

Ergonomic Workplace Assessment - Manufacturing

Sector - Manufacturing

Background

A manufacturing company who produce high end filtration devices for industries such as aeronautical, defense and the space industry requested an ergonomic workplace assessment covering the task of resistance welding.

The ergonomics investigation was initiated against a background of reports of musculoskeletal disorders (MSDs) and focused on the analysis of posture and how the physical working environment (thermal comfort, lighting levels, noise levels and air quality) affected the wellbeing of the resistance welding staff.

The Ergonomics Investigation

1. Postural analysis tools such including the Rapid Upper Limb Assessment (RULA) and Assessment of Repetitive Tasks (ART) were used to measure the impact of the environment on the postures adopted by the resistance welding staff.
2. A physical environment questionnaire was completed by the resistance welding staff. The purpose of the questionnaire was to understand and identify areas of the physical capability against the worker's demands under the premise that an imbalance can lead to negative wellbeing and ill health.
3. Scenario based walkthroughs was conducted with the resistance welding staff to understand which part of their daily tasks positively or negatively affected their subjective wellbeing.

Results

- ✓ *Reduction in exposure to high risk postures during assembly.*
- ✓ *Improved acoustics and reduction in exposure to noise.*
- ✓ *Improved lighting.*
- ✓ *Application of a more user centered design process.*



Impact Assessment and Clarification

Each issue identified from the ergonomics investigation had an impact statement assigned to it. These impacts statement are formulated from Human Factors best practice.

Each impact statement had one of four categories assigned to it :

- No Human Factors impact.
- Minor Human Factors impact.
- Moderate Human Factors impact (e.g. comfort / convenience / efficiency).
- Unacceptable Human Factors impact (e.g. performance / safety / health critical).

Recommendations

Physical discomfort recommendations included:

- Providing adjustment arms/ elbow support to the task chairs to support user's due precision tasks.
- Design in the ability to sit and stand during assembly tasks.
- Postural Awareness training to employees to increase awareness of high risk postures.
- Reduce risk of repetitive tasks by reducing exposure via Assessment of Repetitive Tasks (ART) tool.

Task Design recommendations included:

- Encourage a user centered approach to the design of product assembly stations.
- Provide Human Factors Training to staff involved with task, product, assembly design to reduce risk of rejection and injury.
- Reduce heat from task lighting.
- Reduce glare form task lighting.
- Increase illuminance of ambient and task lighting.
- Provide easy to adjust/maneuver task lighting.
- Noise - Increase distance between resistance welders.
- Look to block and absorb noise from machines using screens, barriers, enclosures and absorbent materials.
- Limit exposure period
- Reduce noise from machines by proper and regular maintenance.
- Seek advice from a qualified acoustician to reduce the risk of noise exposure.

Benefits

- ✓ Improved user experience and working conditions.
- ✓ Reduction in presenteeism and absenteeism.
- ✓ Improved wellbeing and productivity.
- ✓ Reduction in upper limb exposure levels.
- ✓ Reduction from noise exposure
- ✓ The ability to apply human factors from the start of a product design.