

TITLE: Liquid Composite Moulding Simulation of Complex Parts

ABSTRACT

Liquid composite moulding applications for which the use of flow simulation technology is useful and feasible typically involves complex geometry, layup and often both. Modelling such parts can be time consuming and tedious. We have developed several tools to make this easier or even automate parametric model generation completely. In addition, to get reasonable performance on contemporary hardware, it should be possible to generate coarse meshes with decent quality elements, and to combine 3D volume elements with 2D shell elements and 1D line elements. Accuracy on coarse meshes should be as high as possible. Recently, simulation models are also increasingly used to train Machine Learning software, which adds the requirements that the software is very robust and can reliably run for long periods.

We will present the latest technology we implemented and added to RTM-Worx, like the 3D elements, 3D mesh generator and optimizer, new flow front algorithm and several tools to streamline the process of building and running models, illustrated by several industrial applications: wind energy, automotive, aerospace and off-shore.

KEYWORDS: liquid composite moulding, infusion, RTM, Darcy flow, permeability modelling, numerical simulation, finite elements, CFD, programming/scripting, wind turbine blades, machine learning, aerospace, automotive, off-shore.