

# **MEASUREMENT OF RESIDUAL STRESSES IN LASER WELDED EDSS AND IFS PLATES USING XRD**

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## **ABSTRACT**

This paper presents the experimental determination of residual stresses in EDSS and IFS steel plates which are extensively used in automotive applications. Residual stresses can be defined as the stresses which remain in a material in the absence of any external forces. These stresses play a vital role in automotive body fabrication, since they can be easily damaged by factors such as low cycle fatigue etc. There are many stress determination methods. X ray diffraction was used to determine the stresses. It uses the distance between crystallographic planes as a strain gage. The deformations cause changes in the spacing of the lattice planes from their stress free value to a new value that corresponds to the magnitude of the residual stress. The EDSS and IFS plates were laser welded with different weld parameters. The weld areas along with the HAZ [heat affected zones] were inspected for the residual stresses. All the welds were butt welds, with very high accuracy. Once the residual stresses were determined, the weld characters like weld depth, heat input, weld energy etc were considered and their relationships were found. Graphs were plotted between weld energy and other parameters to find and establish a relationship.