National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Investigation of the Microstructure and Mechanical Properties of Cold Metal Transfer Welded SS304L
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Venue	: M.Tech class room (MM 202E), MM Annex building
Date and Time	: 13 Jan 2025 (10:30 AM)
Abstract	: The recent innovation in the gas metal arc welding (GMAW) process, called Cold Metal Transfer (CMT) welding technique, has significantly reduced the heat input during the welding of thinner materials. The CMT welding technique is particularly well-suited for producing defect-free welds, especially when working with thin materials. Furthermore, CMT welding provides superior quality compared to conventional GMAW welding processes, as the microstructural characterization and mechanical properties of CMT welded joints have been demonstrated to be superior. SS304L is a strong and easyto-fabricate material and finds extensive applications in automotive, medical, construction, Nuclear power plant and aerospace industries. However, conventional arc welding processes pose several challenges like Burn-through, distortions, splatter, and other flaws when welding thin SS304L sheets, due to high heat input. Therefore, present study investigates the microstructure and mechanical properties of Cold Metal Transfer Welded SS304L. The CMT welding process used ER 308L SS filler wire to weld SS304L sheets of 1.2 mm thickness. The CMT welding process resulted spatter-free welds due to low heat input and optimum penetration. The weld beads were found to be of excellent quality without any cracks in the welded SS304L sheet samples. The maximum micro-hardness value was achieved in the weld zone. Austenite was detected as main phase in both the base metal and the weld zone. The residual stresses were observed with compressive nature in the weld zone which attributes to the slightly higher corrosion rate in the welded zone as compared to the base metal of SS304L.