

Name of the Project	:	VISUAL INSPECTION OF FOB/ PF-1 - PF-4 AT WARANGAL RAILWAY STATION
Location	:	WARANGAL RAILWAY STATION
Location Co-ordinates	:	17°58'23.3"N 79°36'18.1"E
Date of Inspection	:	25th SEPTEMBER, 2019



Summary:

- a) Spalling and reinforcement exposure is observed in pre-cast RCC panels.
- b) Spalling and Cracks are observed in staircase 1 and 2 steps from bottom.
- c) Landing RCC slab broken at corners to support elevator with exposed reinforcement left unattended.

Tests to be conducted:

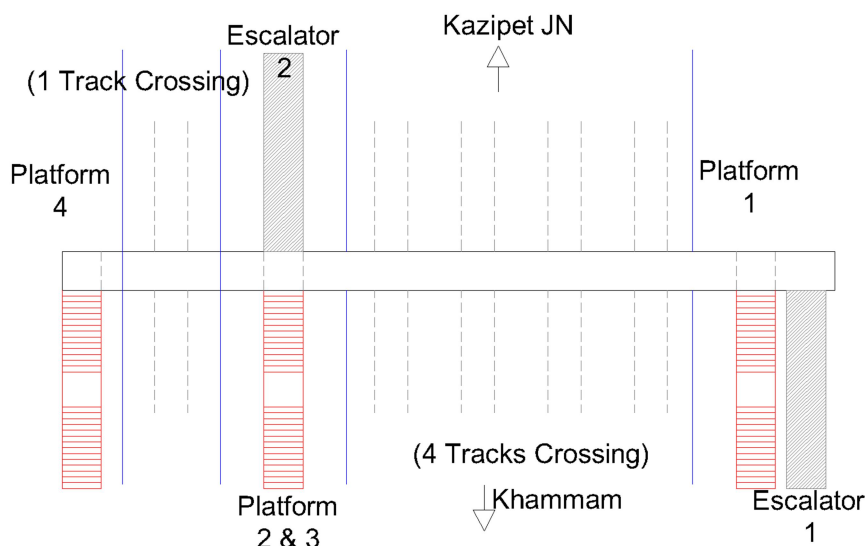
- a) Ultrasonic Thickness gauge to measures local thickness of a solid element.
- b) Elcometer (Coating thickness Gauge) to measures dry film thickness on steel surfaces.
- c) Ultrasonic Flaw detector to detect hidden cracks, voids, porosity, and other internal discontinuities in metals.
- d) Fillet 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)
- g) Vibration analysis.

FORMAT FOR VISUAL INSPECTION OF STEEL FOOT OVER BRIDGE

Name of the Project	Visual inspection of FOB/ PF-1 - PF-4 at Warangal railway station
Location	Warangal Railway Station
Date of Inspection	25-09-2019

PART 1 GENERAL INFORMATION AND OBSERVATION		
1.1	Name of the Bridge	FOB/ PF-1 - PF-4
1.2	Location Location co-ordinates	Warangal Railway Station 17°58'23.3"N 79°36'18.1"E
1.3	Type of truss Structure	N – Type Pratt truss
1.4	Year of Construction	Approx. 25+ years
1.5	Description of the main use of the bridge	Pedestrians Crossing
1.6	Major Materials used in different parts of bridge	Structural Steel (Truss, frame), Pre-cast RCC (Slab, Staircase)
1.7	Width of the Pathway (m)	2.10 m
1.8	Length of the Pathway (m)	47.60 m (overall length over 2 spans)
1.9	No of Railway Lines Crossings	Span 1 = 4 tracks crossing ; Span 2 = 1 tracks crossing
1.10	Span arrangement (no x Span in meters)	1 x 25.45 + 1 x 11 m
1.11	Vertical Clearance (from rail top to girder bottom)	6.0 m
1.12	Head Room	2.90 m (upto Roof truss bottom)
1.13	Damages due to accidental hitting, Grazing Marks	No Visible signs appear
1.14	History of Repair/ Maintenance	Yes observed at site
1.15	Original Structural Drawings	Not available

1.16 Key Plan



PART 2 IDENTIFICATION OF LOADS ON BRIDGE

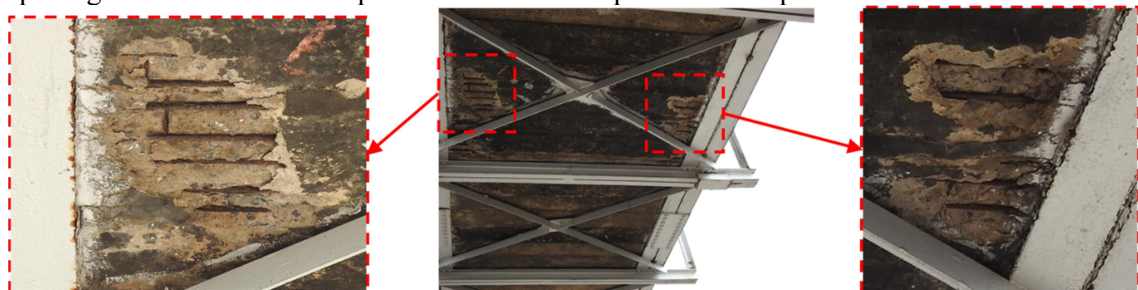
		Yes/ No	Notes
Dead Loads at Roof level			
2.1	a) Pipeline - Utilities	No	Not observed in site
	b) Cables	Yes	Set of Cables are running along the length of the FOB (Refer fig : 2)
	c) Roof Truss	Yes	65 x 65 x 8 mm Angles are used (Refer fig :2,3)
	d) Roof Sheet	Yes	Corrugated sheet is used for FOB Roof (Refer fig : 2)
	e) load of advertising hoarding	Yes	No Advertising boards are provided. Rail Wi-Fi units are supported on roof truss.(Refer fig :3)
	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 are provided
2.2	Dead Loads at Floor level		
	a) Additional wearing coat on Floor	No	Chequered tiles used for Flooring (Refer fig :3)
	b) Provision of protective screen for passengers	Yes	XPM mesh of 2 mm gauge and 2 mm Galvanized sheet is used above OHE Line on both side of Gangway is used for passengers Protection. (Refer fig : 3)
	c) Type of Material used for mesh	GI wire mesh	

PART 3 STRUCTURAL SYSTEM OF THE BRIDGE			
			Notes
3.1	Foundation details		Not Visible
3.2	Pedestals details		Foundation not visible
	Type of Material for Bottom Encasement	Concrete	Concrete encasement is used for protecting trestles from the corrosion on the platform (Refer fig : 6)
	Dimensions (L x W x D)	a : 570 x 360 x 150 mm	** 'a' dimensions of Concrete encasement are observed in site
3.3	Roof Truss		
	Element of roof truss section	King post truss	65 x 65 x 8 mm Angle sections are used for King post roof truss supported on 150 x 150 x 12 mm Top Chord Members using welded joints. (Refer fig :2)
	Size of roof truss	2.15m wide	
	Connection of Roof elements	Welded connection	
3.4	Steel Truss		
	Type /Shape of Truss Section	Pratt truss, N- type, Double Angle	Span 1: a) Main Chord members 2/150 x 150 x 12 mm Double Angle section. b) 100 x 100 x 12 mm angles are used as Vertical and inclined bracing Members c) 10 mm thick, gusset plate used for welded joint. (Refer fig :1(a))
	Height of Truss (H)	2.60 m	
	Boundary Condition	Rigid connection	Span 2: a) Main Chord members 2/65 x 65 x 8 mm Double Angle section. b) 65 x 65 x 8 mm angles are used as Vertical posts and bracing Members c) 10 mm thick, gusset plate used for welded joint. (Refer fig :1(b))
	Shape of Floor beam /Bracings	Double Channels angle section	Span 1: ISMC 150 Double channel Sections are used as Floor beams, supported with 2/65 x 65 x 8 mm bracings angle. Floor beams are connected to bottom chord Member using Bolts and Bracings are connected by welding. (Refer fig :1(a)) Span 2: 2/100 x 100 x 8 mm Angle Sections are used as Floor beams, 65 x 65 x 8 mm angle sections are used as bottom bracings. Floor beams are connected to bottom chord Member using Bolts and Bracing are connected by welding.
	No of Floor beams/bracings for span	9 no's	
	Arrangement of Bracings	Diagonal	
	Type of Beam-Column Joint (shape of gusset plate if any)	Cleat angles	
3.5	COLUMN		
	Shape of Column section	I – Section	FOB is Supported on 4 Vertical Column (built-up section ISMB 350 and 200 x 10 mm plates welded on both sides with 2/65 x 65 x 8 mm Angle Lacing members connected using Gusset
	Height of column from (pedestal top to bottom of slab panel)	5.250 m	
	No of Columns/ support	4 no's	

	Dimensions of Column	400 x 150 mm	plates and bolts. (Refer fig :6)
	BEAM-Column joint (bolted, welded, riveted)	Welded connection	
3.6	Floor of the Pathway		
	Material of Slab	Pre-cast slabs	Span 1: Pre-cast Reinforced Concrete Slab panels are used for floor slab of 100 mm thick, Pre-cast RCC slab panels are resting on bottom chord. Span 2: <ul style="list-style-type: none"> Pre-cast Reinforced Concrete Slab panels are used for floor slab of 100 mm thick, Pre-cast RCC slab panels are resting on Floor beams. Chequered tile (25 mm thick) flooring is laid on the top of the Pre-cast slab panels. (Refer fig :3) *Note: Span 2 floor level is 400 mm higher than the span 1.
	Thickness of Slab	100 mm	
	Condition of Slab from Bottom	Cracks observed	
	Condition of Slab from Top	Covered with Chequered tiles	
3.7	Staircase Details		
	Number of Staircase	3 No's	Staircase steps are observed as Pre-cast RCC slab panels of size 300 x 100 are used. Steps are supported on ISMC 250 Channel stringer beam using cleat Angles. Staircase Landing of 2 m wide is supported on Vertical and Horizontal 100 x 100 x 12 mm Angle Members. Cracks are observed in almost all the steps from bottom in three staircases.
	Number of Steps from PF – 1	36 no's (Staircase 1)	
	Number of Steps from PF – 2	36 no's (Staircase 2)	
		30 no's (Staircase 3)	
	Material used for steps	Pre-cast RCC Slab Panel	
3.8	Staircase Railing		
	Type of Parapet Railing	Steel Railing	Stair case is provided with Railing on both sides of one-meter height using Angle 65 x 65 x 8 mm and 4/50 x 12 mm flat plate sections.
	Height of Railing	1 m	

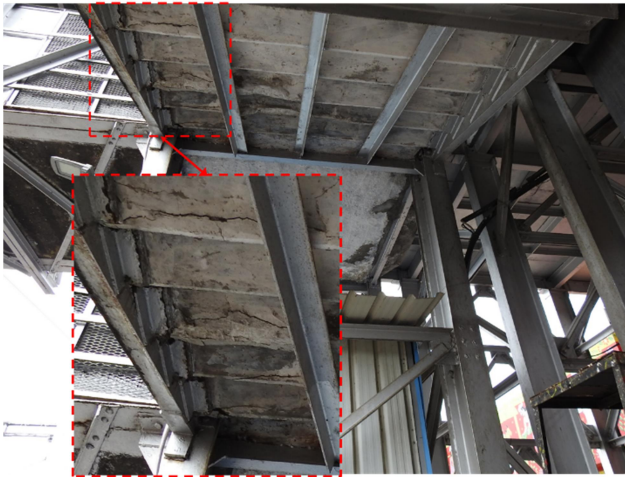
PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES

- ✓ Spalling and reinforcement exposure is observed in pre-cast RCC panels





- ✓ Spalling and Cracks are observed in staircase 1 and 2 steps from bottom



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 and spalling is observed in Staircase and floor slab Pre-cast RCC panels
	Water seepage		Vegetation is observed at stringer beam joint.
	Spalling		Spalling is observed in Slab 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 Gusset plates
	Corrosion at steel-Concrete joint		Major corrosion is observed at steel concrete joint along length of FOB

Condition of Painting of steel structure		Painting is affected at distressed places.
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Fig 1(a): Span 1 Front view of FOB towards Khammam



Fig 1(b): Span 2 Front view of FOB towards Khammam



Fig 2: Set of cables running along the length of FOB



Fig 3: Rail Wi-Fi units are supported on roof truss



Fig 4: Cleat angle below staircase steps are corroded



Fig 5: RCC slab broken to support elevator: reinforcement left exposed



Fig 6: Concrete Encasement for vertical trestles on platform 2 are damaged