

Author's Accepted Manuscript

A study on environmental and economic impacts of using waste marble powder in concrete

Manpreet Singh, Kailash Chaudhary, Anshuman Srivastava, Kuldip Singh Sangwan, Dipendu Bhunia



PII: S2352-7102(17)30103-1
DOI: <http://dx.doi.org/10.1016/j.jobee.2017.07.009>
Reference: JOBE303

To appear in: *Journal of Building Engineering*

Received date: 25 February 2017
Revised date: 26 July 2017
Accepted date: 26 July 2017

Cite this article as: Manpreet Singh, Kailash Chaudhary, Anshuman Srivastava, Kuldip Singh Sangwan and Dipendu Bhunia, A study on environmental and economic impacts of using waste marble powder in concrete, *Journal of Building Engineering*, <http://dx.doi.org/10.1016/j.jobee.2017.07.009>

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 galley proof before it is published in its final citable 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 study on environmental and economic impacts of using waste marble powder in concrete

Manpreet Singh^{a*}, Kailash Chaudhary^b, Anshuman Srivastava^a, Kuldeep Singh Sangwan^b, Dipendu Bhunia^a

^a*Civil Engineering Department, Birla Institute of Technology and Science, Pilani, Pilani Campus, Rajasthan, 333031, India*

^b*Mechanical Engineering Department, Birla Institute of Technology and Science, Pilani, Pilani Campus, Rajasthan, 333031, India*

*Corresponding Author. +91-9780508420. manpreet_singh04@yahoo.com

Abstract

Gainful utilization of waste marble powder in various construction practices has become a topic of interest in research areas. An overview of works reported regarding the use as partial replacement of sand and cement by marble powder in concrete is presented in the paper. Gaps in the studies to date have been pointed out. An environmental impact comparison of normal concrete with the use of marble powder as partial replacement of cement and sand is carried out using the UMBERTO NXT life cycle analysis software with ReCipe midpoint and endpoint methods. Finally, a detailed cost analysis study has been performed to justify the use of marble powder in concrete which has exhibited encouraging results in terms of strength and quality. It has also been found that the use of marble slurry in concrete reduces its environmental impact and is economically beneficial.

Keywords: Concrete, marble powder, life cycle assessment, cost analysis, eco-efficient.

Introduction

Marble is one of the most common building materials used since ancient times. Marble is used for construction and decoration purposes and its mineralogical constituents vary depending on its place of origin. Marble is processed for different applications generating a huge amount of waste either at quarries or at processing plants. During its processing, 30% percent of marble becomes waste because of being irregular in shape or smaller in size. The amount of waste is 2% to 5% in

Download English Version:

<https://daneshyari.com/en/article/4923058>

Download Persian Version:

<https://daneshyari.com/article/4923058>

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