

使用可弯曲辊的三维曲面卷板成形过程数值模拟

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收稿日期 2007-7-12 修回日期 网络版发布日期 2008-10-25 接受日期

摘要

简单介绍了可弯曲辊卷板成形技术, 利用通用有限元程序建立了可弯曲辊卷板成形过程的有限元模型。进行了球形件的数值模拟, 得到了球形件的应力分布与应变分布。研究了上辊不同压下量对其成形过程的影响, 结果表明: 在一定的辊间距下, 压下量的变化对球形件纵向曲率影响非常敏感, 探讨了不同摩擦情况对成形过程的影响, 对回弹进行了初步的分析, 通过实验验证了模拟结果。模拟结果对可弯曲辊卷板成形设备的优化设计以及实际板材成形研究都有重要意义。

关键词 [材料合成与加工工艺](#) [可弯曲辊](#) [卷板成形](#) [有限元分析](#) [数值模拟](#) [压下量](#) [纵向曲率](#)

分类号 [TG306](#)

Numerical simulation of three dimensional surface bending by using bendable roller

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Abstract

The technology of bending by bendable roller(BBBR) was introduced briefly. A finite element model of the process of BBBR was built by the general finite element program. The spherical part was numerically simulated and distributions of the stress and the strain were obtained. The impact of the press displacement of the upper roller on the forming process of BBBR was studied and it was concluded that the lengthways curvature of the spherical part is very sensitive to the press displacement under fixed distance between two lower rollers. The effect of friction condition on the forming process of BBBR was discussed. The springback behavior of the process was analyzed preliminarily. The simulated results were validated by experiments. The obtained achievements were useful for the optimal design of BBBR equipments and the practical sheet forming process study in general.

Key words [material synthesis and processing technology](#) [bendable roller](#) [bending](#) [finite element analysis](#) [numerical simulation](#) [press displacement](#) [lengthways curvature](#)

DOI:

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