

散料与锥仓接触模拟 Contact Simulation on Loose Material and Cone-shaped Silo

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关键词: 小麦 松散物料 锥形筒仓 接触分析 接触压力

摘要: 基于Drucker-Prager屈服准则与弹性力学问题有限元方法,以小麦为例建立了松散物料与某型号钢板锥仓的接触数学模型。在合理建模基础上解决了松散物料与锥仓接触时接触面上必须满足的位移条件、力的传递关系以及力与位移的关系。通过建立求解方程与计算程序,使用Lagrange乘法与罚函数法相结合进行强制接触协调,获得了较精确的计算结果。结果表明,散料在锥仓中接触摩擦应力与接触状态相关,应力值较小,总接触应力主要表现为接触压力,压力从仓顶到仓底逐步增大且光滑过渡,表现为某种非线性关系。 Based on the Drucker-Prager yield criterion and finite element method, the contact mathematical model was established on wheat and a type of cone-shaped steel-sheet silo. These requirements on the contact surface were solved of the displacement conditions, the pressure transfer and the relations between the pressure and the displacement. Through establishing solving equations and calculation procedures, the reliable results were offered, using Lagrange's method of multiplier and penalty function method. The results showed that the contact friction stress was small and associated with the contact state. The total contact stress was mainly contact pressure which was increased gradually from the top to the bottom of the silo and showed itself a non-linear relationship.

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