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# 物料沿抛送叶片的运动仿真与高速摄像分析

# Dynamic simulation and high-speed camera analysis on materials moving along throwing impellers

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**中文关键词:** 物料,运动学,计算机仿真,叶片式抛送装置,当量摩擦系数,虚拟样机技术,高速摄像

**英文关键词:** materials kinematics computer simulation impeller-blower equivalent friction coefficient virtual prototyping technology high-speed camera

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**中文摘要:**

为了揭示物料运动规律与叶片式抛送装置功耗及抛送效率之间的关系，从而降低叶片式抛送装置功耗、提高抛送效率，采用理论分析、虚拟样机技术与高速摄像技术相结合的方法对物料沿抛送叶片的运动进行研究。建立了适合前倾、后倾及径向叶片的物料沿抛送叶片运动的动力学模型及ADAMS模型，为了综合考虑气流对物料以及物料间的相互作用引入当量摩擦系数，通过与高速摄像试验数据进行回归分析得到当量摩擦系数的值，进而对动力学模型及ADAMS模型进行了修正。通过分析功耗及抛送效率与物料运动规律之间的关系，获得了物料最佳抛出角范围约为60°～130°。该研究为叶片式抛送装置参数优化提供了参考。

**英文摘要:**

In order to reveal the relationship between the motion pattern of the materials and power consumption and throwing efficiency of an impeller blower, and further reduce its power consumption and improve its throwing efficiency, the motion pattern of the materials moving along the throwing impeller was studied based on the high-speed camera technology combining with the theory analysis and virtual prototyping. Its dynamic equation was established and the moving pattern of the materials was numerically simulated in ADAMS. They can be applied to various mounting angle of the throwing impeller. Moreover, the equivalent friction coefficient obtained through regression analysis on the data acquired by the high speed camera was used to correct the dynamic equation and ADAMS simulation model for the sake of considering the interaction between the air flow and the materials as well as the interaction among the materials comprehensively. In addition, the optimal range of the material-throwing angle was established to be 60°-130°. All the results will play a significant role in carrying out the parametric optimization of the impeller blower in the future.

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