

Wave and Storm Surge Forces on Bridges (\$25,000)

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Recent hurricanes, including Katrina in 2005 and Ivan in 2004, caused unexpected damage to bridges on major interstates and highways. In several cases, the bridge superstructure was completely demolished due to the combined effects of the storm surge and wave forces, as illustrated in Fig. 2. Loss of these structures hindered emergency response and caused significant impacts on recovery and reconstruction efforts. Hurricane induced wave and surge forces on bridges are not well understood and new methods are needed to insure adequate performance of bridges subjected to these forces. However, almost no data are available to develop these new methods. The Kiewit Center is supporting new research with physical tests of highway bridge superstructure model geometries using the world-class wave generating capabilities available in the Hinsdale Wave Research Laboratory at Oregon State University. These research findings will enable design of retrofits for existing bridges and design of new bridges to withstand hurricane wave and storm surge forces. The \$25,000 provided by the Kiewit Center will be matched by funds from the Hinsdale Wave Research Laboratory and these can further be matched by the new Oregon Transportation Research and Education Consortium (OTREC) to provide total research funding of \$100,000 to develop these new design methods that address a nationally significant need. Professor Dan Cox of the Department of Civil, Construction, and Environmental Engineering at Oregon State University is leading this effort.



Figure 2 - U.S. 90 bridge over Biloxi Bay, MS, after Hurricane Katrina in 2005. Bridge deck spans were moved off the substructure and several spans were flipped (center of photo).