

Summary Of Bridge Projects

Wilcania Bridge Fatigue Investigation

Client - Roads and Traffic Authority NSW (RTA)

Project included modal analysis of bridge structure, static and dynamic strain measurements, determination of Dynamic Amplifications, FEA modelling of Bridge, tuning of FEA to match measured dynamics. Project also included assessment of the coupled effects of heavy vehicle suspension on the bridge dynamics, also on-road measurements of heavy test vehicle suspension. Proposal and modelling of alternative fatigue life extension options, preparation of construction drawings for modifications. The proposed modifications were successfully implemented in 2006.

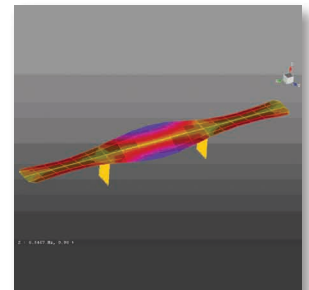


On-road Measurements

Bridge 1263 Fatigue Investigation, Kimberly Region WA

Client - Main Roads WA

Project included preparation of dynamic FE model of complete bridge, measurement of natural modes using shaker, impact and output only modal techniques, measurement of 24 channels of strain during controlled test truck pass bys as well as under normal traffic. Investigation of fatigue failures of reinforced concrete deck, comprehensive explanation of the static and dynamic behaviour.



FEA Model

Bridge 1308 Fatigue and Strengthening Investigation, Kimberly Region WA

Client - Main Roads WA

Project included preparation of dynamic FE model of complete bridge, measurement of natural modes using shaker, impact and output only modal techniques, measurement of 24 channels of strain during controlled test truck pass-bys as well as under normal traffic. Investigation of fatigue failures of reinforced concrete deck, comprehensive explanation of the static and dynamic behaviour, verification of stiffness increase by modal techniques.



Auckland Harbour Bridge

Auckland Harbour Bridge (AHB)

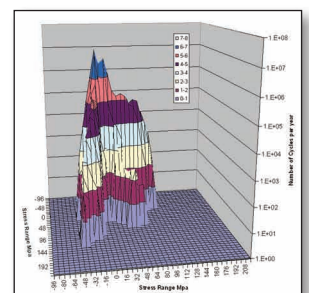
Client - Transgrid

Modal analysis of AHB using output only techniques. Project also included long term monitoring of bridge vibration and expansion.

Bascule Bridge and Orthotropic Deck Fatigue

Client - Roads and Traffic Authority NSW (RTA)

Project included development of dynamic FE model, tuning of model to match dynamic response, vibration measurements and modal analysis of bascule spans, measurement of 16 channels of strain data over long term including rainfall cycle counting and fatigue life assessment. Measurement of vibration and strain during controlled test truck pass bys, determination of maximum dynamic amplification factors, proposal and modelling of fatigue life extension modifications.

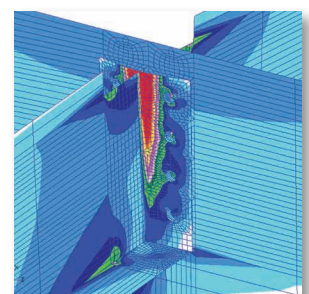


Fatigue Analysis

Kempsey Bridge Fatigue Investigation

Client - Roads and Traffic Authority NSW (RTA)

Project included preparation of dynamic FE model of complete truss span of bridge, measurement of natural modes using output only modal techniques, measurement of 16 channels of strain during controlled test truck pass-bys as well as under normal traffic. Investigation of fatigue failures at stringer cross girder connections, comprehensive explanation of the static and dynamic behaviour as well as design of alternative concept fatigue life extension options, modelling of stress reduction and prediction of fatigue life increase.



FE Stress Model

Gateway Bridge Modal Analysis and MBEJ Fatigue Assessment

Client - Leighton Abigroup Joint Venture

Project included vibration measurements and modal analysis of the main span of the Gateway Bridge Qld. The project also included 16 channel strain measurements of the bridge Modular Bridge Expansion Joint (MBEJ) under controlled test truck pass-bys as well as long term strain measurements under traffic. Analysis included derivation of maximum dynamic amplification factors as well as fatigue life assessment from rainfall cycle counts.

BRIDGE PROJECTS CASE STUDIES

- **ANZAC Bridge (NSW) MBEJ Fatigue Investigation**

Client - Roads and Traffic Authority NSW (RTA)

Project included vibration measurements and modal analysis of the MBEJ. The project also included 16 channel strain measurements of the bridge MBEJ under controlled test truck pass-bys as well as long term strain measurements under traffic. Analysis included derivation of maximum dynamic amplification factors as well as fatigue life assessment from rainflow cycle counts. Fatigue life extension modifications were proposed and fitted.

- **ANZAC Bridge (NSW) MBEJ Bearing Loss Warning System**

Client - Roads and Traffic Authority NSW (RTA)

Project included development of a remote monitoring and MBEJ bearing loss detection system, presently in operation. Bridge Alert System™ has successfully detected all dislodged bearings since installation in 2005.

- **Hexham Bridge Fatigue Investigation**

Client - Roads and Traffic Authority NSW (RTA)

Project included preparation of dynamic FE model of complete truss span of bridge, measurement of natural modes using output only modal techniques, measurement of 24 channels of strain during controlled test truck pass-bys as well as under normal traffic. Investigation of fatigue failures at stringer cross girder connections, comprehensive explanation of the static and dynamic behaviour as well as design of alternative concept fatigue life extension options, modelling of stress reduction and prediction of fatigue life increase.

- **Taree Bypass Bridge (NSW) MBEJ Fatigue Investigation**

Client - Roads and Traffic Authority NSW (RTA)

Project included vibration measurements and modal analysis of the MBEJ. The project also included 16 channel strain measurements of the bridge MBEJ under controlled test truck pass-bys as well as long term strain measurements under traffic. Analysis included derivation of maximum dynamic amplification factors as well as fatigue life assessment from rainflow cycle counts. Fatigue life extension modifications were proposed and fitted.

- **Pheasants Nest Bridge (NSW) Modal Testing**

Client - Roads and Traffic Authority NSW (RTA)

Project included impact modal of main bridge span and integral piers, analysis included definition of modal parameters including damping factors

- **Karuah Bypass Bridge (NSW) MBEJ Fatigue Investigation**

Client - Roads and Traffic Authority NSW (RTA)

Project included vibration measurements and modal analysis of the MBEJ. The project also included 16 channel strain measurements of the bridge MBEJ under controlled test truck pass-bys as well as long term strain measurements under traffic. Analysis included derivation of maximum dynamic amplification factors as well as fatigue life assessment from rainflow cycle counts. Fatigue life extension modifications were proposed and fitted.

- **Harwood Bridge (NSW) Vibration and Noise Investigation**

Client - Roads and Traffic Authority NSW (RTA)

Project included modal analysis of typical approach span, FE modelling of approach span, tuning of FE model to match measured dynamics, proposal and modelling of noise mitigation modifications.

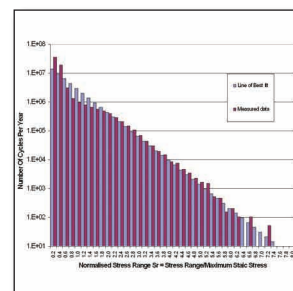
- **Wardell Bridge (NSW) Lift Span Joint Fatigue Investigation**

Client - Roads and Traffic Authority NSW (RTA)

Project included vibration analysis of joint behaviour and development of new long life joint design.



Bascule Bridge



Fatigue Life Assessment



Strain Measurements



Bridge Alert System™



MBEJ Measurements