STUDY ON RESISTANCE SPOT WELDING BY USING FEM SIMULATION METHOD AND EXPERIMENTAL INVESTIGATION

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In the name of Allah S.W.T, the most gracious and most merciful

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ABSTRACT

This project discusses about the study of weld nugget development of the resistance spot welding (RSW) by experimental process and by using numerical simulation approach. The most important aspect in the resistance spot welding process is weld nugget development. For the experimental process, a RSW machine in the workshop .will be used for the purpose. The SYSWELD was utilized for the simulation process as the finite element modeling technique.

In the simulation approach, a two dimensional axis-symmetric finite element model were developed in Visual Mesh to model the electrode. The model of the electrode being used were a 3.0 mm diameter E-nose, B-nose and ParaCap electrode geometry type and a dissimilar of two layers and three layers sheet assemblies with the thickness of (1.5+1.0)mm and (1.0+1.5+1.0)mm respectively made of low carbon steel. All of the simulation process parameters such as force, weld time and also the properties of both sheets and electrode such as thickness and electrode size were taken into account throughout the study.

In the experimental process, the only E-nose electrode geometry and parameters process will be used and the result of the weld nugget formed will be taken due to verify the simulation process being used. To get the result of the weld nugget is done by doing macro test to measure the diameter of weld nugget and HAZ. Based on these simulation and experimental process, the result of the weld nugget formed were compared and discussed later. Form this project, we can find out the effectiveness of using the simulation approach rather than the experiment approach.

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