

**Description:** Downtime is expensive. Regardless of the precautions you've taken and preventive maintenance practices you've implemented, sometimes things just go wrong and you need it fixed now. But in order to fix it you must know how to isolate and define the problem, and that's what this course is all about - teaching you how to quickly and accurately troubleshoot mechanical rotating equipment so that you can avoid costly downtime. Rather than teaching about "equipment specific" situations you are taught to troubleshoot based on the common components that make up a piece of equipment. The attendee will learn about basic mechanical applications, failures, life expectancy and maintenance of shafts, bearings, couplings, chains, sprockets, bushings, gears, belts, sheaves and machine components. Most importantly you will learn how to find and fix the real problems with your equipment, and not just the symptoms.

### COMMON ELEMENTS IN ALL EQUIPMENT

### DETERMINING LIFE EXPECTANCY of MACHINERY COMPONENTS

#### BEARINGS

Anti-Friction & Plain

#### SHAFTING

Fracture and fretting

Shaft seats

#### HOUSINGS

Housing bores and proper fits

#### MACHINERY LUBRICATION

Oil or Grease?

#### COUPLINGS

Which coupling is the best

Slow-motion studies

#### V-BELTS AND SHEAVES

Tensioning and inspection

#### POSITIVE DRIVES

Timing belts and HTD belts

Synchronous drives

#### CHAIN DRIVES

Tooth and chain wear measurement

#### GEARS AND GEAR BOXES

Tooth inspection and measurement of backlash

#### VIBRATION ANALYSIS

Vibration severity and using The Rathbone Chart

#### ACOUSTICAL ANALYSIS

Shock pulse, SEG, and BDU

#### INFRA-RED INSPECTION

Infra-red thermometers and infra-red thermography

#### OIL ANALYSIS

Ferrographic and spectrographic techniques

Viscosity measurement

#### LOW RESISTANCE TESTING

Insulation resistance testing

#### HANDS-ON ACTIVITIES

More than 50% of the course will be "hands-on" and each student will receive work books and supervised instruction as well as individual one-on-one assistance to make sure they can accomplish the tasks assigned. It is expected that an attendee will leave the class with the basic knowledge and skill to troubleshoot problems with rotating mechanical equipment. Many state-of-the-art instruments are available to learn high-tech troubleshooting and determine what might work at your location.

#### DURATION AND ATTENDANCE

Three day duration (8 hours each day) and up to 12 students may attend. Minimum of 6 students.

