



# Corrosion Monitoring Plan for Emergency Bulkheads at Emsworth Lock and Dam

## ERDC Dredging Operations Technical Support Program (DOTS)

U.S. ARMY CORPS OF ENGINEERS

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### Response Summary:

This DOTS response was requested for the design of a corrosion monitoring system for the emergency bulkheads at Emsworth Lock and Dam, Pittsburgh District. An investigation was performed by ERDC CERL in FY17 that identified the cause of highly accelerated corrosion on the bulkheads as the result of dissimilar metal corrosion and the presence of zebra mussels. ERDC CERL recommended a coating system to mitigate corrosion, and the district requested that the bulkheads be monitored before and after coating to ensure (1) the initial investigation was correct in its diagnosis and (2) the coating system reduces further corrosion. This DOTS response enabled a rapid field survey and system design that was submitted to the district.

### Period of Performance:

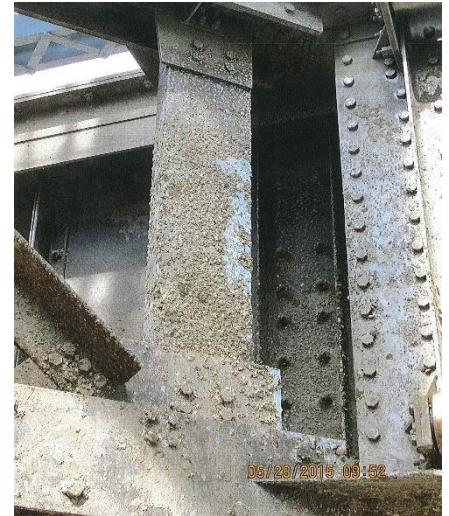
January – February 2018

### Benefits of the Response to the USACE Dredging/Navigation Program:

The benefits of this response and its implementation include (1) increased understanding of dissimilar metal corrosion in USACE hydraulic steel structures (HSS) and the need for design changes to avoid it; (2) increased understanding of the effect of zebra mussels on the corrosion of HSS and potential mitigation techniques; (3) evidence for synergistically accelerated corrosion that occurs when zebra mussels are present under galvanic (dissimilar metal) corrosion conditions; and (4) verification of the reduction of corrosion of the Emsworth emergency bulkheads and return to normal operation.

### Deliverable:

This response generated a system design with hardware/software recommendations for corrosion monitoring of the Emsworth emergency bulkheads. This system enables data collection that can be used to determine the causes of accelerated corrosion and to verify that the applied coating system reduces further corrosion. The district approved the design and funded the design implementation. The system was installed in JUN 2018, and data collection is anticipated to be completed in SEPT 2018. System provides the capability for other infrastructure in the future to monitor corrosion, especially under galvanic (dissimilar metal) corrosion conditions.



Extreme pitting corrosion present on emergency bulkheads



Corrosion sensors mounted on emergency bulkheads



Providing environmental and engineering technical support to the U.S. Army Corps of Engineers Operations and Maintenance navigation and dredging missions

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DOTS ID: DOTS-18-R11