

CENTRIFUGAL PUMP HANDS ON-MAINTENANCE, TROUBLESHOOTING AND REBUILDING

Description: The course covers centrifugal pumps and pump theory including how to read a pump curve and select the proper pump for the job. Several different ANSI end suction pumps are disassembled, checked, and reassembled to industrial standards. Three types of sealing are available: expeller, packing, and mechanical seal. The attendee performs accurate measurement of bearing shaft fits, precision setting of the impeller, checking for shaft straightness, packing installation as well as setting of a mechanical seal. Use of premade as well as "home made" gaskets are covered in the course. A pre-test is used to assess skill level at the beginning of the course and post-test is used involving actual pump rebuilding to document the level of improvement of the attendee. The attendee should be able to rebuild centrifugal pumps to factory standards.

HISTORY OF PUMPS

- Early pumps
- John Appold and the curved vane pump
- Development of pump theory and engineering tables
- Components of a centrifugal pump—why all pumps are the same

HYDRAULICS AND READING A PUMP CURVE

- Understanding density, specific gravity, pressure, flow, and head
- Calculation of head
- Calculation of head losses and developing a system curve
- Choosing a pump to do the job
- Concern for the BEP (best efficiency point) and cavitation—NPSHR and NPSHA

DISASSEMBLY, CHECKING, and REBUILDING OF THREE DIFFERENT ANSI PUMPS

- Reading a pump rebuilding manual and what to do if a manual is unavailable
- Pump disassembly with concern for troubleshooting
- Shop hydraulic press work
- Shaft measurement and sketching the shaft
- Component inspection
- Rebuilding, repacking, and reassembling the pump

PACKING AND MECHANICAL SEALS

- Measurement and cutting a set of packing rings
- Lantern rings and proper placement
- Setting packing for planned leakage
- Mechanical seal theory and practice - Seal installation
- Troubleshooting seal problems

DISASSEMBLY, CHECKING, and REBUILDING A TYPICAL SPLIT CASE PUMP

- Using a pump rebuilding manual
- Pump disassembly with witness marks
- Bearing disassembly
- Shaft measurement
- Rebuilding, mechanical seal installation, and reassembling the pump

TROUBLESHOOTING PUMP PROBLEMS

- Using a vibration meter
- Using a bearing analyzer
- Detecting misalignment
- Hydraulic troubleshooting

HANDS-ON ACTIVITIES

In each of the sections listed above attendees will be given actual industrial pumps to be disassembled, reworked, repaired and reassembled to factory specs. More than 60% of the course will be "hands-on" and each student will receive work books, class 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 rebuild the most common pumps used in industry today.

DURATION, ATTENDANCE and TIMES

Three day duration (7-1/2 hours each day) and up to 9 students may attend. Minimum of 6 students

