# Investigate the Crashworthiness of high-velocity bird impact on three different designed model wings by using Coupled Eulerian-Lagrangian approach

MUHAMMAD HASSAM SAEED[1], Noaman Muhammad[2], and Joseph Smith[1]

[1]Affiliation not available
[2]Jiangsu University

December 1, 2020

**Abstract**

Bird strike is a significant threat to the parts of the flying aircrafts. The wing is a central part, which provides stability to the aircraft. Mostly at wing, bird attack the leading edge. Worldwide aviation regulation FRA, EASA, required 4Ib bird strike on the wing of aircraft, and after this bird strike, aircraft is able to be safely landed. This study aims to investigate the resistance of the wing against the bird strike and damage analysis of the high-velocity bird collision on the model wing, inner structure, spar, and ribs. By using the Coupled Eulerian-Lagrangian (CEL) approach in ABAQUS/Explicit. Our contribution 1) bird strike on a wing with assembled inner structure by aluminium and outer skin composed of unidirectional fiber-reinforced composite material. 2) bird strike on-wing which is similar with the first test in which the difference is of spar designed layers of horizontal plates like a comb. 3) bird strike on-wing which is similar with second model wing difference in this wing put an aluminium leading edge on the skin leading-edge, final to analyze the damage of bird impact on the wing, the velocity of bird strike is 200m/s and analyze the behavior of the bird at this velocity. Resistance behavior of composite skin After penetration in the wing, analyze the impact on the spar and stress on the inner structure. Analysis of the kinetic and internal energy graph and Comparison all of these results and check the performance, which gives an excellent result at this velocity. based on these results suggest which inner part is sensitive.

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