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PRESS RELEASE

The counter-drilling revolution – using a new method, stack materials can be drilled without damaging the layers and with less wear on tools

Mechanical processing is a key factor for the industrial implementation of fiber reinforced plastics, particularly in hybrid lightweighting applications. A huge challenge in drilling CFP/titanium stacks has typically been the rapid wear of the processing tools. The Fraunhofer IPA in Germany has developed a new tool and processing concept for rivet hole drilling. The innovation: counter-drilling.

Aerospace technology in particular demands precision in drilling rivet holes into materials that are difficult to machine work, often resulting is rapid wear of the tools used. The process of drilling airplane components made out of lightweight materials consisting of layers of titanium and CFP or aluminum and CFP, so called stacks, can be quite expensive due to the rapid wear of the tools and the costs of frequent tool replacements.

By using an innovative tool design, the Fraunhofer IPA has developed a process to simplify the material processing and increase the work life of the tools over the current industry standards. The process is based on a radially adjustable drilling tool which can drill through high-tech aerospace materials centrally in the drilling direction and drill through off-center from the opposing direction.

The advantage of this process is that materials can be machine worked under the optimum conditions. With five cutting edges along three different diameters, each layer of the stack is drilled with the ideal cutting edge for the specific material.

The drilling process from two directions allows the material to be drilled in a way that better matches the processing forces, meaning that the drilling force is pressed into the work piece. Normal tools only apply force in the drilling direction so that material can be thrown off at the point where the bit exits the material, often resulting in damages.

The different materials in stacks such metals like titanium or aluminum on the one hand and carbon composites on the other can be drilled with cutting edges that are specifically designed for those materials, giving the tool a longer work life and reducing damage to the material.

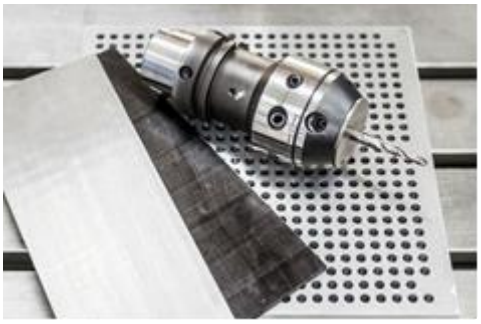
The drilling method is particularly suitable for the high-precision processing of hard to work materials which require low burring on the entry and exit sides or for materials which include laminated CPF and are particularly sensitive to the forces being applied. The innovative counter-drilling method for new high-performance materials opens up huge potential for quality drilling processes.

www.ipa.fraunhofer.de/en.html

About Fraunhofer IPA

The Fraunhofer IPA in Stuttgart, Germany, is one of the largest institutes in the Fraunhofer Group, employing nearly 1,000 employees. It has an annual budget of over 60 million euros, with more than a third coming from industrial projects. The 13 departments of Fraunhofer IPA are supplemented by six business units: Automotive, Machinery and Equipment Industry, Electronics and Microsystems, Power Industry, Medical Engineering and Biotechnology and Process Industry.

Photos



Caption: (left) Tool holder for counter-drilling with the IPA tool and a titanium-CRP stack. Source: Fraunhofer IPA. Photos in a higher resolution and other motives are available from mirko.hertrich@leichtbau-bw.de or can be downloaded from http://www.leichtbau-bw.de/en/press/releases.html.

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Editorial Contct:
Leichtbau BW GmbH
Media and Public Relations
Breitscheidstraße 4
D - 70174 Stuttgart
Tel.: +49 711 – 128 988-46
Mob.: +49 151 – 5060 36 53
mirko.hertrich@leichtbau-bw.de