

Combination of press-hardening and isothermal holding in the treatment of high-strength steel

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Abstract:

Today, high-strength parts for the automotive industry are mainly produced by the press-hardening technology. In order to reduce costs, savings in production and optimal materials are sought. One option involves the use of high strength steels of various chemical compositions. Two high strength steels were studied in the present experiment. The first one was CMnSi steel, a typical low-alloy TRIP steel with a carbon content of 0.2 %; alloyed with manganese and silicon. The second one was 42SiCr steel, a member of the group of martensitic steels, with a carbon content of 0.42 %. In addition to manganese and silicon, this steel is also alloyed with chromium. The CMnSi steel has not proved to be very sensitive to changes in process parameters, achieving an ultimate tensile strength of more than 950 MPa and an elongation of over 10%. 42SiCr steel was found to respond to both heating temperature and deformation, showing different mechanical properties. With the right combination of process parameters, an ultimate tensile strength of over 2100 MPa was achieved.

Key words:

Press-hardening, AHSS, TRIP steel, Q-P process