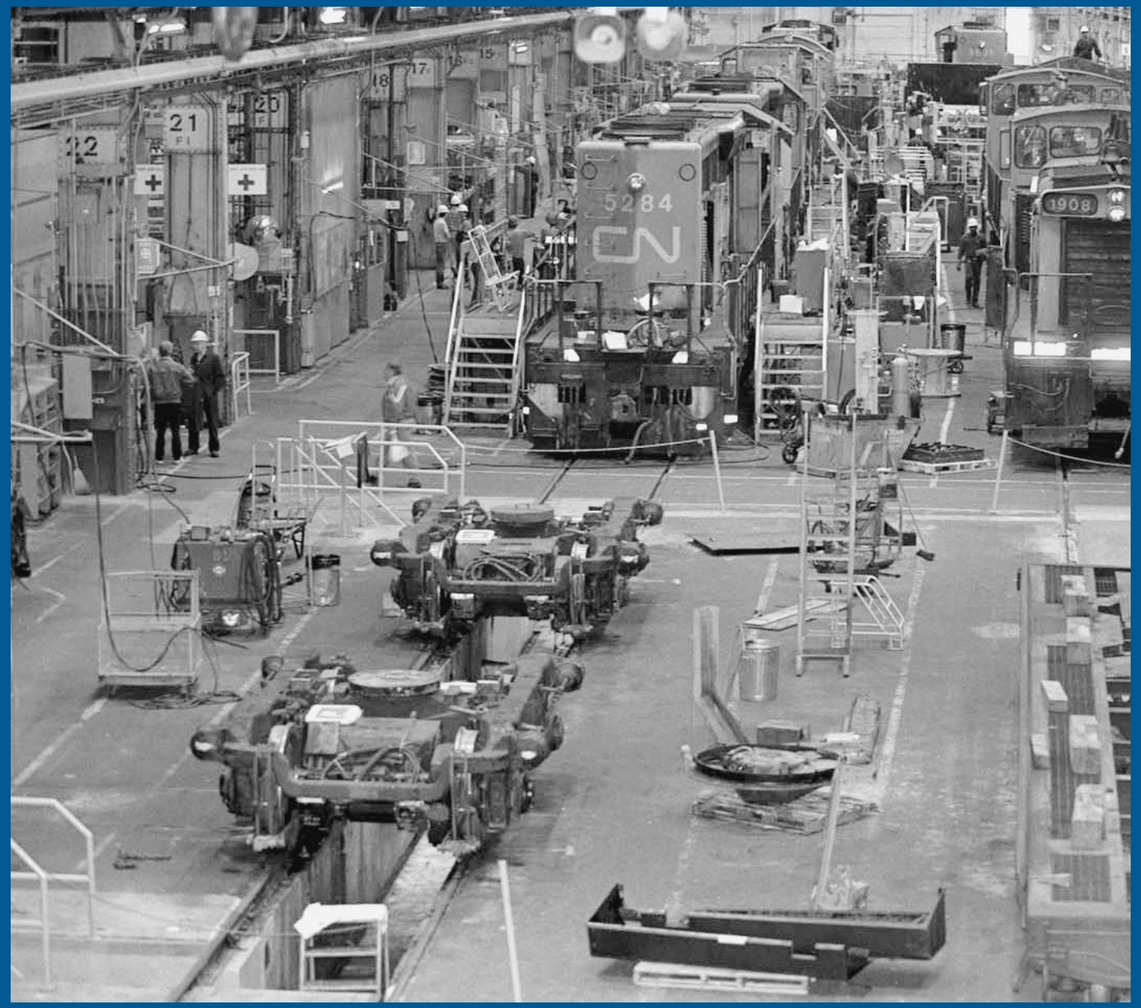

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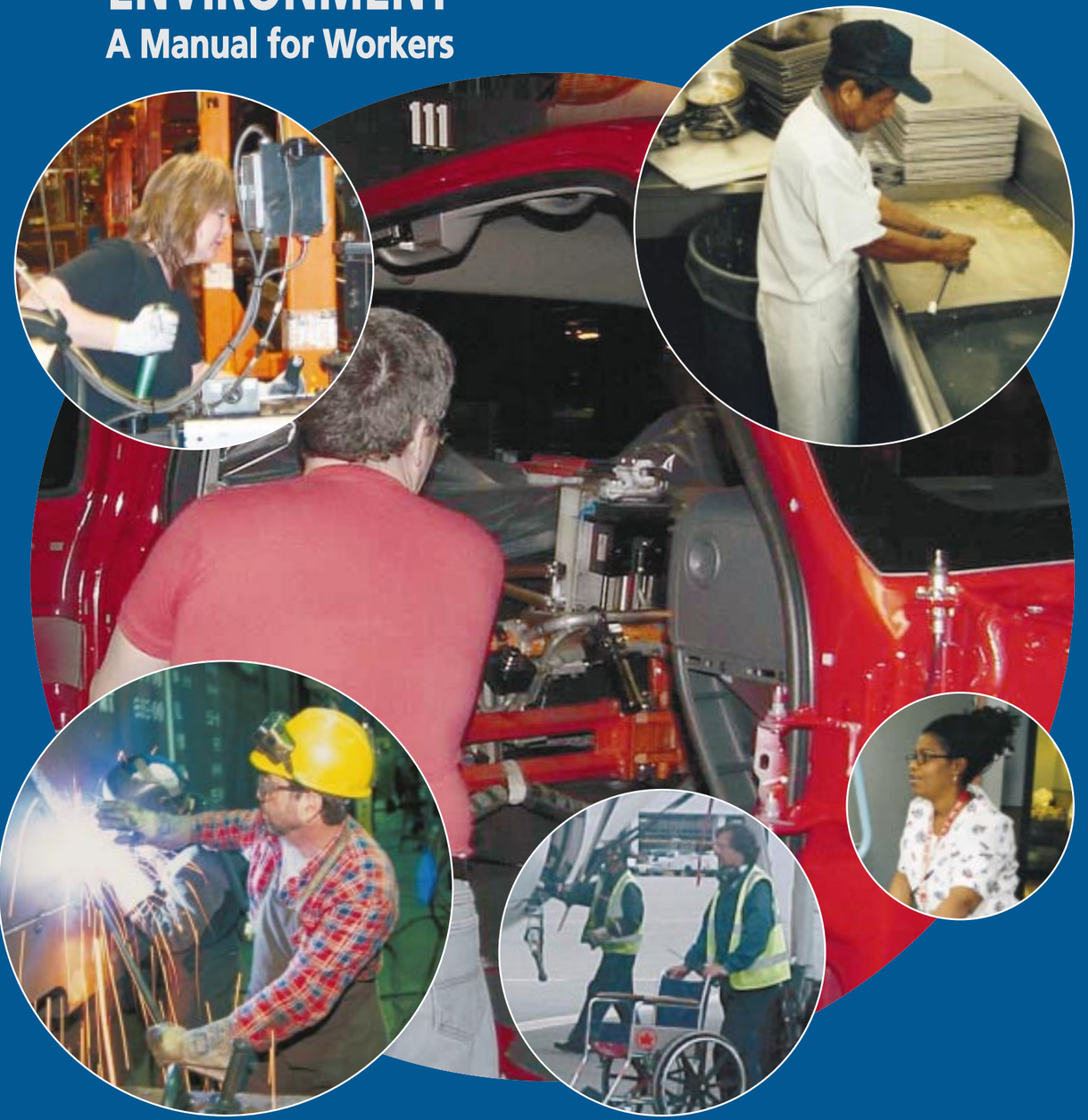
ERGONOMICS

IN THE WORK ENVIRONMENT

A Manual for Workers



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A MESSAGE FROM CAW PRESIDENT BUZZ HARGROVE

REPETITIVE STRAIN INJURIES (RSIs) occur every day in Canadian workplaces. In fact, RSIs occur more frequently than any other type of occupational injury. In some provinces RSIs account for more than 50 per cent of occupational injuries and illnesses, and of this 30 per cent are injuries to the back.

In this high-tech age, employers have developed many sophisticated ways of speeding up work while little attention has been paid to the effect that work is having on the human body. Take a look around you. Is your job comfortable? Do you feel as good when you leave your job at the end of the day or the shift as you did when you arrived at work? RSIs do not develop when jobs are correctly designed to fit workers. RSIs are a direct result of poor job design. Employers assume workers are capable of lifting anything, working in awkward postures, never tiring, and continuously having their work pace increased. If workers ignore symptoms of injury and don't question the design of their jobs they are vulnerable to disabling conditions that may be incurable. Acquiring information about causes and types of injuries, and participating in health, safety and ergonomic education and training create the knowledge that is needed to make change. Working with our members, our local unions and workplace union leadership gives us the strength to compel employers to make changes to the workplace.

Our union has made significant gains in improving the design of the work environment across the country. The CAW has been in the forefront of launching a national campaign for Ergonomics Regulations across the country, and succeeded in British Columbia and Saskatchewan. We have negotiated language into our collective agreements such as ergonomics checklists and processes, union input into job-machinery-process designs, ergonomics awareness training for workers and anti-discrimination policies to ensure workers with disabilities are accommodated. Ergonomics is a necessity for the modern workplace. It's about "Fitting Jobs to Workers" and not the other way around.

Basil "Buzz" Hargrove

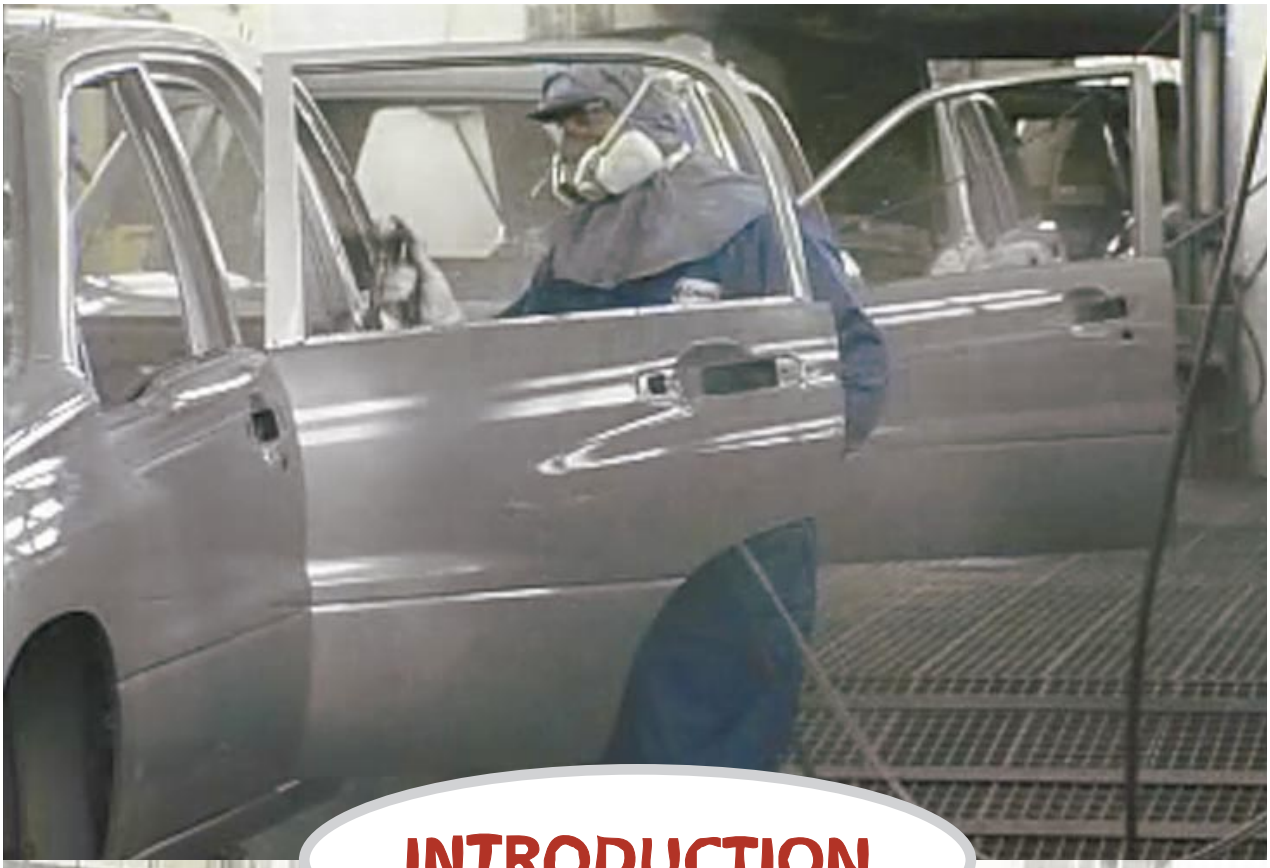
A MESSAGE FROM CAW SECRETARY-TREASURER JIM O'NEIL

THIS PUBLICATION will help workers and their health and safety committees understand the principles of ergonomics and job design to improve the workplace and prevent future workplace injuries.

We want you to know about the signs and symptoms of injuries, poor job design and what you can do about them. Taking the issue of workplace design a step further, we need to consider the barriers that exist which prevent many from having the opportunity to work in our workplaces such as having no ramps or elevators provided for mobility impaired persons. Our union believes the workplace should be designed to take into account the abilities and limitations of the widest range of the workforce. In other words, design should consider size, strength, gender, age, healthy workers, injured workers, and workers with temporary or permanent disabilities. With the technology and information available to employers today, there is no reason our workplaces cannot be far more safely designed. Safe workplaces create happy, healthy and productive employees.

This manual will give you a good starting point. You will have to pursue new designs and redesigns in the same manner as all other health and safety problems in the workplace. You will have to identify problems, document them, develop solutions, and organize and mobilize leadership and membership support to achieve those solutions. Education and action are the best defense workers have against haphazard job design that places the demands of production before the needs of health and safety. Like everything else in health and safety, change will come about because of your work and your commitment.

Jim O'Neil



INTRODUCTION

INTRODUCTION TO ERGONOMICS

What is Ergonomics?

NEARLY THREE CENTURIES ago Bernardino Ramazinni "the father of occupational medicine" wrote about work related complaints in his publication *Diseases of Workers*. While the early industrial revolution focused on increasing worker productivity, leading to increased injury and disease, it was World War II that highlighted the need for ergonomics. Sophisticated fighter planes could be compromised and errors made when cockpits were poorly designed. Confusing controls in cockpits that were not designed for variation in pilot size prompted these errors. While men were abroad, women faced the issue of toiling in workplaces that were designed for men.

The word "ergonomics" comes from the Greek "ergo" meaning work and "nomos" meaning law. Ergonomists study how workers interact with their tasks, workstation layout, tools, equipment and the organization of the work. The science of ergonomics is used in engineering and job design in an attempt to ensure the design of the workplace and the demands of the work do not exceed the abilities of humans. In the book, *Fitting the Task to the Man*, author Etienne Grandjean outlined the following objectives for ergonomic research: "Fitting the demands of work to the efficiency of a worker in order to reduce stress … designing machines, equipment, and installations so that they can be operated with great efficiency, accuracy and safety … working out proportions and conditions of workplaces to ensure correct body posture … adapting lighting, air-condition, noise, etc. … to suit the worker's physical requirements."

As you can see, much of what we do as health and safety activists comes under the definition of ergonomics. However, health and safety is not the only area in the workplace where ergonomics plays a role. Ergonomics, like safety, is best viewed as a process that must be fully integrated with other workplace programs involving work organization, production standards, workers' compensation, and accommodation.

Ergonomics – Definition

"Ergonomics is human-centred design. Ergonomics is the process of designing or modifying tools, materials, equipment, work spaces, tasks, jobs, products, systems and environments to match the mental and physical abilities and limitations and social needs of all people affected."

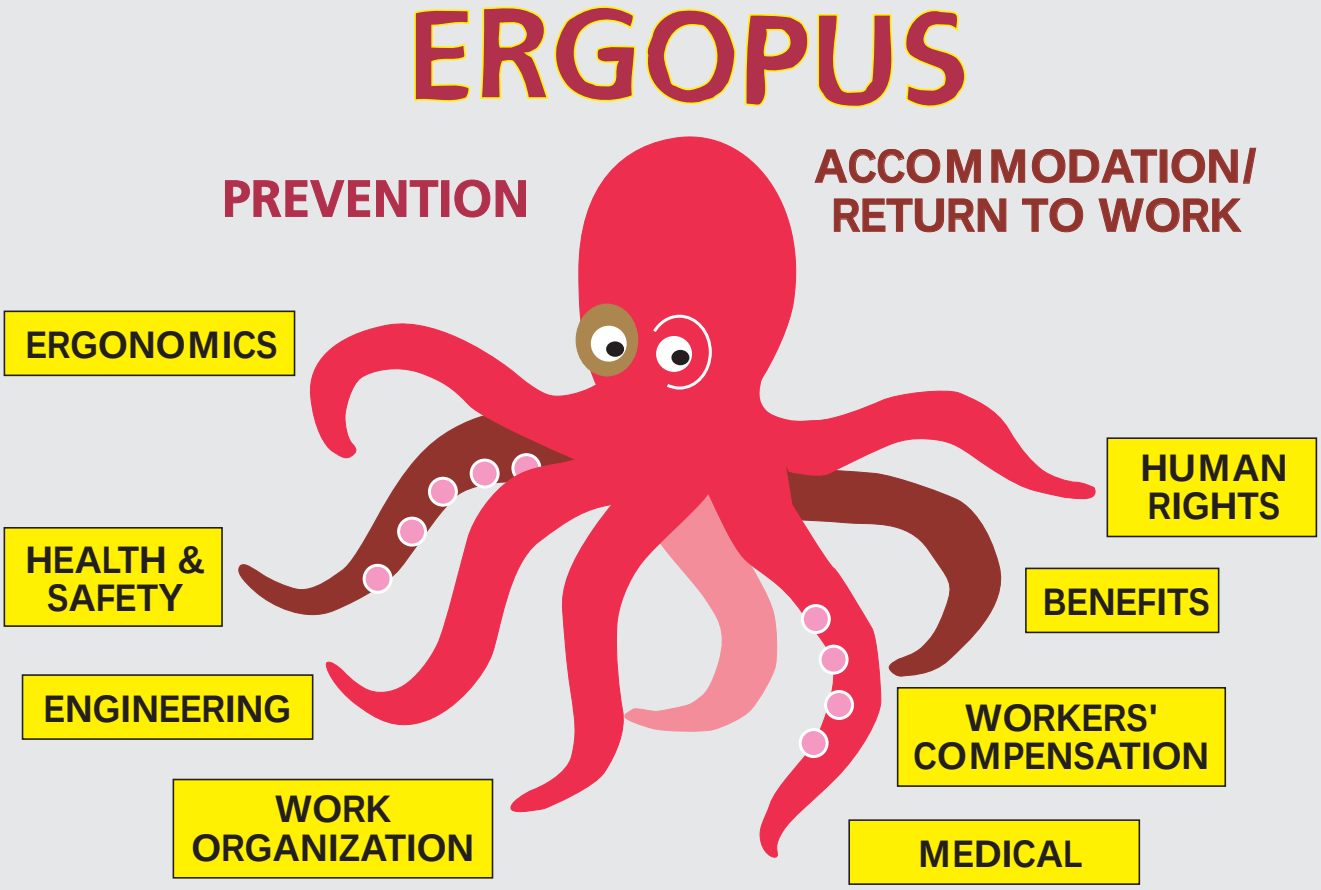
Professor Richard Wells,
University of Waterloo

At the most basic level, ergonomics focuses on human functional (physical and psychosocial) abilities. No matter what aspect of ergonomics is being studied the basic principle remains the same, **"Fit the job to the worker and not the worker to the job."** Unions understand that workers' needs go beyond simply reducing injuries and illnesses. Our goal is to improve our workplaces by properly designing the work to prevent injury and illness. In that way, workers can enjoy their **health**, described by the World Health Organization and the International Labour Organization as **"the highest state of physical, social and mental well-being"**.

Any worker can suffer an injury. No job is without risk. Sprains and strains are the leading type of occupational injury. Ordinary movements such as pushing, pulling, lifting, carrying, twisting, gripping, sitting or standing can cause workplace injuries. They can be the result of an acute incident or the result of a gradual accumulation of many smaller injuries. In this manual we will discuss some actions that give rise to the greatest risk and how to prevent them. To begin to understand how repetitive strain injuries are caused, it is important to understand something about how our bodies work.

What is the Scope of Ergonomics?

Ergonomics includes interventions aimed at improving work, products and services both at the level of the individual (micro-ergonomics) and at the level of the work organization (macro-ergonomics).



Contract Language
ERGONOMIC PRE START-UP REVIEWS

The company and the union agree to ask management to encourage members of Local Ergonomic Committees to participate in the review process of new machinery, equipment and work processes prior to start-up for production. The review will be done with a view to providing constructive recommendations to management. During this review process, management representatives will give consideration to comments from Local Ergonomics Committees when the health and safety of employees may be affected.

Bargained 2002 CAW/General Motors Collective Agreement

HOW OUR BODIES WORK

This is how MUSCLES and JOINTS work:

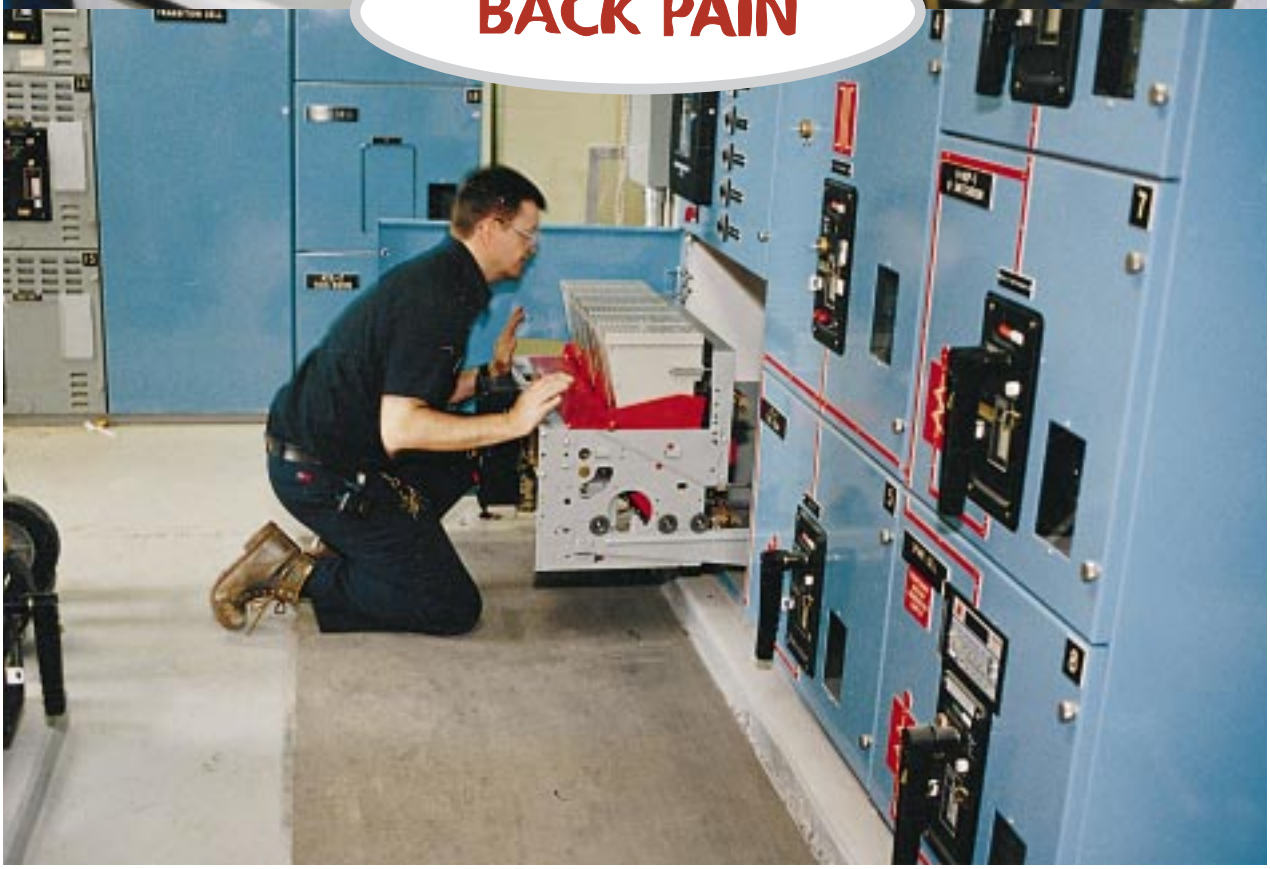
- Skeletal muscles move our bones. Repetitive strain injuries involve skeletal muscles.
- Using the bones as levers, the skeletal muscles enable us to move – to raise our arms, wrinkle our foreheads. They are very elastic and contract and relax easily. Most muscles work under voluntary control.
- There are about 400 skeletal muscles of various shapes and sizes, and they make up 40-50 percent of the weight of the body.
- Apart from keeping us moving, they generate a large part of our body heat.
- The covering tissue of the muscle generally tapers off at the end to form the tendon by which the muscle is attached to a skeletal component.
- Joints are the connections between adjoining bones of the skeleton. Joints make movement possible. The ends of the bones are covered with cartilage that creates a smooth surface to reduce friction. Some joints have interior cartilages, meniscuses and discs that aid the movements.
- Capsules surround all joints. Lining the interior of the capsule is the synovial membrane, which secretes fluid to lubricate the joint. Special tissue bands called ligaments attach to the bones to increase joint stability. They may be combined with the joint capsule, or separated from it. Muscles and tendons give additional strength to the structure.
- Most joints are hinge joints and permit movement only about a single axis, much like the fingers or knees. Ball and socket joints like the shoulder where one rounded bonehead fits into a cavity of another bone, permit movement in all directions.
- The joints of the spine are plane joints that allow small movements in all directions. Although individually small, the sum of the movements of all the vertebrae add up to a sizeable range of motion in all three axes – we are able to twist and bend our backs quite considerably.

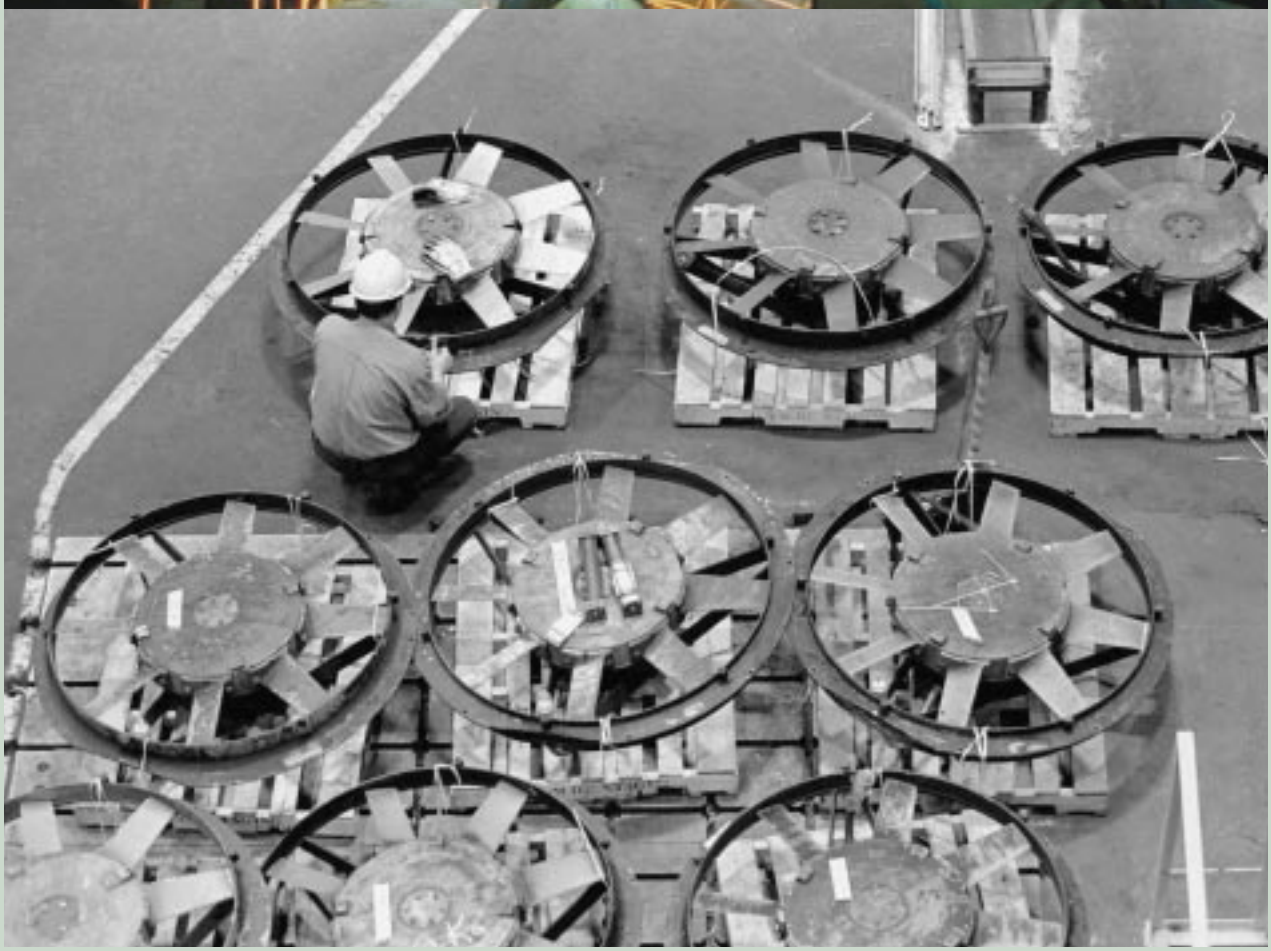
(Adapted from the book " Your Body at Work" published by the Swedish Work Environment Association)

The description above gives you only the barest outline. **Any one of the parts of the skeletal muscle system – the 400 muscles, attaching ligaments, tendons, bones, and joints – can be injured by the work you do. Any injury may result in a level of permanent disability.**


COLD BEVERAGES
Crush

BACK PAIN





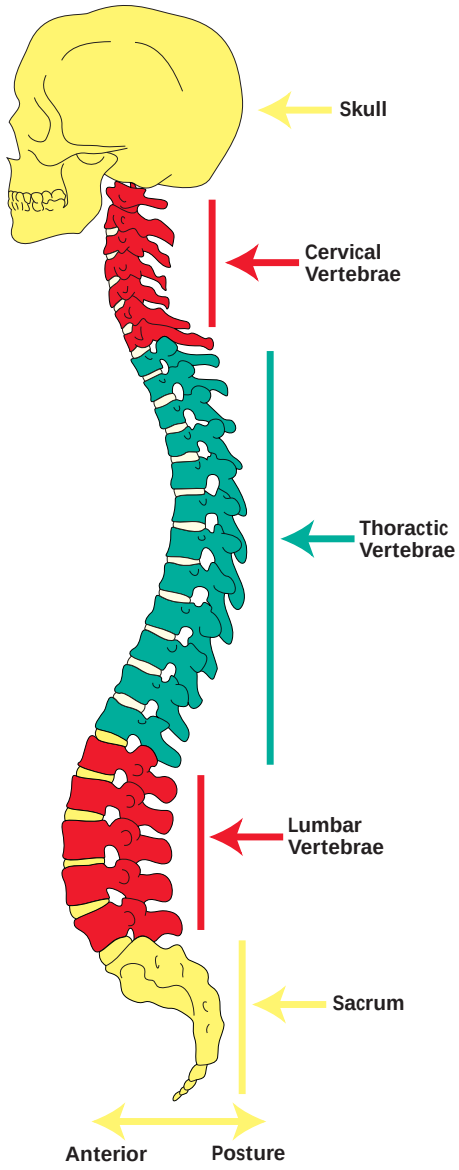
BACK BREAKING: OCCUPATIONAL BACK DISEASE

"In order to prevent occupationally related back disease, workplaces must be designed correctly with human beings (not machines, production quotas, and cost-cutting) as the number one concern… Lower back pain is not an injury, but a disease, a clinical syndrome often caused by working conditions on the job. For the vast majority of people it must be considered an occupational disease."

Dr. Linda Rae Murray, MD, MPH
First occupational health physician, Manitoba Federation of Labour
Occupational Health Centre

FACTS ON THE BACK

1. Occupational back disease is the most common strain injury suffered by workers.
2. At least thirty percent of all worker compensation claims in Canada are paid to workers suffering from occupational back disease.
3. In Canada, the annual bill for back pain is $1.5 billion (not including lost productivity, lowered morale, absenteeism, retraining costs or lost skills estimated to be $1.1 billion more for a total of $2.6 billion).



Structure and Mechanics of the Back

The back is made up of vertebrae, discs, ligaments, muscles, the spinal cord and nerves. Together these structures keep our body upright, stabilize our heads, and protect the most critical components of the body's electrical communications system. The back enables our bodies to bend, lift, twist, and carry.

There are twenty-four (24) vertebrae in the back. The upper seven (7) in the spinal column are called the cervical vertebrae, the next twelve (12) are the thoracic vertebrae, and the lowest five (5) are the lumbar vertebrae.

Between each of the vertebrae are jelly-like discs that act as shock absorbers. They allow the spine to bend without causing damage to the

bones. Ligaments are bands of connective tissue that bind together the vertebrae, support the spine and prevent excessive movements.

The short muscles of the spine expand and contract enabling us to make delicate movements. Over the short muscles are many layers of longer back muscles. Covering them all is the group of muscles which runs the entire length of the spine. When it comes to overall structural support, the abdominal muscles play a key role. When the abdominal muscles and the back muscles are more or less equal in strength, they work together, and maintaining an erect posture is relatively easy. However, if the abdominal muscles are much weaker than those of the back, the spine becomes more vulnerable to wear and tear. The spinal cord and associated nerves are the most complex part of the back. It runs from the base of the brain down through the vertebrae. At intervals it branches out into nerves that supply the various limbs and other areas of the body.

An Egyptian physician was the first to describe the "occupational back disease" he saw in construction workers who built the Sakkara pyramid in 2500 B.C. Five thousand years later, physicians still cannot locate the precise source of pain experienced by many sufferers of occupational back disease.

Damage to the vertebrae, discs, ligaments, muscles, spinal cord and nerves can result in back pain. Typically, doctors treating workers with low back pain make a diagnosis of non-specific occupational back disease. A "slipped" or "herniated" disc, as evidenced by the changed shape of an inter-vertebral disc creating pressure on a nerve, is found in less than 2% of workers suffering occupational back disease. The widespread belief that work-related low back pain must be the result of a specific injury or accident is simply not true. This pain can develop as a result of stresses in the muscles, bones, cartilage, and discs of the back over a long period of time.

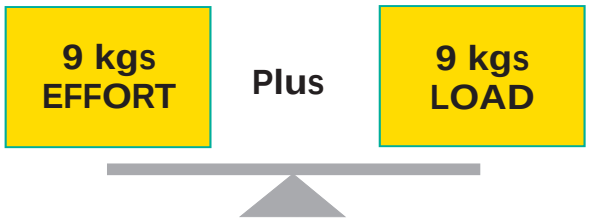
So How Does the Back Work?

First let's look at something familiar to many of us, the teeter-totter. When two people of the same weight occupy opposite ends of the teeter-totter and the balance point, called the fulcrum, is located in the middle then both people can go up and down with ease.

The mechanics of the back work in much the same was as a teeter-totter. Our spine acts as the fulcrum, its associated muscles as one person and the objects we lift as the second person.

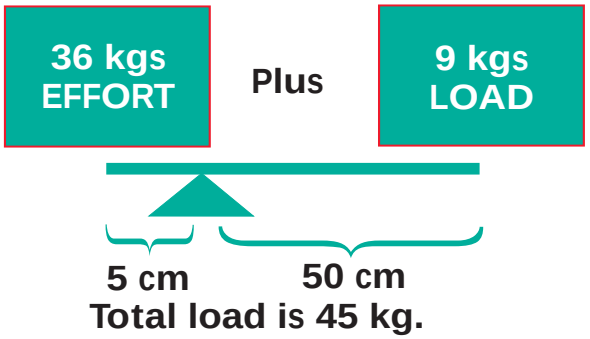
See the diagrams to left.

Example 1: (Teeter Totter)



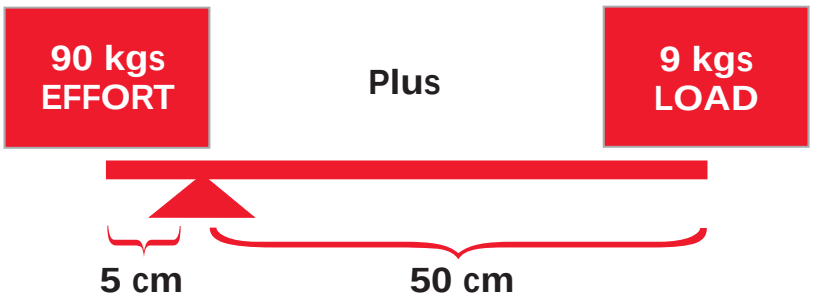
Equal distance from fulcrum
Total load is 18 kg.

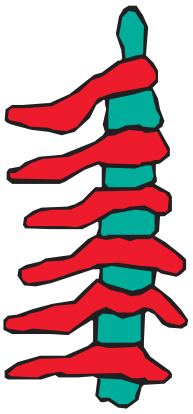
Example 2:

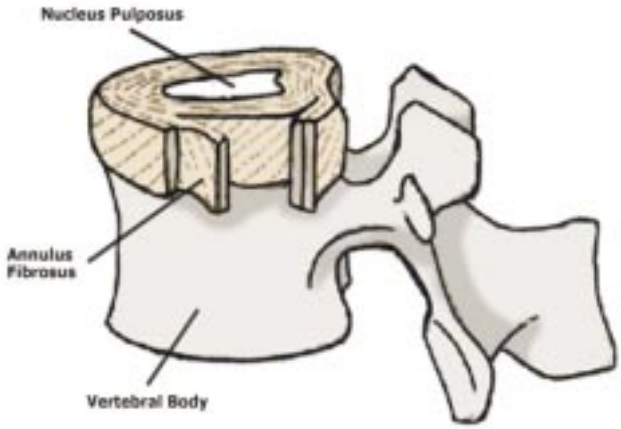


Total load is 45 kg.

Example 3:







On average, there is a 5 centimeter thick layer of muscle between the skin of the back and the spine. Obviously, we can't get a load as close as 5 centimeters in front of our spine. This is one way the spine differs from the teeter totter. ***Example 2*** shows how a 9 kilogram object located 20 centimeters from the spine (fulcrum) would require 36kg of effort (force) by the back muscles to counter act the weight of the object and lift the load. Because the load is 15 cm further away from the spine than the muscles performing the work, the effort required to complete the task is compounded. Similarly, ***Example 3*** depicts a load located even further from the spine and the resultant effort required by the back muscles to complete the task. This is the reason for the golden rule…

"Lift all loads as close to your body as possible to reduce the amount of effort or force generated by the muscles of your back."

Many factors determine whether manually lifting a load is hazardous:

- Weight of the object being lifted
- Position of the centre of gravity of the load
- Frequency, duration and the pace of the lifting
- Stability of the load
- Handles of the load
- Layout of the work area, whether the person has to lift and twist
- Pace of production
- Nature of the floor surface
- Workplace environment – factors such as temperature, humidity, lighting, noise, vibration
- Stability of the feet

People in their work who are sitting or standing for long periods of time also have a higher than average rate of back disease. People exposed to whole body vibration may also experience back problems.

Back Treatment

One of the most troubling aspects of back pain is the lack of agreement on how it should be treated. Most attacks of pain related to occupational back disease subside without medical treatment. However, the damaged tissues cannot be repaired. Many treatments are designed to help cope with chronic back pain, not prevent it and are primarily based on personal solutions. None of them address the need to design workplaces differently to promote healthy backs. Common treatments include short-term bed rest, exercise or limited continued daily activity, physiotherapy, acupuncture, painkillers, psychiatry or chiropractic treatment. Surgery is another treatment option but most physicians and orthopedic specialists agree that many people have undergone surgery unnecessarily. Rather than improve, back problems can get worse after surgery.

Does Your Back Hurt

WorkSafe | Workers' Compensation Board

www.worksafebc.com

Back Facts

- Back pain does not necessarily mean that you have a back injury.
- Eighty percent of North Americans will have back pain at some time in their lives.
- Many different factors can work together to cause back pain.
- Most back pain comes from the muscles, ligaments, and joints in the back when they are not moving the way they should.
- Muscle tension can cause spasm resulting in pain.
- Smokers and people with previous back pain are more likely to get back pain.

Back Myths

Myth: "I have a slipped disc."

Fact: It is impossible for a disc to slip "out of place." Discs can bulge or herniate, however.

Myth: Back pain is usually caused by a pinched nerve.

Fact: Pinched nerves are very uncommon.

Myth: Prolonged rest is the best treatment for back pain.

Fact: Bed rest for more than a day or two is bad for your back. The best thing to do is to get mobile as soon as possible (for example, go for a walk).

Myth: Taking a pain killer or muscle relaxant will cure back pain.

Fact: Pain killers and muscle relaxants often mask the pain so that we think we are better. We may then move in ways that do not allow the injury to heal.

Back Posture

Your spine is one of the strongest parts of your body. It is strongest in its natural curves. When you put your back in a position that does not follow the natural curves, the back has to work harder to do the same job. Poor posture fatigues the muscles faster and over time can produce back pain.

Where possible, the following back postures should be avoided because they do not maintain the natural curves of the spine.

Forward bending

Twisting

Extreme side bending

BACK PAIN IN CANADA

ANNUAL COST $2.6 BILLION

Back Pain Study – CAW Members at General Motors

Overview

Low back pain remains a major occupational health problem in most industrialized countries, accounting for about 20-30% of all workers' compensation claims and up to 50% of all direct compensation costs.

Objectives of Study

The University of Waterloo, McMaster and the Institute of Work and Health researchers wanted to determine which work-related physical and work organization factors were associated with an increased risk of back pain.

Methods

At the GM car and truck plants in Oshawa, workers with back pain were compared with other workers who did not have back pain. Workers were interviewed. Workers' physical demands at their job were carefully measured by the researchers using sophisticated methods. Data was analyzed statistically.

Results

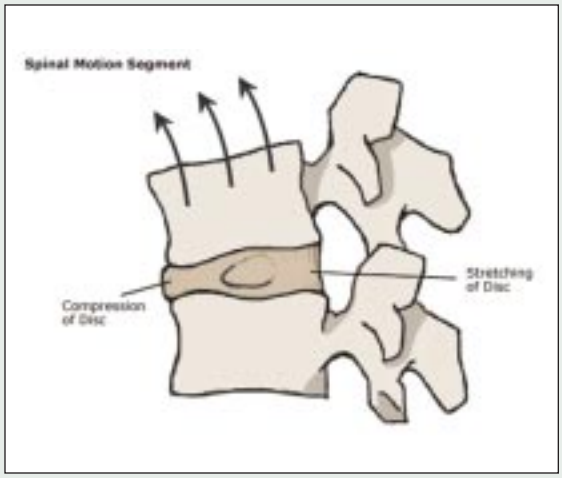
Workers with back pain:

Had Physical Risks

- lifted heavier objects
- had to lift heavy objects from more bent over positions
- had to bend and twist more
- had to lift more objects over time (cumulative load higher)

Had Work Organization Risks

- physically demanding job
- poor workplace social environment
- inconsistency between job and education level
- low job control



Surprisingly, those with back pain reported better job satisfaction and better co-workers support than the control group.

The effects of this study helped to set the stage for bargaining CAW ergonomic representatives in the GM Oshawa plants and CAW national ergonomic co-ordinators. They have been able to address many of the most poorly designed jobs and reduce the risk factors.

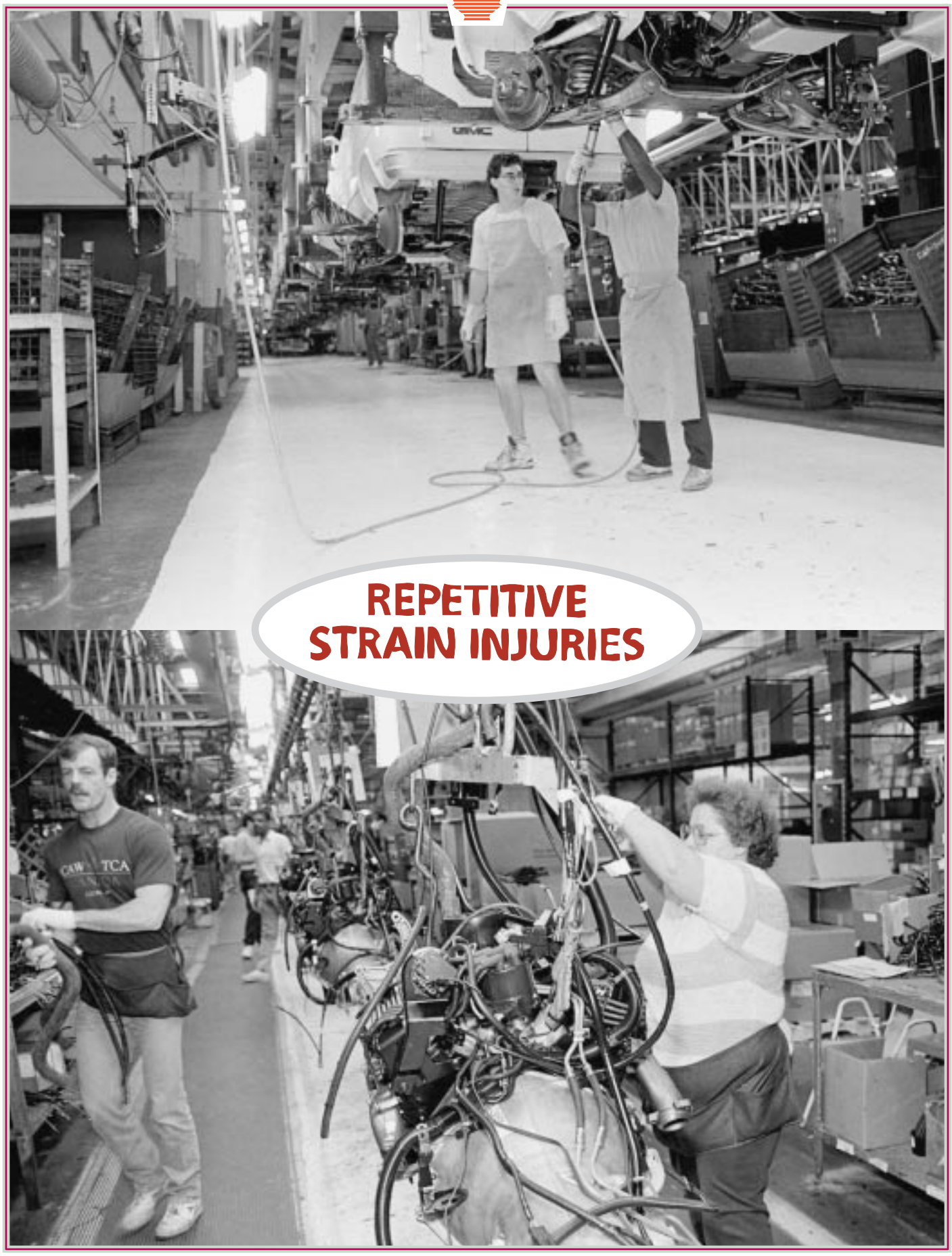
Back pain risk factors in this study:

- biomechanical 31.4%
- psychosocial 11.5%
- personal 4.7%

The message from the researchers:

Reduce injuries and create a healthier workplace by improving both the physical and workplace organizational environment.


Transcona Shops
CN



REPETITIVE STRAIN INJURIES

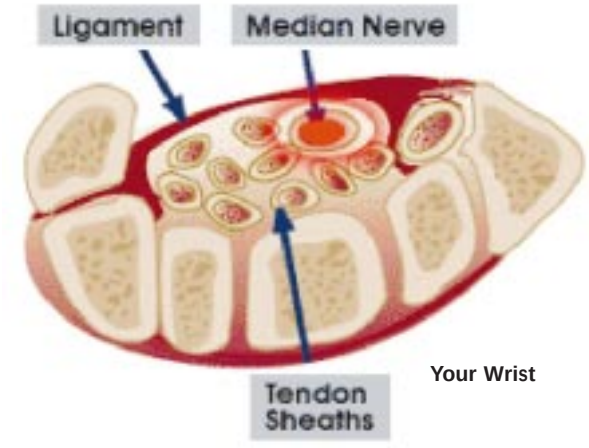
What You Should Know: SYMPTOMS, SIGNS AND TYPES OF INJURY

The **most common symptoms of repetitive strain injuries** include:

• Numbness • Tingling • Swelling • Redness • Discolouration • Heaviness • Fatigue • Eye strain • Mental strain • Other long term aches or pain

Key signs of symptoms include:

• Increased medical visits • Increased worker complaints • High turnover on jobs • Increased absenteeism • Reduced performance at work and at home



Your Wrist

Symptoms that act to prevent the movement of the limbs. Restricted movement is a key indicator that the muscle may need rest from the actions causing the symptoms. **Always take symptoms seriously. They are the first indicator that something is wrong with your body!**

You cannot rely on symptoms alone to tell you when work is injuring your body or a co-worker's. As with other risks in the workplace, ergonomic hazards often do their damage silently. It is for this reason you must look at the jobs and the movements in your workplace in the same way you inspect for chemical or other safety issues. Whether it is signs or symptoms, they are the result of poor job design.

Key signs of injury include:

Workers suffer a variety of health and economic effects from poor ergonomics. Illness, work restrictions, permanent disability, financial loss and loss of quality of life are but a few. Poor ergonomics impacts employers as well. Increased accident frequency, higher workers' compensation assessments (premiums), production losses, reduced quality, increased scrap, increased warranty claims and loss of worker expertise and experience all have a significant economic cost.

Smart employers should recognize the benefits ergonomics has to offer. Not only is it the right thing to do in order to maintain the health and safety of the entire workforce, but it also creates long-term benefits for both the workers and the employer.

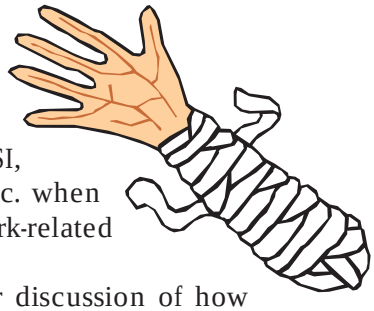
In the sections that follow we will look at some of the specific strains and sprains that workers experience. Remember, however, you may discover causes of strains and sprains that we have not discussed.

"What happens to all of those people, often young, who are obliged to leave their jobs after numerous operations? What do we know of the long-term effects of these operations? And most of all, how many people must lose their physical integrity before the workplace is changed?"

Nicole Vézina, PhD. Ergonomie
Groupe de récherche-action
En biologie du travail
Département des Sciences biologiques
Université du Québec à Montréal

Types of Injury

It is important to understand that sprains and strains are referred to by a variety of terms having the same meaning. You will hear a variety of acronyms – RSI, CTD, MSI, WMSD etc. when people refer to work-related injuries.



Recall our earlier discussion of how our bodies function, the three types of muscle in the body and the fact that repetitive strain injuries involve skeletal muscle. Most researchers use the common umbrella term **"**Work-related Musculo-Skeletal Disorder (WMSD)**"** to describe this type of injury. Below, you will see other common acronyms and their definitions often used to describe the same types of injuries. We will be using the term **Repetitive Strain Injury (RSI)**, a more familiar and widely used term among workers and the Canadian public.

WORK LOADS ARE BAD

61% of workers employed in the Canadian automotive components sector reported that their workload was either:

- Too fast,
- Too heavy,
- Required to be done by too few people or,
- Required to be completed in too little time.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

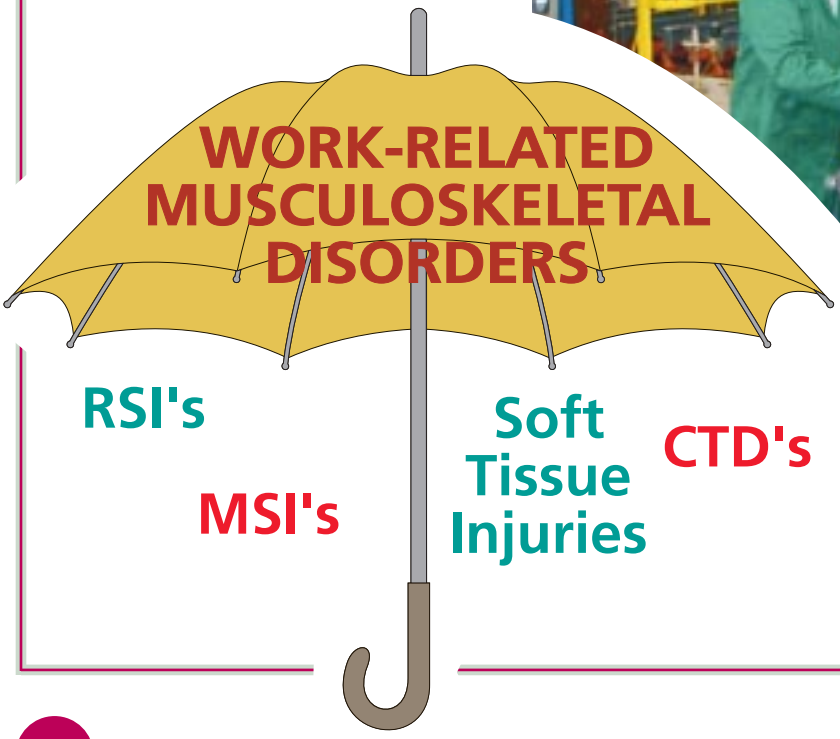
...AND THEY'RE GETTING WORSE

52% of those same workers reported that in the last two years their work load had increased, becoming either:

- Heavier,
- Faster or,
- Required to be done in less time.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

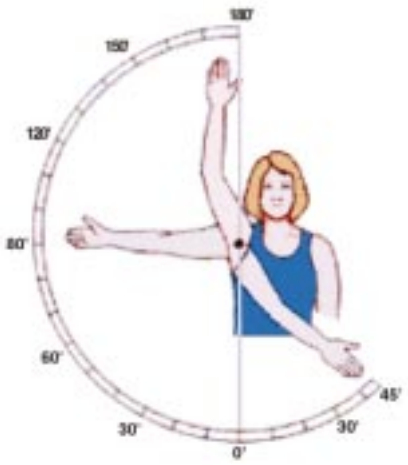
RSIs – Repetitive Strain Injuries
MSIs – Musculo-Skeletal Injuries
CTDs – Cumulative Trauma Disorders
STIs – Soft Tissue Injuries



REPETITIVE STRAIN INJURIES
WHAT ARE THEY, WHAT ARE THE CAUSES AND TREATMENT?

Shoulders, Arms and Hands

Although statistics show back problems as the most common injury type, they are not the only part of the body subject to injury in the workplace. The next most common injury type occurs to the upper extremities – the arms, hands and shoulders.



"Never agree to surgery without an opinion from a second surgical specialist. The most important thing to realize is that medical surgical treatments will not cure these problems. At most, physicians may be able to stop pain and prevent further damage.
You must find a doctor you can talk to, someone who will answer your questions in plain language. If you don't understand what your doctors are saying, insist that they take the time to carefully answer your questions or find another doctor."

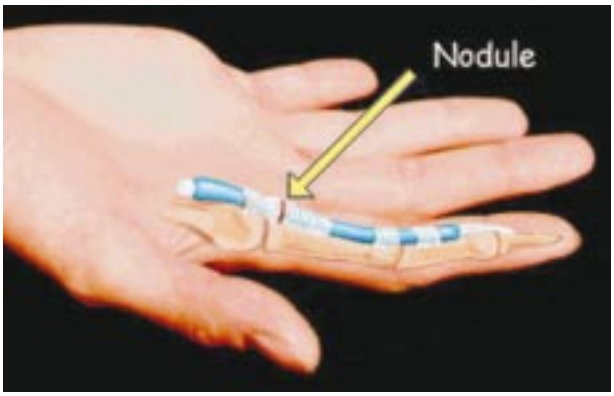
Dr. Linda Rae Murray, MD, MPH
First Occupational Health Physician
Manitoba Federation of Labour
Occupational Health Centre

Tendinitis or Tenosynovitis

Tendons are very strong, smooth, flexible structures that supply the connection between muscles and bones. Rapid, frequent and repetitive movements, especially when combined with great force or twisting of the joint, can cause microscopic damage to tendons. Tendinitis occurs when that damage leads to inflammation. A related condition, tenosynovitis, involves inflammation of the tendon sheath, the protective covering surrounding the tendon.

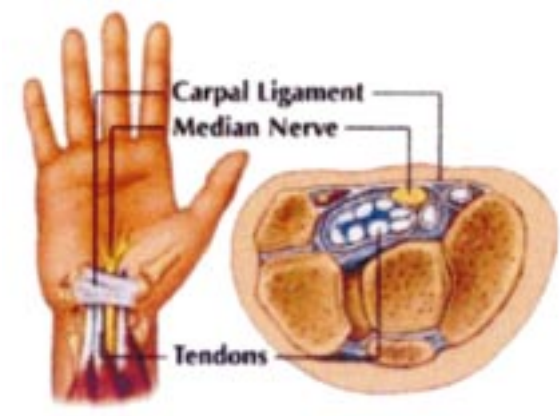
"Trigger finger" is an example of tenosynovitis, more specifically stenosing tenosynovitis. Grasping an object with a pinch grip or pistol grip places strain on the tendons of the fingers and thumb. Bending the wrist while gripping accelerates muscle fatigue even further. The capacity of the tendon to move within the sheath becomes restricted causing a jerking or snapping motion or even "locking."

Tendinitis can happen to any tendon. Repetitive lifting of the arms can lead to shoulder problems. Work that requires arm movement or lifting away from the body, especially with the rotation of the arm at the shoulder, can cause rotator cuff tendinitis. Without intervention, this can result in the thickening of the tendons. This produces discomfort, a dull aching feeling in the affected tendons and may produce reddening and local heat.



Tendons are exceedingly tough, resilient structures and require only a minimal blood supply. As a result, healing tendon damage is a slow process. Complete rest for the tendons over several weeks is necessary. Physicians may prescribe treatment by non-steroidal or anti-inflammatory drugs, by the use of a splint or the application of heat. Treatment cannot be effective unless the motions that caused the damage in the first place are eliminated.

Carpal Tunnel Syndrome



Carpal tunnel syndrome is an increasingly common disorder caused by compression of the median nerve. The carpal tunnel is a very narrow channel within the bones and ligaments of the wrist. The median nerve, blood vessels and tendons used to flex the fingers pass through this channel. When the hand is bent forwards, backwards, or sideways, the median nerve, the tendon and their sheaths are stretched. Bending and straightening the wrist rapidly and repeatedly while under load creates friction that causes scarring of the sheath. As scar tissue builds up and pressure develops within the tunnel, the tendons, blood vessels and the nerve become compressed.

Impaired function of the median nerve results in sensations of numbness, burning, tingling, and pain. A damaged nerve impairs electrical transmissions thus inhibiting proper motor function. Muscles of the hand may atrophy (decrease in size) and in some cases the skin of the hands develop a shininess or sheen.

Early symptoms are rarely recognized as being work-related and are often ignored. If exposure to aggravating factors continues, symptoms will worsen and eventually cause chronic pain and loss of use. To make a diagnosis of carpal tunnel syndrome, physicians use a nerve conduction test. If symptoms are diagnosed early and exposure to aggravating factors ceases, compression of the median nerve will lessen and eventually disappear through natural healing. Physicians may prescribe a splint or wrist brace to provide support and ensure that tissues rest. Work should not be continued while wearing either of these external appliances. They are only effective in restricting movement and do nothing to restrict compression. That is the intent of the prescribed rest period. Non-steroidal anti-inflammatory medications such as aspirin may be prescribed. A small minority of cases can involve surgery which sometimes, but certainly not always, works. Anyone with severe carpal tunnel syndrome can never safely return to the same work unless working conditions are changed.

Guyon's Canal Syndrome

Guyon's canal syndrome, while similar to carpal tunnel syndrome, involves an entirely different nerve. Sometimes both conditions are present in the same hand. After leaving the side of the neck, the ulnar nerve travels through the armpit, down the arm to the hand and fingers. As it crosses the wrist, the ulnar nerve and associated artery run through the tunnel known as Guyon's canal. Two

bones, the pisiform and hammate and the ligament that connects them form this tunnel.

After passing through the canal, the ulnar nerve branches out to supply feeling to the little finger and half the ring finger. Branches of this nerve also supply the small muscles of the hand. If these fingers are involved in any symptoms of numbness, compression of the ulnar nerve in Guyon's canal may be present. It is critical that the area of compression be localized to either the wrist (Guyon's canal), or the elbow (cubital tunnel), by physical examination and electrical studies prior to deciding on a treatment plan. This syndrome is much less common than carpal tunnel syndrome (CTS), but may be present along with CTS.

Regardless of the location of the compression of the ulnar nerve, the symptoms are the same. They begin as a tingling feeling in the ring and little finger, most noticeable when first awakening in the morning. Without relief, this tingling progresses to a burning feeling followed by decreased sensation and eventually the inability to grasp or hold on to objects.

Hand-Arm Vibration Syndrome (HAVS)

A worker's body can also be damaged by vibration. The most common of these disorders, Vibration White Finger Disease, is also know as Raynaud's phenomenon, dead hand or traumatic vasospastic disease.

The constant vibration from hand held tools can cause damage to blood vessels resulting in an inability to supply nutrients and oxygen to the fingers. The fingers turn white, become numb, experience an increased sensitivity to temperature and pain and may develop sores on the fingertips. If exposure to the vibration continues, a chronic form of the Raynaud's disease with permanent disability may result. The problem can move up into the arm as well.

The only way to cure white finger is to eliminate exposure to vibration. Most symptoms disappear with early removal from exposure. Without removal from exposure, damage will be permanent and result in a lifelong sensitivity to cold. Shock absorbers and vibration dampening gloves assist with prevention. Reducing the force of the grip when holding tools helps to prevent white finger disease. The most effective prevention is designing and purchasing tools with little or no vibration.

Epicondylitis

Epicondylitis is a strain injury of muscle and tissues in the elbow. Muscles used to bend the wrist and fingers forward and backward are attached at the upper ends to bone and ligament just below the elbow joint. The injury can be caused by a variety of jobs such as hammering, bricklaying, lifting with out-stretched fingers or bending the wrist against a resisting force.

There may be tenderness and swelling in or near the elbow and pain may be more acute if the hand is moved. Athletes often develop this type of RSI. The name "tennis elbow" is also called lateral epicondylitis and "golfer's elbow" is known as medial epicondylitis.

REGARDING HEALTH RISKS AND STRESS

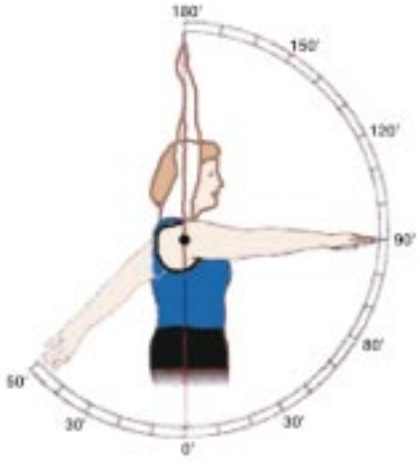
55% (52% of women and 55% of men) reported working in pain or physical discomfort half the days in the last month.

58% Reported distaste at going to work at least half the time.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

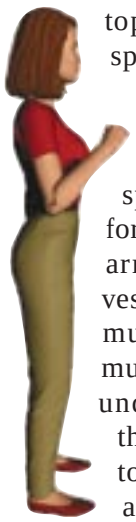
Bursitis

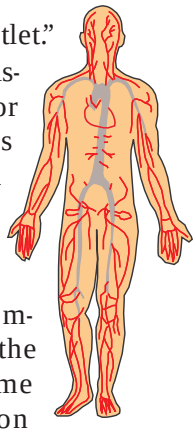
A bursa is a small fluid filled, protective sac located around joints and where ligaments and tendons pass over bones. The bursa serves to ease friction caused by movement of these structures against the bone. Excessive use may cause inflammation and swelling of the bursa, a condition known as bursitis. In the case of the shoulder, these protective cushions can swell and deteriorate as a result of prolonged pressure or jolts to the joint. The inflammation produces pain and may restrict movement of the joint. In a severe chronic case, tendinitis can develop.



Thoracic Outlet Syndrome

The nerves and blood vessels supplying the arm and hand originate from the side of the neck. Arteries arise from the aorta at the top of the heart. Nerves exit from the spine through small openings between each vertebra called *foramen*. Where they leave the spine, the nerves are referred to as *nerve roots*. Multiple spinal nerve roots then join together to form the nerves that will run into the arm and hand. Together, the blood vessels and nerves travel between two muscles in the neck (the scalene muscles), over the top of the rib cage, under the collarbone (clavicle), through the armpit (axilla) and down the arm to the hand. The area where the nerves and vessels leave the neck between the two scalene muscles and over the first rib is know as the "Thoracic Outlet."





Thoracic Outlet Syndrome is a disorder caused by damage to, or chronic compression of, the nerves and blood vessels passing through the thoracic outlet. When the arms are lifted up and out from the body, the nerves and blood vessels to the arms become compressed. Carrying heavy loads with the arms down at the side has the same compressive effect. Compression obstructs the flow of blood to the muscles, ligaments and tendons of the arms and hands. Chronic compression can damage the main nerve supply to those areas. Pressure on the nerve can cause numbness and weakness to the shoulder, arm or hand.

Ice decreases the size of blood vessels in the sore area, decreasing inflammation and relieving pain. Surgery to relieve the constant rubbing of impingement is not uncommon. When surgery becomes necessary, its goal is to increase the space between the acromion and the rotator cuff tendons.

Other RSIs

The previously described occupational injuries and diseases does not consist of an all-inclusive list. It is however a good start in becoming familiar with the more common work-related musculoskeletal disorders.

MYTHS ABOUT RSIs

RSIs know no limits regarding where and how they attack workers. Injuries can occur to the back, neck, shoulders, arms, elbows, wrists, and fingers. Injuries may also occur to the legs and feet though they are less common. Let's look at some of the familiar myths about RSIs.

Myth: RSIs, they are just in your head.

Just because there is no visible trauma does not mean an injury is non-existent. Those who make this claim have not themselves suffered from an RSI. RSIs are injuries that rarely can be seen. Even so, countless researchers have shown that these injuries not only exist but can be extremely debilitating.

Myth: Most repetitive strain injuries are not work-related.

In spite of its everyday name, playing tennis seldom causes "tennis elbow". Although some non-work activities can contribute to repetitive strain injuries, the physical work stresses imposed by lengthy, repetitive work schedules are most often the cause.

Myth: Women are more vulnerable to RSIs than men.

Although women have had more workers' compensation claims for sprains and strains, workplace studies show when men and women are exposed to the same working conditions, the rate of development of symptoms is similar. However, women continue to do most of the jobs at the highest risk for repetitive strain injury.

Myth: Ergonomics is too costly. Employers cannot afford to invest in jobs designed to fit workers.

The costs of inefficiencies, product quality loss, worker lost time, worker turnover, workers' compensation and job redesign are far greater than the cost of applying ergonomic principles at the design stage. At the design stage, many ergonomic solutions require little or no capital investment. Rather, the investment should be in proper workplace planning. Even if the workplace or work station has been poorly designed, many ergonomic changes such as moving the height of a bench are low cost.

Myth: By using pre-employment screening methods like x-rays, medical exams, and functional assessments employers can screen out job applicants who are vulnerable to strains and sprains.

There is no test or measurement that can predict these disorders. All workers are at risk. In fact, many of these tests are considered discriminatory and thus illegal under human rights legislation.

Myth: No pain, no gain.

This slogan never applies to the workplace even though many like to compare workers to athletes.

Pain is a warning signal generated by injury or disease. Workers do not gain by working in a way that hurts. The elimination of work practices that cause pain should be the goal.

Myth: It is safe to keep on working if you take aspirin or other pain relievers to reduce the pain.

Drugs may help to reduce inflammation and can reduce pain, but if workers continue to be exposed to the hazard, damage will increase. Treatment must include removal from the hazard so the affected tissues have time to heal.

Myth: Work and the natural effects of aging cause aches, pains, stiffness, and rheumatism. They are inevitable and you should ignore them.

Studies show workers do not develop RSIs when jobs are properly designed. Ignoring symptoms does nothing to change the working conditions and lessen their disabling impacts.

Collective Agreement

BOMBARDIER AEROSPACE, DE HAVILLAND DIVISION AND CAW LOCAL 112

The Company and the Union agree to establish a site-wide Workplace Ergonomics Committee, which will function as a sub committee of and report to the Joint Health and Safety Committee. The Ergonomics Committee mandate will be to review workplace conditions, tools, equipment, practices and procedures relative to bargaining unit job assignments or physical tasks and to make recommendations regarding their design, use, modification or improvement, effectiveness and potential for injury or other negative effects. The Committee's composition, meeting frequency and format, resource and training requirements and other related matters will be established through joint consultation between the Company and the Union within the mandate of the Joint Health and Safety Committee.

ERGONOMIC SOLUTIONS

GETTING STARTED ON SOLUTIONS

PREVENTING health, safety and ergonomic hazards on the job has long been a priority of the CAW. Our approach is to provide education and training so that people are able to recognize the hazards they experience at work. Workers know their job and workplace better than anyone and are the most valuable asset in identifying hazards and finding solutions.

Not all workplace hazards can be solved overnight. Resources and time are required to solve problems requiring work process and product design changes. The resources of the National Union are available to assist you in your efforts. The workplace's ergonomic and health and safety efforts can be assisted in many ways, from training at the workplace level, to collective bargaining at the local and national level, to lobbying for ergonomics regulations and enforcement at the political level.

"The remedy for repetitive strain injuries is to prevent the problem from occurring in the first place, not to wait until the pain or loss of function is intolerable and then to subject people to surgical repair work. In any case, such repairs seldom stand up to the acid test of a return to work with the result that there will only be more agony and a return to the "repair" shop.

The solution lies in the design (or choice) of equipment, furniture and work layout to minimize postural stress, excessive ranges of movement and high forces; careful consideration of factors such as task duration, work pace and rest intervals; and effective training to ensure that design advantages are followed through in practice.

Early warning signs such as discomfort should be actively sought out and taken seriously as an indication that one of these factors is moving outside suitable limits rather than being dismissed".

Robert Webb, PhD.
President, Humansystems Incorporated
Milton, Ontario

Collective Agreement

CLIPPER NAVIGATION AND CAW LOCAL 114, VICTORIA, BC

Education and Training

No employee shall be required or allowed to work on any job or operate any piece of equipment until he or she has received proper education, training and instruction. Such training shall include ergonomics training.

What is an Ergonomic Process?

As with everything else we do in health and safety, ergonomics needs a process to give direction to its efforts. Health and safety committees use monthly inspections to identify hazards. Ergonomics must also have a method to identify ergonomic hazards in the workplace. It is very likely the ergonomic process you develop in your workplace will be very similar to the health and

safety process. In most cases health and safety committees will have their duties expanded to include ergonomics. A good ergonomics process is a joint workplace process that includes full consultation with and participation by the health and safety committee. Larger workplaces may set up a separate ergonomics committee which should work together with the health and safety committee while smaller workplaces include ergonomics as part of the work of the health and safety committee. The process should contain the following steps:

1. Define what ergonomic hazards could exist in the work environment.
2. Outline strategies to identify ergonomic hazards in the work environment.
3. Define methods to assess the identified hazards.
4. Communicate the identified hazards to the affected workers, the current controls in place for the hazards and discuss a work plan to eliminate or at least further reduce the hazards. Develop permanent solutions to eliminate or minimize the hazard. Where permanent solutions will be delayed temporary measures must be implemented.
5. Use job design principles.
6. Implement and document solutions.
7. Develop a procedure to share strategies to eliminate or minimize hazards with other locations or areas within a location.
8. Establish a period to review and revise or update the ergonomic changes and/or process.
9. Provide education and training on the ergonomics process.
10. **At all stages of ergonomics, fully involve the workers. After all, they are the ones injured and are well placed to offer good ideas for injury prevention.**

Now that you have an understanding of the direction of ergonomics, we will move on to the next important issue - ergonomic hazards. If you do not know the ergonomic hazards that can exist in the workplace you cannot design the work environment to be free of such hazards.

WORKING CONDITIONS ARE BAD…
Of the workers surveyed

40% Said they worked in pain at least half the time.
55% Said they couldn't keep up the current pace until age 60.
53% Said they worked as fast as they could most of the day.
37% Said they worked in an awkward position at least half the day.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

…AND THEY'RE GETTING WORSE!
Of the workers surveyed

41% Said they're health risks at work are higher now than 2 years ago.
45% Said they are more tired after work than 2 years ago.
44% Said their job is more tense than it was 2 years ago.
52% Said their work load is heavier now than 2 years ago.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

ECONOMIC PROCESS
STEP 1


20-27
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STEP 1: DEFINE ERGONOMIC HAZARDS

REGARDLESS OF THE industry, there are common ergonomic hazards that put workers at risk of developing repetitive strain injuries. Management would prefer we take a narrow approach to identifying ergonomic hazards and focus on the most common three – Force, Posture and Repetition. As a union we believe workers deserve attention to all the details of their work and working environment. The following list of ergonomic hazards gives a more detailed view of the potential hazards to be found in the workplace. Hazards can generally be divided into four categories, Physical, Psychological, Organizational and Personal.

PHYSICAL HAZARDS

Force

Force is the effort required to accomplish a task or element of a task. This hazard requires close attention, as it can be very deceptive. We sometimes think of force in terms of heavy or awkward work. The force required to grip slippery or small items on a regular and constant basis, however, may also cause damage.

Posture

Posture can be divided into two categories, "neutral vs. awkward" and "static vs. dynamic." In ergonomic terms there are neutral positions for all of the joints in our body. Neutral postures are generally the body's most naturally relaxed positions. Extreme deviations from neutral positions are what we call awkward postures.

Static postures result from job demands that require us to hold our bodies in neutral or in awkward positions, in one place for prolonged periods of time. Workers who are required to stand in one position for prolonged periods are at risk of developing varicose veins and experiencing lower back pain. Sitting also puts the back under static load. Dynamic postures are those that occur during movement.

Static Loading

Static loading of muscles occurs during prolonged muscle contractions required when gripping a tool or part while completing a task such as sawing or sanding. A job with much static loading results in high stress which weakens joints, ligaments, tendons and the contracting muscle. A job which imposes frequent, prolonged static loading should be redesigned. Clamps, jigs, or other mechanical means should be used in place of the hand.

Collective Agreement

CANADIAN PACIFIC RAILWAY AND CAW LOCAL 101

The importance of ergonomics training was discussed. Both the Company and the Union are committed to improving the environment for our employees and have agreed that Union representatives will be offered an off-site training course in ergonomics. Each Union Representative will be entitled to a one (1) full day session during the life of this Agreement.

Repetition

Repetition refers to the frequency of performing a task or movement. Repetition can be looked at within job cycles or, if the cycle is of short duration, as the entire cycle itself. Factors to consider when looking at repetition are time and frequency.

Mechanical Stress

This type of stress occurs when portions of the body come in contact with hard or sharp surfaces either repeatedly or continuously.

Vibration

Vibration is divided into two categories, local and whole body. The use of power tools are an example of local vibration. Whole body vibration is experienced by operators of transportation and construction machinery, press operators, indeed by anyone who is exposed to vibration that gets transmitted throughout the entire body.

Temperature extremes

Extreme high or low temperatures are well recognized conditions that make work more difficult and the body more prone to injury. Extremes are stressful and cause the body to function in a different manner than it otherwise would under normal temperature conditions. Cold impairs the sense of touch and reduces hand dexterity. Extreme heat causes whole body physiological strain.

Noise

Noise is a regulated physical stressor. It is readily recognized for its ability to damage hearing. The psychological aspect is beginning to be considered and should be part of ergonomic assessments.

Lighting

Insufficient or excessive lighting affects our abilities to accomplish our tasks without eyestrain. In particular, poor lighting causes workers to adapt poor postures in order to be able to see and complete required tasks.

Air quality

Like noise, there are regulations that enforce minimum standards of air quality. Wherever it is substandard or borderline, we must have air quality considered in an ergonomic assessment.

PSYCHOLOGICAL HAZARDS

Any factor that may increase psychological stress

From experience, we intuitively recognize the contribution stress plays on workers. Pressures of work such as speed up, excessive workload, too much overtime, lack of control at work, boredom and monotony, missed holidays or vacations, all can contribute to stress. Harassment (from any source, and for any reason), layoffs or the threat of layoffs, parts or equipment changes, process changes, as well all can contribute to stress. The list can become quite extensive. When employers try to move towards group work and "quality circles", stress increases on workers if they are placed in the uncomfortable position of policing each other.

WORK ORGANIZATION HAZARDS

Duration

Duration refers to the length of time a person is exposed to a particular hazard or hazards. Duration may range from a 30 second cycle time to the length of the entire workday. Nearly all ergonomic research is based on an eight hour workday. The longer the exposure to a hazard, the more the hazard will need to be reduced. Many

jobs today, from health care to mining, either voluntarily or by design, have workers putting in 10 or 12-hour shifts. The union movement fought for the 8 hour day so workers would have more time to rest.

Insufficient Rest

Rest can be divided into two categories, muscle group rest and whole body rest. The musculoskeletal system requires both to function properly. With short duration activities, the amount of rest required for a muscle group is dictated by the amount of force applied and the time over which it is exerted. The harder and longer the muscles work, the longer the immediate recovery period required. The opposite is true as well. Muscles recover faster and require less rest in shorter duration and lower force activities.

At the same time, the day's total physical activity requires whole body rest. Consider the activities of athletes and the activities of workers. It is rare for athletes to have a 12-month competitive season. The off-season gives athletes the opportunity to rest their minds and bodies following the rigors of the competitive season. Like athletes, workers require the same down time for physical and mental rest. Where the proper rest time does not occur the body becomes more susceptible to breaking down. Injury and illness might be considered the body's way of forcing you to give it the rest it requires. Vacations are the equivalent of an athlete's off-season. A vacation is the negotiated downtime for the body and mind which enables workers to be able to work successfully till retirement.

EASY ERGONOMICS

1. Ask workers where they hurt from strains and sprains.
2. Ask them what they think could be changed in their job to prevent the pain.
3. If it makes sense, do it.

Collective Agreement
ALCAN AND CAW LOCAL 2301, KITIMAT, BC

Area OH&S Committees will develop relevant sub committees such as accident investigation review and ergonomics. These committees will meet and report regularly, as determined by the area OH&S Committee. The membership of these committees will be made up of an equal number of union and management appointees.

The union Modified Work and Benefits Representative shall participate in the Ergonomics Committee.

Machine paced work

A job where the operator has no independent control over machinery is machine paced work. The machine starts and stops its cycle whether the operator is ready or not. The pace of work may not necessarily coincide with operators' abilities and rest periods may not coincide with the actual amount of rest required.

Unfamiliar work

The science of ergonomics presumes workers are properly trained and experienced with their work. Unfamiliar work poses a hazard on both

the body and the mind. Proper job training and break-in times are essential. Jobs must be designed in such a way that they are understandable and can be done safely in the allotted time.

Shift work

Shift work negatively affects the body's normal biorhythms and is documented as having an affect on a person's overall physical and mental state and ability to function.

PERSONAL

Age

General studies on aging have found that the average 60-year-old North American male retains 80% of the physical strength of an average North American 25-year-old male. But jobs in many workplaces are designed for 100% able-bodied healthy young men. The 1992-1994 CAW Benchmarking Studies on Working Conditions found many of our older members not only feared the current workloads and work pace but were highly concerned about being able to keep up until age 65. Ergonomic research is generally conducted on groups that contain old and young, tall and short, strong and weak. Because of this, researchers claim that age is accounted in the averages it calculates.

Our experience as workers is immensely different. We come to the workforce with our own peculiarities. Our body's ability to withstand the rigors of age is one of these peculiarities. Some people never experience the pain of arthritis. For others, the onset of this disease begins relatively early in life. It is obvious to all of us that we cannot work at the same pace in our fifties as we could in our twenties. This is one of the reasons we treasure a seniority structure that allows older workers to move to preferred areas and jobs.

Gender

It was not long ago that many workplaces were dominated by men and jobs in the workplace were designed accordingly. in today's environment, where a progressively increasing percentage of the workforce is female, it is illogical and dangerous to continue designing jobs only for men. Our sisters have the right to any job in the workplace so every job should be designed with the differences between men and women in mind. Force requirements must consider weaker operators, reach requirements must consider shorter workers. Height requirements must consider both tall and short operators.

Pregnancy

When population averages are studied, they do not include pregnant women. From a biomechanical standpoint, the progressive changes in the body's dimensions and center of gravity increase the distance from the spine that loads are lifted and carried. What were previously considered safe loads can become unsafe. The risk for injury increases greatly when spinal loading increases. Additionally, hormonal changes and increased swelling in the female body during pregnancy increase the risk of injury.

Workers, health and safety committees, supervisors, and engineers must be able to identify ergonomic hazards and must be aware of the increased risk of injury when

multiple hazards work together. Only then can they begin to work towards effective control and ultimately the elimination of RSIs in the workplace.

STRESS

Have you ever been "hot under the collar" when a supervisor has criticized you unfairly before your fellow workers? If this has happened to you, you were exhibiting a *stress response.*

Types of stressors include: physical stressors such as heat or cold; chemical stressors such as carbon monoxide or ammonia; and emotional stressors such as speed up or harassment by a supervisor.

The Stress Response

These stressors produce a biological reaction in a person which is called a stress response. The stress response includes increased blood pressure; increased metabolism (eg. faster heartbeat and breathing); increased stomach acids; increased production of blood sugar for energy; faster blood clotting; increased cholesterol and fatty acids in blood for energy production systems and decreases in the synthesis of protein, digestion, immunity and allergic response systems.

REGARDING JOB INSECURITY AND FAMILY LIFE

78% (79% of women and 78% of men) of those under the age of 50 felt it was unlikely they could sustain their current work pace until age 60.

77% (86% of women and 75% of men) reported having enough energy for their families after work half the time or less.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

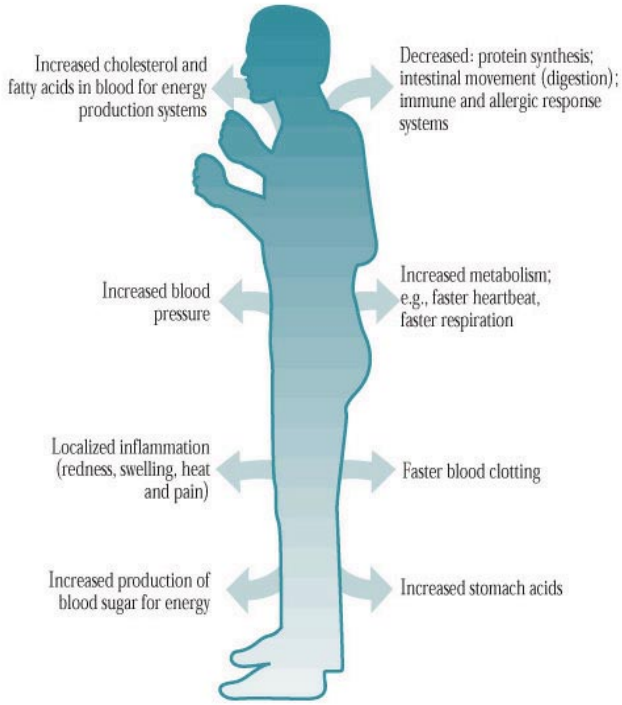
The stress response is therefore called "non-specific". Regardless of the type of stress (physical, chemical, or emotional) the biological response is always the same.

The stress response undoubtedly served a useful function in primitive humans. Confronted by a physical threat, the body understandably activates its alarm system so that maximum energy is available for meeting and combating an emergency, or for fleeing, if that is the logical alternative. Because of this, the stress response is sometimes called the "fight or flight" reaction.

Stress can cause ill health

The reason that too much stress is harmful is because the biological aspects of the stress response can produce ill health. The stress response is useful in the short run but when stress is chronic, it can lead to many harmful diseases. The stress response was designed to be used only for a short period of time. At work, however, we are exposed to stress throughout our shift, during the work week and often during our entire lives at work.

Chronic stress can produce harmful effects such as excessive production of stomach acids combined with steroid production (also part of the stress response) which eats away at the



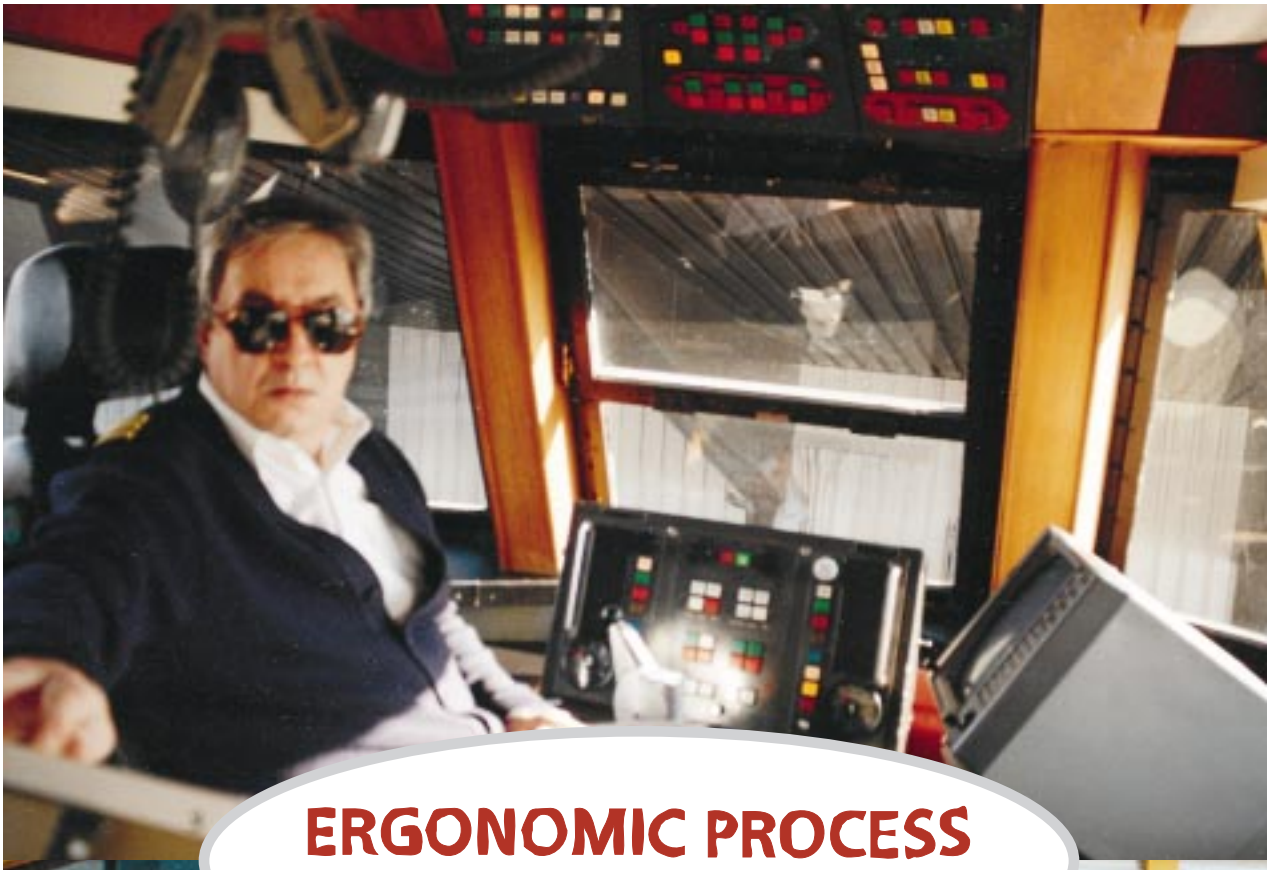
stomach lining and can produce peptic ulcers. Heart disease can result from a rise in cholesterol and changes in fatty acid and blood-sugar content, all part of the stress response. The latter effect of course can contribute to diabetes. Persons exposed to excessive stress produce fewer white blood cells increasing their susceptibility to infectious diseases.

Reducing the Stress Response

Adverse physical stresses must be reduced if the effects of ill health are to be eliminated. It is important to remember that a physical stress such as noise can produce the stress response at a level below that required to produce hearing loss. Chemical agents should be reduced to levels below those recommended in order to protect workers from ill health effects specific to that chemical.

Reducing the emotional stressors in the workplace is a difficult task but is central to the complete application of ergonomics. Job security through seniority provided in union contracts and control of the employer's authority through union protection are important first steps down the road to reducing the level of stress in the workplace.

Fighting speed up and pressures to increase the pace of work, giving workers more control over their work, ensuring workers' concerns about tool, work station and workplace design are listened to and their needs met are important steps in reducing the emotional or work organizational causes of stress.



ERGONOMIC PROCESS
STEP 2

STEP 2: STRATEGIES TO IDENTIFY HAZARDS

A VARIETY OF procedures may be used to identify ergonomic hazards. Every workplace should jointly develop procedures to identify ergonomic hazards as part of the ergonomics process.

Unfortunately, first aid and medical statistics are among our strongest arguments for implementing an ergonomics program. We wish we did not have to point out injuries before changes occur but they do provide workplace-specific proof of the need for change. In the situation where your employer has more than one facility, supporting evidence may be derived from first aid and medical data from other facilities. Statistical information should be easily accessible since statistics are not confidential. Occupational health and safety legislation outlines the right of worker health and safety representatives to obtain information.

Workers' compensation statistics may also be extremely helpful but in some cases there is under-reporting due to the system of experience rating. Experience rating means that workers' compensation assessments on employers (these assessments are 100% paid by employers) vary according to the costs of workers' accepted claims. Employers may get an increase in their assessments if the costs go up and may get reduced assessments or rebates if the costs go down. Many employers react to this by discouraging workers from making workers' compensation claims or engage in inappropriate return to work practices.

Employers must instead be persuaded to prevent injuries from occurring in the first place. Workplaces with high injury rates have a greater opportunity to make workplace improvements. Smart employers should see the cost of their injuries as a ready-made budget to improve particular jobs and implement an overall ergonomic program. Very smart employers will realize that workers' compensation assessments and repeated injuries are continual expenses whereas eliminating the risk is a one time cost.

International RSI AWARENESS DAY

The last day of February each year is used to promote awareness of sprains and strains injuries. An email from a Canadian injured worker proposed February 29th, 2000 as the very first International RSI Awareness Day because it was the only non-repetitive day of the year. Via the internet, the idea spread to many other countries. In non-leap years it is observed on February 28. In 2001, the CAW launched a national campaign for ergonomic regulations on International RSI Awareness Day.

Some of the regulated and negotiable procedures which will help to provide you with evidence of the need to make ergonomic changes in your workplace may include any of the following:

1) Oral and Written Complaints and Records
   - Worker complaints and concerns
   - Worker surveys and questionnaires
   - Work refusals
   - First aid reports
   - Injury and illness reports
   - Accident investigation reports
   - Workers' compensation, short and long term disability benefit records
   - Policy, guidelines or procedure reviews
2) Health and safety committee workplace inspections
3) Past experience with similar hazards
4) Ergonomic and health and safety checklists
5) Application of ergonomic standards and or guidelines

Workers' Symptoms Survey

Name:_____ Date: _____

Department: _____ Job/Position: _____

Other jobs you have done in the last year for more than 2 weeks:

Department: _____ Position Held: _____ Time on Job: _____

Department: _____ Position Held: _____ Time on Job: _____

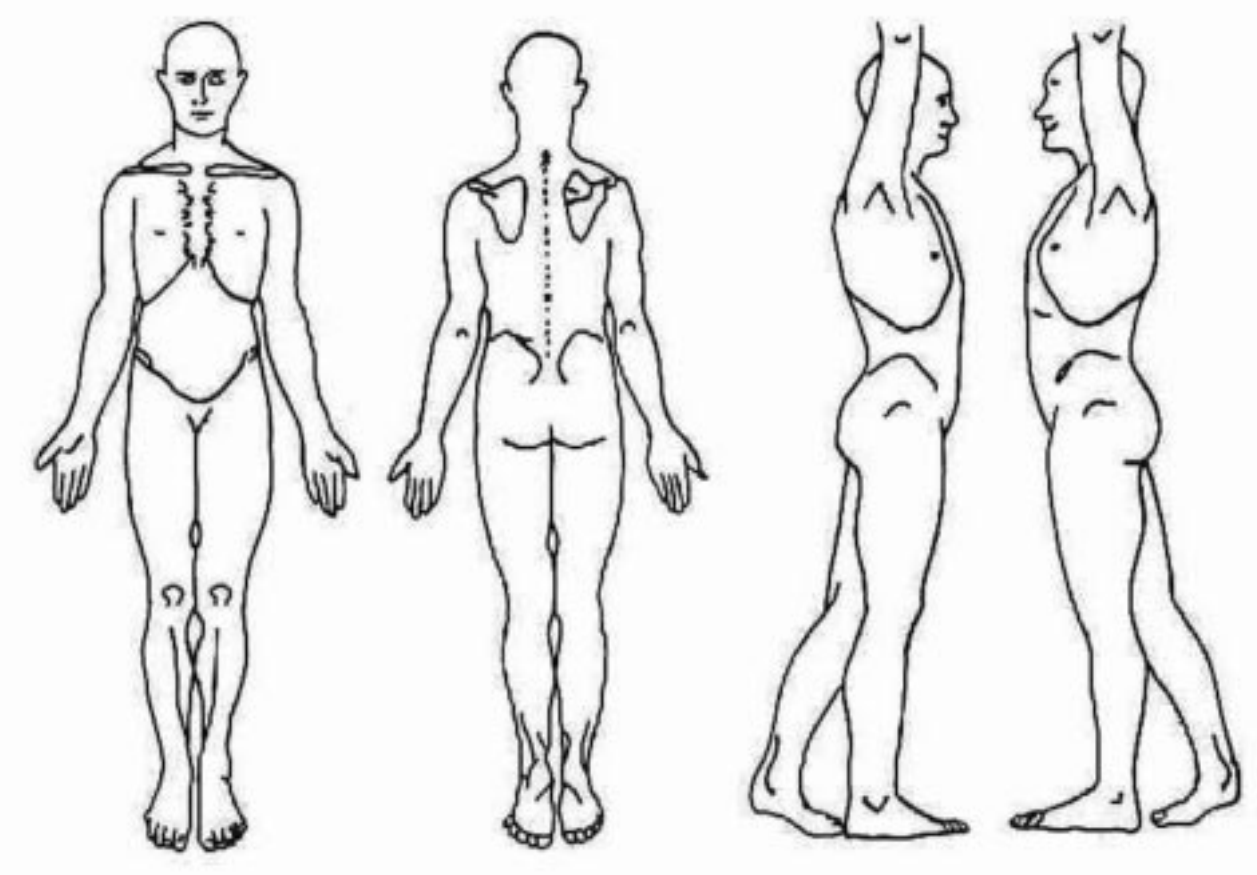
Department: _____ Position Held: _____ Time on Job: _____

(Include jobs you worked on the most)

Have you had any pain or discomfort in the upper extremities during the last year?

☐ Yes ☐ No

If YES, carefully shade in the area of the drawing representing the body part that bothers you the MOST.



Symptoms Survey (continued)

Put a check beside the body area where you experience symptoms:

☐ Neck	☐ Shoulder	☐ Elbow/Forearm	☐ Hand/Wrist	☐ Fingers
☐ Upper Back	☐ Low Back	☐ Thigh/Knee	☐ Low Leg	☐ Ankle/Foot

(The following series of 13 questions must be completed separately for each of the above checked areas)

1. Put a check beside the words that best describe the problem:

☐ Aching	☐ Numbness (asleep)	☐ Tingling
☐ Burning	☐ Pain	☐ Weakness
☐ Cramping	☐ Swelling	☐ Other
☐ Stiffness		

2. When did you first notice the problem? Month_____Year_____

3. How long does each episode last? (*Mark an X along the line*)

_____	_____	_____	_____
1 Hour	1 Day	1 Week	6 Months

4. How many separate episodes have you had in the past year? _____

5. What do you think caused the problem?_____

_____

6. Have you had this problem within the past week or two? ☐ Yes ☐ No

7. How would you rate this problem? (*Mark an X on the line*)

NOW

_____
Faint *Unbearable*

When the problem is at its WORST

_____
Faint *Unbearable*

8. Have you had any medical treatment for this problem? ☐ Yes ☐ No

9. If NO, why not?_____

_____

Symptoms Survey (continued

10. If YES, where did you receive treatment?

☐ At Work Number of times in the past year? _____

☐ Personal Physician Number of times in the past year? _____

☐ Other Number of times in the past year? _____

Did treatment help? ☐ Yes ☐ No

11. How many workdays have you lost in the last year because of this problem? _____

12. How many days in the last year were you on restricted or light duty? _____

13. Please comment on what you think would help improve your symptoms.

_____

_____

_____

_____

_____

_____

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_____

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_____

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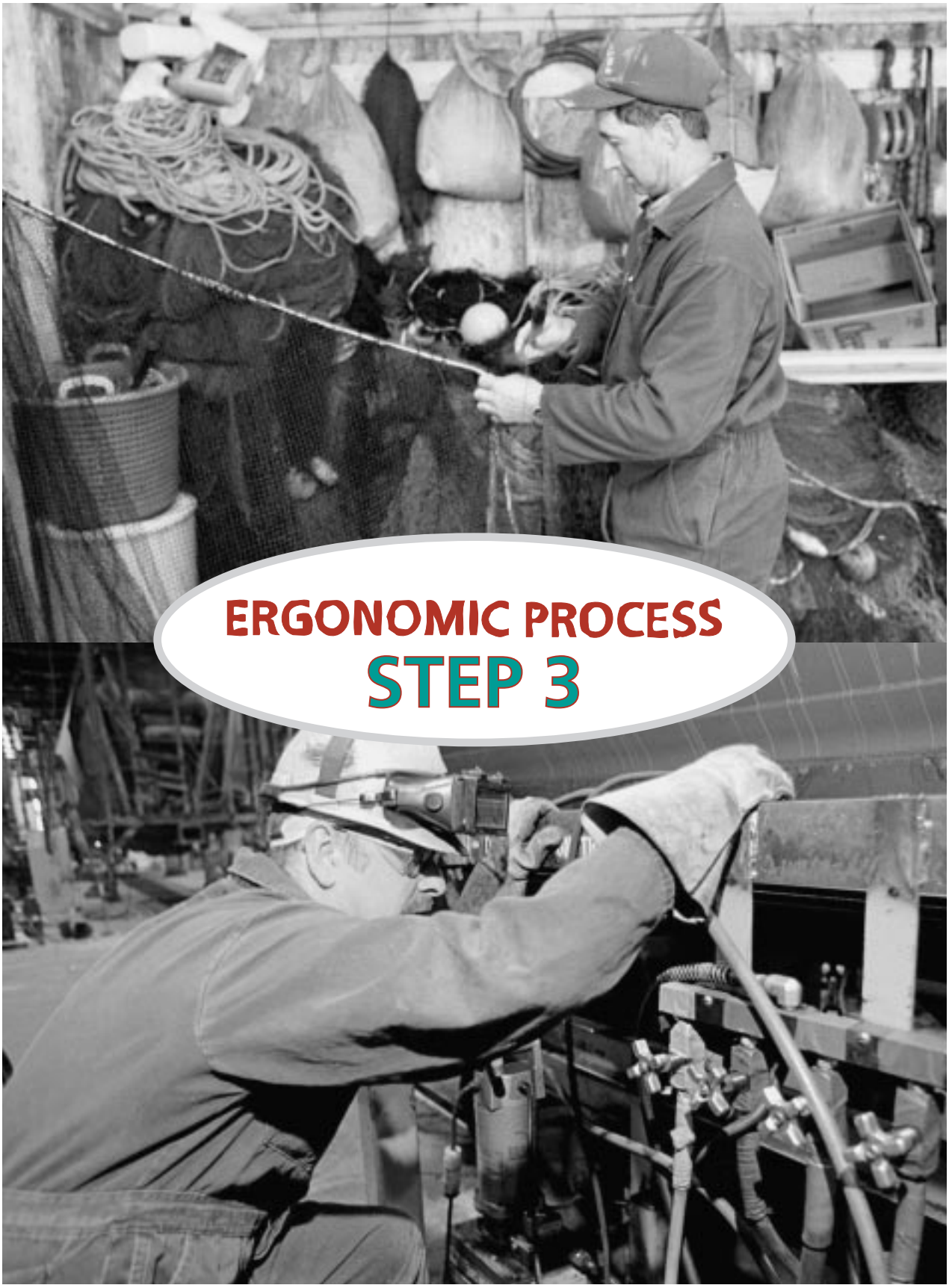
_____

Computers: Workers' Symptoms Survey

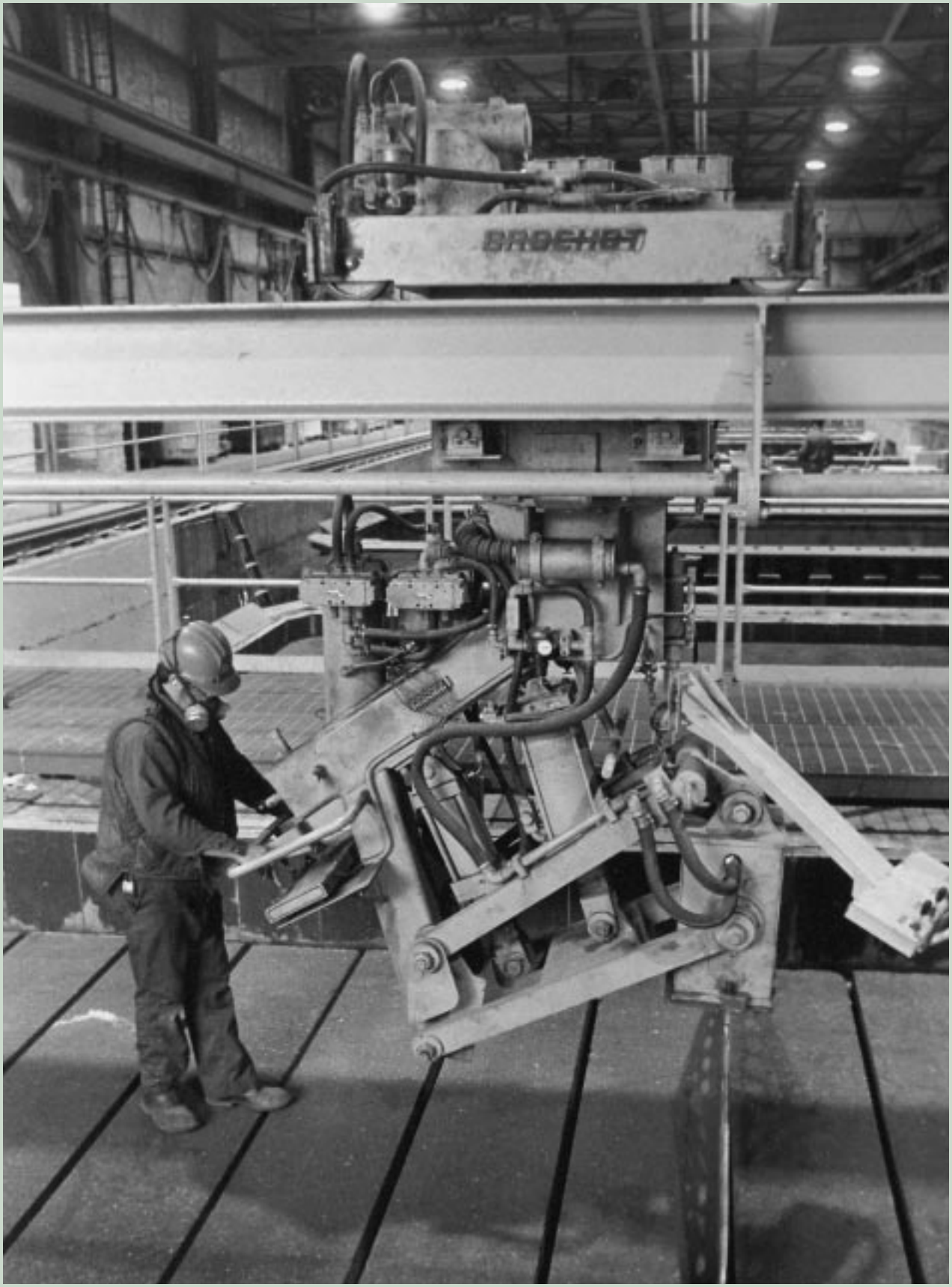
Please complete the following:

1. Does your workstation ensure proper posture, allowing for…
   - Horizontal thighs? ☐ Yes ☐ No
   - Vertical lower legs? ☐ Yes ☐ No
   - Feet flat on the floor or on a foot rest? ☐ Yes ☐ No
   - Neutral wrists? ☐ Yes ☐ No
2. Does your chair…
   - Adjust easily? ☐ Yes ☐ No
   - Have a padded seat with a rounded front? ☐ Yes ☐ No
   - Have an adjustable backrest? ☐ Yes ☐ No
   - Provide Lumbar Support ☐ Yes ☐ No
   - Have casters? How many? _____ ☐ Yes ☐ No
3. Are the height and tilt of the work surface on which the keyboard is located adjustable ☐ Yes ☐ No
4. Is the keyboard detachable? ☐ Yes ☐ No
5. Do keying actions require minimal force? ☐ Yes ☐ No
6. Is there an adjustable document holder? ☐ Yes ☐ No
7. Are arm rests provided where needed? ☐ Yes ☐ No
8. Are monitor and/or eyeware glare and reflections avoided? ☐ Yes ☐ No
9. Does the monitor have brightness and contrast controls? ☐ Yes ☐ No
10. Do you judge the distance between your eyes and the monitor to be satisfactory for your viewing needs? ☐ Yes ☐ No
11. Is there sufficient space for your knees and feet? ☐ Yes ☐ No
12. Can the workstation be used for right and left-handed activity? ☐ Yes ☐ No
13. Are adequate rest breaks provided for task demands? ☐ Yes ☐ No
14. Can prolonged, high keystroke rates be avoided by self pacing? ☐ Yes ☐ No
15. Have you been trained in…
    - Proper posture? ☐ Yes ☐ No
    - Proper work methods? ☐ Yes ☐ No
    - When and how to adjust your workstation? ☐ Yes ☐ No
    - How to seek assistance for your concerns? ☐ Yes ☐ No

Notes



ERGONOMIC PROCESS
STEP 3



STEP 3: METHODS TO ASSESS HAZARDS

THE HEALTH and safety committee or the ergonomic committee must develop procedures to identify hazards and then decide the priority of each. Once hazards have been prioritized, the committee should determine by what methods the hazards will be measured in further detail.

Workplaces may use one, or a combination, of the following ergonomic approaches:

1) Common sense approach
2) Technical approach

Common Sense Approach

With a common sense or subjective approach, workplaces depend much less on technical ergonomic tools. Ask workers where they hurt. Ask them what they think would make their job better and less painful. Using the suggestions described in this manual, your understanding of job design principles, information you have learned in any ergonomic courses you may have taken and your own experience, devise a solution to the problem. Persuade the employer to make the change. See how it works in practice. In consultation with the workers concerned, change it if necessary. This approach is most practical for small workplaces without many resources. Patience and the use of a "practice makes perfect" method are required. The advantages are speed and ease in evaluating hazards. A disadvantage may be accuracy.

Technical Approach

A technical or objective approach uses many of the scientific ergonomic research tools available. We will not describe these tools in detail here as it is beyond the scope of this manual. These tools go by names such as NIOSH Lifting Equation, Snook Tables and the like. See the appendix for internet sites where you can find out more information about these tools. In most cases, people using these tools have special training in ergonomics and should be certified ergonomists. Nonetheless, even the experts sometimes battle over which tools are appropriate to use for a given issue. Like any imperfect science, there will be instances where there may be no tool available to address the problem. It should be noted that there is no single tool that can

REGARDING WORKLOAD AND CHANGE IN WORKLOAD

75% (69% of women and 76% of men) reported their workload as either:

- too fast
- too heavy
- done by too few people, or
- done in too little time

73% (68% of women and 73% of men) reported that in the last two years had increased in at least one of the above four categories.

Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

assess every hazard. Many of the ergonomic tools are hazard specific. The disadvantage with a technical approach is that it can be time consuming if you have multiple hazards and jobs to assess. An ergonomist may use an ergonomic tool, decide a job is adequately designed and thus no change is necessary. But the worker still hurts! When this happens, it is the job of the union representative to continue to argue for ergonomic improvements. Remember, ergonomics should improve jobs for every worker, not just the "average" worker.

Combination Approach

Often, health and safety committee members may not have the time or expertise to use a technical approach to ergonomic hazard assessment even though they realize that a critical, objective eye is needed. A quick and easy resource to aid the technical or objective approach is to apply an ergonomic checklist. Many workplaces use relatively short, quick yet somewhat technical checklists as a way to identify and prioritize hazards in a short period of time. No real expertise is needed other than proper training in how to apply the checklist accurately and consistently. There is no such thing as the perfect checklist. They can vary greatly depending on the workplace and type of work. Many workplaces develop their own checklist with the assistance of someone with technical knowledge in ergonomics. The checklist in this manual will give you a good start.

An Example of a Hazard Assessment

Consider the following example. The workplace has a job where workers are required to regularly lift and carry a 16 kilogram object. The committee will need to come to an agreement as to how they will assess such a hazard.

Common Sense Approach

"We have had several workers sustain injuries where they were required to lift and carry more than 16 kilograms. As well our records show that for some workers 16 kg's was too heavy and assistance was required. Therefore we will aim to reduce all lifting loads to 13 kg's and provide assistance where necessary."

Technical Approach

This approach must decide which ergonomic tool will be used to assess the lifting and carrying hazard. The available list of tools for this type of risk includes:

- NIOSH Lifting Equation
- Snook and Cirello Lifting Tables
- Mital Tables
- University of Michigan 3D Biomechanical Model

Each of the tools in the list can be legitimately applied in this example. Each has its strengths and weaknesses depending on the specific situation. Choosing the appropriate tool or tools requires advanced ergonomic education and training and work experience.

Contract Language
ERGONOMIC PILOT PROJECT

The parties agreed to establish a joint taskforce consisting of representatives from the CAW and from management to focus specifically on four ergonomic concerns. These concerns include working overhead, walking backwards/sideways, working in cramped postures and over extended reach. The goal of this taskforce will be to identify operations containing these factors and to make recommendations for the reduction/elimination of them.

Bargained 1999 CAW/Daimler Chrysler Collective Agreement

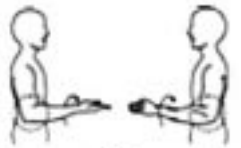
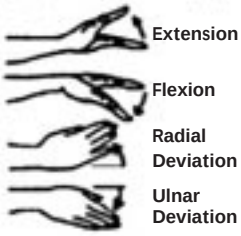
ERGONOMIC RISK FACTOR CHECKLIST

Do this checklist for each job. Higher scores mean more problems. Higher scores determine your priorities for developing ergonomic solutions.

UPPER EXTREMITY RISK FACTOR CHECKLIST

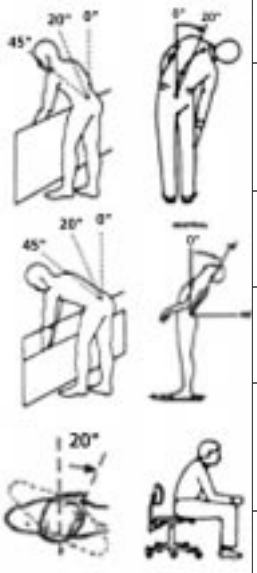
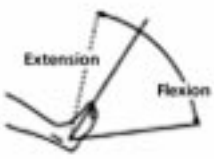
Date: _____ Analyst: _____ Job: _____ Location: _____

RISK FACTOR CATEGORY	RISK FACTORS	EXPOSURE Is the risk factor present within the job or task?	TIME				SCORE
			0% to 25% of total job time	25% to 50% of time	50% to 100% of time	If total time for job is >8 hrs., add 0.5 per hour	
Upper Limb Movements	**1.** Moderate: Steady motion with regular pauses	☐ YES ☐ NO	0	1	2		
	2. Intensive: Rapid steady motion without regular pauses	☐ YES ☐ NO	1	2	3		
Keyboard Use 	**3.** Intermittent keying	☐ YES ☐ NO	0	0	1		
	4. Intensive keying	☐ YES ☐ NO	0	1	3		
Hand Force (Repetitive or Static) 	**5.** Squeezing hand with the hand in a power grip	☐ YES ☐ NO	0	1	3		
	6. Pinch more than 1 kg.	☐ YES ☐ NO	1	2	3		
Awkward Postures  	**7.** Neck: Twist bend (twisting neck >20°, bending neck forward >20° or back <5°)	☐ YES ☐ NO	0	1	2		
	8. Shoulder: Unsupported arm or elbow above mid-torso height	☐ YES ☐ NO	1	2	3		

RISK FACTOR CATEGORY	RISK FACTORS	EXPOSURE Is the risk factor present within the job or task?	TIME				SCORE
			0% to 25% of total job time	25% to 50% of time	50% to 100% of time	If total time for job is >8 hrs., add 0.5 per hour	
	**9.** Rapid forearm rotation	☐ YES ☐ NO	0	1	2		
	**10.** Wrist: Bend or deviate	☐ YES ☐ NO	1	2	3		
Contact Stress 	**11.** Hard/Sharp objects press into skin	☐ YES ☐ NO	0	1	2		
	12. Using the palm of the hand or wrist as a hammer	☐ YES ☐ NO	1	2	3		
Vibration  	**13.** Localized vibration (without dampening)	☐ YES ☐ NO	0	1	2		
	14. Whole-body vibration (without dampening)	☐ YES ☐ NO	0	1	2		
Environment	**15.** Lighting (poor illumination or glare)	☐ YES ☐ NO	0	0	0		
	16. Adverse temperatures	☐ YES ☐ NO	0	0	0		
Control Over Work Pace	**17.** One control factor present = 1 Two or more control factors present = 2	☐ YES ☐ NO					
						TOTAL UPPER EXTREMITY SCORE	

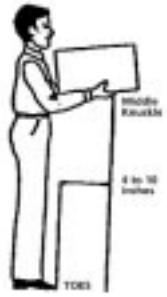
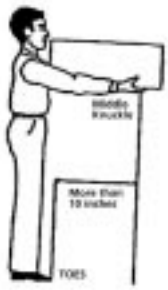
BACK AND LOWER EXTREMITY RISK FACTOR CHECKLIST

Date: _____ Analyst: _____ Job: _____ Location: _____

RISK FACTOR CATEGORY	RISK FACTORS	EXPOSURE Is the risk factor present within the job or task?	TIME				SCORE
			0% to 25% of total job time	25% to 50% of time	50% to 100% of time	If total time for job is >8 hrs., add 0.5 per hour	
Awkward Postures 	**18.** Mild forward or side bending of torso more than 20° but less than 45°	☐ YES ☐ NO	0	1	2		
	19. Severe forward bending of torso more than 45°	☐ YES ☐ NO	1	2	3		
	20. Backward bending of torso	☐ YES ☐ NO	0	1	2		
	21. Twisting of torso	☐ YES ☐ NO	1	2	3		
	22. Prolonged sitting without adequate back support	☐ YES ☐ NO	0	1	2		
	23. Standing stationary or inadequate foot support while standing	☐ YES ☐ NO	0	0	1		
	24. Foot action (pedal). Standing stationary with inadequate foot support, balancing	☐ YES ☐ NO	0	1	2		
	25. Kneeling/ squatting	☐ YES ☐ NO	1	2	3		
	**26.** Hip abduction (repetitive/prolonged)	☐ YES ☐ NO	0	1	2		
	27. Repetitive ankle (extension/flexion)	☐ YES ☐ NO	0	1	2		

RISK FACTOR CATEGORY	RISK FACTORS	EXPOSURE Is the risk factor present within the job or task?	TIME				SCORE
			0% to 25% of total job time	25% to 50% of time	50% to 100% of time	If total time for job is >8 hrs., add 0.5 per hour	
Contact Stress	**28.** Hard/sharp objects press into skin	☐ YES ☐ NO	0	1	2		
	29. Using the knee as a hammer or kicker	☐ YES ☐ NO	1	2	3		
Vibration 	**30.** Whole-body vibration (without dampening)	☐ YES ☐ NO	1	2	3		
Push/Pull	**31.** Moderate load	☐ YES ☐ NO	0	1	2		
	32. Heavy load	☐ YES ☐ NO	1	2	3		
Control Over Work Pace	**33.** One control factor present = 1 Two or more control factors present = 2	☐ YES ☐ NO					
TOTAL BACK AND LOWER EXTREMITY SCORE							
PLUS Total Upper Extremity Score							
PLUS Manual Handling Checklist Step II Score							
PLUS Manual Handling Checklist Step III Score							
TOTAL: ERGONOMIC RISK FACTOR CHECKLIST TOTAL SCORE							

MANUAL HANDLING CHECKLIST

34(a). **STEP I:**	NEAR LIFT	MIDDLE LIFT	FAR LIFT
Determine if the lift is near, middle, or far (body to hands) – Use an average horizonal distance if a lift is made every 10 minutes or less. – Use the largest horizontal distance if more than 10 minutes pass between lifts.			

34(b). **STEP II:**	NEAR LIFT		MIDDLE LIFT		FAR LIFT	
Estimate the weight lifted (Kilograms) – Use an average weight if a lift is made every 10 minutes or less. – Use the heaviest weight if more than 10 minutes pass between lifts. – Enter 0 in the total score if the weight is 4 kg. or less.	**DANGER ZONE**	More than 23 kg. 5* points	**DANGER ZONE**	More than 16 kg. 6 points	**DANGER ZONE**	More than 13 kg. 6 points
	CAUTION ZONE	8-23 kg. 3 points	**CAUTION ZONE**	5-16 kg. 3 points	**CAUTION ZONE**	4-13 kg. 3 points
	SAFE ZONE	Less than 8 kg. 9 points	**SAFE ZONE**	Less than 5 kg. 0 points	**SAFE ZONE**	Less than 4 kg. 3 points

***If lifts are performced more than 15 times per shift, use 6 points. STEP II SCORE:**

34(b). **STEP III:**

Determine the points for other risk factors

– Use occasional lifts if more than 10 minutes pass between lifts.

– Use the more than 1 hour points if the risk factor occurs with most lifts and lifing is performed for more than 1 hour.

Factor	Occasional lifts (<1hr./shift)	Frequent lifts (>1hr./shift)	
35. Twist torso during lift	1	1	
36. Lift one-handed	1	2	
37. Lift unexpected loads	1	2	
38. Lift 1-5 times/minute	1	1	
39. Lift > 5 times/minute	2	3	
40. Lift above the shoulder	1	2	
41. Lift below the knuckle	1	2	
42. Carry objects 10-30 feet	1	2	
43. Carry objects > 30 feet	2	3	
44. Lift while seated/kneeling	1	2	
		STEP III SCORE	

ERGONOMIC PROCESS
STEP 4


NURSE
LUV

STEP 4: COMMUNICATE PROBLEMS AND DEVELOP SOLUTIONS

ALL TOO OFTEN, problems are discussed and solutions are developed without including all the key people. Anyone with a vested interest in the problem should assist with developing solutions, especially and most importantly the workers who have had problems and who will be affected by the change. It is important to ensure that everyone who can provide valuable input be included and given the opportunity to provide feedback. Unfortunately, the perfect "paper" solution is often not a workable answer. Those who have direct experience with the problem and/or an understanding of past solutions will provide the most valuable insight. In all cases where hazards are identified, it is essential to communicate with and include the affected worker(s) when developing solutions. The affected workers are the true experts and will be the people most affected by the applied solutions. The health and safety committee's job can often be simplified by tapping into the ideas of someone who, in all likelihood, already has some good ideas for eliminating the hazard.

Keep in mind that the ultimate responsibility lies with the employer. All provinces, territories and the federal jurisdiction have "duties of employer" clauses as part of their occupational health and safety legislation. Employers are required to "take every precaution reasonable in the circumstance for the protection of a worker" (wording from Ontario *Occupational Health and Safety Act*.) Worker input is smart, worker input is important, but responsibility remains with the employer.

Below you will find a few important tips to remember when developing solutions to control workplace hazards:

- Employers should aim to permanently control hazards to below prescribed exposure levels where they exist by preferably eliminating or at least significantly reducing the exposure.
- Employers should further reduce exposure where injuries/illnesses continue to occur, regardless of whether the technical calculations would require change.
- Where permanent engineering controls will be delayed, interim administrative controls should be implemented immediately.
- When hazards cannot be eliminated or reduced other measures such as personal protective equipment (PPE) or administrative controls such as job rotation, work enlargement, work rest cycling, or work reorganization should be implemented.
- New solutions should not create new hazards in the work environment.
- Education and training should only be used to supplement other forms of prevention and control and not be seen as a control itself.

Hazard Control

There are two main methods of controlling ergonomic hazards:

1) Engineering controls (permanent solutions)
2) Administrative controls (interim or temporary solutions)

Engineering Controls

Engineering controls are permanent solutions. This is the preferred control method since it is designed to eliminate the hazard. These types of controls correct ergonomic hazards at the source. Some examples of engineering controls:

- Replacing manual tools with powered tools
- Installing a mechanical assist to eliminate a lifting task
- Redesigning the product being produced
- Redesigning the production process
- Redesigning the organization of the work

ENGINEERING DEPARTMENTS

Engineering departments often have different roles in different workplaces. In many manufacturing settings engineering spans the range from product and process design right through to facility maintenance. As part of product design, engineering may also be responsible for product quality and for setting production standards to assemble the products. Ergonomics needs to be integrated throughout these processes. It is counterproductive to design products that cannot be assembled without the risk of injury. Process design and production standards should rely heavily on ergonomics. If a product is designed with human abilities in mind for the user of the product, so too should the process used to manufacture the product be designed to be within human capabilities. Both engineering disciplines, product design and manufacturing design, must work together to ensure people's needs are met.

Administrative Controls

Even though administrative controls should never be considered as permanent solutions to an ergonomic problem, they are often a large part of the solution when engineering controls are not immediately available or feasible. Administrative controls should be used as a last resort where hazards cannot be entirely eliminated or reduced. They should be used to temporarily reduce exposure to hazards and should be followed up with permanent solutions. Three types of administrative controls are listed below:

1) Job Rotation
2) Work/Rest Cycling (2 types)
3) Job Enlargement

1. Job Rotation

Although this method is by no means a solution to an ergonomic problem, it can be useful when engineering controls are not feasible or until long-term, permanent changes are made. When implementing a job rotation schedule it is important to ensure good sound ergonomic theory is used. The intent of job rotation is to reduce the repetition risk factor and insure workers have the ability to use different muscle groups at each stage of the rotation. Job rotation is only effective when all the jobs in the rotation are properly designed and workers are not simply being rotated between several poorly designed jobs.

Contract Language
ERGONOMIC COMMITTEES AND MEETINGS

As for the frequency of local joint ergonomic committee meetings, these meetings shall be at least monthly. A forum shall be established for reporting the ergonomic committee recommendations to management. Time allotment for committee members to perform ergonomic committee functions will be determined.

Bargained 1996 CAW/General Motors Collective Agreement

2. Work/Rest Cycling

Work/rest cycling can occur in two forms, by providing ergonomic relief or by adding additional workers. Ergonomic relief reduces hazard exposure and provides the necessary recovery from exposure by providing a worker with additional, frequent breaks. This control is particularly useful when dealing with hazards like heat stress, high frequency work or excessive force. Adding an extra person to assist with a task while developing and implementing permanent controls helps to contain and minimize hazard exposure.

3. Job enlargement

The modern push for increased production rates and efficiency has resulted in shrinking cycle times and ever increasing repetitive movements in our work. Job enlargement is a concept that attempts to address the problem by expanding the number and kind of tasks we do into a longer time frame. Properly implemented, job enlargement enables workers to increase the variety of muscle groups required to complete their work thereby reducing the repetition on any given body part over any given time period. An auto factory enlargement might look something like this:

An operation with a high level of awkward posture is combined with two other jobs having no postural hazards. The cycle time is tripled and 3 workers are individually responsible for all the tasks on every third vehicle rather than each worker having a smaller number of tasks on every vehicle.

This concept can be used in any work setting. Office workers charged with data input could have their responsibilities enlarged to include filing, photocopying, answering phones and any other duties that would allow them the opportunity to move around and utilize different muscle groups in different postures.

Like rotation, this effort is only effective when **all** the elements of the enlarged job are properly designed and workers are not simply being exposed to new, unsafe tasks.

A well thought out plan to reduce risk may include a combination of engineering and administrative controls. Suggestions for engineering controls can be found in Step 5: Principles for Job Design.

REGARD CONTROL AND AUTONOMY

58% of workers surveyed reported they had little if any opportunity to vary the pace of their work during the day.

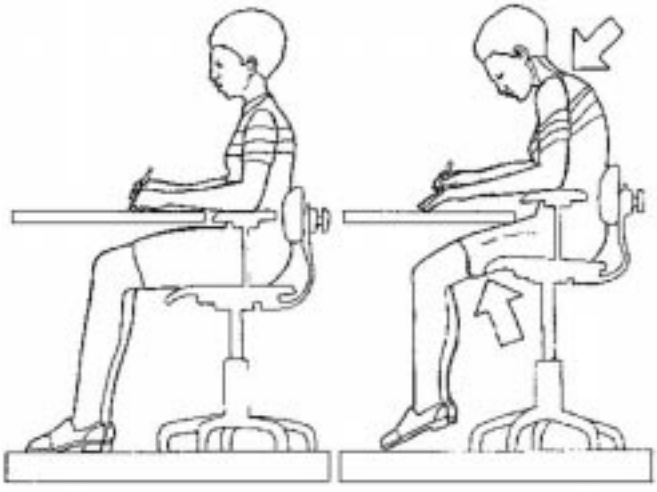
Source: CAW/TCA Canadian Auto Parts Working Conditions Benchmarking Study 1995

Wrist and Back Support Devices

Wrist supports, elbow splints and back braces are becoming too common in workplaces. These were all designed as medical devices to be used for treatment when prescribed by a physician. They are intended to restrict movement in an effort to supply rest to an injured area. They were never intended to be marketed as "ergonomic" solutions and **should not be used for controlling ergonomic hazards.** Their use outside the medical arena is a classic example of attempting to fit a worker to the job, which is the opposite of the intent of ergonomics.

There is no evidence to show back belts reduce back injuries.

After a review of the scientific literature, NIOSH (National Institute for Occupational Safety and Health) in the U.S. has concluded that, because of limitations of the studies that have analyzed workplace use of back belts, the results



cannot be used to either support or refute the effectiveness of back belts in injury reduction.

One large U.S. retail hardware chain required workers to wear back belts and claimed a 34% reduction in back injuries. What they failed to mention is, at the same time, they introduced more lift trucks, exercise programs and mandatory drug testing. Would you report back pain if the boss told you you had to then pee into a bottle?

We are opposed to workers routinely using back belts. When workers wear back belts they may think they are stronger than they are and lift objects that are too heavy.

WEIGHTLIFTING OR LUMBAR SUPPORT BELTS IN MANUAL MATERIALS HANDLING WORK

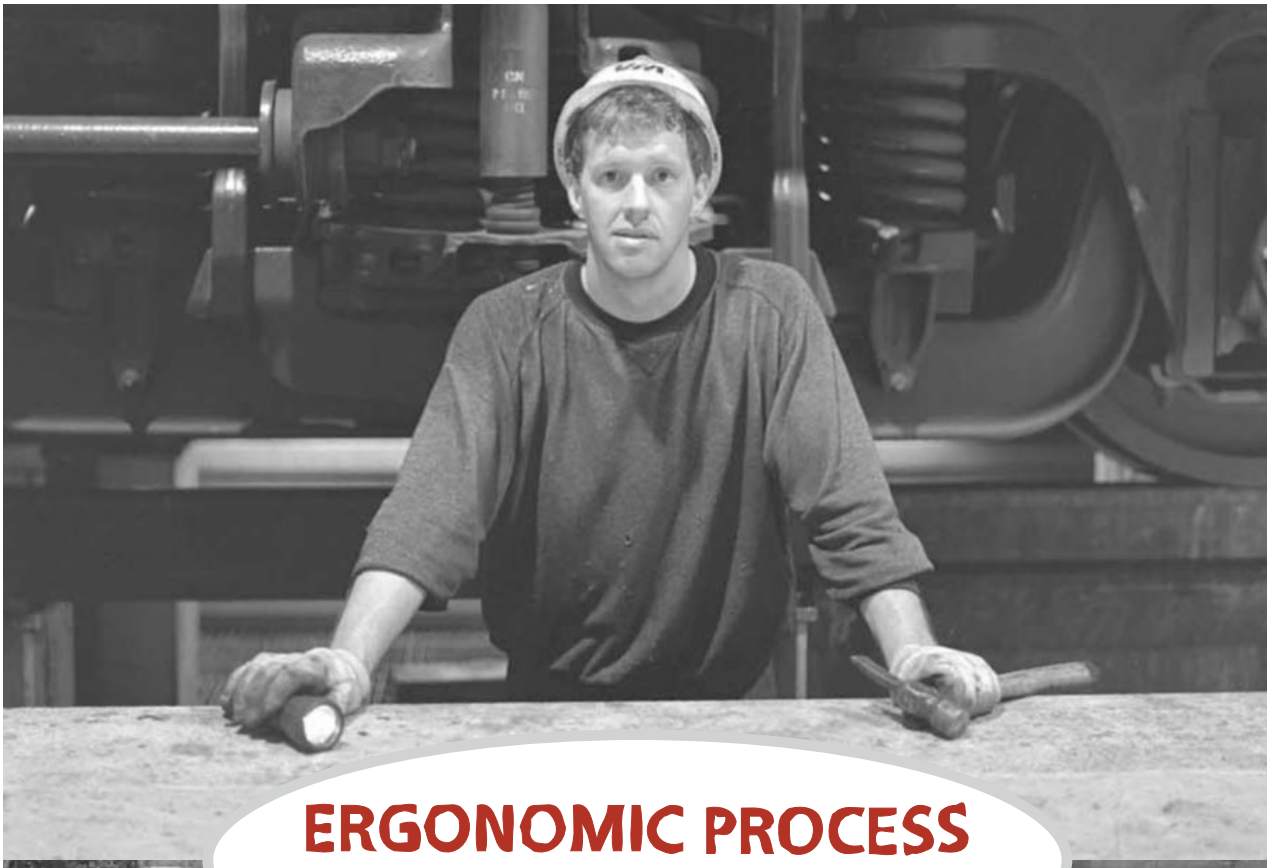
Produced by Professional and Specialized Services and the Occupational Health and Safety Branch, Ontario Ministry of Labour.

INTRODUCTION: The Ministry of Labour has received inquiries about the use of weightlifting or lumbar support belts or "back belts" in the workplace. The question asked is whether they will reduce the risk of low back injuries in jobs, which involve the manual lifting and moving of materials. These belts should not be used generally as a means of preventing back injuries. They are suitable in certain well-defined circumstances (outlined below), but there is no evidence that they reduce the load on the back in materials handling work. However, there is solid evidence that job redesign — workplace changes based on ergonomics principles — does reduce the load on the back and prevents back injuries.

BACKGROUND: There are conflicting findings as to the usefulness of back belts in the scientific literature:

- Some literature suggests that belts act to increase intra-abdominal pressure during lifting. In turn this is believed by some authors to increase back support and consequently back stability. On the other hand, the increase in intra-abdominal pressure causes an increase in cardiovascular stress. The wearing of the belts by people with cardiovascular disease is not advised. Moreover, the presence of cardiovascular disease is not always apparent.
- Another possible advantage suggested by some authors is that the belts are likely to make users more aware that they are bending to the side or twisting, and so may make them limit these activities. Both sideways bending and twisting should be avoided during materials handling work.
- Despite the fact that weightlifters commonly use these belts, they do not reduce the muscular effort required to perform lifts. Weightlifters do not gain any biomechanical advantage by using them. A belt may assist a highly skilled weightlifter but if so, the belt helps only indirectly, by improving nervous system co-ordination during symmetrical, high-weight lifts. In any case, competitive weightlifting cannot be taken as a guide in occupational materials handling since it is a very different kind of physical activity.
- There are concerns that long-term, habitual use of the belts may cause a loss of strength in the abdominal muscles. In turn, this may lead to back injuries when the person is not wearing the belt. Some evidence does suggest that injuries increase in people who are not wearing a belt after a period of wearing one.
- Another cause for concern is that back belts may give wearers a false sense of security, with the result that they may injure themselves by handling loads beyond their physical abilities.
- Finally, wearers of some types of belts have complained of excessive heat under the belt or pressure and pinching of ribs.

GUIDELINES: The weight of the evidence on back belts suggests that they do not offer benefits in reducing occupational injury rates or absenteeism. Back injuries are a serious problem in Ontario workplaces: the use of back belts will not prevent these injuries. Prevention of back injuries can best be accomplished by following accepted ergonomic principles in designing jobs, tools and work environments. An important adjunct to good ergonomic design is education in wellness and back care for both workers and managers. Back belts do have a place in the treatment of low back pain, particularly in the case of a person returning to work after an injury. It is recommended that they be worn at work only on the advice of the worker's physician or chiropractor.



ERGONOMIC PROCESS
STEP 5

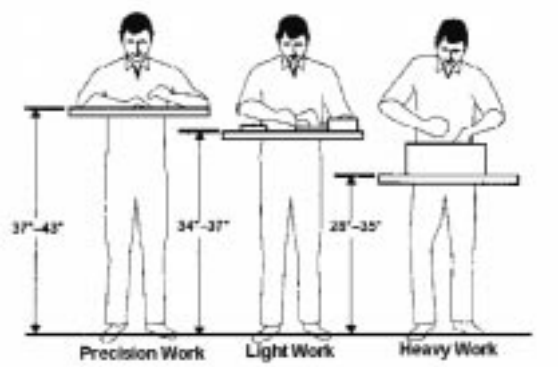
STEP 5: PRINCIPLES FOR JOB DESIGN – 3 KEYS

THERE ARE THREE keys to RSI prevention.

Key #1 – Proactively design the work environment using ergonomics. Proactive ergonomics attempts to design the work environment properly so injuries do not occur at all. This is the only genuine method of injury prevention. Redesigning unsafe jobs is not injury prevention but rather a reactive approach to a problem. That does not mean the effort has no value, only that a reactive ergonomic process should not be confused with a proactive or preventative process. There are benefits for everyone involved in proactive ergonomics. Management often argues about the expense of incorporating ergonomics into the original design but studies have repeatedly shown that the costs to redesign are far higher. Smart employers understand that proper job design benefits everyone.

Key #2 – Redesign the work environment where bad jobs exist. Ask workers if they are in pain and what suggestions they may have for improvements to their job to eliminate the problem. Then implement what they suggest. And, "if at first you don't succeed, try, try again." Just because the first attempt did not work does not mean you cannot make it work. Most hazards require only minor changes to make major improvements for workers. Your thinking must be creative. In many cases, the worker can supply the solution for improvement by explaining why something did not work. Don't reinvent the wheel. Find others who have had a similar problem and determine whether all or part of their solution will work for you.

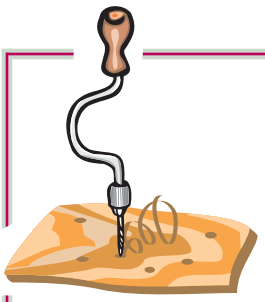
Key #3 – Anthropometry is the foundation upon which ergonomics is built. Anthropometry is the study of the physical and functional dimensions of the human body. Ergonomics uses anthropometry to define the "average human" and then attempts to design as broadly as possible around that. Is average really average? We must recognize that physical differences cross many lines, particularly ethnicity and gender. Many people from Asia or Central America are



considerably smaller in stature than North Americans. To illustrate the differences in anthropometry, P. Ashby (Ergonomics Handbook 1 – Body size and strength) showed that, using available data, a piece of equipment designed to fit 90% of the North American male population, would fit approximately 90% of Germans, 80% of Frenchmen, 65% of Italians, 25% of Thais, and only 10% of Vietnamese. These calculations used 1979 data and may no longer be relevant as better nutrition and medical care has altered the physical size of some populations. They do, however, give us an idea as to the difficulty faced when workplaces are designed and why we need to be aware that body size plays a very significant role in job design. We cherish the diversity in our union which reflects our multi-cultural Canadian society. We must do our utmost to ensure all our members are protected from harm.

Those involved in workplace ergonomics will find after the experiences and information obtained from operator complaints and medical visits, the next most critical sources of information are anthropometric and strength data. In order to design any workplace properly there are some basic ergonomic design principles that must be applied. We have divided design principles into 5 categories,

- Workstation design principles
- Work organization principles
- Tools and equipment design principles
- Manual material handling design principles
- Display, control and auditory signal design principles



TOOLS AND EQUIPMENT PRINCIPLES

- Well-designed tools and equipment allow workers to maintain wrists in a neutral posture.
- Tools and equipment should comfortable and easy to handle.
- Tools and equipment that accommodate both left and right-handed workers should be readily available.
- Allow more comfort for workers by providing adjustable grips or different size tools.
- Tool and equipment handles should be covered with comfortable slip-resistant materials.
- Workers should not use tools with sharp edges or short handles that place contact stress on palms of hands.
- Where possible substitute power tools for manual tools.
- Power tools should be well balanced to eliminate or at least reduce awkward postures or applications of high force.
- Select power tools and equipment with anti-vibration properties. Use handle coatings that suppress vibration.

Tools and equipment must be properly maintained and in good working order.

TOOL DESIGN

To prevent hand and wrist disorders, tools and equipment should be designed to keep hands and wrists in the same position as they would be if they were hanging relaxed at your side. The shape of each tool should be made to prevent awkward hand positions. Look at these modifications of traditional knives, for example, making cutting in various situations much easier.

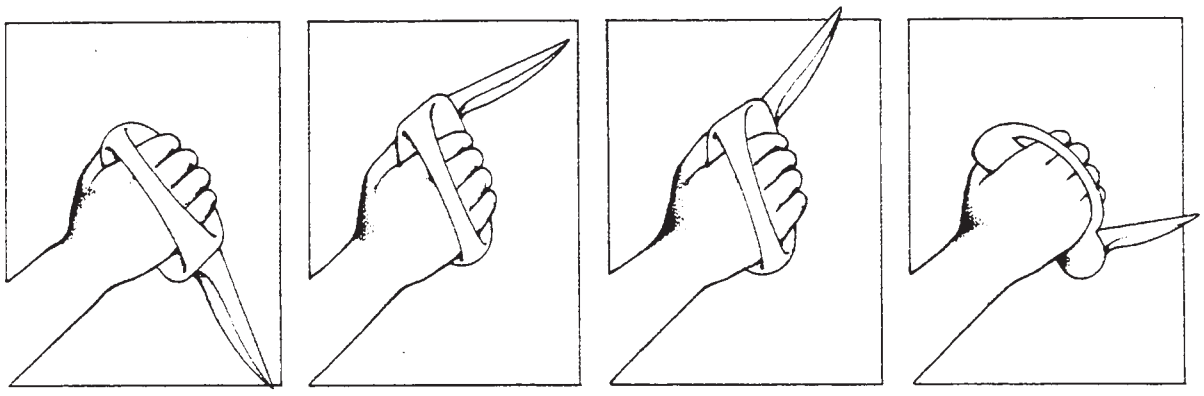
Bend the tool, not your wrist. Sometimes a tool that is correct for one operation is incorrect in another.

Well-designed tools reduce repetitive motions. For example, the hazards of working continuously with an ordinary screwdriver can be reduced with a tool that incorporates a pistol grip to provide for a straighter wrist and better leverage, a "yankee drill" mechanism which rotates the bit when the tool is pushed forward; and a ratchet device to drive hard-to-move screws efficiently.

Your thumb and finger should slightly overlap around a closed grip.

A hand grip should not be so large that it is difficult to grasp, close or hold. The grip cannot be too small either, causing strain just to hold.

The handle or grip should be about 10 cm. to



IN A POULTRY PROCESSING PLANT A VARIETY OF SPECIAL KNIFE HANDLES WERE DEVELOPED SO THAT EACH CUT COULD BE MADE WITH STRAIGHT WRIST

"Repetitive strain injuries must be treated early. Late treatment guarantees prolonged suffering and an illness that is very difficult or impossible to treat."

Roland Wong, MD
Occupational Health Physician, Toronto, Ontario

13 cm. in circumference for maximum grip strength. This equivalent to a 4 cm. diameter of a closed grip.

Tools that provide a comfortable grip to a person with a very large hand may be awkward for someone with a very small hand. Workers come in a variety of sizes and shapes; so should tools. This is particularly important to remember as women and visible minorities enter jobs formerly only performed by Caucasian men.

Sharp edges or a small surface area on tool handles and equipment can create a pressure point on sensitive tissue. This can contribute to poor circulation and can damage blood vessels and tendons.

Often a soft plastic covering over the tool handle can reduce pressure. Putting covers on hand grips also helps in other ways: protecting hands from heat and cold; reducing vibration; reducing slipperiness of grip enabling a more relaxed hold.

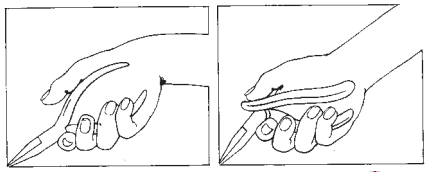
There should be a means to return the tool to an open position, such as with a spring.

Pinch points where parts of the hand can be caught during tool use should be eliminated.

"Trigger Finger" is a common problem that can be caused by using some pneumatic tools in assembly jobs. The trigger should work easily to reduce the effort needed to pull it. Some designs provide for the use of the middle finger. Some designs use a thumb trigger.

Many hand tools should have two handles to permit better manipulation and easier holding of the tool. Double-handed tools should have stoppers to avoid any pinch points.

Hand tools should not be too heavy for easy handling.



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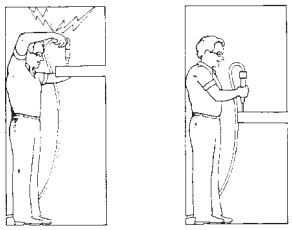
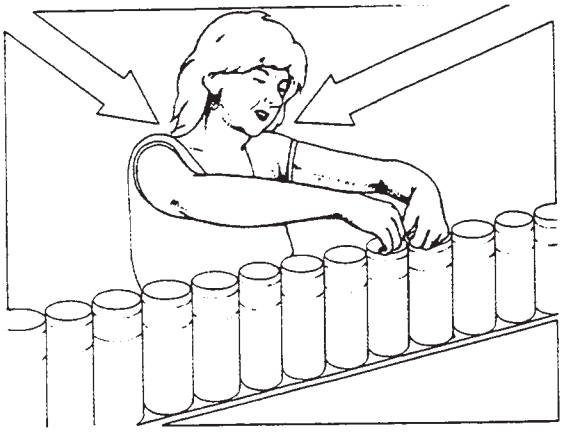


BAD DESIGN GOOD DESIGN

TOOLS SHOULD FIT YOU AS WELL AS YOUR CLOTHES



BAD DESIGN

GOOD DESIGN

MSI PREVENTION GUIDANCE SHEET

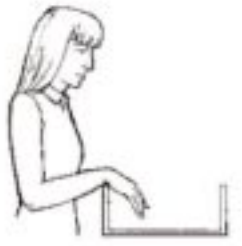
Risk Factor: Local Contact Stresses

Purpose

This guidance sheet, produced by the BC Workers' Compensation Board, can be used to identify and assess the risk of MSI due to local stresses.

Description and General Concepts

Local contact stresses result from contact between the body and hard or sharp objects. Stress intensifies with increasing force and decreasing contact surface area. Adverse outcome can be injury or irritation to the skin, underlying nerves, bursae and blood vessels. Exposure to local contact stress may be sustained (continuous) or intermittent in nature.



The amount of pressure, duration and frequency of exposure to the pressure, and area of body subject to exposure are important considerations in assessing the risk. Areas of the body that may be sensitive because tendons, nerves and blood vessels are located close to the surface and underlying bones include the sides and backs of fingers, sides and centre of palm, base of wrist, elbow, shoulder and knee.

The normal contact areas of the hand are covered with fat pads, covered with skin so as to maximize friction, grip conformity and sensory feedback. When loads, especially point loads are applied elsewhere, such as the sides of the fingers, where the digital nerves and blood supply are located, injury can result. An example of such pressure can come from prolonged use of scissors.

When parts of the body strike an object such as using the hand as a hammer or when using tools, whose handles press into the palm, irritation of the skin and underlying tissue may result. The pain of the hand contains a branch of the ulnar nerve that is vulnerable to local pressure.

The wrist area is vulnerable to pressure from supporting the weight of the hand and also to pressure applied over the carpal tunnel area. Local mechanical stresses may also occur at the elbow and forearm; these are commonly used to support part of the body weight on work surfaces. The ulnar nerve runs across the inside of the elbow and can be compressed relatively easily when leaning on that side of the elbow.

Examples

Sample occupations where local contact stresses may be present include the following:

Housekeeping: Kneeling to clean surfaces.

Manufacturing: Kneeling on pitted concrete.

Healthcare: Crushing pills for patients.

Bakery: Pushing dough through press.

MSI PREVENTION GUIDANCE SHEET

Risk Factor Identification for Local Contact Stresses

Determine if local contact stresses are present through observation of tasks and discussions with workers about contacts or sore points.

Local contact stresses can result from:

- Tasks involving handling objects with sharp or uneven edges.
- Handles with sharp grooves or edges pressing on small joints of the hand.
- Working movements that require contact with hard surfaces.
- Palm-type control buttons.
- Using power tool triggers with sharp edges.
- Tool handles that are too short resulting in pressure on the base of the hand.
- Handles made of hard, resistant material which presses on the base of the hand.
- Kneeling, resting or leaning on a sharp or hard surface (for example the wrists resting on the edge of a desk).
- Striking a hard surface with a part of the body.

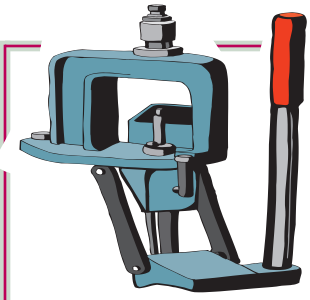
Risk Factor Assessment for Local Contact Stresses

The greater the pressure exerted on the skin, the greater the magnitude and greater the risk of injury. Determine the magnitude through subjected reporting by workers exposed to the risk factor, pressure marks on the skin and any discolouration that may be present. The greater the total time over which the skin in a particular body area is subjected to the local contact stress (contact time), the greater the risk of injury. Sustained exposure can generally be expected to pose a greater risk than intermittent exposures totalling the same duration. Use of gloves or other protective coverings or paddings used to protect the area of contact will reduce the risk of MSI.

Control Options

- Locate work or modify workstations so the body does not contact sharp edges.
- Round or pad the edges of sharp or uneven-edged objects.
- Avoid using tools that rub the wrist.
- Use a spring rather than the fingers to open tools such as pliers or scissors.
- Use a jig or fixture to hold an object during precise work to avoid resting elbows on a hard work surface.
- Use a tool such as a hammer or a mallet to strike an object rather than using the hand or palm.
- Distribute pressure over as wide an area as possible.
- Use tools with long enough handles so they don't dig into the palm.
- Pad or round surfaces with softer material (wrapping tools, wrist rests, padded edges of work surface) that the body contacts.
- Round surfaces and avoid contours. Use gloves or knee pads if force not an issue.
- Avoid use of hand, knee, etc. for striking objects.

(Thanks to B.C. WCB for producing this guidance sheet)



WORKSTATION DESIGN PRINCIPLES

PREVENTION OF RSIs cannot effectively take place unless there is a conscious effort made to properly design the work environment from the start. Redesigning the work environment reactively is not prevention. Redesigning is simply hazard control. Below is a list of general principles for workstation design.

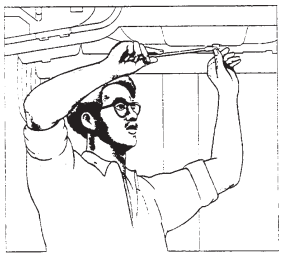
- A well-designed workstation will permit workers to reach objects, controls and displays without adopting awkward postures.
- Good design should control and/or eliminate the need to work in awkward bending, twisting or reaching postures.
- Good design should reduce or eliminate the need to work while holding arms at or above shoulder level whether in forward or overhead position.
- Good design should allow workers to work with elbows at a comfortable height.
- Well-designed workstations allow room to do work comfortably and to vary body postures.
- Where feasible, provide a sit/stand stool for jobs that require workers to stand all day.
- For static work, where feasible, provide a small stool or support bar to rest a foot on and alternate between feet to reduce fatigue.

- Locate tools and materials within a short reach distance.
- Where there are multi-shift operations consult with all operators and ensure job design considers everyone, for example, ensure workbenches are adjustable.
- Proper flooring surfaces should be used to reduce back pain and foot and leg fatigue.

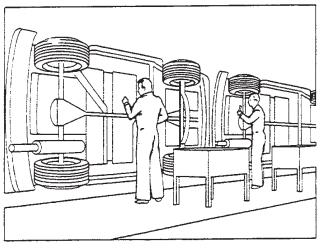
REACHING

If possible, jobs should be designed so arms are not raised above shoulder height on a regular basis. Keep your arms low and shoulders close to your body.

BAD DESIGN



GOOD DESIGN



Working in a pit with arms raised overhead to reach the assembly points on a machine is a poor job design which will harm the arms.

Many auto plants are equipped with devices which hold the machine on one side which eliminates the stresses on the arm caused by reaching overhead.

Working with the elbows raised and out can cause thoracic outlet syndrome. The correctly designed assembly line permits the worker to do the job without raising the elbows.

This worker throwing parts into a crate behind him every half-second or so, day in and day out, will eventually experience symptoms of tendinitis in his right shoulder and thoracic outlet syndrome.

The problems can be avoided altogether by providing the worker with a bin or chute beside him underneath the conveyor belt.

Twisting, stretching or leaning with a heavy load may cause back problems. Jobs should be changed to eliminate these reaching motions. Move the parts closer. Use a long tool or a "rake". Provide a stepping stool for standing reaches.

Always consider the interface between the worker, parts storage containers, and racking or shelving.

Often jobs are designed without enough thought to the differences between tall and short people or even to the normal reach of an average person.

Design to provide enough space for the large worker – shorter workers will have all the more room.

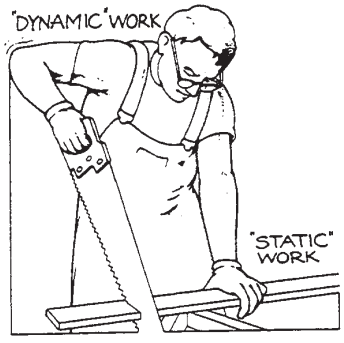
Design standing work for the taller worker and then use movable platforms or benches for shorter workers.

Design tasks requiring reach for shorter workers – this way taller workers will be able to reach as well.

In designing workplaces for the smaller worker, you also ensure that jobs will not be automatically "sex" stereotyped. Too often in the past, job design characteristics have been used to exclude women from traditionally men's jobs with allegations that – "women aren't strong enough" or "women aren't tall enough".

Static Loading

Clamp it down. Holding your muscles tense in a fixed position is more fatiguing than using moving muscles. The movement allows the



muscles to relax momentarily. This difference is often referred to as 'dynamic' work versus 'static' work.

As general principle, 'static' work should be designed out. For example, use tools and clamping devices instead of holding by hand.

Use body strengths. Work tasks should be designed to use postures for the limbs and body which give the best mechanical advantages for the muscles used. This avoids overloading the muscles.

For example, for some jobs which require arm strength, the exertion should be in and out and not across the body.

Control Panels

A number of simple 'rules' apply to the design of control panels.

Most important displays (signals, gauges) are place within easy sight.

Information presented by displays is simple and easy to read.

Panels, consoles, worktables, etc. are sufficiently large and all their parts are easily seen from the normal position.

Sometimes it is impossible to look at the job and operate the controls at the same time.

Clearly, in this case, the controls must be moved and the job redesigned.

Instruments, displays and controls are clearly marked to show what they are for.

Differences in size, colour, shape and location are used to make different instruments, displays and controls distinguishable. Remember, however, that some workers are colour blind so colour alone should not be relied upon.

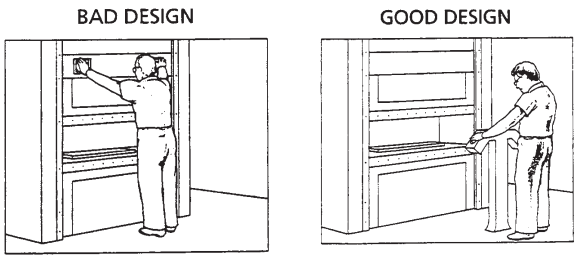
All gauges are easy to read whether they are in the normal functioning position or not.

Emergency controls are easy to find and operate.

Accidental activation of controls is prevented by proper spacing, resistance, shield, etc.

Direction of operation controls is easy to understand according to local custom.

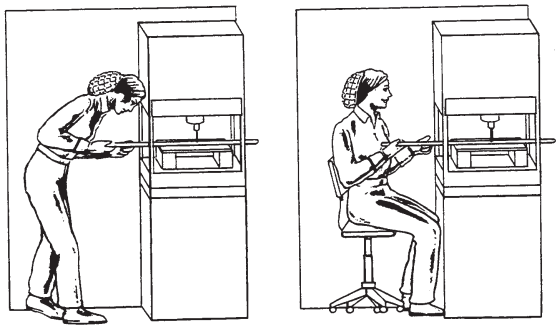
Switched or other points of manipulation are lower than shoulder height.



Display Design

Take these factors into consideration in designing displays for control panels or other displays with which workers must interact:

- Display visibility - the use of colours and contrast in presentation
- Display design - integrate information by the use of visual and auditory displays which enhance the perception of information



BAD DESIGN GOOD DESIGN

- Control design, e.g. voice control - reduce information overload due to excessive demands on dual task performance
- Decision support - reduce information overload
- Use of colours
- Design of symbols
- Information coding
- Consistency in display design across applications
- Layout of information on displays
- Principles for integration of information
- Where colour coding is used, provisions and considerations should be made for colour blind people and other people with visual disabilities

- **Operable with low vision and limited or no hearing**
  - Provide at least one mode that permits operation by users with visual acuity between 20/70 and 20/200, without relying on audio output.
- **Operable with limited manual dexterity**
  - Provide at least one mode that does not require user fine motor control or simultaneous actions
- **Prevention of visually-induced seizures**
  - Visual displays and indicators must minimize visual flicker that might induce seizures in people with photosensitive epilepsy.
- **Provide a variety of modes that consider all forms of limitations e.g. visual, hearing, manual dexterity, reach and strength, cognitive skills, and speech.**

Auditory Design

Reduce noise in workplaces at the source to ensure hearing loss and stress are reduced. For

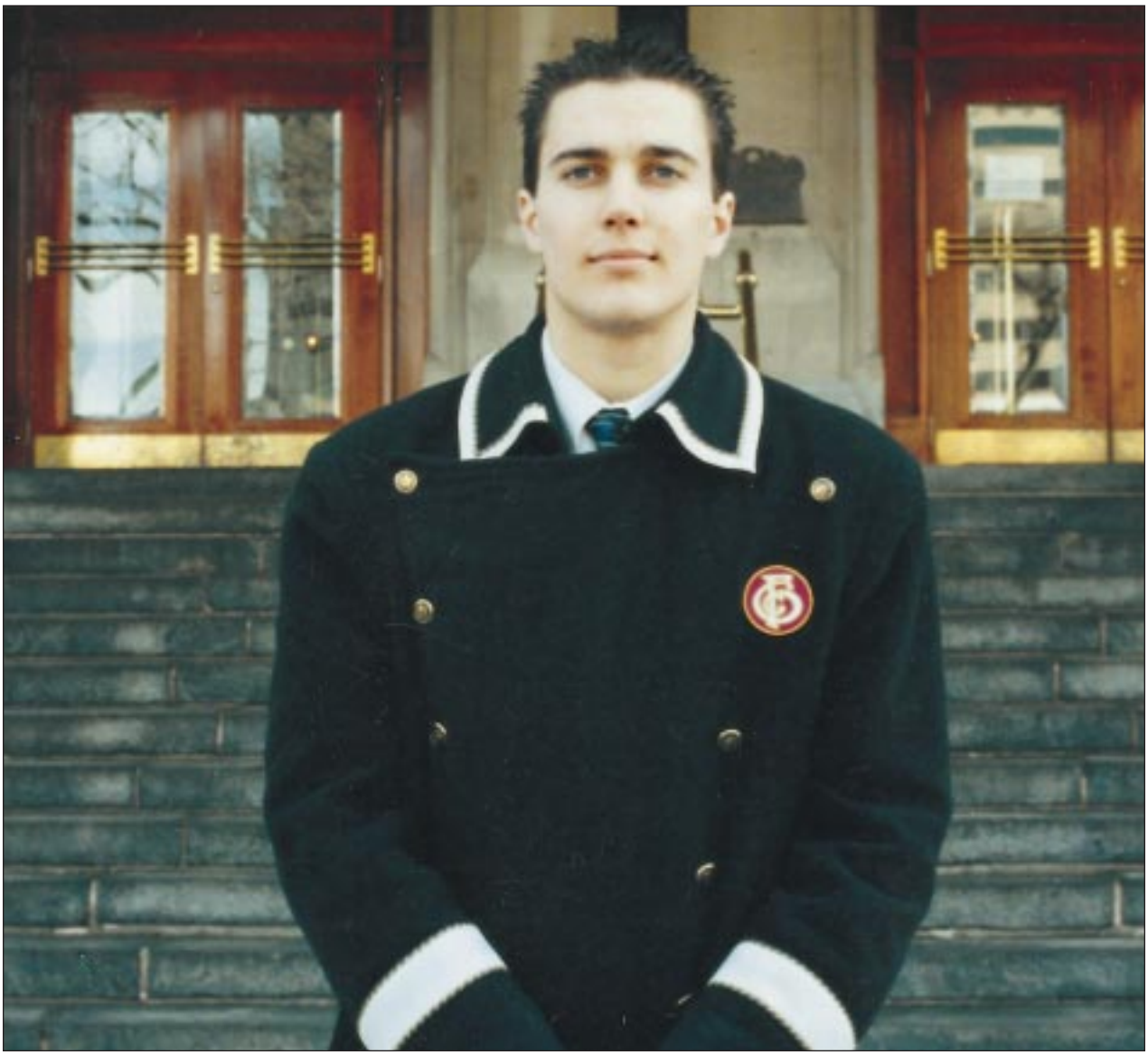
hearing impaired persons, this is even more important. Here are recommendations for designing for hearing impaired workers:

- Use sounds with strong mid-low frequency components, 500-1500 Hz. (for alarms use at least 2 strong mid-frequency components).
- Provide adjustable volume control, preferably with easy to see (visual) indication of volume.
- Use loud default volume settings (77dB)
- Provide loudest possible undistorted volume capacity
- Reduce background noise and noice level of internal components
- Allow warning signals to exceed normal sound level by 15 dB, or any maximum sound level with a duration of 30 seconds by 5dB (with an upper limit of 120 dB)
- A variety of complex tones, sounds, and speech should be used for displaying different types of information.

Standing

Standing still too long can put excessive stress on the spine and back muscles, causing pain and even permanent damage to body tissues. But solutions do exist.

Provide a foot rest (like the classic "brass rail" in a bar) and stand with one foot up. This lessens the stress on the back. Change legs often.



Provide mats and floor coverings. The harder and less-giving the floor surface, the more stress this places on the body.

Provide a stool with a back rest for support, where suitable. Provide opportunities to change positions, move around, or alternate between sitting and standing.

Working height allows work with the back naturally straight and shoulders relaxed.

Work is done with a natural hand position as close to the body as possible.

Enough room is available for the legs and feet.

Sitting

Sitting is often preferable to standing, but make sure the chair is correctly designed for the job and the person. Poorly designed or mismatched chairs and workbenches may cause fatigue and discomfort, circulation problems and pressure on nerves.

Seats should be padded and the height individually adjustable.

Seat height should not put pressure on the lower side of the thigh. Feet should be able to be placed firmly on the floor.

Good design prevents poor posture. A backrest with padding gives comfortable support to the back.

A footrest is used when seat height is unchangeable.

Enough leg room is secured for easy change of leg positions.

Provide opportunities to change positions, move around or alternate between standing and sitting. (In some provinces, legislation prescribes seating where feasible.)

Organize work so that workers can move around during the shift. No one should have to do the same thing in the same position all the time. When considering job rotation, it is important to remember that there is no point in doing it unless different muscle groups are used.

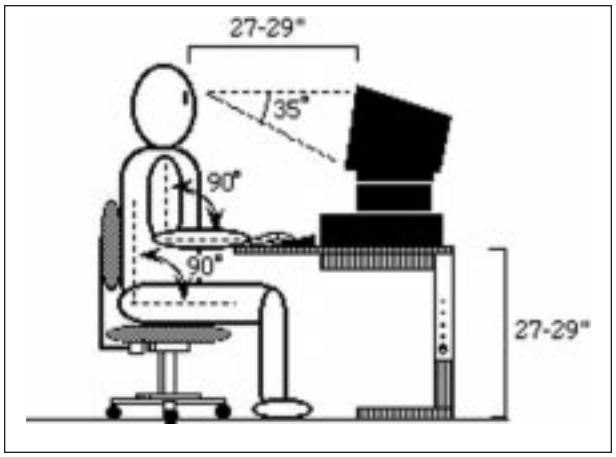
Table or hand position height is at the level of the elbow.

Materials are placed within easy reach.

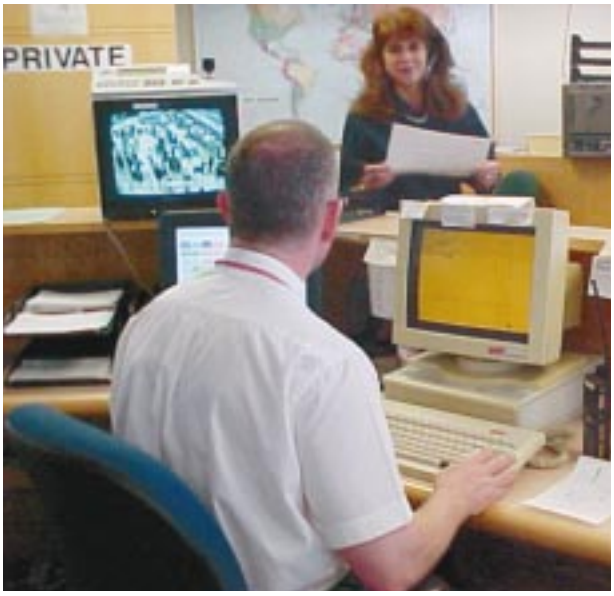
All chairs and workbenches should be evaluated and adjusted for proper height.

Proper work height may depend on the nature of the job. Precision work (with the need to see closely) should be high, with excellent non-glare lighting. Work which requires heavy manipulation, pressure or lifting should be lower.

These design principles and guidelines assume that workers can always control how they work. In most workplaces this is not the case. But like all other health and safety issues, with hard work, preparation and careful presentation, we can win improvements in our working conditions, and we can reduce the numbers of strains and sprains suffered by our members.



SITTING OR STANDING

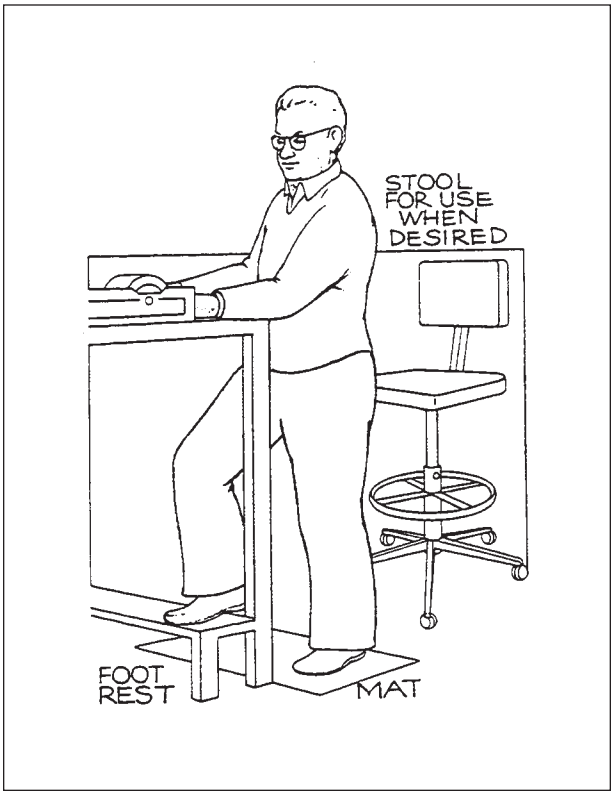


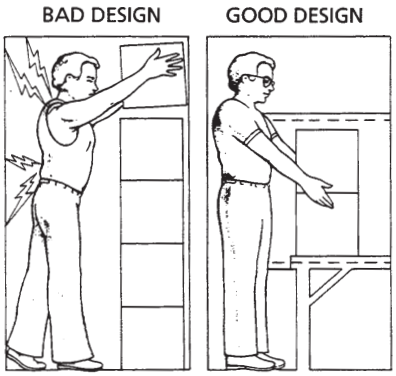
SINCE YOUR legs are strong and since the inherent strength of the natural curves of the spine is greatest while standing, heavier assembly jobs are done standing. If you work on an automotive assembly line, it is usually impossible for you to sit to do your job because you have to move around. In fact, it is important that you do move around because static standing (standing in one place) can create discomfort and risk of injury to the feet and legs. In these types of jobs, it is important to ensure ergonomic matting and proper foot wear are provided.

In other types of jobs, from electronics assembly to office work, seating should be provided. If you are working in a seated position, it is important to pay attention to the following issues:

- Watch the weights of parts – sitting eliminates most of the use of the large muscles of the legs and hips that aid in lifting. This increases the risk to the lower back for any given weight.
- Watch reach distances – sitting automatically puts the trunk in a 90° posture. A 20° trunk flexion while standing now becomes a 110° flexion, increasing risk to the lower back.
- Adjustability is paramount in work surfaces, chairs or both. The seated work posture must not cause workers to "hunch" over their work creating constant strain on the small muscles of the shoulders and neck. As well, workers should not need to support their upper body weight on their elbows causing contact stress on the forearms.
- Consider lighting – poor light causes workers to lean forward to see what they are doing.
- Consider eyewear - a seated position usually means having to work at closer visual ranges. Seated workers wearing bifocals may lose the ability to work at a visually comfortable distance resulting in exaggerated neck extension being needed to perform their tasks. Trifocals or glasses designed for the work distance should be provided.

These are just some of the main considerations. On the surface, seated workstations seem like an intuitive and simple ergonomic intervention. The real experience may be the opposite unless thorough and thoughtful design principles are applied. Always remember, seated work creates a whole new set of ergonomic risks and has the potential for causing its own set of problems and injuries.





MANUAL MATERIAL HANDLING PRINCIPLES

Lifting

Safer lifting is less lifting. Many studies verify that workers who lift heavy objects, lift frequently and with inadequate rest periods experience a high incidence of damage to their backs.

As with other occupational health problems, engineering controls are the only proven way to prevent these injuries.

Based on the U.S. government agency, National Institute for Occupational Safety and Health (NIOSH) research, guidelines for lifting have been developed:

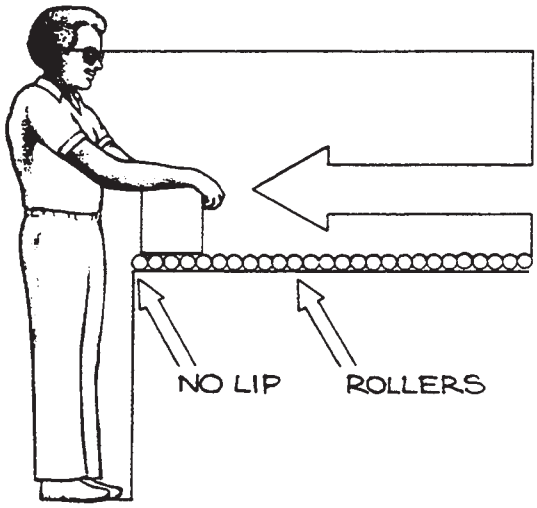
1. The lifting of heavy objects should be avoided.
2. Frequent lifting should be avoided.
3. Objects to be lifted should be stable and balanced.

4. Objects to be lifted should have handles and be packaged compactly.
5. The horizontal distance between the object to be lifted and the feet should be minimized.
6. The height of the lift and the distance the object is to be carried should be minimized.
7. The starting position of the lift should be between 100 and 150 cm above foot level.
8. For workers in a standing position, relatively heavy objects should be lifted with two hands in a plane parallel to the front of the body.
9. Lifting or carrying of heavy loads should be mechanized as much as possible.
10. Sufficient staff must be available to lift safely.
11. When lifting is combined with pushing, one foot should be placed ahead in the direction of movement.
12. Twisting the body while lifting should be avoided.
13. Keep lifting and handling to a minimum. Where possible eliminate lifting altogether.
14. Use well designed mechanical aids such as lift tables, hoists, handcarts and conveyors.
15. Reduce overall weight and capacity of containers.
16. Use containers with well-designed handles that allow for proper grip and two-handed lifts.
17. Reduce carrying distances.
18. Change the shape of the object or container so it can be held closer to the body.
19. Redesign workstations to bring heavier materials closer to the worker.
20. Where lift assists are not available ASK FOR HELP!

Avoid lifting and handling materials above shoulder height, below knee level, and while bending or twisting.

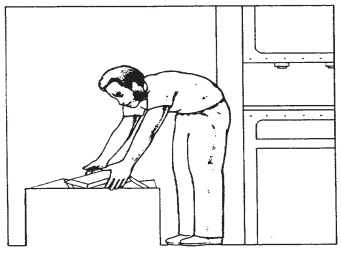
A commonly recognized problem is lifting objects from the floor. But lifting objects overhead is also hazardous. It is better to build platforms to store objects off the floor (above knee height) to eliminate the need for stooping and also keep the materials below shoulder height.

Provide shelves, supports, or roller conveyors on which objects can slide in order to eliminate unnecessary lifting.

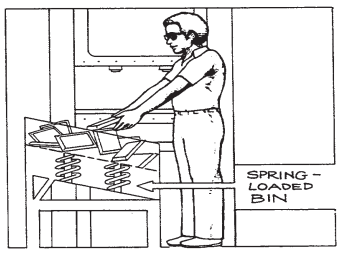


Reaching down into a bin is an example of poor workplace design. It is better to keep the bin off the floor and tilted to ease loading and unloading. A powered assist can be installed to adjust the tilt angle. Also, spring loaded bins can be used, which lift the parts ups as they are being unloaded.

BAD DESIGN

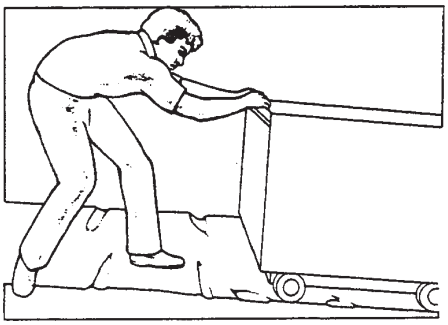


GOOD DESIGN



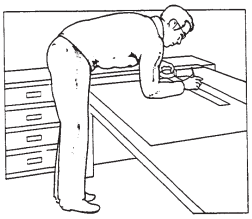
Pulling and pushing objects can also cause back injuries. Proper equipment design and maintenance can reduce these problems. In the above illustration, the floor needs repair, the wheels should be larger and a better handle provided.

BAD DESIGN

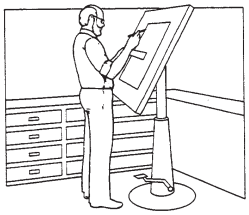


Work that involves the bending of the back should be avoided as much as possible. Change the work station to eliminate the need to work with a bent spine. Angle the workbench, not your back.

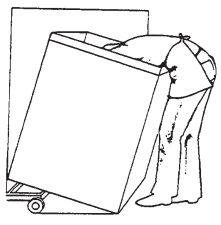
BAD DESIGN



GOOD DESIGN



Many jobs have combinations of back hazards. For example, loading a machine from a bin on the floor combines sidestepping, twisting, low lifting and reaching. It is better to re-locate the bin to minimize these movements.



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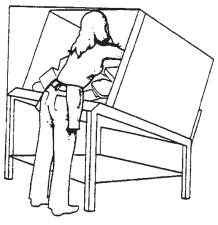


GOOD DESIGN

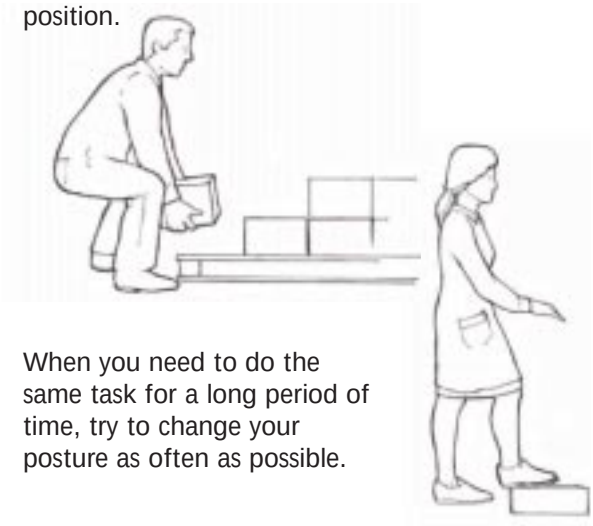
Preventing Low Back Pain

Risk Factor Combinations

Back pain is caused by many factors. When two or more risk factors are present at the same time, you are at a much higher risk of injury. The most common poor postures used when handling objects are forward bending, twisting, and extreme side bending.

- When lifting loads, use a two-handed grip where practical and maintain a straight back with your head up.

- When repetitively handling objects, turn your body by moving your feet and getting into a stable position.



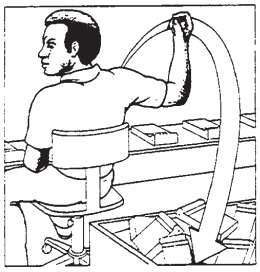
- When you need to do the same task for a long period of time, try to change your posture as often as possible.

REPETITION

Reduce repetition. Repetitive elbow and shoulder movements can often be eliminated by changing material handling practices.

For example, the common practice of tossing rejected parts into a bin has been linked with arm and back problems. The work layout can be changed to eliminate this practice, such as by dropping parts onto a chute to the bin.

BAD DESIGN



GOOD DESIGN

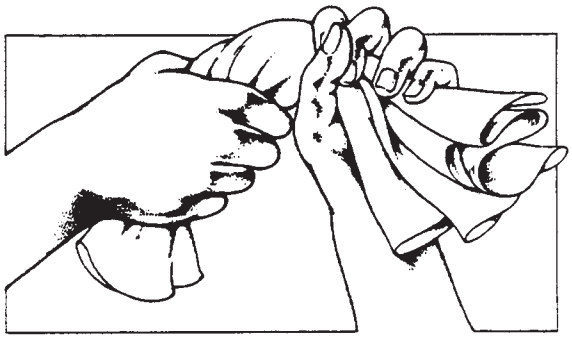
Material handling in some assembly jobs can be mechanized to eliminate repetitive arm motions.

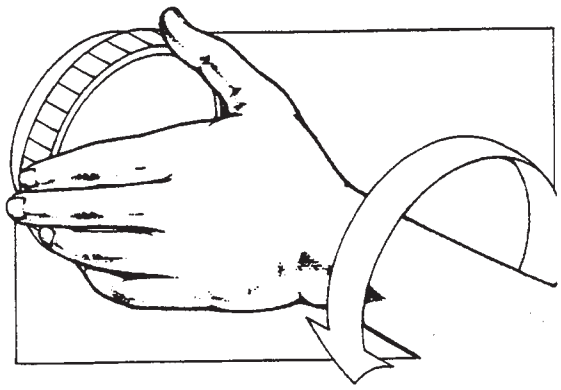
Continued repetitive movements of the fingers should be avoided.

Use of special tools with ratchet devices can reduce stressful repetitive motions.

Repetitive work motions which duplicate this wringing motion are very hazardous. Even when little force is used, the cumulative effect of tendinitis and carpal tunnel syndrome is eventually inevitable.

BAD DESIGNS





When motions like this are a common and frequent part of a job, alternatives such as mechanical wringers must be made available.

This twisting motion repeated thousands of times in a work day triggers tendinitis and carpal tunnel syndrome.

WORK ORGANIZATION PRINCIPLES

The way in which work is organized is closely linked to the health and well being of workers.

- Provide workers with proper training on how to use tools, equipment, and job procedures to ensure they take advantage of well-designed workstations and jobs.
- Provide workers with time to adjust to the demands of new work or after an extended period of time away from work.
- Provide frequent short breaks to give muscles a chance to recover.
- Limit where possible the total time per day spent on continuous repetitive work by enlarging the work or alternating tasks.
- Develop work schedules where workers can be productive and have adequate rest between changes in schedules.
- Allow for time off the job and out of the workplace to allow time for the body and mind to rest and recover.

Have you ever thought that your working method made no sense? Management is always changing something in the workplace whether for increased efficiency and productivity or implementation of the latest business concept. Work organization strategies need to be subjected to ergonomic design principles.

The term work organization refers to how, when and where work is done and how those who do the work are rewarded for their efforts. The principles of work organization deal not only with the physical content of the job but also with the needs and expectations of workers. Issues like work pace, isolation, boredom, work scheduling, hours of work and incentive pay systems all impact on health and safety. Take incentive pay systems as an example. This method of organizing work either forces or invites workers to exceed their normal abilities. A pace of work is

PIECE WORK HURTS

"About 15 years ago, when I was working in the North of England, I negotiated a bonus system for data entry clerks based on the number of entries, which members were really pleased with at the time as it was a very good deal in money terms. However, I often think back to that agreement and wonder what happened to those women. Knowing what I do now about RSI, I would never negotiate such a scheme again." (Trade union negotiator)

(RSI Hazards Handbook, London, England)

Contract Language
PROACTIVE ERGONOMICS

The company and the union discussed their joint commitment to efforts, where feasible, to improve the interface of employees with the workplace through the use of ergonomics principles reactively and proactively.

Bargained 2002 CAW/Ford Collective Agreement

created that exceeds their normal daily functional abilities.

Work organization often has decisions made from a labour relations perspective. Every day new management work systems are being developed to increase productivity. We've seen systems such as Kaizen, Team Concept, Lean Production and others implemented in our workplaces. The employers' goal is to increase workloads for productivity improvements. There has been virtually no consideration of human abilities in the design of these systems even though they may be marketed as such. Newer systems like "material handling marketplaces" or "supermarkets" go beyond issues such as productivity by having long-term goals of outsourcing. Our first response as a union to combat this speed up in our work environments is to get ergonomics on the table as part of the discussion when these new systems are being considered. The provincial *Employment Standards Acts* as well as the *Canada Labour Code*, Part 3 sets out some parameters for how work can be organized so those doing ergonomics should be familiar with these parameters.

Ensure workers get sufficient rest breaks. Lunch and coffee breaks are important as are weekends, holidays and vacations. Excessive overtime can easily lead to strains and sprains that might otherwise not have occurred. Piecework, speedup and incentive programs can have an adverse effect on the injury rate. We need to see the issue of the pace of work as an ergonomics issue.

Issues such as hours of work and staffing are ergonomics issues even though the employer may try to claim these are labour relations issues.

When redesigning work areas remember to allow for the social interaction among workers. The boredom of assembly line work can be relieved if workers have an opportunity to talk as they work.

In some workplaces, hostile, authoritarian supervisors restrict our movements and our ability as workers and union members to communicate among ourselves, both to socialize and to collectively work to redesign our workplaces. We need to challenge the authority of supervisors and empower ourselves to reduce unacceptable stress which makes our work unpleasant and unhealthy.

There is no question that people are much healthier, with greatly reduced harmful stress levels, if they have increased control over their lives. As workers in the workplace we need more collective control.

Many of our workplaces are gloomier than they need to be. In addition to preventing injuries, workers should have the power to be able to redesign workplaces and work stations to make them more pleasant to be in. Everything from ensuring that the walls are painted regularly in attractive colours to ensuring there are as many windows as possible to allow in natural light and a view of the outside should be considered. In some Northern European countries factories are as nicely designed as some North American offices. We need to make these examples our goal in Canada.

Contract Language

ERGONOMIC TRAINING AND SHARING STRATEGIES

The parties agree that the Master Ergonomic Committee will plan and implement annually four (4) days of meeting/training for appropriate members of the Local Ergonomic Committees from each plant location.

Bargained 2002 CAW/Ford Collective Agreement

OUR UNION'S PERSPECTIVE ON JOB ROTATION

Introduction

Job rotation is a controversial issue within our union. There is no national policy on this issue. Rather, union leadership at particular workplaces or in particular local unions have often taken a firm stand, often opposed but sometimes in favour of job rotation. In many CAW workplaces job rotation has gone on for years. In other workplaces, when job rotation is raised by management, workers resist. Why is this so? The issue of the possible effect of job rotation on injuries must be seen in the context of important issues of seniority and the history of bargaining the workplace collective agreement. We look at the issue of job rotation from the perspective of our union and focus particularly on short-cycle vehicle assembly jobs.

We take the position that there is nothing inherently beneficial or detrimental about job rotation. Rather, three factors must be analysed when making a determination about whether workers and the union should support or reject job rotation. They are: 1) who controls the rotation? 2) what are the staffing levels? 3) is the purpose to hide bad jobs? All three questions must be answered before unions can decide if job rotation is good or bad. When a rotation is set up, it must be ergonomically sound, not simply rotating workers among several bad jobs.

Job rotation can be beneficial if different muscle groups are used and if it reduces psychological stress. It can be detrimental if there is more complexity added to the job without sufficient time or technological support.

We put job rotation into a context. When workers control the rotation, have sufficient numbers of workers to perform the work, and know the problems of bad jobs will be addressed, they may support rotation. When these issues are not dealt with to their satisfaction, they resist.

Union Collective Agreements

Union collective agreements are documents bargained to erode management power. They seek to introduce standards of fairness for workers in the area of job opportunity so that managers cannot play favourites in awarding jobs to friends or family or people who pay them off. This is the reason unions were organized in the automobile assembly plants in the first place, including the bitter strike to establish the principle of seniority in 1937 at General Motors in Oshawa. Within most collective agreements, jobs are awarded on the basis of seniority. Those who have been in the workplace longest have the opportunity for better jobs. The job posting procedure is usually spelled out in detail in the collective agreement. Sometimes jobs are awarded by strict seniority. In some agreements ability is also taken into consideration. Seniority usually means younger workers do harder jobs and they can look forward to getting easier jobs when they are older.

In Canada today most large vehicle assembly plants are characterized by jobs which take a maximum of 45-60 seconds to complete. Most vehicle assembly jobs are of this nature. The entire production facility and organization of work is built around these incredibly repetitive jobs where tiny fractions of a second are taken into consideration in timing the jobs when management decides how much work each worker will do. While union production standards representatives can challenge the timing of individual jobs, the nature of the system remains.

In the past, vehicle assembly workers had an opportunity to get off the assembly line and into sub-assembly jobs such as repair work or bench work. These sub-production jobs were often performed sitting down and workers worked at their own pace rather than being driven by the pace of the assembly line. These sub-assembly jobs were awarded on the basis of seniority and these preferred jobs went to the senior people. Since these were older workers who had often been standing on the assembly line for twenty years or more, the system seemed sensible and fair. Today, however, in the large vehicle manufacturing facilities in North America, the sub-assembly jobs have been integrated into the assembly line or in some instances contracted out. As a result, workers face spending their entire working lives standing on the assembly line.

Within assembly lines and vehicle assembly facilities there are preferred jobs and jobs which are shunned. Given the opportunity to drive a car off the end of an assembly line, or inspect paint for defects, most people would choose these jobs over physically demanding jobs involving a lot of reaching, stretching, climbing in and out of vehicles and fitting parts in vehicles at a rapid pace. Union collective agreements have been built on the premise that senior workers will have a chance to successfully bid on these preferred jobs. Some collective agreements provide for a Sadie Hawkins day, the day once a year when all of the assembly jobs are posted and everyone is allowed to bid. Since the jobs are 45 seconds long and do not take a long time to learn (usually a few hours at most), this system makes sense and allows workers who are bored or who want easier jobs to bid around, based on seniority. Most plant collective agreements allow bidding when jobs are vacated.

Group Jobs

Within some vehicle assembly facilities such as the Japanese transplants, workers do their jobs as part of a group. There may be a dozen workers as part of the group and the workers rotate within the dozen jobs they are responsible for. The rotation may be stipulated such as a rotation every four hours or the rotation may be permitted on the basis of a group decision. Work in the Japanese transplants has been organized on the basis of group work in order to ensure workers can perform a variety of similar tasks which makes them more flexible and benefits the employer. When workers are away, the remaining workers are often obliged to fulfil the same production requirements. Since this is quite difficult, it puts pressure on workers to report for work even if ill or injured so their fellow workers will not be disadvantaged. And when they do return injured, they are unable to do the harder jobs so their fellow workers are disadvantaged just the same.

Skilled Trades Workers Become Production Workers

When automobiles were first produced in the early 1900s they were built by machinists. Each part was made for the vehicle and each car was assembled piece by piece. The work was undoubtedly extremely interesting for the skilled trades workers concerned.

Henry Ford and Frederick Taylor changed all this. Mass production meant the de-skilling of jobs so that each worker repetitively did the same job over and over again. Machinists were not needed to produce vehicles but only to maintain the machines of the assembly line itself. Jobs which had been fascinating became boring. Producing a car which had involved a wide variety of tasks and different muscle groups, now meant workers' arms and wrists repeated the same motion day after day, year after year. Power which had resided in the hands of the machinist who controlled his own pace of work was now shifted

to the owner of the assembly line. Charlie Chaplin's movie, *Modern Times* graphically depicted the reality of the monotony of the factory, the control of the pace of work by the employer and the dangers of the work.

Production Workers Become Skilled Production Workers

The Swedish economy was very strong during the 1960s and early 1970s and unemployment was very low. With a Social Democratic government, a 90% unionization rate as well as a union movement with a strategy to move in the direction of democracy in the workplace, the Swedish Metalworkers union was well placed to bargain a new way of assembling cars with Volvo. The Volvo Uddevalla plant became the model for a completely new way of assembling vehicles in Sweden. Production workers would require a year or more to learn how to assemble an entire vehicle in small groups rather than the few hours of training required for conventional assembly line jobs.

> "Small, parallel work teams, each of which built a car from start to finish, handled all inspection and repairs, determined the allocation of tasks, were able to vary the pace at which they worked, and took on recruitment responsibilities. Team autonomy was insured by an extremely flat control hierarchy consisting of only two layers of management and no first-line supervision."[1,2]

Although the workers did not machine parts so therefore could not be called skilled trades workers, the Uddevalla experiement effectively turned production workers into skilled production workers. The work was more interesting.

Production Workers Become Lean Production Workers

Japanese transplants in North America used a "team concept" as well. Small groups of workers would assemble cars. But the concept was completely different from Uddevalla. The small groups of workers at CAMI, for example, a joint venture Suzuki/General Motors plant in Ingersoll, Ontario certified with the CAW, have no autonomy over their work. The assembly line, just-in-time production requirements and electronic monitoring ensure workers at CAMI must follow the dictates of production and certainly not the other way around.

But work is organized differently at CAMI than in other, conventional vehicle assembly plants certified with our union. Small groups of perhaps eight workers each, rotate jobs within them. The cycle of the job is less than a minute but the cycle of work is much longer. Jobs will be rotated within the group perhaps every four hours. While far from democratic, assembly workers at CAMI find the nature of their work more interesting than a conventional assembly line and the vast majority (more than 90% in two surveys) support

Contract Language
ERGONOMIC CHECKLIST

In carrying out job station design at introduction of new processes or procedures or the changing of job assignments all Industrial Engineers shall use an Ergonomics checklist. The checklist will be explained to the JHSC before its launch when they may make recommendations. The checklist may in the future be computerized.

Bargained 1996 CAW/Daimler Chrysler Collective Agreement

the retention of the work group system. "The workforce uses rotation not only to relieve monotony but also to regulate work and to restrict managerial flexibility."[3]

At CAMI, job rotation has been used to attempt to reduce the incidence of repetitive strain injuries, which are rife in the auto assembly industry. However, one manager was candidly ready to explain the consequences of job rotation, "One thing you can say about rotation is, you know, they're sharing the pain. It's not the elimination of it, it's a sharing of pain, a spreading around of pain."[4]

The fights with management (including a difficult strike) at CAMI have not been about job rotation but rather, who controls the rotation, are there enough workers to do the work, and is job rotation being used to hide bad jobs.

Ergonomics

The vehicle assembly plant collective agreements in the CAW have extensive provisions on ergonomics, the science of making the tool, work station, workplace and work organization meet the needs of the worker, rather than the other way around. We have bargained full time national ergonomic coordinators, chosen by the union and paid by the employers, in the Big 3 (General Motors, DaimlerChrysler and Ford) master collective agreements. We have bargained joint ergonomic committees in these workplaces and in a number have bargained full time union ergonomic representatives. They see their job as advocating changing the job either through design or retrofit, to prevent injuries. They usually oppose the idea of job rotation both for union seniority reasons and because they feel that job rotation means that problem jobs do not get fixed and more workers are injured as a result. The wording of the collective agreements do permit job rotation as a temporary solution to injuries.

Conclusion

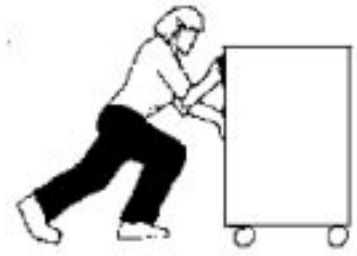
Job rotation is no panacea in preventing injuries to workers. Nor, however, is job ownership of one boring 60 second job a point of principle never to be challenged. Volvo's Uddevalla plant showed that a different kind of production system which would make vehicle assembly work both interesting and with less repetitive strain injury, is possible. Short of that, changing the job to prevent injury is key. The key issues: who controls the job rotation, workers or management? are there sufficient numbers of workers to perform the work? is job rotation used as a management excuse to neglect fixing bad jobs? must all be answered to the satisfaction of the workers and the union if job rotation is to be supported.

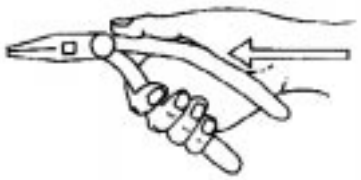
References

1. James Rinehart, Christopher Huxley, and David Robertson, *Just Another Car Factory? Lean Production and its Discontents*, Cornell University, 1997, p. 105.
2. Berggren, Christian, *Alternatives to Lean Production: Work in the Swedish Auto Industry.* Ithaca, New York: ILR Press, 1992.
3. James Rinehart, Christopher Huxley, and David Robertson, *Just Another Car Factory? Lean Production and its Discontents*, Cornell University, 1997, p. 57.
4. James Rinehart, Christopher Huxley, and David Robertson, *Just Another Car Factory? Lean Production and its Discontents*, Cornell University, 1997, p. 57.

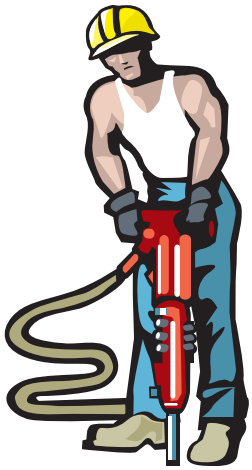
PREVENTION

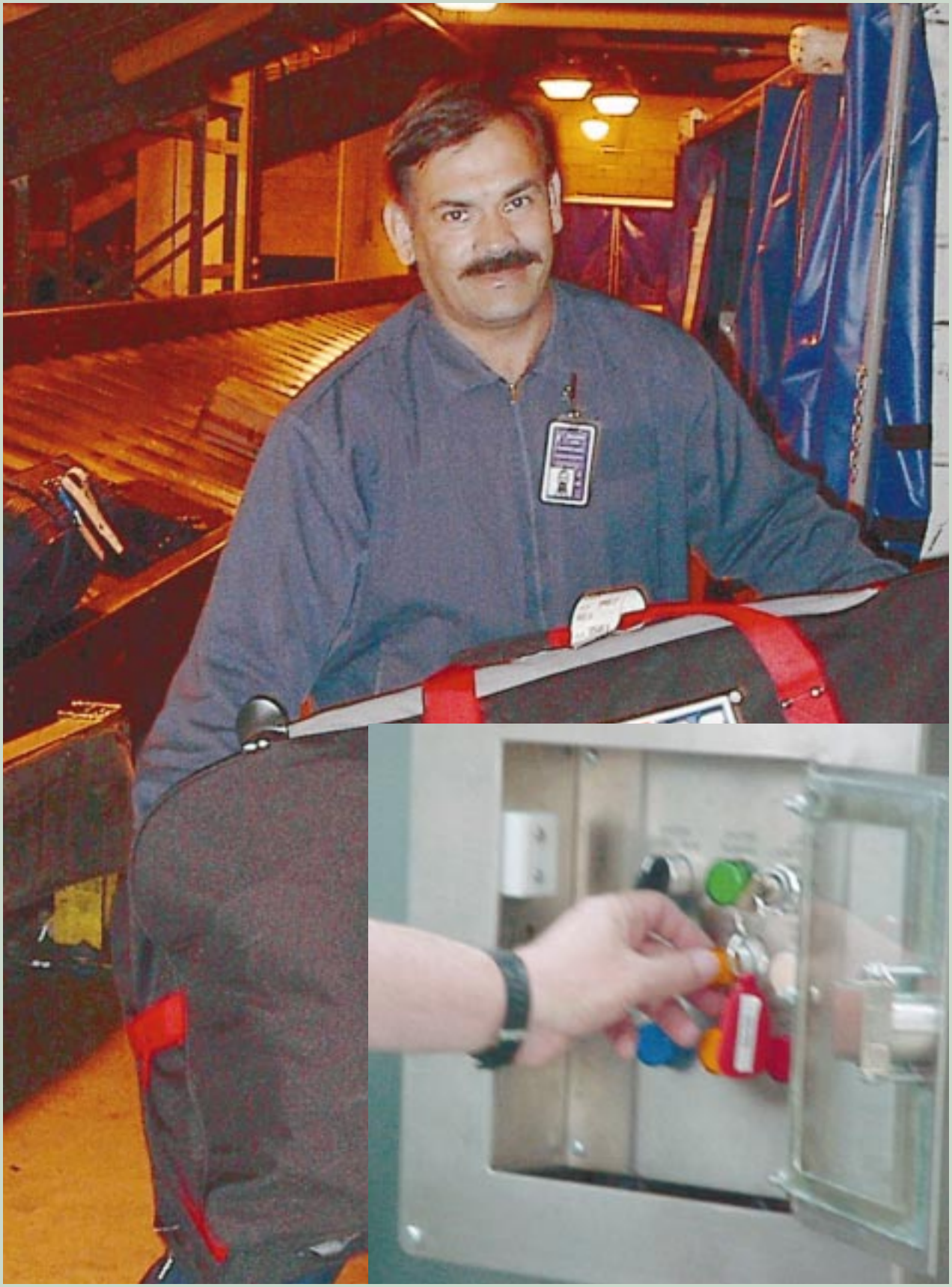
This table does not include all possible options for preventing strains and sprains injuries. It is a starting point for the selection of appropriate prevention measures. Priority should be given to controls that do not rely primarily on changes in worker behaviour to reduce the risk of RSIs. First try to eliminate the risk, but if that is not practicable (capable of being done), minimize the risk. Engineering or administrative controls must be used before personal protective equipment.

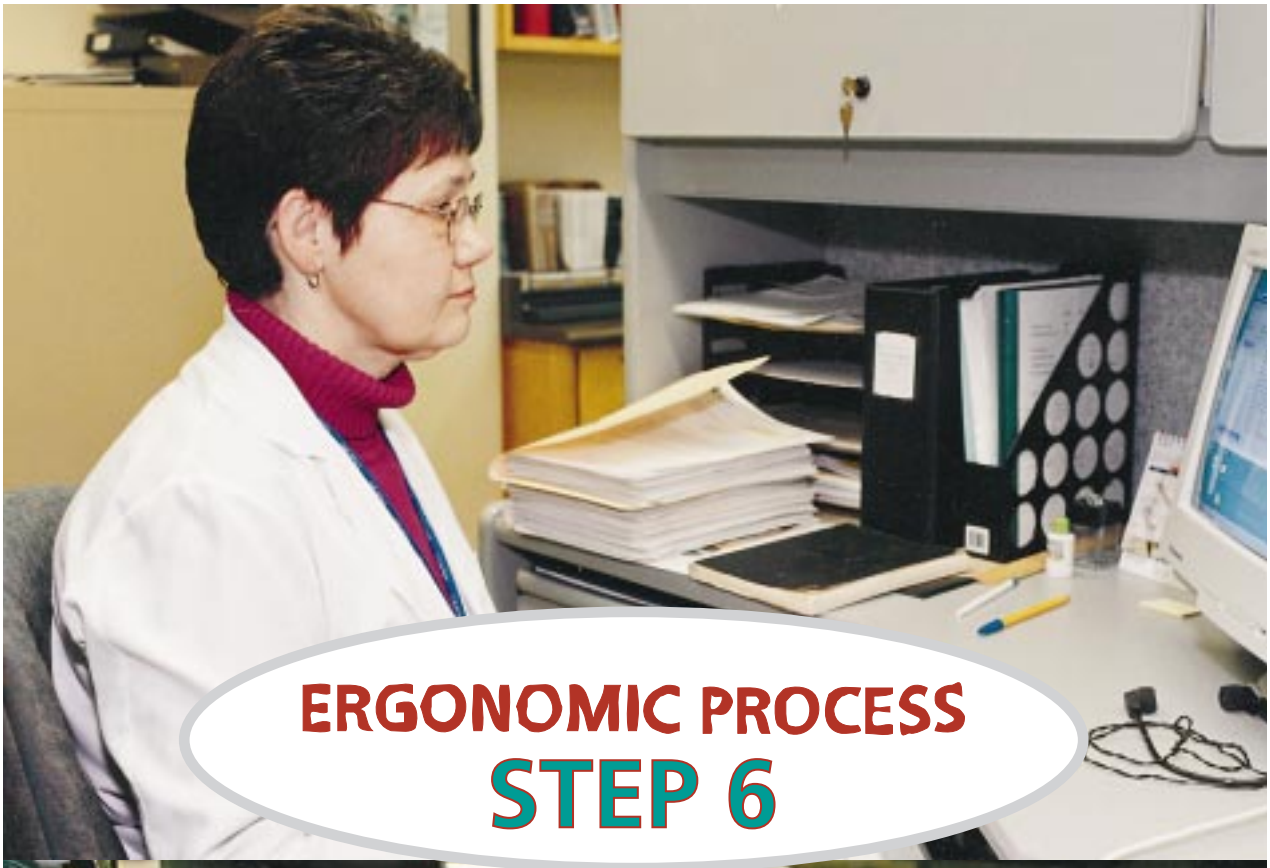
Risk Factor	Preventing Risks
Force: Lift, lower or carry 	Eliminate the need to manually lift, lower, or carry objects by using engineering controls such as hoists, pallet jacks, carts, and conveyors. If that is not practicable, consider options such as the following to minimize risk: • Minimize the distance of the load from the worker (eg., use turntables; move the worker closer to the object; don't place obstructions close to the object). • Minimize the vertical distance over which the load is lifted or lowered (e.g., use pallet jacks; limit shelf height). • Avoid tasks below knuckle height (eg., use scissor lifts, pallet jacks). • Avoid tasks above shoulder height (eg., limit shelf heights; improve storage practice, raise the worker). • Avoid stooped or twisted positions (eg. provide unrestricted work space; arrange the workstation to minimize twisting when the worker picks up or puts down a load). • Minimize the size of the load (eg., order loads in smaller containers; have worker take two trips rather than one). • Minimize carrying distance (eg. have a well-designed work flow). • Avoid handling heavy or unbalanced objects while sitting down (eg. stand so that stronger muscles are used to perform physically demanding tasks; avoid handling more than 4.5 kilograms while sitting down). • Improve the grip on the load (eg. provide good handles on containers; add clamps or other devices to improve grip). • Change the design of the task (eg. from a lifting task to a lowering task; from a lifting, lowering, or carrying task to a pushing or pulling task). • Use pause periods or job enhancement to permit muscles to recover from applying force for prolonged periods.
Force: Push or Pull 	Eliminate the need to manually push or pull objects by using engineering controls such as conveyors, hoists, and gravity-fed systems. If that is not practicable, consider options such as the following to minimize risks: – Use carts that are well designed and appropriate to the task: • Handles can be grasped between waist and shoulder height (eg., vertical handles that can accommodate workers of different heights). • Load can be secured on the cart if necessary (eg., belts or clamps provided). • The size, number, and type of wheels are appropriate for the floor surface and weight carried. • Moving parts are maintained (preventive maintenance).

Risk Factor	Preventing Risks
Force: Push or Pull 	• The worker has good visibility when pushing the cart. – Use carts in an unrestricted area: • The worker is able to push and is not forced to pull the cart. • The worker can assume a comfortable position to initiate and maintain movement of the load. • The worker is not forced to assume awkward postures because of restricted work space or poor visibility. – Use carts in areas with proper flooring or surface: • The floor is clean (eg., no debris or clutter on floor). • The floor does not slope and is not slippery. • There is no thick, plush, or shag carpet. • The surface is level (eg. minimize surface height changes in areas such as the entrance to elevators; fill potholes and cracks in surface). – Reduce the load (eg. make two trips). – Reduce the total time spent pushing or pulling , or break the total time into smaller blocks of time doing that task.
Force: Grip  **BAD**  **GOOD** 	Eliminate the need to manually grasp or handle objects by using engineering controls such as clamps or automated tools. If that is not practicable, consider options such as the following to minimize risk: • Maintain a straight wrist (neutral position) through: – Improved design of handles (eg., bent instead of straight handles). – Improved design of workstation (eg., parts containers that are tilted instead of flat; use of in-line tools). – Improved work practice (eg., conscious effort to keep wrist straight). • Use power grip to grasp objects through: – Improved design of objects of handles on tools (eg. using boxes with cut-outs to permit power grip; adding handles to objects). – Improved layout of workstation (eg., objects positioned to permit easy access to handles). – Improved work practice (eg., conscious effort to avoid pinch grip). • Avoid strong or hard grasping of vibrating tools through: – Improved design of tools (eg., tools with built-in vibration-dampening sleeve). – Improved work practice (conscious effort not to grasp too hard). – Use of personal protective equipment (eg., well-fitting vibration-dampening gloves to reduce grip force). • Avoid handling objects with cold surface temperature through: – Improved work practice (eg., at the end of the day, store the next day's supplies inside instead of keeping them outside where they will be cold by morning). – Improved work procedure (eg., avoid skin contact by using tools or utensils for grasping; use warm water periodically to warm hands). – Use of suitable gloves. • Improve grip while handling slippery objects by using friction-enhanced, well-fitting gloves or gloves with fingers removed. Reduce the total time spent manually gripping objects, or break the total time into smaller blocks of time doing that task.

Risk Factor	Preventing Risks
Repetition 	Eliminate highly repetitious tasks by using engineering controls such as mechanization (eg., power tools) or automation. If that is not practicable, consider options such as the following to minimize risk: • Combine or eliminate some parts of work to reduce the pace of repetition. • Incorporate flexibility over pace (eg., allow the worker to take rest breaks and micro-pauses or to control the speed of the conveyor). • Use good work techniques (eg., avoid unnecessary repetitions as with multiple scanning of grocery items or multiple turning of lumber for grading). • Reduce the duration of exposure to repetition (eg., offer job rotation or job enhancement).
Work Posture  	Eliminate awkward postures by using engineering controls such as adjusting work heights, minimizing reaching distances, changing orientation of work, changing layout of workstation, using adjustable or angled tools and equipment, and using turntables, conveyors, tilted surfaces, or spring-loaded surfaces. The objective is to enable the worker to work in a comfortable posture. Every posture requires periodic changes and movement or it becomes static. If elimination of awkward postures is not possible, consider options such as the following to minimize risk: • Minimize awkward postures of the trunk: – Minimize forward bending by increasing the work height or moving objects closer (eg., use turntables, improve layout of workspace). – Minimize side bending by reducing the reach distance or moving objects to the front of the worker (eg., improve layout of work space; move closer to the objects). – Minimize twisting by reducing reach distance or moving objects to the front of the worker (eg., improve layout of work space; move closer to the objects). • Minimize awkward postures of the shoulder: – Minimize reaching forward by reducing the reach distance or lowering the work height. – Minimize reaching sideways by reducing the reach distance, lowering the work height, or moving objects to the front of the body. – Minimize reaching behind by moving objects to the front of the worker. – Minimize reaching across the body by moving closer to the objects or transferring objects from one hand to another. • Minimize awkward postures of the wrist by selecting the required tools with appropriate handles (eg., angled handles). • Minimize forearm rotation by using power tools or mechanical turners. • Minimize squatting and kneeling by raising the work. • Minimize static postures: – Provide footrests to allow the worker to transfer weight from one to foot to another. – Provide opportunities for the worker to move about periodically. • Minimize awkward postures while sitting by providing an appropriate chair that is adjusted to give good back support, maintain a comfortable posture, and minimize contact stress. • Provide a tilted sit-stand stool to take weight off the worker's feet and legs while allowing mobility.

Risk Factor	Preventing Risks
Local Contact Stress  BAD	Eliminate or minimize exposure to local contact stress: • Change or modify equipment (eg., use a long-handled screwdriver to prevent the butt from digging into the palm). • Change or modify work area to prevent sharp edges from digging into the skin (eg., pad sharp or metal edges). • Use personal protective equipment (eg., use knee pads while kneeling; use padded gloves when lifting heavy objects by narrow plastic strapping). • Improve or change work practice: – Avoid resting or leaning against sharp edges. – Avoid using a body part (eg., hand or knee) as a hammer.
Environment 	Eliminate or minimize exposure to whole-body vibration: • Avoid sitting or standing for prolonged periods on a vibrating surface if practicable (eg., catwalks on vibrating machinery). • Isolate the source of vibration from the rest of the work space to prevent transmission of vibration to the sitting or standing area (eg., isolation of truck cabs from diesel engine vibration). • Keep equipment well maintained to reduce vibration. • Reduce total exposure to vibration by breaking up driving tasks or incorporating job rotation. • Keep road surfaces well maintained where possible Keep the body warm at a comfortable temperature: • Use local source heating. • Wear warm clothing. • Take rest breaks in warm areas. Ensure that lighting is proper for the task being performed and glare is avoided so that the worker does not assume awkward postures to compensate for glare, brightness, or inadequate lighting.
Work Organization 	Ensure that repetitive or demanding tasks incorporate opportunities for rest or recovery (eg., allow brief pauses to relax muscles; change work tasks; change postures or techniques). Incorporate task variability so that the worker does not have to perform similar repetitious tasks throughout the full shift. Provide the worker with the opportunity to vary work tasks by rotating jobs or increasing the scope of the job. Ensure that work demands and work pace are appropriate.
	This table is taken from the B.C. Workers' Compensation Board's publication ***Preventing Musculoskeletal Injuries (MSI)***





ERGONOMIC PROCESS
STEP 6

STEP 6: IMPLEMENTATION AND DOCUMENT SOLUTIONS

THE COMMITTEE should develop a work plan that specifies the time frame for implementation of prevention and control measures for ergonomic hazards. As part of this plan, all affected parties should reach a consensus and be made aware of new solutions prior to implementation. We cannot emphasize often enough the importance of involving the workers concerned.

Every part of an ergonomics process should be documented from the time hazards are reported and identified to the time controls are implemented and follow-up occurs. Ergonomic incidents should be recorded as a part of overall health and safety injuries in the workplace. In fact, ergonomic documentation should closely resemble other health and safety documentation. Good record keeping practices help to ensure mistakes are not repeated and that progress is made in workplace design.

Contract Language
ERGONOMICS COMMITTEES

The company assured the union that it is committed to efforts where feasible, to improve the interface of employees with the workplace.

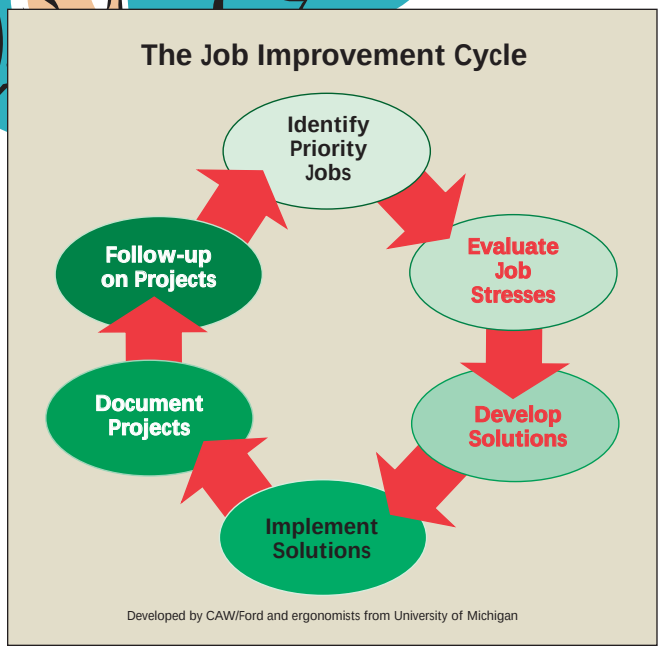
Each assembly, manufacturing unit, and parts distribution centre of 125 or more employees will establish a local ergonomics committee with the objective of introducing and exploring ways to reduce injuries or illnesses through the application of ergonomics.

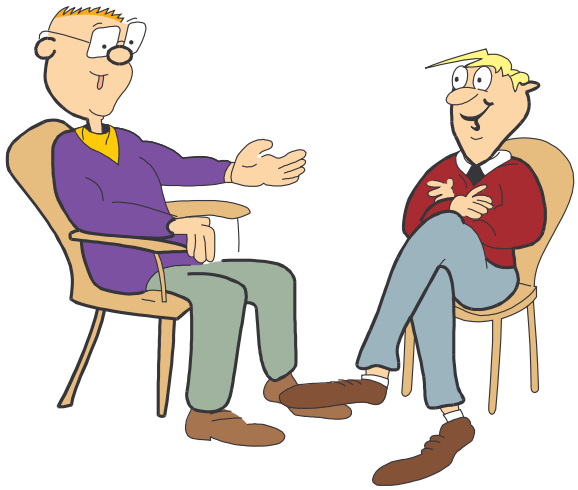
Bargained 1990 CAW/Ford Collective Agreement

ERGONOMIC PROCESS
STEP 7

STEP 7: SHARE STRATEGIES

DEVELOP A procedure to share strategies to eliminate or minimize ergonomic hazards within your workplace, including different departments or divisions. Share your ergonomic strategies in your local union by attending union or other types of workshops or conferences on ergonomics. Take the opportunity to network with others in the union, in your industry and in your community so you can call upon them for assistance from time to time.



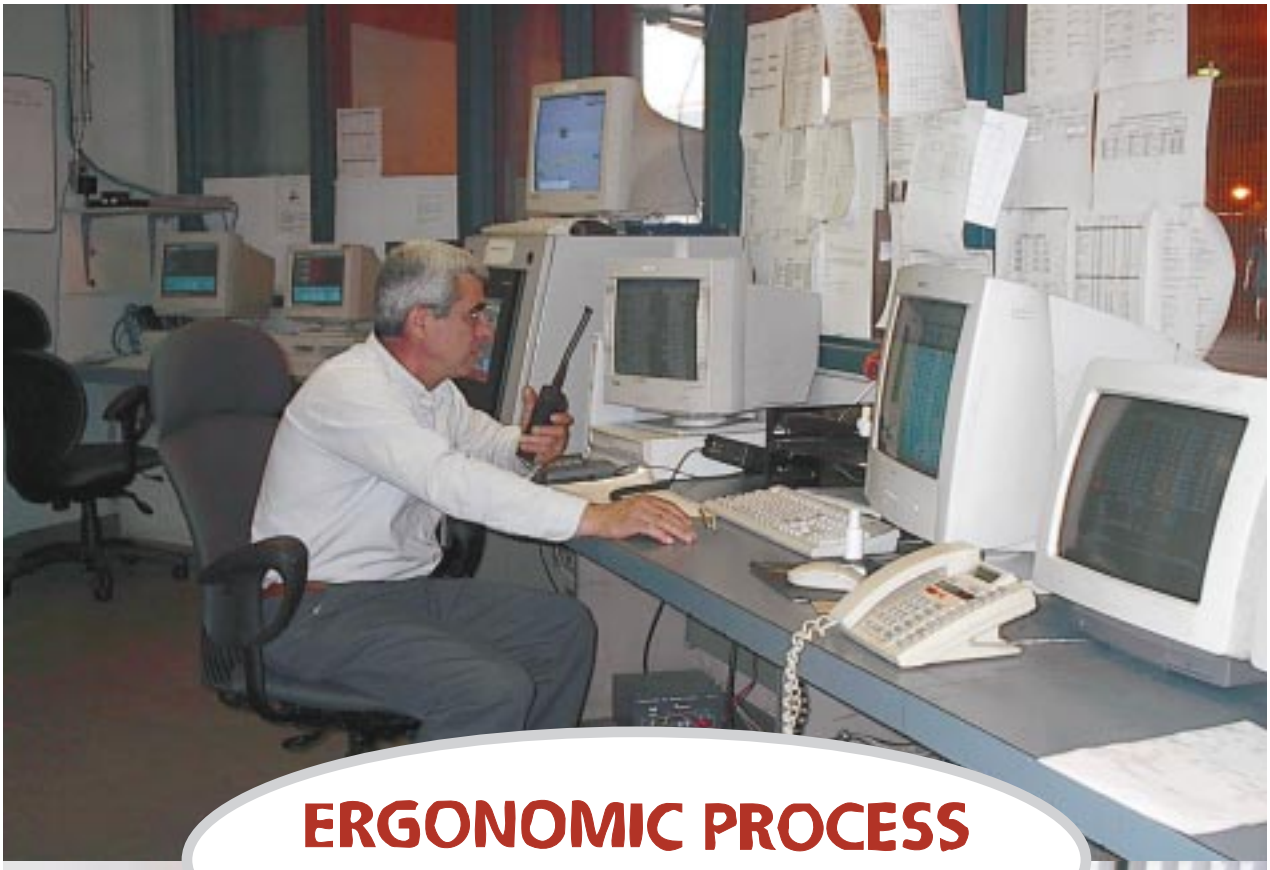


Contract Language
JOINT CAW-FORD ERGONOMICS PROCESS

The two primary strategies that are used in ergonomics are outlined in the Joint CAW-Ford Ergonomics Process:

- **Identify the causes of injuries and illnesses in existing workstations by:**
  1. Identify priority jobs through either the examination of medical records, employee reports, or risk factor checklists, and assessment;
  2. Evaluate job stresses to reveal the causes of the injury/illness or employee complaint;
  3. Reduce or, where feasible, eliminate these causes by developing changes in work methods, machinery, tools, equipment and workstation design;
  4. Implement and test the changes to determine their effectiveness;
  5. Document changes using the CAW-Ford documentation guidelines;
  6. Follow-up to ensure the issue is corrected and job changes are being utilized.
- **Use the Design for Ergonomics Process in the design of appropriate workstation, equipment, tools and other job attributes**

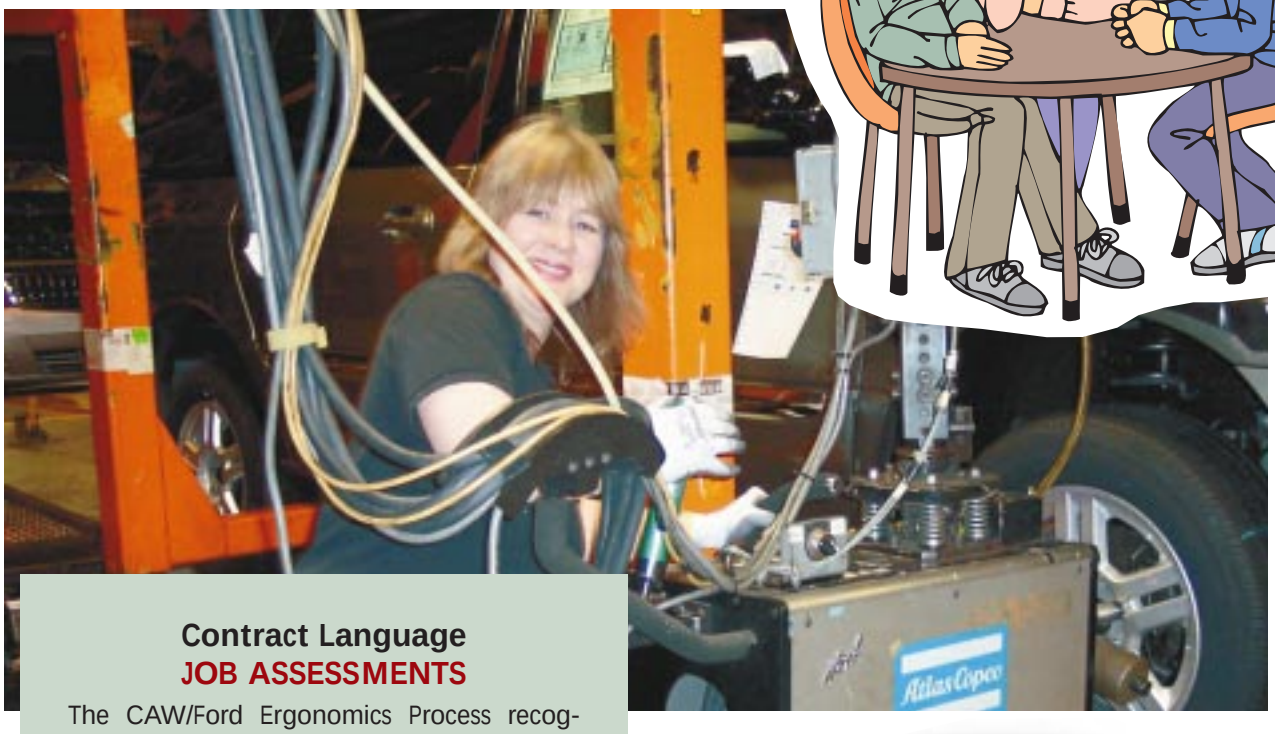
Bargained 1999 CAW/Ford Collective Agreement



ERGONOMIC PROCESS
STEP 8

STEP 8: REVIEW AND REVISE

ESTABLISH A review period on newly implemented hazard controls and enact follow-up procedures to ensure they are effective and have not created any new hazards. Annually review and if necessary revise or update the overall ergonomic process. Consider developing an annual audit (administered internally or externally) to ensure that your process is being used effectively.

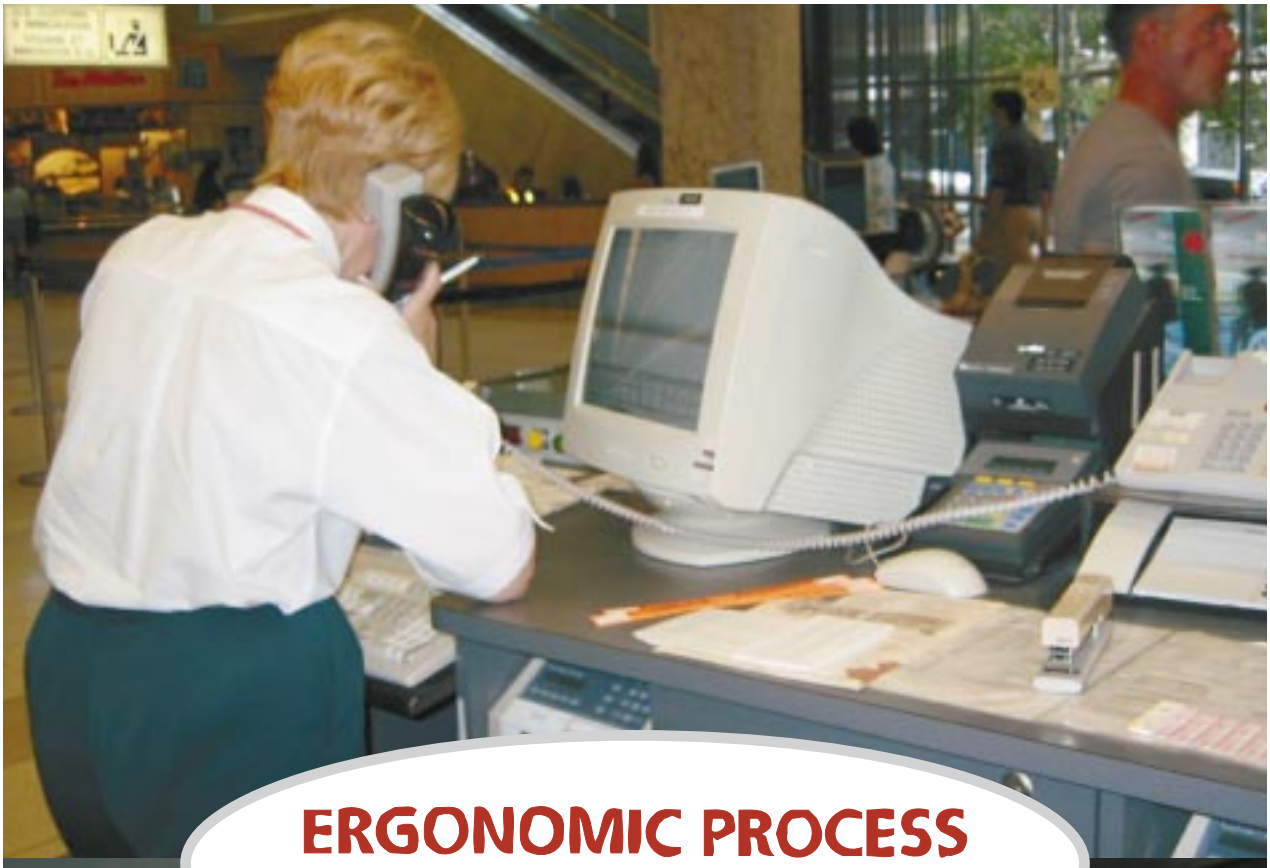


Contract Language
JOB ASSESSMENTS

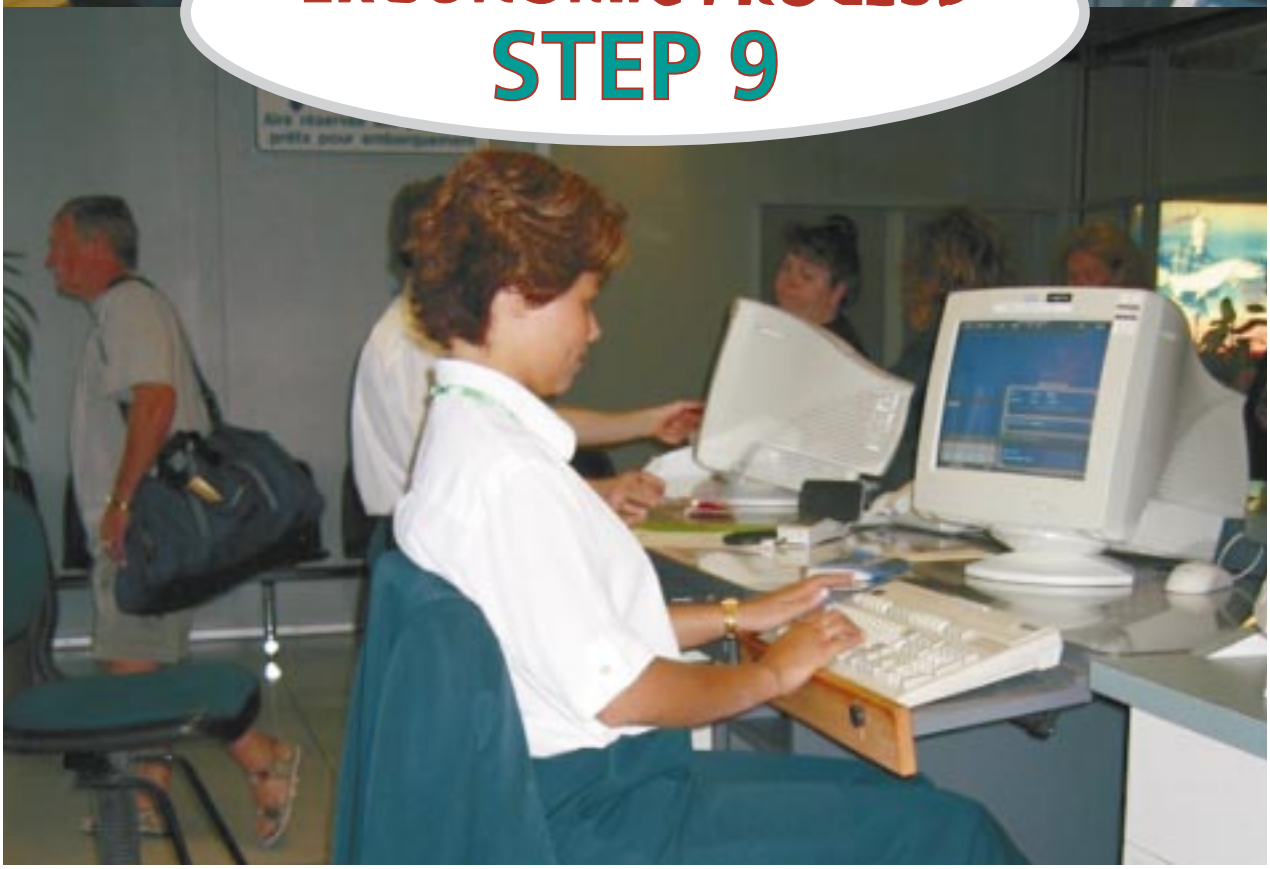
The CAW/Ford Ergonomics Process recognizes that a number of factors may be appropriate to review in job assessments, including:

- The movement and postures of limbs and whole body as workers perform a task;
- The energy expended in performing a task over a given period of time;
- The amount of physical strength required for a task or job;
- Relationship between the worker and the machine, equipment, tools, workstation and workplace;
- Design and layout of control panels and displays;
- Repetitiveness of the task;
- Pace of work.

Bargained 1999 CAW/Ford Collective Agreement



ERGONOMIC PROCESS
STEP 9



STEP 9: EDUCATION AND TRAINING

EDUCATION AND training is the key element to any good ergonomics process. Employers, engineers, union representatives, health and safety professionals and workers should all receive ergonomics training. The workplace should perform a needs assessment to help determine who should receive what type of training. The CAW and organizations such as the Workers Health and Safety Centre offer ergonomics courses from several hours to one week in length. Listed are some basic topics that should be covered in any good ergonomic training program:

- How to recognize RSI signs and symptoms and the importance of early reporting to first aid or medical.
- How to report RSI signs and symptoms and hazards, and make recommendations.
- Ergonomic hazards and the general measures used to control them.
- Job-specific controls and work practices that have been implemented.
- The overall workplace ergonomics process and the role of everyone within it.
- The requirements of any specific legislation regarding ergonomics and workplace health and safety.

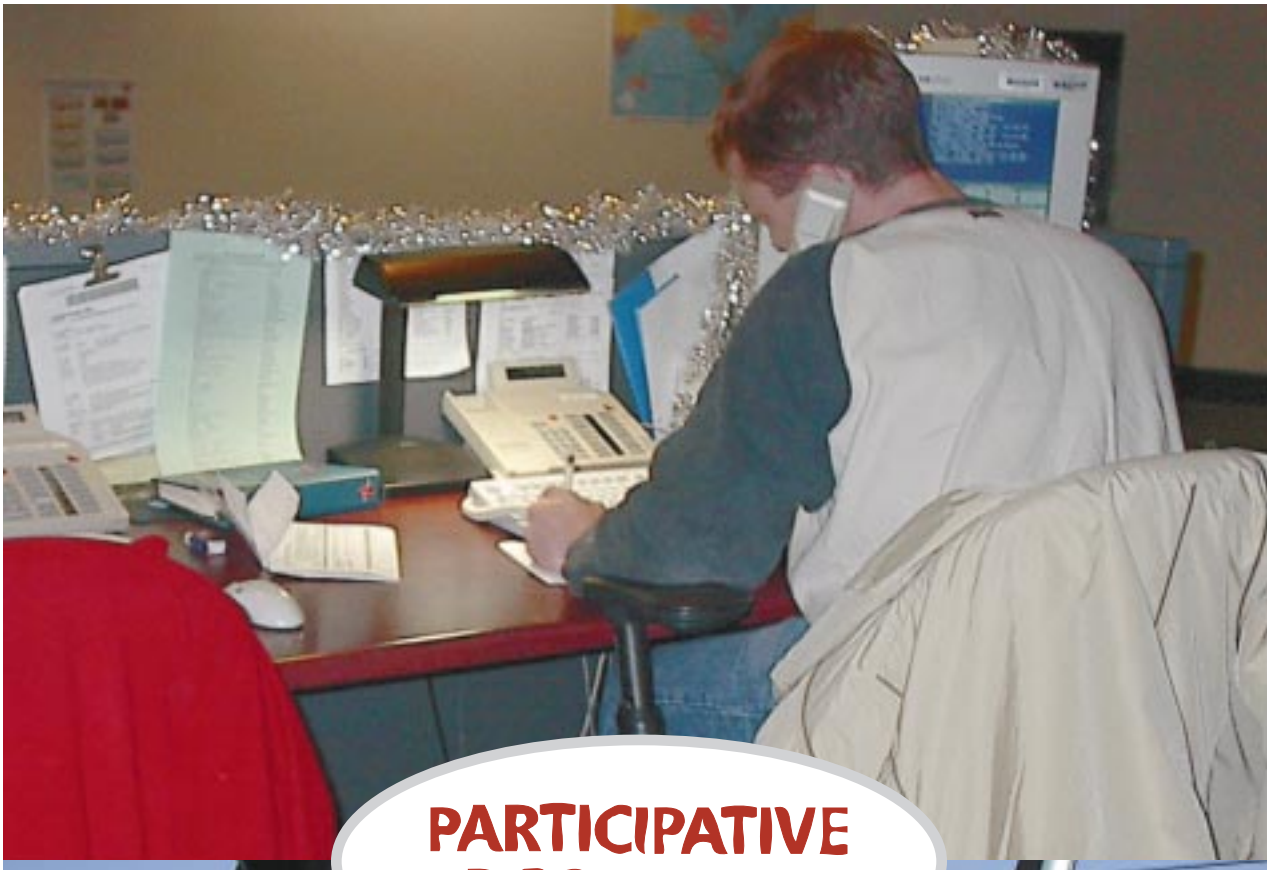
Ensuring that all participants understand the education and training materials well after the session is perhaps the most difficult. For any education and training to be effective, more than one exposure to the material is required, especially if the subject is unfamiliar to participants. Strategies to promote effectiveness include:

- Small group sessions to maximize participation and to ensure all questions are answered.
- Scheduling several smaller topic sessions versus one long training period.
- Conducting demonstration training in the work area.
- The use of quality training videos to provide continuity of training.
- Using group work activities that allow for feedback to the facilitator to confirm that participants understand the material.
- Ask workers how they have used the education and training they have received to recommend ergonomics improvements in their jobs. Ask them if their suggested changes have been implemented and, if so, if they have made a difference. Help them to make changes they feel are necessary. This feedback loop is very important.

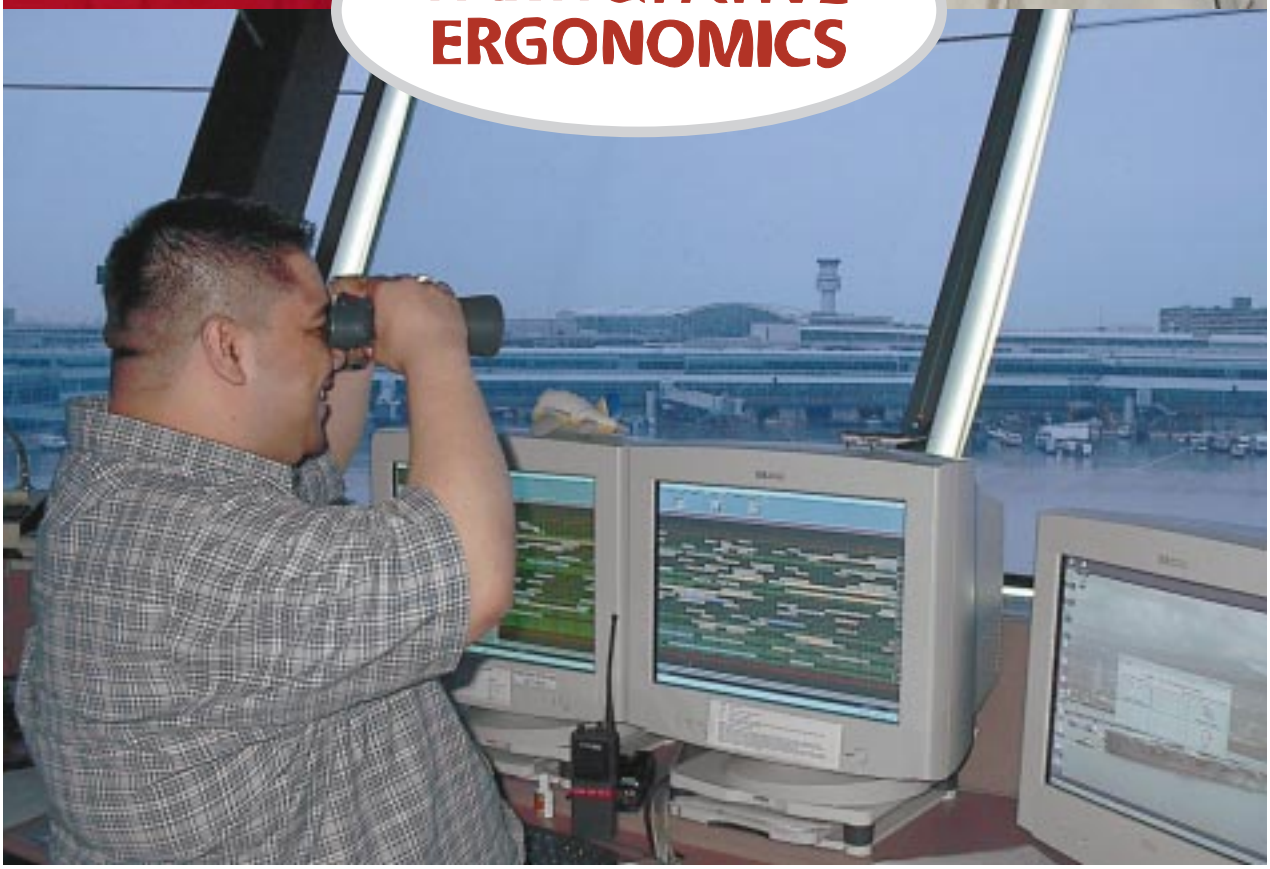
Contract Language
ERGONOMIC RESOURCES

The ergonomics committee will have access to engineering, medical and other resource personnel.

Bargained 1996 CAW/General Motors Collective Agreement



PARTICIPATIVE ERGONOMICS




LEGENDARY SHAKES
LEGENDARY TASTE


THIS MACHINE ACCEPTS

WHAT IS PARTICIPATIVE ERGONOMICS?

"THE INVOLVEMENT of people in planning and controlling a significant amount of their own work activities, with sufficient knowledge and power to influence both process and outcomes in order to achieve desirable goals."

Why Participative Ergonomics?

- More effective change
- Easier implementation of change
- Better communication
- Decreased worker dissatisfaction

Participatory Change Teams

CAW members at Woodbridge Foam plants have participated in participatory ergonomics change teams that have resulted in significant improvements to their workplaces. University of Waterloo researchers helped the process throughout.

Here are key principles emphasized by the researchers for Participation and Consultation:

– use a one minute survey on each shift to get worker feedback.
– if suggestions are made, some kind of immediate response is necessary. So is follow-up. If a problem requires long term follow-up then the individual who made the suggestion needs to be kept informed.
– do the easy things first to encourage people when they see changes being made.
– notify workers when <u>any</u> change is being tested so that they can give feedback.

Involve all relevant personnel:

– commit to a participative style of work.
– establish a formal strategy and process for clear and continuous communication for all workers across all shifts.
– open channels of communication with all relevant groups within the organization. e.g. engineering, human resources, purchasing, maintenance, sales.

This is <u>not</u> participation: "We make the decisions and the workers participate by doing the work," (remark by a company manager in an Ontario workplace.).

GAMING WORKERS' HEALTH & SAFETY RESEARCH PROJECT

Participatory Action Research

Gaming workers in casinos in Windsor, Ontario and Winnipeg, Manitoba worked together to research the health and safety hazards they face on the job. The workers, our union (CAW Local 444) and the Manitoba Government Employees Union, joined with the Windsor Occupational Health Information Service, Occupational Health Clinics for Ontario Workers and the Manitoba Federation of Labour Occupational Health Centre to carry out the research. The study looked at all health and safety issues but we will focus on ergonomics issues here.

Windsor and Winnipeg – The Windsor Casino employed approximately 3,600 workers and the Winnipeg casinos employed 800 workers in three gaming facilities.

Focus Group – Thirteen focus group sessions were set up in Windsor and six in Winnipeg. In Windsor there were 51 workers participating and 20 in Winnipeg for the three hour sessions. Trained union facilitators led the sessions which were observed and recorded by staff from the three occupational health centres.

Research Tools – Mapping – The focus group participants used "mapping" exercises to report their health problems, the hazards they face on the job, and the impact work has on their lives.

Body Mapping

Body mapping is a research tool used for gathering information regarding the health problems (illness, injuries, aches and pains, etc.) of workers.

In each focus group, large images of the body (front and back) were posted on the wall. The gaming workers placed self-sticking dots on the body map to indicate their own health problems. They reported, one at a time, to the group, what health problems their dots represented.

The information was recorded.

The focus group participants reported the following health problems:

- musculoskeletal pain in the shoulders, back, hips, feet, ankles, knees, neck, elbow, wrists, hands and fingers; repetitive strain injuries, such as tendinitis, carpal tunnel syndrome, stress fractures, and epicondylitis.
- general health complaints such as headaches, irritability, fatigue, sleeplessness, and dizziness which was largely attributed to stress.
- many other problems from hearing loss to allergies.

The completed body maps showed clusters of dots in the joint areas (elbows, wrists, knees, ankles, shoulders). There were also concentrations of dots on the hands and feet. Large numbers of dots were placed in the upper, middle and lower back areas and in the neck and head areas.

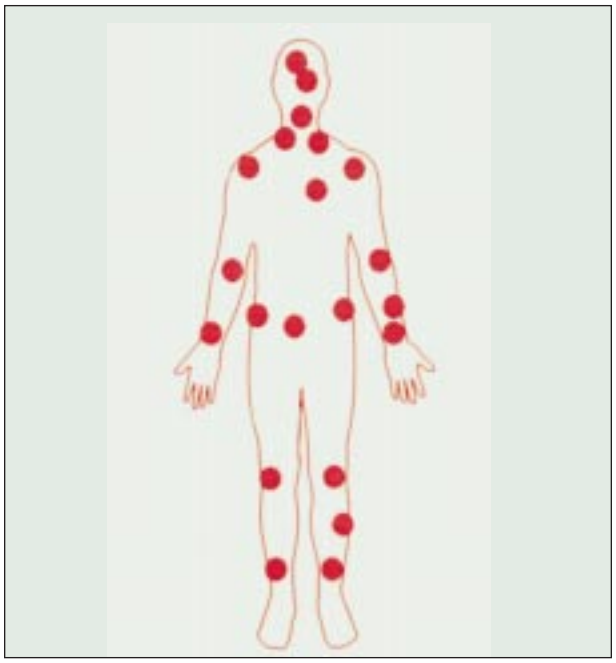
"I thought I was the only one having all these pains."

– Cook, Windsor

Work-related health problems adversely affected workers' lives outside of work.

"I like to go for walks but if my feet or knees are bothering me from work, I can't walk."

– Slot Attendant, Winnipeg



NOTE: This is just an example of how a body map might look. It is not an actual representation of the health problems of any particular gaming worker or group of gaming workers.

Hazard Mapping

The gaming workers were asked to draw a rough diagram of their work area(s). Large sheets of craft paper were mounted on the wall. Collective maps were used when workers came from the same area. These sheets of paper included the physical layout of the work area, the location of the individual worker and their co-workers as well as any existing hazards. Colour-coded, self-sticking labels were provided. They then described their drawing to the rest of the group. The information was recorded.

Hazard Mapping Results

Work Design and Stress

- overcrowding
- cramped work areas
- poor building design
- poor building maintenance
- lifting and carrying
- equipment/machinery
- workload/under staffing
- repetition
- awkward reaching
- heavy work
- standing

The dealers considered repetitive strain injuries to be one of their greatest concerns. The porters were concerned about ergonomic issues (pushing, pulling and carrying equipment). Participants from the security department reported that standing for a long period of time was an important issue for them.

Workers' work-related health problems also affected their lives outside of work.

Establishing Priorities

Each participant named their top priority workplace health and safety concern. These concerns were recorded on a chart along with details regarding causes, effects, and some proposed solutions.

Participants cast votes for the top priority issues using self-sticking notes. They each had three notes, giving them a chance to vote, not only for their top issue but other participants' issues as well.

Finally, the participants offered a number of solutions to the problems which were believed to be of high priority. Workers from each city raised the same three top priority issues.

Ergonomics and Work Design

Participants said problems could be remedied by replacing machines with updated equipment, asking for worker input on work station design, improving work station design, having more space per worker, increasing staff and floaters, removing "shuffle masters", changing booth locations, widening aisles, bolting stools and chairs to the floor, limiting the number of customers, using smaller/lighter chairs, having a massage therapist/physiotherapist on site, better job rotation, longer rest/break periods, shorter work weeks, planning traffic flow, implementing exercise/stretch/gym programs, more variations in job, sharper knives, providing ergonomically designed tools, lifting devices, anti-fatigue mats, step-ups, risers, chairs, stools, light weight, adjustable carts, proper shoes and clothing/uniforms.

Action

The union representatives on the Joint Occupational Health and Safety Committee used the priorities and suggestions in their repective committee meetings as a program of change to be raised with management. Many positive changes resulted. CAW Local 444 took the issues and put them into language to raise in collective bargaining. Good language was negotiated and many improvements were made.

CAW LOCAL 444 AND WINDSOR CASINO COLLECTIVE AGREEMENT 2001-2004

LETTER OF UNDERSTANDING #14

ERGONOMICS

During the current negotiations, the parties discussed the value of the application of ergonomics in the Casino.

The Casino assured the Union that it is committed to efforts, where feasible, to improve the interface of employees with the workplace. Accordingly, the Director of Labour Relations will designate a qualified member of Management, to have responsibilities for Ergonomics. In carrying out job station designs during the introduction of new processes, procedures or the changing of job assignments all managers shall use an Ergonomics checklist. The checklist will be explained to the JHSC before its launch when they make recommendations. The checklist may in the future be computerized. The Local Health and Safety Committees will address Ergonomic concerns on a continuing basis with this Management designate.

It is intended the Local Joint Health and Safety Committee will address ergonomic needs on a priority basis and work progressively toward improving workplace/employee interface. When an ergonomic concern is beyond the scope of the Local Ergonomic Committee below and requires further expertise, a consultant may be hired to evaluate the problem. The CAW National Union Ergonomics Representative may evaluate the reports, and assist the JHSC as required. When the parties agree upon ergonomic solutions, they will be implemented on a priority basis.

In addition, where New Technology is to be introduced into the Casino, the Joint Health and Safety Committee will be given the opportunity to review the technological changes and to make recommendations with respect to Ergonomic concerns.

LOCAL ERGONOMIC COMMITTEES

In negotiations, the Casino and the Union discussed their joint commitments to efforts where feasible, to improve the interface of employees with the workplace through ergonomics. The Casino will establish a Local Ergonomics Committee (LEC) with the objective of exploring and introducing ways to reduce injuries and illnesses through the application of ergonomics.

This Sub-Committee will consist of four (4) members; the CAW H & S Co-Chair, and a Committee Person as provided for in Article 6, and the Management H & S Manager (or designate) and another qualified member of Management responsible for ergonomics. All members shall receive a minimum of forty (40) hours Ergonomic Training.

The LEC should consider several factors when identifying priority jobs. Medical tracking tools should be used to verify employees are experiencing injuries on these jobs.

AIRPORT CHECK-IN WORKERS IN PAIN

CAW LOCAL 2002 members work at airport check-in counters throughout Canada from Gander to Victoria to Inuvik. Dr. Ellen Rosskam of the ILO (International Labour Organization) worked with the International Transport Workers' Federation (ITF), our union and unions in Switzerland as well as CCOHS (Canadian Centre for Occupational Health & Safety) to investigate the hazards of these jobs. The study found a high risk of work-related musculoskeletal disorders as well as a risk of violence from passengers.

The check-in agents handle more than one hundred pieces of baggage a day having an average weight of 33 kg. each. Where the baggage handling systems are not mechanized, the check-in agents lift and carry each bag to the conveyor belt. (At non-mechanized baggage check-in systems, workers can lift and carry up to 600 bags a day, weighing on average 33 kg. each. This means that workers may lift and carry up to almost 20,000 kg. a day). Even at fully mechanized baggage check-in systems, workers often push and pull bags, often in painful postures.

Dr. Rosskam had this to say:

"Check-in workers are also subjected to immense stress. Present management practices applying 'just in time' policies mean that workers should check in passengers (including check-in and baggage handling) in around three minutes. But if for any reason the agent spends more time - such

as with a passenger who doesn't understand the instructions, or with an elderly passenger who may move more slowly with their baggage, etc. - they must try hard to make up the time later, because at the end of the line is an airplane waiting to take off. A missed schedule is costly. At the check-in counter, the agent knows this very well. So you can imagine the pressure. At the same time, workers are not consulted about the organization of their work, they do not have a voice in workplace decision-making, nor are they consulted about problems they may be experiencing. Communication is top-down only, whereas it could easily be top-down and bottom-up. This environment, full of repetitive physical effort and stress due to existing management practices, favours the occurrence of MSD."

"The industry-wide use of 'just in time' policies in airports has caused an increase in pressure which is exerted directly on the check-in workers, pushing them to work faster. The objective is to avoid as much as possible delays in takeoffs, which are very costly to the airlines. There are more people travelling today through airports than ever before. 'Just in time' policies impose a speed-up in the work process. To characterize the situation, one might say that the agents have more work to complete in less time, while remaining smiling and polite with passengers who are more and more aggressive, and working under conditions often physically demanding, with no training to protect them against any of these risks. That this has repercussions on their health is not surprising."

"For their part, the check-in workers continue to go to work as though nothing were wrong, in spite of their often severe pains. There is a kind of 'culture of pain' at work; if the majority of people in your professional environment suffer from the same kind of pain as you, you may end up by considering that this is the normal state of things. You may tell yourself it's up to you to put up with the pain and suffering without complaining, and to get on with your work. What I call an occupational culture of pain, combined with the difficulty to obtain diagnosis and compensation, and the fact that workers may be somehow encouraged to use their sick leave rather than activate workers' compensation when needed, may work in consort to cause low or no injury reporting and a low level of lost work time, despite widespread suffering. The workers are motivated to do their job because they strongly identify with their profession and are proud of it."

Key Findings: Backs and RSIs

- 44 per cent were absent from work with back pain and 18 per cent were absent from work with neck pain in the previous year.
- Baggage tagging, either from a sitting or standing position increases pain.
- More injuries occur where there is no mechanised system for handling baggage, and where workers sit for a whole shift.
- Workers suffer more injury and discomfort in international terminals than domestic terminals since baggage is often heavier and larger.
- Workers often lift loads exceeding the standard 30 kg. limit
- Bending low, reaching forward, lifting with one hand, and hauling bags to the conveyor belt puts workers at increased risk of injury, yet few staff receive training on manual lifting.
- Computer work at non-adjustable work stations leads to strained, uncomfortable body posture whether sitting or standing.
- The risks of discomfort and injury remain largely unrecognized due to lack of training.

Prevention Measures

Dr. Rosskam says, "The first step in prevention is to recognize that these problems exist. Once there is awareness and recognition of the problems, one can begin to discuss workplace improvements with involvement of the workers directly concerned."

"There are some very simple preventive measures

which can be adopted. Eliminate those workstation arrangements that oblige workers to either remain standing during their entire service, or to remain seated. It is important for workers to be able to alternate positions. The baggage tag dispenser should be placed so that workers are not forced to adopt awkward postures, such as bending over to attach the tags to the baggage and then twisting around to push the bags. Moreover, perhaps there should be a universal baggage weight limit of 20 kg. The check-in counters are often poorly designed; often there is not enough space underneath the counter for the legs when the agents are seated, or even leg room when standing. Workers often end up adopting impossible positions to adapt to what may be a complete lack of leg room under the counter. As well, the work surface of the counter is often too narrow to accommodate all of the documents the agent must deal with. These need to be adapted to the needs of the worker so they may perform their job efficiently and comfortably. Fully mechanized check-in systems are far more desirable than manual systems, but even where costs prohibit the introduction of a fully mechanized system, at least a roller bar could be installed, to obviate lifting and carrying every bag."

The International Transport Workers' Federation had this to say:

"Many of these problems could be solved for relatively little cost, especially when set against the costs of high levels of injury. Yet the current trend in airports is for lower costs, recruitment of less experienced, younger workers, and the focusing of less attention on working conditions.

There are obviously ways to increase staff comfort. The biggest risk factors come with excessive workloads due to high volumes of passengers, constrained and awkward postures, and strains from lifting or repetitive hand movements. Therefore, managers need to ensure adequate staffing and breaks, and to provide adjustable keyboard trays, adjustable chairs and sufficient leg space. Staff should be able to alternate between sitting and standing during a work shift and they should, for example, be able to view a baggage scale without twisting."

REGULATIONS

ERGONOMICS REGULATIONS

ERGONOMICS REGULATIONS are needed in all jurisdictions so that ergonomics requirements will have the force of law. Both British Columbia and Saskatchewan have ergonomics regulations to prevent musculoskeletal injuries. There is a federal working group composed of labour, employer and government representatives drafting a regulation under Part 2 of the Canada Labour Code. Our union has participated in a major campaign of the labour movement and injured workers' groups to lobby for ergonomics regulations to protect workers in all jurisdictions in Canada.

This is the BC Regulation:

Ergonomics (MSI) Requirements

The purpose of sections 4.46 to 4.53 is to eliminate or, if that is not practicable, minimize the risk of musculoskeletal injury to workers.

Definition

"musculoskeletal injury" or "MSI"

4.46 In sections 4.47 to 4.53 (the Ergonomics (MSI) Requirements) means an injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation, that may be caused or aggravated by work.

Risk identification

4.47 The employer must identify factors in the workplace that may expose workers to a risk of musculoskeletal injury (MSI).

Risk assessment

4.48 When factors that may expose workers to a risk of MSI have been identified, the employer must ensure that the risk to workers is assessed.

Risk factors

4.49 The following factors must be considered, where applicable, in the identification and assessment of the risk of MSI:

(a) the physical demands of work activities, including
  (i) force required,
  (ii) repetition,
  (iii) duration,
  (v) work postures, and
  (v) local contact stresses;

(b) aspects of the layout and condition of the workplace or workstation, including:
  (i) working reaches,
  (ii) working heights,
  (iii) seating, and
  (iv) floor surfaces;

(c) the characteristics of objects handled, including
  (i) size and shape,
  (ii) load condition and weight distribution, and
  (iii) container, tool and equipment handles;

(d) the environmental conditions, including cold temperature;

(e) the following characteristics of the organization of work:
  (i) work-recovery cycles;
  (ii) task variability;
  (iii) work rate.

Note: In work situations where a risk of MSI exists, typically only some factors from the list will be applicable. To assist, the WCB provides a risk factor identification chart in the publication *Identifying MSI Risk Factors*.

Risk control

4.50 (1) The employer must eliminate or, if that is not practicable, minimize the risk of MSI to workers.

(2) Personal protective equipment may only be used as a substitute for engineering or administrative controls if it is used in circumstances in which those controls are not practicable.

(3) The employer must, without delay, implement interim control measures when the introduction of permanent control measures will be delayed.

Education and training

4.51 (1) The employer must ensure that a worker who may exposed to a risk of MSI is educated in risk identification related to the work, including the recognition of early signs and symptoms of MSIs and their potential health effects.

(2) The employer must ensure that a worker to be assigned to work which requires specific measures to control the risk of MSI is trained in the use of those measures, including, where applicable, work procedures, mechanical aids and personal protective equipment.

Note: The WCB provides the pamphlet *Understanding the Risks of MSI* to assist with the application of section 4.51(1). Materials addressing other matters such as risk assessment and control are also available.

Evaluation

4.52 (1) The employer must monitor the effectiveness of the measures taken to comply with the Ergonomics (MSI) Requirements and ensure they are reviewed at least annally.

(2) When the monitoring required by subsection (1) identifies deficiencies, they must be corrected without undue delay.

Consultation

4.53 (1) The employer must consult with the joint committee or the worker health and safety representative, as applicable, with respect to the following when they are required by the Ergonomics (MSI) Requirements:

(a) risk identification, assessment and control;

(b) the content and provision of worker education and training;

(c) the evaluation of the compliance measures taken.

(2) The employer must, when performing a risk assessment, consult with:

(a) workers with signs or symptoms of MSI, and

(b) a representative sample of the workers who are required to carry out the work being assessed.

Newfoundland and Labrador

Approximately 60% of claims made to the Workplace Health and Safety and Compensation Commission in Newfoundland and Labrador in 1999 were for soft tissue injuries. The Task Force looking into improving the workers' compensation system recommended ergonomics regulations be instituted to protect the workers of Newfoundland and Labrador. The new regulations came into effect in 2003.

Presentation on RSIs and Ergonomics to St. Catharines City Council, March 10, 2003

I want to thank you for the opportunity to make a presentation concerning repetitive strain injuries (RSIs). Late last month people in many countries around the world observed International RSI Awareness Day. The purpose of that day was to focus attention on the suffering and costs associated with these crippling disorders known as RSIs affecting more and more people. International RSI Awareness Day was also conceived to raise awareness of the need for prevention, rehabilitation and compensation.

It is hard to think of a problem so large in magnitude that receives such scant public attention and is so neglected as a public policy issue. To appreciate the significance of the problem of RSIs it is only necessary to recognize that recent U.S. Bureau of Labor statistics revealed that 62% of all reported work related illness cases were for repetitive trauma disorders. Statistics in this country are not quite as bleak but are still alarming with injuries to the back accounting for a majority of RSIs.

Repetitive strain injuries are caused by poorly designed workplaces, work stations and tools and by work paces that are too fast and physically stressful. These injuries are prevalent in all economic sectors. RSIs manifest themselves in symptoms like aches, pains, tingling, swelling and loss of joint movement and loss of strength. RSIs commonly develop into crippling disorders permanently injuring workers to the point where they are prevented from working and leading normal lives.

The consequent costs are enormous both in terms of diminishing productivity and health care. In 1998 the direct medical costs alone of treating such injuries was $2.6 billion overall in Canada. To further grasp this one only needs to consider the proliferation of physiotherapy clinics. In addition, there is an immediate impact on the bottom line in the form of higher insurance and WSIB premiums.

Yet all of this suffering and cost is largely preventable through the use of ergonomics. Ergonomics is the study of how to adapt workplaces, workstations and tools to the worker. It recognizes workers' physical limits and ensures the work they perform does not exceed these limits to the point of injury.

One expects unions to negotiate contractual language promoting ergonomics in the workplace. Nonetheless, the prevalence of the problem of RSIs attests to the fact that contractual language negotiated into collective agreements is most definitely not enough. Heightened public awareness of the problem of RSIs and the magnitude of it is also critical. So is meaningful concern about the issue by public policy makers at all levels. This is especially true provincially where most of the responsibility for labour legislation lies in this country.

This brings me to my main point. That is to make the case for the need to have a Canada-wide standard for ergonomics and corresponding ergonomics regulations included in

Ontario's occupational health and safety legislation. Ergonomics are currently integral to labour legislation in B.C. and Saskatchewan. Manitoba is soon expected to follow suit.

Legislation currently in place obligates employers to identify and assess risk factors for musculoskeletal injury (MSI), back injuries and RSIs. The goal is to eliminate or at least minimize the risk of MSIs and RSIs. It also calls for monitored control measures and deficiencies to be corrected and for the education of and consultation with employees in MSI and RSI risk identification.

Accordingly, I would like to see this council, by way of adopting this resolution, express its support for the incorporation of such measures into Ontario's occupational health and safety legislation and for a Canada - wide ergonomics standard. And I might add that doing so now would be especially timely given the approach of a provincial election where this question should be the subject of serious debate. Thank you.

Proposed Resolution on RSIs:

Whereas repetitive strain injuries (RSIs) commonly develop into crippling disorders permanently injuring workers to the point where they are prevented from working or leading normal lives, and

Whereas the consequent costs are enormous in terms of diminishing productivity and health care, and

Whereas the use of ergonomics to adapt workplaces, workstations and tools to the worker to ensure the work each worker performs recognizes their physical limits and ensures they are not exceeded to the point of injury, and

Whereas the negotiations of ergonomics language into collective agreements offers insufficient protection of workers against repetitive strain injuries, and

Whereas the incorporation of ergonomics into occupational health and safety legislation and a Canada-wide standard for ergonomics will make an effective difference in addressing this enomous social problem, therefore.

Be it resolved that St. Catharines City Council supports both a Canada-wide standard for ergonomics and the incorporation of ergonomics regulations into occupational health and safety legislation.

Bruce Allen, Vice-President, CAW Local 199

Contract Language
PROMOTING RSI AWARENESS

Each year on the last working day of February, the company and the union agree to promote awareness of repetitive strain injuries in order to reduce their occurrence. Initiatives used to promote RSI awareness could include safety talks, videos, disseminating written material and posters.

Bargained 2002 CAW/General Motors Collective Agreement

GETTING BACK TO WORK

REHABILITATION AND TREATMENT

A SOUND ergonomics program must ensure workers receive education and training to enable them to recognize the signs and symptoms of strains and sprains injuries. Injured workers must seek prompt treatment if serious and sometimes permanent disabilities are to be avoided. Rest, ice, anti-inflammatories and pain relievers can play an important role in reducing pain and suffering in the short run. Prompt treatment is important so we must fight to eliminate waiting lists and delays in accepting workers' compensation claims. Physiotherapy, chiropractic treatments, acupuncture, naturopaths and massage therapy can all play a role depending on the diagnosis and what works for the individual concerned. Activity at reduced levels, including something as simple as walking for those with low back pain, can be effective in treating strains and sprains injuries. All types of non-invasive therapies should be tried before there is any consideration of surgery. If a physician has recommended surgery, get a second opinion before allowing anyone to operate on you.

When injured workers are in any kind of treatment program, ergonomics can assist with providing information regarding job demands so that rehabilitation can be adjusted accordingly. Good rehabilitation programs should be readily available. We must fight the de-listing of treatments from our medicare programs. We must also fight for coverage through our extended health care plans for any treatments not covered under medicare.

Return to Work

As a result of changes to legislation across the country, Workers' Compensation Boards are moving toward promoting return to work (RTW)

processes. From a labour perspective, the key failing in these processes is that workers are often returned to their original job without any safety improvements having been made. Ergonomics can do two things in workers' compensation RTW issues.

1. Ergonomics can analyse and improve jobs where workers have been injured thus preventing re-injury and injuries to other workers.
2. Ergonomics can develop recommendations to modify jobs to meet a worker's restrictions.

The CAW Return to Work Checklist speaks of using ergonomics to modify jobs in the workplace. Where an employer is unwilling to make improvements to a job, workers may exercise their "Right to Refuse Unsafe Work." This may stimulate the development and implementation of needed ergonomic improvements. Information obtained from workers' compensation cases may be used to argue for future changes in job design. On the other side of the coin, ergonomics can provide information regarding a job's demands and hazards to assist in claims for workplace injuries.

Our union supports changing job design to meet the needs of workers with disabilities, regardless of whether the disability is work-related or not, and regardless of whether the disability is temporary or permanent.

Our union believes the workplace should be designed so that the abilities and limitations of the range of the workforce is considered. Jobs should be designed for workers of various sizes, strengths, of different genders and of varying physical and cognitive abilities. Under human rights legislation employers have a "Duty to Accommodate" disabled workers. According to the Ontario Human Rights Commission 30% of all complaints made involve allegations of discrimination in employment based on disability. The human rights codes set out the duty of the employer to accommodate workers. Some

human rights codes or decisions outline a three-step process for an accommodation search. The first step is "modify, adapt, or adjust own job." As with workers' compensation and return to work, ergonomics can assist in developing solutions to modify jobs based on workers' abilities. Under the *Human Rights Codes* the duty to accommodate is available to workers with both work-related and non-work-related injuries and illnesses.

For more information on workers' compensation, return to work issues, or on human rights and the duty to accommodate contact your Local Union, national servicing representative, or the CAW Health and Safety or CAW Human Rights Departments.

CAW RETURN TO WORK or Modified Work Checklist

√ The purpose or goal of the program should be to help the injured worker return to work safely:
- ☐ at the appropriate time
- ☐ to work which will help him or her get better
- ☐ to work which will accommodate workers with permanent disabilities

√ and to **prevent further injuries**

√ The union should be involved in a *Joint* Return to Work (Modified Work) Committee playing a meaningful role in:
- ☐ developing comprehensive job descriptions
- ☐ job design
- ☐ analyzing and identifying appropriate preventative measures
- ☐ consulting the worker
- ☐ defining the individual return to work plan

√ The union should receive:
- ☐ copies of all employer report forms to the workers' compensation system
- ☐ copies of all functional abilities forms

√ The program should include a method of monitoring and analyzing the cause of injuries in order to take appropriate action to prevent further injuries
- ☐ it should provide for an effective job analysis and comprehensive job descriptions
- ☐ it should provide for taking appropriate action to modify jobs to prevent injuries (and to prevent recurrences)

√ The first preference of the program should be modifying the workers' job using the principles of ergonomics

- ☐ it benefits the worker
- ☐ it plays a significant role in preventing further injuries
- ☐ assists the injured worker in reintegrating into the workforce

√ If it is not possible to accommodate the injured worker at their original job
- ☐ there should be a hierarchy of jobs defined in the program

√ The program should treat employees with work-related and non work-related disabilities in the same way
- ☐ consistent with human rights legislation

√ The program should include workers with permanent disabilities as well as temporary disabilities

√ The return to work plan should be based on, and tailored to, the individual worker's needs
- ☐ there should *not* be an arbitrary mould
- ☐ it should last as long as required for the benefit of that particular injured worker

√ The program must respect medical confidentiality of the worker
- ☐ involve and respect the advice of the worker's medical practitioner

√ The work that the worker returns to should help him or her get better:
- ☐ it should be constructive
- ☐ it should be rehabilitative
- ☐ it should be at a point where the worker is ready for, and will benefit, from it
- ☐ it should assist the worker in re-integrating into the work force

√ The program should be consistent with the collective agreement
- ☐ it should not impose arbitrary and unnecessary restrictions such as permitting no overtime for the worker

√ The layoff and recall provisions for the injured worker should be the same as if he or she was not injured

√ The wages of the injured worker should be the same as if he or she had not been injured

WHO ARE ERGONOMISTS?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WHO ARE ERGONOMISTS?

Who are ergonomists?

Ergonomists are people who have had some sort of education in at least the following areas:

– Biomechanics

The application of physical laws and engineering concepts to an understanding of how the human body acts and reacts to motion and external forces.

– Human Anatomy

The science of the physical structure of the body (in particular the musculoskeletal system).

– Human Physiology

The science of which studies the processes and functions of the human body.

– Human Factors Design

This is an area of study that focuses on *human information processing* and *anthropometry*. *Human information processing* is the process by which humans use their senses to perceive, interpret, make decisions and then act on those decisions based on information received from their environment. *Anthropometry* is the study and measurement of the physical and functional dimensions of the human body.

– Engineering

The profession of applying scientific principles to design and construction.

– Injuries and Rehabilitation

Understanding the mechanisms of injury and the methods of treatment.

There is a professional college that now certifies ergonomists in Canada. It is important to note that this certification has only been present since 1998. Many people who practice ergonomics still use the title "ergonomist". Only those who are professionally certified by the Canadian College for the Certification of Professional Ergonomists can use the title and designation "Canadian Certified Professional Ergonomist or CCPE." The certification itself outlines a set of standards in training and experience that those who apply must meet.

The purpose of the certification as outlined by the college is to:

- Protect users of ergonomics services
- Protect the reputation of ergonomics
- Improve quality of practice

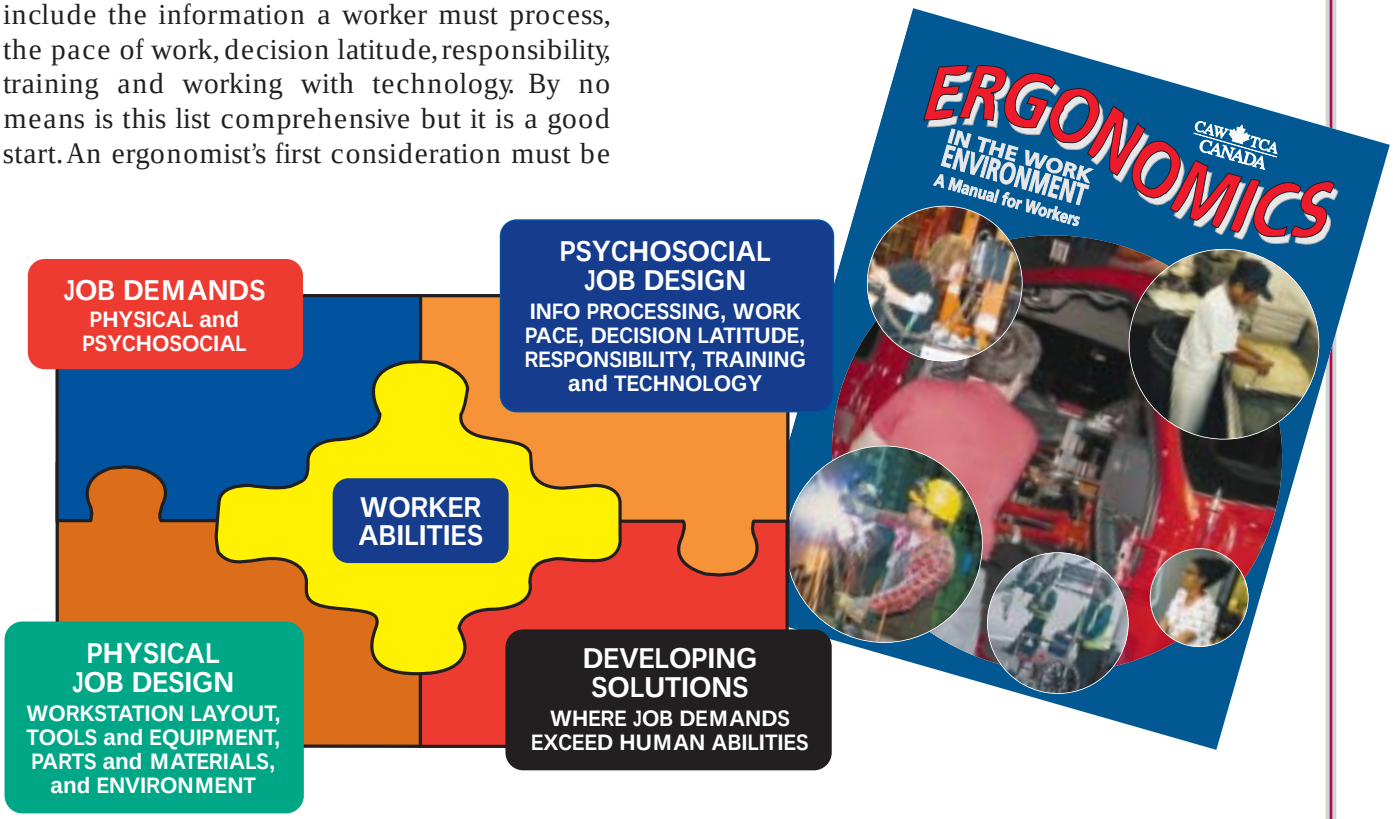
What Do Ergonomists Do?

Ergonomists use data from human body sizes and strengths to design jobs so that tall, short and average people can do the same job without developing injuries. They may measure reaches, heights or forces to paint a more accurate picture of the problem. Some apply principles acquired from research to improve work design. Today there are all sorts of computer programs that can assess workplace hazards but we must keep in mind that every worker is different. A hazard that may affect one worker may not affect another worker in the same way or at the same time. No computer program can tell a worker whether he or she is in pain. Don't let fancy devices and software programs intimidate you. Ergonomic principles can be applied without these fancy tools. Ergonomics involves quite a bit of trial and error.

Even the most experienced ergonomists don't get it all right the first time. The most important requirements are a good ear, a great eye and a lot of common sense! Observing and interviewing workers still remains the most critical step in assessing and redesigning jobs. It doesn't have to be rocket science.

Ergonomics involves analyzing both the physical and the work organization job demands. The physical aspects of work include reviewing the workstation layout, the tools and equipment, the parts and materials and the surrounding working environment. The psychosocial aspects of work include the information a worker must process, the pace of work, decision latitude, responsibility, training and working with technology. By no means is this list comprehensive but it is a good start. An ergonomist's first consideration must be the range of workers' abilities. Everyone differs in his or her physical and mental abilities and this is the building block for job design. Ergonomics is like a puzzle. The demands of work must not exceed the abilities of workers or the puzzle pieces just won't fit. Jobs must be designed to fit multiple workers. Ergonomics attempts to correct job demands when they exceed workers' abilities.

You don't have to be an ergonomist to do ergonomics in your workplace! Use this manual, take a course and most of all use common sense to identify workplace hazards that increase risk of injury. Whether you have a professional certification or not, is irrelevant to making effective ergonomic improvements in your workplace. Remember, the big advantage workers' representatives involved in ergonomics have over professional ergonomists is familiarity with the workplace as well as being trusted by the workers. Workers will tell you about their problems and propose solutions because they know you will listen to them sincerely. They have confidence in your ability to make effective changes that will protect them.



COLLECTIVE BARGAINING


NASCO PLANT
AUTOMOTIVE PRODUCTS
DIVISION

ERGONOMICS AND COLLECTIVE BARGAINING

EMPLOYERS MUST be compelled to improve workplaces and the conditions of work. Workers must be involved in the design and organization of their work. Ergonomic issues should be raised in Joint Health and Safety Committee meetings. We need to bargain ergonomic requirements in our collective agreements. This is even more important in jurisdictions which do not yet have ergonomics regulations. Here is a sample of issues in CAW collective agreements:

Time off the job

Increasing time away from the workplace reduces exposure to ergonomic hazards and gives the body extended time periods to heal and recuperate. Time off comes in many forms including extended weekends, formal vacation time and shorter workdays or weeks.

Relief at work

Increasing break time and relief time during the workday gives the body more of the rest time it needs between work exertions. Especially for short cycle time assembly jobs such as those in automotive assembly plants where cycle times are less than a minute, we need to ensure each cycle has a micro pause built in. Five seconds rest a minute can make a big difference in a job that's a minute long.

Workload

The constant pressure to increase production efficiency means we have to make efforts to limit employers' ability to alter job tasks and to insure they supply and maintain adequate staffing levels. We need union time study representatives in many workplaces to ensure workers are not forced to work too hard and too fast.

Health and Safety

It is critical that we bargain the basic health and safety rights of workers into our collective agreements to provide the framework for ergonomics:

- Right to know about the risks of strains and sprains.
- Right to participate in joint health and safety committees or joint ergonomics committees.
- Right to refuse work which would result in RSIs.

Representation

- For smaller workplaces, expanded duties of the health and safety committee to include ergonomics.
- For larger workplaces, establishment of a joint ergonomics committee (or sub-committee of the workplace health and safety committee).
- For larger workplaces, full time union ergonomic representation.
- Ergonomics education and training for committee members as well as workers and management.

Ergonomics Checklists

Checklists are most valuable when used at the earliest stages of job design, introducing new processes or procedures, changing job assignments and prioritizing ergonomics needs.

Ergonomic Process

A formalized plan for highlighting, assessing and solving ergonomic issues that incorporates your ergonomic resources and helps focus them on seeking solutions.

Worker Accommodation and Return to Work

A process that recognizes injured workers can contribute during the healing and rehabilitation stages and provides them with suitable work until they can return to their normal duties.

Ergonomic Resources

Involvement of engineers, skilled trades, maintenance and medical staff as well as any other people who could provide assistance with ergonomic efforts in the workplace.

International RSI Awareness Day

Recognition of International RSI Awareness Day, held each year on the last day of February, serves as a way to raise awareness about repetitive strain injuries and other ergonomic issues.

CAW GENERAL MOTORS MASTER AGREEMENT, 2002-2005

VIII ERGONOMICS

(a) CAW National Ergonomic Coordinator

During the current negotiations, the Company agreed with the Union that a National Ergonomics Coordinator could enhance the joint efforts of the parties in maintaining and improving ergonomics in the workplace.

The National Ergonomic Coordinator will be appointed by the President National Union CAW for the term of the current Master Agreement and no person shall act as the National Ergonomic Coordinator until written notice of their permanent assignment has been furnished by the President National Union CAW to Divisional Labour Relations. Any issues relative to the performance of the Coordinator may be referred to the President's Office.

The National Ergonomics coordinator will work jointly with a Company representative designated by the Vice President and General Director of Personnel and will be based at the CAW National Office.

The parties further agreed that the Coordinator can have an important role in improving employee ergonomics and must fulfill the responsibility of the position in a spirit of cooperation by emphasizing a problem solving approach in dealing with Company and Union representatives.

The role of the National Ergonomic Coordinator is to receive, analyze and assess concerns of an ergonomic nature submitted by the CAW National Health and Safety Coordinator and the General Motors of Canada Limited Divisional Safety Manager or the Master Ergonomic Committee. This analysis and assessment will assist the Union and the Company in determining the priority of each concern, in order that Union and Company resources may be effectively applied and that problem resolution may be maximized. The National Ergonomic coordinator will assist

in resolving disputes that may arise from time to time, using generally recognized and established ergonomic standards.

The Union will promote an ergonomics process that uses advanced knowledge and skills in applied life sciences to recommend improvements to work stations, tools, and work methods. It is understood that the implementation of recommendations can occur only after thorough discussion in a joint environment.

The National Ergonomic Coordinator will work on a pro-active basis to support joint CAW/General Motors of Canada Limited initiatives to reduce injuries and related Workers' Compensation costs.

The National Ergonomic Coordinator will meet on a regular basis with the CAW National Health and Safety Coordinator and the General Motors of Canada Limited Divisional Safety Manager to discuss issues and initiatives, as well as areas of concern which could be addressed by the Master Joint Health and Safety Committee.

Following his/her appointment, meetings will take place to determine the courses required in order for the National Ergonomic Coordinator to upgrade his or her skills in the field and to function effectively, at a cost not to exceed the normal employee entitlement under the Tuition Refund Plan for General Motors of Canada Hourly-Rate Employees taken in the aggregate over the life of the Agreement. Tuition for said courses will be payable by the Company upon presentation of an invoice from the instructional institution.

The National Ergonomic Coordinator may visit all plants and access will be provided on reasonable notice.

Any problems arising from this document will be discussed by the Master Joint Health and Safety Committee. If the problem is not resolved, the problem may be referred to the National Union CAW and Divisional Labour Relations for resolution.

(b) Master Ergonomics Committee

During the current negotiations, the Company and the Union confirmed their willingness to form a Master Ergonomics Committee (MEC). The Master Ergonomics Committee will meet quarterly at mutually agreed upon times and places to discuss and update MEC members on the status of Local Ergonomic Committees (LEC), best practices and lessons learned. An agenda will be prepared in advance. This Master Committee will consist of two (2) representatives of the National CAW and two (2) representatives of the Company. Each party will appoint to the committee at least one (1) member who has professional training in ergonomics.

Among those matters that will be appropriate for discussions by the committee include:

1. Plant applications and support of the GM/CAW Ergonomics Standard Operating Process;
2. Training of LEC members;
3. Results of completed GM ergonomic studies;
4. Advanced Ergonomic applications at the Company;
5. Plant applications and support of the local placement program.

The Company and the Union further agreed it would be beneficial to share among various plants what each one is doing with respect to ergonomics activities. As a result, the parties agreed that the MEC will plan and implement an Annual Ergonomics Meeting of the LECs from each plant location to discuss ergonomic activities at our facilities. The Company will pay for scheduled hours worked, registration, where nec-

essary, lodging and transportation. The Union will be responsible for meals and other expenses for Union Representatives.

(c) Local Ergonomics Committees

Following negotiations, the Personnel Director and the Plant Chairperson at each location will establish a Local Ergonomics Committee and determine a course of action to jointly address local ergonomics initiatives, which shall encompass the following:

1. Appointment of one (1) Union and one (1) Management member to the Ergonomics Committee. The selection of committee members shall not change any mutually satisfactory Ergonomics Committee members or structure established prior to the effective date of the current Agreement.
2. The Ergonomics Committee will have access to engineering, medical and other resource personnel.
3. Adequate and necessary training for Ergonomics Committee.
4. Duties and responsibilities of Ergonomics Committee members. These responsibilities include local implementation of Master Health and Safety Committee ergonomic recommendations, accident investigation, job task analysis, and other recommendations to local management to reduce injuries or illnesses through the application of Ergonomics. In carrying out job station design at introduction of new processes or procedures or the changing of job assignments, all Industrial Engineers shall use an Ergonomics check list. The check list will be explained to the Joint Health and Safety Committee before its launch when they may make recommendations. The check list may, in the future, be computerized.
5. Frequency of Local Joint Ergonomic Committee meetings. These meetings shall be at least monthly.
6. A forum for reporting the Ergonomics Committee recommendations to Management.
7. Time allotment for committee members to perform Ergonomics Committee functions.

Issues regarding the implementation of this Document may be referred to the Divisional Labour Relations Staff and the National Union CAW for resolution.

GM/CAW Ergonomics Standard Operating Process

(d) GM/CAW Ergonomics Standard Operating Process

In 1999 negotiations, the Company and the Union discussed their joint commitment to efforts, where feasible, to improve the interface of employees with the workplace through ergonomics.

The study of ergonomics examines the interaction between the worker and the work environment, including such factors as machinery, tools, equipment, control panel design, and others. If the match between the worker and their work environment is poor, the worker's ability to perform the job may lead to, in the short term, fatigue, and in the long term, physical injury and/or disability. In addition, improper job design may hinder the worker's ability to produce high quality work and may result in increased absenteeism and decreased job satisfaction.

Therefore, the parties agree to jointly develop an Ergonomics Standard Operating Process for use in all of its plants. The MEC will develop the GM/CAW Ergonomics Standard Operating Process. The parties agree that it is important to recognize local practices already in place and therefore all plants will submit to the MEC their current joint process within 6 months after the effective date of this agreement. These submis-

sions will be used to assist in developing the GM/CAW Ergonomics Standard Operating Process. This GM/CAW Ergonomics Standard Operating Process will not restrict the plants from any jointly agreed upon existing practices which meet or exceed the requirements of the process as determined by the MEC.

The primary goal of the GM/CAW Ergonomics Standard Operating Process is to protect the health and safety of workers by examining the worker's job and reviewing it for risk factors that can contribute to injury and illness. In addition, the parties agree to incorporate basic ergonomic principles into the design of new equipment, machinery, tools, processes, facilities and workplace layouts.

The two primary strategies that are used in ergonomics are outlined in the joint GM/CAW Ergonomics Process.

1. Identify the causes of injuries and illnesses in existing workstations by:
   A. Identify priority jobs through either the examination of medical records, employee reports, or risk factor check lists, and assessment;
   B. Evaluate job stresses to reveal the causes of the injury/illness or employee complaint;
   C. Reduce or, where feasible, eliminate these causes by developing changes in work methods, machinery, tools, equipment and workstation design;
   D. Implement and test the changes to determine their effectiveness;
   E. Document changes using a joint GM/CAW agreed upon process;
   F. Follow-up to ensure the issue is corrected and job changes are being utilized.
2. Use the Design for Ergonomic guidelines in the design of appropriate workstations, equipment, tools and other job attributes.

The Parties recognize that a number of factors may be appropriate to review in job assessments, including:

- The movement and postures of limbs and whole body as workers perform a task;
- The energy expended in performing a task over a given period of time;

- The amount of physical strength required for a task or job;
- Relationship between the worker and the machine, equipment, tools, workstation and workplace;
- Design and layout of control panels and displays;
- Repetitiveness of the task;
- Pace of the work.

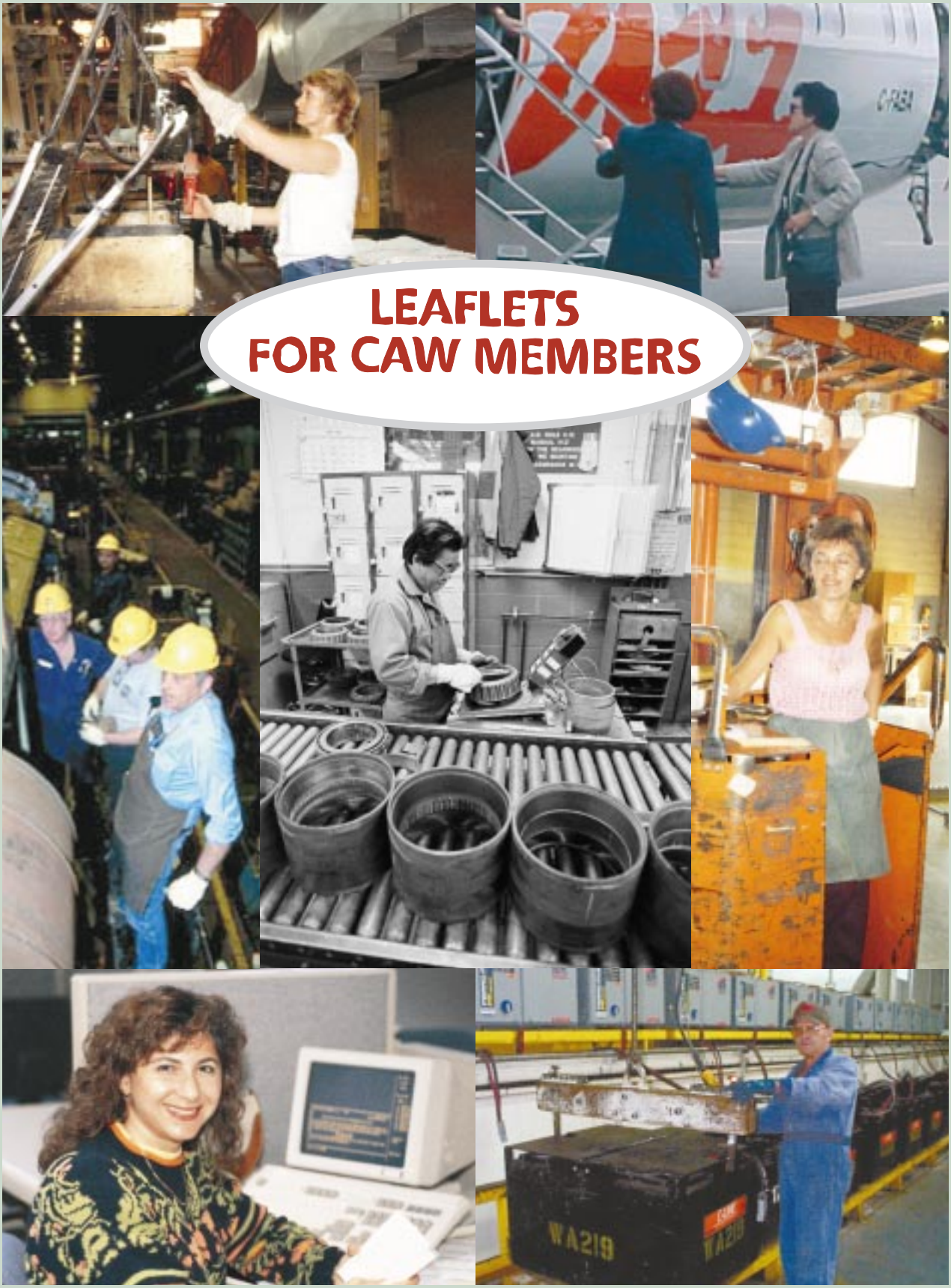
The parties reaffirmed their support for the role of the Local Ergonomics Committees (LECs) in the GM/CAW Ergonomics Standard Operating Process. The LEC should consider several factors when identifying priority jobs. Some of these factors may include excessive overhead work, cramped working postures, and walking backwards. Medical Tracking tools should be used to verify employees are experiencing injuries on these jobs.

BUILDING AWARENESS AMONG THE MEMBERS

It is important members know they are not alone in their pain. They need ongoing education and training about signs and symptoms of RSIs and back pain and encouragement to think of ways to eliminate their causes.

To help with this task, we have drafted the following four leaflets for you to copy or download (www.caw.ca/healthsafetyenvironment) to use as individual leaflets to distribute to the membership, include in your local union newsletters, and use in ergonomics awareness courses.

Notes



LEAFLETS FOR CAW MEMBERS

PROTECT YOUR BACK... YOU ONLY HAVE ONE!

Whose Backs Are At Risk of Injury?

Regardless of where we work, whether it be in auto, truck and bus assembly, parts plants, railways, aerospace, telecommunication, electronics assembly, foundries, fisheries and processing, airlines, offices, retail stores, mining, transportation, hotels, restaurants and health care… ***all*** workers are at risk from back injuries.

How Does Your Back Work?

Your back is made up of 24 main bones called vertebrae. Between each are shock absorbers called discs. Ligaments bind the bones together and muscles make the entire structure move.

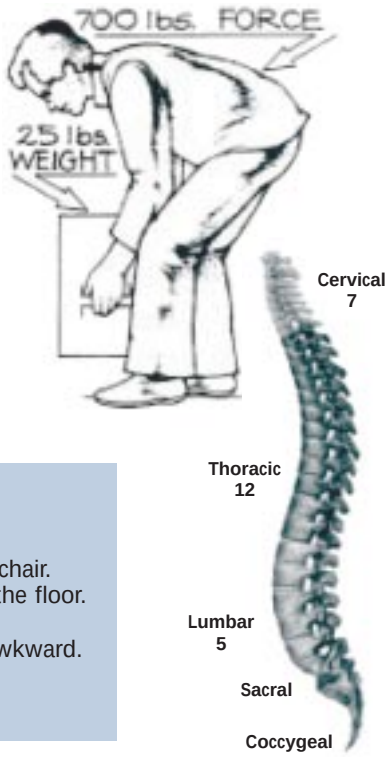
The back provides the ability to stand or sit upright, it stabilizes your head and, by protecting the spinal cord, it facilitates the passage of nerve signals that allow you to freely bend, lift, twist and carry.

Why Does Your Back Hurt?

Damage to the vertebrae, discs, ligaments, muscles or the spinal cord and its nerves will cause back pain. You can hurt these parts of your back in a number of ways.

With respect to loading, you can injure your back if the loads:

- √ Are too heavy
- √ Are too far from your body
- √ Require frequent lifting
- √ Require twisting
- √ Require you to work too fast
- √ Have no handles



You Can Hurt Your Back:

- √ If you stand or sit at work for long periods.
- √ If you sit all day with no backrest or on a poorly designed, non-adjustable chair.
- √ If you sit in a chair so high that your feet don't maintain full contact with the floor.
- √ If you have to work in a cramped position hunched over a workstation.
- √ If you have to pull or push objects, particularly those which are heavy or awkward.
- √ If you have to stretch and reach repeatedly.
- √ If you are exposed to whole body vibration such as when driving a vehicle.

The CAW and Ergonomics:

Ergonomics is the science involved in designing work so that it accommodates the workers. As a union, the CAW is at the forefront in the field of ergonomics by:

- √ Bargaining ergonomic language in our contracts.
- √ Bargaining ergonomic expertise at the National, Regional and workplace levels.
- √ Bargaining paid time away from the job to give our bodies and minds the rest they need and deserve.
- √ Designing and providing ergonomic training for our reps and membership.
- √ Leading the push for Ergonomic Regulations both provincially and nationally.

How to Learn More:

You can learn more about your back or Ergonomics by contacting:

CAW Health and Safety Department
205 Placer Court, Toronto
Ontario M2H 3H9
Tel: (416) 495-6558 or 1-800-268-5763
Fax: (416) 495-3785

www.caw.ca/healthsafetyenvironment

PROTECT YOUR HANDS, WRISTS AND ARMS... WHAT COULD YOU DO WITHOUT THEM

Whose Hands, Wrists and Arms Are At Risk of Injury?

Anyone working with their hands – assemblers, manual material handlers, office workers, hospitality servers, health care workers, data entry clerks or skilled trades. In short, almost anyone who works with their hands. Those who do repetitive, forceful work with their hands, wrists or arms in awkward postures are at risk. This also includes those with daily exposure to vibrating power tools and equipment powered by electricity, gas or compressed air and used by the hands.

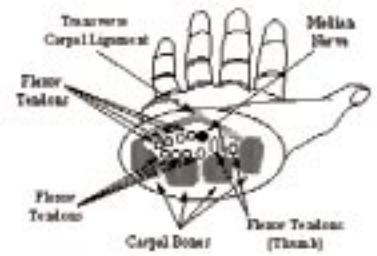
Why Do Your Hands, Wrists and Arms Hurt?

Your hands, wrists and arms hurt because of poor ergonomic design of the workplace. This includes poor physical design of the workstation layout, tools, equipment, parts, materials and the environment. Many job designs do not consider different design requirements that exist for age, gender, dexterity, or ethnicity. In fact, most who do ergonomically designed jobs do so based on old U.S. military data based on healthy and young males from 18-24 years old. Every day many left-handed workers work with workstations and equipment designed for right handed people which can also pose a greater safety risk.

BEWARE!

Your work can damage the muscles, ligaments and tendons of your hands, wrists and arms. In addition, your work can impact the circulation of blood to these same areas. You can hurt these structures in a number of ways:

- √ Exerting large forces with your hands such as gripping, handling, pulling, pushing (such as when making electrical connections or inserting push pins).
- √ Working with them in poor postures, bent wrists, blind tasks with hands.
- √ Working on highly repetitive tasks.
- √ Working in cold or getting cold blow off from tools and equipment.
- √ Working with poorly designed power tools, or improper tools for tasks.
- √ Working with the hands, wrists and arms in constant contact with other objects causing added stress (such as working over parts to perform your job, leaning on arm or wrist areas).
- √ Working without sufficient rest.



SIGNS & SYMPTOMS OF TROUBLE

- Pain, Numbness, and/or Tingling.
- Loss of sensation to touch or pain.
- Discolouration of hands or finger tips.
- Swelling, and/or inflammation.

The CAW and Ergonomics:

Ergonomics is the science involved in designing work so that it accommodates the worker. As a union, the CAW is at the forefront in the field of ergonomics by:

- √ Working with health and safety and ergonomics committees to convince employers to change the workplace, work station, tools and work organization to prevent injuries.
- √ Bargaining ergonomic language in our contracts.
- √ Bargaining ergonomic expertise at the National, Regional and workplace levels.
- √ Bargaining paid time away from the job to give our bodies and minds the rest they need and deserve.
- √ Designing and providing ergonomic training for our union representatives and membership.
- √ Leading the push for Ergonomic Regulations both provincially and nationally.

How to Learn More:

You can learn more about your back or Ergonomics by contacting:

CAW Health and Safety Department
205 Placer Court, Toronto
Ontario M2H 3H9
Tel: (416) 495-6558 or 1-800-268-5763
Fax: (416) 495-3785

www.caw.ca/healthsafetyenvironment

PROTECT YOUR SHOULDERS... YOU CAN'T WORK WITH YOUR TEETH!

Whose Shoulders Are At Risk of Injury?

Regardless of where we work, whether it be in auto, truck and bus assembly, parts plants, railways, aerospace, telecommunications, electronics assembly, foundries, fisheries and processing, airlines, offices, retail stores, mining, transportation, hotels and restaurants and health care… ***all*** workers are at risk from shoulder injuries.

How Do Your Shoulders Work?

Your shoulders are a delicate structure that allows flexibility or range of motion. They are also an ***engineering nightmare.*** Because the shoulder has no structural support, its integrity is entirely a function of the health of the ligaments that bind it together and the strength of the muscles that provide its movement.

Why Do Your Shoulders Hurt?

Your shoulders hurt because of the poor ergonomic design of your workplace. This includes poor physical design of the workstation, layout, tools, equipment, parts, materials, environment and poor work organization. Many job designs have not considered different design requirements that exist for size, gender, culture, nor limited abilities. In fact, most jobs are designed for healthy young males 18-24 years old.

BEWARE!

Your work can damage the shoulder's ligaments, muscles or the protective bursae (fluid filled sacs). The result can be pain, weakness or loss of motion. You can hurt these structures in a number of ways:

- √ Carrying or lifting heavy loads.
- √ Working in awkward postures, e.g. working overhead.
- √ Working with elbows at a distance from the body.
- √ Working with the elbows above shoulder level.
- √ Engaging in repetitive movements.
- √ Exposure to vibrations.
- √ Pulling heavy awkward loads.

SIGNS & SYMPTOMS OF TROUBLE

- Pain, Numbness, and/or Tingling.
- Reduced range of motion.
- Swelling, and/or inflammation.

DON'T IGNORE THE SYMPTOMS!

The CAW and Ergonomics:

Ergonomics is the science involved in designing work so that it accommodates the worker. As a union, the CAW is at the forefront in the field of ergonomics by:

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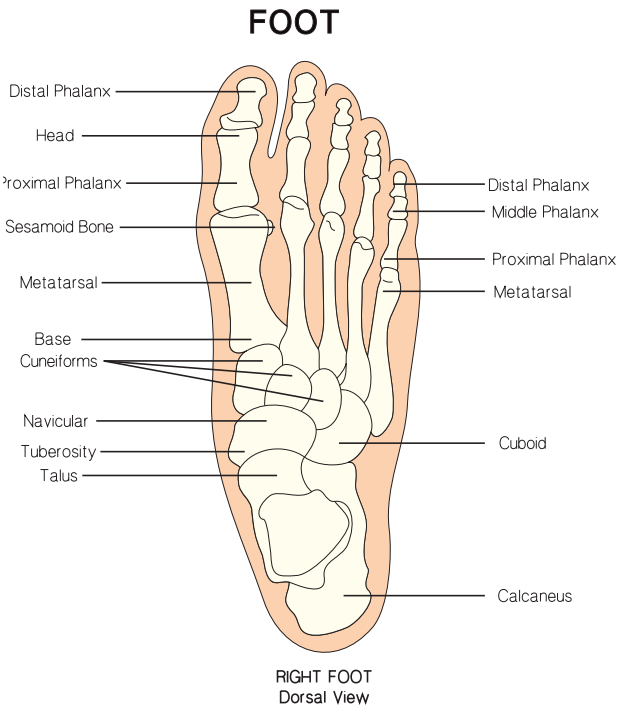
PROTECT YOUR FEET...
THEY MUST CARRY YOU FOR A LIFETIME!



How do your feet work?

Your foot has dozens of bones, joints, muscles, nerves, blood vessels, tendons and layers of fascia (connective tissues). The bones of the foot form arches that are supported by ligaments and muscles. These arches contribute to the strength, stability, mobility, and resilience of the foot. During standing, walking, running or jumping, the arches serve as shock absorbers, spreading out and dissipating potentially destructive energy before it is transferred higher up the leg.

Why do your feet hurt?

If the foot's arch is compromised by conditions like flat feet, over-pronation or simple fatigue from overuse, the essential shock-absorbing quality of the foot disappears. The effects of this go far beyond the feet by forcing changes to the structural positioning of other key skeletal components. Misalignment of the knees, hips and spine brought on by foot related problems increase their vulnerability to injury. Be aware that experiments show people are unable to distinguish between whole-body fatigue and fatigue in just their legs and feet. That whole-body fatigue you are feeling could be related to working on your feet!

Beyond simple fatigue and discomfort, more serious health effects can result from working on your feet. Some of these are:

- Corns
- Bunions
- Heel spurs
- Plantar fasciitis
- Achilles tendinitis
- Orthopaedic changes in feet (eg. flat feet)
- Restricted blood flow (from standing)
- Swelling in the feet and legs
- Varicose veins
- Increased chance of arthritis in knees and hips
- Back pain, especially in the lower back

Prevent feet and back injuries

One of the simplest methods to protect your feet is to sit down. But many employers force workers, such as retail clerks, for example, to stand when they could do their work sitting down. Workers are often made to stand on hard surfaces such as concrete floors.

We need to eliminate or at least minimize static standing. We're designed to move around.

We need to insist comfortable chairs with back rests be provided for workers to use both while working and for rest areas. If benches were lowered, many workers could sit to do their job. For many jobs, sit/stand stools should be provided to alternate standing and sitting. In areas where workers stand to work, comfortable ergonomic mats should be provided to stand on. When workers must walk a lot on hard surfaces, orthopaedic inserts and ergo insoles should be provided.

How to Learn More:

You can learn more about your feet or Ergonomics by contacting:

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205 Placer Court, Toronto
Ontario M2H 3H9
Tel: (416) 495-6558 or 1-800-268-5763
Fax: (416) 495-3785

www.caw.ca/healthsafetyenvironment

INTERNATIONAL RSI AWARENESS DAY

Because Work Shouldn't Hurt...

What is RSI?

RSI is the abbreviated term for Repetitive Strain (sprain) Injuries. It is an umbrella term for injuries to soft tissues (muscles, tendons, and nerves) of the neck, upper and lower back, shoulders, wrists, arms and hand. Such injuries are caused by a variety of factors such as poor postures, repetition, force, temperature extremes, vibration and others.

International RSI Awareness Day

The last day of February each year is used to promote awareness of sprain and strain injuries. More than 12 countries promote RSI awareness on this day. The first RSI awareness day was on February 29, 2000 because it was the only non-repetitive day of the year. RSI Day evolved from an e-mail proposal by a Canadian injured worker. In non-leap years it is observed February 28. In 2001, the CAW launched a national campaign for ergonomic regulations on RSI Day.

Why Should You Care?

RSIs are a serious occupational health concern around the world. In some provinces in Canada, sprains and strains account for 50% of all occupational injuries and illnesses and of this nearly 30% are to the back. RSIs are a direct result of poor job design. The CAW believes raising awareness through workplace education is a vital step towards protecting workers from RSIs. No matter what job you perform in your workplace you can possibly develop RSI.

Symptoms and Signs of Injury

Symptoms may act to limit the movement of limbs. Any restriction in ability to move your limbs is a key indication that something is wrong with your body. Always take symptoms seriously. Both the worker and employer suffer a variet of health and economic effects as a result of workplace injuries. Injured workers may suffer work restrictions, permanent disabilities, loss in earning power and loss in quality of life. Employers experience significant operational effects through increased injuries such as higher insurance rates, loss of worker expertise, reduced quality, production problems, more scrap, and increased warranty claims resulting in economic loss. Signs of injury include:

• Numbness • Tingling • Swelling • Redness
• Discolouration • Fatigue • Mental strain

- Increased medical visits
- Increased worker complaints
- High turnover on jobs
- Reduced quality
- Reduced performance in work and home life

What can you do if you are at risk or develop a RSI?

√ Report problems to your Supervisor, First Aid and your CAW Health & Safety and WCB Reps.

What is the CAW doing to prevent RSIs?

The CAW has bargained ergonomic language in collective agreements.

See some examples below:

- Joint workplace committees and processes in ergonomics that exceed minimum government regulations
- Union input into workstation and machinery design
- Ergonomics awareness training for all workers
- Workplace accommodation procedures for injured workers
- Improvements to the engineering work allocation and product design processes
- Workplace representatives to address ergonomic concerns

RSI prevention through the use of ergonomics creates long-term benefits for both workers and the employer.

CAW TCA CANADA

WHY SHOULD YOU CARE?

√ Push for ergonomics in your workplace

√ Send a letter to your MP, MLA or MPP for ergonomic regulations

Currently there are only two province in Canada with ergonomic regulations:

• British Columbia • Saskatchewan

HOW TO LEARN MORE:

You can learn more about Ergonomics by contacting:

CAW Health and Safety Department
205 Placer Court, Toronto, Ontario M2H 3H9
Telephone: (416) 495-6558 or 1-800-268-5763
Fax: (416) 495-3785
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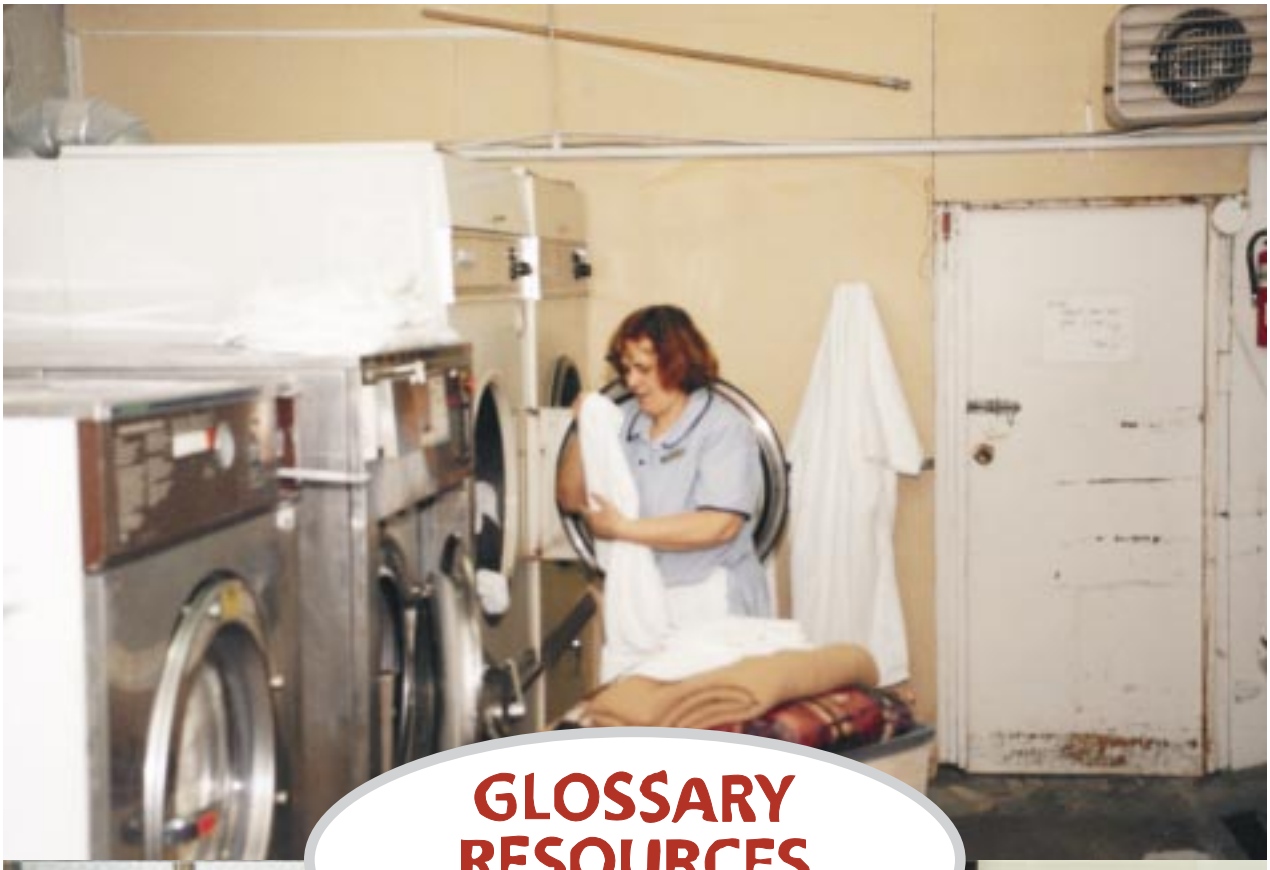

GLOSSARY RESOURCES WEB SITES

GLOSSARY OF TERMS

Administrative Control – Procedures and methods, that may significantly reduce exposure to risk factors by altering the way in which work is performed; examples include job rotation, job task enlargement, and reduction of work pace.

Anthropometry – The scientific measurement of human body dimensions.

Awkward Posture – Posture is the position of the body while performing work activities. Awkward posture is associated with an increased risk for injury. It is generally considered that the more a joint deviates from the neutral (natural) position, the greater the risk of injury.

Specific postures have been associated with injury. For example:

Wrist
Flexion/extension (bending up and down) on (side bending)

Shoulder
Abduction/flexion (upper arm positioned out to the side or above shoulder level) Hands at or above shoulder height

Neck (cervical spine)
Flexion/extension or bending the neck forward and to the back side bending as when holding a telephone receiver on the shoulder

Low back
Bending at the waist, twisting

Biomechanics – Science that uses engineering concepts to describe motions of the body.

Carpal Tunnel – Tunnel formed by the carpal ligament and the bones of the wrist.

Carpal Tunnel Syndrome – Disorder associated with squeezing the median nerve as it travels through the wrist.

De Quervain's Disease – A common type of stenosing tenosynovitis (combination of tenosynovitis and tendinitis).

Duration – Duration is the length of exposure to a risk factor. It can be measured as the minutes or hours per day the worker is exposed to a risk. Duration can also be viewed as the years of exposure to a risk factor. In general, the greater the duration of exposure to a risk factor, the greater the degree of risk. However, specific duration guidelines have not been established for risk factors such as force, posture and repetition.

Engineering Control – Physical changes to jobs that control exposure to risk. Engineering controls act on the source of the hazard and control worker exposure to the hazard without relying on the worker to take self-protective action or intervention. Examples include: changing the handle angle of a tool, using a lighter weight part, and providing a chair that has adjustability.

Epicondylitis – Technical term for "tennis elbow".

Ergonomics – An applied science that seeks to design work requirements to within human abilities. Fitting the work to the worker, rather than the other way round.

Ergonomic Program – A systematic process for anticipating, identifying, analyzing and controlling ergonomic risk factors.

Ergonomic Hazards (Risk Factors) – Conditions of a job, process, or operation that contribute to the risk of developing back injuries and Repetitive Strain Injuries.

GLOSSARY OF TERMS

Fatigue – A reduction in the ability to exert force in response to voluntary effort. Tiredness.

Force – The amount of muscular effort required to perform a task. Generally, the greater the force, the greater the degree of risk. High force has been associated with work-related Repetitive Strain Injuries (Musculoskeletal Disorders) at the shoulder/neck, the low back and the forearm/wrist/hand.

Human Factors – A term synonymous with 'ergonomics', is the branch of this science that began in the US and focuses on cognitive performance of humans.

Kinesiology – The study of human movements as a function of the construction of the musculoskeletal system.

Ligament – Connective tissue attaching bone to bone.

Lighting – The level of illumination in the workplace. Poor lighting can lead to visual symptoms of eye strain, eye focusing breakdown, eye coordination abnormalities, and eye fatigue while performing select activities such as computer tasks.

Local Muscle Fatigue – A reduction in the ability to exert force in a particular muscle group in response to voluntary effort.

Manual Material Handling – Lifting, carrying, and moving materials without mechanical aide.

Mechanical Stress – Pressure to the skin and soft tissues from direct contact with parts, tools, fixtures, etc.

Median Nerve – Nerve feeding the thumb and first two fingers of the hand.

Musculoskeletal Disorders (MSD) – Injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage and spinal discs; examples include carpal tunnel syndrome, rotator cuff tendinitis, and tension neck syndrome. Used in this manual as a synonym for Repetitive Strain Injuries.

Neutral Position – The natural position in which the body or part of the body feels most comfortable.

Occupational Biomechanics – Occupational biomechanics is the science concerned with the mechanical behavior of musculoskeletal tissues when physical work is performed.

GLOSSARY OF TERMS

Occupational Illness (Disease) – Any abnormal condition or disorder (other than those caused by occupational injury) caused by exposure to factors associated with employment. It includes acute and chronic illness or disease which may be caused by inhalation, absorption, ingestion or direct contact. The broad categories of occupational illnesses are skin diseases and disorders, dust diseases of the lungs, respiratory conditions due to toxic agents, poisoning (systemic effects of toxic materials), disorders due to physical agents other than toxic materials, and disorders from repeated trauma.

Occupational Injury – Any injury such as a cut, fracture, sprain, amputation, etc., which results from ongoing work-related events or from a single instantaneous exposure in the work environment. Examples of Repetitive Strain Injuries or disorders that can be work related include:

- Carpal tunnel syndrome (CTS)
- Rotator cuff syndrome
- De Quervain's disease
- Trigger finger
- Tarsal tunnel syndrome
- Sciatica
- Epicondylitis
- Tendinitis
- Raynaud's phenomenon
- Vibration white finger disease
- Carpet layers' knee
- Herniated spinal disc
- Low back pain

Optimal Work Zone – Area in front of the body defined by the keeping the back straight, the shoulders neutral, and the hands between hand rest and elbow height.

Physiology – How the body works. Science that measures people's capacity to do work and their bodies' reactions to doing work.

Practicable – Capable of being done.

Psychophysics – Research method that uses self-reported limits to determine maximum allowable loads or forces.

Psychosocial Conditions – Social influences that affect psychological aspects of human behavior.

Repetitive Strain Injury (RSI) – Term used for injuries that occur over a period of time because of repeated trauma or exposure to a specific body part, such as the back, hand, wrist and forearm. Muscles and joints are stressed, tendons are inflamed, nerves pinched or the flow of blood is restricted. Common occupational induced disorders in this class include carpal tunnel syndrome, epicondylitis (tennis elbow), tendinitis, tenosynovitis, synovitis, stenosing tenosynovitis of the finger, DeQuervian's Syndrome, hand-arm vibration syndrome (vibration white finger disease), and low back pain.

Recovery Time – Recovery time is the length of rest between exertions. Short pauses in the work cycle can reduce discomfort. Inadequate rest periods between exertions can decrease performance. As the duration of the uninterrupted work increases, so does the amount of recovery time needed.

GLOSSARY OF TERMS

Repetition – Repetition is the number of similar exertions performed during a task. A warehouse worker may lift three boxes per minute from the floor to a countertop; an assembly worker may make 70 units per hour. Repetitive motion has been associated with injury and worker discomfort.

Generally, the greater the number of repetitions, the greater the degree of risk. However, there is no specific repetition limit or threshold value (cycles/unit of time, movements/unit of time) associated with injury.

Risk Factor – Actions in the workplace, workplace conditions, or a combination thereof, that may cause or aggravate a Repetitive Strain Injury (Work Related Musculoskeletal Disorder); examples include forceful exertion, awkward postures, repetitive exertion, and environmental factors such as temperature.

Sprain – Injury to ligaments around a joint.

Strain – Injury to muscles or tendons.

Synovia – Membranes lining the inside of joint capsules and moving surfaces of joints. They secrete the synovial fluid, which lubricates joints.

Tendinitis – Swelling in the tendons, resulting in pain.

Tendon – Connective tissue that transmits the force from muscles to the bone.

Tenosynovitis – Swelling in the tendon and tendon sheath, resulting in pain.

Upper Extremities – The arms and hands and associated joints.

Vibration (Hand-Arm Vibration) – Vibration applied to the hand/arms through a tool or piece of equipment. This can cause a reduction in blood flow to the hands and fingers (Raynaud's disease or vibration white finger). Also, it can interfere with sensory receptor feedback leading to increased handgrip force to hold the tool. Further, a strong association has been reported between carpal tunnel syndrome and segmental vibration.

Whole Body Fatigue – An overall reduction in the ability to exert force in response to voluntary effort.

Whole Body Vibration – Exposure of the whole body to vibration (usually through the feet or buttocks when riding in a vehicle). Whole body vibration may increase the risk for injury, including low back pain and internal organ disruption.

Work Related Musculoskeletal Disorders (WMSD, WRMSD) – Injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage and spinal discs due to physical work activities or workplace conditions in the job. Examples include: carpal tunnel syndrome related to long term computer data entry, rotator cuff tendinitis from repeat overhead reaching, and tension neck syndrome associated with long term cervical spine flexion. In this manual we use WMSD as a synonym for Repetitive Strain Injuries.

RESOURCES

CAW Health and Safety Department
205 Placer Court
Toronto, On M2H 3H9
Tel: (416) 495-6558
Toll free: 1-800-268-5763
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Home page:
www.caw.ca/healthsafetyenvironment

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Tel: (514) 389-9223
Toll free: 1-800-361-0483
Fax: (514) 389-4450
Email: tca@tca.qc.ca
Home page: www.tca.qc.ca/francais

Education and Training

Ontario
WORKERS HEALTH AND SAFETY CENTRE
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Home page: www.whsc.on.ca

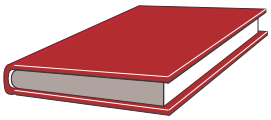
Hamilton
848 Main Street East
Hamilton, On L8M 1L9
Tel: (905) 545-5433
Fax: (905) 545-3131

Ottawa
310-309 Cooper Street
Ottawa, On K2P 0G5
Tel: (613) 232-7866
Fax: (613) 232-3823

Sarnia
1000 Finch Drive
Sarnia, On N7S 6G5
Tel: (519) 337-6083
Fax: (519-337-6807

Sudbury
110-43 Elm Street
Sudbury, On P3C 1S4
Tel: (705) 522-8200
Fax: (705) 522-8957

Toronto
802-15 Gervais Drive
Toronto, On M3C 1Y8
Tel: (416) 441-1939
Toll free: 1-888-869-7950
Fax: (416) 441-1043



Alberta
Alberta Workers Health Centre
#111 – 10451-170 Street NW
Edmonton, AB T5P 4T2
Tel : (780) 486-9009
Toll free : 1-888-729-4879
Fax : (780) 483-7632
Email : kevinf@workershealthcentre.ca
Home page: www.workershealthcentre.ca

Community College or University Labour Education

Contact your local Community College or University to find out if they have a Labour Education Centre.

Occupational Health Clinics

Ontario
OCCUPATIONAL HEALTH CLINICS FOR ONTARIO WORKERS
OHCOW Provincial Office
15 Gervais Drive, Suite 601
Toronto, ON M3C 1Y8
Tel: (416) 443-6320
Fax: (416) 443-6323
Toll free: 1-877-817-0336

Toronto
970 Lawrence Avenue West
Main Floor
Toronto, ON M6A 1C3
Tel: (416) 449-0009
Fax: (416) 449-7772
Toll free: 1-800-461-7120

Hamilton
848 Main Street East
Hamilton, ON L8M 1L9
Tel: (905) 549-2552
Fax: (905) 549-7993
Toll free: 1-800-263-2129

London & District Workers Health Clinic
3-380-Adelaide Street North
London, ON N6B 3P6
Tel: (519) 432-3535
Fax: (519) 642-7834

Sarnia
171 Kendall Street
Point Edward, ON N7V 4G6
Tel: (519) 337-4627
Fax: (519) 337-9442

Sudbury
1300 Paris Street, Unit 4
Sudbury, ON P3E 3A3
Tel: (705) 523-2330
Fax: (705) 523-2606
Toll free: 1-800-461-7120

Windsor
3129 Marentette Ave. Unit 1
Windsor, ON N8X 4G1
Tel: (519) 973-4800
Fax: (519) 973-1906
Toll Free: 1-800-565-3185

Manitoba
MFL Occupational Health Centre
120-275 Broadway Avenue
Winnipeg, MB R3C 4M6
Tel: (204) 949-0811
Fax: (204) 956-0848
Email: pherbert@mflohc.mb.ca. or adolhy@mflohc.mb.ca
Home page: www.mfl.mb.ca

Information

Canadian Centre for Occupational Health and Safety (CCOHS)
250 Main Street East
Hamilton, ON L8N 1H6
Tel: (905) 572-4400
Fax: (905) 572-4500
Toll Free: 1-800-263-8466
Email: inquiries@ccohs.ca
Home page : www.ccohs.ca

London Occupational Safety and Health Information Service (LOSH)
218-424 Wellington Street
London, ON N6A 3P3
Tel: (519) 433-4156
Fax: (519) 433-2887
Email: losh@execulink.com
Home page: www.losh.on.ca

Toronto Workers' Health and Safety Legal Clinic
#301-180 Dundas Street West
Toronto, ON M5G 1Z8
Tel: (416) 971-8832
Fax: (416) 971-8834

Windsor Occupational Health Information Service (WOHIS)
3129 Marentette Avenue
Unit 1
Windsor, ON N8X 4G1
Tel: (519) 254-5157
Fax: (519) 254-4192
Email: wohis@mnsi.net
Home page: www.msni.net/~wohis

ERGONOMICS INTERNET SITES OF INTEREST

Government and Professional Resources

Canada

Association of Canadian Ergonomists	http://www.ace-ergocanada.ca/Canadian
B.C. Workers' Compensation Board	http://www.worksafebc.com
Centre for Occupational Health & Safety (CCOHS)	http://www.ccohs.ca
Defense and Civil Institute of Environmental Medicine (Canada), Human Factors Division	http://www.dciem.dnd.ca/DCIEM/HF/home.html
Institute for Work and Health (IWH)	http://www.iwh.on.ca/
Occupational Health Clinics for Ontario Workers (OHCOW)	http://www.ohcow.on.ca/
University of Waterloo	http://www.ergonomics.uwaterloo.ca/
Workers Health and Safety Centre (WHSC)	http://www.whsc.on.ca/home.html

International

EU - European Agency for Safety and Health at Work	http://europe.osha.eu.int/
Australia – National Occupational Health & Safety Commission	http://www.worksafe.gov.au/
Australia - Ergonomics Society of Australia (ESA)	http://www.ergonomics.org.au/
International Labour Organization (ILO)	http://www.ilo.org
National Institute for Work Life (NIWL)	http://www.arbetslivsinstitutet.se/about/default.asp
United Kingdom - The Ergonomics Society	http://www.ergonomics.org.uk/
International Ergonomics Association (IEA)	http://www.iea.cc/

United States

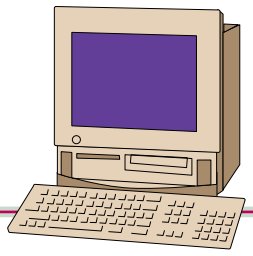
American Industrial Hygiene Association (AIHA)	http://www.aiha.org
American Society of Safety Engineers (ASSE)	http://www.asse.org
Bureau of Labor Statistics (BLS)	http://stats.bls.gov/
Ergo web	http://www.ergoweb.com/
Human Factors and Ergonomics Society (HFES)	http://www.hfes.org/
National Institutes of Health (NIH)	http://www.nih.gov
National Institute for Occupational Safety & Health (NIOSH)	http://www.cdc.gov/niosh/homepage.html
National Safety Council (NSC)	http://www.nsc.org
Occupational Health and Safety Net	http://osh.net
US Department of Labor – Occupational Safety & Health Administration (OSHA)	http://www.osha.gov/

Standards

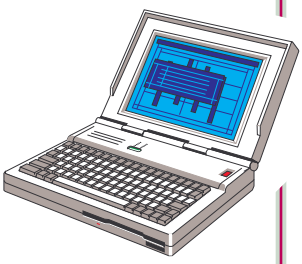
American Conference of Governmental Industrial Hygienists (ACGIH)	http://www.acgih.org
American National Standards Institute (ANSI)	http://www.ansi.org
CSA International (CSA)	http://www.csa-international.org
Ergo Web: Reference Room Ergonomics Standards and Guidelines	http://www.ergoweb.corn/Pub/Info/std.html
International Standards Organization (ISO)	http://www.iso.ch
ISO TC 159 Ergonomics	http://www.iso.ch/meme/TC159.html
ISO 13.180 Ergonomics	http://www.iso.ch/cate/13180.html
TC 159 / SC 4 Ergonomics of human-system interaction	http://www.iso.ch/meme/TC159SC4.html

Tools

RULA	http://www.humanicsergosystems.com/rula-1.htm
	http://ergo.human.cornell.edu/ahRULA.html
	http://www.ergonomics.co.uk/Rula/Ergo/index.html
	http://ergo.human.cornell.edu/ahRULA.html
	http://www.ccoo.upv.es/Salud_Laboral/CURULA96.pdf



ERGONOMICS INTERNET SITES OF INTEREST



Tools *(continued)*

OWAS	http://turva.me.tut.fi/owas/
Michigan 3D	http://www.engin.umich.edu/dept/ioe/3DSSPP/
Strain Index	http://ohlogic.com/StrainAnalysis-Readme.html
Snook	http://ergonomics.uwaterloo.ca/snook.html http://www.undergrad.ahs.uwaterloo.ca/~ahchiang/steps.htm http://www.undergrad.ahs.uwaterloo.ca/~ahchiang/steps.htm http://ekginc.com/snooktables.pdf
NIOSH Lifting	http://aepo-xdv- www.epo.cdc.gov/wonder/prevguid/p0000427/p0000427.asp http://ergonomics.uwaterloo.ca/snookniosh.html http://www.gov.mb.ca/labour/safety/publication/bulletins/nioshliftequa.html http://www.cdc.gov/niosh/lifting1.html
Kilbom	http://www.cdc.gov/niosh/ergtbls3.html#1gif
Repetition	http://www.ehs.iastate.edu/oh/repetition.htm

Some Specific Topics

Ergonomics in MMH Tasks	http://icmr.nic.in/buaug00.pdf/faculty/Hsiang.htm
Lifting Task Analysis Lab	http://www.yorku.ca/pjkeir/MMH-Assign2_Soln_w02.pdf
PDA'S	http://www.oiweb.com/pages/whatsnew2.html
The Typing Injury FAQ	http://www.tifaq.com/
Office Ergonomics Training	http://www.office-ergo.com/
Office Ergonomics Self-Help Site	http://www.3m.com/cws/selfhelp/
Office Ergonomics	http://www.ccohs.ca/oshanswers/ergonomics/office/
Office Ergonomics Training Module	http://www.pp.okstate.edu/ehs/modules/ergo/Ergon1.htm
UCLA Ergonomics	http://ergonomics.ucla.edu/Ergowebv2.0/office_ergonomics.htm
Office Ergonomics Setup Tips	http://www.healthycomputing.com/office/setup/
The Office Environment	http://www.uwm.edu/Dept/EHSRM/GENINFO/genergotips.html
Office Ergonomics Basics Booklet	http://www.wcb.ab.ca/safety/ergobook.html
Office Ergonomics	http://www.utoronto.ca/safety/ergoweb/ergoweb.htm
Ergonomics at Work	http://www.combo.com/ergo/atwork.htm
Office Ergonomics	http://www.lni.wa.gov/wisha/ergo/officerg/toc.htm
Office Ergonomics	http://www.doer.state.mn.us/ei-safih/ergo.htm

Educational Opportunities

Workers Health and Safety Centre	http://www.whsc.on.ca/
University of Waterloo	http://www.ergonomics.uwaterloo.ca/
Taylor'd Ergonomics	http://www.taylordergo.com/
Optimal Performance Consultants	http://www.opconline.com
University of Michigan	http://www.engin.umich.edu/dept/ioe/COHSE

Ergonomic Link Sites

http://www.ergonomics.com.au/ergolinks.htm
http://www.safetysmart.com/links/ergo.html
http://www.safety.vanderbilt.edu/safety_links/ergonomics.htm
http://www.tifaq.com/
http://www.discoverhealthandwealth.com/links/ergonomics.html

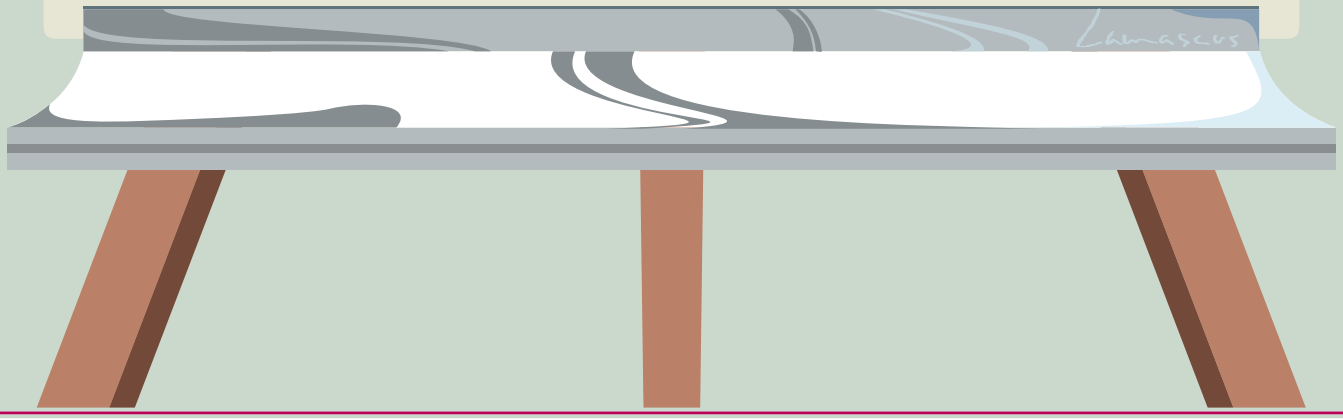
Acknowledgements

Thanks very much to the many people who contributed to this Manual, especially our CAW Ergonomics Coordinators, Tashlyn Chase, Karen Clark and Wyatt Clark.

Great workplace design creates healthy, satisfied and productive workers and a membership that actively participates in the union.

The CAW National Union wishes you all the best in using ergonomics to help our members achieve the highest state of physical, social and mental well-being.

CAW TCA CANADA



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