

ERGONOMICS

- The term ergonomics is derived from two Greek words, ergos meaning work and nomos meaning the principles of. In order words, ergonomics refers to the study of work.
- Ergonomics is the discipline examining the capabilities and limitations of people.

Ergonomics is Multidisciplinary

- Several fields of study contribute to ergonomics. Notable among them are Sociology, Psychology, Anthropology, Anatomy, Physiology, Chemistry, Physics, Mechanics, Statistics, Industrial Engineering, Biomechanics and Anthropometry.

Ergonomics is Multidisciplinary Continued

- Principles and practices are applied to the industrial environment through activities associated with human factors engineering, industrial engineering, occupational layout and design, product design, machinery design, safety engineering, occupational medicine, or industrial hygiene.

Goal of Ergonomics

To help production managers improve productivity and efficiency.

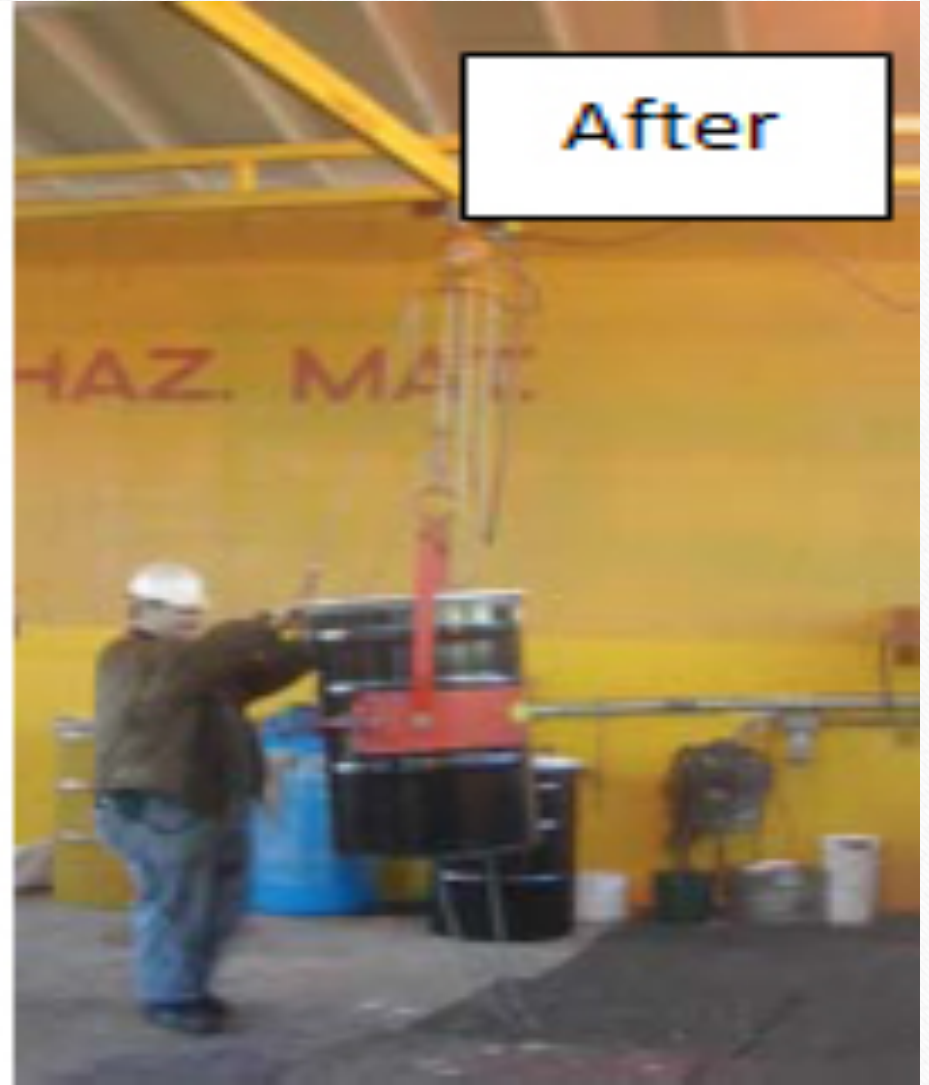
Objectives of Ergonomics

- Improvement of human health
- Improvement in safety and performance through the application of sound people and workplace principles
- To avoid fines and payment of compensation from casualties
- Fulfill regulatory requirements
- Improvement in product design

Before



After





WORKPLACE ERGONOMIC HAZARD PREVENTION & CONTROL

Hazard Prevention And Control

- Part of ergonomics program
- Involves making changes so the job's workstations, tools and environment to fit the worker.
- An active process of eliminating or reducing the risk of injury by changing the things that contribute to the risk factors.
- You can eliminate or reduce the risk of injury through the use of these controls.
- Personal characteristics of the workers, such as size, physical condition or medical history, may need to be accommodated to make the best fit.

Type of Ergo Hazard Control Measures

- Engineering controls.
- Work practice controls.
- Personal protective equipment

Engineering Controls

- Engineering controls involve making changes to workstations, tools or equipment used on the job, or changing the way a job is done to avoid work-related musculoskeletal hazards.
- Preferred, because they make permanent changes that eliminate hazards at the source.

Engineering Controls Continued

- Engineering improvements can be very effective because they reduce or eliminate the underlying reasons for contributory factors.
- Although they can be more expensive to implement than other controls, their effect is often more significant.
- The best time for engineering control is when new facilities, process or work procedures are being planned.

Engineering Controls

Methods of Engineering Control;

- rearranging,
- modifying,
- redesigning or
- replacing

tools, equipment, workstations, packing, parts or products.

Engineering Controls

- Types of engineering control include

- workstation design,
- work methods design,
- tool and equipment design,
- controls and displays,
- connectors,
- fasteners and valves,
- product design.

Engineering Controls

- **Workstation design:** aspects of workstation amenable to engineering control
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- *Workspace layout*
- *Work surfaces*
- *Walking and standing surfaces*
- *Seating*
- *Storage*
- *Work fixtures*
- *Materials handling/ movement*
- *Work environment*

Engineering Controls

■ Work methods design

- Work methods should be designed so work can be completed safely and comfortably, and factors contributing to work-related musculoskeletal disorders are minimized.
- Risk factors that be corrected by work method designs
 - *Static or awkward postures.*
 - *Mechanical stress*
 - *Repetitive-motion tasks*
 - *Excessive force*
 - *Work rates*

Engineering Controls

- **Tool and Equipment Design**

- Tools and equipment should fit the individual user and task specific task. Tools should be designed to maintain neutral body positions. Take extra care to avoid twisting, vibration, static muscle loading, and pressure on tissues and joints.
- Factors that can be modified to prevent risks include
 - *Tool size*
 - *weight and balance*
 - *Handle size and position*
 - *Power control design*

Engineering Controls

■ Controls and displays

- Location of equipment/machinery controls and indicators should take into account their importance,
 - frequency and
 - sequence of use, and
 - height of workers.
- Controls and displays need to be visible and accessible while in use, and easy to operate in relation to equipment functions.
- Spacing should be adequate to accommodate gloves or other protective equipment.

Engineering Controls

Connectors, fasteners and valves

- Components, connectors, valves and fasteners should be located to allow neutral postures during work.

Engineering Controls

Product design

- Product designers should take into account ergonomic considerations, not only for the people who use products, but also for those who fabricate, assemble and perform maintenance on them.
- Form, materials, means of assembly, packaging, disassembly and disposal should be considered.

Administrative controls

- Administrative controls involve altering work organization. These approaches usually are less expensive than engineering controls but are less dependable.
- Examples of administrative controls include:
 - Rotating workers
 - Increasing the frequency/duration of breaks
 - Assigning a second worker to assist in performing select tasks

Administrative controls

- Ensuring proper work techniques are followed
- Conditioning workers for the physical exertion of task demands
- Enlarging job responsibilities such that the same task is not repeatedly performed
- Enacting a preventive maintenance program for mechanical and power tools and equipment
- Developing a housekeeping program
- Limiting overtime work

Personal Protective Equipment

- Personal protective equipment (PPE) includes such things as gloves and knee pads that may help reduce hazards until other controls can be put into place, or to supplement existing controls. Be sure to choose PPE that fits the individual worker, is appropriate for the task being done, and does not contribute to extreme postures or excessive force. Remember, however, that eliminating a hazard is preferable to using PPE.
- **Gloves** Gloves can protect the hands from injury or cold, but they also may reduce dexterity and increase grip force. When choosing gloves, consider these factors:
- Gloves should be small enough to minimize wrinkling or slipping but large enough so they don't impede circulation.
- Padding or insulation can add protection. Texturing improves friction.
- If chemical resistance is not a concern, material should be breathable so perspiration is not trapped.

Personal Protective Equipment

- **Footwear/anti-fatigue insoles** Anti-fatigue insoles can give relief from musculoskeletal fatigue that develops from prolonged standing and walking on hard floor surfaces. They are especially appropriate when anti-fatigue floor mats cannot be used because of housekeeping needs, the size of the area to be covered, or tripping hazards.
- **Knee pads** Knee pads can be used to avoid prolonged contact with hard or sharp surfaces. They should be comfortable, large enough to cover the entire knee, padded, and snug enough to fit well but not so tight that they impede circulation.