Bridges (including ROB/RUBs)

a)	Super Structure	of all Steel, PSC, RCC, Composite Girder bridges
b)	Bearings	
c)	Trolly/Man refuges (Steel)	
d)	Gangways (Steel)	

4.1.2 Old Flood Light towers which are under the books of SSE/Bridges. (These shall be handed over to Electrical deptt. for further maintenance, in consultation with them)

4.1.3 Under water inspection of specified bridges (Identification to be done by sectional ADEN)

4.1.4 Non-destructive testing of Bridges.

4.1.5 Instrumentation of Bridges.

4.1.6 Health monitoring of important specified bridges

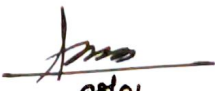
4.2 Inspection schedule:

4.2.1	General inspection of Bridges - items 4.1.1 (a) to (d)	Once a year
4.2.2	<u>Detailed inspection of Bridges - items 4.1.1 (a) to (d)</u>	
	a) Riveted Steel, PSC, RCC, Composite girder bridges (Initial inspection within one year after installation)	Once in 5 years
	b) Welded Steel girders (Initial inspection within one year after installation)	Once in 3 years.
	c) Girders kept under observation	Once a year
	d) Floor system of early steel girders	Once a year
4.2.3	<u>Camber measurement of all PSC girders & open web steel girder bridges.</u>	
	(a) Initial measurements after installation	Within one year
	(b) Periodic measurements	Once in 5 years.
4.2.4	<u>Under water inspection.</u>	
	(a) Routine inspection/swim inspection.	Once in a year.
	(b) Detailed inspection	Once in 5 years
	(c) Special inspection	Need based.
4.2.5	Drone Inspection of Important bridges (older than 10 years)	Once in 5 years
4.2.6	Non-destructive testing & Instrumentation of bridges.	Need based.
4.2.7	Flood light towers (under maintenance of SSE/Br.)	Once in 5 years.


09/01

- 4.3 Laying as well as renewal of Steel Channel Sleepers, H-beam Sleepers, Insulated Steel Channel Sleepers and Central steel gangway to be done by SSE/SE (Br.) and handed over to sectional SSE/SE (P.Way) for further maintenance.
- 4.4 If any petty repairs regarding masonry, concrete and flooring works to Trolley/Man refuges & pathways is noticed during inspection, the same shall be advised to concerned sectional ADENs.
- 4.5 The Proforma for inspection of Flood Light Towers is enclosed as Annexure V-A & V-B. For inspection of PSC/Composite girders, Proforma given under Annexure-11/2a of IRBM shall be followed.
- 5.0 All ROBs (Bridge over Rly portion) constructed on existing lines / doublings etc., should be inspected by the concerned sectional ADEN and SSE/Br., as per the inspection schedule laid down for ROBs even if the bridge is not commissioned and handed over to Open line. Inspection of Railway Bridges on New Lines/ Doubling/ GC and inspection of ROBs (Bridge over Rly portion) on New Lines/GC, before commissioning, shall be done by AXEN/XEN of Construction organization as per the schedule laid down for sectional ADEN.
- 6.0 Laying, inspection and maintenance of height gauges at RUB/LHS shall be as per Guidelines issued vide ESO no.73 dated 05.05.2011.
- 7.0 Inspection in the case of Distressed Bridges (as declared by Sr.DEN/DEN/DEN(Br.) in addition to Annual Bridge Inspections shall be as under:

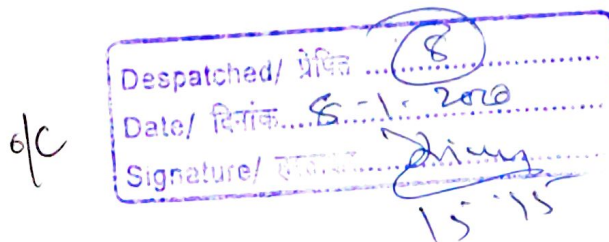
<u>Distressed Bridge Category</u>	<u>Sr.DEN/DEN</u>	<u>ADEN/ADEN(Br.)</u>	<u>Concerned SSE</u>
ORN-1	Once in 3 months.	Once in 2 months	Once in a month
ORN-2	Once in a year	Once in 6 months	Once in 3 months


08/01

(K. V. Siva Prasad)
Principal Chief Engineer.

Copy to:

CAO/C, CPD/BW, CTE, CBE, CGE, CE/Wks, CE/TP, CE/P&D, CE/TM, CE/RSW, CE/BRH, CE/SD.
Sr.DEN/Co-ord/SC, GTL, BZA, HYB, GNT, NED
Principal/ZCETI/KCG.



Proforma for Inspection Platform Shelters

Sl. No.	Items inspected.	Condition at the time Inspection	Rectification		Signature & Designation.
			Date	Details	
1.	Foundation Base				
2.	Junction at Column & pedestal.				
3.	Column.				
4.	Connection of column with Arms.				
5.	Arms.				
6.	Connection of Purlins with Arms.				
7.	Purlins.				
8.	Roof Sheeting.				
9.	Connections of Roof Sheeting with purlins.				
10.	Gutter				
11.	Connection of Gutter with Roof Sheeting.				
12.	Connection of drain pipes with Gutter.				
13.	Connection of Eves board.				
14.	Connection of hangings such as ceiling fans, public addressing systems, display.				
15.	Painting.				
16.	Leakages, if any.				
17.	Columns embedded in walls.				
18.	Down Pipe and Drainage Outfall condition.				

Date of Inspection:

Signature & Designation

DETAILS OF STEEL WATER TANK STRUCTURES

Division	_____	Section	_____
Station	_____	Description of Structure	_____
Year of Construction	_____	Drawing No.	_____
Capacity of Tank	_____	Material of Tank	_____
Height of staging from Ground Level	_____	Whether base of columns encased or not	_____
Periodicity of Cleaning of Tank.	_____	Height of Pedestal (if available)	_____
Type of Structure (Welded/Rivettted)	_____	Periodicity of Inspection of Structure.	_____
Periodicity of Complete Painting of Structure	_____	No. of Main Columns	_____
No. of Lower Tier Beams	_____	No. of Upper Tier Beams	_____

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Proforma for Inspection of Steel Structures of Water Tanks

Sl. No.	Name of the Items inspected.	Condition at the time Inspection	Rectification		Signature & Designation.
			Date	Details	
1.	Foundation Base				
2.	Junction at Column & pedestal.				
3.	Main Columns.				
4.	Connection of column with Lower Tier Beams.				
5.	Lower Tier Beams				
6.	Connection of Lower Tier Beams with Upper Tier Beams.				
7.	Upper Tier Beams.				
8.	Connection of Members with Main Columns.				
9.	Connection of Main Tank with Upper Tier Beams.				
10.	Connection of Bracings.				
11.	Inspection Ladders & Platforms.				
12.	Connection of Pipe lines with Structure.				
13.	Condition of Painting.				
14.	Leakages, if any.				

Date of Inspection:

Signature & Designation

DETAILS OF STEEL FOOT OVER BRIDGE STRUCTURES

Division _____ Section _____

Station	Type of Gangway Structure
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No. of Spans & Span Length. _____ Width of Gangway _____

Type of Roof _____ Type of Floor _____

Whether Gangway slab is _____ Periodicity of Complete
Clear off Main Angles _____ Painting of structure _____

Year of Construction _____ Drawing No. _____

Min. Available vertical Clearance from Rail Level.	Whether base of columns Encased or not
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Min.Horizontal distance _____ Height of Pedestal _____
of structure from C/L of (if available)

Type of structure _____ Periodicity of Inspection _____
(Welded/Rivetted) of structure.

Whether any structures

Built under Stairway, if
Yes, details.

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Proforma for Inspection of Steel Foot Over Bridges

Sl. No.	Name of the Items inspected.	Condition at the time Inspection	Rectification		Signature & Designation.
			Date	Details	
1.	Foundation Bolts				
2.	Column base.				
3.	Column structure.				
4.	Splice joints, if any				
5.	Landing Beams.				
6.	Stringers (Channels)				
7.	Cléats for resting of steps.				
8.	Gangway main angles.				
9.	Floor beams.				
10.	Floor beam connections.				
11.	Bottom bracing angles.				
12.	RCC Slabs/slab.				
13.	Diagonal members.				
14.	Verticals.				
15.	OHE Protective screens.				
16.	Roof sheeting.				
17.	Overall condition of paint.				
18.	Hand railing.				
19.	Nosing angles.				

Date of Inspection:

Signature & Designation

DETAILS OF ENGINE SHED/WORKSHOP

Division _____ Section _____

Station	Description of Shed
1	Shed 1
2	Shed 2
3	Shed 3
4	Shed 4
5	Shed 5
6	Shed 6
7	Shed 7
8	Shed 8
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100	Shed 100

Year of Construction _____ Drawing No. _____

No. of bays & Size _____ Type of Columns _____

Height of Columns from Ground Level _____

Height of Pedestal (if available) _____

Type of Roof Sheeting _____ Schedule of Inspection _____

Cross slope of Roof _____ Type of Structure
(Welded/Rivetted) _____

Overall length of Structure _____ Span of Gantry Beams _____

Inter distance between _____ Size of Gantry Rail _____
Gantry rails.

Carrying capacity of Gantry _____ Periodicity of Complete _____
Crane. Painting of Shed.

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Proforma for Inspection of Steel Structures of Engine Shed/Work Shops

Sl. No.	Name of the Items inspected.	Condition at the time Inspection	Rectification		Signature & Designation.
			Date	Details	
1.	Column Base				
2.	Column				
3.	Beams.				
4.	Connection of Beams with Roof Trusses.				
5.	Roof Trusses.				
6.	Connection of Members of Roof Trusses.				
7.	Purlins and connections with Roof Trusses.				
8.	Connections of Roof Sheeting with purlins.				
9.	Roof Sheeting.				
10.	Condition of Painting.				
11.	Inspection Ladders & Platforms.				
12.	Leakages, if any.				
13.	Connection of column with Gantry Beams.				
14.	Gantry Girders.				
15.	Connection of Gantry Rails with Gantry Girders.				
16.	Gantry track alignment.				
17.	Cross level of Gantry Rails on Gantry Beams.				

Date of Inspection:

Signature & Designation

Proforma for Inspection of Flood Light Towers

Sl. No.	Items inspected.	Condition at the time Inspection	Rectification		Signature & Designation.
			Date	Details	
1.	Foundation Bolts				
2.	Tower Column base.				
3.	Concrete pedestal.				
4.	Tower Structure.				
5.	Splice joints, if any.				
6.	Joint Bolts.				
7.	Verticality of Tower.				
8.	Cabin railing.				
9.	Platform of Cabin.				
10.	Bolted connections of cabin to tower.				
11.	Inspection Ladders.				
12.	Date of Painting & Inspection.				
13.	Overall condition of paint.				
14.	Lacings.				

Date of Inspection:

Signature & Designation