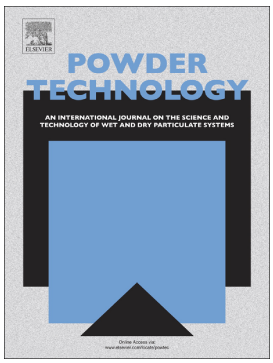

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Numerical prediction of wear in SAG mills based on DEM simulations

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ABSTRACT：Wear is a major operating problem for semi-autogenous grinding (SAG) mills. A credible and efficient numerical approach for accurately predicting wear within SAG mills can significantly reduce design time and improve grinding efficiency. In this paper, the 3D simulations were performed using discrete element method (DEM) combined with an erosion model, which is referred to as Shear Impact Energy Model (SIEM), to predict wear within a SAG mill. The approach is quantitively validated against the corresponding experiment reported by other researchers. The results show that the rotation speed significantly affects the wear rate and wear distribution on the liners. In addition, the effects of changes in lifter shape on wear within the SAG mill are also obtained and analyzed. The primary reason for wear on the liners is revealed based on the simulation results: it is the intense collisions between the particles and the liners during the acceleration of the particles in the toe region that cause the severe wear. Finally, the rotation speed and lifter shape are synthetically evaluated from the aspect of wear and energy utilization.

Keywords: Discrete element method (DEM), Semi-autogenous grinding (SAG) mill, Wear, Grinding, Erosion.

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