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DIFFERENTIAL HEATING OF SHEETED STEEL

Manufacturing parts with graded-hardness profiles by means of press hardening (UN434)

THE PROBLEM

In press hardening, sheeted metals are formed and hardened to manufacture construction parts. They acquire their necessary hardness by preceding heating and rapid quenching in the pressing step, thus changing the structural properties of the alloy in the process. By way of selecting various pre-forming temperatures, zones of varying yield strength or elasticity can be obtained in one and the same construction part.

Previous manufacturing methods, for example, in a continuous roller furnace, have already enabled the exposure of zones to various temperatures across the width, however, a finer resolution is desired, and a transition zone which is as small as possible. Parts that possess a high degree of hardness and still permit local areas to be molded at a later event are particularly needed in the frame and body construction of vehicles.

The invention "Controlled Heat Application" makes it possible to produce highly differentiated temperature zones by heating up the sheets with separate sectoral heating units.

THE SOLUTION

This invention makes it possible to focus heat application on local areas. The novel arrangement of heating and cooling elements produces a very high temperature gradient and thus very narrow transition zones between the various temperature zones. This allows for an adjustment of the structural properties to the point, with a high resolution over the entire geometry of the construction part.

The sheets are heated by means of direct contact heating elements. Other than in the continuous roller furnace, the steel sheets are stacked, so that the sheets lying underneath are preheated, which shortens their overall heat exposure time significantly.

ADVANCES AND APPLICATIONS

- Selectively controllable, high-resolution zones of material hardness in one and the same construction part
- Weight reduction of construction parts due to more precise properties within the parts
- Short heating times, enabling higher throughput rates
- Less space requirement of the heating unit due to stacking

The invention addresses manufacturers and suppliers of the automobile industry.

FIELD OF APPLICATION

Motor vehicle construction, car making, light weight construction with alloyed sheet steel

KEYWORDS

Press hardening, frame and body construction, light weight construction

PROPERTY RIGHTS

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DE application

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