

# Training Agenda of Vibration Online

## PROJECT: PLCPP Control System Retrofit

### One and a half day

#### Online Vibration System

- 1) The difference and various types of online and offline vibration monitoring/protection system
- 2) The difference of relative vibration (proximity probes) and absolute vibration (accelerometer or velocity probes)
- 3) The uses of ICP accelerometers and seismic velocity sensors
- 4) The selection of sensors, vibration cable and connector
- 5) The selection of sensor installation
- 6) How to set a proper frequency filter for bearing, gear drive fan, belt drive fan, compressor, pump, turbo expander, etc.
- 7) How to set a proper maximum Frequency for bearing, gear drive fan, belt drive fan, compressor, pump, turbo expander, etc.
- 8) How to set a proper band frequency for bearing, gear drive fan, belt drive fan, compressor, pump, turbo expander, etc.
- 9) How to select a proper location to install online sensors
- 10) How to set a proper unit for detecting bearing, gear, absolute vibration or relative vibration
- 11) How to set alarm for bearing, gear drive fan, belt drive fan, compressor, pump, turbo expander, etc.

#### Basic Vibration Technology

- 1) Maintenance Philosophy
- 2) Time and Spectrum Domain
- 3) Basic of FFT analysis in order
- 4) ISO Standard for different application, e.g. ISO2372, 10816 and 7919 for Turbine/Generator
- 5) Vibration Analysis for
  - Unbalance
  - Mechanical Looseness
  - Resonance
  - Misalignment, Soft Foot/ Distortion
  - Pump/Fan (Hydraulic Problem)
  - Blade/Vane Pass Frequency
  - Pulley/Belt Problem
  - Oil Whirl/ Oil Whip
  - Bearing Failure Analysis
  - Gear Defected Analysis
  - Motor Analysis

## **One and a half day**

### **System Troubleshooting for both Hardware & Software**

- 1) Hardware & Software architecture
- 2) Software's error troubleshooting;
  - Equipment IP
  - LAN
  - Server
  - Devicenet to LAN
  - Devicenet to TCP IP MODBUS
  - RSview
  - RSmacc
  - Odyssey
- 3) Hardware's error troubleshooting;
  - XM 121
  - XM 440
  - Sensors
  - Cable
  - Connector

### **How to PM the System**

- 1) The procedure and frequency of XM 121 and sensors calibration
- 2) When does it need to be recalibrated or test certified?
- 3) Checking fault signal if come from real hardware fault or just looseness of wiring
- 4) When to check the looseness between connector and sensor
- 5) The definition of display status and alarm status at the hardware
- 6) The definition of display status and alarm status at the software