Ergonomics and Preventing Injuries

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Ergonomics is the scientific discipline concerned with the understanding of the interactions between humans and other elements of a system.

Ergonomics is the process of designing or arranging workplaces, products and systems so that they fit the people who use them.

*Ergonomics* applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

Why Ergonomics?

The goal of ergonomics is to prevent soft tissue injuries and musculoskeletal disorders (MSDs) caused by sudden or sustained exposure to force, vibration, repetitive motion, and awkward posture.

NIOSH

In 1970, OSHA established NIOSH as a research agency focused on the study of worker safety and health, and empowering employers and workers to create safe and healthy workplaces.

NIOSH is part of the U.S. Centers for Disease Control and Prevention, in the U.S. Department of Health and Human Services.

It has the mandate to assure “every man and woman in the Nation safe and healthful working conditions and to preserve our human resources.”

NIOSH ergonomists and industrial hygienists recommend designing tasks, work spaces, controls, displays, tools, lighting, and equipment to fit employee’s physical capabilities and limitations to create an ergonomically sound work environment.

Musculoskeletal Disorders

MSDs are injuries to the muscles, tendons, ligaments, and bones of the body. They are most commonly caused by a repetitive use motion, vibration, or sudden stress such as lifting a heavy box.

Work-related MSDs are among the most frequently reported causes of lost or restricted work time.

According to the Bureau of Labor Statistics (BLS) in 2013, MSD cases accounted for 33% of all worker injury and illness cases.

Work-related MSDs can be prevented.

In the workplace, the number and severity of MSDs resulting from physical overexertion, and their associated costs, can be substantially reduced by applying ergonomic principles.

Injury Factors

1. Duration
2. Frequency
3. Intensity
4. Combination

Duration – You usually need hours of exposure before risk factors become a concern

Exposure can be all at one time or cumulative over the day

Frequency is often a concern in:

* assembly tasks
* sorting tasks
* loading or off-loading materials
* inventorying products
* product stocking
* software programming
* telemarketing
* customer service

Intensity refers to:

* weight in pounds of items lifted or carried
* grip or pinch force of lifted or manipulated items
* vibration level (meters/second2)
* force on keys when typing

Combination of risk factors:

* Exposure to more than one risk factor at a time greatly increases the risk of injury.
* For example:
  + Bending and twisting while lifting
  + Repetitive, forceful use of the hands with the wrists bent

Center of Gravity

Injury caused when lift or carry is outside the body’s center of gravity.

Lifting, carrying ot twisting in a reaching position is almost always going to lead to accidents and injuries.

Reduce Reaching

* Keep items within close reach   
  (design reach distance for the shortest worker)
* Remove obstacles
* Use gravity feed racks

Preventing Injuries

* Follow policies and procedures as described, they are there for a reason
* Use assistive devices such as boards, belts, and lifts.
* Don’t be a hero, ask for assistance
* Share the workload
* Use proper body mechanics

Correct posture

We’ve all been taught chin up, chest out, shoulders back. But that does not provide for a relaxed form in correct body alignment.

Correct posture is achieved by standing or sitting upright and pushing your shoulders downward. This opens the neck and upper spine to allow the lower spine to absorb the weight of the torso allowing the entire spine to bear the workload of the body’s weight.

Proper body mechanics

1. Stand with your feet apart to create a sturdy foundation.
2. Create a small hallow in your lower back by tucking the tailbone in and tilting your pelvic bone slightly forward. This is done by tightening the muscles of the buttocks and thus, rotating the pelvis into the neutral position. Be careful not to arch too much.
3. Bend at your knees instead of your waist.
4. Keep your neck, back, hips, and feet aligned when you move; avoid twisting and bending at the waist.

Proper lifting

The process of lifting places perhaps the greatest loads on the low back and therefore, has the highest risk of injury. Use of proper lifting mechanics and posture is critical to prevent injury. In the end, it is more important how you lift than how heavy a weight you lift. Here are a few tips on how to lift safely:

* Place the load immediately in front of you.
* Bend the knees to a full squat or lunge position.
* Bring the load towards your chest.
* Assume a neutral position with your back.
* Tighten the lumbar and buttocks muscles to "lock" the back.
* Lift now from the legs to the standing position.
* DO NOT:
  + Lift from a twisted / sideways position.
  + Lift from a forward stooped / imbalanced position.

Protect Yourself and Your Coworkers

* Recognize and report symptoms
* Get involved in ergonomics
  + Look at jobs
  + Come up with solutions
  + Work with solutions
  + Take part in training
  + Take responsibility for changing the way you do your job
  + Help to make sure efforts are successful

Symptoms of MSDs

* Discomfort
* Pain
* Numbness
* Tingling
* Burning sensation
* Swelling
* Change in color, bruising, redness
* Tightness, loss of flexibility

Reporting Symptoms

Report symptoms if:

* + Pain is persistent, severe or worsening
  + Pain radiates
  + Symptoms include numbness or tingling
  + Symptoms keep you from sleeping at night
  + Onset of pain is sudden and severe after performing a task
  + You feel pain after feeling or hearing a “pop”
* Minor injuries can easily become chronic injuries and can sometimes lead to disability, even surgery
* Early treatment is more successful

To summarize:

* Ergonomics is there to protect you and your coworkers from injury
* Follow the rules
* Use proper posture and body mechanics
* Ask for help
* Report risks and hazards
* Report symptoms early
* Help the company recognize the need for ergonomic changes that can help protect you and your coworkers