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Title:

Selection of Validation Metrics for Aviation Seat Models.

Abstract:

With the increased use of numerical models for seat design and certification, there is a fundamental need to show the predictive capabilities of these models. This is accomplished by comparing the outcomes of simulations with test results, a process called validation. In order to automate this comparison, as well as allow for models to be compared, validation metrics are used to quantitatively determine the level of agreement between test and simulation results. Within the crash safety literature, particularly the automotive component, many diverse validation metrics are used, all of which produce different assessments of test-simulation agreement. The inherent differences between metrics make it difficult to compare models that have been judged using different metrics. Additionally, the rational for choosing a particular metric is rarely specified. A project was conducted to apply a range of selection criteria to numerous validation metrics that have been utilized in the crash safety community in order to determine the most appropriate metric for use in aviation seat modeling. Four metrics were evaluated to determine the level of agreement to the opinions of subject matter experts, the defined error of idealized curves, and the ability to differentiate between multiple curves. The results of this project highlight the need for a defined selection criterion and suggest an appropriate metric for use in aircraft seat modeling.