Hampden Suspension Bridge

Long term structural health monitoring

Kangaroo Valley, NSW, Australia, 2005

Hampden Suspension Bridge

Aim	The New South Wales Roads and Traffic Authority (RTA) must at all times assure the safety and structural health of the bridge while protecting and preserving the bridge's significant cultural heritage value.
Location	Kangaroo Valley, NSW, Australia
System Integrator	Monitor Optics Systems, www.monitoroptics.com
Customer	New South Wales Roads and Traffic Authority (RTA)
Date	2005
Instrumentation	Micron Optics si425-500 Optical Sensing Interrogator
Sensors	Surface mounted strain sensors
Software	Customer designed
FBG Technology Benefit	FBG sensors to provide real-time quantitative information on the structural condition of the bridge.

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- To this end, the RTA commissioned Monitor Optics Systems to develop and implement a long term, automated, structural health monitoring system for the bridge.
- Monitor Optics Systems developed and installed a fiber optics based strain sensing system on the bridge. Surface mounted sensors measure strain in critical structural elements. The multiplexed sensors are routed to a control room at the bridge abutment.

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- The Micron Optics si425-500 continuously interrogates the sensors. The acquired data is processed and transmitted automatically via GPRS.
- The MOS Monitoring System provides a real-time measure of the structural condition of the bridge.

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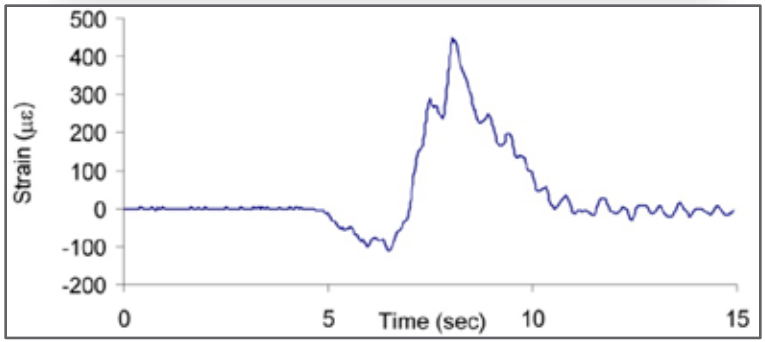
§ A detailed traffic loading profile is compiled from the accumulated data, permitting the development and policing of an appropriate traffic control regimen.



MONITOR OPTICS		Hampden Bridge Monitoring System			
15/12/2004					
Event	no.	34			
Class	3				
5:15:20					
Acquisition frequency:		25 Hz			
Maximum strains:					
TR02AS	**TR02BS**	**SR62S**	**SR78S**	**TR39AS**	**TR39BS**
479.39	675.12	38.63	446.69	403.52	44.40
Temperature:		23	°C		
TR02AS	**TR02BS**	**SR62S**	**SR78S**	**TR39AS**	**TR39BS**
-2.60	1.45	0.00	-2.62	1.17	0.00
-1.45	1.16	0.29	-1.46	1.17	0.00
-2.31	1.45	0.00	-0.29	2.33	0.00
0.00	1.45	-1.16	-1.46	1.17	1.17
-2.31	0.00	-1.16	-0.29	0.00	0.00
-1.16	2.61	0.00	-1.16	1.17	0.00
0.00	1.45	-1.16	-2.62	2.33	0.00
-2.31	0.00	0.00	-2.62	1.17	-2.34
0.00	0.00	-1.16	-0.29	1.17	0.00
-3.76	1.45	0.00	-2.62	0.00	-1.17
-1.45	1.45	1.45	1.16	0.00	-1.17
-1.16	1.45	1.45	1.16	1.17	0.00
-1.45	0.00	1.45	-0.29	1.17	-1.17
0.00	1.45	1.45	-0.29	1.17	-1.17
0.00	1.16	0.00	-0.29	1.17	-2.34
-1.16	2.61	0.00	-1.46	0.00	0.00
-1.16	1.45	0.29	-0.29	2.33	0.00
0.00	1.45	0.00	-2.62	1.17	0.00
-2.31	1.45	-0.87	1.16	0.00	-1.17
0.00	0.00	0.29	-4.07	1.17	-2.34
-3.76	0.00	-1.16	1.16	1.17	0.00
-1.16	2.61	-1.16	-0.29	1.17	-1.17
0.00	4.06	-1.16	-0.29	1.17	-1.17
0.00	2.61	0.00	-2.62	1.17	0.00

Results and Acknowledgements

- Results
  - Tailored maintenance programs have been developed and the effectiveness of structural improvement is assessed.
  - When preset strain thresholds are exceeded an integrated camera can capture details of the overload vehicle.

- Acknowledgements
  - New South Wales Roads and Traffic Authority (RTA)
  - Monitor Optics Systems, Australia
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