National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Additive Manufacture of 18Ni(300) Maraging Steel Part: Characterization of Microstructure and Mechanical Properties
Speaker	: Sudipta Swain (Rollno : 522me6016)
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Venue	: Departmental Seminar Hall (ME-001), New Mechanical Science Building (Physical Mode)
Date and Time	: 10 Sep 2025 (04:30 PM)
Abstract	: The word &lsquomaraging&rsquo is originated from the combination of &lsquomartensite&rsquo and &lsquoageing&rsquo. Maraging steels are designated as low carbon martensitic steels famous for their ultra-high strength with perfect combination of toughness (ductility). The outstanding strength of maraging steels is not imparted by the carbon/ carbides the alloy is hardened through precipitation of intermetallic particulates (within alloy&rsquos martensitic matrix) that are formed during the ageing heat treatment. The low carbon content (< 0.03 %) of this alloy prevents solidification cracking during welding which makes the alloy a suitable candidate to be additively manufactured through laser-based techniques. The present work attempts Laser-Powder Bed Fusion (L-PBF) fabrication of maraging steel 18(Ni)300 parts. Upon fabrication, the *as printed* parts are subjected to a Solution Treatment (ST) and finally, an Ageing Treatment (AT) schedule. In this STA (ST+AT) treatment schedule, ST is performed at 840 °C/ 2 h and AT is carried out at 490 °C/ 2 h. In the *as printed* condition, the obtained solidification microstructure and static mechanical properties (tensile strength, fracture strain and microhardness) are compared with the STA-treated counterparts. Aspects of the dry sliding wear response as well as electro-mechanical corrosion behaviour of the L-PBFed maraging steel 300 parts are studied (the *as printed* and the post-heat treated conditions both).