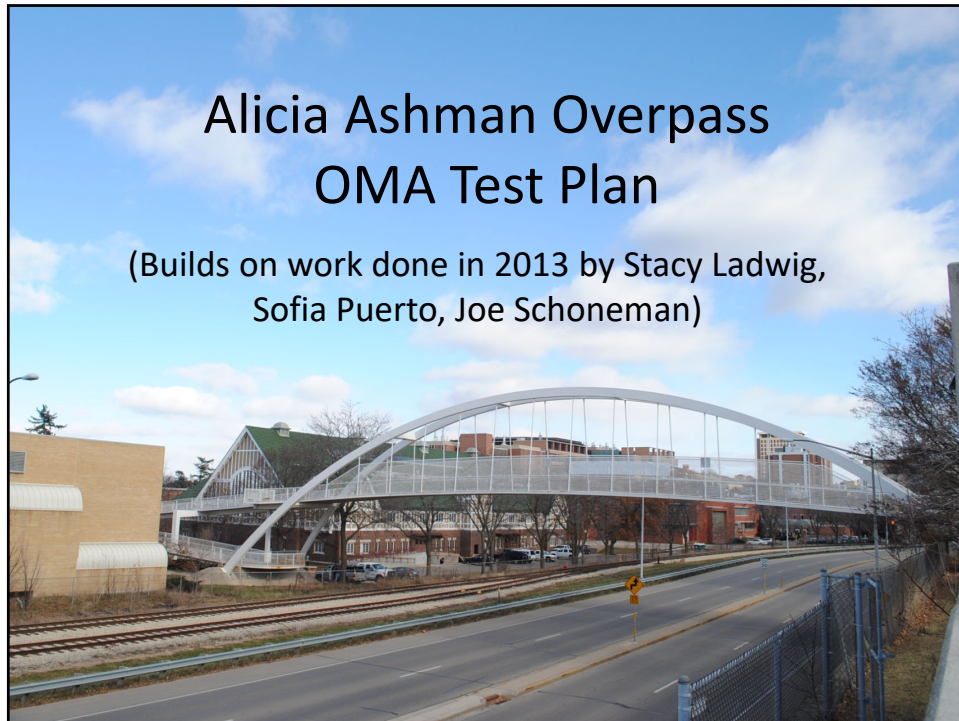




1

Overview

- About Overpass
- Motivation
- SAP Model
- Experimental Setup
- Procedure
- Experimental Results
- Comparison with SAP Model
- Conclusion

2

About Overpass

- Named after:
 - Alderman Alicia Ashman
- Built in 1977
- Materials:
 - Concrete
 - Steel
- Bridge Geometry:
 - Arch Span: 180 x 10 ft
 - Ramp: 200 ft



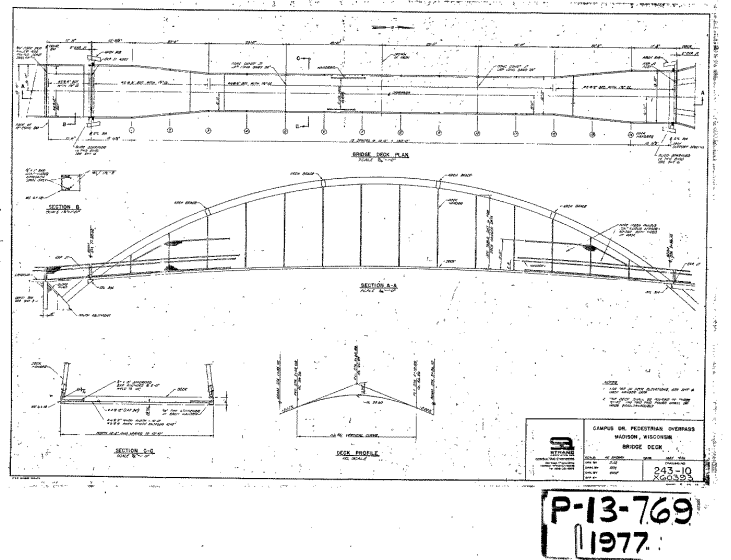
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Motivation

- High amounts of deflection cause users to feel unsafe even when bridge is structurally sound
- Apply OMA concepts
- Compare results with a SAP2000 Model generated by Nasser Abassi during CEE 744

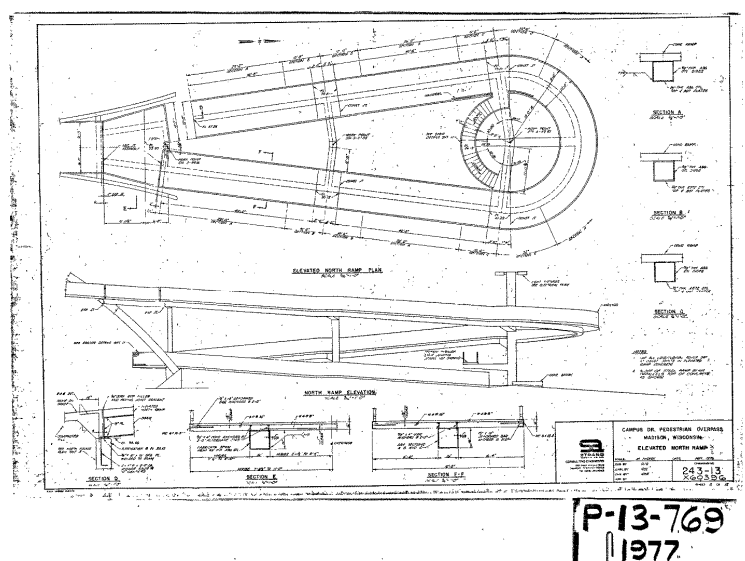
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Campus Dr. Pedestrian Overpass P-13-769



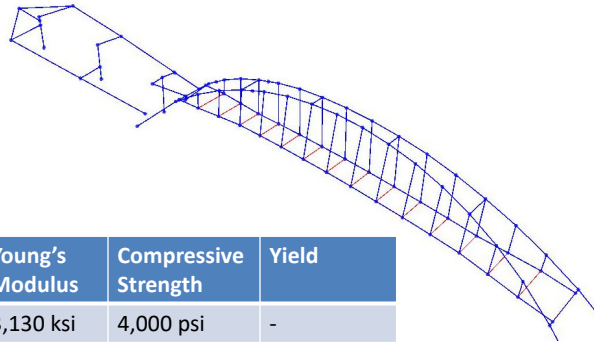
5

Campus Dr. Pedestrian Overpass P-13-769



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SAP2000 Model Given

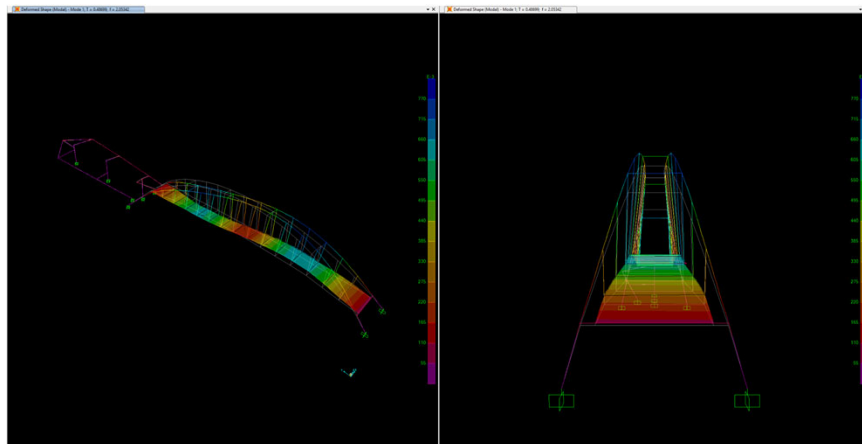


Material	Young's Modulus	Compressive Strength	Yield
Concrete	3,130 ksi	4,000 psi	-
Steel	29,000 ksi		36,000 psi

- Frame elements used to model hangers, arch, beams and columns
- Shell elements to represent concrete slab

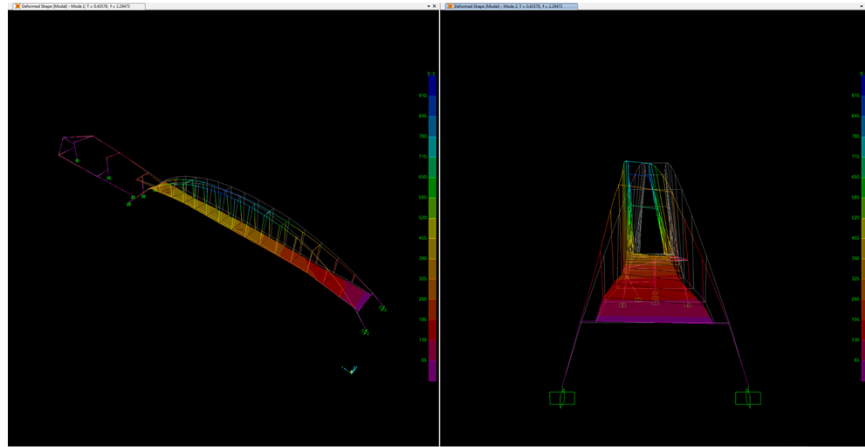
7

Dynamic Behavior of Model Provided Mode 1



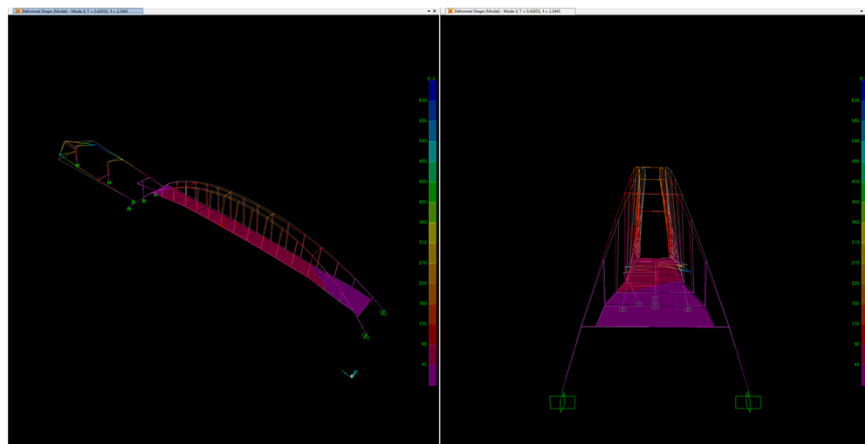
8

Dynamic Behavior of Model Provided Mode 2



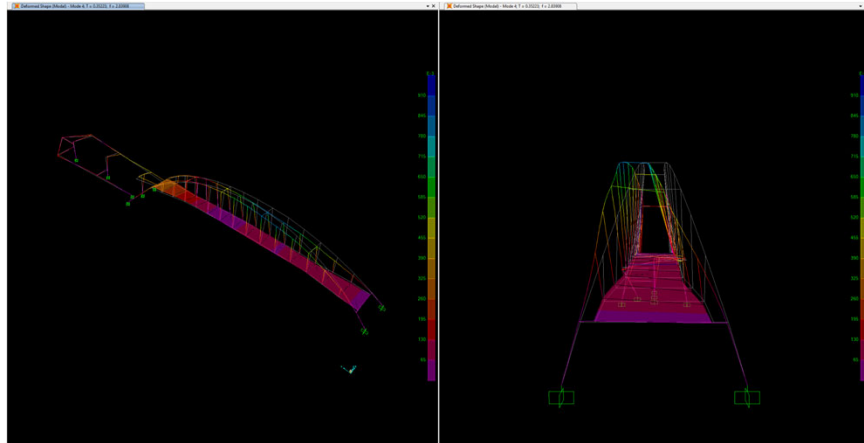
9

Dynamic Behavior of Model Provided Mode 3



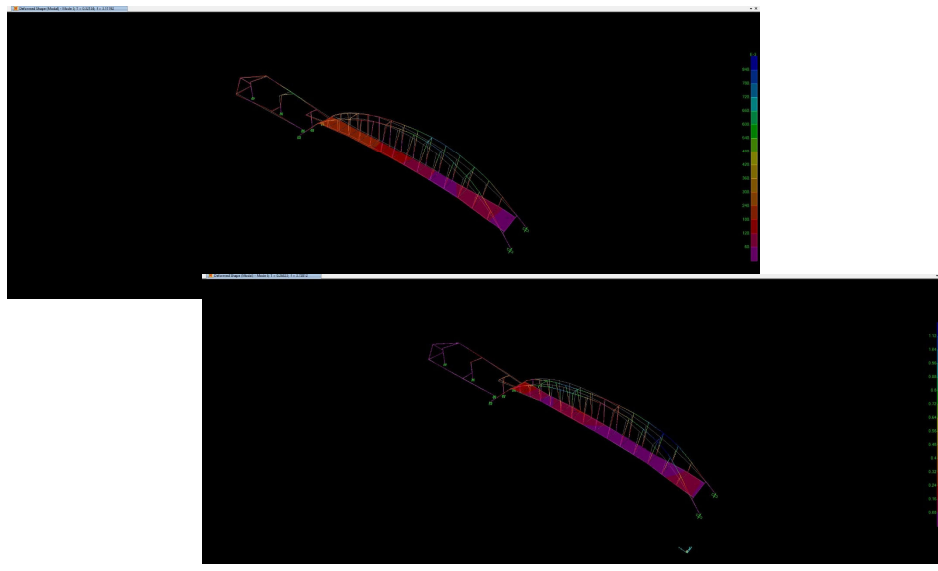
10

Dynamic Behavior of Model Provided Mode 4



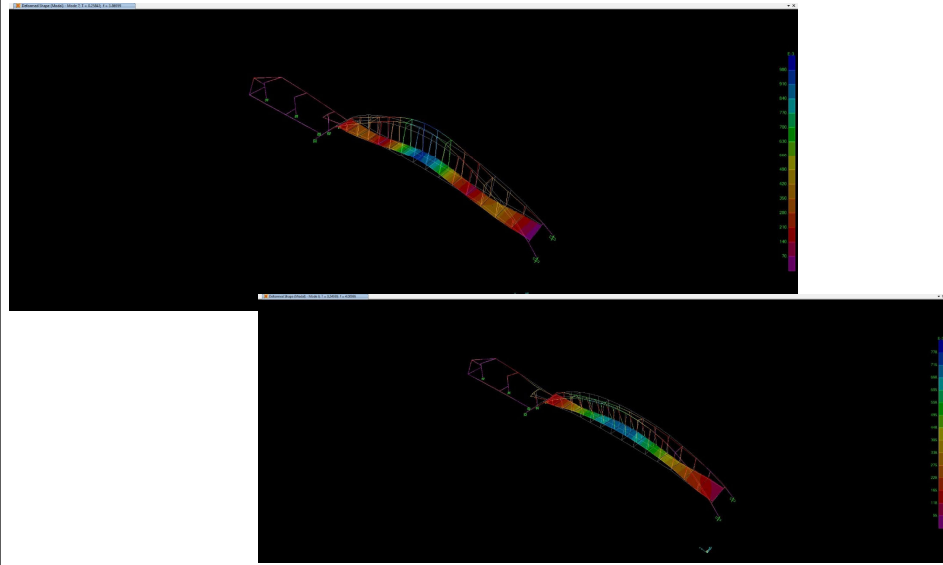
11

Dynamic Behavior of Model Provided Modes 5 and 6



12

Dynamic Behavior of Model Provided Modes 7 and 8



13

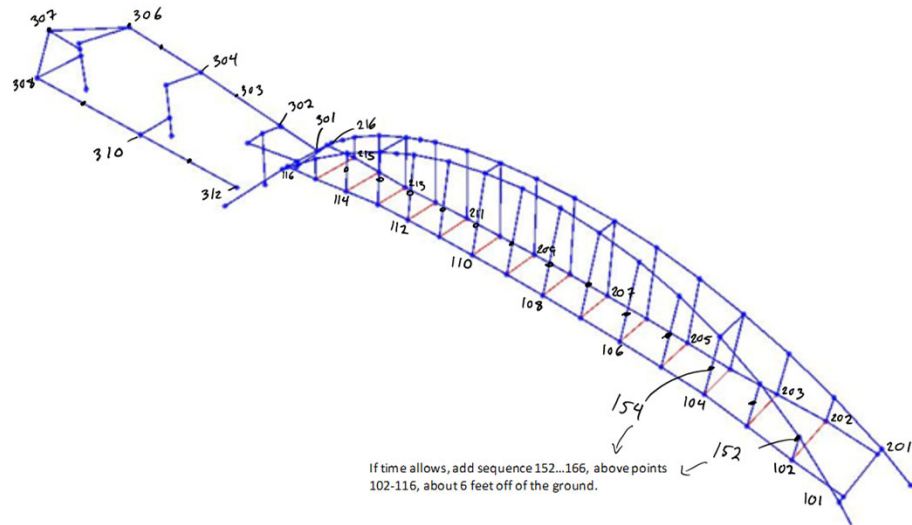
FEA Natural Frequencies

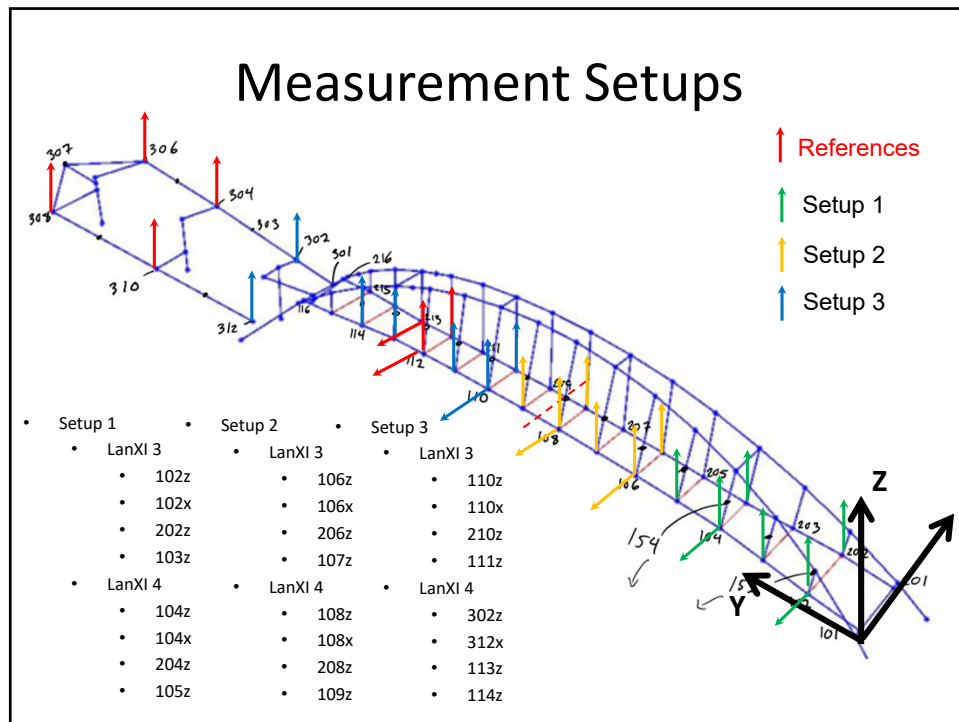
FEA (SAP 2000) Modal Periods And Frequencies

OutputCase	StepType	StepNum	Period Sec	Frequency Cyc/sec	CircFreq rad/sec
Modal	Mode	1.	0.486993	2.0534E+00	1.2902E+01
Modal	Mode	2.	0.43578	2.2947E+00	1.4418E+01
Modal	Mode	3.	0.426531	2.3445E+00	1.4731E+01
Modal	Mode	4.	0.352227	2.8391E+00	1.7838E+01
Modal	Mode	5.	0.321345	3.1119E+00	1.9553E+01
Modal	Mode	6.	0.268232	3.7281E+00	2.3424E+01
Modal	Mode	7.	0.258425	3.8696E+00	2.4313E+01
Modal	Mode	8.	0.249385	4.0099E+00	2.5195E+01

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Measurement DOF





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Procedure

- Randomly excite bridge by walking and jumping on structure
- Used 30 averages per set up to determine dynamic response up to 25 Hz

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