

Design and Analysis of Distortion in Welding Fixture for Frame Assembly

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Abstract: This paper focuses on the Design and Analysis of Welding Fixture for Anti-vibration under carriage Bogie Frame Assembly for Compact Track Loader. The application of a Bogie assembly is to offering smoother transitions over uneven terrain, and the ability to travel at higher speeds with better materials retention. Due to the nature of welding process involving localized heat generation from moving heat source, rapid heating in the welded structures, and subsequent rapid cooling, problems such as residual stresses and distortions of welded structures remain important challenges in the industry. To assemble the respective child parts and to meet the required tolerances on the bogie frame assembly welding fixture specially designed with the help of CAD Software. In practice, welding distortion creates unwanted effects on manufacturing accuracy, appearance and strength of welded parts. By using Finite Element Analysis (FEA), the analysis is carried out to find welding distortion of Bogie Frame assembly. Along with optimum clamping force has been calculated which required for controlling the welding distortion. After successful Design and Analysis, the Welding fixture has been manufactured and has been implemented at shop floor. This welding fixture used for accurate assembly of the child parts with required tolerances, as well as helps in reduction of production loss and also manufacturing lead time for welding, positioning and holding parts.

Keywords: Welding Fixture, Finite Element Analysis (FEA), ANSYS Software, Catia, Welding, Distortion, Clamp

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