

# **Online Condition Monitoring Training for Hydro Applications**

## **1. Maintenance Methodology**

1. Periodic/Planned Maintenance
2. Breakdown/Forced Maintenance
3. Predictive Maintenance
4. Proactive Maintenance
5. (Root cause analysis)

## **2 (A). Vibrations in Rotating Machines**

- i. Introduction & Theory
- ii. Characteristics of Vibration
- iii. Phase
- iv. Vibration Transducers

## **2 (B). Defects Encountered in Vibration Analysis**

- i. Unbalance
- ii. Misalignment
- iii. Looseness
- iv. Gear Box Problems

## **2 (C). Vibration Analysis & Fault Diagnosis Using various Signal Processing Techniques**

- i. Time Domain
- ii. Frequency Domain
- iii. Statistical Domain
- iv. Cepstral Domain
- v. Wavelet Technology

## **2 (D). Pre Outage Survey & Checks**

## **2 (E). Vibration of Hydro Turbine-Generator Unit**

## **2 (F). Field Balancing of Large Rotating Machinery (1 & 2 Plane Balancing)**

## **2 (G). End winding and Stator Bar Vibration**

3. Online Air Gap Monitoring & Case Studies
4. Online & Periodic Partial Discharge Measurement & Fault Analysis of Generators & Motors
5. Online & Periodic Measurement and Diagnostic of Partial Discharge Measurement of Transformer & GIS
6. Online Flow Discharge Measurement in Hydro Power Plants
7. Online & Periodic (Portable) Silt Monitoring System
8. Ultrasonic Detector & Analyzer for Leakage, Bearings and Electrical Fault like Arcing, Tracking & Corona.
9. Transformers Fault Analysis Techniques.
  - i. Dissolved Gas Analysis
  - ii. Sweep Frequency Response Analysis
  - iii. Furan Gas Analysis

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