



Cost-Effective Stabilization of Dredged Sediment for Capping and Beneficial Use

Dredging Operations Environmental Research (DOER) Program

U.S. ARMY CORPS OF ENGINEERS

BUILDING STRONG®

Focus Area

Risk Management

Problem

Beneficial use of dredged fine-grained sediment (FGS) is limited, in part, due to dispersive nature of the sediments after placement, but before consolidation. Stabilizing FGS immediately after placement can increase application for source control, permanent capping, thin layer placement in intertidal zones, and wetland construction. A need exists to evaluate potential for using dredged FGS in beneficial use projects and identify potential amendments to help stabilize sediments rapidly after placement.

Study Description

This RT will take advantage of a large, pre-existing dataset of Sedflume erosion testing performed on dredged FGS from across the nation. These data will be examined to determine if certain physical characteristics can be utilized to identify dredged FGS most appropriate for capping and other beneficial use projects. Additionally, erosion testing on amendments that have potential to stabilize dredged sediment will be reviewed to identify for testing and evaluation. New laboratory testing will then be designed and conducted to investigate the impact of added sediment stabilizers/amendments (e.g. Aquablok™, granular bentonite, granular activated carbon, and extracellular polymeric substances (EPS)) to erosion resistance and consolidation times of dredged FGS. Finally, potential demonstration sites will be identified where dredged FGS will be beneficially utilized and field monitoring/sampling will be conducted to evaluate the effectiveness of the constructed feature.

Products

Multiple peer-reviewed reports discussing the methods and results of the research will be produced as a result of this RT. Technical reports generated by this RT will provide guidance as to what materials are most appropriate for use in beneficial use projects. Journal papers will discuss the methods and findings of this work in terms that expand beyond the specific field demonstration sites and impact the greater engineering and scientific community.

Summary

The USCAE is seeking ways to reduce the placement of dredged sediments in upland or offshore disposal areas, and instead utilize the sediments beneficially within the local system. The ability to apply clean rapidly stabilized, navigation dredged FGS for beneficial use could save nearly half of the cost of alternative disposals practices. The objectives of this research task are to develop the necessary test methods, analytical tools, and interpretative guidance for identifying dredged FGS most appropriate for beneficial use and how amendments can be applied which rapidly stabilize the created deposit. This guidance will increase beneficial use to support source control, construct caps, and place dredged FGS for wetland construction and enhancement of intertidal zone elevation.



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

David Perkey

ERDC Coastal & Hydraulic Lab • David.Perkey@usace.army.mil

November 2019