

Accepted Manuscript

Predicting feeder performance based on material flow properties

Yifan Wang, Tianyi Li, Fernando J. Muzzio, Benjamin J. Glasser

PII: S0032-5910(16)30880-4
DOI: doi:[10.1016/j.powtec.2016.12.010](https://doi.org/10.1016/j.powtec.2016.12.010)
Reference: PTEC 12158

To appear in: *Powder Technology*

Received date: 6 August 2016
Revised date: 1 December 2016
Accepted date: 3 December 2016



Please cite this article as: Yifan Wang, Tianyi Li, Fernando J. Muzzio, Benjamin J. Glasser, Predicting feeder performance based on material flow properties, *Powder Technology* (2016), doi:[10.1016/j.powtec.2016.12.010](https://doi.org/10.1016/j.powtec.2016.12.010)

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.

Predicting Feeder Performance Based on Material Flow Properties

Yifan Wang¹, Tianyi Li¹, Fernando J. Muzzio¹, Benjamin J. Glasser^{1*}**Abstract**

Purpose: Accurate and consistent delivery of materials by well-designed feeders ensures overall process stability. Importantly, feeding performance is strongly dependent on material flow properties. The purpose of this study is to develop a methodology that identifies predictive correlation between material flow properties and feeder performance. **Method:** The proposed methodology includes techniques to characterize material flow properties, methods to quantify feeding performance of a loss-in-weight feeder, and predictive multivariate analysis. Two approaches to correlate feeding performance and material flow properties were examined in the study: principal component analysis, followed by similarity scoring (PCA-SS), and partial least squares regression (PLSR). **Results:** Experimental results showed that selection of the optimal feeder screw to achieve optimum feeding performance is heavily dependent on material flow properties. Both approaches to predict feeding performance based on material properties were validated. In addition, a strong correlation between the initial feed factor of each material and its flow properties were observed. **Conclusion:** The work presented here has demonstrated an efficient approach to correlate material properties with gravimetric feeder performance. This approach is especially powerful in the early phase of process and product development, when the amount of a material is limited.

Keywords: Powder, Powder flow, loss-in-weight feeder, Multivariate analysis, Process development.

1. Department of Chemical and Biochemical Engineering, Rutgers University, Piscataway, NJ 08854, USA

* Corresponding author (bglasser@scarletmail.rutgers.edu)

Download English Version:

<https://daneshyari.com/en/article/4910697>

Download Persian Version:

<https://daneshyari.com/article/4910697>

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