



International Journal of Ch

CODEN (USA):

Vol.9, No.04 pp 158-169,

ChemTech

2016

## Numerical Study on Fatigue Life of Spot Welding using FEA

P.Vineeth Kumar\*, S.Ragunath, A.k Nachimuthu

<sup>1</sup>Department of Mechanical Engineering, SVS College of Engineering, Coimbatore-642109, India.

**Abstract:** Spot welding is one of the primary methods to join sheet metals for automotive components. It is important for the automotive design engineers to understand the mechanical behaviors of different joints and furthermore, to incorporate the static, impact, and fatigue strength of these joints in the early design stage using computer aided engineering and design tools.

The aim of the work is to predict the life of nugget when subjected to fatigue loading. The parameters mainly considered for carrying out the analysis are sheet thickness, spot diameter and loading conditions. A simple model is used to illustrate the technique of spot-weld fatigue analysis. Finite element model and analysis are carried out utilizing the finite element analysis commercial codes. The commercial software Ansys workbench is used for performing the fatigue analysis. It can be seen from the results that spot diameter and sheet thickness greatly influence the fatigue life of the spot welded joint. Acquired results also show that the specimen fails at stress value far below the yield stress limit of the material which clearly shows the characteristic of fatigue failure. Further in this work, an economical design method is proposed to predict the fatigue life of spot welded specimen of different dimensions by defining a maximum stress equation using artificial neural networks.

**Keywords :** Spot welding, fatigue strength and Finite Element Analysis (FEA).