Case Study Beneficial Use of Sediments

Project	***Pneumatic Flow Tube Mixing/Stabilization of Soft Sediments***
Classification	*R1A_2015_US*
Major Funtion	*Raw Material*
Other Funtion	*Reclamation*
Location	*Kearny, New Jersey, USA*
Volume	*3,928 m³*
Technique	*Stabilization via Pneumatic Flow Tube Mixing (PFTM)*
Contaminants	*PAHs, Metals*
Granulometry	*Silty sediment with approximately 3-8% organic content*
Scale	*Pilot Scale*
Client	*New Jersey Department of Transportation*
Executor	*Jafec USA, Clean Earth, Inc*
Research program	*Rutgers University, Center for Advanced Infrastructure and Transportation*
Contact	*Robert Miskewitz, Ph.D. Research Associate Professor, Rutgers University* rmiskewitz@envsci.rutgers.edu
Year start - end	*2015*

Description of the project

A pilot study was conducted to evaluate the use of the Pneumatic Flow Tube Mixing (PFTM) method for the stabilization and solidification of soft sediments dredged from the New York/New Jersey Harbor (NY/NJ). PFTM is a novel technology developed to allow the rapid conversion of soft dredged material into a more stable mixture that can be used for structural and filling applications by adding stabilising material to dredge sediment in controlled doses.

In this case a trial was conducted whereby sediment was stabilized with Portland cement at five different dosages and three different initial moisture contents. The PFTM apparatus was assembled and tested on 7/24/2015. Production began on 8/4/2015 and ran through 9/4/2015. The total amount of material processed during the deployment was 3,928 m^3.

The average strength of amended sediments with 8% cement content (by wet weight), after 28 days, prepared and cured in the laboratory is approximateley 200 kPa. The stabilized material was found to be acceptable by the site contractors using their standard plate test. Analysis of leachability of the contaminants from the amended sediment samples, indicate no detectable mass of SVOCs, PCBs, or Pesticides.

The only metal detected in the leaching tests was arsenic and comparison of stabilized material to raw sediment indicate that approximately 75% of the leachable arsenic was bound by the 8% Portland cement mix and approximately 80% was bound by the 12% Portland cement mix.

This project successfully demonstrated that the PFTM process could be used for sediments dredged from the NY/NJ Harbor and the resulting amended material possessed the required strength and chemical characteristics for upland placement and beneficial reuse.

The results of the laboratory and field experimental program demonstrate that the process yields an amended material that possesses the appropriate structural and chemical characteristics.

Graphical information

Figure 1: -Pneumatic flow tube mixing tool

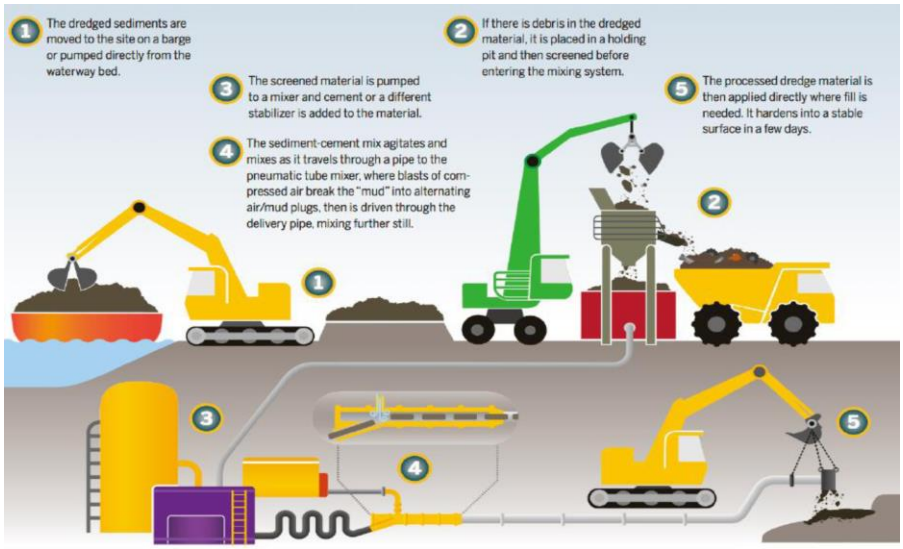

Figure 2. Pneumatic flow mixing tool (process flow)

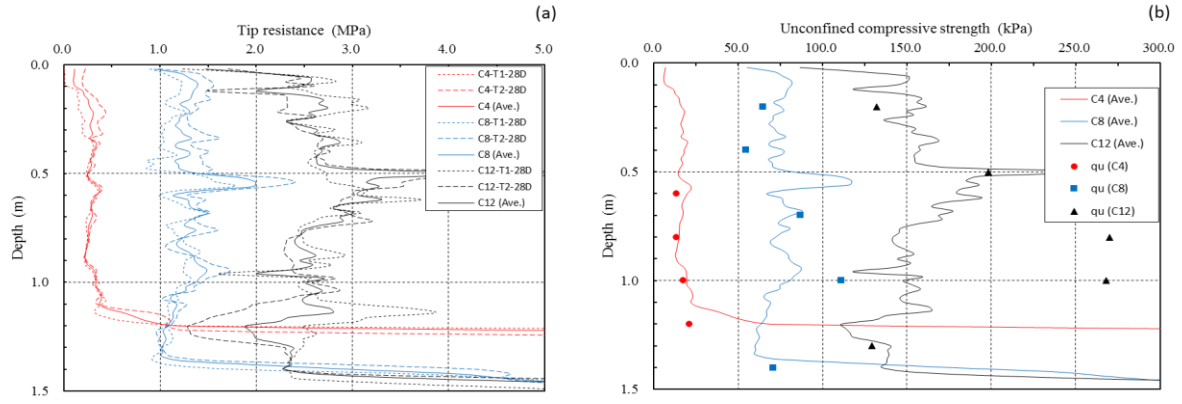

Figure 3. In-situ Strength Characteristics of Stabilized Sediment

References/web links

1. *Maher, A., Kitazume, M., Janbaz, M., Miskewitz, R., Douglas, S., and Yang, D., (2016) Utilization of Pneumatic Flow Tube Mixing Technique (PFTM) for Processing and Stabilization of Contaminated Harbor Sediment. Marine Georesources & Geotechnology, http://dx.doi.org/10.1080/1064119X.2016.1257668*