

Vibration Monitoring and Load Characteristics Evaluation of I-89 Bridge 58N

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ABSTRACT

Along with most states in the country Vermont has a rapidly aging infrastructure. A significant number of bridges, culverts, and roads are in dire need of repair or require complete reconstruction. The yearly monetary commitment to improve Vermont's infrastructure is in the scale of tens of millions of dollars, at a minimum. With tight local, state, and federal budgets; reliable methods to prioritize repair/reconstruction projects are needed. The current methods for bridge condition assessment and repair prioritization rely on visual inspections by trained structural engineers; needless to say, these inspections are tedious, time consuming, and sometimes ambiguous. New methods recently developed at the University of Vermont which implement state-of-the-art sensors and signal processing technology along with structural dynamics and optimal estimation theory allow for real time bridge diagnosis, thus removing some of the drawbacks of visual inspections. The University of Vermont's Structural Monitoring and Diagnostics Lab is partnering with the Vermont Agency of Transportation to instrument and monitor Bridge 58N on Interstate 89 in the town of Richmond, VT. The instrumentation consists of 24 strain sensors and 10 accelerometers. The main objective of the monitoring project is to measure the performance of the steel stringers which support the concrete road deck. These measurements will serve as a calibrator for the load distribution coefficients used in bridge load rating. In addition, finite element models of the bridge will be formulated and updated to better understand the structural behavior and reliability of the bridge deck under heavy traffic loads.