



Caltrans Division of Research,  
Innovation and System Information

# Research



# Results



Maintenance

JULY 2021

**Project Title:**

Managing Scour Potential and Impacts

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## In-Situ Scour Testing Device

The In-Situ Scour Testing Device (ISTD) was field-tested to gather data and evaluate the device for potential use in the scour analysis associated with bridge foundation design.

### WHAT WAS THE NEED?

There was a need to improve scour analysis of bridge foundations thereby reducing costs for bridge foundation work and maintaining the safety of bridge foundations.

The United States Federal Highway Administration (FHWA) is developing the next generation of scour programs (NexScour). NexScour research is focused on updating the 1987 scour program currently in use to include water and hydraulic forces in addition to the erosion resistance of the underwater soils. The 1987 scour program is based on a 1-dimensional design equation associated with water flows that is limited in the prediction of scour.

### WHAT WAS OUR GOAL?

To increase the accuracy of the scour-predictive tools available to designers in order to improve the scour analysis for safe and economical bridge foundation designs.

### WHAT DID WE DO?

The FHWA NexScour research has led to the development of the In-Situ Scour Testing Device (ISTD) which will aid in understanding soil erosion resistance and hydraulic forces more accurately than current programs were designed to do. The NexScour hydraulic program separates the scour phenomenon into two components: hydraulic and geotechnical and the program advances the understanding of shear stress decay as the scour depth increases. By comparing the shear stress from the water flow and the shear stress of soil resistance, the depth at which scour reaches equilibrium can be determined. This information is crucial to proper bridge foundation designs.



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## WHAT WAS THE OUTCOME?

The ISTD will be developed further and continue to be refined to produce a 3D scour analysis tool for designers to use in the development of innovative and economical bridge foundation designs.

## WHAT IS THE BENEFIT?

The ISTD has the potential to reduce costs associated with the bridge foundation design by more accurately predicting the scour effect of hydraulic forces and soil resistive forces on the surrounding river bottom.

## LEARN MORE

[Transportation Pooled Fund Program](#)

To view the evaluations, contact:

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## IMAGES



Image 1: The demonstration group observes the Bay City ISTD field test 2



Image 2: The ISTD equipment assembled for field test 3

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