

ADVANCED LIGHTWEIGHT STRUCTURES

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Summary by Faye Smith, TWI Ltd.

The high performance car, commercial aircraft and wind energy sectors have all experienced rapid innovation over the past year through the use of new composite materials and processing techniques. SAMPE UK & Ireland organised a one-day conference to disseminate and discuss progress. This was supported by Cranfield University, the National Composites Network, Nottingham University Composites Club, and Saint-Gobain Technical Fabrics.

After a welcome and introduction by Andy Mills of Cranfield University, the first two speakers presented examples of innovative manufacturing techniques within the automotive industry. The first of these was Antony Dodsworth of Bentley who presented a method for producing a panel that painted like a metal but had the cost and performance of a composite. The technique involved spraying of a metal layer into a mould followed by lay-up and cure of a composite panel on the back. Bentley is using this technique for the Bentley Azure bumper and is considering other applications. Rob Backhouse of McLaren Cars then presented the InCore RTM process that is used to fabricate part of the Mercedes McLaren SLR. This process involves production of a carbon fibre preform followed by sequential injection of an EPP foam core and resin. It is a rapid process and the finished part requires no finishing, just drilling.

The focus then shifted to aerospace applications. Tim Birkett of Airbus UK gave an overview of Airbus and of the use of composites, focussing on the A350. Jago Pridie, also of Airbus UK, then took to the stage to introduce the DTI funded project NOTS (Nodal Optimisation of Truss Structures). He described the work performed towards developing know-how and innovation in joints and joining for the manufacture of truss test structures.

After lunch, sponsored by Saint-Gobain Technical Fabrics, it was the turn of the Universities to present automotive-focused innovation. Ryan Smith and Simon Lazarus of Cranfield presented work performed using a processing technique called Coretex to produce a carbon fibre space frame for the Caterham 7. Coretex uses vacuum infusion and an expandable foam core to consolidate a structural braided fibre reinforced composite skin. The finished product is expected to be on show at the Motor Show in July. Tom Turner of Nottingham University then presented work performed as part of a Department for Transport project entitled 'Affordable Lightweight Body Structures' (ALBOS). This investigated the use of discontinuous fibre performing (DCFP) in car bodies, a technique already being used by Aston Martin for closure panels.

The final talk of the day switched to wind energy and was provided by John Rimmer of Vestas. John described the current use of wood blade technology by Vestas for the manufacture of large (40m and above) wind turbine blades. The technique involves dry lay-up of wood, balsa, carbon fibre, and a small amount of glass fibre followed by infusion of the resin. A blade takes 24 hours to manufacture and a further 24 hours to finish.