Sebastian Downs

3/11/13

Student Research Conference

Scour Monitoring Research

Scour refers to the erosion of streambed sediments by moving water. By some estimates, bridge scour is responsible for as much as 60% of all bridge failures. There are three main types of scour. Contraction scour is caused by the narrowing of the river channel as it passes under a bridge. Degradational scour is the riverbed sediment loss due to typical flow conditions. Local scour is created by water flowing around the piers and abutments. All of these can undermine structural supports, and are most severe during flooding.

Many systems for scour monitoring are only useful at a predetermined point location at what is predicted will be the lowest spot, typically the front center of the pier or abutment. These systems are also often expensive to buy and install, or are of limited use, in that they will only trigger at one set depth. Consequently, these systems do not track the formation of scour holes, and so do not allow preparation for future scour events.

Although scour is deepest in front of a structure, this depth often extends around the corner. Additionally, the deepest point is often ahead of the structure, not touching it. This would indicate that not all of the areas of concern can be accounted for in a single point. As of now, there are no systems in use that are capable of monitoring the full extent of riverbed scour in real time at an affordable cost.

What we intend to develop is a scour monitoring system that is affordable to build and easy to install. With a less expensive procurement and installation costs these systems can not only be installed on more bridges, but could feasibly be installed in an array around a single bridge so as to track the scour hole development over time.