

MCEER to Design Seismic Instrumentation System for Cable-Stayed Bridge

Under the FHWA-sponsored Highway Project, MCEER is designing a seismic instrumentation system for the cable-stayed bridge currently under construction across the Mississippi River in Cape Girardeau, Missouri. The Bill E. Emerson Memorial Bridge will be comprised of a main cable-stay span crossing the Mississippi River shipping channel that is 1,120 feet long; it also includes 11 approach spans of conventional bridge construction on the Illinois side of the river. Total bridge length is 3,956 feet. The Missouri side of the bridge will have abutment and tower foundations anchored in bedrock, while on the Illinois side, the foundations will be constructed in relatively deep soft soils.

The bridge is in the New Madrid Seismic Zone, and will be subject to regular strong ground motion events. As a result, a high level of seismic design has been included for the structure. It is for this reason that the Missouri Department of Transportation and the Federal Highway Administration highly support this project which is expected to provide a significant amount of bridge structural response data. It is currently believed that this may be the only cable-stayed bridge instrumentation project in the U.S.

The instrumentation scheme will include (a) free-field equipment in the vicinity of the bridge, which will allow the assessment of spatial variation of input ground motions at the piers of this long structure; (b) accelerometers and displacement transducers in the foundations of the main towers and cable-stayed abutment; and (c) accelerometers and displacement transducers on the main towers and along the deck for both the cable-stayed and approach spans. Additional hardware will be included to measure wind-induced structural response data.

MCEER has subcontracted with the US Geological Survey to design the instrumentation plan and, upon approval, acquire the hardware for the system. Dr. Nicholas Jones of Johns Hopkins University will assist in reviewing and approving the instrumentation plan. Project stakeholders include the States of Missouri and Illinois, the FHWA, MCEER, USGS, and the bridge designer, HNTB Corporation.

Two project meetings have been held to date, the most recent of which was on August 4, 1999, in Cape Girardeau, Missouri. It is anticipated that the system design will be complete by the end of November, and the bridge will be completed and open to traffic in early 2003. ❖



MCEER is designing the seismic instrumentation system for the Bill E. Emerson Memorial Bridge, a cable-stayed bridge currently under construction in Cape Girardeau, Missouri.