

**MATC Consortium
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Infrastructure Inspection During and After Unexpected Events

Executive Summary

The objective of this work is to develop a physical-computer model for the structural health monitoring of highway bridges during extreme natural events such as earthquakes and flooding. The physical model, representing a highway bridge in Iowa, will provide the adequate measurements, and a computer finite element model will update and predict the changes in the loading capacity of the bridge during and after the event.

Findings & Outputs

A new methodology will be developed that quantifies bridge loading capacity during and after extreme events such as river flooding and ground movements.

Impacts & Benefits

1. Ensure drivers and goods transport safety during and after extreme natural events
2. Assist emergency responders in their decision-making regarding movement and management of traffic, especially of hazardous material
3. Assist emergency responders in their maintenance and repair plans

Funding Source(s) & Amount

USDOT: \$158,507

UI Department of Civil and Environmental Engineering: \$158,449

Total: \$316,956

For More Information:

Phase I project info on MATC website:

http://matc.unl.edu/research/research_project.php?researchID=533

Phase II project info on MATC website:

http://matc.unl.edu/research/research_project.php?researchID=556**Mid-America
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Left: A multi-span highway bridge crossing a river.

Right: A model of the bridge inside a water flume in a lab setting.

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Dr. Salam Rahmatalla is a professor in structures, mechanics, and materials at the Civil and Environmental Engineering Department in the College of Engineering at the University of Iowa. His field of interest is in the area of mechanical vibration and its effect on the health condition of structural, mechanical, and biomechanical systems. Examples of research studies include the effect of operational loading on the integrity of highway bridges and the biodynamics of human-transport interaction under whole-body vibration.

About MATC

Since 2006, the Mid-America Transportation Center has been designated as the US DOT Region VII University Transportation Center composed of Iowa, Kansas, Missouri, and Nebraska.

Research priority: Increase safety with an emphasis on reducing the number of incidents involving hazardous material transport and improving emergency response.

Education priority: Increase the number of students from underrepresented groups in STEM education and transportation-related careers

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