Evaluation of Sustainable and Environmentally Friendly Stabilization of Cohesionless Sandy Soil for Transportation Infrastructure Dataset

Dataset available at: https://digitalcommons.lsu.edu/transet_data/113

(This dataset supports report **Evaluation of Sustainable and Environmentally Friendly Stabilization of Cohesionless Sandy Soil for Transportation Infrastructure**)

This U.S. Department of Transportation-funded dataset is preserved by the Transportation Consortium of South-Central States (TRAN-SET) in the LSU Digital Commons Repository (https://digitalcommons.lsu.edu), and is available at https://digitalcommons.lsu.edu/transet_data/113

The related final report **Evaluation of Sustainable and Environmentally Friendly Stabilization of Cohesionless Sandy Soil for Transportation Infrastructure**, is available from the National Transportation Library's Digital Repository at https://rosap.ntl.bts.gov/view/dot/61739.

Metadata from the LSU Digital Commons Repository record:

Authors:

- Miladin Radovic, Texas A&M University
- Anand Puppala, Texas A&M University
- Surya Sarat Chandra Congress, Texas A&M University
- Jungyeon Jang
- Oscar Huang

Document Type: Data Set
Publication Date: 8-2021

Abstract: Ordinary Portland cement (OPC) is generally used to stabilize cohesionless sandy soils that are often found in coastal areas. Due to its high carbon footprint, many studies are being conducted to identify a suitable green alternative for stabilizing cohesionless soils. Previous studies have shown that partially replacing OPC with waste materials such as nano-silica and coal waste reduces the overall carbon footprint without significantly impacting the performance. Geopolymer (GP) received a lot of attention in the past few decades owing to its similar properties to that of OPC yet with a lower carbon footprint. This study investigated the feasibility of stabilizing cohesionless sandy soils with metakaolin-based GP. Engineering and characterization tests such as shrinkage, strength, pH, scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS) were performed to evaluate various characteristics of the stabilized mixes with different dosages of geopolymer and relate them to microstructural changes. Notably, GP-treated soils did not deteriorate during the durability tests, whereas the OPC-treated soil only retained about 75% of its strength. This is an indication that GP could be a better choice than OPC in coastal areas where cohesionless soils often experience heavy rainfall and flooding. Overall, an optimum dosage of GP improved both the mechanical properties and durability of cohesionless soils.

Comments: Tran-SET Project: 20GTTAMU21

Recommended citation:
Radovic, M., Puppala, A., Chandra Congress, S., Jang, J., & Huang, O. (2021). Evaluation of Sustainable and Environmentally Friendly Stabilization of Cohesionless Sandy Soil for Transportation Infrastructure. Retrieved from https://digitalcommons.lsu.edu/transet_data/113

Dataset description:
This dataset contains 1 file collection described below.

Data.zip:
- XRD data.xlsx
- UCS_detailed.xlsx
- Summary USC.xlsx
- pH tests.xlsx
- Particle size distribution of natural soil.xlsx
- Mr Test.xlsx
- EDS.xlsx
- Durability Tests.xlsx

File Type Descriptions:
- The .xlsx and .xls file types are Microsoft Excel files, which can be opened with Excel, and other free available software, such as OpenRefine.

National Transportation Library (NTL) Curation Note:
As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (https://ntl.bts.gov/public-access) Section 7.4.2 Data, the NTL staff has performed ***NO*** additional curation actions on this dataset. NTL staff last accessed this dataset at https://digitalcommons.lsu.edu/transet_data/113 on 2022-05-20. If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.