

# DEVELOPMENT OF AN ENHANCED HEAD INJURY CRITERIA COMPONENT TESTER FOR AEROSPACE CRASHWORTHINESS APPLICATIONS

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## ABSTRACT

The Head Injury Criteria (HIC) represents a significant challenge to engineers designing cabin interior furnishings for all classes of aircraft. The dynamic seat tests required in 14 CFR 23.562 and 25.562 for the evaluation of this injury measure are costly, time consuming and provide too much scatter on HIC. Many segments of the aerospace industry have expressed the desire for an effective component test with which to address this problem. Although industry and research institutions have developed several component testers, none of them have been capable of reproducing all the parameters obtained during sled testing. The objective of this research was to develop a component tester capable of reproducing sled test results. In order to accomplish this task several sled tests, biomechanical models, and parameter studies were conducted to better understand the Anthropomorphic Test Dummy (ATD) response under several test conditions. The component tester is capable of two different modes of operation, it can be operated as a single degree of freedom system, or as a two degree of freedom system. Both modes of operation were capable of reproducing sled test results accurately. This component tester reduces significantly the test design cycles for interior certification.