

压下量对梯形内齿轮旋压成形质量的影响 Effect of Reduction on Quality of Trapezoidal Inner Gear Formed by Spinning

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关键词: 梯形内齿轮 旋压 压下量 成形质量 数值模拟

摘要: 旋压成形技术是杯形薄壁内齿轮加工的新方法, 其中压下量对内齿轮成形质量的影响最大。采用有限元数值模拟和试验相结合的方式, 以相对齿高和齿顶不均匀度为质量评价参数, 研究了压下量对梯形内齿轮旋压成形质量的影响。结果表明, 对于一定齿高轮齿的成形, 对应一定壁厚的毛坯, 存在着一个最佳压下量, 采用该压下量成形, 轮齿充填质量最好; 小于该值时, 充填材料不够; 大于该值时, 材料整体变形量过大将导致成形缺陷。 Inner gear spinning technology with three rollers was analyzed. According to the material flowing characteristics during spin-forming, two forming quality evaluation factors were put forward and then filling status of gear tooth under different reductions was analyzed. The results indicated that there was an optimum reduction for blank with certain thickness during inner gear spinning. When the reduction was below, the filling status in gear tooth was unsatisfied due to lack of filling material; when the radial reduction was above, the increasing forming force induced by higher reduction would likely decrease the service life of forming tool, and excess relative reduction would result in the status of underfills in the gear tooth.

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