ABSTRAK

Penambat rel dengan material VCN 150 difungsikan untuk mencekam rel, mencegah kegagalan struktur rel, dan pelebaran rel paksa. Permasalahan penelitian adalah penambat rel mengalami kerusakan karena sifat mekanik yang rendah dengan kekerasan 19 HRC. Tujuan penelitian adalah meningkatkan kekerasan material VCN 150 dengan penambahan kuat tarik dan struktur mikro untuk analisis sifat mekanik. Metode penelitian adalah kuantitatif eksperimen, dengan *heat treatment* material VCN 150 *hardening* 830°C, *quenching* oli, dan variasi *tempering* 300-500°C dilakukan *micro examination*, *rockwell hardness test*, dan *tensile test*. Hasil penelitian adalah material VCN 150 sebelum dan sesudah *heat treatment* memengaruhi struktur mikro, tingkat kekerasan, dan kekuatan tarik. *Heat treatment* pada *micro examination* dihasilkan struktur ferit, perlit, dan martensit temper. Nilai *rockwell hardness test* tertinggi pada *tempering* 300°C senilai 47,58 HRC dan terendah pada variasi *tempering* 500°C senilai 36,37 HRC. Nilai *tensile test* tertinggi pada *tempering* 300°C senilai 1.455 MPa dan terendah *tempering* 500°C senilai 1.188,67 MPa. Kesimpulan penelitian adalah *heat treatment* material VCN 150 meningkatkan kekerasan dan kuat tarik.

Kata kunci : *VCN 150, heat treatment, micro examination*, *rockwell hardness test*, *tensile test.*

ABSTRACT

Clip rail VCN 150 material is used to grip the rail, prevent rail structure failure, and force rail widening. The research issues were that the rail fastening was damaged due to low mechanical properties with a hardness of 19 HRC. The aims of the research were to increase the hardness of VCN 150 material by addition of tensile strength and microstructure for mechanical properties analysis. The research method is a quantitative experiment, with heat treatment of VCN 150 material hardening 830 ° C, oil quenching, and tempering variations of 300-500 ° C carried out micro examination, rockwell hardness test, and tensile test. The results of the study are VCN 150 material before and after heat treatment affects the microstructure, hardness level, and tensile strength. Heat treatment on micro examination produced ferrite, pearlite, and tempered martensite structures. The highest rockwell hardness test value at 300°C tempering was 47.58 HRC and the lowest at 500°C tempering variation was 36.37 HRC. The highest tensile test value at 300°C tempering was 1,455 MPa and the lowest at 500°C tempering was 1,188.67 MPa. The conclusion is that heat treatment of VCN 150 material increases hardness and tensile strength.

Keyword : *VCN 150, heat treatment, micro examination, rockwell hardness test, tensile test.*