

# PARAMETRIC STUDY OF CRASHWORTHY AIRCRAFT BULKHEAD DESIGNS

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## ABSTRACT

This thesis documents an investigation into problems associated with satisfaction of the head injury criteria (HIC) for front-tow bulkhead seats in transport class aircraft. The study addressed two aspects of the problem. First, it investigated the performances of various padding materials, none of which were found to be satisfactory. Second, it employed a MADYMO bio-dynamic simulation, supported by simple quasi-static tests, in the design of energy absorbing bulkheads that effectively attenuated HIC values to non-injurious levels. The performance of these designs was verified during 16g dynamic sled tests of modified cabin class divider panels. The MADYMO model was subsequently used in a manner of parameter studies to assess the effects of the bulkhead stiffness and strength on the HIC levels. The results of these studies generally showed the HIC levels to be more sensitive to the strength of the panel than to its stiffness.