

Novel forming technology for structural lightweight design

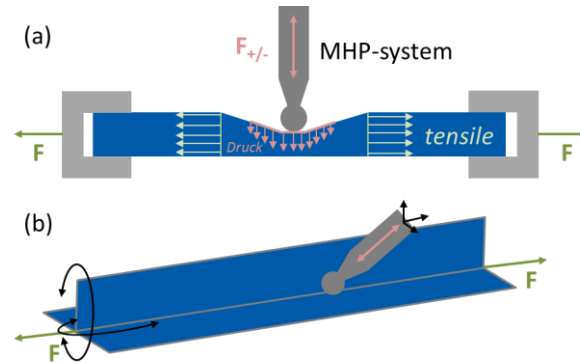
Load-oriented component design by flexible adjustment of material thicknesses in complex sheet and profile parts

Status quo

The use of load-adapted components represents a widespread approach of structural lightweight design. This can be achieved by a load-oriented distribution of the material thickness. Previous technologies for producing variable sheet thicknesses are limited to flat sheets and simple component geometries or are accompanied by ecological concerns (e.g. chemical milling).

Our technology: MHP under axial tension

The combination of a stretch-forming process and machine hammer peening (MHP) enables local material thinning and thus the forming of load-adapted profile components. In this process, a global axial tensile pre-stress is applied by stretch forming without plastic forming of the component. This tensile stress is superimposed with compressive stresses at specific points by means of MHP, which lead to local exceeding of the yield strength and thus to targeted thinning of certain component areas.



Benefits

- ✓ Enables individual, application-specific thickness distributions
- ✓ Pure-mechanical, flexible technology
- ✓ Also applicable for complex components

Application possibilities

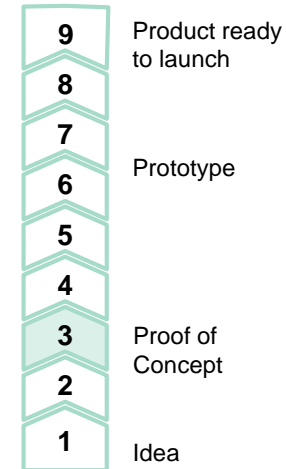
- Load-adapted stiffening profiles in aircraft construction (e.g. fuselage)
- Material savings through load-oriented design of automotive components (e.g. chassis)
- Static load beams in civil engineering

Commercialization opportunities

There are various possibilities for cooperation between the industrial partner and TU Darmstadt: from an exchange with the know-how carriers of the technology up to a close cooperation in case of further development needs. The technology is protected by intellectual property rights and can be used by the industry partner after a sale or licensing agreement.

Current stage of development

Technology Readiness Level (TRL)



The technology development is at Level #: The feasibility of the technology concept has already been validated in numerical simulations and preliminary experimental tests in which local thinning was successfully generated.

Your contact partners at TU Darmstadt

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