## Scourwatch: Bridge Monitoring Application Service

Transportation engineers monitoring bridges at risk during flood situations are getting a helping hand with locally focused weather forecasting, Web bots that troll automatically for targeted information and software that assesses the data to send alerts when preset conditions are met. The innovation is called Scourwatch.

Bridge scour garnered renewed national attention in 1987 with the collapse of the I-90 bridge over Schoharie Creek in New York. Without warning, five vehicles plunged into the creek as two spans of the bridge fell into the floodwaters on April 5, killing 10 people. An investigation into the collapse by the National Transportation Safety Board determined the cause of failure to be bridge scour stemming from inadequate riprap around the base of the piers and the shallow depth of the foundation.

Directing its attention to the scour problem, the Federal Highway Administration (FHWA) issued a Technical Advisory in 1988, and again in 1991, revising the National Bridge Inspection Standards to require evaluation of all bridges for susceptibility to damage resulting from scour. Of particular concern were scour-critical bridges, bridges that could experience catastrophic failure or become structurally unstable as a result of excessive scour caused by a destructive flood event. In addition, a 1997 study by the Transportation Research Board said there are 488,750 bridges over streams and rivers in the U.S. It set the annual cost for scour-related bridge failures at $30 million.

Creating practical devices to monitor scour has proven elusive. As an alternative, engineers are trying to predict more accurately which specific bridges are threatened and send inspectors to them even before waters rise.

The New York State DOT, Tennessee DOT, Connecticut DOT, and Iowa DOT are all using the services of USEngineering Solutions Corp. in West Hartford, Connecticut, which has been inventing systems to tie localized weather and bridge data together. Its product, ScourWatch, collects stream and weather data for clients from the Internet and matches it against the customer's bridge data.

Each bridge is given a particular flood stage and flow-rate threshold that is used to automatically trigger email, beeper or telephone alerts to engineers when scouring conditions threaten the bridge. A new option also can push relevant structural data to inspectors in the field.

According to the Iowa DOT's Office of Bridges and Structures, because of improved forecasting technology, highway personnel can concentrate on specific bridges and water courses instead of whole counties during floods. With the automatic notification systems, designated personnel can receive alerts via their cell phones when established thresholds are exceeded, allowing them to monitor threatened bridges even before waters rise. As the threat increases, the bridge and roadway can be closed to prevent possible loss of life.

SOURCES:    1) *ENR*, May 26, 2004, article by Tom Ichniowski
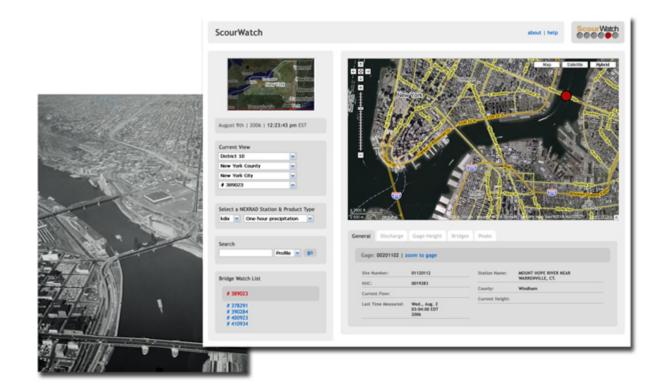            2) *Bridges,* May 1, 2006, article by David Claman, P.E., M.ASCE; Dena M. Gray-Fisher

**Figure 1. Scourwatch screen depicting bridge location and data.**



**Figure 2. Older bridge showing deterioration due to scour (A typical bridge that would be monitored with the Scourwatch system).**