Title: Study on Design Allowables for Fibre-Steered Laminated Composites in Aircraft Structures (supported by Embraer)

Type of award  PhD Research Studentship

Department  Aerospace Engineering

Scholarship  A minimum £17,777 p.a. for 2018/19 subject to contracts (please check below for further scholarship details)

Funding Duration  3.5 years

Eligibility  Home/EU applicants only

Start date  1 October 2019

PhD Topic Background/Description

This PhD studentship is a collaboration between the University of Bristol and Embraer SA based in Brazil who is the world’s third largest producer of civil aircraft. The research will explore the feasibility of applying novel fibre-steering design to composite aircraft structures, focusing mainly on the challenges arising in evaluating the design allowables for the laminates including curved fibres.

Although the current state-of-the-art, automated fibre placement (AFP) technology, enables the fibre steering in production of composite aerospace structures, the process-induced defects is the most critical problem in realising such a design as the defect generation mechanism is complex and material-dependent. Furthermore, there is no standard suitable for determining the design allowables for the fibre-steered laminates that can take into account the effect of the curved fibres in the structure and the defects.

The project will start by reviewing the current industrial practice for design allowables of straight fibre laminates and identifying its limitation for fibre-steered laminates. The research will consider modifying or developing new test methods and/or specimen designs to address the unique aspects of the laminates including curved fibres and manufacturing defects, and their impact on the structural integrity will be studied through an extensive coupon testing programme and rigorous evaluation of the test results. The test specimens will be manufactured to reflect the manufacturing characteristics of the AFP and a novel fibre steering technology developed at the University of Bristol, Continuous Tow Shearing.

The studentship will be jointly supervised by the academic and industrial supervisors, and a unique opportunity for a short secondment at Embraer will be provided.
Further Particulars

Candidate Requirements
Applicants should have or expect to achieve a first-class or high upper-second class degree (or equivalent) in Mechanical or Aerospace or relevant engineering discipline.

Knowledge of fibre-reinforced composite materials and experience in mechanical testing are essential. Experience in composites manufacturing and testing will be advantageous.

Scholarship Details
Scholarship covers full UK/EU (EU applicants who have been resident in the UK for 3 years prior to 1st September 2018) PhD tuition fees and a tax-free stipend at the current RCUK rate (£14,777 in 2018/19) plus an industrial top-up of plus £3,000 p.a. (subject to contracts). EU nationals resident in the UK may also apply but will only qualify for PhD tuition fees.

Informal enquiries
For informal enquiries, please email Dr BC Eric Kim, B.C.Eric.Kim@bristol.ac.uk

For general enquiries, please email came-pgr-admissions@bristol.ac.uk

Application Details
To apply for this studentship, submit a PhD application using our online application system [www.bristol.ac.uk/pg-howtoapply]

Please select PhD Aerospace Engineering on the Programme Choice page and enter details of the studentship when prompted in the Funding and Research Details sections of the form with the name of the supervisor.

Closing date for applications 28 February 2019.

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