

5<sup>th</sup> World Congress on

# Materials Science & Engineering

June 13-15, 2016 Alicante, Spain

## Mechanical performance of novel thin ply thermoplastic composites

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In the ever-growing world of material innovation, carbon composites are fast becoming a tremendous solution for aerospace, automotive, marine and offshore, sports and many other applications seeking high specific properties. An ample amount of attention is being given in choosing the right mix of fibres and matrix system to achieve an optimal composite system in terms of quality, mechanical properties as well as long term durability. In current research, a novel thin Ply thermoplastic composite system has been developed. Thin bi -angle C-Ply ( $<150 \text{ g/m}^2$ ) has been used as a reinforcement while a reactive processing liquid thermoplastic Elium rein was a chosen matrix material. The manufacturing of composite system was carried out using cost effective Vacuum assisted resin infusion (VARI) and light resin transfer moulding process. The manufacturing process has been optimised and the mechanical properties (in and out of plane) were characterised. Mechanical tests are followed by detailed failure mode studies to understand the finer nuances of the difference in various laminate configurations. The Elium resin was found to be a competitive solution to epoxy resin in tensile and flexure properties while it offers significant improvement in out of plane properties like fracture toughness. The results of developed Thin-Ply thermoplastic composite system composite are indeed promising and has a potential to be a perfect material for mass production processes utilizing cost effective liquid injection techniques.

### Biography

Somen K Bhudolia received his MSc in Aerospace Engineering from Nanyang Technological University (NTU), Singapore, and Technical University of Munich, Germany (Joint Degree Program). He is currently pursuing a joint industrial PhD at NTU on Thin Ply thermoplastic Composites for Sports Applications. To date he has presented 8 conference papers and has 3 journal publications. His research interests are – design, fabrication and testing of advance composite materials, thermoplastics, thin ply NCFs, microwave curing of composites, NDT and fatigue analysis.

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