

Modeling the Global Failure of Aircraft Fuselage in Water Entry Using a Plastic Beam Model

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In the study of aircraft crashing into water such as the disasters of the Malaysia Airlines Flight MH370 and Air Asia's Flight 8501, the impact may not be large enough to cause local failure of fracture, unlike the case of crashing on land. However, the impact can induce large bending moment on the fuselage, causing severe global failure of the breakup and disintegration of the fuselage into multiple segments. In this talk, the speaker will model the aircraft fuselage as a plastic free-free beam. Beam theories and equations involved will be discussed. The model will then be applied to the data obtained from CFD (computational fluid dynamics) simulations of aircraft water entry to study the structural failure of the aircraft in this dynamic process.

This is joint work with Cong Gu and Tomasz Wierzbicki.