# Mechanical and Fluid Drive Systems

## Course 342: Mechanical and Fluid Drive Systems

Covers further details of drive maintenance, including brakes, clutches, and adjustable-speed drives. Also covers maintenance and troubleshooting of fluid drives and package drive systems.

TPC Training is accredited by IACET to offer **0.5 CEU** for this program.

### Lesson 1: Mechanical Brakes and Clutches

*Topics*

Basic Types of Mechanical Clutch; Installing a Mechanical Clutch; Preparing the Shafting; Installing the Clutch Body; Initial Lubrication of Clutch; Providing the Power Supply; Making Initial Adjustments; Test Running with No Load; Making Final Adjustments; Test Running with Full Load; Installing a Mechanical Brake; Preventive Maintenance; Operating Environment; Troubleshooting Brakes and Clutches; Brakes, Clutches, and Safety

*Objectives*

- Explain how friction-type and jaw-type clutches differ in construction.
- Name the precautions that should be taken when mounting body on a shaft.
- Explain how to test-run a mechanical clutch with no load.
- Explain how to install a mechanical brake.
- Describe the results of improper alignment between driving and driven shafts.
- Identify the problems that may be indicated by chatter and excessive noise.

### Lesson 2: Electric Brakes and Clutches

*Topics*

Types of Brakes and Clutches; Single-Disc Friction Clutch; Multiple-Disc Friction Clutch; Tooth-Type Clutch; Hysteresis Clutch; Eddy-Current Clutch; Magnetic Particle Clutch; Clutch Operation; Clutch Torque; Heat Dissipation; Response Time; Preventive Maintenance; Wiring Brakes and Clutches; Troubleshooting Brakes and Clutches; Brakes, Clutches, and Safety

*Objectives*

- Describe how single-disc and multiple-disc friction clutches operate.
- Explain how the principle of hysteresis is applied in electric clutches.
- List the three basic components of magnetic particle clutch.
- Differentiate between the static torque, pickup torque, and average torque of a clutch.
- Identify the problems that may arise in a clutch if its heat is not dissipated.
- Define decay time, pull-in time, and response time.

### Lesson 3: Adjustable-Speed Drives

*Topics*

Principles of Adjustable-Speed Drives; Two Basic Designs; Open-Type Adjustable-Speed Drive; Environment for Open-Type Drive; Enclosed-Type Adjustable-Speed Drive; Storage of Enclosed Drives; Protection of Enclosed Drives; Handling an Enclosed Drive; Preparing the Drive Shafting; Leveling an Enclosed Drive; Eliminating Vibration in Drives; Initial Lubrication of Drive; Test-Running; Preventive Maintenance of Drives; Troubleshooting Adjustable-Speed Drives; Adjustable-Speed Drives and Safety

*Objectives*

- List the precautions necessary to provide extra protection for open-type drives.
- Describe how to install an enclosed-type drive on a concrete floor.
- Explain how to prepare the shafting when installing a new enclosed drive.
- Describe the initial lubrication of new adjustable-speed drives.
- Describe how to test-run an adjustable-speed drive under no load and full load conditions.
- Name some of the safety rules for working on an adjustable drive.

### Lesson 4: Fluid Drives

*Topics*

Principle of Fluid Drives; Operation of Fluid Coupling; Constant-Speed Couplings; Variable-Speed Couplings; Operation of Torque Converter; Torque Converter Modifications; Coupling Drive Arrangements; Installing Fluid Couplings; Installing Large Fluid Couplings; Installing Torque Converters; Preventive Maintenance of Couplings; Fluid Couplings and Safety

*Objectives*

- Explain how a fluid drive works.
- Describe how constant-speed couplings differ from variable-speed couplings.
- Trace the fluid path through a torque converter using either a drawing or a cutaway.
- Describe the various ways of mounting a fluid coupling.
- Explain how to cool the fluid in large couplings.
- Discuss preventive maintenance procedures for couplings.

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## Lesson 5: Complete Drive Systems

*Topics*

Introduction; Drive with Coupling and Roller Chain; Drive with Two Flexible Couplings; Drive with Right-Angle Drive Shafts; Drive with Adjustable-Speed Belt; Shaft-Mounted Drive; Installing a Drive System; Protection of Drives; Test Running a Drive; Preventive Maintenance of Drives; Troubleshooting a Drive System; Packaged Drives and Safety

*Objectives*

- List the components used in a typical drive system.
- Name the part of a drive system in which most of the speed reduction occurs.
- Describe the construction and operation of a shaft-mounted drive.
- List the protective devices for a drive.
- Explain the proper maintenance procedures for a drive system.
- Describe the steps to be taken when troubleshooting a drive system.