

عنوان مقاله:

Enhancement abrasion resistance of ductile cast iron by applying two-step austempering process

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نویسندگان:

Khaled M. Ibrahim - *CMRDI, Cairo-Egypt*

Ahmed Elsayy - *TTU, Tennessee, USA*

خلاصه مقاله:

Due to the low wear resistance of the as-cast ductile iron (DI), it is thought to apply a developed austempering heat treatment process defined by two-step austempering process that enhance the mechanical properties as well as the wear property. In this study two DI alloys were used, the first one was unalloyed DI and the second contains 0.2% Cr. Two batches of samples were prepared for each alloy. The first batch was proceeded by conventional (single-step) austempering treatment, where the samples were austenitized at 900 °C for 1 hour and then quenched in a salt bath at austempering temperature of 360 °C for 1 hour. A developed austempering process (or two-step austempering process) was applied on the second batch of samples. The samples were austenitized at 900 °C for 1 hour and then quenched consequently at 360 °C and while being kept at that temperature, the temperature of the salt bath was raised by 29 °C in 1 hour. So, the final austempering temperature reached 389 °C and then cooled directly by forced air. The correlation between microstructure, mechanical properties, as well as abrasion resistance has been done for both conventional (single-step) and two-step ADIs. The two-step (or developed) ADI achieved superior abrasion resistance than the conventional one. This marked improvement in abrasion resistance of the two-step ADI is attributed to the high amount of transformed fine ausferrite in the final structure. The wear mechanisms were also defined by means of studying the worn surface using scanning electronic microscope.

کلمات کلیدی:

Tow-step, Single-step, ADI, Wet abrasion, ausferrite, Austempering

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