

WATER-STRUCTURE IMPACT

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ABSTRACT

Predicting the response of a flexible structure to impact with water is of concern for a number of engineering areas, notably:

- Aircraft ditching (emergency landing on water)
- Ships and offshore structures (sloshing, slamming, green-water loading)
- High speed planing crafts (porpoising, hull-waves interaction)

The topic of this mini-symposium will be numerical methods for the prediction of fluid-structure interaction. This can include

- Fluid models -
 - Improved semi-analytical methods and potential based approaches
 - Meshless numerical methods such as the Smoothed Particle Hydrodynamics (SPH) method.
 - Eulerian and Arbitrary-Lagrangian-Eulerian (ALE) methods.
- Structural models – for the prediction of local effects, such as rupture, or the overall dynamics of the whole structure.
- Coupling of fluid and structure models – methods for treating the transfer of loads between the fluid model and the structural model

This mini-symposium will include at least six papers (from different institutions) presenting results of the SMAES project. SMAES (SMart Aircraft in Emergency Situations) is a European research project, funded under the seventh framework programme. All new aircraft must meet required ditching safety standards, and improved analysis tools are required to support the continued development of safer and lighter aircraft structures. The objective of the SMAES project is the development of advanced simulation tools to support aircraft development from the pre-project phase through to certification. Ditching analysis is particularly challenging as it combines high speed water flow with the response of a flexible structure and research within the project addresses all of the topics identified above.

This mini-symposium is not restricted to aerospace applications. The numerical approaches adopted for aircraft ditching are closely related to the methods used for many other water-structure interaction problems. It is particularly important to mention the relevance of the water impact problem in the naval and ocean engineering. Papers are invited from researchers working in all these fields.