

Numerical simulation and practical experiments regarding bird strike on airplanes

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***Abstract:** In order to use less fuel, aircrafts have to be lighter. However, aircrafts structures have still to resist, among other factors, to collisions.*

A collision between a bird and an aircraft may lead to significant damages on aircrafts. Therefore, we have to design protections against bird strike. Numerical simulations and practical experiments could be helpful to achieve this goal. We used the explicit calculation code RADIOSS combined with both a 2D-axisymmetric model and a 3D-model based on the SPH (Smoothed Particle Hydrodynamics) methods. In order to compare simulations with experimental data, we chose a bird velocity of 100m/s. This value matches with the limitation of the gas gun owned by the ENSTA Bretagne engineering school. In the meantime, several experiments were conducted to simulate the impact between an aluminum bullet and a polycarbonate target. Results and experimental protocol established will allow to characterize future materials such as ballistic gelatin. Finally, all results were correlated with analytical models in order to validate our results.

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