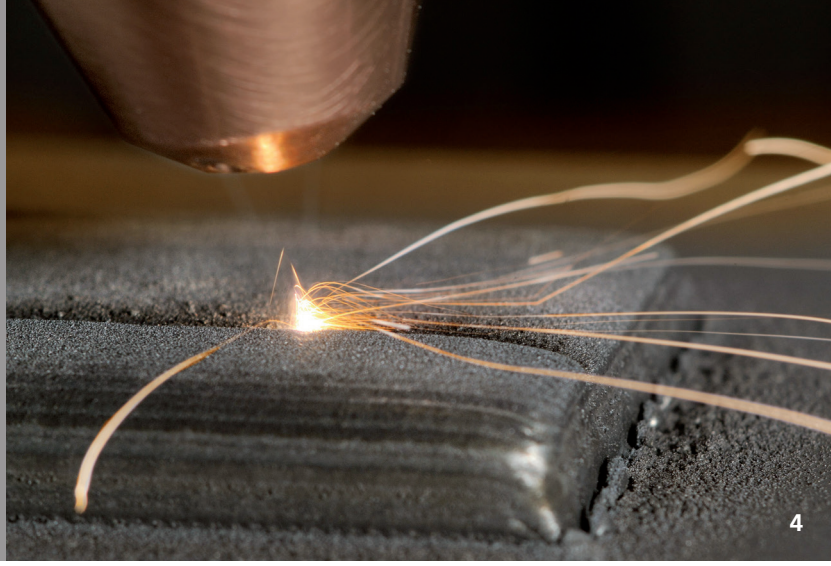

ADDITIVE LASER METAL DEPOSITION FOR 3D-COMPONENT MODIFICATION IN AUTOMOBILE CONSTRUCTION

Task

By using forged aluminum components, the automobile industry can contribute to saving weight in its vehicles. A continuous challenge is, among other things, reducing production costs for as many vehicle models as possible while simultaneously maintaining the highest demands on the structural durability of the components. As an alternative to costly new production of different component types, additive Laser Metal Deposition (LMD) has been studied for the modification of functional prototypes and small series in cooperation with the BMW Group. The aim is to modify properties with minimal material and production costs.

Method

First, the process parameters were developed for laser cladding the 3D surfaces of a chassis component out of aluminum. In the second step, the component was optically scanned, a surface model created and a contoured building strategy designed using the ILT's own software LMDCAM. This strategy was applied to the original chassis components of the BMW Group in a final step.

Result

With a strategy adjusted to the geometry, both surface and ridge-like volumes could be precisely bonded metallurgically to the component with an allowance in the magnitude of 0.3 - 0.5 mm. By successfully combining the steps – surface mapping, path generation and LMD – the partners could demonstrate the potential to automate the process, even with complex tasks.

Applications

In addition to modifying aluminum components additively, the process can be adapted to diverse geometries for numerous other metallic materials and 3D surfaces. Targeted functional integration of mechanical and surface properties makes its use particularly attractive for component modification of prototypes and small series.

Courtesy of the BMW Group.

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3 Forged aluminum component.

4 LMD process.

Subject to alterations in specifications and other technical information. 09/2014.