

Finite Element Simulation of Limiting Dome Height Test on the Formability of Aluminium Tailor Welded Blanks

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Abstract : Tailor Welded Blanks (TWBs) have established themselves to be a revolutionary and foremost integral part of the automotive and aerospace industries. Metals sheets with varied thickness, strength and coatings are welded together to form TWBs through friction stir welding and laser welding prior to stamping operations. The formability of the TWBs completely varies from those of conventional blanks due to the diverse strength levels of individual sheets which are made to deform under the same forming load uniformly throughout causing unequal and unsatisfactory deformation in the blank. Limiting Dome Height(LDH) test helps predicting the formability of each blanks and assists in determining the appropriate TWB. Finite Element Simulation of LDH test for both base material and TWBs was performed and analysed for both before and after the solution heat treatment. The comparison and validation of simulation results are done with the experimental data and correlated accordingly. The formability of solution heat treated TWBs had enhanced than those of blanks made from non-heat treated TWBs.

Keywords : tailor welded blanks, friction stir welding, limiting dome height test, finite element simulation

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