

## **Thermal Fatigue Study of the Weld Cladding Material**

Based on the interest of the manufacturing companies users of continuous casting roll weld cladding, the present work was developed seeking relationship between mechanical and microestructural changes with thermal fatigue. With this objective, was development an study for mechanical and microestructural behavior of a martensitic stainless steel of the 400 series, with small variations in its chemical composition. This study was based on the results of mechanical test of hardness, room and high temperature tensile strength and thermal fatigue, as well as, qualitative microestructural characterization by means of Optical Microscopy (OM) and Scanning Electron Microscopy (SEM). It was concluded that the nitrogen contents of the material, obtained by open arc welding process with tubular wire, is welding parameters dependent and influences the mechanical properties of the studied materials. The thermal fatigue results material cyclic softening, with variation in the tension level as well as increases the average tension, inducing the thermal crack initiation in the material. The reheated/overlap zone of weld bead showed to be the most critical point in the cladding and prone to thermal tensions cracking. These cracks start at in the surface of the samples for the repetitive application of tensile and compression stress. An oxidation in the surface and carbide precipitation in the boundary and inside of the grains was observed, inducing material crack initiation during the thermal fatigue.