

Name of the Project	:	VISUAL INSPECTION OF FOB/ PF-1 – CIRCULATING AREA AT MANCHIRYAL RAILWAY STATION
Location	:	MANCHIRYAL RAILWAY STATION
Location Co-ordinates	:	18°52'46.3"N 79°26'57.7"E
Date of Inspection	:	24th September 2019



Summary:

- a) Exposed reinforcement is observed on Pre-cast RCC slab panels of staircase at bottom which is connecting Circulating area to PF-1.
- b) Leaching effect and Cracks are observed on Pre-cast slab panels on 1st span of FOB (PF-1 – PF-2).
- c) Corrosion is observed at gusset plate joints and bottom main chord double angle section of 2nd span of FOB and vegetation is also observed.
- d) Corrosion of Floor beam is observed in 2nd span and Slight rusting of bottom main chord angle section
- e) Corrosion is also observed at steel concrete joint.

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 measure 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

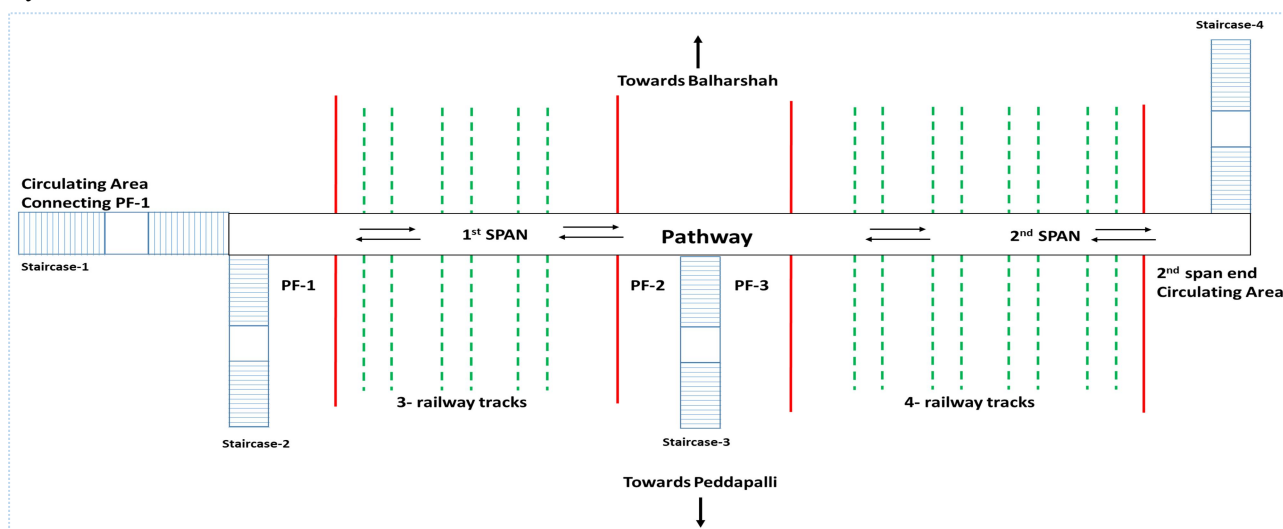
FORMAT FOR VISUAL INSPECTION OF STEEL FOOT OVER BRIDGE

Name of the Project	Visual inspection of FOB/ PF-1 - PF-4 at Manchiryal Railway Station
Location	Manchiryal Railway Station
Date of Inspection	24 th September 2019

PART 1 GENERAL INFORMATION AND OBSERVATION

1.1	Name of the Bridge	FOB/ PF-1 – circulating area
1.2	Location Location co-ordinates	Manchiryal Railway Station 18°52'46.3"N 79°26'57.7"E
1.3	Type of truss Structure	N-type 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. Structural Steel (Frame, truss) b. Pre-cast RCC Slab panels (Floor slab, staircase steps)
1.7	Width of the Pathway (m)	2.4 m
1.8	Length of the Pathway (m)	a) Span 1 = 26.2 m b) Span 2 = 28.2 m
1.9	No of Railway Lines Crossings	7 tracks Span 1 = 3 tracks Span 2 = 4 tracks (yard)
1.10	Span arrangement (no x Span in meters)	1x21.06 m + 1x25.6 m
1.11	Vertical Clearance (from rail top to girder bottom)	6.132 m
1.12	Head Room	2.5 m
1.13	Damages due to accidental hitting, Grazing Marks	No Visible signs appear
1.14	History of Repair (if any...)	Yes (Patch work are 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	No pipe lines are observed
	b) Cables	Yes	a. Cables run in 1-inch pipe and 1-inch CPVC pipe. b. King post truss of 65 x 65 x 6 mm angles c. Metal sheet is used for roof d. Advertising boards are provided. (Refer fig :1)
	c) Roof Truss	Yes	
	d) Roof Sheet	Yes	
	e) load of advertising hoarding	Yes	
	f) load of train/coach display boards	No	No train display boards are provided
	g) Additional load of overhead electrical equipment (OHE), Signal	No	No Additional load of overhead electrical equipment (OHE), Signal
2.2	Dead Loads at Floor level		
	a) Additional wearing coat on Floor	No	Chequered tiles are used for flooring (Refer fig :1)
	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 :1)
	c) Type of Material used for mesh	Galvanized wire mesh	

PART 3 STRUCTURAL SYSTEM OF THE BRIDGE			
			Photo ID
3.1	Foundation details		Not visible at site
3.2	Pedestals		
	Column – Trestles Connection Details		a. Concrete encasement is observed at bottom of vertical supports. b. Elevator Roof truss is supported on trestles on PF-1 and PF-2. (Refer fig :2 and 3)
	No of Bolts and size	Not visible, filled with concrete	
	Thickness of Base Plate	Not visible, filled with concrete	
3.3	Roof Truss		
	Element of roof truss section	Angle sections	1 st span and 2 nd span roof truss is made with 65 x 65 x 6 mm angle section and supported on 150 x 150 x 12 mm Double angle Top chord of truss (Refer fig :1)
	Size of roof truss	2.5 X 0.8 m	
	Connection of Roof elements	Bolted	
3.4	Steel Truss		
	Type/Shape of Girder Section	Double angle sections	a. Main top and bottom Chord members are 150x150x12 mm Double angle section. b. 100 x 100 x 12 mm angles used as vertical and diagonal bracing members. c. 10 mm thick gusset plate is used for welded joint. d. For 1 st span ISMC 150 Double Channel are used as Floor beams supported by 100 x
	Height of Girder/ Truss (H)	2.55 m	
	Truss Support Condition	Ridged connection	
	Type/Shape of floor beams /Bracings	Double Channel sections, Double angle section	

	No of Floor beams/bracings for span	1 st span :9 no's 2 nd span: 17 no's	100x 10 mm angle section bottom chord. e. For 2 nd span 100x100x12 mm Double angle section are used for floor beams supported by 100x 100 x10 mm angle section bottom chord member connected by bolts (Refer fig :4)
	Arrangement of Bracings	Diagonal	
	Type of Beam-Column Joint (shape of gusset plate if any)	Cleat angles	
3.5	COLUMN		
	Type/Shape of Column section	I – Section	
	No of Columns per support	4	a. FOB is supported on vertical column of Four - ISMB 300 with bracings of 90 x 90 x 10 mm double angle section
	Dimensions of Column	300x150 mm	b. Staircase landing is supported star angle of 100 x 100 x 12 mm. at PF-1 and PF-2.
	BEAM-Column joint (bolted, welded, riveted)	Bolted	c. Staircase landing is supported ISMB 300 at 2 nd span circulating area. (Refer fig :2)
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 125 mm thick. RCC slab panels are resting on Bottom chord double angle sections in 1 st span and on floor beams in 2 nd span.
	Thickness of Slab	125 mm	b. Chequered tile flooring is laid on the top of the slab panels (Refer fig : 1 and 5)
	Condition of Slab from Bottom	Leaching effect near 1 st span and for 2 nd span	
	Condition of Slab from Top	RCC slab is not visible, Covered with Chequered tiles	
3.7	Staircase Details		
	Number of staircases	4 No's	a. Staircase steps are observed as cast in situ RCC slab on PF 1 & 2. Steps are supported on ISMC 250 channel Stringer beam using cleat angles at circulating area. Staircase landing of 2.3 m wide is supported on ISMB 150.
	Number of steps from Circulating area to PF-1	39 no's	
	Number of steps from PF – 1	38 no's	
	Number of steps from PF – 2	36 no's	
	Number of steps at 2 nd span Circulating area	34 no's	b. Staircase steps observed as cast in situ slab on sacrificial plate supported on ISMC 250 stringer beam and slab panels for staircase landing is supported on ISMB 150 at PF-1, PF-2 and 2 nd span circulating area.
	Material used for steps	RCC slab panel, cast in situ slab	
3.8	Staircase Railing		
	Type of Parapet Railing	Steel railing	a. Staircase is provided with railing on both sides of one-meter height using 65 x 65 x 6 mm double angle section and 50 x 6 mm M.S flats are used.
	Height of Railing	1 m	b. Staircase roof is supported on 75 x75 x6 mm double angle section which is supported on ISMC 250.

PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES

4.1

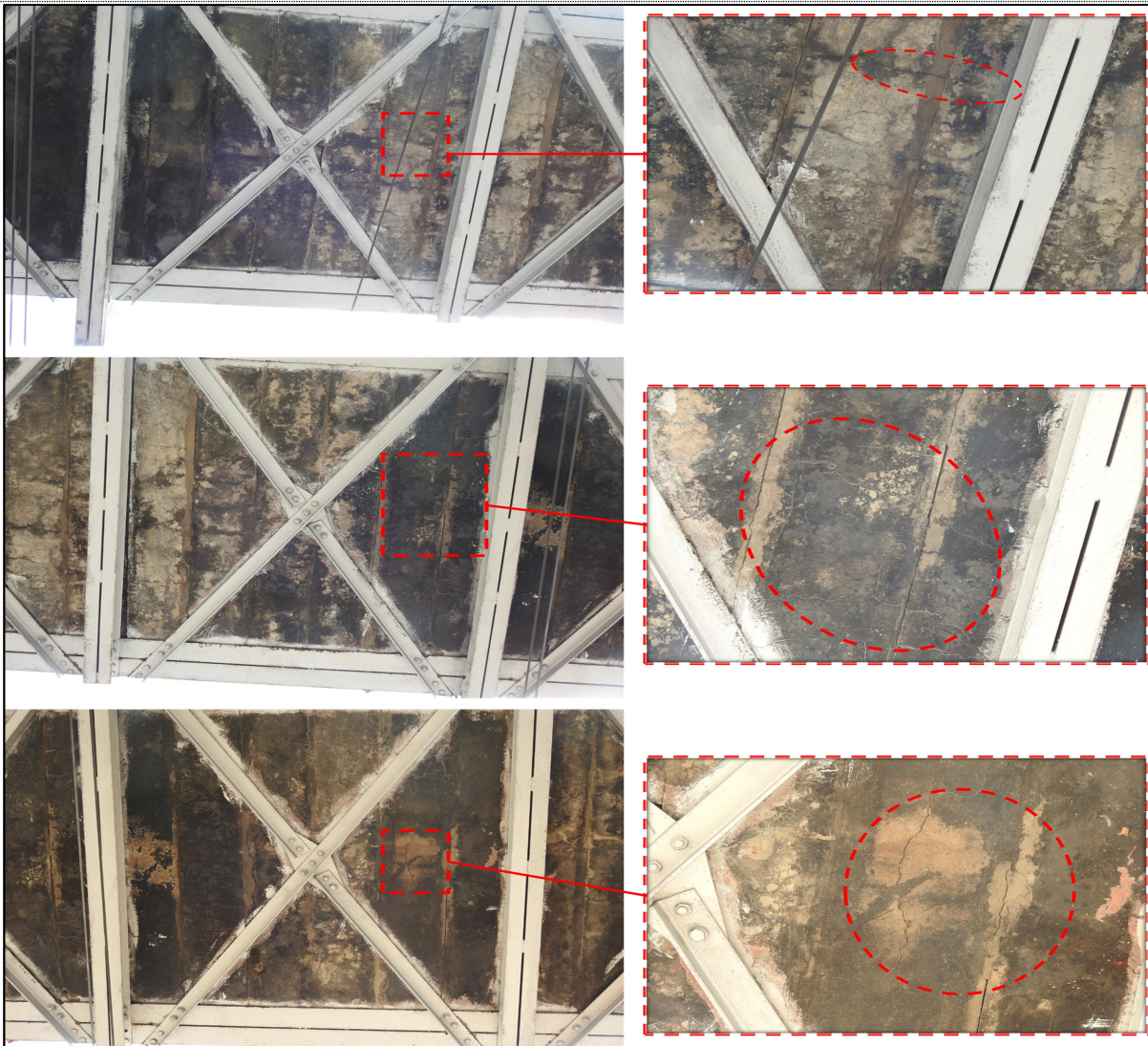
- ✓ Exposed reinforcement is observed on Pre-cast RCC slab panels of staircase at bottom at Circulating area.



Reinforcement exposed slab panels

4.2

- ✓ Leaching effect and Cracks are observed on Pre-cast slab panels on 1st span of FOB (PF-1 – PF-2).



Leaching and Cracks in Pre-cast panels of 1st span

- 4.3 ✓ Corrosion is observed at gusset plate joints and bottom chord double angle section of 2nd span of FOB and vegetation is also observed.



(a) Corrosion in gusset plate joints and bottom chord double angle section



(b) Vegetation

4.4

✓ Corrosion of Floor beam is observed in 2nd span and Slight rusting of bottom chord angle section



Corrosion of Floor beam and rusting of bottom chord members

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 (Refer <i>Part 4 - 4.2</i>)
	Water seepage		No water seepage is observed
	Spalling	Stair case	Spalling and reinforcement exposure is observed in some precast RCC panels connecting circulating area to PF-1 staircase. (Refer <i>Part 4 - 4.1</i>)
	Rust straining	Bottom main Chord members	Rusting is observed at all the joints of FOB (Refer <i>Part 4 - 4.3 and 4.4</i>)
	Extent Of Corrosion	In Floor beam	Corrosion of floor beam is observed in 2 nd span of FOB. (Refer <i>Part 4 - 4.4</i>)
	Corrosion in Gusset plate	Bottom of the slab	Rusting is observed on Gusset plates (Refer <i>Part 4 - 4.3</i>)
	Corrosion at steel-Concrete joint		Corrosion is observed at steel concrete joint. (Refer <i>fig : 6</i>)
	Condition of Painting of steel structure		Painting is affected only 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.

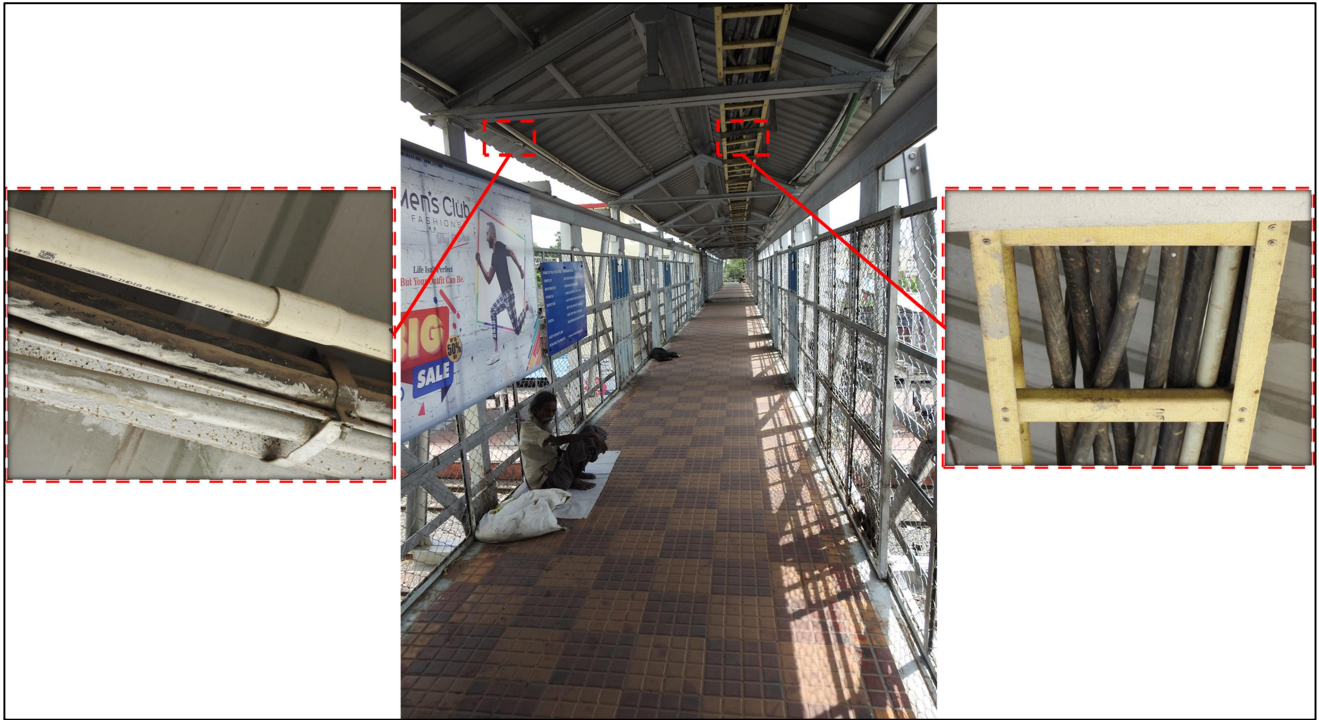


Fig 1: Cables, Roof truss, load of advertising hoarding, Flooring and protective screen



(a) Plat form -1

(b) Platform-1 staircase landing

(c) Circulating area



(d) Plat form -2

(e) Platform-2 staircase landing

(f) 2nd span Circulating area

Fig 2: Trestles details



Fig 3: Elevator Roof truss supported on trestles on PF-1 and PF-2 & RCC slab resting on trestles



Fig 4: Chord members, Floor beams, vertical and diagonal bracings for 1st span and 2nd span



Fig 5: Bottom view of 1st and 2nd span of FOB



Fig 6: Corrosion is also observed at steel concrete joint