

铝合金板冲压成形Benchmark试验与有限元仿真 Benchmark Test and FEM Simulation of Aluminum Alloy Sheet Forming

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摘要: 采用NUMISHEET2002会议提出的杯形件拉深Benchmark试验方案,在不同压边力工况下,对铝合金板6111-T4的拉深性能、各向异性行为、起皱缺陷进行了试验研究。研究表明:各向异性系数小并未对铝合金板的成形性能产生较大影响,通过增大压边力能有效解决起皱问题,铝合金板6111-T4具有良好的冲压成形性能。基于自主研发的冲压成形CAE软件KMAS平台,对Benchmark试验进行了仿真验证,与试验结果对比表明:KMAS软件采用的Barlat-Lian各向异性屈服准则和动力半显式算法能够准确模拟铝合金板的冲压成形。Adopting the Benchmark test scheme of a cylindrical cup deep drawing proposed by NUMISHEET2002, the deep draw ability, anisotropic behavior and wrinkling of aluminum alloy 6111-T4 sheet were researched under different blank holder force (BHF) conditions. The results show that the formability of aluminum alloy sheet is hardly influenced by small anisotropic coefficient, and wrinkling can be eliminated effectively by increasing BHF, therefore aluminum alloy 6111-T4 sheet has excellent stamping formability. Based on the platform of KMAS, self-developed sheet metal forming CAE software, Benchmark test was simulated, and the results were compared with that of the test. KMAS software, adopting Barlat-Lian anisotropic yield criteria and dynamic semi-explicit algorithm, is able to simulate aluminum alloy sheet forming accurately.

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