Troubleshooting Process Operations

Tools for troubleshooting:

- Pareto charts
- 5-why method
- Cause and effect diagrams (fishbone)
- Failure modes and effect analysis (FMEA)
- Fault tree analysis (FTA)
- Computer software (**PROACT, REASON, TAPROOT, ...ETC)**
- Tables of troubleshooting designed by me

These tools are applied to:

- Bearings: in this chapter we are going to talk about
- This part consists of
- Types of bearing
- Failure patterns
- Operating symptoms
- Symptoms found on inspection
- Wear and wear patterns
- Lubrication failure
- Bearing troubleshooting : in this chapter we will talk about
- What to do when a fault is detected
- The use of phases in diagnostic
- The vibration spectrum of a faulty bearing
- Pumps: in this chapter we will talk about
- Pump classification
- Pump troubleshooting
- Cavitation
- Turbulence
- Vane passing syndromes
- System problems
- Pumps control: we will address the following topics
- Pump operation
- Abnormal operation

- Operation curve and BEP
- Capacity regulation
- Compressors: in this chapter we will study
- Compressors types
- Centrifugal compressors
- Reciprocating compressors
- Rotary compressors
- Thrust control
- Seals
- Prime movers
- Lubrication
- Maintenance
- Monitoring
- Operating range
- Lubrication
- The role of lubrication
- Effect of friction
- Theory of lubrication
- Lubricant selection
- Method of application
- Lubricant additives