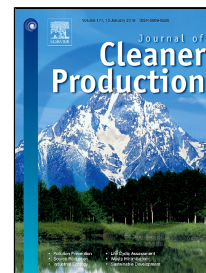


Accepted Manuscript

Sustainable Reuse of Excavation Soil in Cementitious Composites

P. Priyadharshini, K. Ramamurthy, R.G. Robinson



PII: S0959-6526(17)32930-X
DOI: 10.1016/j.jclepro.2017.11.256
Reference: JCLP 11395
To appear in: *Journal of Cleaner Production*

Received Date: 31 May 2017
Revised Date: 26 November 2017
Accepted Date: 30 November 2017

Please cite this article as: P. Priyadharshini, K. Ramamurthy, R.G. Robinson, Sustainable Reuse of Excavation Soil in Cementitious Composites, *Journal of Cleaner Production* (2017), doi: 10.1016/j.jclepro.2017.11.256

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Sustainable Reuse of Excavation Soil in Cementitious Composites

P. Priyadharshini¹, K. Ramamurthy¹, R. G. Robinson²

¹Building Technology and Construction Management Division, ²Geotechnical Engineering Division,
Department of Civil Engineering, Indian Institute of Technology Madras, Chennai 600 036, India.

Highlights

- A zero wastage technology for the utilisation of excavated soil waste is suggested.
- The sand fraction, separated by wet sieving, is used as a replacement for the depleting river sand.
- The by-products, wash water and residual clay, are also utilised.
- Wash water can be used for mortar production
- Calcined residual clay can be used as a pozzolanic material in cement mortar.

Abstract

The possibility of reusing excavated soil as an alternate for river sand in the production of mortar was studied. The soil samples before and after wet sieving were used as fine aggregate in mortar preparation. The resulting wash water in wet sieving was analysed for the presence of soluble ions and its effect in cement hydration and mortar properties. Residual clay from the wet sieving process was also studied for its use as pozzolan in cement mortar by thermal treatment. Several tests, including flow table test, dry density, compressive strength, water absorption and drying shrinkage were performed to understand the effect of washing treatment on excavation soil based cement mortar. From the test results it was concluded that washing treatment is effective in the usage of excavated soil as fine aggregate.

Keywords: soil, fine aggregate, wet sieving, residual clay, wash water, cement mortar, shrinkage

1. Introduction

River sand remains the major source of fine aggregate in construction industry. The requirement is increasing with the need for infrastructure development. On the other hand, construction activities also result in large volume of soil from the excavation activities. Excavated soils produced at construction sites, mines, road works, tunnelling, are mostly dumped in open grounds causing environmental problems. Based on the amount of clay and fines content, the classification of these soils lies anywhere between highly siliceous to totally

Download English Version:

<https://daneshyari.com/en/article/8099437>

Download Persian Version:

<https://daneshyari.com/article/8099437>

[Daneshyari.com](https://daneshyari.com)