

FIBER OPTIC SENSING TECHNOLOGY FOR STRUCTURAL HEALTH MONITORING OF A BRIDGE

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Abstract

The Structural Health Monitoring (SHM) of large civil infrastructures has become a priority due to economic advantages and early detection of structures failure. Distributed sensors have played an important role in developing a reliable monitoring system. The purpose of this project aims to investigate new sensing alternatives using fiber as the sensor medium. Specifically, this project explored the ability to measure the variation of strain in bridges using Brillouin Optical Time Domain Reflectometry (BOTDR). Additionally, this project investigated the possibility of embedding fibers in textiles to help and reduce installation costs. The prototype was installed on a railway bridge located in New Hampshire. This field test will serve as a long-term study of the effect of seasonal weather in the Brillouin frequency signal and to monitor the bridge during this time for any strain change. Ideally, we are expected to see no changes in the signal, which will indicate no damage has occurred during this period. On the other side, this research will aim to develop a reliable system that can be used by any operator without the need for extensive training.

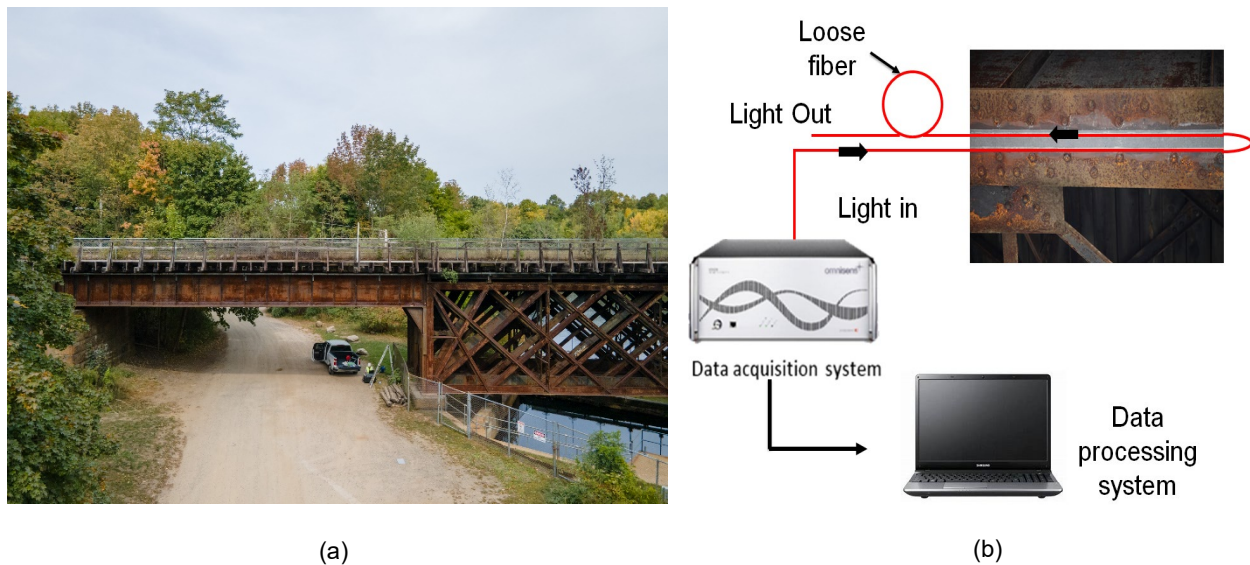


Figure 1 (a) Salmon Fall Bridge (b) BOTDR system

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