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SOLID MATERIAL MOTION LAW IN VERTICAL FEEDING SYSTEM WITHIN FULLY MECHANIZED COAL MINING AND BACKFILLING TECHNOLOGY

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Abstract

Based on principles of feeding solid waste into vertical boreholes in fully mechanized coal mining and backfilling technology, the literature established a trajectory model of particles in gas-solid two-phase flow for the sake of reducing the damage to storage silo underground done by enormous impulsive force generated by falling solid waste. In addition, dynamical analysis method in gas-solid two-phase flow field was adopted herein to study the solid particles' force characteristics and the research indicates that air viscous resistance and gravity are major vertical forces affecting the movement of solid particles. And furthermore, correlation equations about their displacement, velocity and acceleration were composed and obtained using MATLAB software. Motion law of solid particles in a vertical pipe, by considering actual conditions of a certain coal mine, has been thus figured out: the motion of particles has been variably accelerated when its velocity increases with passage of time but then in a smaller scale and finally levels off. According to the conclusions obtained, a special buffer device for vertical feeding system has been designed to buff the impulsive force and it is operating very well.

Key words: gas-solid two-phase flow, motion law, solid waste, vertical feeding

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