



Hybrid Moulding Technology

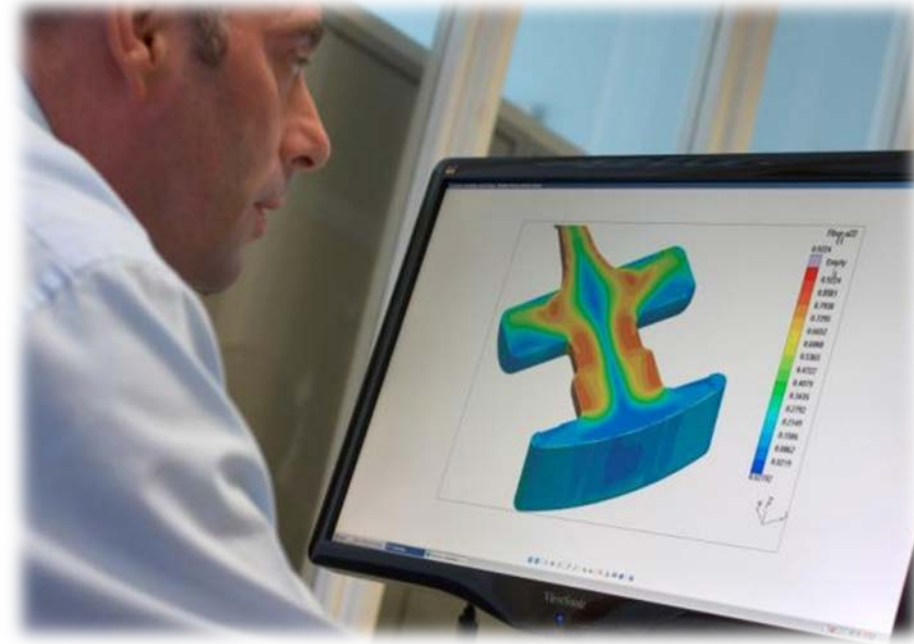


● Drivers

- Manufacture of complex shape parts
- Reduction in recurring costs
- Geometrical optimisation
- Functional integration
- Improved mechanical performance
- Improved damage tolerance
- Ease of processing

● Approach

- Investigate hybrid technology opportunities for complex-shaped structural parts

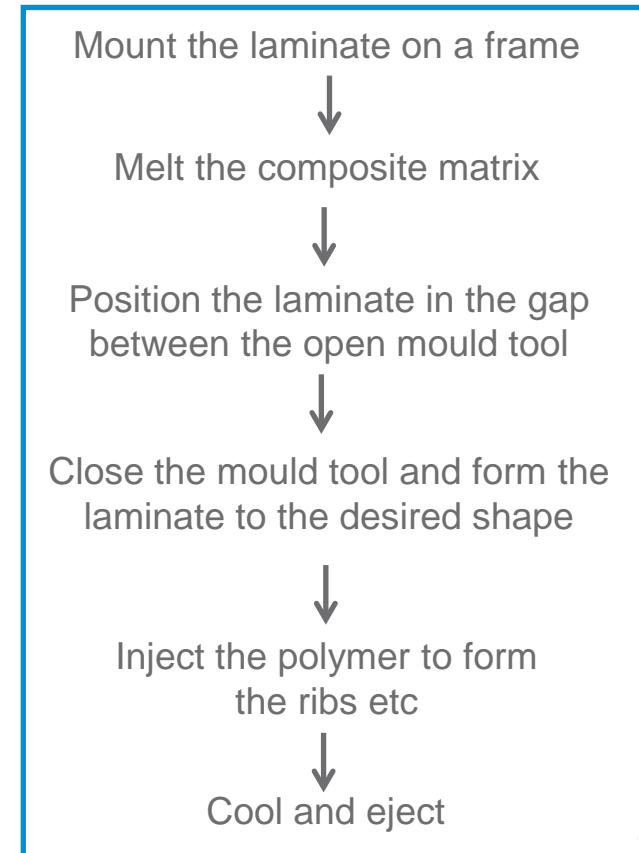


● Overmoulding Basics

- Overmoulding metals is an old technology
- Overmoulding composites
 - Pre-consolidated laminate – ‘organo-sheet’
 - Melt the matrix
 - Thermoform the laminate
 - Injection mould structures onto the surface

● Challenges

- Control of fibre orientation during forming
- Another heat cycle for the laminate matrix
- Post-moulding operation to remove the excess laminate
- Uniform laminate thickness



● Ideal Process

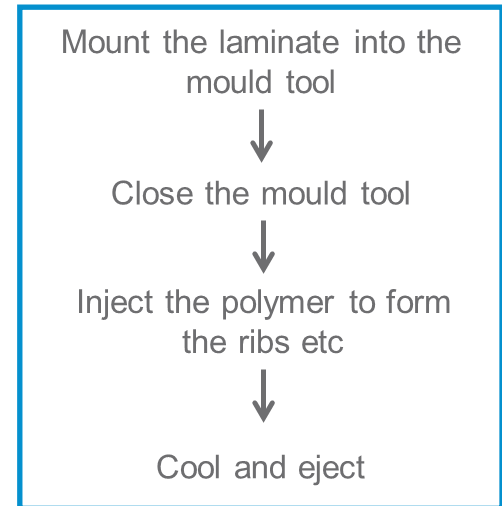
- Pre-form the composite laminate to the net shape
- Design the laminate to maximise the performance
- Necessitates being able to vary the thickness of the laminate
- Mount the net shape into a mould tool
- Inject the polymer onto the surface
- Cool and eject

● Benefits

- Laminate fibre structure does not change
- No post moulding operations
- Lower energy requirements = lower costs

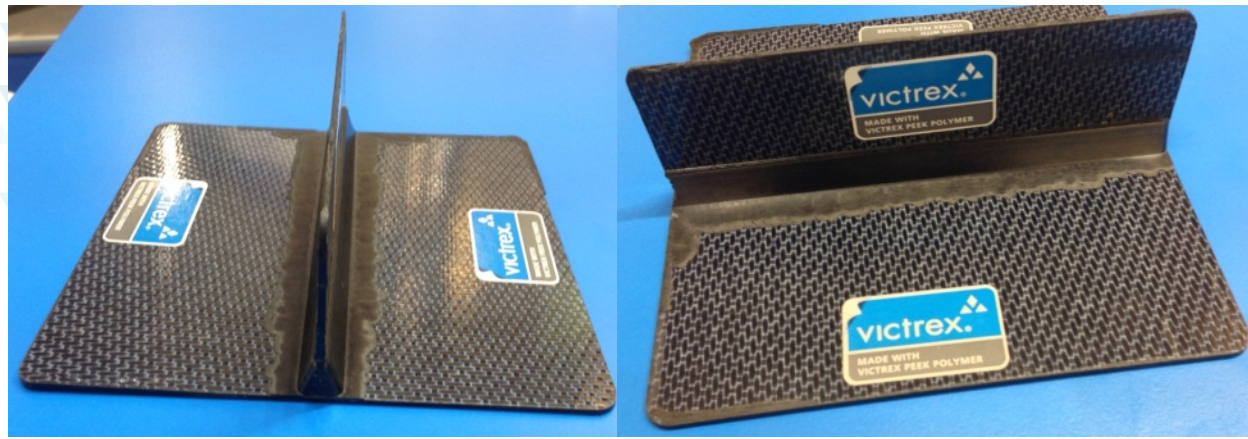
● Challenges

- Potential for variations in laminate thickness



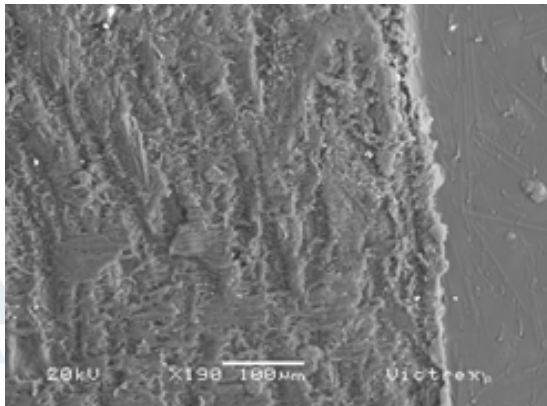
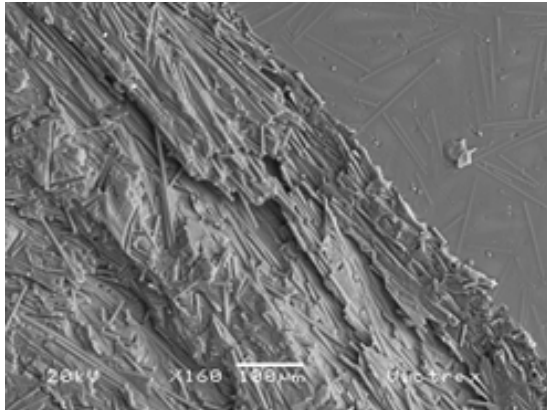
● Bonding

- Molecular scale bonding requirements
 - Compatibility of the resins/same resin
 - Similar mechanical properties
 - Similar levels of crystallinity
- Resin combinations
 - Moulding PEEK onto a solid PEEK laminate does not work
 - Energy available from the melt is not sufficient to melt the solid surface



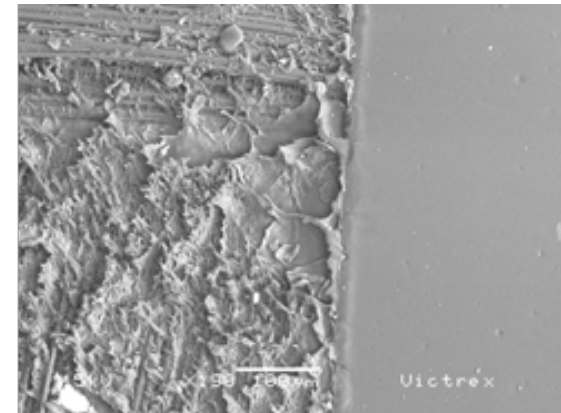
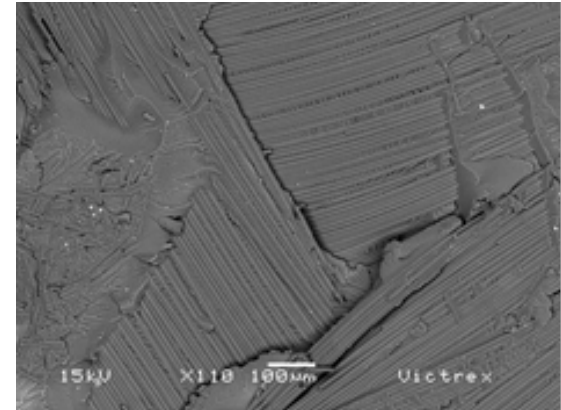
New Hybrid Technology

Developed by Victrex



PEEK moulded surface

**Good
bonding**



Composite surface

New Hybrid Technology

Developed by Victrex

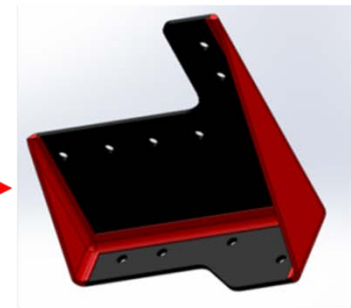
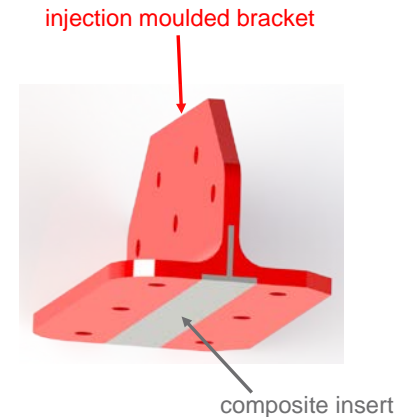
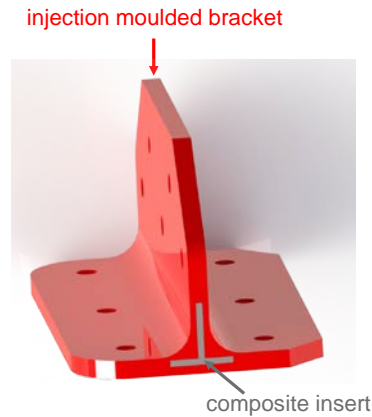
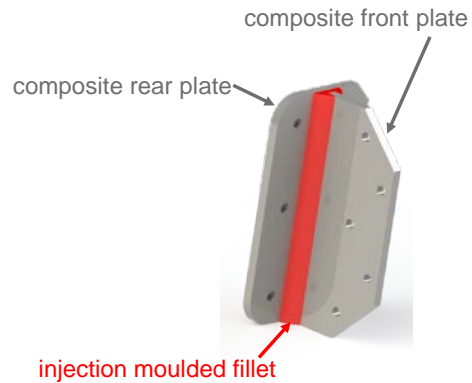
● Structural Aerospace Bracket

- Insert made from VICTREX® PAEK-based continuously-reinforced composite
- Injection moulded component made from VICTREX PEEK polymer
- Manufactured by Tri-Mack Plastics Manufacturing Corp.



Potential Applications

Aerospace



Red – VICTREX® PEEK injection moulding polymer
 Grey/black – VICTREX PAEK-based continuously-reinforced composite

Have a Question?

Contact Us!

**If you have questions regarding the
hybrid moulding technology, please contact...**

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