

## Deformation response of steel sheet metal under transverse impact loading

### Abstract

Steel sheet metals used as body panels and trims of an automobile are often subjected to lateral loading. In the event of a crash, the panel will likely experience impact loads in the range where strain-rate effects are significant. This study examines deformation response of the sheet metal subjected to transverse impact loading using combined finite element (FE) method and drop weight impact test. Johnson-Cook constitutive model parameters for the 0.045C (wt. %) coldrolled steel used are extracted from tensile test data of the sheet metal specimens at straining rates ranging from 0.001/sec to 0.1/sec. Results show that the calculated amount of plastic work or energy of 78 % is dissipated within the short dynamic plastic deformation process of 0.001 s. Predicted dynamic response of the sheet metal compares well with measured data.