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Examining the Effects of Material Dimensions on Flex-forming Process Wrinkling

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Abstract:

The automotive and aerospace industries rely heavily on sheet metal forming as a key production process. Flexible production and the capacity to create several components at once make flex forming one of the most popular sheet metal forming methods. Wrinkling is a prevalent problem with convex-shaped flex-formed components, which is widespread in the industry. Predicting wrinkling before manufacturing is essential to reducing scrap rates, labour time, and other unforeseen expenditures. A flex-forming press was used to perform extensive trials with convex contoured pieces in order to study the influence of geometric factors on wrinkling. The findings reveal that when flange length, contour radius, and sheet thickness decrease, the likelihood to wrinkle rises. A wrinkling limit diagram is then generated from the testing results, which specifies safety and failure zones for various material conditions and sheet thicknesses. The schematics that have been created may be used to design components that are free of defects, decrease scrap, and lower manufacturing costs.

Keywords:

Flex forming; Sheet forming; Wrinkling; Convex contour flange