Safety Talk
These safety talks can be used during presentation of formal training, or as a posting for safety bulletin boards.

Prevent Back Injuries with Proper Lifting Techniques

Back injuries account for about one-fourth of lost-time injuries. Many of these injuries could be avoided if workers practiced a few basic and simple rules for back conservation.

Avoid the need to move materials manually—use a machine when you can. Proper planning and good job design can eliminate much lifting.

The use of mechanical lifting aids can be a back-saver. However, if you must lift, remember that your body is not a crane; your back is not designed to "boom up," "boom down" or "boom to the side" with ease.

Therefore, when lifting and carrying a load:

- If lifting an object, examine it for grease, oil, sharp edges and other hazards.
- Know your limit and halve it; estimate the weight and divide the load or get help if the weight is more than you can comfortably handle.
- Plan your path and make sure that it is free of obstructions.
- Consider how you will set down the object before you lift.
- Stand close to the object with your feet spread apart (at about shoulder width), with one foot in front of the other for balance.
- Do not twist your body to get into position.
- Squat down and tuck in your chin, while keeping your back as straight as possible.
- Lift with your legs by slowly straightening them.
- Return your back to a vertical position.
- Turn only with your feet; do not twist your torso while you are lifting or carrying.
- Avoid, if possible, lifting from below your knee level or from above your shoulder level; both maneuvers, unless done very carefully, create great stress on the disks in the lumbar region.
- Carry the object close to your body. Avoid, if possible, any lift where the load's center of gravity is more than a few inches out from your belly; the stress on the lumbar region multiplies quickly as the center of gravity moves out from the spine.
- The squat-down, lift-with-the-legs maneuver does not come naturally to most people, and it is more tiring than the traditional bent-back lifting technique. Yet, its one great virtue-protection of the lumbar spine-makes it a maneuver well worth the extra effort.

Only the common cold is responsible for more worker absenteeism in the United States than back problems. More than one-fourth of all disabling work-related injuries are from back injuries.

Back pain seems to be closely linked to aging as well as on- the- job and off-the-job activities. Today, we will discuss the basics of how the back works, how to take care of it through better body mechanics and exercises, as well as safe lifting techniques.

General Requirements

Section 5(a)(1) of the Occupational Safety and Health Act, commonly referred to as the "general duty clause," provides that "Each employer - (1) shall furnish to each of his employees ... a place of employment ... free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees...." Section 5(b) requires that "each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct."

In order to comply with the federal law and to insure workers the safest working conditions possible, ALL employees must follow safe work practices and use proper lifting techniques and body mechanics to limit the risks of back injuries.

General Background and Injury Information

According to the National Safety Council and medical research, the causes of back aches and pains can be broken down as follows:

- 20% Inflammation
- 10% Injuries
- 70% Degeneration of Spinal Discs (Aging of the discs)

Back injuries are not usually caused by just one incident; they are usually the results of many small, almost undetectable injuries that occur over a long period of time. It is so much easier to try and take care of your back and avoid these injuries than it is to "repair" an injured back. Again, once you have suffered a back injury, you are much more likely to have another one. Only you can protect and care for your back. There is no "magic formula" or "trick" that can guarantee you won't hurt your back. Basic prevention is the key and it is pretty simple — maintain a good body weight, exercise to keep your back muscles flexible and your stomach muscles strong, and always use good body mechanics and proper lifting techniques.

Before we discuss these items in detail, let's take a quick look at how your back works.

Basic Workings of the Spine

The spine is the main body structure that allows us to sit and stand upright. It is made up of 24 vertebrae (bones), with discs in between each one. There are muscles and ligaments attached to each vertebrae that provide support and let the spine and torso move.

Each disc is a circular pad filled with a gelatinous substance that is under great pressure. Each disc looks like a soft hockey puck with jelly on the inside. Discs act like shock absorbers or springs that link the vertebrae (bones) while making sure the bones don't slide or scrape against the other. They absorb fluid when the spine is in a resting position. Discs do not have nerve endings and blood doesn't circulate within them, so they don't send any early warning signs that they are overloaded or degenerating. They don't repair themselves significantly once they are injured.

The spinal cord is a bundle of nerves in a protected vertical passage behind the disc area. Nerve roots branch out through spaces between each vertebrae and go to different parts of the body. They are the pathway for sensory and motor messages to and from the brain.

The spine has five sections and has a natural curve in the lumbar area. The five sections are:

- Cervical (neck region)
- Thoracic (upper back)
- Lumbar (lower back)
- Sacrum (lower back)
- Coccyx (tail bone)

Poor posture causes ligaments to stretch or shorten - this causes the spine to be out of alignment, by flattening or increasing its normal curve, and increases your risk of injury. The most common work related injuries are caused by muscle strains and sprains involving stretched or torn muscles. Muscles and ligaments can be injured and weakened by poor posture and improper lifting, twisting, and bending.

Each time you bend forward or backwards, even in a normal range of motion, the nerve roots are put in a very vulnerable position. The spinal cord must bend and flex without the vertebrae slipping out of alignment. Every time you bend and move, your discs are working, just like shock absorbers in a car. It is quite easy to wear out a disc with NORMAL movement.

Discs can wear out from excessive twisting, turning, bending, or just the natural aging process. As we get older, there is less blood in the disc. It may develop a "slow leak," begin losing pressure and flatten out. This causes more pressure in the joint surfaces, especially the facet joints and bony areas, and just increases the "wear and tear" cycle. Damaged discs may allow vertebrae to touch one another or pinch a nerve exiting the spinal column, causing pain and numbness.

Causes of Back Pain

As previously mentioned, most back pain and back injuries can be attributed to:

- Age and the natural degeneration of the discs in the spine,
- Lack of strength and flexibility,
- Poor posture and bad body mechanics,
- Improper lifting techniques.

While we can not do much about the fact that we age and that the aging process is causing changes in our bodies, we can make a commitment to take the best possible care of our bodies to maximize our good health and minimize illness and injury. Back injuries are NOT inevitable. The back is one of those areas where we can greatly reduce our risk of injury with a bit of work.

Strength and Flexibility

Regular exercise is essential for keeping our bodies, including our backs, healthy and strong. Strong abdominal and back muscles provide support for the back and minimize the forces that could otherwise cause considerable damage. Up to 80% of back problems may be the result of weak muscles or from anxiety. (Tense muscles can aggravate a back problem even if they don't cause it.) Research shows that good physical conditioning and proper posture while working and resting can actually minimize the aging process in the back. A recent study comparing the number of back injuries between industrial workers and weight lifters revealed that weight lifters have fewer back problems. This doesn't mean you should become a weight lifter, but you should work on keeping your back and abdominal muscles strong. Good muscle tone decreases your chance of injury.

Keep your weight at a good level. Being overweight greatly increases the stress on your spine and the likelihood of an injury.

Most experts agree that the majority of back injuries could be avoided if people would spend a few minutes stretching and strengthening their back muscles every day, in addition to using proper body mechanics and following back precautions. In countries such as Japan and China, workers start the day out by stretching, and the populations of these countries don't have near the number of back injuries that Americans do. Flexible back muscles can actually widen the opening that nerve roots pass through and reduce the chances of pinching. Flexibility increases the range of motion within a joint, and reduces the strains and sprains that may occur when muscles are tight.

Talk with your family doctor or health care practitioner to find out what exercise(s) would help you the most and be appropriate for your current physical condition and fitness level. (Always see your doctor before starting a new exercise program.) If you have any history of back problems, NEVER do any exercises that strain your low back, such as sit-ups with straight legs, two leg raises, or lying on your stomach and raising your head, arms, and legs.

Your doctor may recommend a few basic stretching exercises. The one explained below is a good exercise for increasing your flexibility and stretching the extensor muscles of the low back.

1. Lie on your back with your knees bent and your feet flat on the floor.
2. Keep your arms at your sides on the floor, then raise one knee to the chest.
3. Lower the foot to the floor with the knee bent, and then slide the foot along the floor until the leg is fully extended.
4. Slide the foot back up into the starting position, with both knees bent and both feet on the floor.

5. Repeat with other leg.
6. Repeat the entire exercise 5 to 6 times.

Again, check with your doctor to make sure this exercise is appropriate, and to find other exercises that will help improve the health of your back.

Proper Lifting Techniques

Eight Steps to a Safe Lift

Following these basic steps, every time you lift, will go a long way towards preventing back injuries.

1. Size Up the Load
Before you lift anything, make sure you know how heavy it is. Can you really lift it yourself or do you need help? Do not pick it up if it is too heavy. Use a mechanized lift or get another employee to help so you are sure you can complete the lift without injuring yourself or damaging an object. If someone will be helping you lift, work out your signals before you start. (For example, "We lift on my count of three.") Is the load stable or likely to shift during the lift? Break the load down into smaller parts that will be easier to carry whenever possible.

2. Think About the Job
Where will you be carrying the object? How far? Are there any slipping or tripping hazards in your way? If so, move them before you start.. Where are you going to put the object down after your lift? Is there a clear space ? Think about the lift, and if possible, start off facing the direction that you want to go. DO NOT twist your body around once you have picked the object up!

3. Get a Good Base of Support
Make sure you have firm footing, that the floor and your shoes aren't slippery. Keeping your feet at least shoulder width apart gives you a wider base of support and makes you more stable. You might try a "staggered stance", with one foot slightly behind the other for more stability. Walk with short steps, but with your feet far enough apart to maintain good balance.

4. Bend and Lift with your Knees
Don't bend at the waist, bend your knees and squat down as far as you need to so that you use your legs for the lift, not your back. When you bend, you dangerously increase your risk of injury.

5. Get a Good Grip
Grasp whatever you are moving firmly, using your whole hand, not just your fingers.

6. Keep the Load Close to Your Body
The closer the weight of whatever you are carrying and moving is to your spine, the less force it exerts on your back. Lifting 10 pounds at "arms length" is like lifting 100

pounds. Keep your back upright so that you can maintain the normal inward curve of your low back. If you are lifting or putting an object down, do not add the weight of your body by bending over. Again, grasp the object with your palms, not just your fingertips.

7. Lift with Your Legs
You have very powerful leg muscles, use them to do the work of lifting. Flex your knees and hips, not your back. DO NOT bend at the waist.

8. Pivot - Do Not Twist
Don't twist your body when you are moving objects that you have already lifted. Pivot your feet and turn your entire body in the direction of the movement. Twisting is one of the most damaging movements for the back.

Proper Body Mechanics
Good body mechanics will help minimize the back's natural deterioration. These techniques should be used not only when you are lifting heavy objects, but in all of your activities.

- All objects have a center of gravity. In a standing adult, the center of gravity is inside the pelvis. The broader your base of support and the lower your center of gravity, the more stable you are. When lifting, make sure your feet are apart and your knees are bent. This helps transfer the weight of the object to your legs, which are stronger than your back.

- Maintain good posture at all times. Poor posture can actually cause back injuries. There should be a straight line intersecting your ear, shoulder, elbow, and hip, with your abdomen and buttocks tucked in. The back functions best only when the lumbar lordosis (slight curve in the small of the back) is maintained. This way, the discs and surrounding ligaments are in a neutral position and there is very little strain on the back.

- Always sit up straight. The pressure on your back increases about 600% when you move from a reclining position to sitting upright. That pressure increases to about 740% when you "slouch."

- Women should not wear high heels too often. They can actually change the alignment of the spine. They push the pelvis forward and put more strain on the stomach and back muscles.

- When you can, push an object instead of pulling it. Lean into the object, letting your body weight and thigh muscles do the work.

- Keep whatever you lift at a height between your shoulder and your thigh.
  - Anything higher or lower is considered the "danger zone" and substantially increases the chances of injuring your back. Also, keep what you are lifting in front of your body.

- Lower whatever you are carrying slowly, by bending at the knees and hips. Let go, then straighten up again using your legs. It is just as easy to injure yourself when you are putting something down as when you are picking it up.

- Don't reach over something or across a surface to pick something up. Get closer to it, or slide it towards you before you pick it up.

- Tighten you stomach muscles when you are lifting to give your spine extra support.

- Don't twist or bend at the waist when lifting.

- Move in a smooth motion. Don't use jerky movement. Jerking could strain or sprain your back or even throw you off balance and cause you to fall.

- Use devices for assistance whenever possible. Make sure you understand how to use them so you don't injure yourself or damage the object you are moving.

- Don't work in the same position for long periods of time. Change positions every 10-15 minutes. (Lack of movement starves your spine of nutrients and health.) If you must sit for long periods of time, make sure your posture is good and that your workstation is the right height. Put your feet on a small box or stool to relieve some of the pressure on your spine.

Ergonomics and Equipment

Ergonomics can greatly decrease the number of back injuries in the workplace. This means that employers and employees take a look at the workplace and the tasks that must be done there, and modify them, if possible, to make them easier for the workers to accomplish. Here, we focus on making the work place fit the workers abilities, not just on how the workers do their jobs.

These changes could be as basic as storing heavy, bulky items at waist height instead of on overhead shelves. Let your supervisor know if you have ideas for making your tasks easier and safer to accomplish.

Use lifting equipment whenever it is available to do the lifting for you. Make sure you understand how to use the equipment and that you use it properly every time. Don't take short cuts. Make sure the equipment is working properly and is clean. All mechanical aids, equipment and machinery must be properly maintained and employees must use it consistently for injuries to be avoided.

Good housekeeping will also reduce the risk of injuries. Make sure your work area isn't cluttered, has enough light, and that the floors aren't slippery.

Make it a habit to maintain good posture, an ideal body weight, safe lifting techniques, and good body mechanics in ALL your activities, both on and off the job. Use any devices available to you to decrease the number of times you must lift things and the weight of

those things you must lift. You only have one back, and it is up to you to take care of it. Communicate your ideas for improving the workplace with your supervisor. Take responsibility for your own health.

- Back Belts
  - Back belts are lifting aids that are quite controversial. They are not appropriate for all jobs.

- Employers and workers who feel that back belts are beneficial state:
  - Back belts support abdominal muscles which in turn support the spine.
  - Belts serve as a mental reminder, they make workers more aware of their posture, so they are more likely to stand and lift correctly. (Use proper body mechanics.)
  - They prevent overstretched muscles.
  - Belts encourage squat lifting.

- Those who don't believe back belts are effective argue that:
  - They make employees too confident so they might try to pick up more than they would without the belt.
  - They may actually weaken abdominal and back muscles because you get dependent on the belt for support.
  - Back braces constantly stimulate a large area of the skin and may decrease workers' sensitivity to pain.
  - Belts can cause a build-up of heat on the back, which can make symptoms worse.
  - They are used as a substitute for a permanent solution to the problem. (i.e. having employees stretch and have better muscle tone or reducing the number of lifts required.)

Back supports are a fairly new type of protective equipment. NIOSH (The National Institute for Occupational Safety and Health) does not recommend using back belts to prevent back injuries. It bases its conclusion on the fact that there just aren't enough documented, scientific studies available to prove (or disprove) their effectiveness.

The consensus among occupational therapists for employers who do choose to use back belts as part of their overall injury prevention program is that the belts be worn loosely and then tightened with Velcro© when the person is going to lift something. This will help keep the stomach muscles from getting weak by always relying on the belt for support. Loosen the belt at least every 15 minutes.

Overhead Transparency
This page is designed to be used as an overhead transparency in your safety training sessions.

EIGHT STEPS TO A SAFE LIFT

1. **Size Up The Load**
2. **Think the Job Through**
3. **Have a Base of Support**
4. **Bend Your Knees**
5. **Get a Good Grip**
6. **Keep the Load Close to You**
7. **Lift with Your Legs**
8. **Pivot, Do Not Twist**

Training Handout
This training handout is to be used during the presentation of formal training, as a "tool box talk" or as a posting for safety bulletin boards.

PROPER BODY MECHANICS

1. Keep your center of gravity low and your stance wide.
2. BEND YOUR KNEES, lift with your legs. They are stronger than your back.
3. Maintain good posture. Sit up straight.
4. Push a heavy object instead of pulling it.
5. Don't reach over something to pick up an object; get the object closer to you BEFORE you lift.
6. Keep what you are lifting in the "Safe Zone" — between the shoulders and thighs and in front of your body.
7. Put down whatever you are carrying slowly, again bending your knees.