



**Texas Department  
of Insurance**

# General Ergonomics



Provided by

**Division of  
Workers'  
Compensation**

HS02-005C (9-06)

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# General Ergonomics

Today's companies, now more than ever, have to deal with the health and welfare of their employees. Employees have to deal with rises in production rates and the demands on quality, while employers are trying to overcome budget reductions, increases in workers' compensation claims and lost time due to injuries. Musculoskeletal disorders (MSDs) are one of the most frequent workers' compensation claims with back injuries, one type of MSD, leading the list. The ability to understand what ergonomics is, how to identify some of the most common risk factors and what practical solutions to use, will aid in reducing the number of MSDs.

## What is Ergonomics?

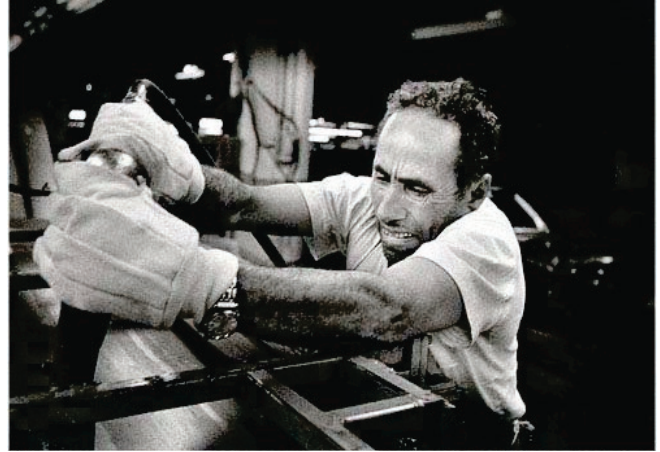
Ergonomics is essentially the science of fitting the work to the worker. The Greek form of the word is broken into Ergo (Work) and Nomos (Laws of), and basically means "the laws of work." Ergonomics, as a science, draws on many other disciplines as its base.

First, ergonomists draw on sciences like physiology, anthropometry, and biomechanics. In order to understand how to fit the job to the worker, an understanding of how the human body works is important.

Once there is an understanding of body mechanics, ergonomists focus on engineering. Equipment that is "ergonomically engineered" assists in protecting workers from one or more ergonomic risk factors. Cubicles are designed so the work surface is adjustable, meeting the workers' height needs. Handles on pliers are designed with grips enabling the worker to apply more pressure without applying undue stress to the wrist, and handcarts are designed to enable workers to move heavy items while keeping their back safe from injury.

Ergonomists draw on social sciences for information. Disciplines, such as psychology and sociology, explain the interactions of people and their workplaces. In many occupations the workplace schedule causes stressful situations. Ergonomists want to understand how people deal with this stress, both as an individual and as a society, in order to design better working conditions. Stress causes muscle tension, which is one of the many causes of MSDs. MSDs cause pain that increases stress.

Lastly, the social science ergonomists draw on is history. The first ergonomic disorders were named after occupations, because individuals in certain occupations suffered similar ailments. 'Carpenter's Elbow' referred to an inflam-



mation of the elbow due to the constant back and forth motions of sawing and hammering. Now it is referred to as 'Tennis Elbow' because carpenters today use nail guns and electric saws, but tennis players still use repetitive motions in play and practice. Therefore, ergonomists look for repetitive motions that, through history, have proven to cause MSDs.

## What are some common risk factors?

The workplace of today strives toward "paperwork reduction" and job specialization, both of which increase the chances of suffering from MSDs. Paperwork reduction puts people in front of computers more often and for longer periods, while job specialization keeps workers at the same workstations performing the same jobs day-in and day-out. With increases in production and reductions in the workforce, ergonomic incentives are challenged.

## Who is in danger?

Risk factors can be found in any occupation from the construction site, to the pharmacy, the store, or the office. Everyone needs to understand that there is a risk of injury, but there are some definite risk factors to consider. The potential for MSDs increases if work activities and job conditions involve any of the following conditions:

1. frequent manual material handling;
2. exposure to extreme temperatures;
3. exposure to excessive vibration;
4. repetitive motions throughout the work shift;
5. awkward or stationary work positions;



6. utilization of excessive force or localized pressure to perform tasks;

7. unnecessary lifting of heavy and awkward items; and

8. insufficient rest periods.

### **What can be done to prevent MSDs?**

Whether it is to sit upright, lift properly, or take appropriate breaks, everyone can do something to prevent MSDs. Considering the following concepts will supplement the efforts to improve work place design and practices. These are common ergonomic principles and can be easily adapted to all organizations and workstations.

1. Maintain a neutral posture.

The neutral posture represents the natural stance the body wants to take. When standing in a neutral posture, a straight line can be drawn from the ear through the shoulder, the hip, the knee, and the ankle. Work surfaces should be about waist level to prevent reaching, while keeping the elbows bent at about a 90-degree angle. While seated, keep the back straight and the knees bent at about a 90-degree angle and feet flat on the floor. Design workstations and offices with this in mind: “the closer the body is kept to neutral, the better.”

2. Prevent excessive repetition.

One of the major causes of MSDs, such as carpal tunnel and tendonitis, is excessive repetition. There are several ways to prevent excessive repetition while working. If possible, try not to perform the same task all day. Work on some files, then go and file them in the cabinet after 20 or 30 minutes instead of waiting until the end of the day to file them all at once. Try varying your routine. If you always perform the same tasks every day, try completing them in a different sequence. The key to preventing excessive repetition is to not sit or do the same things for hours on end.

3. Adjust work surfaces.

Whether standing or sitting, work surfaces need to assist individuals in keeping a neutral posture. The work surface should be about at waist height, keeping the worker from stooping over to work or having to raise their shoulders to reach. A workstation may fit one person, while causing another to work in an awkward posture. Adjustable work surfaces are the best option if possible. This allows many different people to work at the same workstation (i.e., warehouses, assembly lines). If adjustable workstations are not feasible, adjust the station for the taller employees and supply platforms or stepping stools for the shorter employees. If more than one station exists in the company, adjust one higher than the other and assign employees to the appropriate station. The bottom line is to maintain the most neutral posture possible and keep employees working erect.

4. Lift properly.

Back injuries are the number one workers’ compensation claim. There are two basic types of back injuries. The first are direct results of slips, trips, and falls and are not typically classified as MSDs. Back strains directly resulting from lifting improperly are. Everyone knows the old adage “Lift with your knees, not with your back.” Many companies have a Back Injury Prevention Program but other steps can be taken to prevent these injuries. First, design containers that hold smaller amounts of product putting less stress on the back. Often suppliers and distributors would be happy to package in smaller containers, this keeps their employees’ backs safer also. Create or utilize containers with handholds, enabling a better grip. Ensure that the containers fit the product. A bowling ball in a large cardboard box is not a good match, as it is unwieldy and unstable. Have plenty of hand trucks available and supply training on how to operate them safely, to include: loading the truck, lifting and lowering the load, and pushing the cart versus pulling it. Training employees is a good start to preventing back injuries and applying some general engineering principles will go a long way.

5. Avoid reaching.

Bursitis is an inflammation of the Bursa sack in the shoulder and can be a direct result of repetitive work with the arms outstretched or reaching. Reaching also puts stress on the back as even lighter items are lifted repetitively. Place items used most often closer to you. On an assembly line, the parts or tools used most should be closer. Likewise in an office, the books or equipment utilized more frequently need to be located closer. In the same respect, place heavier items closer. This puts less stress on the back and shoulders as they are lifted. Appropriate arrangement



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of the workstation can alleviate many shoulder and upper back issues.

#### 6. Control environmental factors

The Occupational Safety and Health Administration's (OSHA) first booklet concerning ergonomics was about the meat packing industry. One of the primary factors that raised alarm was the temperature. The cold environment placed undue stress on the joints, increasing the chances of MSDs such as tendonitis or carpal tunnel. Extremes in temperature, hot or cold, put stress on the body. Employees working in these environments should be given the proper personal protective equipment and trained on its usage. The employees of the meat packing plants were issued gloves, but the employees cut the fingers off enabling them to use the meat cutting saws, inadvertently exposing their fingers to the extreme cold. Ensure the tools are appropriate for the climate, such as slip resistant handles, and provide training on the usage of the equipment. Another important ergonomic environmental concern is lighting. With too much light, computer users get eyestrain from the glare on the screen. Having too little light makes it difficult to see the work, causing eyestrain. Supply task lighting to areas and offices with poor lighting. Another consequence of too little light is tripping hazards, which can lead to an unfortunate back injury. Control the environmental factors where possible and supply the proper equipment to operate safely where the factors cannot be controlled.

#### 7. Take time to recover.

Recovery is an important part of preventing MSDs. One way to give the body some recovery time is to take breaks while working. First, take advantage of any scheduled breaks the company offers. In addition, performing even minor stretches on these breaks makes the blood flow back to the parts of the body that have been stationary and increases mobility and flexibility in the joints. It is also recommended to take micro-breaks. Micro-breaks are short 20 – 30 second pauses where employees stop performing any tasks and stretch. It is recommended to take a micro-break every 15 minutes or so, especially in any job, such as data entry, that is very repetitive. The point of this break is to simply rest the body shortly from any repetitive or strenuous work, without taking the employee away from the task.

Once away from the work tasks, the body starts to heal itself of the stress and minor injuries it endured throughout the day. Emotional stress can cause MSDs through muscle tightness. Hobbies are an excellent release of tension but avoid those like playing the guitar that require strong pinching grasps. Keep these ergonomic principles in mind while undertaking any hobbies and do not over do them. Stretch before athletics, ensure there is proper lighting for the task, and, above all else, get plenty of sleep. Allowing the body sufficient time to heal can be one of the most effective means of reducing MSDs.

#### 8. Understand the risk factors.

This is the first step in finding problems before they become issues. Some of the known risk factors, as discussed earlier, are excessive vibration, repetitive motions, awkward postures, extreme temperatures, heavy lifting, and overexertion of force. Once you understand what the risk factors are, it will be easier to spot them. In addition, giving employees training on these risk factors will help. They perform the job every day and will know where to find the hazards. Minimize as many of these factors as possible to improve the ergonomics of any given task.

#### 9. Know the signs.

Ensure you understand the signs and symptoms of the common MSDs. Numbness and tingling in the extremities, especially in the fingers, lasting more than 24 hours or prohibiting sleep is a sure sign of an ergonomic disorder and requires medical attention. Ensure employees understand how important it is to seek medical attention and not to disregard the pain as the usual aches of working. By catching MSDs early, employers can avoid costly workers' compensation claims and long, painful recovery times for employees.

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