Böllhoff Otalu

New assemblies for thermoplastic composites

The specialist of fastening and assembly technologies worked with Cetim to directly incorporate metallic inserts into the thermostamping step of the Quilted Stratum Process® (QSP®).

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OUR CUSTOMER

Corporate name
Böllhoff Otalu

Business activity
Böllhoff Otalu is the French subsidiary of the family-owned German group Böllhoff, a leading global manufacturer and distributor of fasteners and systems technology. It owns an R&D centre specialised in cold heading technologies, in-moulding and assembling located in Chambéry (France).

Sales turnover
EUR 675 million in 2016 (Böllhoff Group)

Workforce
2,800 people (Böllhoff Group)

Böllhoff Otalu and Cetim worked together to successfully functionalise a thermoplastic composite part with a one-shot process, without any drilling operation or subsequent rework, and resulting in an improved mechanical strength of 75%.

In the automotive sector especially, the functionalisation of thermoplastic composite parts offers major innovation potential. Subsequent to an initial cooperation in 2012, the specialist of industrial fasteners and Cetim were back together in 2014 looking for new solutions for more added value on the Quilted Stratum Process® developed by Cetim. "*We offered to integrate into the QSP® the Rivkle® SFC version specifically designed for composites and the Imtec® CF technology intended for in-moulding applications in thermoplastics*", explained Jean-François Jambut, Head of the innovation department at Böllhoff Otalu.

Stronger assembly solutions

The partners worked in two stages. First, they placed Rivkle® SFC inserts into the holes created into QSP® mould. With this in-mold technology, fibers are mainly deviated (instead of cut with classic drilled solutions), and material removed from the hole is also re-used for local reinforcement, improving at the end the resistance of the assembly. Then, a direct integration of thread in composite was developed in one-shot process using metal insert Imtec® CF. It is also done during the stamping process without any preparation in composite, in the same cycle time, with specific movements inside the mould and overmoulding for a complete integration. This resulted in an increased mechanical resistance. "*Compared with a conventional solution assembled with a machine drilled composite, these solutions increase the pull-through performance from 30 to 75% and the lap-shear performance from 60 to 75%, not to mention the energy absorption gain*", stated Emmanuelle Berlire, Innovation Project Manager at Böllhoff. Two patents were filed in 2016. Böllhoff Otalu and Cetim are now developing a new innovative solution for structural assembly of composite parts.

Cetim's asset

The centre provides product and process skills in high-speed thermoplastic composites, cost control and multimaterial assemblies. Its overall vision allows it to guarantee a concrete link between generic R&D and technology transfer to industry.

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