Smart Rocks for Integrated Monitoring and Mitigation of Bridge Scour

Case 10MST012

Scour is a process in which a fluid erodes material supporting a structure. When scour occurs near a bridge, the associated erosion can cause that bridge to collapse. Bridge collapses occur in hours or days. To prevent them, scour must be monitored and its mitigation strategy must be developed in real time. This invention introduces magnetic embodiments with sensors, a *smart rock* system, to address the challenge of scour monitoring and mitigation in real time. This smart rock system can facilitate evaluation of the critical scour condition of bridges and reduce damage and loss of life from bridge failures caused by scour.

**Benefits of Technology**

- Real time monitoring
- Reliable and robust data
- Easily maintained
- Cost effective
- Can be positioned in areas that other monitoring systems cannot reach

**Potential Commercial Applications**

In the United States, scour is the most common cause of bridge collapses. Before 1997, more than 10,000 bridges out of 460,000 over-water bridges were scour critical and 132,000 were scour susceptible. By 2005, approximately 26,000 of them became scour critical and more than 190,000 bridges became scour susceptible. This invention could prevent bridge collapses by providing real-time monitoring of scour formation and progression. The technology can be applied to other situations as well, such as the monitoring of seismic activity and earthquake prediction.

**IP Status**

US Utility Patent App
13/104,682 Pending

**Development Status**

A prototype has been developed and demonstrated successfully.

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