

Name of the Project	:	VISUAL INSPECTION OF FOB AT TENALI RAILWAY STATION
Location	:	TENALI RAILWAY STATION
Location Co-ordinates	:	16°14'38.0"N 80°38'22.7"E
Date of Inspection	:	23rd OCTOBER, 2019



Summary:

- a) Cracks and Spalling observed at RCC slab panels of Span-1.
- b) Deformations are observed in Stanchion-7 and at Floor beam in Span-1.
- c) Corrosion is observed in stringer beams and Floor beams of Spans-5, 6, 7 & 8.
- d) Cracks are observed at Span-2 & 11 of RCC Slab Panels.
- e) Corrosion is observed in Gusset Plates of Span-2, 3 & 4.
- f) Corrosion is observed in Bottom chords of Span-7 & Base Plates of Stanchions.
- g) Spalling & Reinforcement exposure are observed in flights & landings of Staircase-2 and in Spans -8, 9, 10 & 11.

Tests to be conducted:

- a) Ultrasonic Thickness gauge to measures local thickness of a solid element.
- b) Elcometer (Coating thickness Gauge) to measures dry film thickness on steel surfaces.

- c) Ultrasonic Flow detector to detect hidden cracks, voids, porosity, and other internal discontinuities in metals.
- d) Fillet weld gauge to measures the size of the weld.
- e) Profometer Test for concrete cover and diameter of rebar.
- f) Rebound Hammer test surface strength of concrete (For Pre-cast slab panels and staircase)

VISUAL INSPECTION OF STEEL FOOT OVER BRIDGE

Name of the Project	Visual inspection of FOB at Tenali railway station
Location	Tenali Railway Station
Date of Inspection	23-10-2019

PART 1 GENERAL INFORMATION AND OBSERVATION		
1.1	Name of the Bridge	FOB/ CIRCULATING AREA TO CIRCULATING AREA
1.2	Location Location co-ordinates	Tenali Railway Station 16°14'38.0"N, 80°38'22.7"E
1.3	Type of truss Structure	Span 1,2,8,9,10,11 NG Rail with railing of MS Flat and Verticals Span 3,4,5,6,7 Pratt Truss ("N" Type Truss)
1.4	Year of Construction	Not available
1.5	Description of the main use of the bridge	Pedestrians Crossing
1.6	Major Materials used in different parts of bridge	a. Rail & Structural Steel b. Pre-cast RCC Slab panels (Floor slab, Staircase)
1.7	Width of the Pathway (m)	Span 1,2,8,9,10,11 = 1.1 m Span 3,4,5,6,7 = 1.65 m
1.8	Length of the Pathway (m)	98.8 m
1.9	No of Railway Lines Crossings	7 tracks Span 1 & 2 = No tracks Span 3 = 2 Span 4 = 1 Span 5 = 1 Span 6 = 1 Span 7 = 1 Span 8 = 1 Span 9,10,11 = No tracks
1.10	Span arrangement (no x Span in meters)	1 x 5.75 m + 1 x 6.4 m + 1 x 14.5 m + 1 x 12.6 m + 2 x 12.05 m + 1 x 12.14 m + 1 x 5.15 m + 1 x 4.7 m + 1 x 5.32 m + 1 x 5.43 m = 96.09 m
1.11	Vertical Clearance (from rail top to girder bottom)	6.295 m
1.12	Head Room	Open to sky
1.13	Damages due to accidental hitting, Grazing Marks	No Visible signs appear
1.14	History of Repair/ Maintenance	Patch work observed in the staircase-2 Landing

1.15	Original Structural Drawings	Not available	
1.16	Key Plan		
<div><div>CIRCULATING AREA-1</div><div><div>CHENNAI</div><div><div><div>S1</div><div>S2</div><div>S3</div><div>S4</div><div>S5</div><div>S6</div><div>S7</div><div>S8</div><div>S9</div><div>S10</div><div>S11</div></div><div>VIJAYAWADA</div></div><div>CIRCULATING AREA-2</div></div></div>			
PART 2 IDENTIFICATION OF LOADS ON BRIDGE			
		Yes/No	Notes
	Dead Loads at Roof level		
2.1	a) Pipeline - Utilities	No	a. Cables in 1-inch HDPE pipe, 1.5-inch HDPE pipe. & 2-inch PVC pipe are supported on Truss. (Refer <i>fig :3</i>) b. GI Pipes of Dia-60mm at Trestle-1 is observed c. No Roof Truss is provided.
	b) Cables	Yes	
	c) Roof Truss	No	
	d) Roof Sheet	No	
	e) load of advertising hoarding	Yes	
	f) load of train/coach display boards	No	No train coach display boards are provided
	g) Electrical equipment (OHE), signal	No	No electrical equipment and signal
2.2	Dead Loads at Floor level		
	a) Additional wearing coat on Floor	No	No wearing coat on RCC precast Slabs (Refer <i>fig :2</i>)
	b) Provision of protective screen for passengers	Yes	Fence made of galvanized wire of 2 mm gauge and 2 mm galvanized sheet is used above OHE Line on both side of pathway is used for passengers Protection. (Refer <i>fig :2</i>)
	c) Type of Material used for mesh	GI wire mesh	

PART 3 STRUCTURAL SYSTEM OF THE BRIDGE			
			Notes
3.1	Foundation details		Not visible at site
3.2	Pedestals		
	Trestles Connection Details	Bolted Connections	
	No. of HD Bolts and size	6 Nos. with 16mm Dia. Bolts	
	Thickness of Base Plate	30mm	
3.3	Roof Truss		
	Element of roof truss section		No Roof truss. Open to Sky.
	Size of roof truss		
	Connection of Roof elements		
3.4	Steel Truss		
	Type /Shape of Truss Section	Pratt truss with Double Angles & Rail sections	<p>Span 1,2,8,9,10&11:</p> <p>a) Top Angle is 75 x 75 x 10 mm sections and bottom NG Rail section is 45 x 90 x 90 (Head x Height x Base) (Refer fig : 5)</p> <p>b) 75 x 75 x 10 mm Angle sections are used as vertical members.</p> <p>c) 75 x 75 x 10 mm Angle sections are used as Floor beams</p> <p>Span 3,4,5,6&7</p> <p>a) Top and bottom Chord members are 75 x 75 x 10 mm Angle sections (Refer fig : 5)</p> <p>b) 75 x 75 x 10 mm Angle sections are used as vertical and diagonal bracing members.</p> <p>c) 75 x 75 x 10 mm double Angle sections are used as Floor beams.</p> <p>d) Bottom Lateral Bracings 75 x 75 x 10 mm Angle sections in Cross pattern are used to support Floor beams.</p>
	Height of Girder/Truss (H)	Span 1,2,8,9,10 & 11 = 1.20 m Span 3,4,5,6 & 7 = 1.90 m	
	Truss Support Condition	Rigid Connection	
	Type/Shape of Floor beam /Bracings	Single & Double Angle Sections	
	No of Floor beams/bracings	Span 1 = 4 No's Span 2 = 3 No's Span 3 = 7 No's Span 4 = 5 No's Span 5 = 5 No's Span 6 = 5 No's Span 7 = 5 No's Span 8 = 3 No's Span 9 = 3 No's Span 10 = 3 No's Span 11 = 4 No's	
	Arrangement of Bracings	Cross bracing	
	Type of Beam-Column Joint (shape of gusset plate if any)	Cleat Angle	
3.5	COLUMN		

	Type/Shape of Column section	Bull headed Rail Sections, ISMB-300 & ISMC-300	a. Span 1 & Span 11 are supported one side on trestle and other side on stanchion, remaining spans are supported on two legged stanchion.
	No of Columns/ support	4, 2	b. Trestles Columns are 45 x 90 x 90 (Head x Height x Base) Rail sections.
	Dimensions of Column		c. Stanchion-1,8,9&10 column has built up section of 2 rail sections of size 55 x 100 x 100mm (Head x Height x Base) (Refer fig : 4)
	BEAM-Column joint (bolted, welded, riveted)	Bolted	d. Stanchion-2,3,6&7 columns ISMB-300 Beam Sections e. Stanchion-4&5 columns are double ISMC-300 Channel Sections
3.6	Floor of the Pathway		
	Material of Slab	Pre-cast slab panels for Spans 1,2,8,9,10&11 Cast In-situ for Spans 3,4,5,6&7	Span 1,2,8,9,10&11 a. Pre-cast Reinforced concrete slab panels are used for floor slab of 75 mm thick, RCC slab panels are resting on Floor beams, which are supported by Bottom chords.
	Thickness of Slab	75 mm for Spans 1,2,8,9,10&11 100 mm for Spans 3,4,5,6&7	Span 3,4,5,6&7 a. Cast In-situ concrete slab is used for floor slab of 100 mm thick, RCC slab is resting on Floor beams.
	Condition of Slab from Bottom	Spalling is observed	
	Condition of Slab from Top	ok	
3.7	Staircase Details		
	Number of Staircase	2 No's	Staircase is observed as Pre cast RCC Slab panels supported on 90 x 90 x 12mm Angle tie beams and 50 x 100 x 100mm Rail Stringer beam on both sides of stair case.
	Number of Steps from Circulating Area – 1	48 no's	
	Number of Steps from Circulating Area – 2	49 no's	
	Material used for steps	Pre-cast RCC Slab Panel	
3.8	Staircase Railing		
	Type of Parapet Railing	Steel Railing	Staircase is provided with railing on both sides using 100 x 100 x 12mm Angle section and 65 x 10 mm M.S Flats are used.
	Height of Railing	1.3 m	

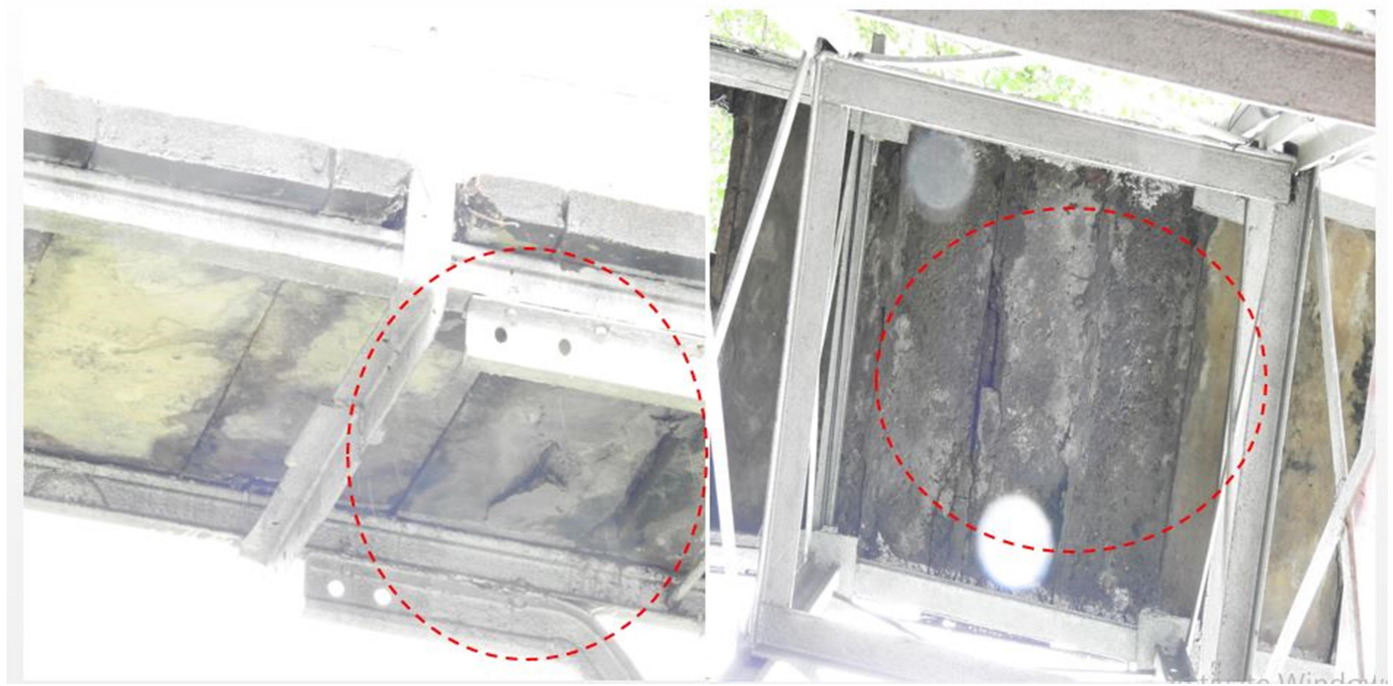
PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES

4.1

- ✓ Exposed reinforcement is observed on Pre-cast RCC slab panels of Span 11 and staircase panels



a) Reinforcement exposed & broken slab panels

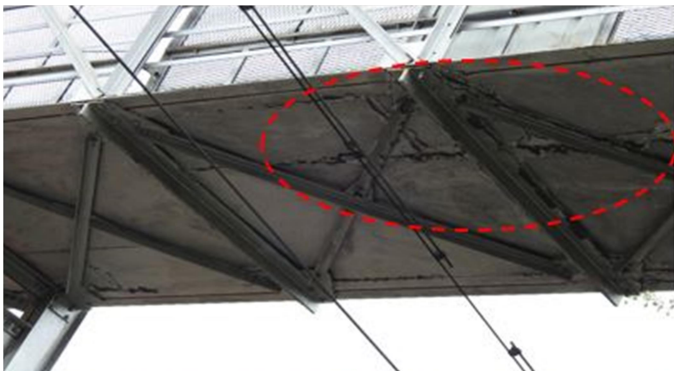
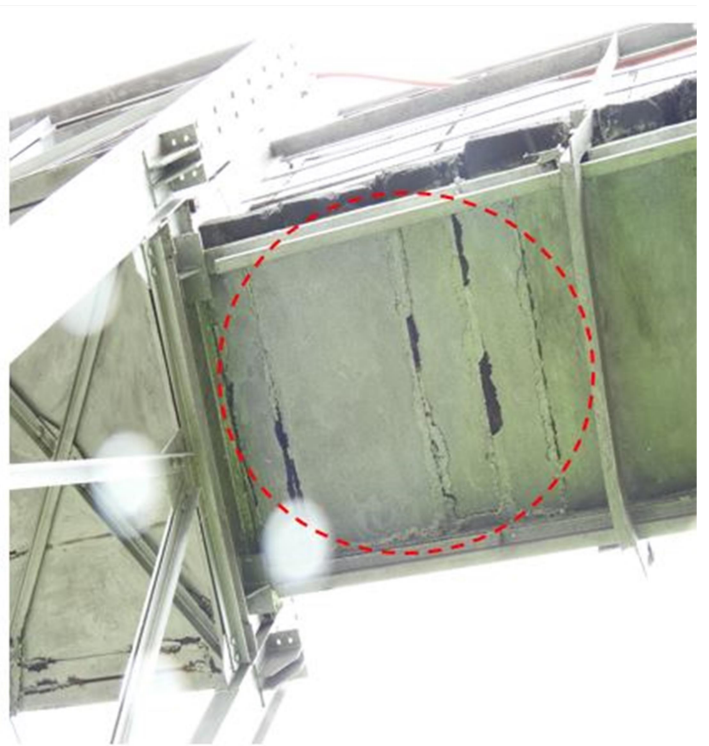


b) Spalling and cracks at Main Slab & stair case pre cast slab panels

4.2	✓ Leaching effect and Cracks are observed on Pre-cast slab panels on 2 nd & 11 th span of FOB.
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a) Leaching effect and Cracks are observed on Pre-cast slab panels



b) Corrosion observed at floor beams & Sacrificial Plates

4.3	✓ Deformation is observed at Stanchion-7.
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(a) Deformation observed in Stanchion-7 column and bracing

4.4

✓ Critically damaged staircase



PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES			
	Defects	Location	Notes
	Cracking in Steel Members		No cracks are observed in Steel during visual inspection
	Cracking in RCC components	Slab panels	Cracks are observed in Pre-cast RCC slab panels of stair case & Main Slab.
	Water seepage		Seepage observed in the slab
	Spalling		Spalling is observed in Slab panels and in staircase-pre-cast panels.
	Rust straining		Slight rusting is observed at all the joints of FOB at floor level
	Corrosion in Gusset plate	Floor level	corrosion is observed in Sacrificial Plates
	Corrosion at steel-Concrete joint		corrosion is observed at steel concrete joints along length of FOB
	Condition of Painting of steel structure		Painting is affected at corroded places



Fig 1: Front view of FOB span 4, 5 & 6



Fig 2: FOB pathway, protective screen



Fig 3: Additional loads of PVC pipes



Fig 4: Stanchion column sections details



Fig 5: Bottom view of FOB

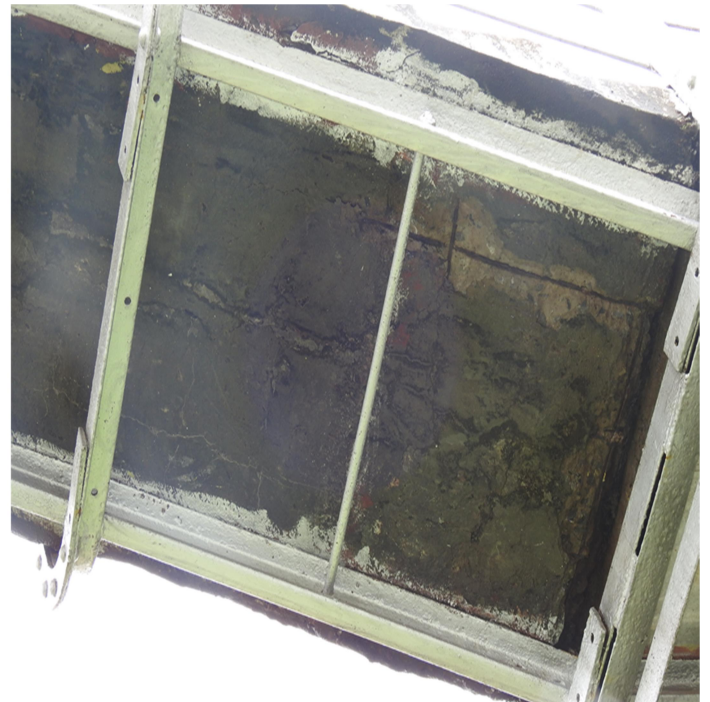


Fig 6: Patch work is observed at slab panels of stair case landing



Fig 7: Inspection Team at Tenali FOB