

Pre-weld Heating Temperature Effect on the Welding Quality of a 100 T Truck Crack Frame—Case Study (Book Chapter)

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Abstract:

The heat generated during the welding process tends not to be evenly distributed between the weld metal, base metal, and heat affected zone and produces residual stresses. To obtain the desired result from the welding process it needs to be subjected to a heat treatment for removing residual stress through pre-weld and post-weld heat-treatment procedures. This research aims to determine the effect of the pre-weld heat-treatment process on the results of the FCAW welding of a 100-ton truck crack frame with temperature variations between 120 and 150 °C with a hold time of 15–30 min which is heated at the and cooled in free air. The combination of temperature and time that can optimize the welding quality in regard to crack failure of the truck frame is 100 °C temperature and 15 min. Temperature factor has an effect of 54.4% and the time. The time factor has an impact of 24.2%. The temperature interaction factor and time have an impact of 0.004% on pre-weld heating. The prediction of the meant time between stoppage (MTBS) of the truck from pre-weld heating on truck frame cracking failure if the optimal design is used, i.e., 100 °C preheat for 15 min is 603 days. The type of research conducted is an experimental investigation.

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