

KINEMATICS OF CHILD RESTRAINT SYSTEMS IN AN AIRCRAFT ENVIRONMENT

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ABSTRACT

The need to provide and improve crash protection for children in the air is the subject of much interest and research. The National Highway Transport Safety Authority is solely responsible for developing certification criteria for both cars and aircraft. Children traveling in aircraft experience different dynamic responses during a crash. Moreover, transport aircraft passenger seats are not designed for use with Child Restraint Systems (CRS). Therefore, there is a lot of scope for improvement in the design of passenger seats in aircraft so that they are more compatible for use with CRS.

An analytical model of a CRS has been developed for modeling the dynamic responses in a crash scenario. This analytical model is used to validate sled test data and the model is used for study of occupant biodynamic responses in aircraft environments. Occupant simulations were studied for CRS placed on a standard aircraft seat. These studies were done for both configurations forward facing upright as well as rear facing reclined. The transport aircraft passenger seat was redesigned and parametric studies were also conducted so as to improve the chances of survivability of the occupant in the event of a crash.