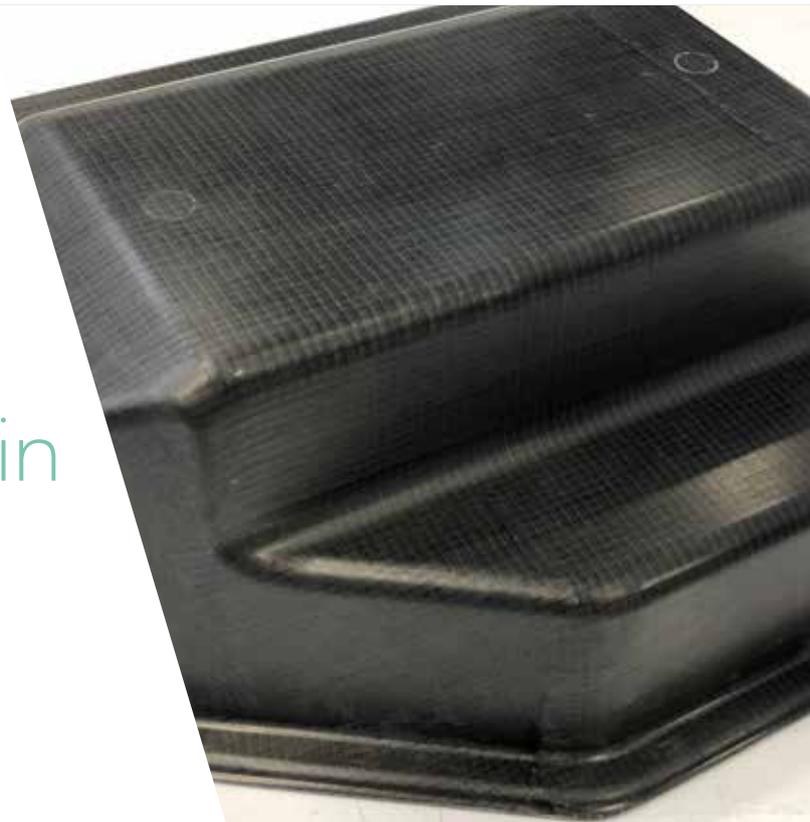


Carbon fibre
non-crimp fabric
(NCF) + epoxy resin
manufactured
using RTM



Case objective

- Provide empirical data for cost modelling. Identify alternative composite materials for battery cases to reduce part cost and increase rate, while maintaining mechanical performance (against baseline prepreg).

Case output and comparison

- Identified key manufacturing challenges with the RTM process for this type of battery case.
- 50% cost reduction in demonstrator case cost using RTM compared to current CFRP prepreg baseline, provided target yearly production rates are greater than 700.
- Part preforming requires significant development compared to prepreg baseline.

What next

- Expand cost modelling to investigate effect of case size and geometry complexity on part costs.

Carbon fibre non-crimp fabric (NCF) + epoxy resin manufactured using wet compression



Case objective

- Provide empirical data for cost modelling. Identify alternative composite materials for battery cases to reduce part cost and increase rate, while maintaining mechanical performance (against baseline prepreg).
- Identify key manufacturing challenges with the Wet Compression process for this type of battery case.

Case output and comparison

- 50% cost reduction in demonstrator case cost using RTM compared to current CFRP prepreg baseline, provided target yearly production rates are greater than 700.
- Fastest case manufacturing process investigated, with part TAKT times < 5 minutes.
- Part preforming requires significant development compared to prepreg baseline.

What next

- Expand cost modelling to investigate effect of case size and geometry complexity on part costs.

Recycled carbon fibre + epoxy resin manufactured using wet compression



Case objective

- Produce battery case using recycled carbon fibre recovered from a Rapide E case, demonstrating possible use for material at the end of its working life.
- Provide processing data for the manufacture of battery cases using a recycled carbon fibre reinforcement.

Case output and comparison

- Battery case demonstrators successfully manufactured using recycled carbon matt from Rapide E case.
- Approximately 65% of carbon reinforcement in Rapide E carbon case is recoverable.
- Reduction in material stiffness compared to continuous fibre can cause issues during manufacture. Influence on tool design must be considered.

What next

- Defined potential CO₂ recovery from re-using carbon fibre from battery cases.
- Investigate carbon footprint reduction from replacing virgin carbon fibre reinforcement with recycled, for different composite parts / processes.

Carbon fibre + PS200 resin prepreg manufactured using compression moulding



Case objective

- Demonstrate feasibility of manufacturing a battery case using a material designed for improved fire resistance.
- Identify key manufacturing steps and understand process challenges compared to current prepreg baseline.

Case output and comparison

- Case demonstrators successfully manufactured using Carbon + PS200 prepreg.
- Quality of surface finish low compared to prepreg baseline.
- Two stage pressing process required to remove moisture from material during consolidation.

What next

- Fire testing of PS00 and other FST material to EV regulations.

Flax fibre + PS200
resin prepreg
manufactured using
compression moulding



Case objective

- Demonstrate feasibility of manufacturing a battery case using fully Bio-based composite material.
- Identify key manufacturing steps and understand process challenges compared to conventional prepreg.

Case output and comparison

- Case demonstrators successfully manufactured using Flax + PS200 prepreg.
- Two stage pressing process required to remove moisture from material during consolidation.
- Mechanical performance of case made of flax fibre lower than prepreg baseline.

What next

- Define carbon footprint reduction from replacing carbon fibre reinforcement with flax for different composite material parts / processes.