

ANALISIS PENGARUH QUENCHING DENGAN MEDIA ARANG BATOK KELAPA PADA PROSES CARBURIZING TERHADAP PENINGKATAN KEKERASAN BAJA ST 41

ABSTRAK

Proses carburizing merupakan salah satu metode perlakuan panas yang bertujuan meningkatkan kekerasan permukaan baja dengan cara difusi karbon ke dalam material. Dalam penelitian ini, dilakukan analisis terhadap pengaruh quenching menggunakan media arang batok kelapa setelah proses carburizing terhadap peningkatan kekerasan baja ST 41. Baja ST 41 dipanaskan dalam lingkungan arang batok kelapa pada suhu 860°C selama 60 menit dan variasi waktu *quenching* yaitu 20 menit, 40 menit, dan 60 menit dengan menggunakan media air. Uji kekerasan menggunakan alat uji kekerasan *Brinell*. Media quenching yang digunakan juga mempengaruhi tingkat kekerasan, di mana pendinginan dengan larutan garam menghasilkan kekerasan tertinggi dibandingkan media lainnya. Hasil penelitian menunjukkan bahwa hasil uji kekerasan baja ST 41 sebelum proses *carburizing* diperoleh nilai rata-rata yaitu sebesar 188,22 HB. Hasil uji kekerasan baja ST 41 setelah melalui proses *carburizing* dengan variasi *quenching* 20 menit diperoleh nilai rata-rata yaitu sebesar 229,44 HB. Hasil uji kekerasan baja ST 41 setelah melalui proses *carburizing* dengan variasi *quenching* 40 menit diperoleh nilai rata-rata yaitu sebesar 236,78 HB. Sementara hasil uji kekerasan baja ST 41 setelah melalui proses *carburizing* dengan variasi *quenching* 60 menit diperoleh nilai rata-rata yaitu sebesar 256,33 HB. Secara keseluruhan menunjukkan bahwa adanya peningkatan nilai rata-rata kekerasan baja ST 41 dari sebelum dilakukan proses *carburizing* dan setelah dilakukan proses *carburizing* dengan variasi waktu *quenching*. Artinya semakin lama waktu *quenching*, maka semakin tinggi nilai kekerasan baja ST 41.

Kata Kunci: Baja ST 41, *Carburizing*, *Quenching*, Nilai Kekerasan.

ANALYSIS OF THE EFFECT OF QUENCHING USING COCONUT SHELL CHARCOAL MEDIA IN THE CARBURIZING PROCESS ON INCREASING THE HARDNESS OF ST 41 STEEL

ABSTRACT

The carburizing process is a heat treatment method that aims to increase the surface hardness of steel by diffusion of carbon into the material. In this research, an analysis was carried out on the effect of quenching using coconut shell charcoal media after the carburizing process on increasing the hardness of ST 41 steel. ST 41 steel was heated in a coconut shell charcoal environment at a temperature of 860°C for 60 minutes and the quenching time variations were 20 minutes, 40 minutes and 60 minutes using water as a medium. Hardness test using a Brinell hardness tester. The quenching media used also influences the level of hardness, where quenching with a salt solution produces the highest hardness compared to other media. The research results show that the results of the ST 41 steel hardness test before the carburizing process obtained an average value of 188.22 HB. The results of the ST 41 steel hardness test after going through the carburizing process with a quenching variation of 20 minutes obtained an average value of 229.44 HB. The hardness test results of ST 41 steel after going through the carburizing process with a quenching variation of 40 minutes obtained an average value of 236.78 HB. Meanwhile, the results of the ST 41 steel hardness test after going through the carburizing process with a quenching variation of 60 minutes obtained an average value of 256.33 HB. Overall, it shows that there is an increase in the average hardness value of ST 41 steel between before the carburizing process and after the carburizing process with variations in quenching time. This means that the longer the quenching time, the higher the hardness value of ST 41 steel.

Keywords: ST 41 Steel, Carburizing, Quenching, Hardness Value.