

USING OF RESPONSE SURFACE METHOD TO DETERMINE THE OPTIMAL PARAMETERS OF CLINCH JOINTS

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ABSTRACT

The response surface methodology (RSM) is a collection of statistical and mathematical techniques useful for different types of processes (improving, optimizing, and developing). The RSM also has important applications in the design of new products. The most extensive applications of RSM are in the industrial world where several parameters potentially affect the results. The characteristic of the results is called the response. It is typically measured on a continuous scale. Most real world applications of RSM will involve more than one response. The parameters (or input variables) are sometimes called independent variables. The graphical representation of the fitted surface to the results has led to the term response surface methodology. The idea of RSM is to use designed experiments to obtain an optimal response. In this case the goal is to determine the optimal geometrical parameters of the punching tool of a clinching tool assembly. The used material type is DP600 steel. The clinch joint has a few geometrical parameters, such as the undercut (C) and the neck thickness (tN) from which the joint's strength is highly depends. These parameters should be high as possible to improve the strength of the joints. From previous calculations the main influencers are the tool's radius and the taper angle of the punch. In this presentation the technological background and the RSM technique is presented, and the result of the method is also.