Seminar

Institute for Plasma Research

Title : Thermo-mechanical analysis of GTA welding of Mod. 9Cr-1Mo steel considering the effects of phase transformation, Pre heating and Post heating

Speaker: Mr. Zubairuddin
Institute for Plasma Research, Gandhinagar

Date : 16th January 2021 (Saturday)

Time : 10.30 AM

Venue : Online - Join: https://vimeet.igcar.gov.in/

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Abstract :

Grade 91 (Modified 9Cr-1Mo) steel is ferritic-martensitic steel which undergoes phase transformation during welding. Phase transformation significantly influences the residual stresses of the weld joint. Grade 91 steel is extensively used in fabrication of high temperature components of nuclear industries. In the present work, it is proposed to develop numerical models for predicting residual stress and distortion in modified 9Cr-1Mo steel plate weld joints by considering phase transformation effects for autogenous and multi-pass GTA welding. The beneficial effects of combined preheating and post heating on the residual stresses and distortion need to be quantified. Hence the effect of preheating before welding and the combined effect of pre heating and post heating on the residual stresses and displacements is proposed to be studied in detail using simulation. Validation of the simulated results on the residual stresses and displacements employing suitable experimental tools such as XRD technique and height gauge respectively is envisaged. Two different thicknesses of plates 3 mm and 6 mm were preheated at 200°C and after welding; the joint was post heated at 200°C for 30 minutes. Thermo-mechanical analysis of GTA welding was carried out using SYSWELD software. Predicted and measured values are compared for the joints fabricated employing combined pre heating and post heating.