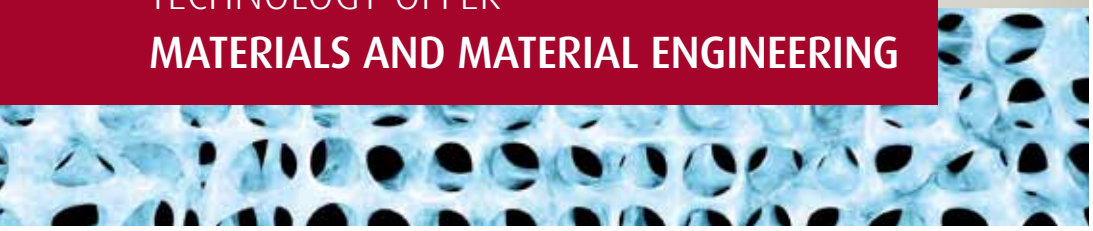
TECHNOLOGY OFFER

MATERIALS AND MATERIAL ENGINEERING



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SCHWARZ SILBER: METHODS TO BUILD CFRP-AL TRANSITION STRUCTURES IN LIGHTWEIGHT DESIGN (UN302)

THE PROBLEM

Lightweight designs are of great significance in car manufacturing and in the aerospace industry. A light weight and the required resilience are achieved by combining different materials. So-called hybrid components consisting of a metal and a fiber composite laminate, which combine the advantages of each single component, are needed to optimally tune the properties of the materials applied.
At present, metals and fiber composite structures are usually joined by adhesive (gluing) or mechanical (e.g. riveting) methods. These two coupling techniques produce an overlapping join which has a negative effect on the mechanical properties, weight, and height of the integral component. A high susceptibility to contact corrosion occurs especially when aluminum and carbon fiber are paired.

THE SOLUTION

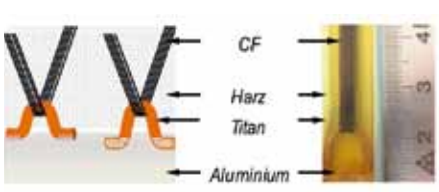
Bremen's DFG research group "Schwarz Silber" has developed several methods to join aluminum with a fiber composite laminate (carbon fiber), saving space and weight. The transition between the materials lies in a transition zone in which titanium is applied as a transition material. If titanium is welded to the aluminum in a loop, fiber rovings can be led through the loops and then brought into final shape with a resin matrix. Another method fabricates a composite of titanium and fiber laminates, which enables welding on the metal side, and laminating on the fiber side. This invention is now being further developed and brought to application in the scope of a funded research project. Manufacturing has been successful on a laboratory scale, so that material tests are now in progress.

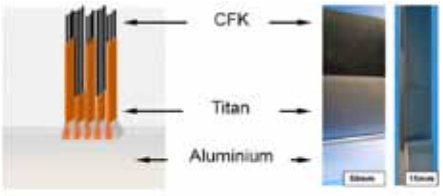
ADVANCES AND APPLICATIONS

- Transmission of very heavy loads
- Markedly reduced building space as compared with adhesive joining (no thickening)
- Stability without reinforcement layers
- No contact corrosion
- Utilization of different material properties in the material mixture
- Economical realization and scaling

Benefit:

- Weight reduction results in a lower energy consumption in the application fields of aerospace industry and car manufacturing





FIELD OF APPLICATION

Aerospace industry, car manufacturing

KEYWORDS

Hybrid component, CFRP aluminum, composite component, lightweight design

PROPERTY RIGHTS

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US 8 722 201 B2

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Licensing, cooperation and further development

AN INVENTION OF

Faserinstitut Bremen e.V. (FIBRE), Germany, BIAS – Bremen Institute for Applied Beam Technology, Germany, IWT – Stiftung Institut für Werkstofftechnik, Germany

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