

Over-3D Printing of Continuous Carbon Fiber Composites on Organo-sheet Substrates

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Abstract. Fused Filament Fabrication (FFF), or 3D printing, of continuous fiber reinforced composites allows getting advanced materials (steered-fibers, dispersed stacking sequence laminates or functionally graded composites), as well as complex geometries (cellular structures or metamaterials). However, FFF presents several drawbacks, especially when large projected area or high fiber content composite parts are required. On the other side, stamp forming of organo-sheet thermoplastic composites is a cost-effective technology, but with severe geometric limitations. Combining both technologies, by over-3D printing on the organo-sheet, can be a promising approach to add the best of each of them. The effect of the organo-sheet temperature on the shear strength of the bonding interface is studied. The results shows that strong bonding interface can be achieved when the correct substrates temperature is chosen. In fact, it is largely improved if the interface temperature is higher than the melting temperature of the substrate layer, and in these specimens, failure does not take place at the interface.