Forming of Tailor Blanks for Increase in Wall Thickness at Corner of Stamped High Strength Steel Products

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Source: STEEL RESEARCH INTERNATIONAL  Volume: 81  Issue: 9  Pages: 833-836  Published: SEP 2010

Abstract: A tailor blank was employed for stamping of high strength steel products having large wall thickness at inner corner from thin sheets. To form the tailor blank, a 2-stage local thickening process was developed for increasing the wall thickness of the blank at portion equivalent to the inner corner. In the 1st stage of the local thickening process, a ring including the portion equivalent to the inner corner is drawn, and the drawn ring is compressed with flat tools in the 2nd stage to attain a local increase in wall thickness. The 2-stage local thickening process was designed from both finite element simulation and an experiment. A tailor blank having an increased wall thickness of 8.2% was formed, and the wall thickness at the inner corner of a stamped wheel disk from the tailor blank was successfully increased by 9.6%. It was found that the tailor blanks are attractive for controlling the distributions of the wall thickness of stamped products from thin high strength steel sheets.