Ergonomics

Designing jobs and workplaces to match capabilities and limitations of the human body.
Cost of Ignoring Ergonomics

- Increased workers’ compensation premiums
- Loss in productivity
- Increase in production costs
- Employee turnover
- Decreased employee morale
- More likely an inspection target
- Increased administrative costs to investigate and follow up on injuries

Ergonomic Program Benefits

- Improve quality and productivity
- Reduce employee absenteeism and turnover
- Improve employee health and safety
- Improve employee morale
- Minimize regulatory and administrative problems
- Reduce workers’ compensation insurance rates
Ergonomic Success Stories

Company A automated some finishing activities

Prior to automation
- 21 wrist injuries, 21 low back injuries, and 72 injuries for all material handling activities

Three years later
- Only 2 wrist injuries, 14 low back injuries, and 24 injuries associated with materials handling

Musculoskeletal Disorders (MSDs)

An Injury To
tendons, related bones, muscles, or nerves

As a result of
repetitive movements, force, and awkward postures

Affecting
hands, wrists, elbows, shoulders, backs, legs, knees, and feet
### Musculoskeletal Symptoms

- Pain and discomfort
- Numbness and tingling sensations
- Limited joint motion
- Muscle weakness
- Skin redness and swelling

### Contributing Factors

<table>
<thead>
<tr>
<th>Physical Fitness</th>
<th>Psychosocial Factors</th>
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<tr>
<td>Weight</td>
<td>Level of stress</td>
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<tr>
<td>Diet</td>
<td>Amount of autonomy in job</td>
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<td>Lifestyle</td>
<td>Level of job security and satisfaction</td>
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<tr>
<td>Medical Conditions</td>
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<tr>
<td>Arthritis</td>
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<td>Pregnancy</td>
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<td>Thyroid problems</td>
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Ergonomic Concerns

**Force** - pinching an unsupported object, gripping an unsupported object, pushing, pulling and lifting.

Ergonomic Concerns

**Repetition** - repeating the same motion with little or no variation and inadequate rest periods.
Ergonomics Concerns

**Awkward postures** - include prolonged or repeated
- Reaching
- Twisting
- Bending
- Kneeling
- Pinching
- Squatting
- Holding a fixed position

Awkward Postures
Ergonomic Concerns

**Contact Stress** – soft tissue compression such as using the hand or knee as a hammer

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Ergonomic Concerns

**Hands and Wrists**
- Repetitive flexion, extension, side to side movement
  - Especially while exerting force or pinching an object
- Direct pressure or compression of delicate parts
- Repetitive twisting motions
- Forceful exertions
- Raised arms and abducted shoulders
- Any combination above
**Ergonomic Concerns**

**Back Injuries**

- Most injuries related to material handling involving
  - Handling large or bulky loads
  - Lifting heavy objects
  - Frequent forward bending
  - Frequent side to side bending
  - Jerking or awkward body movements

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**Ergonomic Concerns**

**Back Injuries**

- Most injuries related to material handling involving
  - Twisting
  - Extended reaching or away from the body handling
  - Poor grip between hands and load
  - High push and pull forces
Addressing Ergonomic Concerns

Management Commitment
- Policy statements
- Meetings between supervisors and employees
- Setting and refining goals
- Committing resources
- Communication
- Track and report results

Addressing Ergonomic Concerns

Supervisors
- Receptive to early reporting of MSD signs and symptoms
- Observe worker activities for ergonomic concerns

Employees
- Participate in and accept ergonomic activities
- Identify ergonomic concerns
- Identify controls
**Work Site Evaluation**

**Ergonomic General Awareness Task Checklist**

- Manual Material Handling
- Physical Energy Demand
- Other Physical Demands
- Computer Workstation
- Environment
- General Workplace
- Tools
- Personal Protection Equipment
- Administration

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**Controlling Ergonomic Concerns**

1. Engineering Controls
2. Work Practice Controls
3. Administrative Controls
4. Personal Protective Equipment
Quick Fixes vs Long Term Solutions

**Quick Fixes**
- Rearrange a work area
- Raise work heights
- Rotate employees

**Long Term Solution**
- Automation
- Redesign Workstations

*It is important to perform follow up evaluation and receive employee feedback*
Computer Workstation Concerns

- Working Posture
- Seating
- Keyboard and Mouse
- Computer Workstation
- Workstation Space
- Office Environment
- Special Considerations

Workstation Adjustment and Working Posture Guidelines

- Tuck chin in line with shoulders
- Adjust lumbar support to fit lower back curve
- Adjust back of chair to 100° to 110° reclined angle
- Adjust chair height so that thighs are parallel to the floor or just below the horizontal
- Forearms are slightly angled downwards to keyboard
- Top of monitor at eye level
- Monitor at comfortable reading distance (about arm's length) and centre directly in front
- Document folder between keyboard and screen
- Mouse close to keyboard
- Feet are flat on the floor
**Computer Workstation**

**Eliminate Monitor Glare**
- Adjust monitor tilt and position
- Position screen so it is perpendicular (90°) to outside window or other light sources
- Close blinds, shades or curtains to shield outside light and reduce glare
- Fine tune contrast and brightness
- Clean the monitor
- Use an anti-glare screen

**Computer Workstation**

**Lighting**
- Overhead lights free from flickering
  - Replace light bulb
  - Check light bulb receptacle end
  - Replace ballast
- Provide adequate lighting
  - Illumination level should range from 200-500 lux
  - Use more low powered lamps
  - Use task lighting for intense visual work
Computer Workstation

Environmental Issues
• Work area is free from distracting noise
• Sufficient privacy
• Work area is generally at a comfortable temperature
• Work area is free from drafts or air currents
• Adequate storage space for files, supplies, etc.
• Sufficient free desktop space
• Frequently used items are within easy reach
• Work space provides enough room
What’s Wrong with this Picture?

Pinch grip that strains the thumb and wrist
What’s Wrong with this Picture?

Reaching
Hard on the shoulders and wrists

What’s Wrong with this Picture?

Squatting and bending
Hard on the back
What’s Wrong with this Picture?

Where should the box be?

What’s Wrong with this Picture?

Bending and twisting of back

Notice operator has to step down as well
What’s Wrong with this Picture?

Bending over to stack 30 lb boxes.

Hard on the Back.
Quick Fix

Rolling cart for paper handling

Quick Fix

Anti-fatigue mat for standing employees
Quick Fix

Large plate roll cart

Quick Fix

Rolling cart for cutter blades
Quick Fix

Adjusting your seat back to the right height

Quick Fix

Stool for sitting at work table
Quick Fix

Tri-folding fewer large sheets for an easier grip

Quick Fix

Use hoist to lift 60 lb rolls onto shrink wrapper
Quick Fix

Rolling cart for finished product

Summary

- MSD injuries result from awkward posture, repetition, excessive force/weight.
- Recognize cost and benefits of successful ergonomics
- Things you can do:
  - Avoid awkward postures whenever possible.
  - Work on possible quick fixes then long term remedies
  - Track progress
  - Recognize symptoms
  - Recognize concerns--force—repetition--posture
  - Ergonomics helps you do your job safely
  - Contribute to the program
  - Follow company standards
  - Always be on the look-out for ERGO
ERGONOMICS IN THE GRAPHIC COMMUNICATION INDUSTRY