



Engineering and
Physical Sciences
Research Council



CERTIFICATION
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RESHAPING THE
TESTING PYRAMID



23rd International Conference on Composite Materials (ICCM23) workshop on
‘Modernising Routes to Compliance with Composite Regulations: A Journey
towards Virtual Testing and Digital Twinning’

organised by

Ole Thybo Thomsen, Janice Dulieu-Barton & Stephen Hallett, *Bristol Composites Institute,*
University of Bristol, UK

Enrique Garcia, *National Composites Centre, Bristol, UK*

Richard Butler & Andrew Rhead, *University of Bath, UK*

ICC Belfast, Tuesday 1 August 2023, 14:20-18:30 / Room: Arc

Introduction & Background:

Following on from the successful ‘industrial needs’ sessions on modernising composites regulations that were held at the [ICCM21](#) in Xi’an in 2017, and the [ICCM22](#) in Melbourne 2019, this event will follow up from the previous workshops with an aim to define a cross sector view on the need for modernisation of routes to demonstrate compliance with composites regulations. This includes discussion of viable routes forward with respect to lessening the burden of meeting regulations, including reducing cost and time to market whilst also enabling improved performance.

One of the major inhibitors to the uptake of composites in sectors that are traditionally adverse to composites is that regulations, codes and standards are in many cases are considered non-optimal or even insufficient for composites. This presents a barrier to the uptake of composites across sectors and applications, despite the clear benefits of composites over other material solutions in many cases. The conundrum on composite regulations and the need for reform were the subject of a University of Southampton study that resulted in a [position paper](#) that was published in 2017, as well as a study conducted by the UK National Physics Laboratory (NPL) [published](#) in 2019.

At the same time as the uptake of composites is adversely influenced by current regulations in some sectors, other sectors where composites are well accepted and used increasingly are facing challenges directly linked to current practices for validation and certification. The most prominent example is the aerospace sector, which represents a success story for the adoption of composites, and where composites validation/certification is conducted through a rigorous performance-based framework known as the ‘building block approach’ (or ‘testing pyramid’). However, there is increasing evidence and awareness that the building block approach has severe limitations, linked to high costs of certification and time to market. Current research programmes around the world aim to unlock the use of composites by developing the foundations of virtual test, validation and eventually certification frameworks that rely less on costly and time consuming physical testing and more on numerical simulations and digital twinning; an example is [CerTest](#) project funded by the UK Engineering and Physical Sciences Research Council (EPSRC) in the UK.

The workshop will address the above through a selection of invited talks covering both the challenges of composite adverse sectors as well as the challenges faced by sectors that are currently seeking to modernise and improve current performance based certification processes. A panel discussion will follow, taking questions from the floor, on the future process to achieve a more flexible and efficient compliance with the composites regulatory framework and the new opportunities this will unleash.

Programme

- 14:20-14:30: 'Welcome & background and aims of workshop / introduction to speakers': *Janice Barton, Bristol Composites Institute, University of Bristol, UK*
- 14:30-14:50: 'Developing composite (and other advanced manufactured) product certification – a regulator perspective', *Simon Waite, EASA, DE*
- 14:50-15:10 'Overview of current processes and future developments in composites certification – a wind turbine industry perspective", *Chris Harrison, DNV Denmark, DK*
- 15:10-15:25 'CerTest: scientific foundations for a novel framework for performance validation of composite aerostructures relying less on physical testing and adopting digital twinning', *Ole Thomsen, Bristol Composites Institute, University of Bristol, UK*
- 15:25-15:45 "CerTest: enhanced performance and productivity through integration of multi-scale modelling, high-fidelity experimentation and Bayesian learning', *Richard Butler & Andy Rhead, University of Bath, UK*
- 15:45-16:05 'VVUQ framework to assess credibility of simulation of composite structures', *Ludovic Barriere, IRT Saint Exupéry, F*
- 16:05-16:30 Break
- 16:30-16:50 'Regulatory barriers across to efficient validation and certification of composites across sectors and applications', *Enrique Garcia, National Composites Centre, UK*
- 16:50-17:10 'An Airbus perspective on challenges in certification for future airframes', *Linden Harris, Airbus, UK*
- 17:10-17:30 'Offshore wind turbine blade certification – challenges and opportunities', *Stephen Randall Vestas Wind Systems, UK*
- 17:30-17:50 'Barriers and opportunities in certification of composites for infrastructure applications', *Lee Canning, Jacobs, UK*
- 17:50-18:30 Panel discussion & general discussion / chaired by *Janice Barton, Bristol Composites Institute, University of Bristol, UK*