EFFECT OF VOLTAGE VARIATION AND NICKEL ELECTROPLATING TIME ON TENSILE TEST AND MICROSTRUCTURE ANALYSIS IN ST-42 STEEL

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ABSTRACT

Electroplating is a coating that uses the electrolysis method to coat other metals. To increase the mechanical strength of the steel, electroplating is needed using the correct coating material. Nickel is a metal that has anti-corrosion properties and adds strength. This study aims to determine voltage variations of 5 v and 10 v while the time is 30, 50 , 70, and 90 minutes on tensile strength and microstructure analysis. The method used is experimental using steel plates with a thickness of 4 mm. The research was carried out at the Jember State Polytechnic and Malang State Polytechnic. The results showed that the greater the voltage and time variations, thus affecting the specimen weight after electroplating, that is, the highest weight difference weight was in the 10 v 90 min specimen with 18.89 g. The greater the voltage and the longer the time used, the more tensile strength and stretch. The lowest tensile and strain strength values occurred at the 30-minute 5v variation with 286.12 Mpa and 3.18% while the highest tensile and strain strength occurred at the 10 v 90-minute variation with 322.68 Mpa and 8.23%. In microstructure analysis, it is proven that the greater the voltage and length of time of the electroplating process causes more pearlite phase grains, this causes the carbon content of the metal to increase and has stronger properties.

***Keywords** : Electroplating, ST-42 Steel, Tensile Strength, Microstructure Analysis*