

One Hour Safety Presentation

The main goal of the Division of Safety & Hygiene is the reduction of accidents and illnesses in the workplace. Toward this goal, the One Hour Safety presentation is designed to support the delivery of a presentation to co-workers in your workplace to help them understand and promote safer and healthier work environments. It is recommended that you take the DSH Training Center course as a background for using One Hour Safety Presentation to train others at your workplace. Call 1-800-OHIOBWC, option 2, 2, for class dates and locations.

The One Hour Safety Presentation contains:

- Transparency Masters from which films can be made to use on an overhead projector,
- Instructor Notes which gives the instructor suggestions and script notations to use during the presentation, and
- Student Handouts which can be copied for those attending the presentation.

Materials are included for a one-hour presentation on each of these topics:

- | | |
|--|--|
| ✓ Accident Analysis | ✓ Machine Guarding Basics |
| ✓ Bloodborne Pathogens | ✓ Measuring Safety Performance |
| ✓ Effective Safety Teams | ✓ Noise & Hearing Conservation |
| ✓ Enhancing Safety through a Drug-Free Workplace | ✓ Personal Protective Equipment |
| ✓ Ergonomics Basic Principles | ✓ Powered Industrial Trucks Training Program |
| ✓ Ergonomics Developing an Effective Process | ✓ Respiratory Protection |
| ✓ Hazard Communication | ✓ Safety and Ergonomics for Extended Care Facilities |
| ✓ Lockout/Tagout and Safety-related Work Practices | ✓ Violence in the Workplace |
| | ✓ Wellness in the Workplace |

Applications used:

- 1) Text documents (ending in .txt) can be opened with any word processing program.
- 2) Microsoft PowerPoint slides (ending in .ppt) can be opened with the Microsoft PowerPoint program. If you do not have PowerPoint and you do have Windows 95, 98, 2000 or Windows NT operating system, you can view the PowerPoint slides by downloading a free PowerPoint Viewer from the following website:
<http://office.microsoft.com/downloads/default.aspx?Product=PowerPoint&Version=95|97|98|2000|2002&Type=Converter|Viewer>
- 3) Adobe Reader document (ending in .pdf) contains the One Hour Safety Presentation in read-only format. It can be opened when you download Adobe Reader, which is available free of charge at the following website:
<http://www.adobe.com/products/acrobat/readstep2.html>

If you have comments or questions about these materials for One Hour Safety Presentation, please e-mail us: Safety@bwc.state.oh.us or call us at the number above.

Transparency Masters



Ergonomics

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Ergonomics

BWC
Div. Of
Safety &
Hygiene



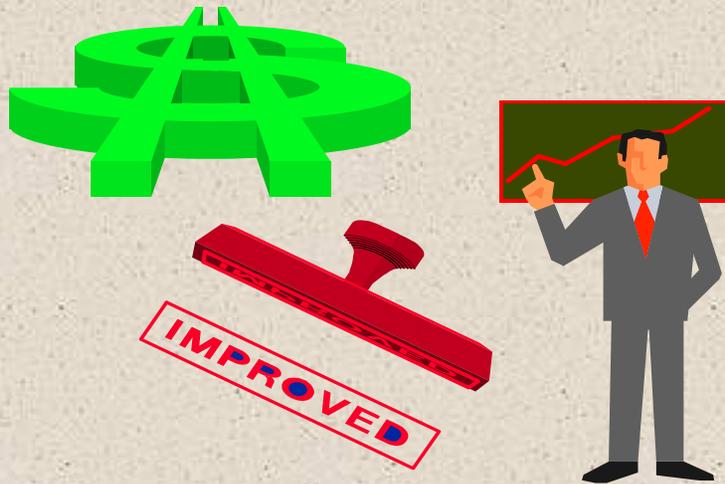
Ergonomics



A Balance for Optimization



Win/Win



Higher Production

Higher Quality

Compliance

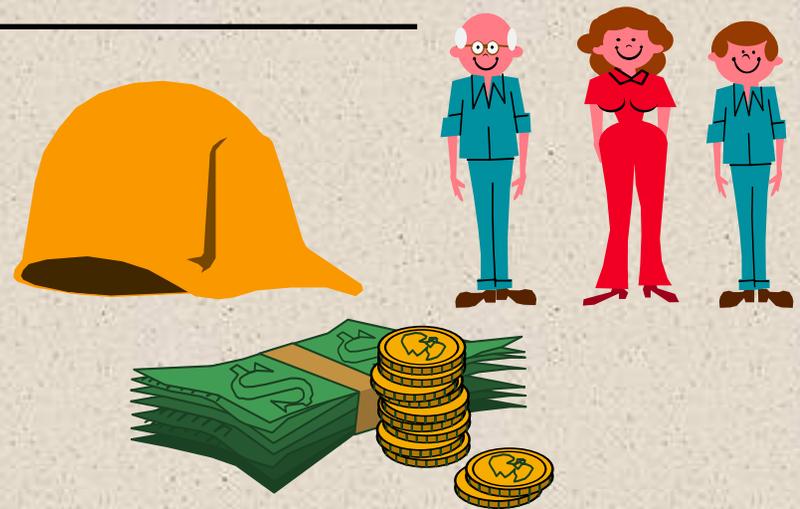
Lower Compensation Costs

Careers/Employment
Longevity

Safe Working Conditions

Quality of life

Morale





Acute Vs. Cumulative Disorders

- Acute:
 - Result from a one time event
- Cumulative:
 - Result from repeated wear and tear; however, a specific event may have been “the last straw” upon a previously weakened system and thus given the appearance that the problem is acute rather than chronic. {*Stephen Konz. “Work Design; Industrial Ergonomics”, Third edition. 1990*}

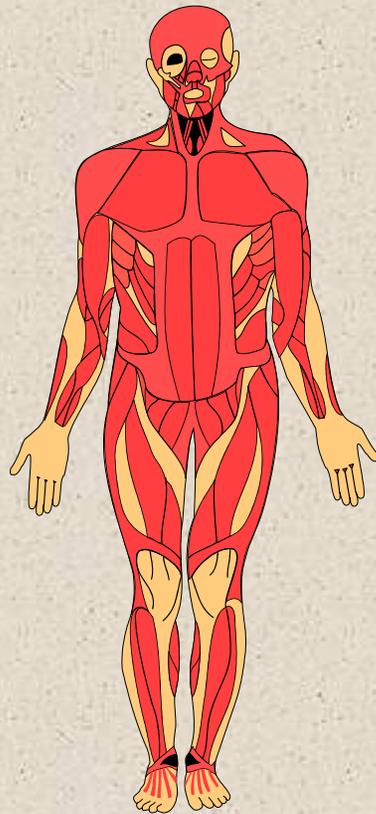


Some Common Upper Extremity CTD's

- Tendinitis
- Tenosynovitis
- Trigger Finger
- Epicondylitis
- Thoracic Outlet Syndrome
- Carpal Tunnel Syndrome



Two Kinds of Back Injuries



MUSCULAR



SPINAL



Risk Factors

- Repetition
- Forceful Exertion
- Direct Mechanical Pressure
- Static Posture
- Inadequate Recovery Time
- Awkward Posture
- Environmental Stressors



Worksite Analysis Methods

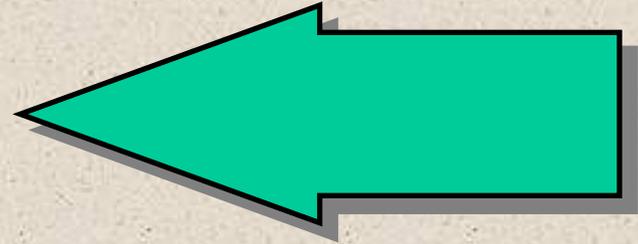
- Task Analysis
- Checklists
- NIOSH Lifting Guides
- Video Taping / Observation
- Interviews
- Symptom Surveys



Control Strategies

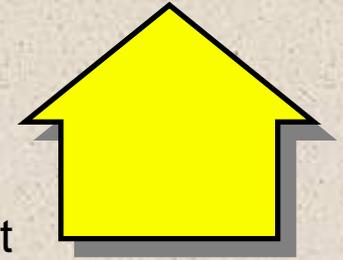
Engineering Controls

- Workstation Design
- Tool Design
- Process Modification
- Mechanical Assist
- Education



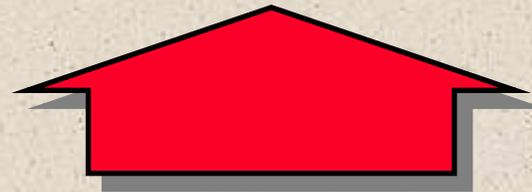
Administrative Controls

- Training
- Job Rotation
- Pacing
- Policy
- Job Enlargement



Band Aid Solutions !?!

- Splints
- Braces





Design Strategies - Hand Tool Design

Power Tools Tips & Controls

- Use tool balancers
- Reorient work
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Design Strategies - Back Issues

- Minimize pushing/pulling
- Minimize load weights
- Slide objects
- Lower loads rather than lift
- Use gravity
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- Use suitable containers
- Provide comfortable hand holds
- Remove constraints/obstacles
- Avoid placing loads on the floor





BWC Ergonomics Resources

- Ergonomics Consultants
- Library
- Video Library
- OCOOSH Courses

**For more information:
Call 1-800-OHIOBWC
Or visit www.ohiobwc.com**

Instructor Notes

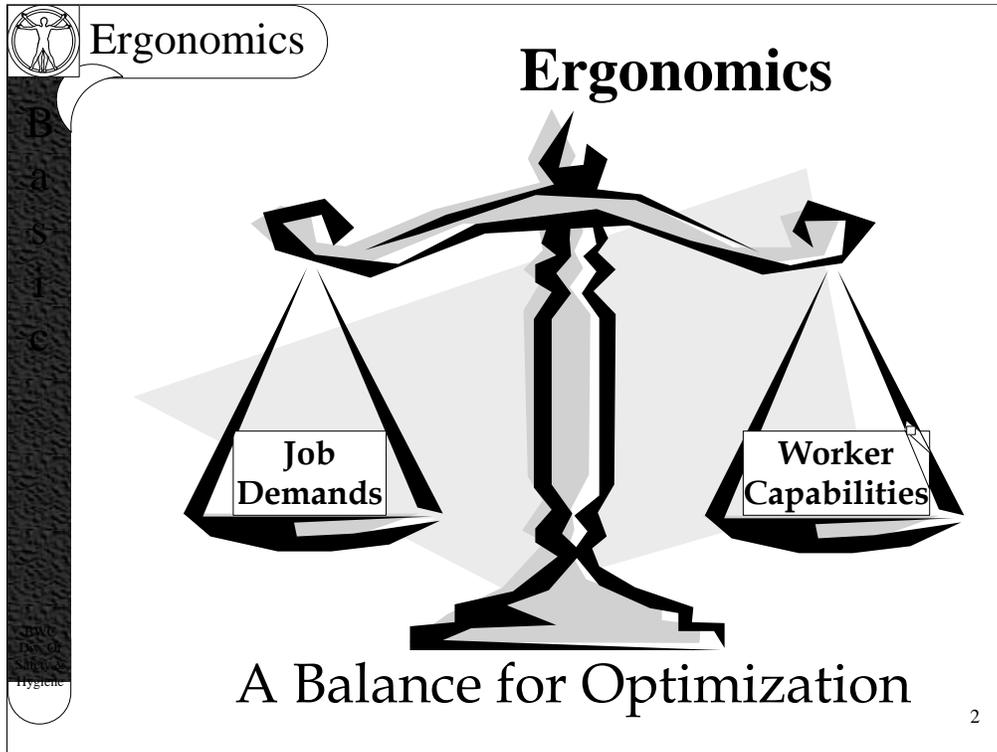


Ergonomics

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Hygiene

Ergonomics



WHAT IS ERGONOMICS?

There are many definitions of ergonomics:

The study of the laws of work.

Fitting the task to the worker rather than forcing him/her to adapt to the working environment.

Designing the workplace to prevent occupational injury and illness.

The process of identifying and preventing work related musculoskeletal disorders.

Working definition:

The process of balancing job demands worker capabilities.

Ergonomics

Win/Win

Higher Production
Higher Quality
Compliance
Lower Compensation Costs

Careers/Employment Longevity
Safe Working Conditions
Quality of life
Morale

Hygiene

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The application of ergonomic principles is a win-win scenario for both management and labor.

▼ **LABOR BENEFITS**

Career Longevity

You can control your career destiny.

Safe Working Conditions

Safe working conditions allows everyone to work with minimum fatigue. This in-turn will give you more energy for other activities. Minimizing pain on the job allows a worker to focus on the tasks of the job.

Quality of Life

Ergonomics can provide long-term benefits. You should retire from work able to enjoy your hobbies and activities pain-free for the rest of your life.

Morale

Ergonomics can help make your job less stressful so that you can concentrate on other things rather than your discomfort. Employees' morale may also be uplifted if they "see" that the company does care about how the workers are feeling while performing a job.

▼ **MANAGEMENT BENEFITS**

Production

When ergonomic principles are properly applied, many obstacles to efficient production are removed. It has been shown that production can be positively impacted when ergonomics is applied.

Some examples of production benefits of proper ergonomically designed jobs are:

- Less fatigue
- Elimination of bottlenecks
- Reduction of bottlenecks
- Increased throughput
- Optimization of cycle time
- Help in meeting deadlines
- Well designed jobs
- Increase in profitability & competitiveness

Quality

As mentioned earlier, when an employee has an ache or pain, his/her mind is not on the task at hand. Removing the causes of those pains will mean greater focus on the job, resulting in higher quality. This is true for all jobs where quality of the product or service is important.

Some examples of quality benefits of proper ergonomically designed jobs are:

- Less scrap and re-work
- Increased efficiency
- Reduction of rushing and shortcuts
- Less fatigue
- Improved customer satisfaction
- Better accuracy



Acute Vs. Cumulative Disorders

- Acute:
 - Result from a one time event
- Cumulative:
 - Result from repeated wear and tear; however, a specific event may have been “the last straw” upon a previously weakened system and thus given the appearance that the problem is acute rather than chronic. {*Stephen Konz. “Work Design; Industrial Ergonomics”, Third edition. 1990*}

ACUTE VERSUS CUMULATIVE INJURIES

Acute Injuries are the type of injuries that traditional safety deals with preventing. These injuries result from a single event that has a clear cause-effect relationship.

Example: If a person cuts his/her finger, it is very simple to determine the cause. The individual usually knows:

what cut the finger;

what they were doing when they were cut;

what they were doing just before the injury occurred;

who was around them at the time of the injury, and so forth.

Cumulative Injuries result from multiple events over a period of time. However, a specific event may have been “the last straw” for the previously weakened system, thus giving the appearance that the problem is acute rather than chronic.

{*Stephen Konz. “Work Design; Industrial Ergonomics”, Third edition. 1990*}

Example: You probably know someone that has stepped off of a curb, hopped out of a truck, or picked up a small item from the floor and had shooting, debilitating pain in their back. At first glance this may seem like an acute injury. However, the act of picking a small bolt up off of the floor is not a dangerous act. And, it is obvious (since we all do similar activities daily) that it is not the sole cause of this injury. This action, that was associated with the pain, is simply that “last straw” that “broke their back”. There were probably thousands of insults and injuries to this back before it reached the injury point. This is a classic example of a back injury that could be classified as a *cumulative trauma disorder*.



Some Common Upper Extremity CTD's

- Tendinitis
- Tenosynovitis
- Trigger Finger
- Epicondylitis
- Thoracic Outlet Syndrome
- Carpal Tunnel Syndrome

Common Cumulative Trauma Disorders

Tendinitis: a form of tendon inflammation when muscle/tendon unit is repeatedly tensed.

Tenosynovitis: repetitive-induced tendon injury involving the synovial sheath; sheath produces excess synovial fluid

Trigger Finger: tendon sheath of finger sufficiently swollen to lock tendon in sheath

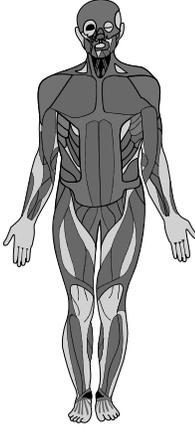
Epicondylitis: tendonitis effecting vulnerable unsheathed tendons of the elbow and shoulder

Carpal Tunnel Syndrome: compression of median nerve through the tunnel, sometimes resulting from tenosynovitis of finger tendons



Ergonomics

Two Kinds of Back Injuries



MUSCULAR



SPINAL

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BACK INJURIES

Work related back injuries fall into two primary categories:

- 1) Muscular injuries
- 2) Spinal injuries

Muscular injuries

Of the two we can recover most easily from muscle injuries. A pulled muscle, if the individual is injured while doing the normal duties of his or her job, is a warning that the back is not strong enough to do the work. Proper exercises should be obtained from a doctor, physical therapist, or occupational therapist that knows the individual's back history and job duties.

Spinal injuries

The three main components of the spine are the vertebrae, spinal cord, and the discs. The weak links in this system are the discs.

There are two important factors which must be considered when dealing with the spine. First, the discs have no direct blood supply which means that all nutrients must be transmitted from the surface of the vertebra. Therefore, the discs actually take longer to heal than bones.

The second factor is that there are no nerve connections to the discs. This means that when the disc is injured you don't know it. Because you are not aware of the injury, you do not make any changes and keep doing what you normally do, making the healing process even slower.

Since the discs and surrounding bone heal slowly, and are aggravated by sustained activity, scar tissue is formed. This scar tissue impedes the flow of nutrients to the disc, causing increased degeneration as time progresses.



Risk Factors

- Repetition
- Forceful Exertion
- Direct Mechanical Pressure
- Static Posture
- Inadequate Recovery Time
- Awkward Posture
- Environmental Stressors

Risk factors are those characteristics of a job that might contribute to the onset of aches/pains and/or injury. There are several CTD risk factors that may be present at a work area. The more risk factors that are present, the higher the risk of injury. Also, higher levels of individual risk factors increases the risk of injury.

The best way to reduce the risk of injury is to identify these risk factors and implement control measures which eliminate or reduce these risk factors.



Worksite Analysis Methods

- Task Analysis
- Checklists
- NIOSH Lifting Guides
- Video Taping / Observation
- Interviews
- Symptom Surveys

BWC / OSU Lifting Guidelines: BWC and The Ohio State University have partnered to develop lifting guidelines for healthy workers and workers with low back disability. The purpose of the guidelines is to aid in developing realistic transitional work programs for employees with low-back disorders and to provide guidance on the design of lifting tasks to reduce the frequency and severity of initial and recurring back claims. The tool can be accessed online at

<http://www.ohiobwc.com/employer/programs/safety/Ergoliftguide.asp>

There are many techniques for evaluating problem jobs and determining the causes of the problems.

Task Analysis is an outline or set of instructions for sequenced actions to accomplish a task.

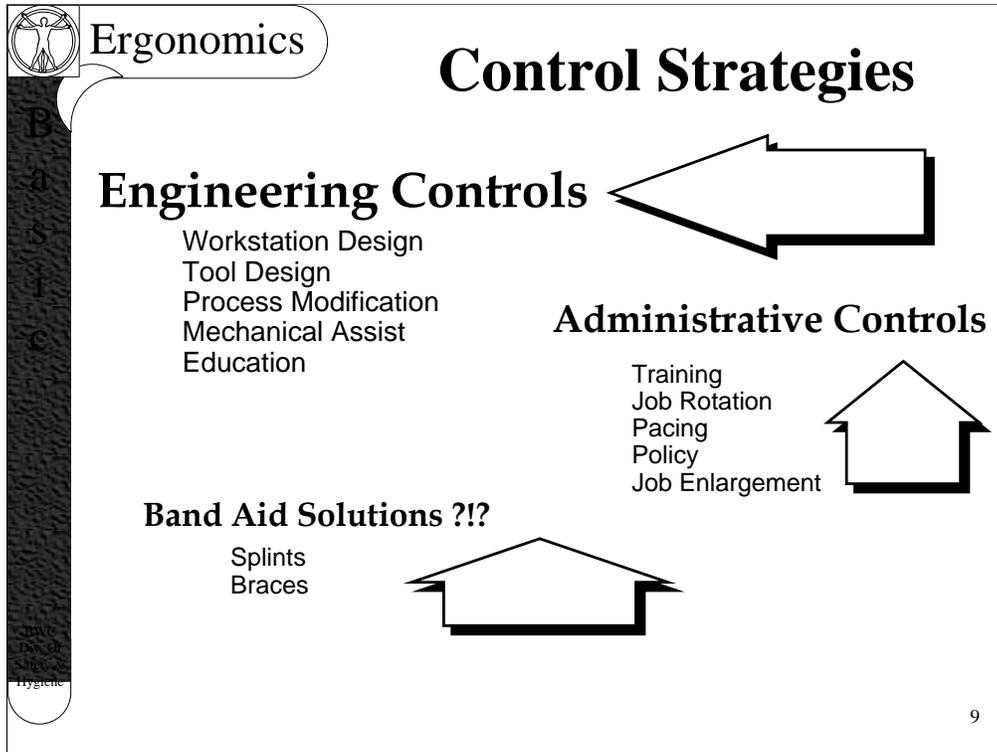
Checklists are shorthand tools that help to collect and quantify risk factors. Checklists are rarely if ever valid pass/fail measurement devices. They are best used as comparative gauges.

National Institute for Occupational Safety and Health (NIOSH) Lifting Model – was developed as an evaluation tool to assist individuals in assessing lifting tasks. The outcome of the model is to determine a recommended weight limit (RWL) where a “normal” worker would not likely injure their back while performing the lifting task.

Video taping is a useful tool for ergonomic evaluations for many reasons:

- It allows a permanent record of the job to show before and after conditions.
- It allows multiple people to perform a task analysis without causing a major disruption.
- It allows much more thorough analysis of a task.
- It uncovers differences in technique.

Interviews and Symptoms Surveys involve asking the workers to suggest improvements and to report pain and/or discomfort associated with the job.



CONTROL STRATEGIES

Engineering Controls are permanent modifications to the working environment to reduce or eliminate a recognized ergonomic risk factor. Common types of engineering controls include:

- Workstation design
- Tool Design
- Process modification
- Mechanical Assistance devices

The most important consideration when making an engineering change to a job is to include the employees that will be using the modifications. They must:

- understand why the change is being made,
- feel as if they have had input into the change
- understand that the first modification is not perfect and that their input will be critical to making the project work.

Administrative Controls are managerial decisions that affect exposure to the risk factors but do not remove the actual hazards. Typical Administrative controls include:

- Training
- Job Rotation
- Pacing
- Policy
- Job Enlargement

Administrative controls can be put in place until an engineering solution can be developed.

Band-Aid Solutions (or ergonomic snake oil?) are things such as wrist splints. Wrist splints should not be used on the job unless the individual is under ongoing care and monitoring of a physician or physical therapist. Many products have had the term ERGONOMICS added to them by the marketing people. However, any tool or item can be used in a good or poor ergonomic fashion. What makes a job poorly designed, from an ergonomic standpoint, is not how a given item was designed, but how it works in conjunction with the task at hand.



Design Strategies - Hand Tool Design

Power Tools Tips & Controls

- Use tool balancers
- Reorient work
- Use angled tools
- Use in-line tool for vertical work
- Use Pistol Grip for horizontal work
- Use dyna-swivel
- Use adjustable workstations
- Use 3 or 4 finger triggers
- Handles should be 4"-5" long
- Utilize vibration torque dampening features
- Handle diameter 1.25"-2"
- Control exhaust exit point

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Power Tools Tips & Controls

- Use tool balancers
- Reorient work
- Use angled tools
- Use in line tool for vertical work
- Use pistol grip for horizontal work
- Use dyna-swivel couplings for air tools
- Use adjustable workstations
- Handles should be 4"-5" long
- Utilize vibration and torque dampening features
- Handle diameter should be 1.25" to 2"
- Control exhaust at the exit point

Trigger Design

- Minimal 1" long to allow for activation by 2 fingers
- 3 to 4 finger triggers should only be used on suspended tools,
- Trigger should be activated by index or middle finger,
- Avoid thumb triggers on highly repetitive operations

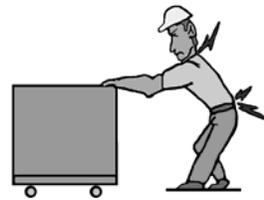
Torque reduction strategies

- For a pistol grip tool use reaction torque limiting devices if the torque exceeds 24 in-lbs.
- For a straight or in-line driver, use reaction a reaction torque exceeds 14 in-lbs.
- For right angle power tools with torque exceeding 42 in-lbs. Use an articulation arm, or some other positive means of reaction torque limiting devices.



Design Strategies - Back Issues

- Minimize pushing/pulling
- Minimize load weights
- Slide objects
- Lower loads rather than lift
- Use gravity
- Avoid double handling
- Use suitable containers
- Provide comfortable hand holds
- Remove constraints/obstacles
- Avoid placing loads on the floor



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▼ Back Protecting Strategies:

Bending at the waist should be avoided. Objects to be lifted should be located between knuckle and shoulder levels. Avoid placing loads on the floor.

Reach distances should be minimized. Reaching to the other side of a pallet places 10 times the compression on the spine as lifting close to the body!

Twisting should be eliminated. Twisting, while lifting, stresses the spine, as well as requiring the least capable muscles in the torso to do most of the work.

High speed or acceleration/deceleration should be avoided. The faster the object is moving, the greater the effective weight of the object.

Minimize pushing/pulling – if one must be done, pushing allows a person to get in better alignment to use both hands to exert the force, allows entire body weight to be used more effectively, and improves stability in case of slipping

Minimize load weights

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Ergonomics

BWC Ergonomics Resources

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- Library
- Video Library
- OCOSH Courses

**For more information:
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Or visit www.ohiobwc.com**

Hygiene

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Ergonomics Consultants analyze the physical relationship between the worker and the workplace. They formulate solutions for problems involving manual materials handling, cumulative trauma disorders, video display terminals, workplace and workspace design, adverse environmental conditions, shift work, and occupational stress, and provide consultation to reduce low-back injuries in the workplace. BWC consultants are available, at no additional fee, to help Ohio employers.

The BWC Library provides free information services on the topics of occupational safety and health, workers' compensation, and rehabilitation. Library users do not have to visit the library; most phone, fax, or e-mail their requests for a quick response. Our experienced and knowledgeable staff provides personalized, objective research services and in-depth answers.

The Video Library is a lending library of occupational safety and health videotapes. It has an extensive collection of 500 titles. There is no direct charge for borrowing tapes from the Video Library. Users may view or preview tapes on-site.

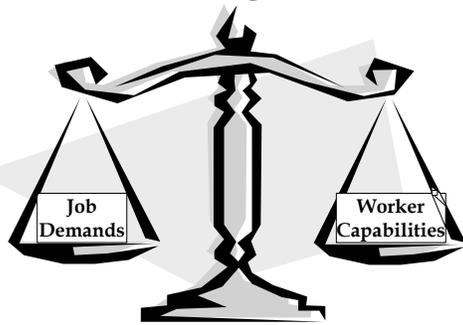
The BWC Division of Safety & Hygiene Training Center is an adult continuing education facility specializing in occupational safety and health. Through seminars and workshops, the Training Center provides students with the knowledge, tools and skills they need to prevent occupational injuries and illnesses in the workplace. More than 30 subjects are offered addressing:

industrial safety,
construction safety,
industrial hygiene,
ergonomics and
safety management.

Student Handouts

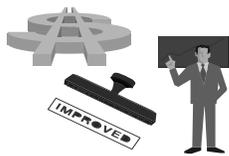
Ergonomics

Ergonomics



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- Higher Production
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- Compliance
- Lower Compensation Costs

- Careers/Employment
- Longevity
- Safe Working Conditions
- Quality of life
- Morale



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Ergonomics

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Ergonomics

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Ergonomics

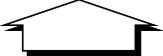
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Engineering Controls 

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- Education

Administrative Controls 

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