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Energy Efficiency in Systems for Pneumatic Conveying by Solids Feeder

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Abstract

Dry granulate or powder material is transported using the pneumatic conveying of particles engineering method. Adriano's doctoral dissertation's goal is to propose a modeling framework for optimizing pneumatic conveying systems' energy efficiency while taking into account the unique bulk properties of the product being transported. The foundation of this study is the technical optimisation of a workflow using information from an industrial operation that is controlled by a Programmable Logic Controller (PLC) that executes logical, sequential, and timed activities for plant control. In order to connect with the process operator through a graphical environment interface, the PLC interfaces with a Human-Machine Interface and a Supervision and Control System. It has been demonstrated on an industrial scale that it is possible to control a conveying system using only two input parameters by using mathematics to develop a systematic technique to choose the gas (air) pressure and flow required to operate a pneumatic conveying system in dense phase. As a result, OPEX is decreased while still operating at predetermined conveying rates with less electricity used. This study applies a methodical modeling technique to optimize energy efficiency in order to lower operational expenditure (OPEX). Since pneumatic conveyance relies heavily on actual data, general models are challenging to develop. These restrictions mean that measuring energy efficiency is typically restricted to a particular experimental set of circumstances. This approach can be modified to increase the energy effectiveness of other kinds of systems for pneumatic conveying.

Keywords

Bulk solids; Energy; Energy efficiency; Optimization; Pneumatic conveying.

Biographies

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