



HBNI

Alumni Webinar

**Friday,
30 October 2026
at 17:00 hrs**

Venue:

**Conference Hall ,
First Floor, New Training
School Complex,
Anushaktinagar,
Mumbai**

Link for : -

YouTube:

[https://youtube.com/
live/Sp2WfpeM_9I](https://youtube.com/live/Sp2WfpeM_9I)

Webex :

[https://
hbni.webex.com/hbni/
j.php?
MTID=m5bb1ff2970c57
b109e2113da3bb0261d](https://hbni.webex.com/hbni/j.php?MTID=m5bb1ff2970c57b109e2113da3bb0261d)

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"Degradation of carbon steel pipelines and components by Flow accelerated corrosion: plant experience and experimental work"

Dr. Vivekanand Dubey is an alumnus of Homi Bhabha National Institute (HBNI), where he obtained his Ph.D. in 2018. After graduating from 46th batch of the BARC Training School (Chemistry discipline), he joined the Materials Science Division, Materials Group, Bhabha Atomic Research Centre (BARC), Mumbai, in 2003. His expertise encompasses corrosion research, particularly flow-accelerated and aqueous corrosion of carbon steel, oxide-film formation and characterization, high-temperature oxidation, localized corrosion, corrosion under deposits and protective coatings. He has experience in electrochemical techniques, including electrochemical impedance spectroscopy (EIS), potentiodynamic polarization and Mott-Schottky analysis, and materials characterization using X-ray diffraction (XRD), Raman spectroscopy, scanning electron microscopy (SEM) and glow discharge optical emission spectroscopy (GDOES). His professional activities also include nuclear power plant support, component assessment, materials selection, metallurgical failure analysis, field investigations of components removed during Biennial Set Down (BSD) activities, and hot-conditioning of pressurized heavy water reactors (PHWRs), including newly commissioned reactors and those following En Masse Coolant Channel Replacement (EMCCR). He has contributed to more than 50 failure-analysis and technical reports and over 20 research papers and conference proceedings.

Abstract

In general, carbon steel is the material of construction of different pipelines and components to carry high temperature and high-pressure water/steam in nuclear/thermal power plants. Flow accelerated corrosion (FAC) is the main mode of degradation of these piping and components of carbon steel in the pressurised heavy water reactors (PHWRs) across India. In FAC, the rate of corrosion is enhanced by flowing environment (water/steam) through chemical/electrochemical action. Based on the phase of the environment, FAC is classified in two types viz. single phase FAC and two phase FAC and these can be distinguished on the basis of surface appearance. In the presentation, a correlation between plant experience and laboratory results will be discussed. While covering all the NPPs in India, a robust experience was gained on the aspect of surface appearance of different mode of degradation and a correlation between the scallops size and FAC rate. Mechanism of FAC and parameters affecting FAC will be explained on the basis of solubility and mass transfer coefficient. The effect of these parameters on the nature of oxide film (protectiveness and defect density in the oxide) has been established in the laboratory by forming oxide and their characterization by electrochemical techniques like electrochemical impedance spectroscopy and Mott-Schottky analysis. Also the appropriate technique of determination of thickness of oxide film, processes during formation, phases of the oxide will be deliberated.

All are cordially invited for in person attendance