

**Press release****Laser Zentrum Hannover e.V.****Michael Botts**

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<http://idw-online.de/en/news381477>Research projects, Research results  
Materials sciences, Mechanical engineering  
transregional, national**Laser Technique Shortens Welding Process for Heat-Treatable Steels**

**The Laser Zentrum Hannover e.V. (LZH) and the Institute of Electrotechnology (ETP) at the Leibniz Universität Hannover have developed a process to inductively harden and weld multi-piece construction elements of heat-treatable steels in one step.**

The Laser Zentrum Hannover e.V. (LZH) and the Institute of Electrotechnology (ETP) at the Leibniz Universität Hannover have developed a process to inductively harden and weld multi-piece construction elements of heat-treatable steels in one step.

Heat-treatable steels are often used for highly stressed construction elements, since they show a high tensile and endurance strength resulting from the heat treatment. In order to weld heat-treatable steels, they must pass through a complex multi-step process. This enables a flawless and stress-resistant weld between both construction elements.

The LZH and the ETP have now developed a process which combines inductive hardening and laser beam welding of multi-part construction elements in one process step. The construction elements are heated to a temperature of over 900°C, the parts are laser welded and then quenched.

The so called "hot welding" immediately reduces tensions occurring during the welding process, so that the danger of cold cracks in the welding seam and a softening of the basic material are avoided.

In order to achieve this, a processing head has been conceived and constructed, which combines inductive heating, the welding process and quench hardening in one step. The processing head consists of a laser processing head, an inductor, a quench shower and a shielding gas nozzle.

In comparison to construction elements which have not been preheated, the processing head used increased the welding depth by 25%. The welding seams and the heat-affected zone show a homogenous hardness distribution. Also, martensitic structures were detected in both areas. After the welding/hardening process has been complete, it is also possible to harden the surface of the construction material using the inductor.

The hot welding process significantly shortens the processing time for heat-treatable steels, and simplifies the process run. In addition, the process simulation developed in the project can be used for an exact calculation of the process.

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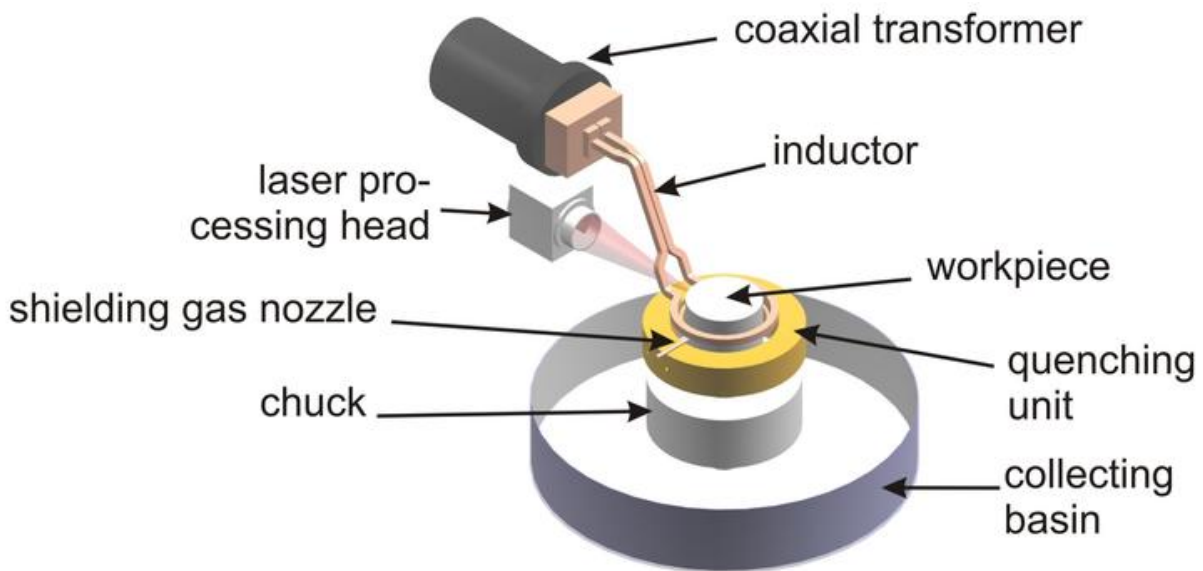
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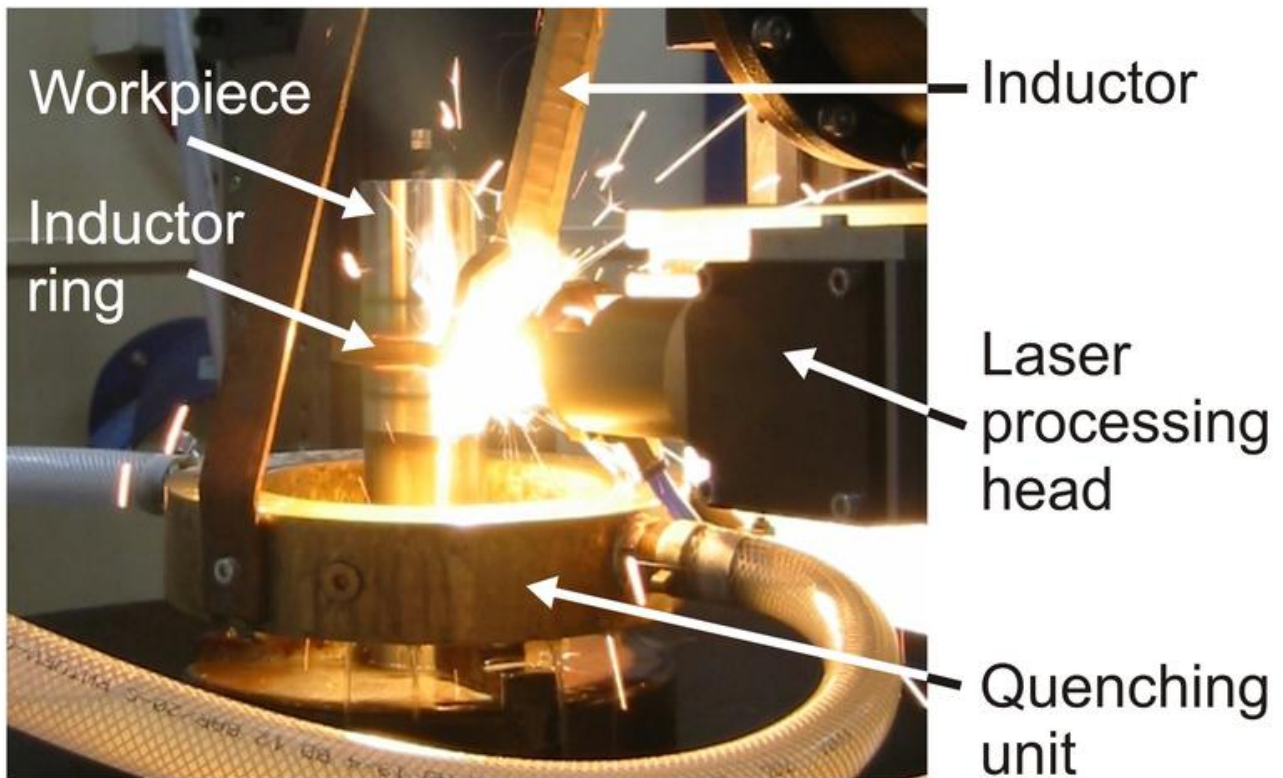
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You can find the LZH press releases with pictures at [www.laser-zentrum-hannover.de/en/](http://www.laser-zentrum-hannover.de/en/) (English) under "publications/press releases"



Schematic structure of the combined processing head for the laser hot welding of heat-treatable steels.



Laser hot welding of heat-treatable steels.