Improving the seismic performance and reliability of the nation’s highway system is the overall aim of MCEER’s Highway Project. The project was initiated in the fall of 1992 with two Federal Highway Administration (FHWA) contracts totaling more than $14 million. In 1998, MCEER received an additional 6-year, $10.8 million FHWA contract to expand on work begun in 1992 (see “Highway Research Extended ...”). Research is augmented by additional contracts from FHWA and other agencies.

The project uniquely examines the impact of earthquakes on the highway system as an integrated network, rather than a collection of individual roads, bridges, embankments, tunnels, etc. Projects seek to ensure the usability of highways following earthquakes, by improving performance of all interconnected components.

Overall goals are to improve understanding of the seismic hazards to highways and to improve and develop analysis methods, screening procedures and additional tools, retrofit technologies, design criteria, and other approaches to reduce seismic vulnerability of existing and future highway infrastructure.

Studies examine:
- seismic hazards and ground motion
- soils and foundations
- structural systems and components
- performance criteria
- analysis and design issues
- intelligent and protective systems

In all, MCEER highway research involves more than 40 investigators from over 20 institutions throughout the United States.


**Design Criteria and Methods**

- Seismic Design Criteria for Bridges and Other Structures (MCEER 97-0002) — prepared for MCEER by the Applied Technology Council (ATC). Contains a review of national and international approaches and criteria used in the seismic design of bridges, tunnels, and retaining structures.

**Tools for Evaluation and Analysis**

- Screening Guide for Rapid Assessment of Liquefaction Hazard at Highway Bridge Sites (MCEER 98-0005) - (see “Screening Guide…”).


**Retrofitting Tools & Technologies**

- Seismic Retrofitting Manuals for Highway Systems (see “Manual…”).

- Earthquake Protective Systems — studies have addressed optimizing the design and performance of various earthquake protective systems. Results have been incorporated into the newly-issued AASHTO Guide Specifications for Seismic Isolation Design (2nd Edition, 1999).

**System Performance and Societal Impacts**

- Queensboro Bridge Seismic Evaluation (1994) — establishment of the site-specific seismic response spectra and time histories at the foundation level for each of the major structures comprising the Queensboro Bridge, one of the five major bridges linking Manhattan and Queens in New York City.

- Seismic Risk Assessment (SRA) Methodology — a formal seismic risk assessment methodology evaluating an earthquake’s impact on a city, county or regional highway system or network (see “Manual…”).

---

**Current Research Partners**

- Applied Technology Council
- Brigham Young University
- University at Buffalo
- University of California/Irvine
- Earth Mechanics, Inc.
- EQE Inc.
- Geomatrix Consultants, Inc.
- Imbsen & Associates, Inc.
- T.Y. Lin International
- Modjeski & Masters
- National Institute of Standards and Technology
- Richard V. Nutt, Bridge Engineering Consultant
- University of Nevada/Reno
- Princeton University
- Rensselaer Polytechnic Institute
- Seismic Systems & Engineering Consultants
- United States Geological Survey
- University of Southern California
- Virginia Polytechnic Institute & State University

**Sponsors**

- Federal Highway Administration
- Transportation Research Board, National Research Council
- New York State DOT
- New York City DOT

**Contact**

Michael S. Higgins, P.E.
Senior Program Officer,
Transportation Research
MCEER
University at Buffalo
Red Jacket Quadrangle
Buffalo, New York 14261-0025
Tel: 716/645-3391 ext. 107
Fax: 716/645-3399
Email: mhigg@buffalo.edu
WWW Site: http://mceer.buffalo.edu

---

**Highway Project Highlights**

Below are some examples of contributions that MCEER's Highway Project has made to improving the seismic performance of the national highway system.

**Codes & Standards**


- AASHTO Commentary on Standard Specifications for Highway Bridges — commentary to the above, adopted in 1997.