Bioinspired Adhesion of Dredge Sediment for Field Placement Applications

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS BUILDING STRONG®

Focus Area

Dredged Material Management

Problem

The United States Army Corps of Engineers' mission to evaluate and move dredge sediment requires innovative solutions to meet the demand for the 70% beneficial use of dredge sediment by 2030. The placement of dredge sediment into the environment as a solid structure (i.e. habitat, embankments, seawalls) with little to no damage to the local environment requires a way to solidify the placed dredge sediment. Currently, placed dredge sediment needs to be deployed in such a manner to avoid the effects of weathering and erosion which limits the potential beneficial use opportunities.

Study Description

The project's purpose is to develop methods to create a bio-adhesive to expand the beneficial uses of dredge sediment in novel way by creating structures that can be placed long-term at needed sites. The methods and techniques developed will explore primarily bio-adhesion methods of keeping dredge sediment sedimented, however non-bioinspired methods will also be explored to cover the broadest of needs for solidifying dredge sediment with causing little to no damage to the surrounding environment at the placement site. The project will focus on four objectives: 1) Refining dredge sediment adhesives, 2) durability tests of dredge sediment solidified with adhesives, 3) potential site impacts of adhesives, and 4) structure design and site field placement.

Products

ERDC Technical Note (Q4 FY26) – Low-energy methods for dredge sediment adhesion

Journal Article (Q4 FY27) – Bioinspired adhesives for dredge sediment structures field placement

Video – ERDC Video showcasing the technology adhesive technology and field placement of structures (Q4 FY28)

Summary

Detailed methods and understanding for non-fire adhesives for dredge sediments solidification will be developed for field site placement of dredge material structures. This research topic will explore and develop optimal methods for the use of bioinspired adhesive for dredge sediment for field placement, determine the non-fire solidified dredge sediment structures durability, and quantify site impacts. The research topic will increase the USACE capabilities for beneficial use of dredge sediments by creating durable structures with onsite technologies.

Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.

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Research Products

Product Type	Product Title

Balancing operational and environmental initiatives and meeting complex challenges of dredging and dredged material placement in support of the navigation mission.

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