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# PRACTICAL MECHANICAL DRIVES (BELTS, CHAINS AND GEARS) FOR ENGINEERS & TECHNICIANS



## **YOU WILL LEARN HOW TO:**

- Install and maintain drives correctly
- Align drives correctly
- Apply correct lubrication techniques
- Select bearings correctly
- Troubleshoot and fix drives

## **WHO SHOULD ATTEND:**

This workshop is designed for personnel with a need to understand the use, care, installation, or the economics associated with mechanical machinery. Those who will benefit the most from this workshop include the following:

- Plant operations and maintenance personnel
- Consulting engineers
- Design engineers
- Process technicians
- Plant engineer-managers and supervisors
- Process control engineers and supervisors
- Mechanical engineers
- Drive sales engineers
- Drive service contractors
- Drive operators

## The Workshop

The mechanical drives workshop is a comprehensive, highly practical and interactive two-day course. You will have an opportunity to discuss drive design-applications, operations, maintenance and management issues. You will be provided with the most up-to-date information and best practice in dealing with the subject. Towards the end of the workshop, you will have developed the skills and ability to recognise and solve drive problems in a structured and confident manner.

## Overview

Most engineering professionals working with drives will confirm that there are major benefits in installing and maintaining mechanical drives correctly. Typical areas which can be dramatically improved include: less wear and tear on equipment; minimal unscheduled downtime and production losses and improved operating efficiencies.

The workshop has been designed to examine most mechanical drives such as belts, chains, gears in terms of improved lubrication, proper alignment and fastening techniques. Finally, there is detailed coverage of troubleshooting techniques so that you can identify symptoms of failure well before the event and thus correct the problem.

## The Program

### MECHANICAL POWER TRANSMISSION

- Laws of motion
- Mechanical advantage
- Basic machines
- Friction

### PRIME MOVERS

- Introduction and general types
- AC synchronous motors
- Induction motors
- Operating characteristics
- Selection considerations

### BUSHINGS, KEYS, AND KEYWAYS

- Square, flat, tapered, woodruff keys
- Tapered, QD, and split bushings
- Splines
- Sizing and fit
- Symptoms of failure

### GENERAL LUBRICATION CONSIDERATIONS

- Oil vs. grease
- How much
- How often

### BEARINGS

- Types and construction
- Bearing loads
- Numbering systems
- Installation and removal
- Bearing clearance and pre-loading
- Bearing failure
- Bearing life
- Bearing material
- Troubleshooting

### CHAINS

- Precision roller chain
- Sprocket selection
- Silent chain
- Engineering chains
- Chain lubrication
- Installation and maintenance

### BELT DRIVE SYSTEMS

- V-belt, flat belt, synchronous/timing
- Principles of operation
- Determining proper tension
- Belt selection
- Miscellaneous belts

### GEAR DRIVE SYSTEMS

- Open and closed systems
- Parallel, concentric, and right angle
- Load factors and selection
- Service factoring
- Installation and maintenance
- Angular errors, backlash adjustment and alignment considerations
- Lubrication
- Gear material
- Troubleshooting

### COUPLINGS

- Rigid and flexible couplings
- Universal joints
- Load factors
- Chain couplings
- Installation and alignment
- Hydraulic couplings

### CLUTCHES AND BRAKES

- Mechanical, friction, centrifugal, and plate clutches
- Clutch selection
- Torque converters
- Mechanical, hydraulic, pneumatic, and electric brakes

### MECHANICAL VARIABLE SPEED DRIVES

- Open and closed
- Variable speed belt drives, gear boxes, hydrostatic drives
- Installation and adjustment
- Belt materials
- Troubleshooting
- Service factoring

