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三通翻板分料器的长寿化设计及离散元验证

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摘要:针对现有三通翻板分料器摆动翻板磨损快、使用寿命短等问题,依据物料的安息角原理设计了阶梯型摆动翻板,并采用离散单元法对普通直板摆动翻板和阶梯型摆动翻板的工作过程进行了对比模拟。结果表明,阶梯型摆动翻板能够在物料流冲击区稳定积料,形成一定厚度的料垫,大大减少物料流对摆动翻板的冲击与磨损。同普通摆动翻板相比,阶梯型摆动翻板受到来自料流的冲击力均值减少至普通翻板的17.5%左右,靠近壁面物料颗粒的滑动速度均值减少至15.2%左右。经试验验证,设计的阶梯型摆动翻板具有很好的抗冲击性和耐磨性,是一种延长三通翻板分料器寿命的有效方法。

关键词:三通翻板分料器;摆动翻板;抗磨损;离散元法

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Long life design and discrete element validation of overturn type 3-pass splitter

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Abstract: The 3-pass splitter has some problems such as quick wear and short life. According to the angle of repose, a turning plate with a type of ladder swing was designed to prolong its life. The discrete element method was used to simulate the property differences between straight-swing turning plate and ladder-swing turning plate. The results show that the ladder-swing turning plate can stay accumulated materials to form a thickness of material pad and greatly reduce the impact and wear of the material flow on the swinging plate. Compared with straight-swing turning plate, the ladder-swing turning plate has got the material flow impact force value reduced to about 17.5%, and the sliding velocity value of particles close to board is decreased to about 15.2%. The experiments verified that the ladder-swing turning plate of the overturn type 3-pass splitter has good impact resistance and abrasion resistance, and it is an effective method to prolong the life of overturn type 3-pass splitter.

Key words: overturn type 3-pass splitter; swing flap; wear resistance; discrete element method