

ABSTRAK

Proses *quenching* merupakan salah satu teknik perlakuan panas yang bertujuan untuk meningkatkan sifat mekanik logam, terutama kekerasan dan kekuatan tarik. Tujuan dari penelitian ini dilakukan untuk mengetahui pengaruh media pendingin terhadap sifat mekanik baja melalui proses perlakuan panas. Metode yang digunakan pada penelitian ini adalah spesimen baja dipanaskan pada suhu 900°C dengan waktu tahan selama 30 menit, kemudian didinginkan menggunakan dua jenis media pendingin, yaitu air garam dan oli. Sebagai pembanding, digunakan spesimen tanpa perlakuan panas. Setelah proses heat treatment maka dilanjutkan ke tahap pengujian kekerasan dan kuat tarik, untuk menilai perubahan sifat mekanik akibat perbedaan media pendingin. Hasil penelitian menunjukkan bahwa media pendingin berpengaruh signifikan terhadap kekerasan dan kekuatan tarik baja. Nilai kekerasan tertinggi yang diperoleh adalah sebesar 57,5 HRC, yaitu spesimen dengan media *quenching* air garam. Sementara itu, spesimen tanpa perlakuan memiliki nilai kuat tarik tertinggi yaitu 1488,5 N/mm². Kesimpulannya, semakin cepat laju pendinginan, kekerasan baja meningkat, namun kekuatan tariknya menurun akibat terbentuknya struktur yang lebih rapuh.

Kata kunci: perlakuan panas, media pendingin, air garam, oli, kekerasan, kuat tarik

ABSTRACT

Quenching is a heat treatment technique aimed at improving the mechanical properties of metals, especially hardness and tensile strength. The purpose of this research was to determine the effect of cooling media on the mechanical properties of steel through the heat treatment process. The method used in this research was that steel specimens were heated to a temperature of 900 °C with a holding time of 30 minutes, and then cooled using two types of cooling media, namely salt water and oil. For comparison, a specimen without heat treatment was used. After the heat treatment process, it was followed by the hardness and tensile strength testing phase to assess the changes in mechanical properties due to the difference in cooling media. The results showed that the cooling media had a significant effect on the hardness and tensile strength of the steel. The highest hardness value obtained was 57.5 HRC, which was the specimen using the salt water quenching medium. Meanwhile, the untreated specimen had the highest tensile strength value, which was 1488.5 N/mm². In conclusion, the faster the cooling rate, the hardness of the steel increases, but the tensile strength decreases due to the formation of a more brittle structure.

Keywords: *heat treatment, quenching, cooling media, salt water, oil, hardness, tensile strength*