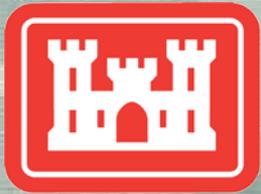


Oh No, My Back

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US Army Corps of Engineers
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Ergonomics in Navigation

- Why do I care?
- What is Ergonomics?
- Examples from Navigation Industry
- What do I with the information?



Why Do I Care?

2010 Bureau of Labor Statistics Findings

<http://www.bls.gov/iif/oshcdnew2010.htm#10m>

- 26 percent of all reported injuries are WMSD (Last year USACE results were similar)
- 242,632 total WMSD cases reported
- The median number of missed work days from a WMSD is 20 vs 8 for all other injuries (USACE similar)
- Carpal tunnel syndrome required a median of 27 days to recover from ACUTE effects, amputation required 18 days to recover from ACUTE effects.



Why Do I Care?

Poor Ergonomics Leads to: Work-related Musculoskeletal Disorders (WMSDs)

- Influences worker health
- Influences other's health



Why Do I Care?

Before Injury

Decreased Productivity
Discomfort
Pain
Lowered Morale

After Injury

Loss of Worker
Lost Work Time
Retraining Costs
Replacements



What is Ergonomics?

Ergonomics involves the application of knowledge about human capacities and limitations to the design of workplaces, jobs, tasks, tools, equipment, and the environment.

- A simpler way to define Ergonomics is:
 - **Fitting the Workplace to the Worker**
 - **Not fitting the Worker to the Workplace**



Work-Related Musculoskeletal Disorders or Ergonomic Injury

- Affects bones, muscles and other soft tissues
- Caused by exposure to ergonomic risk factors
- Caused by cumulative changes, over time
- ***May or May Not*** cause pain
- Reduced in work capacity



Seven Risk Factors for Ergonomics

Duration

Compression/Contact Stress

Position/Posture

Vibration

Force

Temperature (Cold)

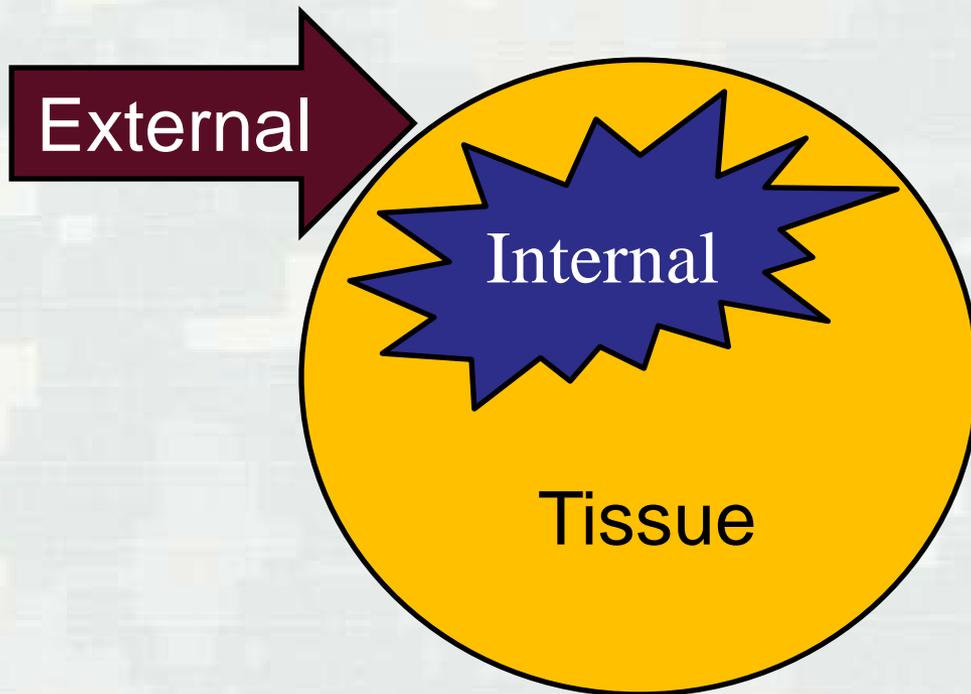
Repetition

(Workers can experience more than one at the same time.)



Work Related Musculoskeletal Disorders

Two Energy Sources



- External Sources
 - Mechanical Stress (HAV, WBV...)
 - Thermal
- Internal Sources:
 - Muscular Exertion
 - Non-neutral Posture



Where should Ergonomics be Implemented?

Anywhere risk factors exist

- Home
- Work
- Leisure



Maintaining a mechanical advantage makes work easier.



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When should ergonomics be applied?

■ BEST

- Proactively
- Before an injury
- Once a risk factor is identified



When should ergonomics be applied?

■ WORSE

- Retroactively
- Once a worker has sought medical treatment
- Injury most likely has occurred



Were there warning signs that could have prevented this injury?



Issues in Pilot House

- Good:
 - ▶ Access
 - ▶ Adjustable Chair
- Requires Improvement:
 - ▶ Controls too Low
 - ▶ Chair Seat too High



Worker experiencing posture and compression issues.



Pilot House



- Not fit to the worker
- Knees hitting control panel
- Has to reach down to use controls rather than 90 degrees
- Leaning forward to see



Lifting Lines



- Shoulder and lower back injury possible.
- No easy way to lift this type of rope.
- Bending all the way down at knees and then getting up with load
- Or use a lifting devise.



Tying Lines

Worker bending verses standing less compression on back muscles and force on the knees.



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Welding



Compression on lower back and shoulder.
Force on the wrist. Not the best choice.

Arms and shoulders are aligned and no compression on lower back. Still a little problem on the neck.



Storage

Workers need controls to help them do their job better and then training to know and remember how and why to use those controls.

There are good controls for storage areas and bins. Remember to avoid lifting in awkward positions and lift from same height.



Using Wench on Lines

- This posture adds force to the lower back and shoulder
- This posture protects back and shoulder but does add force to knees.



Controls – Elimination

- Elimination of the demanding process essentially eradicates the WMSD hazard.
- The forklift and rollers eliminate the lift and carry hazards



Controls - Substitution

- Substituting a new work process or tool (without WMSD hazards) for a work process with identified WMSD hazards can effectively eliminate the hazard.

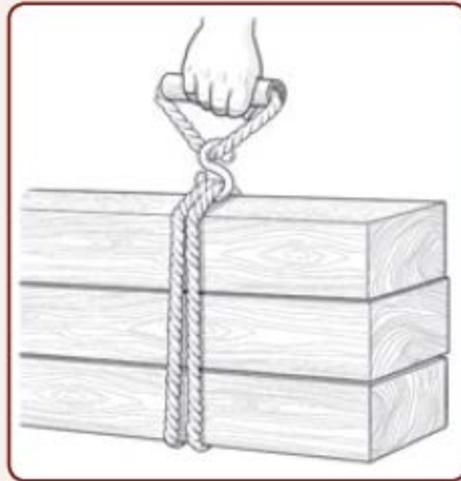


Controls - Engineering

- Pilot Controls
 - ▶ Raise height of table or handles on levers
 - ▶ Adjust the chair height and back
 - ▶ Add longer arms to chair
- For Lifting
 - ▶ Mechanical lifting
 - ▶ Hand made tools
 - ▶ Control for the level you lift from



Controls – Engineering



Handles made with pipe and straps for 2 people to carry heavy lumber.



One-person & 2-person panel carriers reduce bending and make carrying easier.

Handmade tool to carry loads. Hang the rope so you do not have to lift from ground and use a tool like this to carry it.



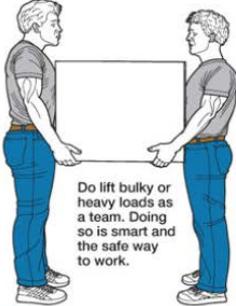
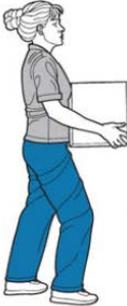
Controls – Work Practices

- Practices that decrease worker exposure to WMSD risk factors include changing work techniques, providing personnel conditioning programs, and regularly monitoring work practices.

- Proper work techniques include methods that encourage—
 - ▶ Correct posture.
 - ▶ Use of proper body mechanics.
 - ▶ Appropriate use and maintenance of hand and power tools.
 - ▶ Correct use of equipment and workstations.



Controls – Work Practices

LIFTING DO'S & DON'TS			
<p>DO LIFT AS A TEAM</p>  <p>Do lift bulky or heavy loads as a team. Doing so is smart and the safe way to work.</p>	<p>DO TURN WITH LEGS</p>  <p>Do move your legs and feet when turning or lowering the load. Avoid twisting at your waist.</p>	<p>DO USE YOUR LEGS</p>  <p>Do lift the load using your powerful leg and buttocks muscles. Your feet should be wide apart, head and back upright. Keep abdominal muscles tight and the load in close.</p>	<p>DO USE EQUIPMENT</p>  <p>Do use equipment like hand trucks, dolly's, or forklifts to do the heavy lifting. It's much less work and less risk of injury.</p>
<p>DON'T LIFT BULKY LOADS ALONE</p>  <p>Don't lift bulky or heavy loads alone. Doing so puts great stress on your low back muscles and spine.</p>	<p>DON'T TWIST WHEN LIFTING</p>  <p>Don't twist when lifting, lowering, or carrying any load as this increases your risk of back injury.</p>	<p>DON'T USE YOUR BACK</p>  <p>Don't lift the load with your rear end high and your lead low. Use your leg muscles, not your weaker low back muscles.</p>	<p>DON'T LIFT HEAVY LOADS</p>  <p>Don't lift heavy loads when you can use equipment. It is less work and less stress on your low back.</p>

Source: Argonne National Laboratory



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What do you do with this information?

- Identify
 - ▶ Look at your workers
 - ▶ Have a professional come in
- Control
 - ▶ During design or refurbish consider controls
 - ▶ Look for easy fixes
- Safe Work Practices
 - ▶ Practice Proper lifting both at home and work
 - ▶ Have worker classes
 - ▶ Stay in Shape



Conclusion

- Information on why to consider ergonomics in your safety program
- Definitions and explanations of ergonomic hazards
- Examples of ergonomic hazards and controls.
- Bottom Line: Work Related Musculoskeletal Disorders are Painful, Costly and PREVENTABLE

