| | | |
|---|---|---|
| **Name of the Project** | : | VISUAL INSPECTION OF FOB AT ANAKAPALLE RAILWAY STATION |
| **Location** | : | ANAKAPALLE RAILWAY STATION |
| **Location Co-ordinates** | : | **17°41'43.8"N 83°00'39.4"E** |
| **Date of Inspection** | : | 7th NOVEMBER, 2019 |

**Summary:**

**a)** Cracks and Spalling observed at RCC slab panels of Span-1, 2, 3&7.
**b)** Deflection observed in Girder (ISMB-400) of Span-5.
**c)** Corrosion is observed in Bottom Chords of Spans 1, 2, 3, 4, 5, 6 & 7.
**d)** Cracks are observed at RCC Slab Panels of Both Ramps.
**e)** Corrosion is observed in Gusset Plates of Span-2
**f)** Corrosion is observed in Girders & Floor Beams of Span-2.
**g)** Spalling & Reinforcement exposure observed in Ramp slabs.

**Tests to be conducted:**

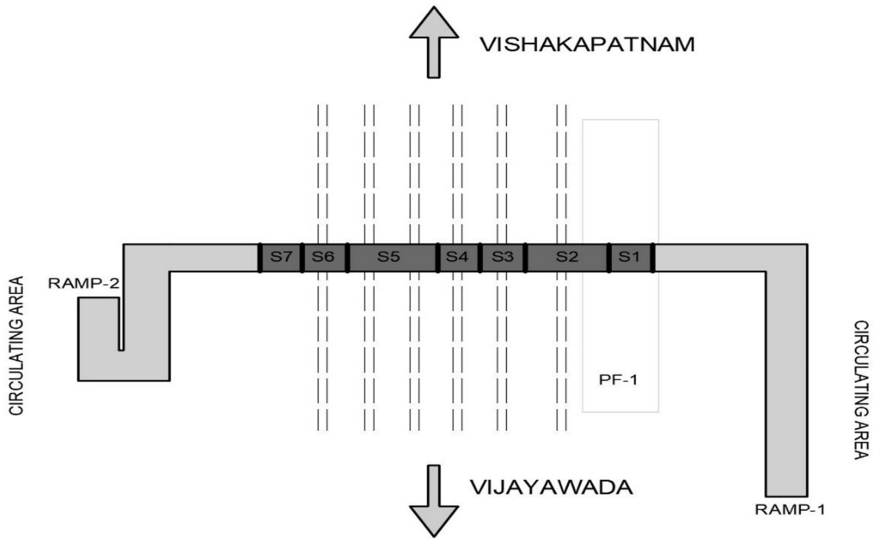
**a)** Ultrasonic Thickness gauge to measures local thickness of a solid element.
**b)** Elcometer (Coating thickness Gauge) to measures dry film thickness on steel surfaces.
**c)** Ultrasonic Flaw detector to detect hidden cracks, voids, porosity, and other internal discontinuities in metals.
**d)** 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 at Anakapalle railway station |
| Location | Anakapalle Railway Station |
| Date of Inspection | 07-11-2019 |

| PART 1 GENERAL INFORMATION AND OBSERVATION | | | |
|---|---|---|---|
| 1.1 | Name of the Bridge | FOB/ CIRCULATING AREA TO CIRCULATING AREA | |
| 1.2 | Location<br>Location co-ordinates | Anakapalle Railway Station<br>17°41'43.8"N 83°00'39.4"E | |
| 1.3 | Type of truss Structure | Vierendeel truss (fabricated with NG Rail) without diagonals | |
| 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. NG Rail<br>b. Pre-cast RCC Slab panels (Floor slab, Staircase)<br>c. RCC for Cast In-situ Slab | |
| 1.7 | Width of the Pathway (m) | 2.5 m | |
| 1.8 | Length of the Pathway (m) | 46 m | |
| 1.9 | No of Railway Lines Crossings | **6 tracks**<br>Span 1 = No tracks<br>Span 2 = 1<br>Span 3 = 1 | Span 4 = 1<br>Span 5 = 2<br>Span 6 = 1<br>Span 7 = No tracks |
| 1.10 | Span arrangement (no x Span in meters) | 1 x 4.8 m + 1 x 9.3 m + 1 x 4.6 m + 1 x 5 m + 1 x 10.2 m + 1 x 5 m + 1 x 4.6 m | |
| 1.11 | Vertical Clearance (from rail top to girder bottom) | 5.941 m | |
| 1.12 | Head Room | No Roof Truss | |
| 1.13 | Damages due to accidental hitting, Grazing Marks | No Visible signs appear | |
| 1.14 | History of Repair/ Maintenance | Replacement of RCC Slab Panels in the spans 4,5&6 with RCC Slab & New Painting Observed | |
| 1.15 | Original Structural Drawings | Not available | |

1.16 Key Plan



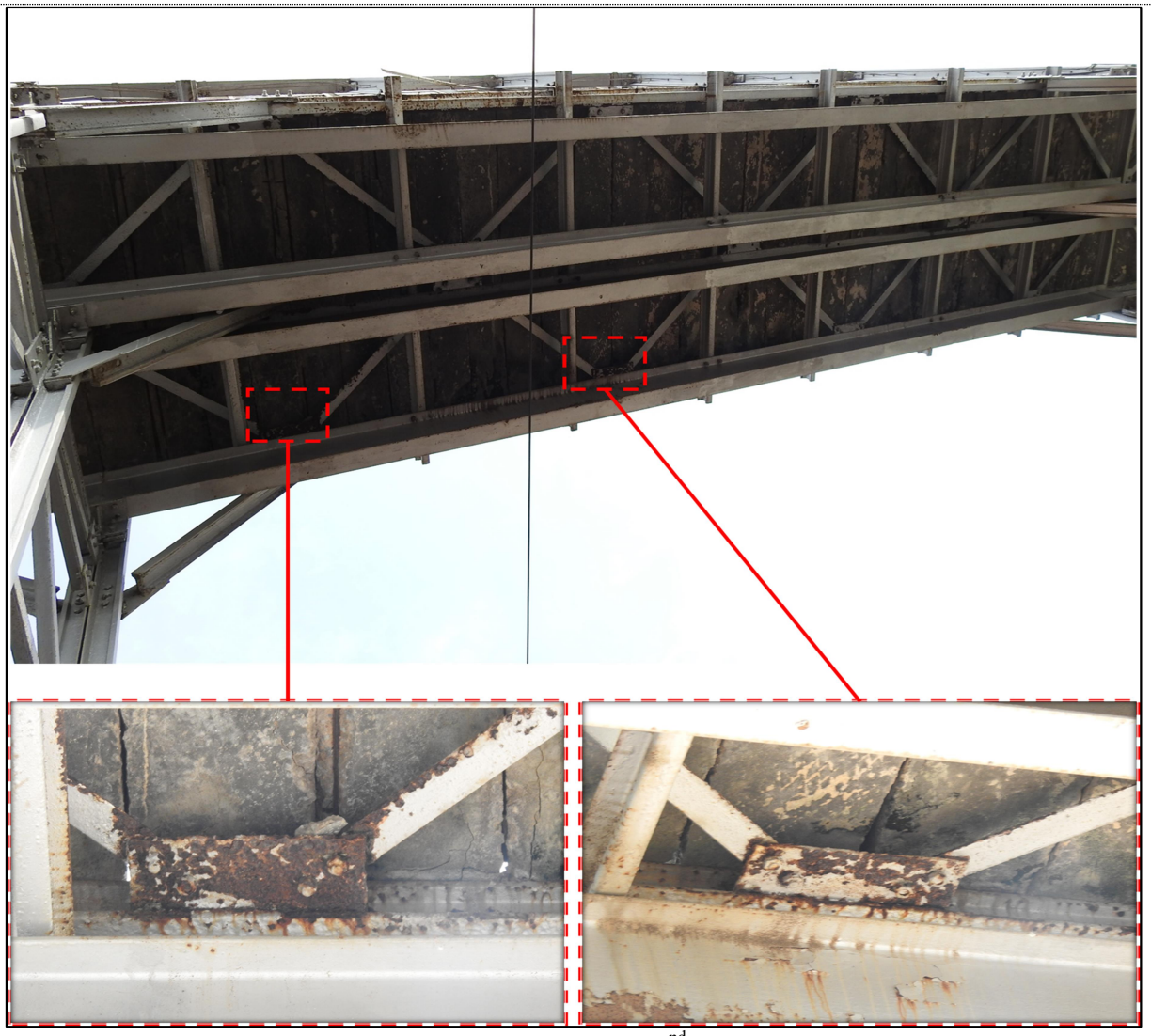

| PART 2 IDENTIFICATION OF LOADS ON BRIDGE | | | |
|---|---|---|---|
| | | **Yes/No** | **Notes** |
| | **Dead Loads at Roof level** | | |
| 2.1 | a) Pipeline - Utilities | No | |
| | b) Cables | Yes | a. Cables are protected with 1.5-inch HDPE pipe. (Refer ***fig :2***)<br>b. GI Pipes of Dia-60mm is observed<br>c. No Roof Truss is provided. |
| | c) Roof Truss | No | |
| | d) Roof Sheet | No | |
| | e) load of advertising hoarding | No | |
| | 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 | No wearing coat observed (Refer ***fig :2***) |
| | 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 ***fig :2***) |
| | 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 | Not visible at site | |
| | No. of Bolts and size | Not visible at site | |
| | Thickness of Base Plate | Not visible at site | |
| 3.3 | **Roof Truss** | | |
| | Element of roof truss section | | No Roof truss |

| | | | |
|---|---|---|---|
| | Size of roof truss | | |
| | Connection of Roof elements | | |
| | | | |
| 3.4 | **Steel Truss** | | |
| | Type /Shape of Truss Section | Rail sections | a) Top Chord members are 60 x 120 x 120 (Head x Height x Base) Rail sections (Refer ***fig :4*** )<br>b) There are 3 nos. of Bottom Chords Bottom Chord members are back to back connected 60 x 120 x 120 (Head x Height x Base) Rail sections (Refer ***fig :4***)<br>c) Addition 4 nos. of ISMB 400 Members are used as longitudinal girders in the spans 2&5.<br>d) 60 x 120 x 120 (Head x Height x Base) Rail sections are used as vertical members.<br>e) 45 x 90 x 90 (Head x Height x Base) Rail sections are used as Floor beams.<br>f) 45 x 90 x 90 (Head x Height x Base) Rail sections are used as Bracings. |
| | Height of Girder/Truss (H) | 1.10 m | |
| | Truss Support Condition | Rigid Connection | |
| | Type/Shape of Floor beam /Bracings | Rail Section | |
| | No of Floor beams/bracings | Span 1 = 4 No's<br>Span 2 = 3 No's<br>Span 3 = 7 No's<br>Span 4 = 5 No's<br>Span 5 = 5 No's<br>Span 6 = 5 No's<br>Span 7 = 5 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 | Built up Section with Bull headed Rail | a. Stanchion Columns are 60 x 120 x 120 (Head x Height x Base) Rail sections.<br>b. Cross Bracings in Stanchions are 75 x 75 x 8 mm Angles are used. (Refer ***fig :3***) |
| | No of Columns/ support | 3 | |
| | Dimensions of Column | | |
| | BEAM-Column joint (bolted, welded, riveted) | Bolted | |
| | | | |
| 3.6 | **Floor of the Pathway** | | |
| | Material of Slab | Pre-cast slab panels for Spans 1,2,3 &7 Cast In-situ for Spans 4,5&6 | **Span 1,2,3&7**<br>a. Pre-cast Reinforced concrete slab panels are used for floor slab of 100 mm thick.<br>**Span 4,5&6**<br>a. Cast In-situ concrete slab is used for floor slab of 100 mm thick RCC slab. |
| | Thickness of Slab | 100 mm | |
| | Condition of Slab from Bottom | Spalling is observed | |
| | Condition of Slab from Top | Spalling is observed | |
| 3.7 | **Ramp Details** | | |
| | Number of Ramps | 2 No's | Ramp is observed as Pre cast RCC Slab panels supported on 55 x 110 x 110 (Head x Height x Base) Bottom chords on both sides and middle of the ramp. (Refer ***fig :5***) |
| | Number of Steps from Circulating Area – 1 | - | |
| | Number of Steps from Circulating Area – 2 | - | |
| | Material used for Ramp | Pre-cast RCC Slab Panel | |

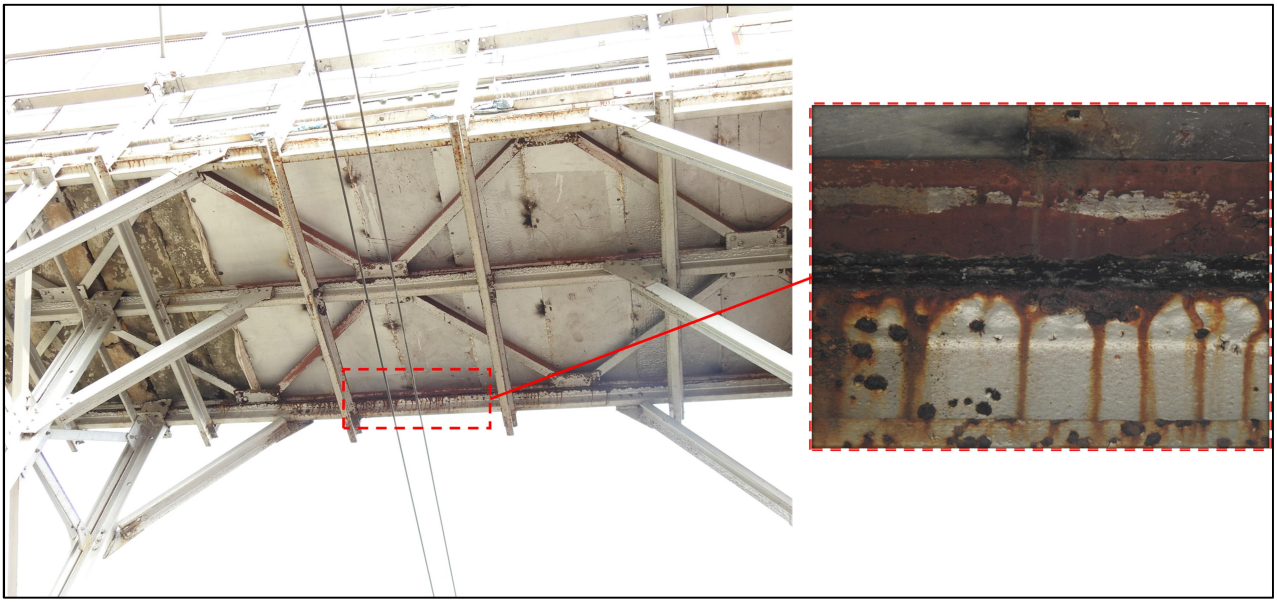
| | | | |
|---|---|---|---|
| 3.8 | **Ramp Railing** | | |
| | Type of Parapet Railing | Steel Railing | Ramps are provided with railing on both sides using 60 x 120 x 120 (Head x Height x Base) Angle sections and 65 x 65 x 8 mm Angles are used. (Refer ***fig :6***) |
| | Height of Railing | 1.1 m | |
| | | | |

| PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES | |
|---|---|
| 4.1 | ✓ Exposed reinforcement is observed in span 1, 2, 3 and 7$^{th}$ span and spalling is observed in ramp. |
| 4.2 | ✓ Corrosion of gusset plate, bottom chord and Landing beam of Ramp |



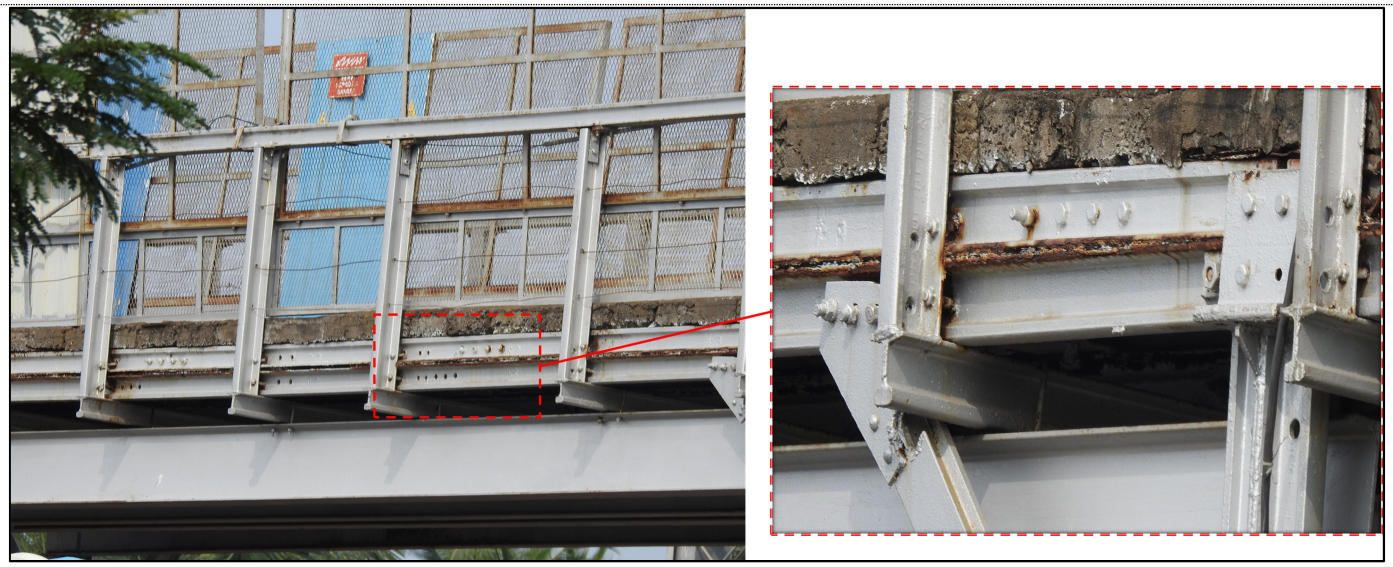
a) Corrosion of Gusset plate in 2nd Span of FOB

b) Corrosion of Gusset plate and bottom chord member in 3rd span of FOB



c) Corrosion of bottom chord member in 5th span of FOB

d) Corrosion of gusset plate connecting bottom bracings in 4th span of FOB



e) Corrosion observed in bottom rail

f) Corrosion observed in bottom rail

g) Corrosion of ramp landing beam

| 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 Ramps & Main Slab. *(Refer: **Part 4.1, Fig- b***). |
| | Water seepage | | No Seepage observed in the slab |
| | Spalling | Slab panels in ramp | Spalling is observed in ramp slab *(Refer: **Part 4.1, Fig- b***). |
| | Rust straining | Bottom chord | Slight rusting is observed at all the joints of FOB at floor level *(Refer: **Part 4.2, Fig- c***). |
| | Corrosion in Gusset plate | Span-2$^{nd}$ ,4$^{th}$ and 5$^{th}$ | Corrosion is observed in gusset plate connecting bottom bracings *(Refer: **Part 4.2, Fig- a, b and d***). |
| | Corrosion at steel-Concrete joint | | No corrosion is observed at steel concrete joints along length of FOB |

***Fig 1***: View of FOB and Ramps on both sides

***Fig 2***: FOB pathway, protective screen and cables on floor of pathway

***Fig 3***: Stanchion column details

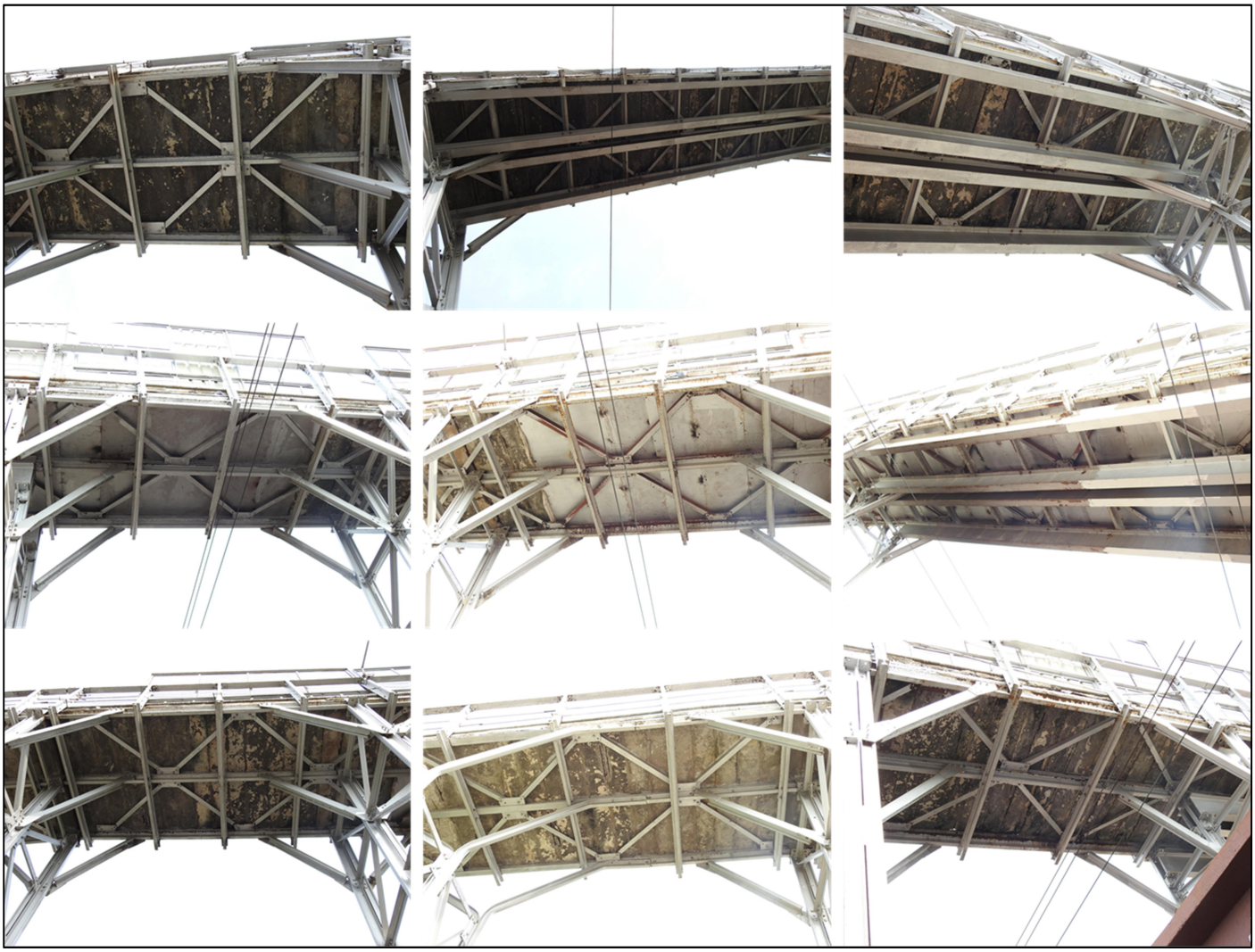


***Fig 4***: Bottom view of FOB

***Fig 5***: Ramp details both ends of FOB

***Fig 6***: Damaged ramp railing

***Fig 7***: Inspection Team at Annakapalle FOB