

Large Strain Compression-Tension Behavior of AZ31B Rolled Sheet in the Rolling Direction

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Abstract : Being made with the lightest commercially available industrial metal, Magnesium (Mg) alloys are of interest for light-weighting. Expanding their application to different material processing methods requires Mg properties at large strains. Several room-temperature processes such as shot and laser peening and hole cold expansion need compressive large strain data. Two methods have been proposed in the literature to obtain the stress-strain curve at high strains: 1) anti-buckling guides and 2) small cubic samples. In this paper, an anti-buckling fixture is used with the help of digital image correlation (DIC) to obtain the compression-tension (C-T) of AZ31B-H24 rolled sheet at large strain values of up to 10.5%. The effect of the anti-buckling fixture on stress-strain curves is evaluated experimentally by comparing the results with those of the compression tests of cubic samples. For testing cubic samples, a new fixture has been designed to increase the accuracy of testing cubic samples with DIC strain measurements. Results show a negligible effect of anti-buckling on stress-strain curves, specifically at high strain values.

Keywords : large strain, compression-tension, loading-unloading, Mg alloys

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