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Additively manufactured clamping structures improve adhesion and joining processes

The turn from traditional "monolythic" components, made of one single material, to hybride constructions made of atypical materials implies great challenges. Modern joining processes must be able to join most diversified materials in a robust and durable manner. The scientists of the IWS Dresden favour clamping structures for transition joints between metal, ceramics or plastic material. The tailored micro structures enable a later application of mechanically highly resistant joints between the parts to be connected.

The IWS clamping structures are additively manufactured directly on the metal substrate by means of numerous superimposed weld beads. The technology of high-precision laser powder cladding allows for the application of precise structures on rotationally symmetrical and plane substrates as well as on free-form surfaces in a reproducible, reliable and cost-efficient manner.

The micro structured metal surfaces can be subsequently coated with plastic materials or with ceramics. To guarantee best possible interlocking between the metal and the plastic or ceramic materials, the geometry of the micro clamping structures has been adapted by means of CAD/CAM tools. In this way the material composite can be adapted and the production process can be optimized.

Most diversified metal materials can be applied for additive manufacturing processes of micro structures. Even variant materials compositions, e.g. gradient structures, now become applicable up to a double-digit micrometer range. If necessary, functional elements can be additively manufactured directly on the generated structures.

The Fraunhofer IWS Dresden "2nd International Symposium on Additive Manufacturing" will present the latest developments in the field of additive manufacturing technology. It will be held at the MARITIM International Congress Center from February 8 to 9, 2017. Please find further information at www.isam.network. On the eve of the symposium the scientists of the Fraunhofer IWS invite all interested customers to the official opening of the novel Center for Additive Manufacturing (address: Winterbergstraße 28, 01277 Dresden).

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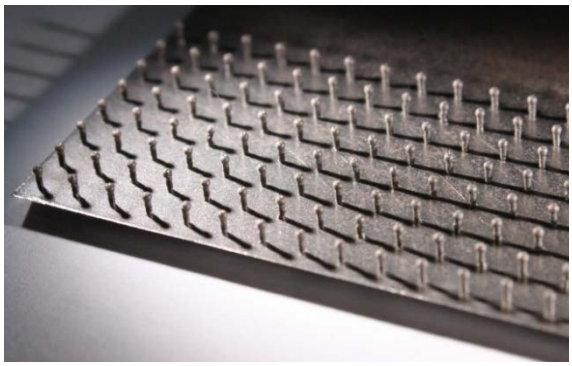

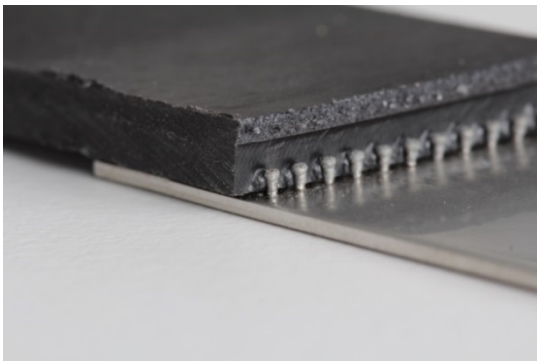

Clamping structure (left) high-strength joining processes of metal and plastic material (right)

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