

Effect of Loading Orientation and Deformation rate on the Formability of

AZ31B Mg Alloy Thin Sheet

吳泓瑜, 孫稟厚, 陳宏偉, 邱垂泓

Mechanical Engineering

Engineering

ncuwu@chu.edu.tw

Abstract

Uniaxial tension and press forming tests were carried out at two different strain rates and temperatures to investigate the formability of a fine-grained AZ31B Mg alloy thin sheet. Formability parameters were determined by tensile test results. The tensile properties and formability parameters were correlated with the forming limit diagrams. This work focused on the effects of loading orientation and deformation rate on the formability. The investigations led to the conclusion that the formability of the rolled AZ31B-0 Mg alloy sheet would be influenced by loading orientation and deformation rate. Stretchability could be enhanced at a higher deformation rate resulted from a lower anisotropy and a higher work hardening effect; in contrast, the drawing processes should be performed at a lower deformation rate to take the advantage of a higher anisotropic behavior. The samples with major strain along the rolling direction showed higher stretchability due to their higher n values and low r values, and the samples with major strain along the transverse direction having higher r values exhibited higher drawability.

Keyword : AZ31B Mg alloy; Formability parameter; Forming limit diagram; Anisotropy