Gearbox, Relevant Bearings, Seals & Lubrications

Course general description

This course focuses the supporting elements of a gearbox that allow gears and bearings to do their jobs most efficiently. Learn about gears, bearings seals, lubrication, lubricants, housings, breathers, and other details that go into operation and maintenance of gearbox systems.

Course objectives:

By end of the course participants will gain:

1. Understanding types of housing construction, housing elements (covers, inspection ports, sump, mounting, etc.)
2. Understanding drawing practices for housings and related components.
3. Understanding bearing mounting, retention and sealing
4. Understanding the role of gearbox accessories, such as breathers, filters, screens, sight gages, and other level indication devices.
5. Applying the lubricant to the rotating elements
6. Describing the selection criteria concerning the basic lubricant chemistry. Since the best design is only as good as its implementation, drawing practices and tolerance will also be addressed from the operator perspective.
7. Learning about translating the general design from the design manual to the individual component drawings.

Audience:

This course is designed for:

1. Mechanical engineers
2. Maintenance Engineers
3. Supervisors from different disciplines

Course duration:

Five days

Course location:

Abu Dhabi

Course contents:

Day-1

- Pretest
- History and overview
  - A general overview on types of gearboxes
- Gearbox Function and Layout
  - The gearbox in the power transmission environment. Discover the best location of the gearbox for various uses.
  - Detailed drawings to get to know all the various parts within a gearbox.

Day-2

- Gearbox style
  - The various components within gearboxes: open gearbox, arrangement, type of gearing, type of support, lubrication, enclosed gearbox arrangement, and types of gearing
- Lubrication

- An introduction to the wide variety of choice in lubrication for gearboxes.
- Learn thresholds of each type, methods of applications; and maintenance of cleanliness of lubricant.
- Details on gearbox breathers, oil level indicators, heat exchangers, operation monitoring instrumentation, health monitoring and instrumentation, oil analysis, and vibration sensors.

Day-3

- Gearbox housing, cover and Sump Design
  - Geometric Dimensioning and Tolerance (GD&T).
  - Housing types, shaft seals, lip seals, packing, split seals, pressure lubrication of gear meshes and bearings, cast oil passages integral with housing and inspection ports.
- Gearbox Marking/Identification
  - A list of the various nameplates and markings used when completing gearboxes.

Day-4

- Gearbox accessories
  - There are small parts that have small roles that are still important in the ultimate functionality of a gearbox. A discussion of breathers, caps, vibration monitoring, lube sample ports and drain ports, is included here.
- Provisions for Preservation
  - Once all the hard work is complete, you need to learn how to package your gearbox to transport and complete.

Day-5

- Maintenance and troubleshooting
  - Common problems and its diagnosis
  - Preventive maintenance
  - Condition monitoring techniques: vibration monitoring, oil sampling analysis.
- Posttest

Methodology:

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions
- 10% Software (if applicable or examples)

Course code: (TEME003)