Tech Brief

Laboratory Study Geotechnical Benefits of Mixing Construction and Demolition Screenings with Cement-Amended Dredged Materials

OENJ-RU9247 September 2001

HERE'S THE PROBLEM

Stabilized Dredged Material (SDM) and Construction and Demolition Screenings (CDS) are currently used as fill materials at brownfield sited, provided that permitted sites have proper environmental controls and that each of these materials is processed prior to placement, however research is needed to evaluate the geotechnical benefits of mixing CDS and with SDM.

AND, HERE IS THE SOLUTION…

Researching alternative beneficial use for dredged material through an assessment of geotechnical benefits of mixed CDS and SDM to determine their engineering properties.

BUT, HOW CAN IT BE DONE?

By evaluating construction and demolition screenings with cement-amended dredged materials in different sample mixes prepared and tested for geotechnical characteristics.

THESE ARE OBJECTIVES OF THE STUDY…

- To evaluate available data on Construction and Demolition Screenings and Stabilized Dredged Material.
- To perform geotechnical testing on selected materials.
- To analyze and evaluate testing results.

AND, HERE'S WHAT WE DID…

This research study began with an evaluation of available data about SDM and CDS, as both plentiful in the New Jersey and New York metropolitan area and are being processed and disposed of at brownfields sites.

Previous studies have evaluated the use of cement to stabilize raw dredged material or the options for disposing of CDS. However, little information is available about mixing such materials.

Sampling took place in Bayonne, New Jersey, at a site where geotechnical and environmental conditions of the structural fill have been evaluated and the fill is considered appropriate for the end-use of the property.

A laboratory study was performed to assess the geotechnical benefits of mixing CDS with cement-amended dredged materials. Different sample mixes were prepared and tested for geotechnical characteristics. Soil index properties, drying curves, permeability, consolidation, swell, compaction, and strength were determined.

Adding CDS improved the workability of the dredge by reducing the water content of the SDM. Reduction of water content of the mixtures at the processing stages accelerated the field handling and drying processes, thus preventing strength losses and reducing construction delays associated with the aeration and drying of SDM.

CONCLUSION…

A summary of soil characterization for each mix was compiled. All samples were classified as A-7-5 and MH according to the AASHTO and USCS systems. The addition of CDS to the SDM did not change any of the classification in the 20%CDS and 40%CDS samples in any of the systems of classification. However, as the amount of CDS increases, there is a marginal decrease in the clay content and an increase of the silt fraction.

Based on the results of this study, it can be concluded that the mix of CDS and dredged materials has similar engineering properties to those of dredged materials. The final product has lower water content than the stabilized dredged material, making it easier to compact and more manageable. The results of this study indicate that there are no geotechnical disadvantages resulting from the addition of CDS to SDM.

WHAT IS THE NEXT STEP?

Additional field testing is recommended to determine the most suitable mixing procedures before implementation of combining CDS and SDM. It is also recommended, to avoid any reduction in strength, that CDS be mixed with SDM at proportions not to exceed 20 percent. During implementation, a monitoring plan should be designed to better determine or confirm the actual geotechnical conditions of the soil media in the field.

FOR MORE INFORMATION CONTACT:	
PROJECT MANAGER:	**Mr. Farhad Jafari**
PHONE NO.	
e-mail	
UNIVERSITY PRINCIPAL INVESTIGATOR	**Dr. Ali Maher**
UNIVERSITY:	**Rutgers University**
PHONE NO.	**(732) 445-0577**
e-mail	**mmaher@rci.rutgers.edu**
PRINCIPAL INVESTIGATORS	**Mr. Nestor Soler**
ORGANIZATION:	**Icon Engineering, Inc.**
PHONE NO.	
e-mail	

If you would like a copy of the full report, please and ask for:

Report Title: Laboratory Study Geotechnical Benefits of Mixing Construction and Demolition Screenings with Cement-Amended Dredged Materials

Research Report No: OENJ-RU9247