

ANALYSIS, FABRICATION AND MODE-I CALIBRATION OF COMPONENT HIC TESTER

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ABSTRACT

Head injuries constitute approximately 50% [1] of all injuries sustained in the transport accidents. The predominant cause of occupant injuries in an aircraft crashes is the impact of occupant with various occupant compartment interior surfaces such as bulkheads, interior walls and instrument panels. The problem encountered in the certification of 16G airline seats, referred to as the front-row HIC problem, occurs for seats located directly behind bulkheads or cabin class dividers. Hence certification of aircraft frequently requires engineers to demonstrate that a head strike into anyone of a several cabin furnishings complies with the Head Injury Criteria (HIC) requirements specified in 14 CFR 23.562 [2] and 14 CFR 25.562 [3]. Full-scale sled tests, which are currently used to develop aircraft interior furnishings, often require several test articles to develop an engineering solution and to demonstrate the compliance for the design. Therefore, the HIC compliance poses a significant problem for the airlines and the manufacturers of the jet transports due to high costs and schedule overruns during the development and certification of aircraft seats. This research will provide an alternate method to determine the HIC value without consuming a seat during each test. A device from this research can be used to evaluate different designs and/or test conditions at relatively low cost and in a short period of time. Hence, this will result in lower cost cabin designs that will improve aircraft safety.

A component HIC tester is an alternate method to determine the HIC value without consuming a seat during each test, thus reducing the cost and time of testing. A device from this research can be used to evaluate different designs and/or test conditions at relatively low cost and in a short period of time.