

On child head injury criteria (HIC) and stress due to frontal fall impact on rigid floor

ABSTRACT

Head Injury Criteria (HIC) during an accident is an important criterion in car crashworthiness assessment. HIC values for driver, adult occupant and child occupant need to be assessed and their values need to be limited. For child occupant, 1 year old (1YO), 3YO and 6YO dummies are used. In developing the child dummies, respective child age dummy heads are subjected to drop impact at particular point on the head. In this paper, the HIC values for 1, 3 and 6 year-old child heads falling on a rigid floor for -5.5o, 0o, 45o and 90o impact angle and drop heights of 150 mm, 300 mm and 450 mm are presented. Ls-Dyna suite of program was used. The results show that HIC depends on age, drop height and angle of impact. It is also found that, 3YO gives the lowest HIC value with against age at all drop height. This could be due to for 1YO, tissues are weaker and fontanel exist, compared to 3YO, and for 6YO, although the tissues are stronger, it is heavier compared to 3YO that contributes to its higher HIC values.

Keyword: Head injury criteria; Child head injury; Head fall impact injury; Finite element analysis; Stress analysis