

ABSTRACT

Companies need to improve the quality of production and reduce product prices. One way to improve the quality of production is by increasing the hardness of the material by means of quenching. Research on the cutting edge material of the plastic chopper is needed to obtain an effective and efficient plastic chopper which has high hardness. The higher the material's hardness, the more resistant to wear.

Research on the cutting edge material of the plastic chopping machine used S45C material before and after the quenching process with well water cooling media, SAE 40 oil and salt solution. The research begins with making test specimens for heat treatment and without heat treatment, then testing chemical composition, hardness testing and microstructure analysis. The test results obtained are then analyzed to see the highest hardness of the quenched material with a variety of cooling media.

Based on the research results, it was found that the microstructure of the raw material contained ferrite and pearlite phases while the quenched material was dominated by bainite and martensite phases. Raw material S45C has a hardness of 204,985 VHN, while specimens of material quenched with well water cooling media, SAE 40 oil and salt solution are 501,882 VHN, 245,302 VHN, and 559,164 VHN. The highest hardness is obtained from the quenched material with salt solution media because it has a fast cooling rate.

Keyword : S45C, Quenching, Cooling Media Variations

INTISARI

Perusahaan perlu meningkatkan kualitas produksi serta menurunkan harga produk. Salah satu cara meningkatkan kualitas produksi yaitu dengan cara meningkatkan kekerasan material dengan cara *quenching*. Penelitian pada material mata potong alat pencacah plastik diperlukan untuk memperoleh alat pencacah plastik yang efektif dan efisien serta memiliki kekerasan tinggi. Semakin tinggi kekerasan material maka semakin tahan aus.

Penelitian pada material mata potong mesin pencacah plastik menggunakan material *S45C* sebelum dan setelah dilakukan proses *quenching* dengan media pendingin air sumur, oli *SAE 40* dan larutan garam. Penelitian diawali dengan melakukan pembuatan spesimen uji untuk diberikan perlakuan panas dan tanpa perlakuan panas, kemudian dilakukan pengujian komposisi kimia, pengujian kekerasan serta analisa struktur mikro. Hasil pengujian yang didapatkan kemudian dianalisis untuk melihat kekerasan tertinggi dari material hasil *quenching* dengan variasi media pendingin.

Berdasarkan hasil penelitian, didapatkan bahwa struktur mikro pada *raw material* terdapat fasa *ferrite* dan *pearlite* sedangkan material hasil *quenching* didominasi fasa *bainite* dan *martensite*. *Raw material S45C* memiliki kekerasan 204,985 VHN sedangkan spesimen material hasil *quenching* dengan media pendingin air sumur, oli *SAE 40* dan larutan garam adalah 501,882 VHN, 245,302 VHN, dan 559,164 VHN. Kekerasan tertinggi didapatkan dari material hasil *quenching* dengan media larutan garam karena memiliki tingkat pendinginan cepat.

Kata Kunci : *S45C*, *Quenching*, Variasi Media Pendingin