A study of the impact of using different DEM-CFD models in a real case industry simulation

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ABSTRACT

A few successful coupling cases between commercial and open-sources DEM and CFD packages were published in the literature, along with experimental validation, indicating the feasibility of this modelling approach to take in account the effect of volume displacement by particles and the drag force of the fluid on the particles. The coupled CFD-DEM approach seems to be a promising approach to model granular-fluid systems, enlarging the range of coupled particle-fluid systems that can be managed with numerical simulations. Complex phenomena such as pneumatic conveying, granular drying, slurry flow inside grinding mills or even chemical reactions between particles and fluid can be handled.

There are many ways to couple CFD and DEM technologies: 1 way single geometry, 1-way multiple geometry and 2-way single and multiple geometries approaches are examples. At this work, the commercial softwares Rocky (DEM) and Fluent (CFD)are used. The aim of this study is to evaluate results achieved using these different models, evaluating the relevance of the additional physical representation each model includes, compared against validated data.

Different number of particles will be also used to define the impact of this key parameter in the cost-benefit analysis of the above mentioned CFD-DEM approaches.