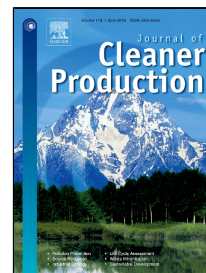


# Accepted Manuscript

A calculation model for compressive strength of cleaner earth-based construction with a high-efficiency stabilizer and fly ash



Cong Ma, Youjun Xie, Guangcheng Long

PII: S0959-6526(18)30466-9  
DOI: 10.1016/j.jclepro.2018.02.153  
Reference: JCLP 12100  
To appear in: *Journal of Cleaner Production*  
Received Date: 12 July 2017  
Revised Date: 27 November 2017  
Accepted Date: 14 February 2018

Please cite this article as: Cong Ma, Youjun Xie, Guangcheng Long, A calculation model for compressive strength of cleaner earth-based construction with a high-efficiency stabilizer and fly ash, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.02.153

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.

# A calculation model for compressive strength of cleaner earth-based construction with a high-efficiency stabilizer and fly ash

Cong Ma, Youjun Xie and Guangcheng Long\*

(School of Civil Engineering, Central South University, Changsha, 410075, P. R. China)

**ABSTRACT:** The earth-based construction with unique advantages of wide source of raw material, low energy consumption and carbon emission has attracted growing attention recently. This study employs a cement-based high-efficiency stabilizer and fly ash to improve the mechanical properties of earth-based construction. And the influences of fly ash on compressive strength and key variables for strength development are studied by measuring the mechanical and physical properties. Total stabilizer content ( $C_T$ ) which changes slightly with curing time and the calculation method of  $C_T$  values are put forward based on the pozzolanic and dispersing effects of fly ash in stabilized earth. An integrated parameter taking into account multiple variables, such as stabilizer and fly ash contents, curing time and physical indexes, is defined as the ratio of void ratio to total stabilizer content ( $e_t/C_T$ ), and the relationship of compressive strength to  $e_t/C_T$  is analyzed by exponential and power functions. The after-curing physical indexes are dependent upon the initial ones, total stabilizer content and curing age. Subsequently, the calculation formulae for physical indexes are proposed through the multiple linear regression and power regression. Finally, the strength-calculation model with a deviation between calculated values and measured results of lower than 10% is developed to guide the design of earth-based construction admixed with the high-efficiency stabilizer and fly ash. Embodied environmental impact evaluation indicates that the combination use of stabilizer and fly ash is a novel low-CO<sub>2</sub> emission method for preparing cleaner earth-based construction.

Keywords: Earth-based construction, Unconfined compressive strength, Physical index, Strength-calculation

---

Corresponding author.  
E-mail address: [scc2005@csu.edu.cn](mailto:scc2005@csu.edu.cn), [macong2211@126.com](mailto:macong2211@126.com)

Download English Version:

<https://daneshyari.com/en/article/8097010>

Download Persian Version:

<https://daneshyari.com/article/8097010>

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