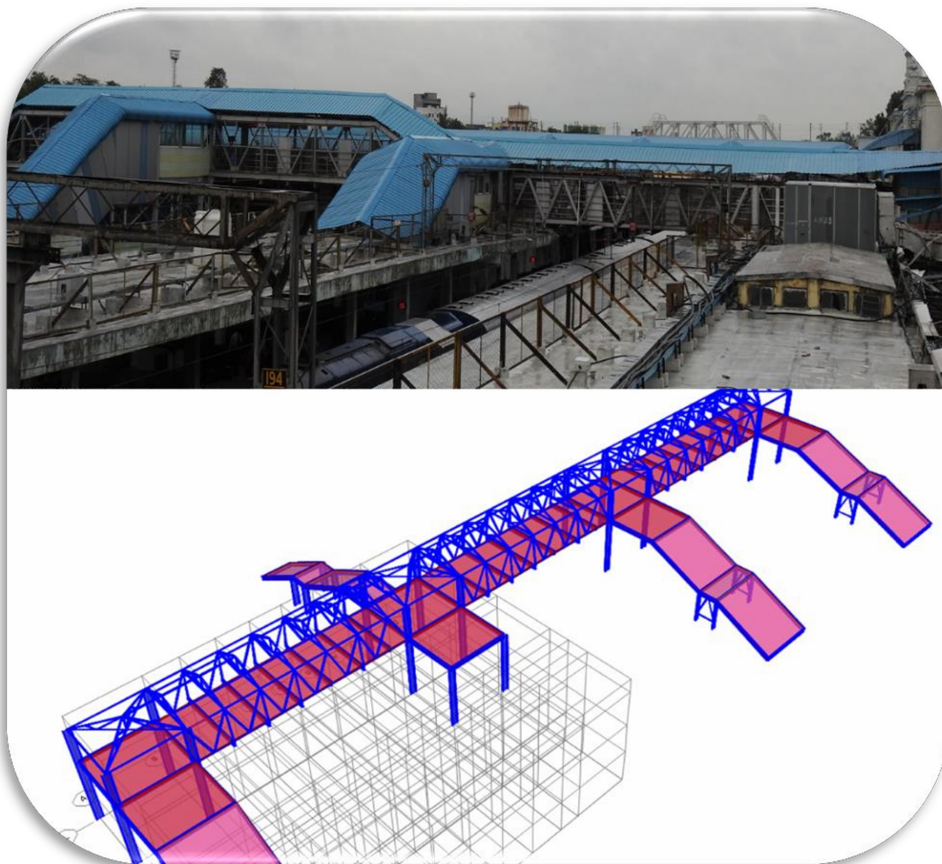


Name of the Project	:	VISUAL INSPECTION OF FOB/ PF-1 - PF-6 AT SECUNDERABAD RAILWAY STATION
Location	:	SECUNDERABAD STATION 17°26'00.3"N 78°30'08.5"E
Date of Inspection	:	2nd, 3rd AUGUST 2019



Summary:

- a) Major Corrosion is observed at steel concrete joint (bottom of slab)
- b) Spalling is observed with exposed reinforcement.

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) Sensor tests

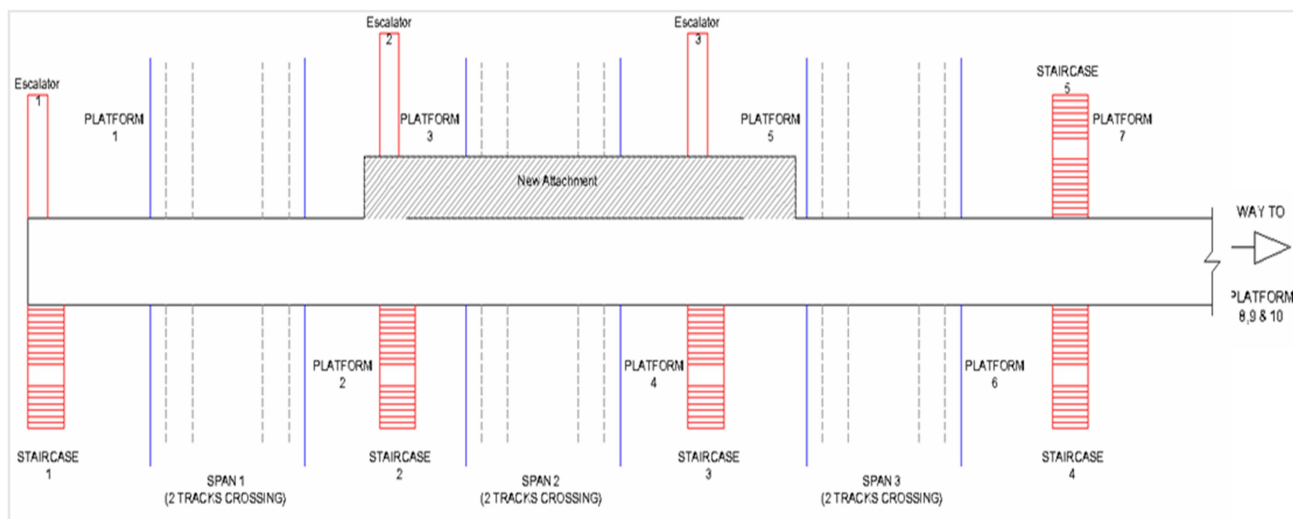
VISUAL INSPECTION OF STEEL FOOT OVER BRIDGE

Name of the Project	Visual inspection of FOB/ PF-1 - PF-6 at Secunderabad railway station
Location	Secunderabad Railway Station
Date of Inspection	02-08-2019

PART 1 GENERAL INFORMATION AND OBSERVATION

1.1	Name of the Bridge	FOB/ PF-1 - PF-6
1.2	Location of Bridge Location co-ordinates	Secunderabad Railway Station 17°26'00.3"N 78°30'08.5"E
1.3	Type of truss Structure	Pin connected triangulated truss
1.4	Year of Construction	Approx. 80+ years back
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)	4.2 m
1.8	Length of the Pathway (m)	57.65 m 1 st span: 23.17 m 2 nd span: 17.4 m 3 rd span: 17.07 m
1.9	No of Railway Lines Crossings	6 Tracks
1.10	Span arrangement (no x Span in meters)	1 x 7.87+15.3 m + 1 x 17.4 m +1 x 17.07 m
1.11	Vertical Clearance (from rail top to floor slab bottom)	4.7 m (As per type drawing from PF level to slab bottom)
1.12	Head Room	2.55 m
1.13	Damages due to accidental hitting, Grazing Marks	No
1.14	History of Repair (if any...)	Yes
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 observed at site
	b) Cables	Yes	Cables are protected with 1-inch dia HDPE pipe (Refer <i>fig :1</i>)
	c) Roof Truss	Yes	
	d) Roof Sheet	Yes	Steel Metal Sheet is used for Roof (Refer <i>fig :1</i>)
	e) load of advertising hoarding	Yes	Advertising boards are provided (Refer <i>fig :2</i>)
	f) load of train/coach display boards	Yes	Train coach display boards are provided (Refer <i>fig :2</i>)
	g) Additional load of overhead electrical equipment (OHE), Signal	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
	b) Provision of protective screen for passengers	Yes	Chain link 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 Protection. Mesh frame is supported with angular and MS flats. (Refer <i>fig :3</i>)
	c) Type of Material used for mesh	Galvanized wire mesh	

PART 3 STRUCTURAL SYSTEM OF THE BRIDGE			
			Notes
3.1	Foundation	Concrete	Not visible at site
3.2	Trestles details		Concrete encasement is merged in walls and covered with platform flooring.
	Details of Pedestal		
	a) No of Bolts and size	Not visible during visual inspection	
	b) Thickness of Base Plate	Not visible during visual inspection	
3.3	Roof Truss		
	Element of roof truss section	King post angular section	King post angular truss with 65x65x8 mm section is used. Supported on Main tie members using welded joints (Refer <i>fig:1</i>).
	Size of roof truss	4.6 m X 0.8 m	
	Connection of Roof elements	Using Gusset plate and Bolts	
3.4	Steel Truss		
	Type/Shape of Girder Section	M.S Flats	a. Main tie members are M.S Flats 6/150x10 mm and at the joints M.S Flats 4/150x 10 mm. b. T- section 2/110x70x10 mm with M.S Flats 1/165x 14 at mid span of FOB. M.S Flat 2/165x18 mm are used at joints at end Support of FOB. Angles 2/190x75x10.
	Height of Girder/ Truss (H)	2.7 m	
	Girder/Truss Support Condition	Simply supported on Roller bearings	

			c. 10 mm thick gusset plate is used for welded joint (Refer fig:4 and 8)
	Type/Shape of Secondary Girder /Bracings	I-Section	ISMB 250x125 are used as secondary girders to transfer load from slab to truss. Secondary girders are connected with tie member using pin joints and bracing are connected to Secondary girder to transfer load to main tie members using bolted joint (Refer fig :5)
	No of Secondary Girders/bracings for span	9 no's	
	Type of Beam-Column Joint (shape of gusset plate if any)	Cleat angles	
3.5	COLUMN		
	Type/Shape of Column section	FOB is supported on I – Sections	FOB is supported on vertical column of Four - ISMB 300
	No of Columns/support	4 no's	
	Dimensions of Column	300x125 mm	
	BEAM-Column joint (bolted, welded, riveted)	Bolted	
3.6	FLOOR SLAB OF THE PATHWAY		
	Material of Slab	RCC	a. Chequered tiles of 25 mm thick are observed on FOB. b. RCC slab casted in site is supported by secondary girders of ISMB 250 (Refer fig :6)
	Thickness of Slab	125 mm	
	Condition of Slab from Bottom	Protected with plastering	
	Condition of Slab from Top	Covered with Chequered tiles	
	Condition of sheeting – MS sheet at bottom	Not provided	
3.7	Staircase Details		
	Number of staircases	4 No's	Staircase steps are observed as Precast RCC slab panels of size 300 x 100 mm used. Steps are supported on masonry to a certain height. Staircase landing of 4.2 m.
	Number of steps from PF – 2	37 no's	
	Number of steps from PF – 5	37 no's	
	Material used for steps	Pre cast slab panels	
3.8	Staircase Railing		
	Type of Parapet Railing	Masonry and steel	Staircase is provided with railing on both sides of one-meter height using masonry for two staircase and 75x75x8 angular and hollow pipe is used for other sections are used. PF 1 and PF 2-3 are supported with masonry structure and PF 4-5 and PF6-7 are supported with steel railing
	Height of Railing	1 m	

PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES

4.1

- ✓ Corrosion is observed in truss joints at bottom T sections -M.S flats steel – concrete joint on both sides of FOB



Corrosion is observed in Tie plates

4.2

- ✓ Condition of slab from bottom and corrosion of M.S flats (Refer **fig:6**)

PART 4 SURVEY OF SIGNS OF DISTRESS, DEFORMATION IN BRIDGES

Defects	Location	
Cracking in steel members		No cracks are observed in Steel during visual inspection
Cracking in RCC components	Deck slab	No cracks are observed, covered with plastering
Water seepage		No water seepage is observed
Spalling		Spalling is observed in some portion of slab at end near support (Refer fig:6)
Rust straining	Beam – Column Joints	Slight rusting is observed at all the joints of truss at floor level
Extent of Corrosion	In Tie member	Distressing is observed in bottom Tie members along steel concrete joints (Refer para:4.1)
Corrosion in Gusset plate		No Rusting is observed in Gusset plates
Corrosion in welded structures	Truss	Corrosion is observed (Refer fig:7)
Corrosion at steel-Concrete joint		Major corrosion is observed at steel concrete joint. (Refer fig:6)
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: Electrical Cables, Roof truss and Roof sheet



Fig 2: Advertising hoarding (Rail wi-fi), coach display boards



Fig 3: Protective screen provided on both sides and details of Flooring



Fig 4: Section properties of Truss

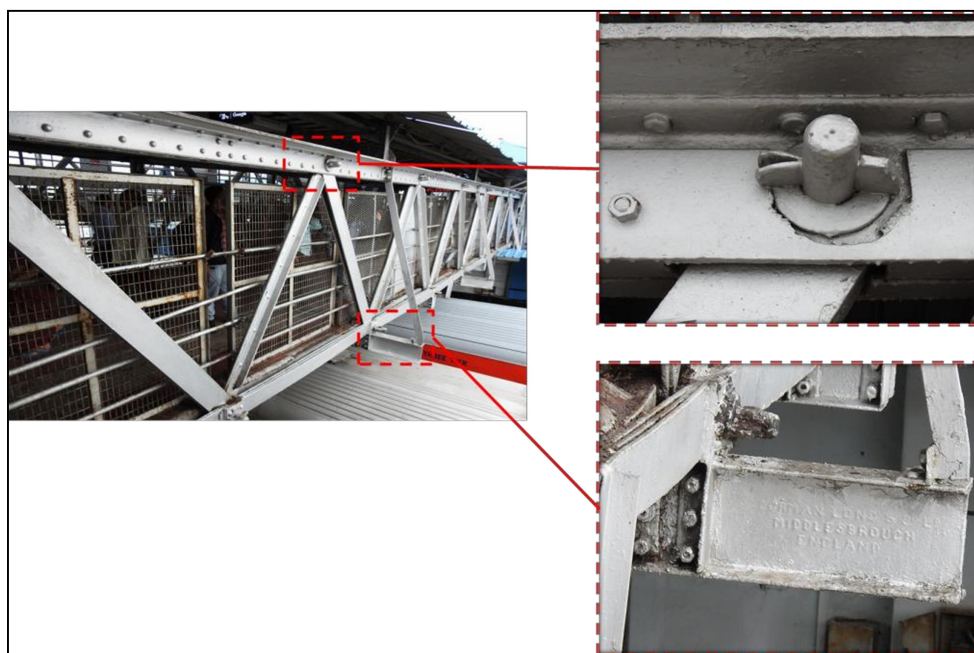


Fig 5: Pinned joints and secondary beam supported with angular bracings

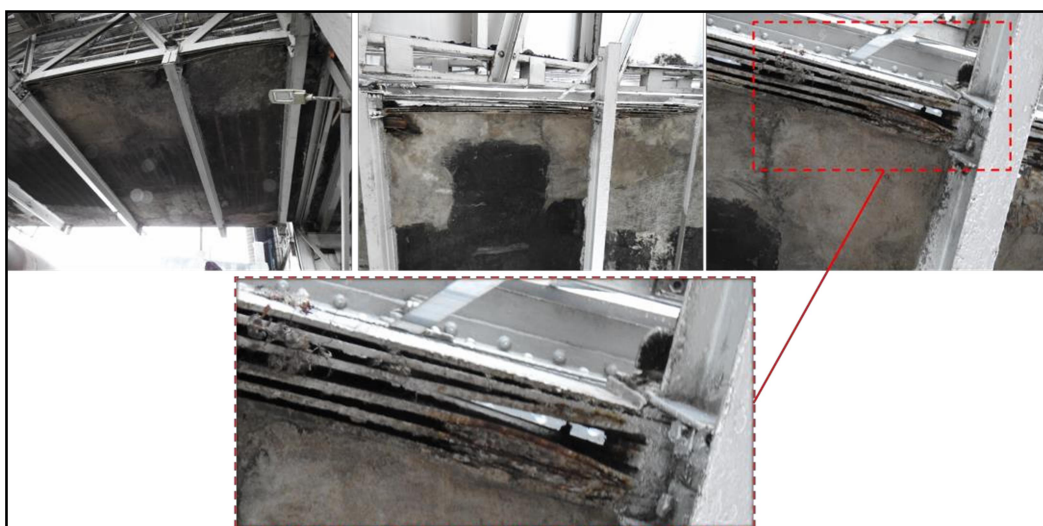


Fig 6: Condition of slab from bottom and corrosion of M.S flats

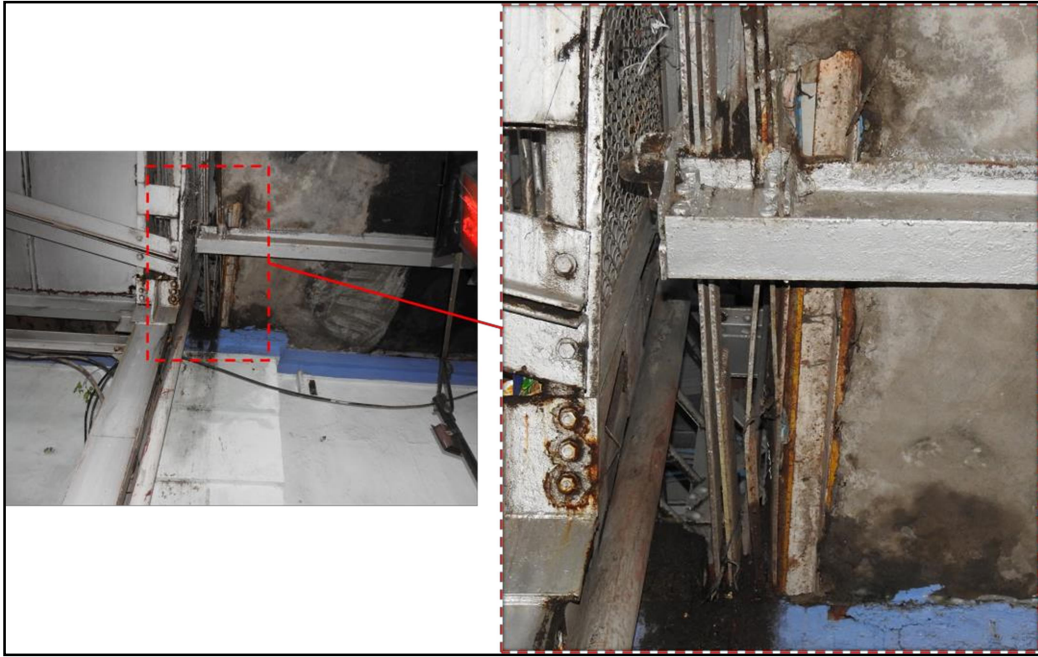


Fig 7: Corrosion of M.S flats near end support

Fig 8: Arrangement of truss



5.0 Numerical Model

- Three-dimensional numerical model has been developed from the dimensions obtained by visual inspection and loads considered for foot over bridge is 5kN/m^2 obtained model and results are shown below.

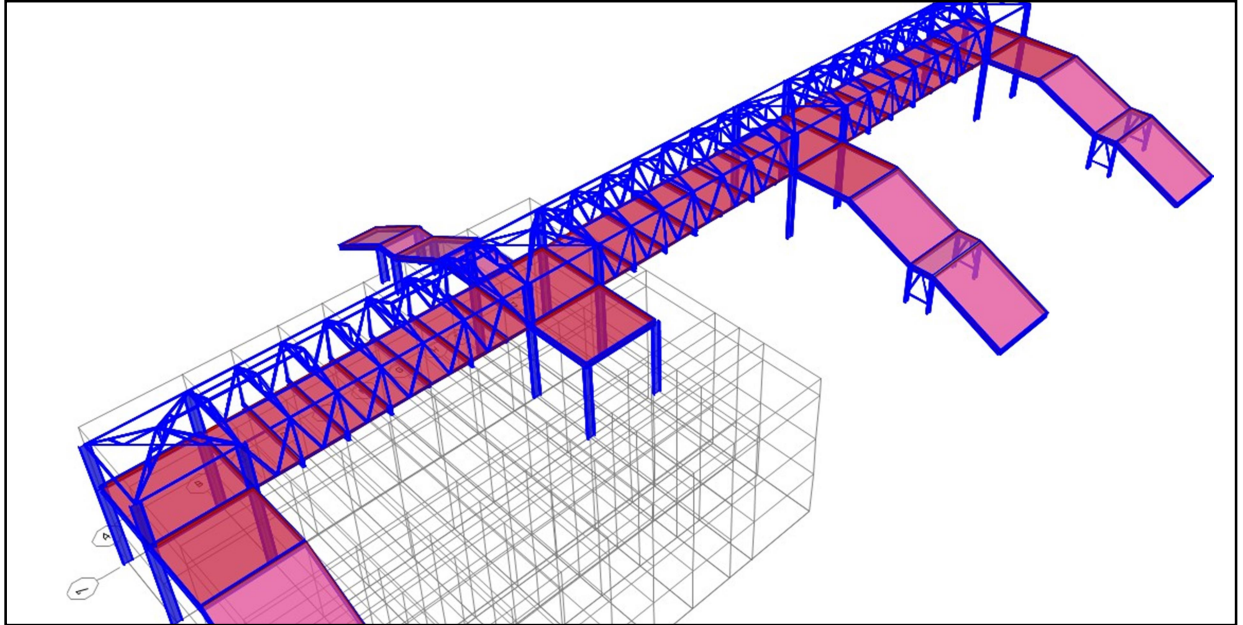


Fig: 5.1 Numerical Modelling of Secunderabad road Railway station FOB
(Developed from the Visual inspection)

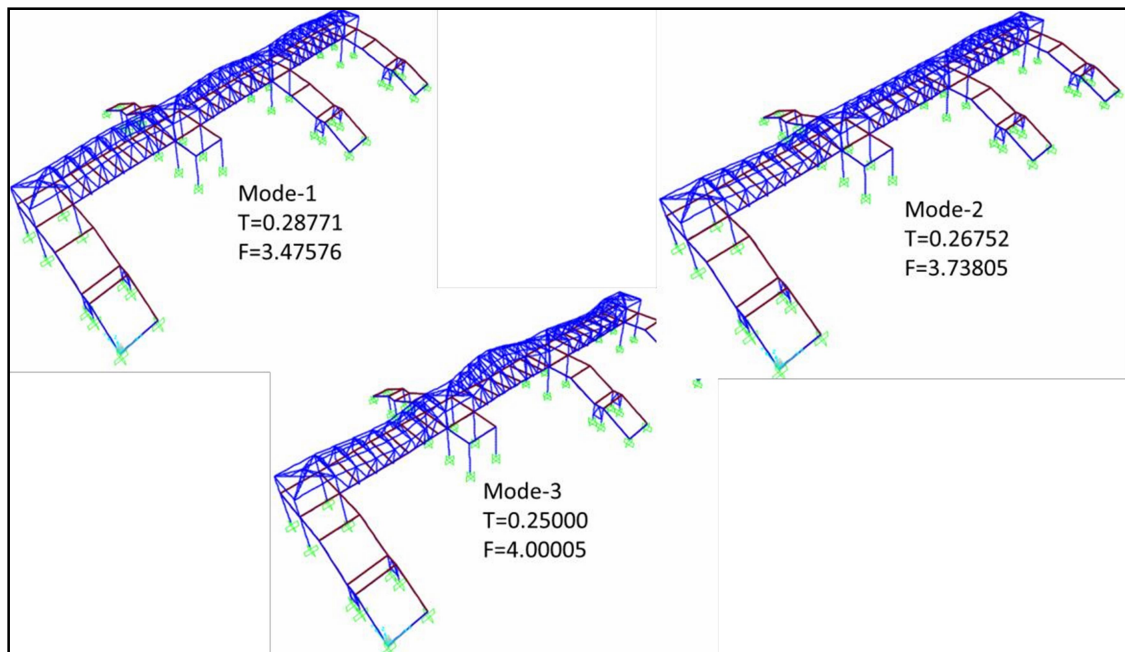


Fig: 5.2 Modal analysis of FOB

