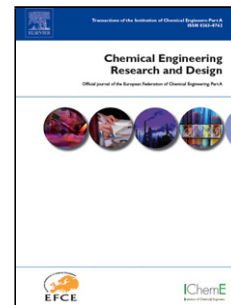


Accepted Manuscript

Title: Numerical investigation of collision dynamics of wet particles via force balance

Author: Britta Buck Johannes Lunewski Yali Tang Niels G. Deen J.A.M. Kuipers Stefan Heinrich



PII: S0263-8762(18)30091-1
DOI: <https://doi.org/doi:10.1016/j.cherd.2018.02.026>
Reference: CHERD 3055

To appear in:

Received date: 1-9-2017
Revised date: 15-1-2018
Accepted date: 16-2-2018

Please cite this article as: Britta Buck, Johannes Lunewski, Yali Tang, Niels G. Deen, J.A.M. Kuipers, Stefan Heinrich, Numerical investigation of collision dynamics of wet particles via force balance, *Chemical Engineering Research and Design* (2018), <https://doi.org/10.1016/j.cherd.2018.02.026>

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.

Numerical investigation of collision dynamics of wet particles via force balance

Britta Buck^{a,*}, Johannes Lunewski^a, Yali Tang^{b,c}, Niels G. Deen^c, J.A.M. Kuipers^b, Stefan Heinrich^a

^a*Institute of Solids Process Engineering and Particle Technology, Hamburg University of Technology, Denickestrasse 15, 21073 Hamburg, Germany*

^b*Multiphase Reactors Group, Department of Chemical Engineering and Chemistry, Eindhoven University of Technology, P.O. Box 513, 5600 MB Eindhoven, The Netherlands*

^c*Multiphase & Reactive Flows Group, Department of Mechanical Engineering, Eindhoven University of Technology, P.O. Box 513, 5600 MB Eindhoven, The Netherlands*

Abstract

Knowledge of collision dynamics of solid materials is fundamental to understand and predict the behavior of particulate macro processes such as in fluidized beds, mixers and granulators. Especially, particle collisions with the presence of liquids are still not fully understood. Many experimental investigations address energy dissipation due to the collision and the liquid involved. For this the so called coefficient of restitution is often used, which is defined as ratio of rebound to impact velocity, as such describing dissipation of kinetic energy. In this work a numerical model based on force balances is proposed, which predicts the coefficient of restitution for normal and oblique collisions of a particle and a wet plate. The model is validated by extensive experiments regarding the influence of collision parameters such as collision velocity and angle, liquid properties as well as initial particle rotation. Good agreement between model and experiments is found for all investigated parameters.

Keywords: Coefficient of restitution; force balance; collision; liquid layer; numerical model

*Corresponding author e-mail: britta.buck@tuhh.de

Download English Version:

<https://daneshyari.com/en/article/7006318>

Download Persian Version:

<https://daneshyari.com/article/7006318>

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