

ABSTRAK

Penggunaan produk limbah botol plastik secara tidak ramah lingkungan menyebabkan berbagai masalah lingkungan hidup yang serius. Pada daerah kabupaten Kuburaya tepatnya daerah ambawang hasil survey sampah dilapangan mencapai 200-250 kg/hari. Perancangan mesin pencacah sampah dilakukan untuk mengurangi permasalahan sampah. Mesin pencacah ini berfungsi untuk mencacah sampah khususnya limbah botol plastik tipe PET (*Polyethylene Terephthalate*). Komponen terpenting pada mesin pencacah limbah botol plastik salah satunya adalah mata pisau. Proses Temperatur *Heat Treatment* ini bertujuan untuk memperbaiki sifat fisik dan mekanik material. dilakukannya perlakuan panas *hardening* dengan media pendingin air agar material dapat menghasilkan tingkat kekerasan dan ketahanan aus yang tinggi.

Pada penelitian ini proses pengujian kekerasan menggunakan alat uji *Vickers* dengan Standar pengujian kekerasan menggunakan ASTM E92-82. Dimensi sampel uji 50 mm x 50 mm x 6.7 mm dan dimensi mata pisau 260 mm x 55 mm x 6.7 mm. Setiap sampel pengujian ada 5 titik pengujian dengan 7 sampel pengujian yang di uji dengan material yang digunakan Baja JIS SUP9. Temperature *Heat treatment* 700°C, 750°C dan 800°C dengan *Holding Time* 15 menit dan waktu *Quenching* 10 dan 15 menit dengan media pendingin air.

Hasil penelitian ini menunjukkan bahwa nilai kekerasan rata-rata tanpa perlakuan 158,56 HV. Waktu *Quenching* 10 menit pada temperatur 700°C nilai rata-rata kekerasan 207,88 HV, waktu *Quenching* 15 menit pada temperatur 700°C nilai rata-rata kekerasan 220,92 HV dan waktu *Quenching* 10 menit pada temperatur 750°C nilai rata-rata kekerasan 193,34 HV, waktu *Quenching* 15 menit pada temperatur 750°C nilai rata-rata kekerasan 204,4HV dan waktu *Quenching* 10 menit pada temperatur 800°C nilai rata-rata kekerasan 227,1 HV, waktu *Quenching* 15 menit pada temperatur 800°C nilai rata-rata kekerasan 208,68 HV. Dapat di simpulkan Nilai kekerasan yang tertinggi pada temperatur 800°C waktu *Quenching* 10 menit nilai rata-rata kekerasan 227,1 HV.

Kata Kunci: *Hardening, Heat Treatment, JIS SUP9, PET (Polyethylene Terephthalate), Vickers.*

ABSTRACT

The use of plastic bottle waste products that are not environmentally friendly causes various serious environmental problems. On In the Kuburaya Regency area, precisely in the Ambawang area, the results of the waste survey in the field reached 200-250 kg/day. The design of the waste shredder is done to reduce the waste problem. This chopping machine functions to chop up waste, especially plastic bottle waste type PET (Polyethylene Terephthalate). One of the most important components in a plastic bottle waste shredder is the blade. The process of Temperature Heat Treatment aims to improve the physical and mechanical properties of the material.heat treatment is carried out hardening with water cooling media so that the material can produce a high level of hardness and wear resistance.

In this research, the hardness testing process uses the Vickers with the standard hardness testing using ASTM E92-82. The dimensions of the test sample are 50 mm x 50 mm x 6.7 mm and the dimensions of the blade are 260 mm x 55 mm x 6.7 mm. Each test sample has 5 test points with 7 test samples tested with the material used JIS SUP9 Steel. Temperature Heat treatment 700°C, 750°C and 800°C with holding 15 minutes 10 and 15 minutes quenching time with water cooling media.

The results of this study indicate that the average hardness value without treatment is 158.56 HV.time Quenching 10 minutes at a temperature of 700°C the average value of hardness is 207.88 HV, Quenching 15 minutes at a temperature of 700°C the average value of hardness is 220.92 HV and Quenching 10 minutes at a temperature of 750°C the average value The average hardness is 193.34 HV, the Quenching 15 minutes at a temperature of 750°C, the average hardness value is 204.4 HV and the Quenching 10 minutes at a temperature of 800°C. The average hardness value is 227.1 HV, the Quenching 15 minutes at a temperature of 800°C the average hardness value is 208.68 HV. It can be concluded that the highest hardness value is at a temperature of 800°C, quenching time of . 10 minutes, the average value of hardness is 227.1 HV.

Keywords: Hardening, Heat Treatment, JIS SUP9, PET(Polyethylene Terephthalate), Vickers.