

Fiber Optic Sensing Technology for Structural Health Monitoring of Bridge Infrastructure

PROJECT TITLE

Fiber Optic Sensing Technology for Structural Health Monitoring of Bridge Infrastructure

STUDY TIMELINE

6/2019 – Present

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More information about the VTrans Research Program, including additional Fact Sheets, can be found at:

<http://vtrans.vermont.gov/planning/research>

Problem Statement

This project aims to study and develop a new sensing system for Structural Health Monitoring. This approach involves the use of optical fibers as the sensors and Brillouin Optical Time Domain Reflectometry (BOTDR) as sensing methodology. This technology is capable of measuring strain and temperature that are important for maintenance.



Methodology

The sensors have been implemented on a railway bridge located at Salmon Falls River in New Hampshire. The objective is to measure the dynamic strain changes while an Amtrak train is going over the bridge.

Next Steps

We successfully observed changes in the strain values by comparing the data collected before and during the train passage. The next step will consist in monitoring the sensors for a year to observe the response of the signal and sensors through different weather seasons.

Potential Impacts and VTrans Benefits

The potential impacts of this technology include the ability to monitor an infrastructure and observe any possible deterioration. With this information, repair and maintenance can be planned accordingly. In addition, it can monitor long distance structures (km range) such as railways and pipelines, reducing the amount of labor and cost needed for installation and maintenance.