

Process Modelling for Composites Manufacturing

During this seminar, you will hear two presentations exemplifying how process modelling enables robust and cost-efficient manufacturing of structural composite components. The first talk is given by Dr Jonathan Belnoue, Lecturer in Composites Manufacturing Process Simulation at Bristol Composites Institute (<http://www.bristol.ac.uk/research/institutes/composites/>) & National Composites Centre (<https://www.nccuk.com/>). Thereafter I will present some recent and ongoing work at KTH, Royal Institute of Technology. Both presentations are briefly introduced below.

You are all most welcome to join and to share the zoom-link to the presentation to others having interest in the subject.

Best wishes
Malin Åkermo

Simulations for automated fiber placement of prepreg slit tape, Jonathan Belnoue

Being able to manufacture composite structures at scale and as cheaply as possible is key for greater uptake of composites in the design of lightweight vehicles (especially electrically powered). In order to increase the repeatability of the process and decrease the manufacturing cost, automated deposition techniques such as automated fibre placement (AFP) are widely used. However, the quality of the finished parts can be greatly influenced by the mechanical properties of the prepreg (i.e. its ability to deform to the required shape) during processing. In this talk, it is shown how process modelling (underpinned by deep understanding of the material behaviour and extensive characterisation campaigns) provides the tools to mitigate defect formation during AFP deposition.

Composites forming and its influence on component quality, Malin Åkermo

Hot forming of stacked prepreg laminas, where each layer has been given an optimised fibre direction, offers effective manufacturing of structural composite components. However, during the forming operation, several mechanisms occur that influence the mechanical performance of the formed component. Even if forming seems successful when studying the outer surfaces of the component, intra-laminar shear inevitably happens during out-of-plane forming, resulting in fibre angle deviations influencing the mechanical performance locally. Also, radius thinning commonly occurs, influencing the geometrical tolerance of the component. During this presentation I will present state-of-the-art considering composites forming simulations and what we now know improves the robustness of the hot forming process.