

INDUSTRIAL ERGONOMICS

COURSE OUTLINE

- **There are thousands of different types of "industrial" jobs, but they all have something in common.**
 - Each one makes physical demands on the person who performs it.
 - Over time these stresses and strains can cause severe and even disabling injuries.
- **"Ergonomics" is the study of how workers can avoid these stresses, so they can work more comfortably, more productively and more safely.**
- **A good way to understand "ergonomics" is to think of our body as a mechanical system.**
 - Our bones provide the supporting framework.
 - They are linked by ligaments, muscles and tendons that hold the bones together and make them move.
 - Nerves are woven throughout the system to deliver information to and from the brain and provide us with our sense of touch.
- **This setup works very well, but like any mechanical system, things can go wrong.**
- **We can encounter a number of "ergonomic hazards" in our work, such as:**
 - Repeating the same motion over and over again without rest.
 - Working in awkward or extreme positions.
 - Using excessive force.
- **All of these things can cause:**
 - Our joints to get sore from overuse.
 - Muscles, ligaments and tendons to be bruised, strained and torn.
 - Nerves to be pinched and squeezed.
- **The more effort you have to use while you're making repetitive motions or working in awkward positions, the more damage it can cause.**
 - While some of these symptoms may seem to be minor inconveniences at the time, over the long term these "malfunctions" can lead to painful and even disabling injuries.

- **This can occur throughout the body, but especially in the:**
 - Hand and wrist.
 - Arm and shoulder.
 - Neck and back.
- **Over time ergonomic stresses can lead to conditions such as:**
 - Carpal tunnel syndrome.
 - Chronic lower back pain.
 - Repetitive motion syndrome.
 - And tendinitis.
- **Fortunately, you can learn to recognize ergonomic hazards in advance, and use "ergonomically safe practices" and equipment to protect yourself before they cause any damage.**
- **Positions that place the least strain on your body are called "neutral positions".**
- **Your hand and wrist are in a "neutral position" when your wrist is straight, as if you were "shaking hands".**
 - You can work more comfortably and safely in this position.
 - Working with your wrist in other positions can be very stressful and eventually lead to injuries.
- **Potentially harmful wrist positions include:**
 - Extension... bending your wrist up and back.
 - Flexion... bending the wrist down.
 - Deviation... bending your wrist to either side.
 - Supination... turning the palm up by rotating your wrist.
 - Pronation... turning the palm down.
- **You should take care to limit how often you make these motions, especially when you're using tools.**
- **Speaking of tools, hand and power tools come in all shapes and sizes.**
 - Thinking "ergonomically" can help you chose the ones that will help to protect your hands and wrists from injury.
- **You need to pay attention to the design of the handles.**
 - They should be at least as long as the widest part of your hand.
 - Shorter handles place "direct pressure" on your palm, which can irritate and damage the tissues inside.

- **Avoid handles with sharp edges or "finger grips".**
 - Plain round ones put less stress on your hands.
- **Always select tools with handles that will allow you to keep your wrist straight as you use them.**
- **Tools that don't "fit" you can increase the strain on your wrist and lead to pain and injury over time.**
 - Try tools out before you use them and make sure they work for you.
- **Some power tools transfer a lot of vibration to your hands when they're operating.**
 - Over time this shaking can irritate and injure your hands, wrists and arms.
- **To protect your hands when you're using these tools, you should:**
 - Limit the amount of time you work with them.
 - Avoid "forcing" them (let the tools do the work).
 - Wear gloves that are designed to absorb as much vibration as possible.
- **When ergonomic problems affect the arm and shoulder, it can lead to conditions such as tendinitis and bursitis.**
- **You can prevent these problems by avoiding certain hazardous motions while you work, such as:**
 - Extension...reaching backwards.
 - Abduction... raising your arm out to the side.
 - Adduction... reaching across the body.
- **Instead, work with your upper arms at your sides, with your elbows bent about 90 degrees, so your forearms and hands are in front of you.**
 - This neutral position will put the least amount of stress on your body.
- **To achieve this 90-degree hand-elbow-arm angle you can adjust yourself or the environment where you're working.**
 - If you're in a chair, you should raise or lower it as necessary.
 - If you're working at a bench or table, raise or lower it.
- **If your work surface is not adjustable, you can still:**
 - "Lower" it by standing on some type of platform.
 - Or raise whatever it is you're working on by placing it on a pad or stand.

- **Where you store tools and materials in your work area is important as well.**
 - If you keep them somewhere off to the side or behind you, you'll have to make stressful movements to reach them.
 - You can avoid this by storing the things you use as close to directly in front of you as possible, so you can reach them more easily... and safely.
- **It also helps to take “mini-breaks” throughout the day to stretch and loosen tight muscles.**
- **If you find yourself straining to "overpower" a stuck or heavy object, remember that using "excessive force" can make any type of motion more hazardous.**
 - Stop what you're doing before you hurt yourself, and find a way to get the job done "stress free".
- **Your neck and back provide strength and support to your head and upper body, while allowing you to move flexibly.**
 - But they are complicated structures.
 - Putting too much stress on them can lead to trouble.
- **To protect your neck, avoid motions such as:**
 - Flexing or extending it by moving your head forward and back.
 - Moving your head side-to-side.
- **To do this, you may have to make some adjustments, such as repositioning your computer screen or altering your workstation, so you can see without straining.**
 - Just remember the goal is to keep you head and neck upright and in a neutral position.
- **Good ergonomics is important for the back as well.**
 - Believe it or not, we place a significant strain on our back just by sitting or standing.
- **If you sit while you work, you can reduce the strain on your back by making sure the lower portion, or "lumbar region", is firmly supported by the back of your chair.**
 - Some chairs don't provide as much "lumbar support" as others, so you may find it helpful to place a pillow or rolled-up towel behind your lower back.

- **Another way to prevent back strain while you're sitting is to make sure your feet are firmly supported, either on the floor or by a footrest or other "platform".**
 - Your knees should be slightly higher than your hips.
- **Ergonomics can help you to work more safely while you're standing too.**
 - Adjust your workspace so that you can stand up straight without bending at the waist or slouching.
- **To prevent tiring out your lower back, place a footrest on the floor and stand with one foot on it at a time.**
 - Remember to switch the foot that you're raising every now and then.
 - Anti-fatigue mats and cushioned insoles can help to keep you comfortable when you're standing for long periods as well.
- **Using proper lifting procedures is especially important whether you are on or off the job.**
 - It can do a lot to prevent straining or otherwise injuring your back.
- **More than one million back injuries occur in U.S. workplaces every year.**
 - Most of them occur because people lift things the wrong way.
 - The most common mistake we make is bending at the waist while making a lift.
- **When you lift something, your back not only has to carry the weight of your upper body, it has to carry the weight of what you're lifting as well.**
- **When you bend at the waist, it focuses this strain on your lower back, and multiplies the weight by a factor of ten.**
 - If your upper body weighs 100 pounds, bending at the waist places one thousand pounds of pressure on the lumbar portion of your spine.
 - If you're lifting a 25-pound object, that adds another 250 pounds, for a total of 1,250 pounds your back has to support!
- **That much stress is dangerous.**
 - So it's important to keep your back straight, and think before you lift.
- **Always examine the load that you're about to lift. If it's too heavy, bulky or unbalanced for you to handle alone, get some help!**
 - Ask a coworker for assistance, or use a cart or a dolly.

- **If you decide you can make the lift by yourself, doing it safely is not complicated.**
 - First, get close to the object.
 - Lower yourself by bending at the knees (remember, don't bend at the waist).
 - Get a good grip on the sides of the object.
 - Lift slowly with your legs, with the load against your body.
 - Keep your back straight!
- **If you need to change direction while carrying a load, don't turn your upper body.**
 - Change direction with your feet instead.
 - Walk through the turn to avoid twisting your back.
- **When it's time to "offload" what you're carrying, simply reverse the process.**
Remember to:
 - Keep your back straight.
 - Bend at the knees.
- **When you're making a "team lift" with a coworker, you need to work in unison.**
 - One person should "lead" the lift by counting... "One, two, three, lift".
 - Do the same thing when you're "offloading".
- **As we've seen, ergonomic hazards can present a real challenge on the job, but you can meet the challenge and avoid injury by following safe work practices and using the appropriate equipment.**

*** * * SUMMARY * * ***

- **Ergonomic hazards place stresses and strains on your body that can cause severe, sometimes debilitating, injuries.**
- **You can reduce the stress on your body by maintaining "neutral positions".**
- **Whether you're sitting or standing, you should set up your workspace to fit you.**
- **Whatever your position, make sure your feet and lower back are firmly supported.**
- **Avoid using excessive force, and always follow safe lifting procedures.**
- **Now that you know what types of ergonomic hazards to look out for, and what to do to avoid them, you can go home pain-free... every day!**