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Project Title: IMPROVING THE MECHANICAL PROPERTIES OF AISI 2205 STAINLESS STEEL BY CRYOGENIC TREATMENT PROCESS

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ABSTRACT

The Duplex stainless steel AISI 2205 is well known for its corrosion resistance, applicable to high pitting and stress resistance. Yet it lacks wear resistance and hardness. For this project Cryogenic treatment is chosen to boost the mechanical properties of AISI 2205 Stainless Steel. DSS 2205 has its applications in transport, storage, chemical processing, Processing equipment, high chloride and marine environments.

The samples are taken in the form of cylindrical shapes with diameter, length of 10mm, 40mm wide respectively. The specimens undergo cryogenic treatment, one of them being treated to the saturated limit. For comparison purpose one specimen is kept as untreated. Wear test will be conducted at constant speed and variable load by pin on disc wear testing apparatus.

wear test is carried out to evaluate the potential of using a certain surface engineering technology to reduce wear for a specific application, and to investigate the effect of treatment conditions on the wear performance, so that optimised surface treatment conditions can be realised.

Eventually, all specimens undergo various metallographic tests such as SEM (Scanning Electron Microscope) and EDAX (X-ray Dispersive Analysis) or XRD (X-ray Diffraction), and the findings are compared.

OBJECTIVES

- To study the effect of cryogenic treatment on AISI 2205 Duplex stainless steels.
- To study the effect of cryogenic treatment on surface hardness.
- To study the effect of cryogenic treatment by monitoring the case depth.
- To investigate the microstructure of AISI 2205 Duplex stainless steel specimen and to study the compound and diffusion layers present in the surface of the specimens.
- To investigate the wear behaviour of AISI 2205 Duplex stainless steel specimens and compare with the untreated specimens with the help of optical microscope, scanning electron microscope.