



INDOT Research

# TECHNICAL *Summary*

Technology Transfer and Project Implementation Information

TRB Subject Code: 25-1 Bridges

Publication No.: FHWA/IN/JTRP-2002/8, SPR-2488

July 2002

Final Report

## **Scour Monitoring of Indiana Streams**

### **Introduction**

INDOT is considering the deployment of fixed scour-monitoring instrumentation in the field as part of a systematic response to the problem of scour around bridge piers and the associated FHWA mandates. A previous study had undertaken to investigate two types of scour monitors, one based on a sliding magnetic collar, the other based on a sonar. During two flow events however, the monitors suffered significant damage. This led to a re-design and modifications of how the sonar-based device was mounted to the pier. The latest configuration of the sonar mounting had

been tested in the field for only a year before the end of the previous project, and this was insufficient to yield any definitive recommendations regarding its wider deployment. Similarly, a re-design of the means by which cables from the sliding magnetic collar were routed to the bridge-deck instrumentation box had been suggested but not investigated in depth. The present project therefore aimed at a more extensive testing of the sonar monitor, and an examination of the feasibility of a more robust cable routing for the sliding-collar monitor.

### **Findings**

An on-site investigation (at the SR25 crossing of Wildcat Creek), involving wading out to the pier in a wet suit, indicated that a large and deep scour hole had developed in the vicinity of the magnetic-collar device. An attempt to locate the device on the stream-bed proved unsuccessful, and it was surmised that the device was no longer in its installed position. Because of the size and depth of the scour hole, the proposed re-design of the cable routing would not be, if not physically impossible, certainly not economically feasible.

The testing of the sonar was more successful. Over a period exceeding 24 months, the sonar device at the US52 crossing of the Wabash River has operated continuously without any difficulties due to damage by

floating debris. It has survived several large flow events, though an event of magnitude equal to or larger than that that had previously caused damage did not occur during the testing period. A study of the sonar reading and the corresponding hydrological parameter (river stage) indicated a definite correlation. This is interpreted as evidence that the sonar monitor is reliably providing information regarding the bed level, which is known to vary with stage.

The merits and deficiencies of the different types of scour monitors, including a portable or mobile sonar monitor, are discussed, and recommendations as to type of situations under which each scour monitor might be appropriate are made.

## Contacts

*For more information:*

**Prof. Dennis Lyn**  
Principal Investigator  
School of Civil Engineering  
Purdue University  
West Lafayette IN 47907  
Phone: (765) 494-9615  
Fax: (765) 496-1988

**Indiana Department of Transportation**  
Division of Research  
1205 Montgomery Street  
P.O. Box 2279  
West Lafayette, IN 47906  
Phone: (765) 463-1521  
Fax: (765) 497-1665

**Purdue University**  
Joint Transportation Research Program  
School of Civil Engineering  
West Lafayette, IN 47907-1284  
Phone: (765) 494-9310  
Fax: (765) 496-1105