

**THE EFFECT OF VARIATIONS IN ELECTROLYTE
TEMPERATURE AND ANODE-CATHODE DISTANCE IN THE
NICKEL ELECTROPLATING PROCESS ON THE THICKNESS
AND HARDNESS OF THE ST 42 STEEL SURFACE LAYER**

Supervised by Dicky Adi Tyagita, S.T., M.T.

Ahmad Fikrian Zuhdi

*Study Program of Automotive Engineering
Engineering Department*

ABSTRACT

Electroplating is metal coating with the help of an electric current through an electrolyte with the aim of transferring coating metal particles to the coated metal. The aim of this research is 1) to determine the effect of variations in temperature and anode-cathode distance in coating ST 42 steel using the nickel electroplating method on layer thickness and surface hardness. 2) to find out which variation can produce the highest layer thickness and surface hardness. The electroplating process uses variations in electrolyte temperature of 40 °C, 50 °C, 60 °C with an anode-cathode distance of 15 cm, 20 cm and 25 cm. The tests carried out were layer thickness testing and Rockwell B hardness testing. The results showed that there was an influence on variations in electrolyte temperature and anode-cathode distance for nickel plating on the thickness of the ST 42 steel layer. The higher the electrolyte temperature, the thicker the layer. The closer the anode-cathode distance, the thicker the layer. The highest layer thickness value was 191.33 μm at an electrolyte temperature of 60 °C with an anode-cathode distance of 15 cm or it could be said that the highest layer thickness value increased by 57% from the layer thickness value of the specimen without treatment. The results of the research show that there is an influence on variations in electrolyte temperature and anode-cathode distance for nickel plating on the surface hardness of ST 42 steel. The higher the electrolyte temperature, the lower the surface hardness value. The closer the anode-cathode distance, the higher the surface hardness value. The highest surface hardness value was 43.25 HRB at an electrolyte temperature of 40 °C with an anode-cathode distance of 15 cm or it could be said that the highest surface hardness value decreased by 33% from the surface hardness value of the specimen without treatment.

Key words: *Electroplating, Metal, Steel, Nickel, μm , HRB.*