

## Effects of ribs on S-frame crashworthiness

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Safety and weight reduction continue to be the main drivers of structural developments. Better control of frontal collapse and avoidance of bending are the most important aspects of the design of front longitudinal members. Such members usually involve a curved section to provide clearance from mechanical systems, so it is difficult to prevent the onset of bending collapse, under end load, prior to the desired controlled longitudinal collapse of the box sections. While vertical ribs are formed into the walls of the box members to induce longitudinal buckling, it is found that inclining these at an angle is successful in cancelling the bending moment induced by the front end load. In this paper various configurations of incorporating formed ribs into the walls of the S-frame are considered and their effects on energy absorption and force response of the S-frame are studied. It is shown that, by using a proper arrangement of ribs in the walls of the S-frame, better crashworthiness characteristics may be achieved