

THE EFFECT OF VARIATIONS IN CORROSIVE MEDIUM AND OVENING TEMPERATURE ON THE RATE OF CORROSION AND WEIGHT LOSS OF ASTM A36 STEEL WELDED JOINTS COATED WITH THE POWDER COATING METHOD

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ABSTRACT

This study aims to analyze the effect of variations in corrosive media and oven temperature on the corrosion rate and weight loss of ASTM A36 steel welded joints coated using the Powder Coating method. ASTM A36 steel material that has gone through the Shielded Metal Arc Welding process is then subjected to a pretreatment and powder coating process with variations in oven temperatures of 160°C, 180°C, and 200°C. The specimens are then tested for corrosion using three types of corrosive media, namely brake fluid, sea water, and acid battery water. The analysis method used is the weight loss method to calculate the corrosion rate in mils per year (mpy). In addition, parameter optimization analysis is carried out using the Taguchi method with the Means approach with smaller is better characteristics to determine the optimal parameter combination that produces the minimum corrosion rate. The results show that the type of corrosive media has the most dominant effect on increasing the corrosion rate compared to the oven temperature. The lowest corrosion rate was obtained with a combination of brake fluid and an oven temperature of 160°C (0,649-3,249 mpy), while the highest corrosion rate occurred with battery acid water and a temperature of 200°C (12,478-28,032 mpy). Taguchi analysis showed that the optimum combination of parameters to minimize the corrosion rate was brake fluid and an oven temperature of 160°C. Based on the results of the study, it can be concluded that increasing the aggressiveness of the corrosive medium significantly increases the corrosion rate, and increasing the oven temperature tends to increase the corrosion rate due to possible degradation or imperfections in the coating layer.

Keywords: *ASTM A36, powder coating, corrosion rate, Taguchi method, corrosive medium, oven temperature.*