



Our group focuses on the critical national problem of aging civil infrastructure. Our interests include the development and application of non-destructive and non-invasive evaluation of civil structures through the use of mechanical, vibration, ultrasonic, acoustic, thermal, electromagnetic, optical and radiographic methods. Research also encompasses the translation of data obtained from the application of nondestructive evaluation methods into quantitative and actionable information useful for the management of large inventories of civil infrastructure assets. This includes the emerging areas of structural health monitoring and smart structures.

Chase Research Group

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“Managing the existing inventory of bridges and other highway structures while developing sustainable methods for future generations.”



Nondestructive Evaluation of Civil Infrastructure

There are many bridges with high traffic volumes or difficult access conditions which make them difficult and expensive to inspect. In addition, the inspection of many bridges exposes the inspectors to hazardous conditions such as the risk of collision from adjacent traffic or access to locations where a fall would result in severe injury or death. Working with the Virginia Department of Transportation (VDOT), we are developing a tool to help inspect these bridges that is safer, less disruptive and more efficient. Our design is based on a robotic platform which would address human limitations by enabling inspection of bridges from the underneath, without the need to disrupt traffic and also reduce the risks to the inspectors. Additionally, we are expanding this technology into the realm of structural health monitoring and diagnosis.

Sustainable Infrastructure Engineering

Research in infrastructure engineering focuses on improving the design, construction, and operation of infrastructure in a sustainable manner. Our group works in the area of advanced information technology to monitor and control infrastructure. Much of the work in this area is conducted in partnership with the Virginia Center for Transportation Innovation and Research (VCTIR).

Infrastructure Asset Management

Our group is investigating the feasibility and potential benefits of the integration of infrastructure monitoring systems into enterprise scale transportation management systems. Currently, two infrastructure monitoring systems have been implemented, one designed for pavement and the second designed for bridges, and a framework has been developed for the integration of the project level data into the distributed network level asset condition and performance data already existing within VDOT's pavement, bridge, traffic operation and asset management systems. We are using the monitoring information to determine how best to augment existing data collection activities and to recommend and support improved asset management business processes for VDOT.

RECENT RESEARCH DEVELOPMENTS

- Measurement of stress concentrations at fatigue prone details on in service steel highway bridges using thermoelastic imaging
- Evaluation of coatings on steel highway bridges using active thermography
- Virtual fabrication and assembly of steel bridges using 3-D laser scanning
- Using SHM systems to provide asset management data
- Bridge Information Laboratory conducting data analysis and data mining of legacy databases for Virginia DOT

RECENT GRANTS

- VCTIR – Long-Term Bridge Performance Program Support
- Fuchs Consulting – Instrumentation to Aid Steel Bridge Fabrication
- U.S. DOT – Bridge Information Laboratory

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