Response surface approach for sensitivity study of neck forces in restrained child occupant during side-impact crash


Abstract

A neck is vulnerable to damage and to characterize the neck, two N2A dummies were used as child occupants restrained in lateral and oblique side impacts. The dummy's neck method is used to map the parameter sensitivity when the dummy's neck was restrained in the side impact. Greater parameter sensitivity affecting neck forces in case of non-impact angles (α ≥ 45°). Singly, the impact angle parameter is considered to be largely the most sensitive parameter to affect neck force especially at non-impact angles. The critical range of neck force is between 90° and 110° while the secondary critical range is observed for angles below 45° (110°) for impact neck force. A conclusion is that the side impact is not only applied in road accidents but also in other accidents involving neck forces.

Author keywords

Child restraint system, Neck force, Response surface method, Sensitivity analysis.

Inclusive keywords

Engineering and materials, Engineering and materials, Sensitivity analysis, Response surface method, Neck force.

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