

Dynamic & Static Load Testing of Bridges, Case Study of Qale Morqi Bridge in Tehran

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ABSTRACT

Bridge performance and health monitoring can be obtained from numerical models, site load test or combination of both. Load test approach illustrates bridge behavior with minimum inaccuracy without taking into account the assumptions and simplified approaches of structure analysis. In this research, the structure of Qale Morqi bridge was investigated in order to identify the bridge performance and defects that cause vibration to be induced into surrounding buildings. Numerical models of bridge were made and bridge model was loaded according to bridge Design codes. Bridge was instrumented with more than a hundred sensors, and then loading was implemented in static and dynamic steps. It was observed that the bridge vibrates intensively and instead of bending pattern, the first mode shape was torsional. Due to proximity of bridge first mode with peripheral building first mode, resonance is probable. In conclusion, some strategies for decreasing bridge vibration or preventing resonance in peripheral building are presented.

KEYWORDS

Bridge, load testing, vibration, displacement, strain, acceleration, resonance.

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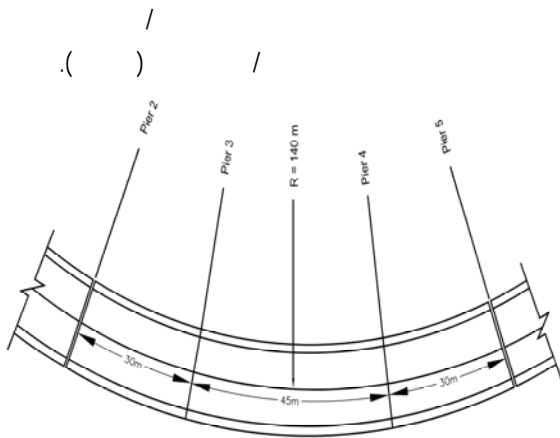
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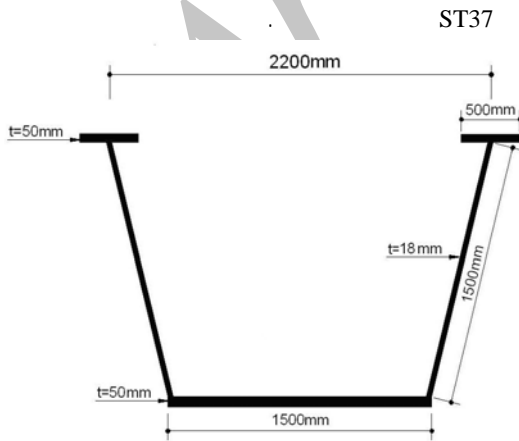


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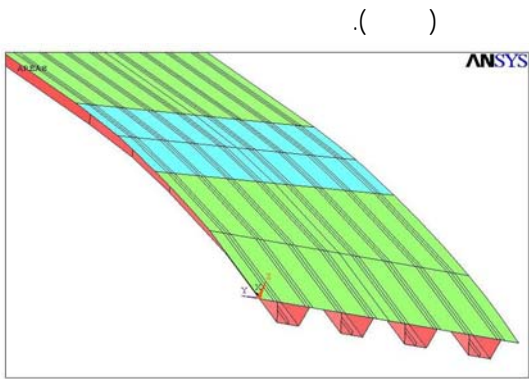
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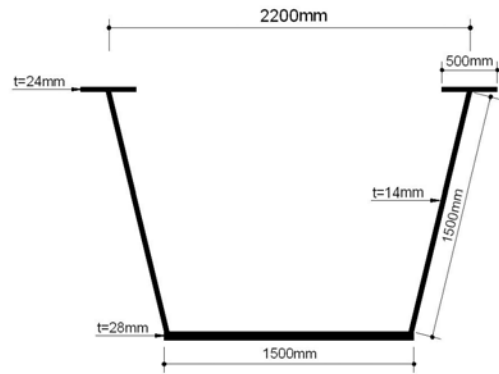


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Shell 63

Beam4

Contact52

Frame

SAP2000

Area

Solid65

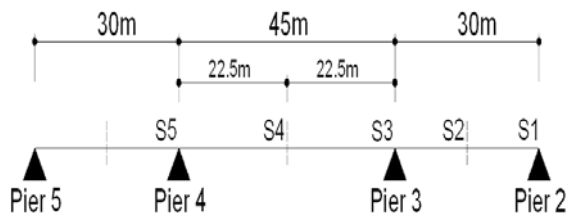
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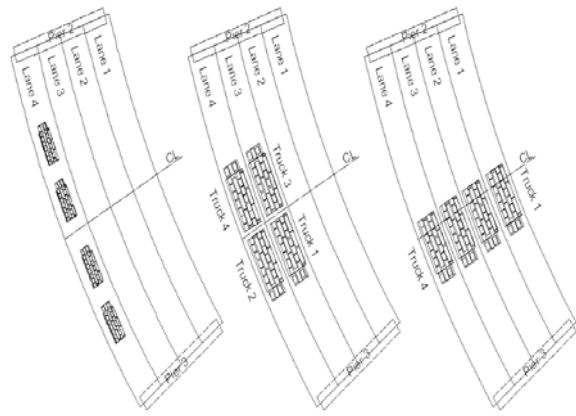
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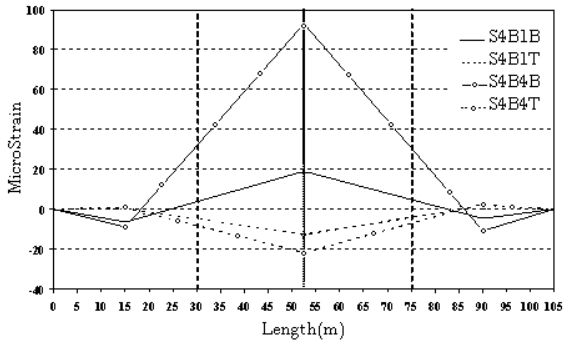
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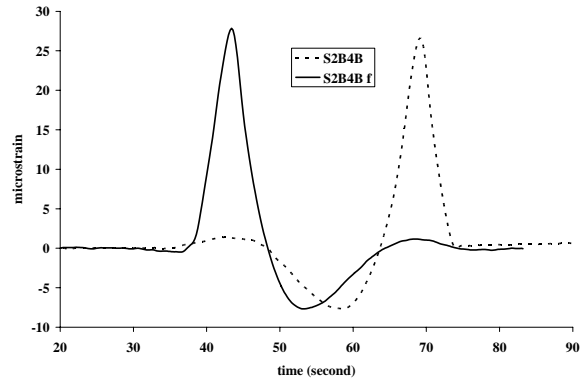
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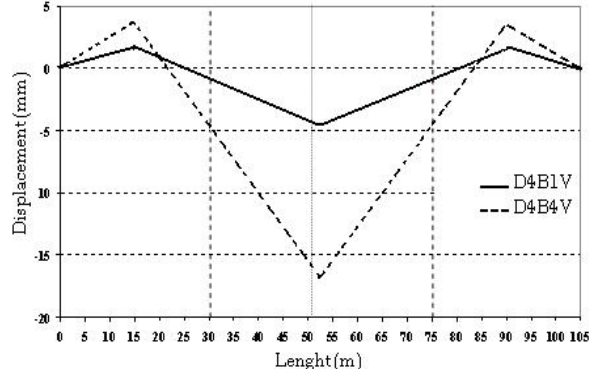
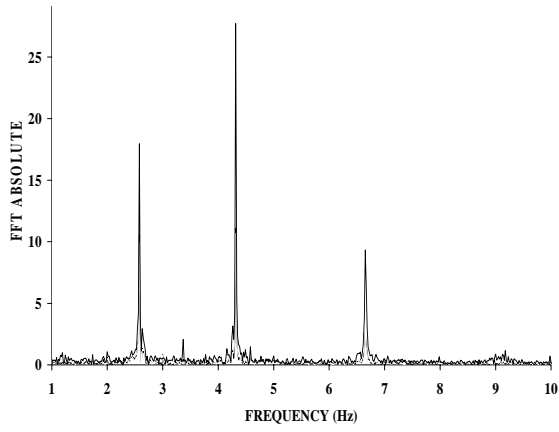


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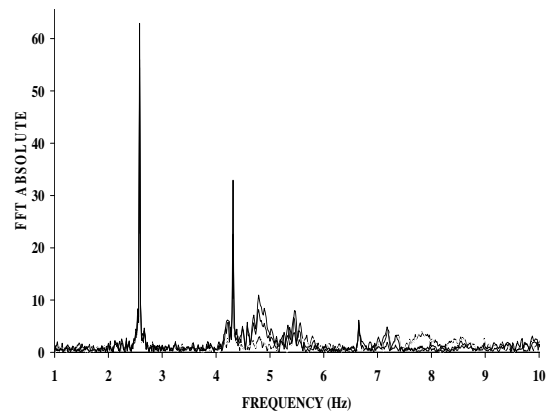
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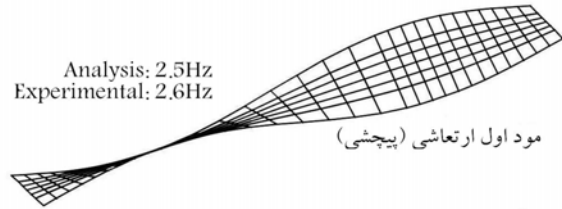
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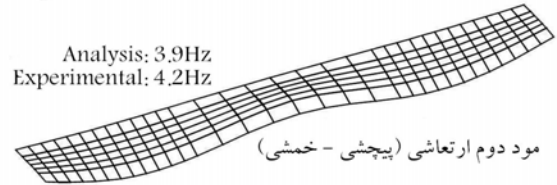
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Analysis: 2.5Hz
Experimental: 2.6Hz



Analysis: 3.9Hz
Experimental: 4.2Hz



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SL34R03	SL34R07	SL34R11	SLAF11	SLAF08	SLAF07	SLAF06	SLAF03	
/	/	/	/	/	/	/	/	S2B1B
/	/	/	/	/	/	/	/	S2B1TE
/	/	/	/	/	/	/	/	S2B2B
/	/	/	/	/	/	/	/	S2B2TE
/	/	/	/	/	/	/	/	S2B3B
/	/	/	/	/	/	/	/	S2B3TE
/	/	/	/	/	/	/	/	S2B4B
/	/	/	/	/	/	/	/	S2B4TI

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SL34R03	SL34R07	SL34R11	SLAF11	SLAF08	SLAF07	SLAF06	SLAF03	
/	/	/	/	/	/	/	/	S3B1B
/	/	/	/	/	/	/	/	S3B1TE
/	/	/	/	/	/	/	/	S3B2B
/	/	/	/	/	/	/	/	S3B2TE
/	/	/	/	/	/	/	/	S3B3B
/	/	/	/	/	/	/	/	S3B3TE
/	/	/	/	/	/	/	/	S3B4B
/	/	/	/	/	/	/	/	S3B4TI



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SL34R03	SL34R07	SL34R11	SLAF11	SLAF08	SLAF07	SLAF06	SLAF03	
/	/	/	/	/	/	/	/	S4B1B
/	/	/	/	/	/	/	/	S4B1TE
/	/	/	/	/	/	/	/	S4B4B
/	/	/	/	/	/	/	/	S4B4TI
/	/	/	/	/	/	/	/	S4B4TE

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SL34R03	SL34R07	SL34R11	SLAF11	SLAF08	SLAF07	SLAF06	SLAF03	
/	/	/	/	/	/	/	/	D2B1VI
/	/	/	/	/	/	/	/	D2B1VE
/	/	/	/	/	/	/	/	D2B1LE
/	/	/	/	/	/	/	/	D2B2VI
/	/	/	/	/	/	/	/	D2B2VE
/	/	/	/	/	/	/	/	D2B2LE
/	/	/	/	/	/	/	/	D2B3VI
/	/	/	/	/	/	/	/	D2B3VE
/	/	/	/	/	/	/	/	D2B3LE
/	/	/	/	/	/	/	/	D2B4LI
/	/	/	/	/	/	/	/	D2B4VI
/	/	/	/	/	/	/	/	D2B4VE

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SL34R03	SL34R07	SL34R11	SLAF11	SLAF08	SLAF07	SLAF06	SLAF03	
/	/	/	/	/	/	/	/	D4B1VI
/	/	/	/	/	/	/	/	D4B1VE
/	/	/	/	/	/	/	/	D4B1LE
/	/	/	/	/	/	/	/	D4B4LI
/	/	/	/	/	/	/	/	D4B4VI
/	/	/	/	/	/	/	/	D4B4VE

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