

Abstract

In different areas of industry (mining, food processing, pharmaceutical, manufacturing...), the problem of grain, aggregate and clusters flow arises during the handling activities especially loading and unloading. Thus, the study and control of the parameters that govern the flow of the granular medium and its interaction with its environment are key parameters to achieve the desired operational excellence and performance of these activities. The adhesion of granular materials on various surfaces of equipments (trucks surfaces, hoppers, silos...) is one of the major problems facing mining companies. In this paper we presented the Calibration of the Discrete Element Method (DEM) parameters for modeling phosphate ore built on the identification of the repose angle. This will help us to specify the correct inputs parameters that will be introduced for the modeling of adhesion phenomena. First we introduced the model contact which allow us to well define contact between phosphate particles-particles (or clusters-clusters) and phosphate particles (clusters) with tipper surface taking into consideration the cohesive and plastic nature of the contact. Secondly, we presented a calibration method based on the determination of the repose angle of the phosphate ore.

This work constitutes the first part for the study of phosphate or clogging. Indeed, the identification of the different parameters that define phosphate by the calibration method will allow us to better model the phenomenon with the DEM method. The study of the impact velocities will be used to model the stresses and strains on the tipper surface during the loading and unloading of the phosphate in our next work.

Keywords: Phosphate ore, Calibration ,DEM, Contact model, Angle of Repose, EDEM®