Assessment of head injury criteria and chest severity index for frontal impact

ABSTRACT

In this study, head injury criteria (HIC) and chest severity index (CSI) assessments are made based on finite element simulation. Simulations are carried out through nonlinear finite element analysis software LS-Dyna. The effect on the occupantôs injury of introducing aluminum alloy, AA5182, to automotive side members is highlighted in comparison to the existing model made of steel. The HIC and CSI are taken as the evaluation criteria. The injury criteria are assessed under two impact conditions: full frontal and oblique. The aim of this paper is to analyze the effect of lightweight materials on occupant crash protection. It was shown that the introduction of AA5182 provides a 30.77% reduction in mass while improving the HIC and CSI performance in full frontal impact; whereas only CSI is improved in oblique impact.

Keyword: Impact; Lightweight; Finite element; Head injury criterion; Chest severity index