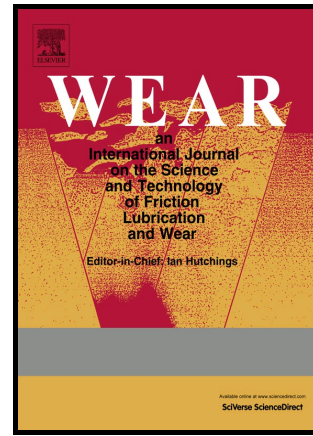


Author's Accepted Manuscript

A probabilistic model for the erosion of cement-based composites due to very high-speed hydro-abrasive flow

A.W. Momber



PII: S0043-1648(16)30186-7
DOI: <http://dx.doi.org/10.1016/j.wear.2016.08.011>
Reference: WEA101762

To appear in: *Wear*

Received date: 12 June 2016
Revised date: 24 August 2016
Accepted date: 26 August 2016

Cite this article as: A.W. Momber, A probabilistic model for the erosion of cement-based composites due to very high-speed hydro-abrasive flow, *Wear* <http://dx.doi.org/10.1016/j.wear.2016.08.011>

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 a 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 probabilistic model for the erosion of cement-based composites due to very high-speed hydro-abrasive flow

A.W. Momber

Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen

Faculty of Georesources and Materials Technology

Wolfgangsweg 12

20459 Hamburg, Germany

E-Mail: andreas.momber@t-online.de

Abstract

A probabilistic model $\dot{V}_M \propto 1 - \exp[-z \cdot (\sigma_T/\sigma_C)^m]$, originally developed for comminution processes, is applied to cement-based materials, eroded by water-driven abrasive particles with velocities as high as 552 m/s. In the equation, \dot{V}_M is the volumetric erosion rate, and the ratio σ_T/σ_C is the dimensionless impact stress (tensile stress/compressive strength). Based on experimental investigations, values for the scale parameter (z) and the shape parameter (m) are estimated for five cement-based materials. Results of Spearman's rank coefficient calculations show that the scale parameter is particularly sensitive to the compressive strength, and this effect is explained through higher flaw densities in low-strength materials.

1. Introduction and model approach

Demolition, cutting and separation of reinforced structures are major parts of repair, recycling and decommissioning processes. The utilization of stream-line tools, which are characterized by high local energy input, for these applications is a promising strategy. Approaches for the implementation of such a cutting strategy include the use of hydro-abrasive cutting tools [1-4]. Erosion, as a material removal mechanism, is actually the generation of a number of chips, or debris. Shape and size of the debris depend on numerous process and material

Download English Version:

<https://daneshyari.com/en/article/4986879>

Download Persian Version:

<https://daneshyari.com/article/4986879>

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