자동차용 알루미늄 합금판재의 표면 품질 해석

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Analysis of Surface Quality of Aluminum Sheet for Automotive Application

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Abstract

Research on ridging in aluminum alloy sheets have become a very hot topic in both the metallurgy and the solid mechanics communities due to two facts. One is strongly growing interest in light weight aluminum parts for automotive application. The other is the recent developments in the technique of automated electron back scattered diffraction (EBSD) in the scanning electron microscope. EBSD provides the spatial distribution of grains as well as the crystallographic orientations. Considerable progress towards a more detailed understanding of the micromechanics of grain scale roughening was achieved by considering the effects of strain localization on surface roughening of aluminum sheets with crystal plasticity based on finite element method. In this study, by using EBSD experiments the authors demonstrated that the spatial distribution of Goss oriented grains were mainly responsible for the development of ridging in the aluminum sheets. This observation was interpreted in terms of the strong planar anisotropy of Goss orientation in the ridging aluminum. This study compares the development of ridging during tensile straining of the automotive AA6XXX alloy with the predictions of a crystal plasticity FEM utilizing the grain orientations obtained from EBSD. Correlation of texture component and ridging will be discussed.

Key Words : Aluminum Sheet, Texture, Ridging, CPFEM, Goss Orientation, EBSD

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