

Name of the Project	: VISUAL INSPECTION OF FOB/ PF-1 – PF-2 AT TSUNDURU RAILWAY STATION+
Location	: TSUNDURU RAILWAY STATION
Location Co-ordinates	: 16°09'24.9"N 80°35'09.7"E
Date of Inspection	: 24th October 2019



Summary:

- a) Exposed reinforcement is observed on Pre-cast RCC slab panels of Span 1, 2 and staircase panels and Landings
- b) Leaching effect and Cracks are observed on Pre-cast slab panels on 1st and 2nd span of FOB
- c) Corrosion is observed on floor beams both spans and Main landing floor beams
- d) Corrosion of Bottom chord, Stringer beam is observed and rusting of Trestle bracing angle section
- e) Corrosion is also observed at steel concrete joint.
- f) Heavy Vibrations Observed

Tests to be conducted:

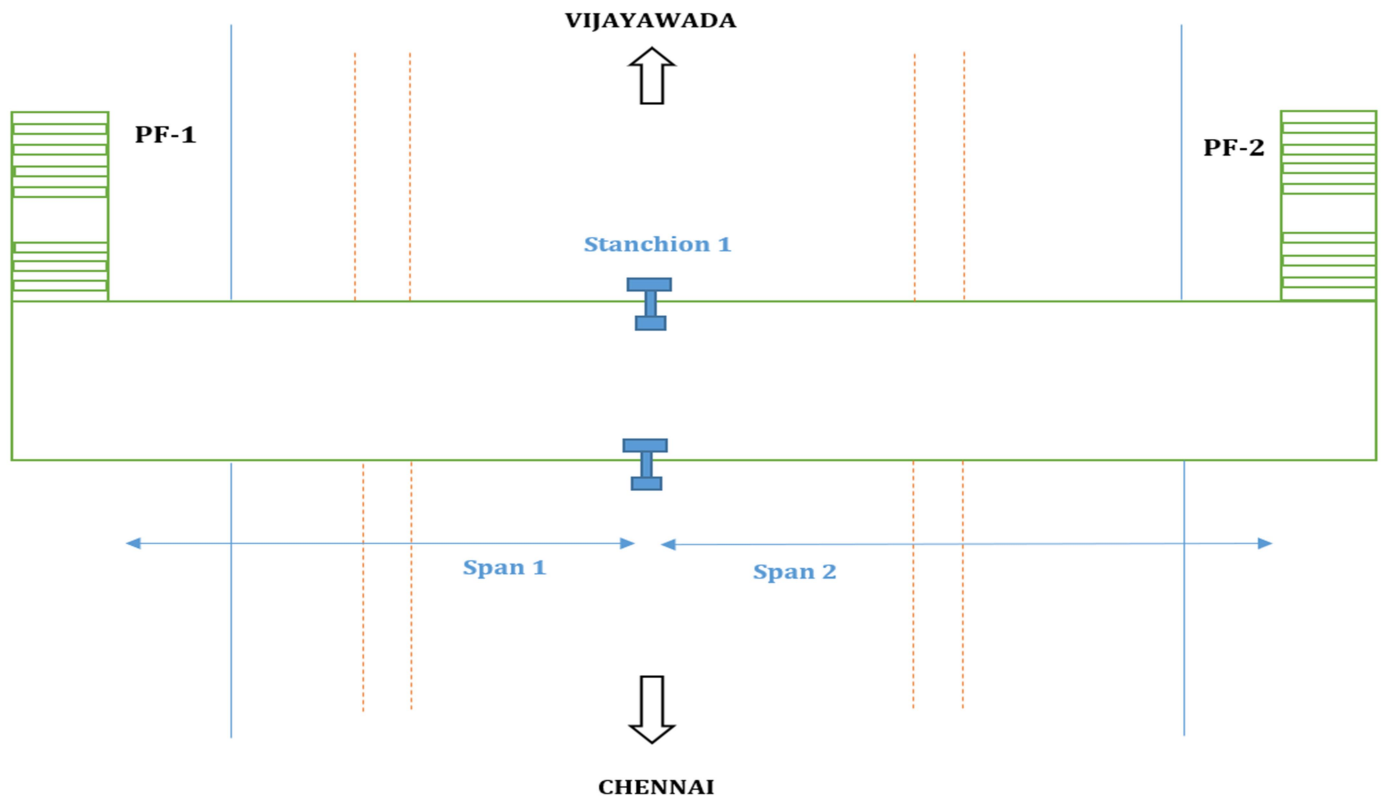
- a) Ultrasonic Thickness gauge to measures local thickness of a solid element.
- b) Elcometer (Coating thickness Gauge) to measures dry film thickness on steel surfaces.
- c) Ultrasonic Flaw detector to detect hidden cracks, voids, porosity, and other internal discontinuities in metals.
- d) Fillet 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/ PF-1 –PF-2 at Tsunduru Railway Station
Location	Tsunduru Railway Station
Date of Inspection	24 th October 2019

PART 1 GENERAL INFORMATION AND OBSERVATION		
1.1	Name of the Bridge	FOB/ PF-1 – PF-2
1.2	Location Location co-ordinates	Tsunduru Railway Station 16°09'24.9"N 80°35'09.7"E
1.3	Type of truss Structure	Warren truss
1.4	Year of Construction, Maintenance History	Not available
1.5	Description of the main use of the bridge	Pedestrians Crossing
1.6	Type of Materials used in different parts of bridge	a. NG Rail (Frame, truss) b. Pre-cast RCC Slab panels (Floor slab, staircase steps)
1.7	Width of the Pathway (m)	1.75 m
1.8	Length of the Pathway (m)	19.4 m
1.9	No of Railway Lines Crossings	2 tracks Span 1 = 1 track Span 2 = 1 track
1.10	Span arrangement (no x Span in meters)	1x8 m + 1x8.5 m = 16.5 m
1.11	Vertical Clearance (from rail top to girder bottom)	5.768 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 (if any...)	Yes (Patch work is observed)
1.15	Original Structural Drawings	Not available

1.16 Key Plan



PART 2 IDENTIFICATION OF LOADS ON BRIDGE

		Yes/No	Photo ID
	Dead Loads at Roof level		
2.1	a) Pipeline - Utilities	No	Not observes at site.
	b) Cables	Yes	Cables are protected with 1-inch HDPE pipe.
	c) Roof Truss	No	No Roof Truss is provided
	d) Roof Sheet	No	No Roof
	e) load of advertising hoarding, Light post	Yes	Light post with 60 mm dia. GI pipe is supported on Trestle railing at both corners of FOB. (Ref Fig. 1)
	f) load of train/coach display boards	No	No train display boards are provided
	g) Additional load of overhead electrical equipment (OHE), Signal, Light Post	No	No Additional load of overhead electrical equipment (OHE) and Signal equipment
2.2	Dead Loads at Floor level		
	a) Additional wearing coat on Floor	Yes	Cement concrete layer is used for flooring (Refer fig :8). GI Pipe of 25 mm dia. connected to bottom chord.
	b) Provision of protective screen for passengers	Yes	Chain link fence made of galvanized wire of 2 mm gauge and 2mm galvanized sheet is used above OHE line on both side of gangway is used for protection (Refer fig :8)
	c) Type of Material used for mesh	Galvanized wire mesh	

PART 3 STRUCTURAL SYSTEM OF THE BRIDGE			
			Remarks
3.1	Foundation details		Not visible at site
3.2	Pedestal details		Not visible at site
	Type of material for bottom encasement		
	No of Bolts and size		
	Thickness of Base Plate		
3.3	Roof Truss		No roof truss is provided.
	Element of roof truss section		
	Size of roof truss		
	Connection of Roof elements		
3.4	Steel Truss		
	Type/Shape of Girder Section	Warren truss fabricated with NG Rail	a) Top and bottom Chord members are 50 x 80 x 80 (Head x Height x Base) NG Rail section. (Refer fig :2)
	Height of Girder/ Truss (H)	1.68 m	b) 50 x 80 x 80 Rail section are used as diagonal bracing members.
	Truss Support Condition	Rigid connection	c) 50 x 80 x 80 Rail section are used as Floor beams supported with Knee bracing of 50 x 80 x 80 Rail section.
	Type/Shape of floor beams /Bracings	Rail section	d) Bottom Lateral Bracings 50 x 80 x 80 Rail section in Zig-zag pattern are used
	No of Floor beams/bracings for span	Span 1 = 11 No's Span 2 = 11 No's	
	Arrangement of Bracings	Zig-Zag bracing.	
	Type of Beam-Column Joint (shape of gusset plate if any)	Cleat angles	
3.5	COLUMN		
	Type/Shape of Column section	Built up Rail Section with Bull headed rail	a. FOB is supported on vertical column of 2 Rail section 65 x 135 x 65, with bracings of 65 x 65 x 10 mm angle section (Refer fig :9)
	No of Columns per support	4, 2	b. Trestles 1 and 3 have 4 columns where as Trestles 2 (Stanchion) have only 2 columns. (Refer fig :9) c. Staircase landing is 2 Rail section 65 x 135 x 65, with bracings of 65 x 65 x 10 mm angle section (Refer fig :10)
	Dimensions of Column	140 x 135 mm	
	BEAM-Column joint (bolted, welded, riveted)	Bolted	
3.6	Floor of the Gangway		
	Material of Slab	Pre-cast panels	a. Pre-cast Reinforced concrete slab panels are used for floor slab of 60 mm thick, RCC slab panels are resting on Floor beams. (Refer Part 4.4.1)
	Thickness of Slab	60 mm	
	Condition of Slab from Bottom	Spalling, cracks and Leaching	

	Condition of Slab from Top	RCC slab is not visible, Covered with CC flooring	b. Cement concrete flooring is laid on the top of the slab panels (Refer fig : 8)
3.7	Staircase Details		
	Number of staircases	2 No's	a. Staircase is observed as Pre cast RCC Slab panels supported on 50 x 80 x 80 Rail Stringer beam on both sides of stair case.
	Number of steps from PF-1	34 no's	
	Number of steps from PF – 2	40 no's	
	Material used for steps	Pre cast RCC slab panel	
3.8	Staircase Railing		
	Type of Parapet Railing	Steel railing	a. Staircase is provided with railing on both sides using 50 x 80 x 80 Rail section and 50 x 8 mm M.S flats are used.
	Height of Railing	1.38 m	

PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES

- 4.1 ✓ Exposed reinforcement is observed on Pre-cast RCC slab panels of FOB.





a) Reinforcement exposed at slab panels of 1st span



b) Reinforcement exposed at slab panels of 2nd span



c) Reinforcement exposed slab panels on bottom of staircase-1

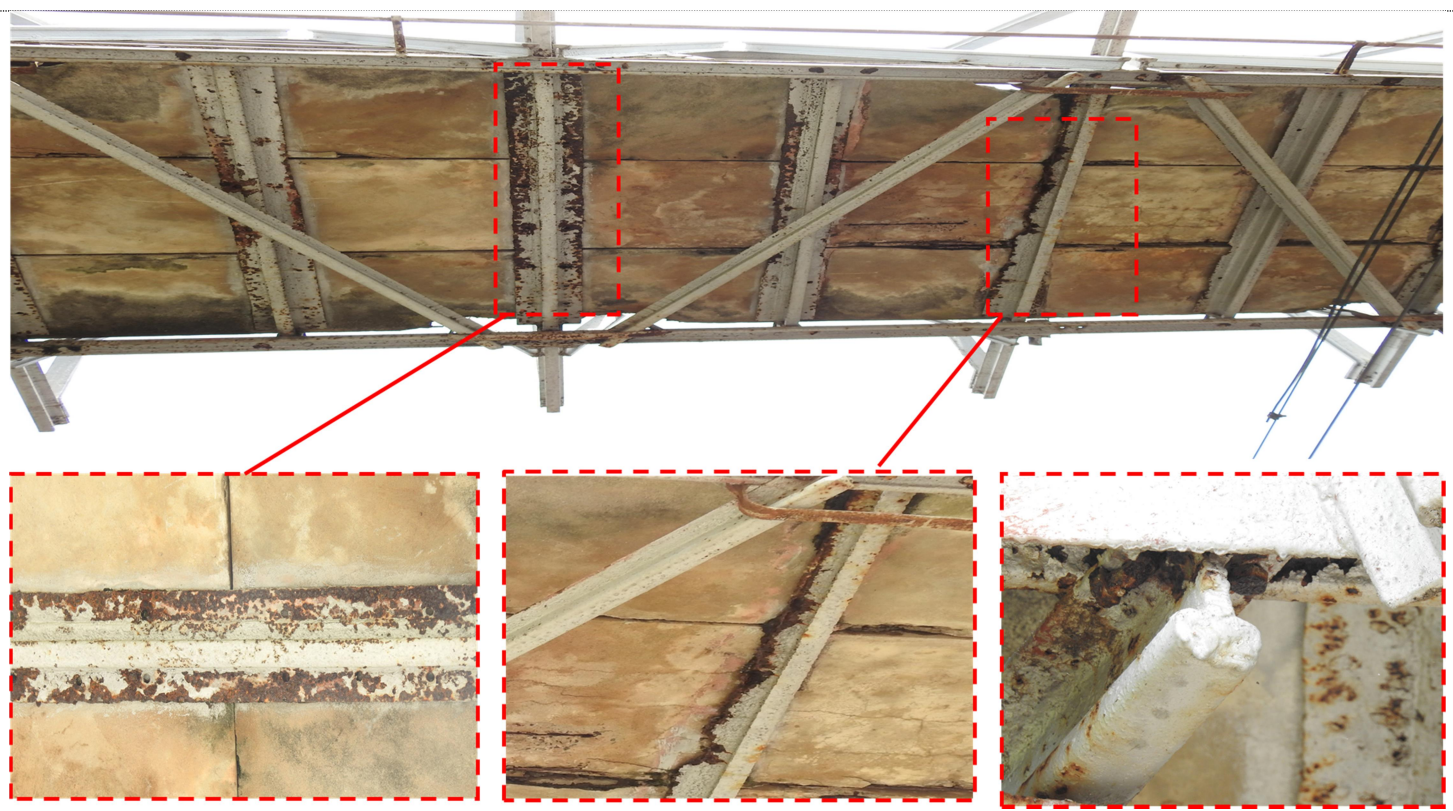


d) Reinforcement exposed slab panels on bottom of staircase-2



e) Severe Spalling, Reinforcement visible in staircase 2 (Mid landing)

4.2	✓ Corrosion and rusting of Floor beams and Bottom chord, bottom bracings & Stringer beam of FOB
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a) Corrosion of Floor beams is observed in 1st span



b) Corrosion of Floor beams is observed in 2nd span



c) Rusting and Corrosion of bottom chord





d) Corrosion of floor beam and Patch work observed at landing



e) Rusting and corrosion observed at Stringer beams

PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES		
Defects	Location	Remarks
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 (<i>Refer part4 - 4.1 a,b</i>)
	Water seepage		No water seepage is observed
	Spalling	Stair case	Spalling and reinforcement exposure is observed in some precast RCC panels of span1, 2 and landings of staircase. (<i>Refer Part 4 - 4.1</i>)
	Rust straining	Bottom main Chord members	Rusting is observed at all the joints of FOB (<i>Refer Part 4 - 4.2</i>)
	Extent Of Corrosion	In Floor beam	Corrosion of floor beams is observed in 1 st and 2 nd span of FOB. (<i>Refer Part 4 - 4.2</i>)
	Corrosion in Gusset plate	Bottom of the slab	Rusting is observed on Gusset plates (<i>Refer Fig 7</i>)
	Corrosion at steel-Concrete joint		Corrosion is observed at steel concrete joint. (<i>Refer Fig 7</i>)
	Condition of Painting of steel structure		Painting is affected at distressed places.

***Rust:** Rust is a part of corrosion and is a chemical process which results in the formation of red or orange coating on the surface of metals.

***Corrosion:** it is the process of deterioration of materials as a result of chemical, electrochemical or other reactions.



Fig 1: Cables, Electric post and protective screen



Fig 2: FOB Front view



Fig 3: Staircase-1 Trestles details



Fig 4: Staircase-2 Trestles details



Fig 5: Span 1 Side view and Bottom View



Fig 6: Span 2 Side view and Bottom View



Fig 7: Corrosion is also observed at steel concrete joint gusset plate



Fig 8: path way, Protective screen



Fig 9: Trestle and Stanchion



Fig 9: Staircase Mid-landing