



TITLE: Permeability strategies in 3D woven composites through binder architecture

AUTHOR(S): Kazi Sowrov¹, Md Raju Ahmed¹, Rehan Umer², Prasad Potluri^{1*}

AFFILIATION(S): ¹University of Manchester, ²Khalifa University

***Presenting author: prasad.potluri@manchester.ac.uk**

ABSTRACT:

3D woven composites may be constructed with bi-directional tow layers held together with a variety of binder architectures such as orthogonal, layer-to-layer and angle interlock architectures. Combination of binder counts, binder fibre types and interlacing steps may be used to produce a large selection of weaves. In this work, we evaluated 3D woven binder architectures for permeability and compressibility (hence fibre volume fractions) with a view to minimise infusion time and at the same time achieve high fibre volume fractions (during resin infusion) and to achieve mechanical properties that are comparable to cross ply laminates.

With the help of novel 3D weaving concept developed at Manchester, we produced 3D weaves with hybrid binder architectures that combine the advantage of through thickness permeability, impact resistance with decent in-plane properties. Additionally, binder count and binder micro-structures have been further optimised. This presentation focusses on manufacturing, permeability measurements and laminate mechanical properties.