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Level 1 Industrial Hydraulics In Depth Fundamentals

Course Description: This course correlates fluid power principles with machine operation and daily maintenance duties. Procedures to insure safety of maintenance personnel and prevent damage to machine will be covered. Fluid power symbols will be compared to the physical components. Location of components in a hydraulic system and proper adjustment procedures will be identified. Hands-on exercises will reinforce location, proper component connections, and effects of adjustments on system operation. Elimination of leaks by proper fitting selection and installation will be discussed. Significance of fluid cleanliness to system longevity and techniques to minimize ingestion of contaminants will be presented.

Prerequisites: None

Textbooks: Industrial Hydraulics Manual, CFC-Solar Lab Manual

Equipment: CFC-Solar Hands-on Trainers; CFC-Solar component take-a-part kits

Course Time allocation: 50% Hands-on, 50% power point presentation and animations

Learning Objectives:

- Practice safe procedures to insure that trapped fluids have been relieved internally and suspended loads have been lowered or properly blocked to permit safe maintenance operations
- Explain hydraulic pressure-force and flow-speed relationships
- Identify and correlate the standard schematic symbols to the hydraulic components and typical locations in a hydraulic system
- Use charts to determine actuator force and speed for given pressure and flow
- Recognize typical cylinder construction and utilize diagnostic procedures
- Identify/classify relief, sequence, unloading, reducing, and counterbalance valves
- Distinguish between meter-in verses meter-out flow control
- Identify schematic symbol and operational differences of directional control valves
- Identify/classify the different types of hydraulic pumps
- Proper installation of hydraulic components with respect to alignment, connections, and pre-filling with fluids
- Identify and work with the fluid conductors used to carry hydraulic fluid to insure proper pressure ratings, routing, and to reduce failures
- Implement leak prevention using proper fittings, assembly techniques, and seal materials
- Identify different types of filtration and understand contamination levels
- Recognize fluid requirements for different machines and seal material compatibility