FAILURE ANALYSIS AND PREVENTION

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IIT Roorkee

TYPE OF COURSE : Rerun | Elective | UG/PG
COURSE DURATION : 8 weeks (15 Feb’21 - 09 Apr’21)
EXAM DATE : 25 Apr 2021

INTENDED AUDIENCE : UG and PG Student, Research Scholar & Practicing Engineers
INDUSTRIES APPLICABLE TO : Heavy engineering and pressure vessel industry, power plants
PRE-REQUISITES : Nil

COURSE OUTLINE :
The course content is designed to systematic understanding on various aspects related with failure such as fundamental sources of failure of mechanical components, industrial engineering tools relevant to failure and failure analysis, general procedure of failure analysis through sample collection, preparation and preservation, testing, macro and microscopic observation of fracture, mode of fracture, metallographic procedure and image analysis, use of fracture mechanics and fracture toughness principles in failure analysis and analysis findings and report/recommendation writing. Presentation will include case studies to communicate concepts and procedures effectively. Case studies will be taken up from failure analysis of weld joints in different sectors.

ABOUT INSTRUCTOR :
Prof. D K Dwivedi obtained BE (mechanical engineering), in 1993 from GEC Rewa, ME (welding engineering) from Univ. of Roorkee in 1997 and PhD in Met. Engineering from MNIT, Jaipur in 2003. He has about 9 years teaching experience at NIT Hamirpur and 14 years at IIT Roorkee in subjects related with manufacturing at UG level and welding engineering related subjects at PG level. He has published more than 120 research papers in SCI/SCIE indexed journals and undertaken 20 sponsored research and 50 industrial consultancy projects. He has authored two books entitled Production and Properties of Cast Al-Si Alloys with New Age International, New Delhi (2013) and Surface Engineering with Springer, New Delhi (2018).

COURSE PLAN :
Week 1: Introduction: Need and scope of failure analysis and prevention
Week 2: Fundamental sources of failures: Imperfections in base metals
Week 3: Fundamental sources of failures: Poor assembly, service and maintenance
Week 4: Industrial engineering tools for failure analysis: Reliability-I
Week 5: General procedure of failure analysis: NDT for failure analysis
Week 6: General procedure of failure analysis: Macroscopy of fracture surfaces-III
Week 7: General procedure of failure analysis: Determination of type of fracture II
Week 8: General procedure of failure analysis: Questions for analysis