

Ergonomic Job Analysis

1. Basic Job Description

- Job/Task Name:** Assembly/Disassembly of Taper Seat Valves (New Style), 2X2, 3X3, 4X4 and 5X5
- Date:** August 2, 2004
- Work Objectives:** The objective of the assembly/disassembly of taper seat valves (New Style), 2X2, 3X3, 4X4 and 5X5 is for the cleaning, servicing and refurbishment of this style of taper seat valve used in the CIP and product transport plumbing system.
- Job Analyst:** James M. Stewart, M.S., M.P.H., CPE, CIE, CHES
- Employees:** One employee per 12-hour shift
- Work Schedule:** Four 12-hour shifts on, three 12-hour shifts off (weekly schedule)
- Break Schedule:** Flexible: Performance objectives are 50 to 60 valves per week
- Total Work Time:** 10.5 to 11 hours per 12-hour shift.
- Production Detail:** Although there exists procedures for disassembly, cleaning, sanitization, refurbishment and reassembly of individual valves, this task is best performed in batches, with lots of 25 to 50 valves being serviced at one time.
- Job Rotation:** None
- Equipment:** Allen wrenches, strap wrenches, air impact wrenches, overhead winch, pliers, awls/picks, mallet/hammer, sanitizer tubs, ultrasound cleaner
- Product:** None
- Environment:** Cool, wet
- Personal Protective Equipment:** chemical goggles, face shield, chemical gloves, rubber boots with steel-toes and slip-resistant soles, chemical apron, hearing protection
- Work Method:** The valve technician will stage all materials and equipment needed to complete the process of disassembly, cleaning, refurbishment, sanitization and reassembly of new style taper valves for return to

service. All valve refurbishment and cleaning tasks are performed by one technician.

2. Generic Risk Factors

Repeated and sustained exertions:

Upper extremity: Twisting, rotational motions are associated with the hand/wrist on assembly and disassembly tasks. These tasks are performed at various intervals of the process

Whole body: None observed

Pace rating: Moderate, self-paced

Posture: Awkward if proper lifting techniques are not used; awkward if bending over to manipulate valves or baskets of valves.

Forceful exertions:

Upper extremity: Present when valve components (stems, roll pins, screws, etc.) are jammed or tight.

Whole body: None observed

Awkward posture:

Upper extremity: Awkward if proper lifting techniques are not used; awkward if bending over to manipulate valves or baskets of valves.

Whole body: Awkward if proper lifting techniques are not used; awkward if bending over to manipulate valves or baskets of valves.

**Mechanical/
Contact Stresses:** None observed

Vibration: May be present with ultrasound cleaner

**Temperature
Extremes:** None observed

Overall Summary: The valve repair job is one that requires a great deal of independent decision making on the part of the operator. Cognitive ability to understand valvage, valve components and sanitation requirements is critical. The valve repair job is self-paced within the framework

of production scheduling and requirements. The process is driven by critical time elements that are necessary to achieve a sufficient number of valves available to the process maintenance and CIP operators.

Because of the configuration of the valve shop areas and the location of the valve shop, travel throughout the complex is required. Floors are wet and uneven in order to facilitate drainage in the shop areas. Because of the complexity of this job, rotation with other areas may be difficult. Lifting and awkward postures can be minimized by use of good ergonomic and biomechanical technique and the use of the overhead hoist when moving baskets of valves.

3. Recommendations: Ensure that overhead hoists are properly maintained and used.

Ensure that tasks are performed so that frequent changes occur, especially when fatigue or discomfort occur.

Ensure that well-maintained and regularly calibrated CO₂, oxygen and chlorine monitors are available for use when making confined space entry to the fermenter tanks. Ensure that all lockout/tagout and confined space entry procedures are followed.

Review proper lifting technique with the valve shop technician and ensure that lifting technique is incorporated into their training.

Explore the possibility of using a pneumatic/electrical tools in order to facilitate elimination of some of the rotational tasks, such as loosening, removing, or tightening screws..