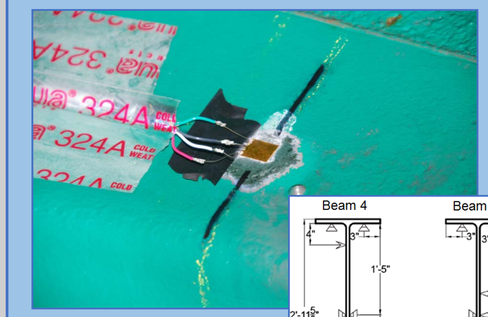
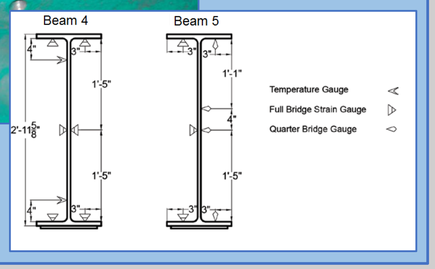
Instrumentation, Digital Image Correlation, and Modeling to Monitor Bridge Behavior and Condition Assessment

Structural Health Monitoring (SHM) uses a blend of instrumentation and science that has the potential to increase the efficiency of bridge asset management. This research aimed to facilitate and accelerate future SHM research projects in New Hampshire through easily implemented technology. Protocols were developed and instrumentation was deployed at the Bagdad Road over US Route 4 Bridge in Durham NH (NH Bridge 114/128).

Strain Gauge Installation at Bagdad Road

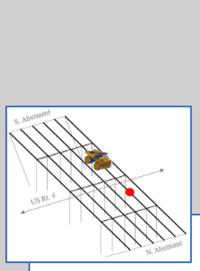
Bonded foil strain gauges and thermocouples were installed on two beams. Readings collected under typical traffic loads from the sensors were used to determine neutral axis locations in the steel\concrete composite girders.

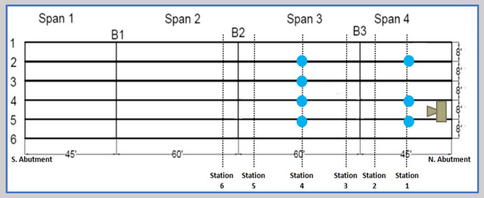


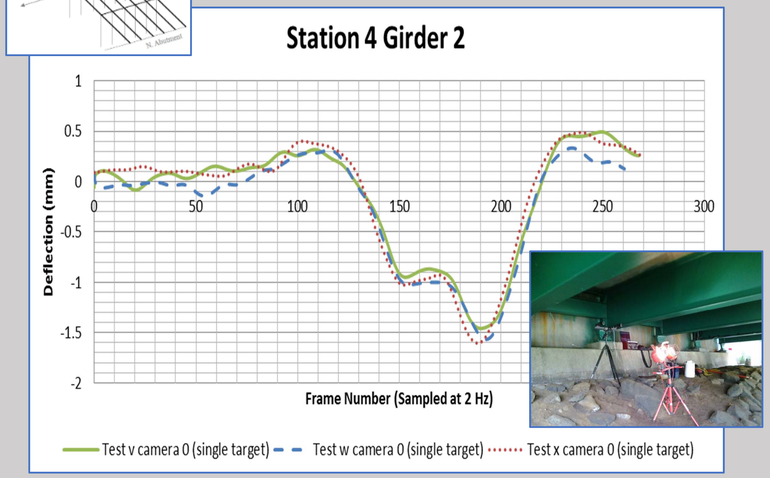


Digital Image Correlation (DIC) at Bagdad Road

DIC is an optical method for tracking changes from one image to another. For this project, images were recorded during an event, analyzed for pixel movement and displacements, and strain was calculated.



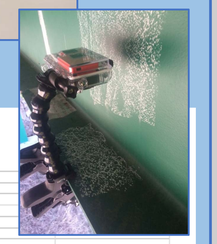




Comparing Strain Gauge to DIC

The effectiveness of GoPro® cameras as DIC sensors for 2D and 3D strain measurement was investigated during this project in the laboratory and at the Bagdad Road Bridge.

The field results correlate to the strain measurement collected with the strain gauges.



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