

The effectiveness of the dynamic analysis for the crew seat of KC-390 aircraft qualification for emergency landing conditions.

Authors: LOUREIRO, P. L. G. ; COLUS, L. H. M.

Abstract: The objective of this work is to evaluate the effectiveness of dynamic analyses in the development and qualification of the crew seat of EMBRAER KC-390 aircraft on PART 25 certification basis, analyzing the emergency landing conditions defined by requirement 14 CFR § 25.562 and comparing the results with the ones obtained by dynamic tests carried out in January 2017, in the laboratory of the National Institute of Aviation Research – NIAR / Wichita. In September 2015, LHColus Tecnologia was contracted by EMBRAER to develop and qualify a double crew seat for KC-390 aircraft, denominated BUNK BED SYSTEM.

During the design of the crew seat, in the development phase, several dynamic analyses were carried out with different seat configurations, studying the emergency landing conditions 14g + 30° PITCH UP, 16g ±10 YAW and 16g ±10 degree YAW with deformed floor. The analyses of +10 degrees and -10 degrees of YAW under 16g conditions were also performed to define the most critical cases to be executed on the dynamic tests.

A comparison between dynamic test and the explicit dynamic analyses results performed by the LHColus will be presented in this paper. A comparison of the dummies for the condition 16g -10° YAW with deformed floor is shown in **Figure 1**.

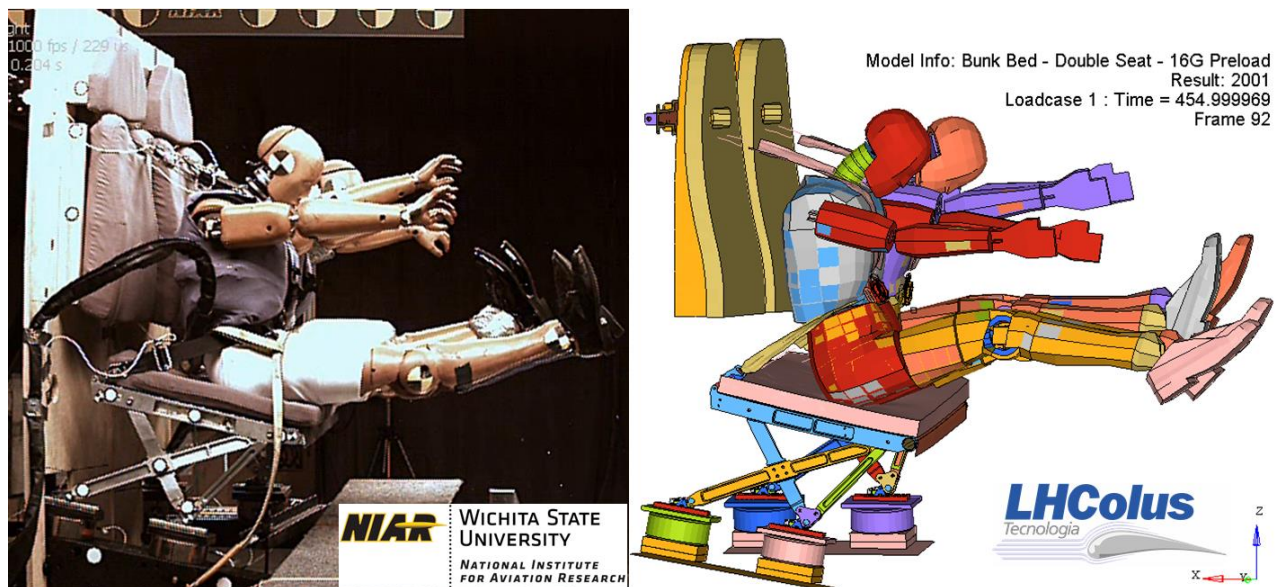


Figure 1 Comparison between dynamic test and explicit dynamic analysis performed by LHColus.

The overall result of these analyses was very positive, once it was observed a very good correlation with the dynamic test performed and contributing to expedite the product development phase. The double crew seat was approved in the dynamic tests, complying with all the requirements defined by the 14 CFR § 25.562, including HIC conditions, without any failures.

Keywords: KC390 Aircraft; Crew Seat; Emergency Landing; Dynamic tests; Dynamic Analysis, HIC conditions.