

# Calling all Young Composite Engineers

The Society for the Advancement of Material and Process Engineering (SAMPE), would like to invite you to participate in a **“Design and Make” competition** to put your composites experience into action and represent your university or company in this national event. The objective is to design and manufacture a **scaled single-deck composite footbridge** to support a central load, using your creativity and composites manufacturing knowledge. The design process of the bridge will require extensive research into different cross-sectional designs to identify the one with the highest failure load relative to the weight.

In conjunction with the EPSRC Future Composites Manufacturing Research Hub, this SAMPE contest will take place on the **1<sup>st</sup> November 2023** during the Advanced Engineering Show at Birmingham’s NEC. The event is sponsored by SHD Composites, Instron UK and the National Composites Centre, with a prize being awarded to the team with the winning structure.

## Launch Event

An in-person launch event will be hosted at the National Composites Centre (NCC), Bristol, on 20<sup>th</sup> September 2023. This will provide the opportunity to network and meet like-minded people to form your bridge building team. Material kits will be distributed during this meeting, kindly provided by our sponsor SHD Composites, and time will be available for you to start your preliminary design and receive some training on how to process these materials. A tour will be given of the NCC and a social event will be organised to extend the networking opportunities.

## Registration

Please e-mail [Joanne Eaves](mailto:Joanne.Eaves@shdcomposites.com) by Friday 25<sup>th</sup> August 2023 to register for the launch event. Entries beyond this date will not be accepted.



## Participants

- Teams should consist of at least 2 members, up to a maximum of 4
- Teams may contain undergraduate, postgraduate/postdoctoral researchers and early career engineers working in industry
- Entries are welcome from all universities and companies in the UK and Ireland
- Only one entry per team. However, universities/companies are welcome to enter multiple teams if they wish
- At least one team member must be present during the Advanced Engineering Show on 1<sup>st</sup> November 2023

## Design constraints

- All bridges must have a single, continuous deck, suitable for a scaled person to walk from one end to the other (think a toy figure)
- All bridges must be at least 650 mm in length to suit the test fixture (see Figure 1). Additional pieces of material cannot be bonded on to the bridge ends to increase the length.
- The bridge must have an unsupported length of 600 mm (distance between simple support rollers).
- The bridge should be a maximum width of 150 mm and a minimum width of 100 mm. Please consider the deck width when trimming the bridge.
- The section height must not exceed 60 mm to ensure the deck of the bridge remains within the fixture support guides.
- The bridge must be manufactured using only the materials provided. The use of substitute materials will not be permitted, so plan your design carefully. Materials will require vacuum-only cure and will be given at the networking event. Some instructions will be provided to help with the layup and cure process.

## Assessment Criteria

Your bridge structure will be assessed at the Advanced Engineering Show on 1<sup>st</sup> November 2023 at Birmingham's NEC.

The following criteria are given as an indication of how the structural performance of your bridge will be assessed. The final criteria will be determined at the launch event in September:

- The maximum applied load will be recorded at failure and will be normalised by the mass of the bridge.
- The specific stiffness will be used as a secondary criterion if multiple bridges exceed the full-scale load of the testing frame.

All teams must also submit a 1-minute video presentation using a phone camera or webcam, highlighting the design and manufacturing decisions taken to produce their bridge. Marks will be awarded in the following areas:

- Depth of technical content
- Effective use of images and/or video clips
- Clarity and flow of the video
- Creativity
- Relevance to bridge entry

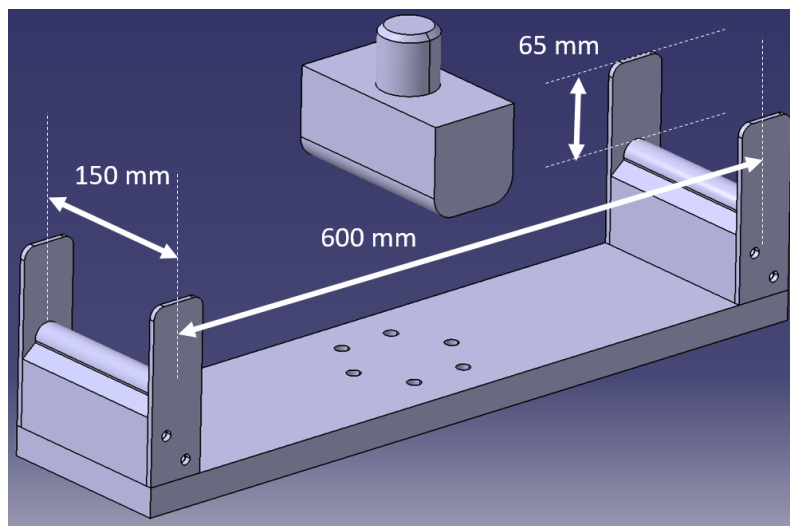


Figure 1: Bridge test fixture to fit Instron. (Support rollers are  $\text{\O}25$  mm)



## About

The Advanced Engineering Show is the UK's largest annual gathering of engineering and manufacturing professionals. The show is a hub of innovation, collaboration and development from all sectors, with around 9,000 annual attendees. Participating in this competition will give you the opportunity to meet people from across the composites supply chain, with 4 technical forums and over 400 exhibitors. This is a great event to learn more about the latest research and developments in composites manufacturing. All team members are welcome to attend this event. Please register for the Advanced Engineering Show [here](#).

SAMPE UK and Ireland is a networking organisation of 150+ professionals and students in advanced materials, which is very active in composites. An objective of SAMPE is to foster technical excellence in the UK, by promoting interest in new materials and processes within the composites community. SAMPE wishes to support this event to create a dialogue and network with tomorrow's engineers. **Free annual membership of SAMPE UK and Ireland** will be offered to all participants who attend the competition in person. Further information about the UK and Ireland Chapter can be found at <https://www.sampe.org.uk/>

## Contact

Questions regarding the competition should be sent to [Lee Harper](#)

