Project Title: Environmental and Cost Effectiveness of Partially Grouted Riprap for Scour Countermeasure

PennDOT Technical Advisor: Peter Berg

Project Duration: May 2014 – June 2019

Project Purposes:

Project purposes are to:

- Develop design guidelines to utilize partially grouted riprap (PGR) as a scour countermeasure mitigation alternative to protect bridge abutments and piers from scour during a flood.
- Collaborate with the PADEP, USACE, PFBC and USFWS in the development of the design guidelines and in support of the technical direction of the research project, in particular, the implementation of these design guidelines and the construction of PGR at scour critical bridge in District 6-0.
- Construct PGR countermeasure at scour critical bridge in District 6-0 in accordance with the developed guidelines.
- Evaluate the environmental impacts on the stream at the installation bridge before, during, and after the construction of the PGR countermeasure through monitoring of hydrologic and hydraulic conditions.
- Perform an inspection at the PGR installation site after a major flood or during the NBIS bridge inspection cycles to assess the performance and the needed maintenance of the constructed PGR countermeasure.

Anticipated Outcomes:

Anticipated project outcomes include:

- PennDOT Design guidelines to utilizing PGR at bridge piers and abutments as a vital countermeasure for scour control and remediation that minimizes environmental impacts and demonstrates strong cost benefit/low life cycle costs. The guidelines will include special provisions to design and install PGR in the dry as well as placed in the wet (under water). The guidelines will include design, construction, inspection, maintenance, and performance specification.
- The design guidelines of PGR countermeasure will have the approval and support of environmental regulating agencies for PGR installation including; PennDOT District 6-0, PADEP, USACE, PFBC and USFWS.
- Grout testing and water quality testing procedures.
- Improved grout mix design and correlation of the field-testing to ASTM testing standards.
- Assessment of the performance standards and maintenance recommendations for the PGR countermeasure.
- Minimize the environmental impact of constructed PGR countermeasure.

In support of PennDOT’s Strategic Goals:

- Leverage resources to maximize effectiveness
- Continually increase efficiency
- Promote continuous improvement and innovation
- Provide timely, quality service for our customers

Research Partner: Temple University
Principal Investigator: Bechara Abboud
Project Cost: $500,000.00