

Crashworthiness Behaviour on Aluminum Foam Bumper Beam and Side Member System under Oblique Impact

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Abstract

This paper presents the simulation of a crush behavior for side members and bumper beam under axial and angular impact loading. Recent issues of automotive industry are to reduce weight and to improve occupant safety. Aluminum foam as a lightweight material was selected due to its excellent energy absorption capacity. Deformation pattern was studied and observed. Various parameters have been considered, such as angles of load, geometry specifications in thickness and length of side members and the material selection, aluminum alloy (AA6063 and AA6060) . Bumper beam connected to side members were impacted load angles of 0° to 30° from longitudinal axis. The finite element analysis approach using the specific software package has determined the crashworthiness parameters, that were specific energy absorption (SEA) and crush force efficiency (CFE). The outcome of this study have formulated functions for calculating of crush parameters.

Keywords: Aluminum foam, bumper beam, crashworthiness, oblique impact, side member