# Hole Expansion Forming Analysis of Mild Steel Sheet Using a Material Model based on Crystal Plasticity

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**Abstract.** The effect of the methods for determining the yield function on the predictive accuracy of a hole expansion forming for a cold rolled steel sheet is investigated. Experimental biaxial tensile tests using cruciform specimens ［1］ and multiaxial tube expansion tests ［2］ for a cold rolled mild steel sheet with a thickness of 1.2 mm are conducted to calibrate the anisotropic parameters and exponent of the Yld2000-2d yield function ［3］. Moreover, numerical uniaxial and biaxial tensile tests using the ALAMEL crystal plasticity (CP) model ［4］ are performed to determine the Yld2000-2d yield function. The thickness distributions of specimens subjected to hole expansion forming along the hole edge and the radial line is precisely measured and are compared with those calculated using the material models based on the experimental data and the numerical CP biaxial tensile test data. The results of the hole expansion forming simulations are in good agreement with the experimental observations.

References

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