

RECYCLING PROCESS FOR THERMOPLASTIC COMPOSITES

Results show not only a more cost-effective but also lighter solution when applying this recycling route.



RECYCLING

With the growth of applications and demand of thermoplastic composites (TPC), increasing amounts of production scrap are expected to be generated. The TPC-Cycle project covers the entire recycling value chain, from scrap collection to application. This project proposes a new recycling solution for TPC that retains the high performance of those materials, is economically viable and improves the environmental impact compared to current solutions.

MATERIAL

Post-industrial scrap is collected from TPC aerospace manufacturers and then shredded to large flakes to retain long fibres. The shredding technology covers the influence of scrap geometry and setup variables to obtain uniform and desired flake sizes. The fibre length is analysed and controlled using specially developed methods, which results in highly robust processability and properties.

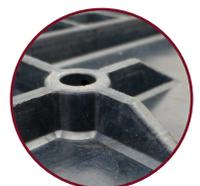
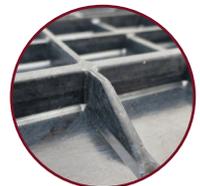


REMANUFACTURING

Scrap is converted to a new component in a two-step process with mechanical performance superior to granulation/injection moulding. Material is first heated upon melting and mixed, while preventing fibre breakage. A molten dough is subsequently extruded and compression moulded. A method was developed in-house to analyse the degree of mixing, showing well mixed and homogeneous results.

PERFORMANCE

Compression moulding offers cycle time in a matter of minutes, while being able to mould net shape complex features and parts enabling function integration and geometric stiffening. Part performance was modelled and tested and shows high strength and impact properties. All combined, this solution offers lightweight components with a large degree of function integration by design, with good mechanical properties and manufactured at low costs.



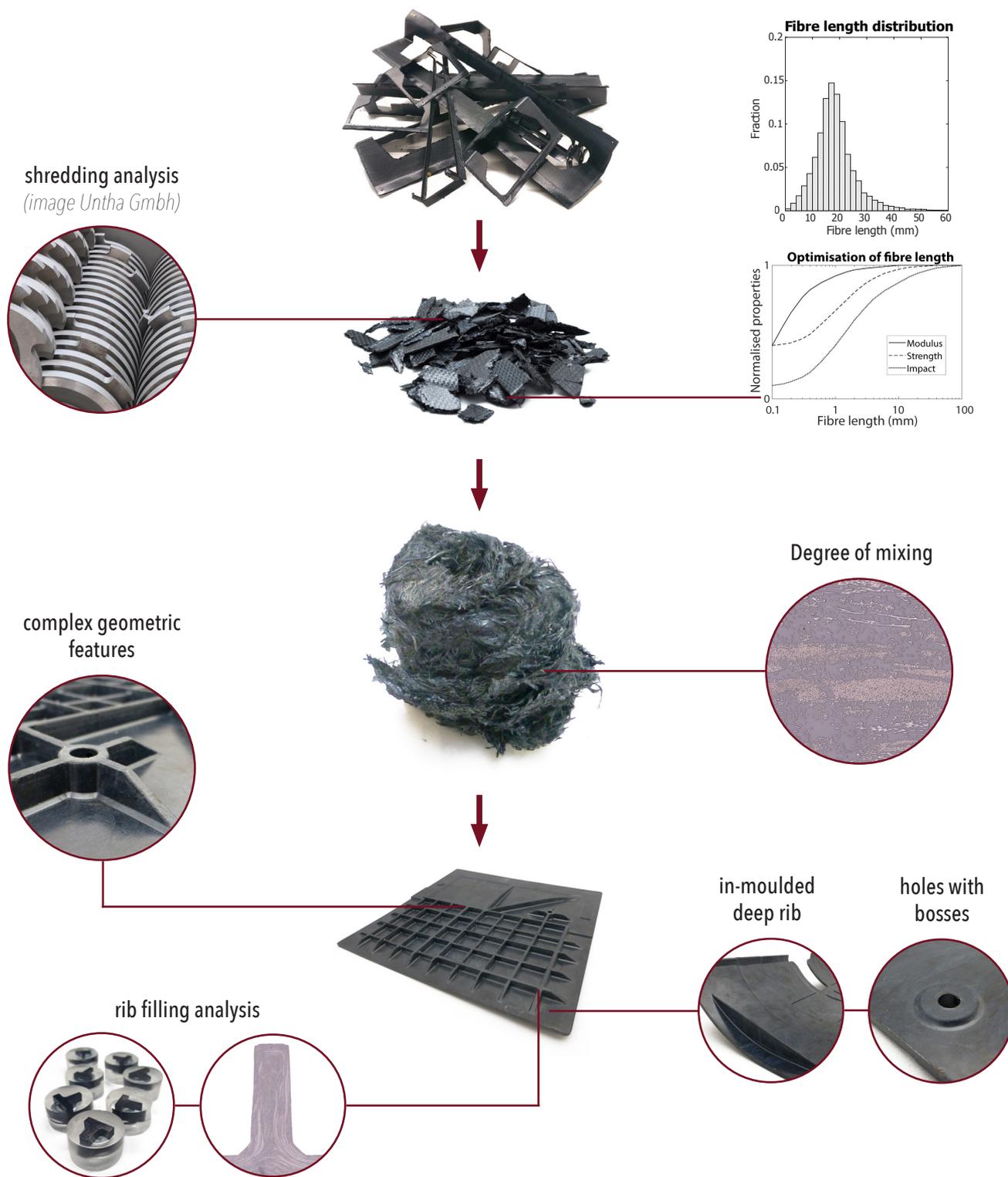
ABOUT THE PROJECT CONSORTIUM

The entire value chain of TPC production and application is covered by the consortium of industrial partners and R&D centres. TPAC and TPRC are R&D centres working in collaboration with universities and industries and are located in Enschede, the Netherlands. They have developed applied and fundamental knowledge on the processing and characterisation of TPC materials over the past decade. TPAC closely works with Saxion University of Applied Sciences and TPRC with University of Twente. The two centres together form the smart industry Fieldlab TPC-NL, which is recognised by the Ministry of Economic Affairs of the Netherlands and is listed as digital innovation hub of the European Commission.

Interested in working with us? Please feel free to contact us or one of our partners.



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