Course title: Creating Innovative Business Models

Lecture 13. Minimizes risks

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Risk Factors Associated with MSDs

Risk factors of MSD injuries:

- Dependent upon:
  - Work positions and postures
  - How often task is performed
  - Level of required effort and duration of task

Risk Factors

- Examples of risk factors include:
  - Exerting excessive force
    - Lifting heavy objects/people
    - Pushing or pulling heavy loads
    - Manual pouring materials
    - Maintaining control of equipment or tools
  - Performing same/similar tasks repetitively

Source: OSHA

Risk Factors

- Working in awkward postures or same postures for long periods
  - Prolonged/repetitive reaching above shoulder height
  - Kneeling
  - Squatting
  - Leaning over a counter/bending
  - Using a knife with wrists bent
  - Twisting the torso while lifting
- Localized pressure into the body part
  - Pressing the body/part of the body against hard or sharp edges
  - Using the hand as a hammer

Source: OSHA

Risk Factors Associated with MSDs

- Cold temperatures
  (in combination with other risk factors)
- Vibration
  - Whole body
  - Hand-arm
- Combined exposure to
  several risk factors

Ergonomic Control Methods

Methods of protecting against MSDs:

- Establish ergonomics program
  - Training
  - Feedback from all levels
- Conduct job hazard analysis (JHAs)
- Early recognition and reporting of potential MSDs

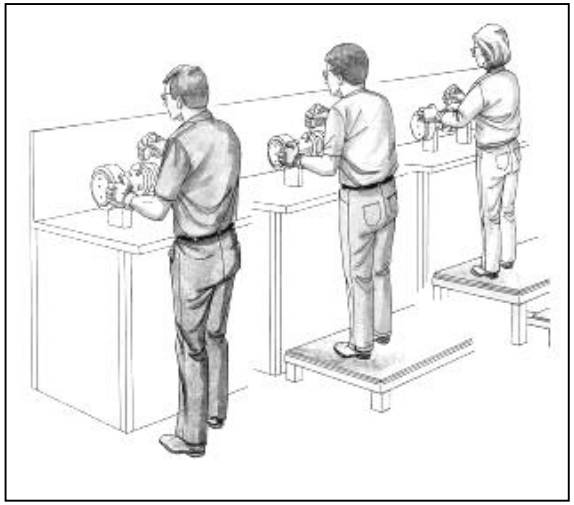
Ergonomic Control Methods

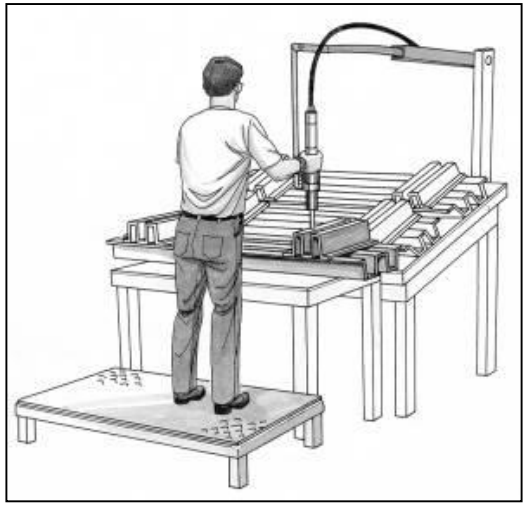
Job Hazard Analysis		
Tasks	Hazards	Controls

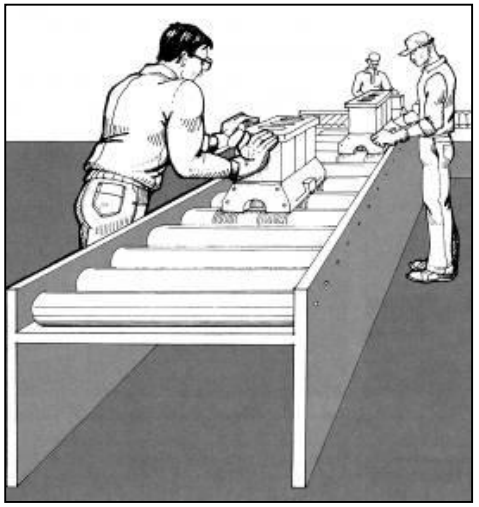
This table provides an example of a tool that can be used when conducting a job hazard analysis. The first column provides a list of tasks performed by a job; the middle column is provided for listing identified hazards; and, the third column provides a list of controls that can be used to mitigate the hazards.

Ergonomic Control Methods

- Examples of **engineering controls**
  - Work station design and setup
  - Ergonomically designed tools
  - Ergonomically designed equipment
  - Load weight reduction







Ergonomic Control Methods

- Examples of **proper work practices:**
  - Proper lifting techniques (NIOSH)
  - Team lift heavy/bulky/awkward loads
  - Stretch
  - Work rotation
  - Task variety
  - Increase rest breaks

Ergonomic Control Methods

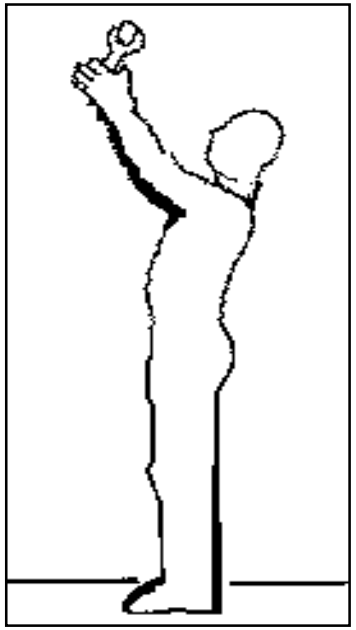
- Examples of **PPE:**
  - Gripping gloves
  - Knee pads
  - Vibration gloves
  - Thermal gloves
  - Lifting straps
  - Shoulder harness
  - Lifting braces

Source of graphics: OSHA

Ergonomic Control Methods

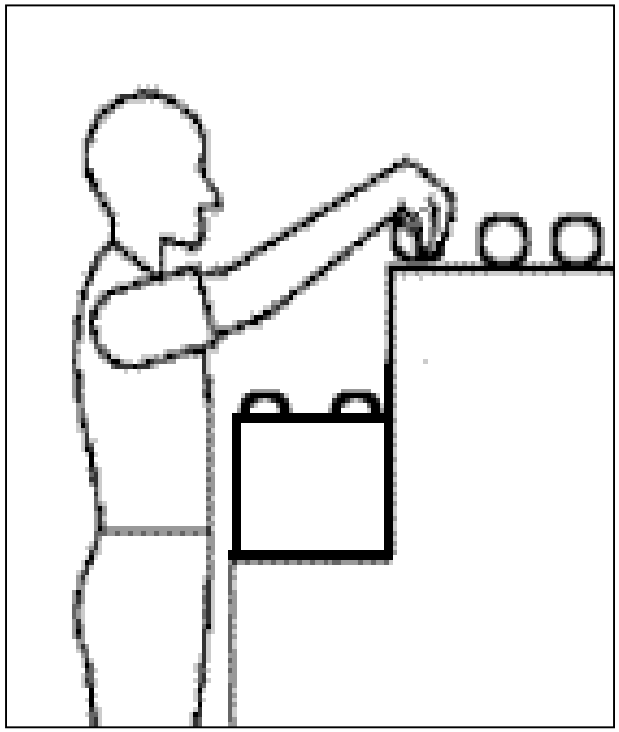
Physical ergonomic **hazards** and **solutions**:

- Reaching above the head/shoulders - **hazards**
  - Working with the hands above head for more than 2 hours per day



Ergonomic Control Methods

– Working with the elbows above shoulders for more than 2 hours per day



Source of graphics: OSHA

Ergonomic Control Methods

- Reaching above the head/shoulders - **solutions**
  - Keep items within close reach
  - Elevate work areas

Source: NIOSH

Source: NIOSH

Source: OSHA

Ergonomic Control Methods

- Reaching above the head/shoulders - **solutions**
  - Remove obstacles
  - Utilize equipment to raise and lower items or move items closer to worker

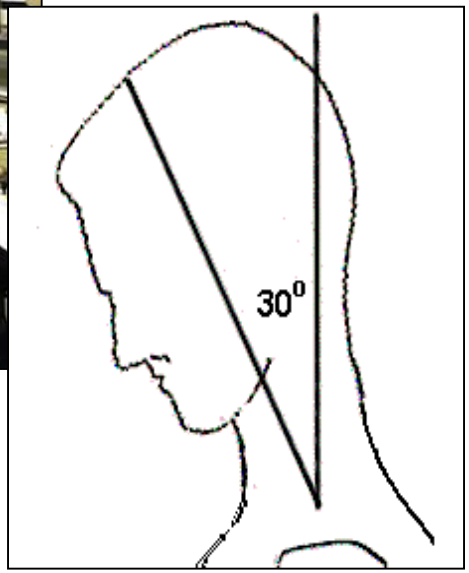
Source: OSHA

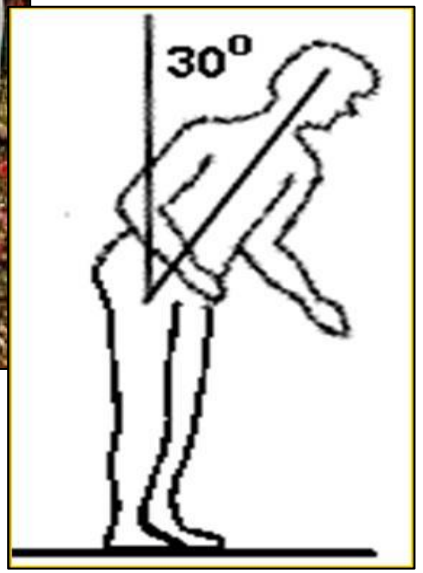
Source: OSHA

Source: NIOSH

Ergonomic Control Methods

- Awkward body postures - **hazards**
  - Working with the neck or back bent forward more than 30° for more than 2 hours per day





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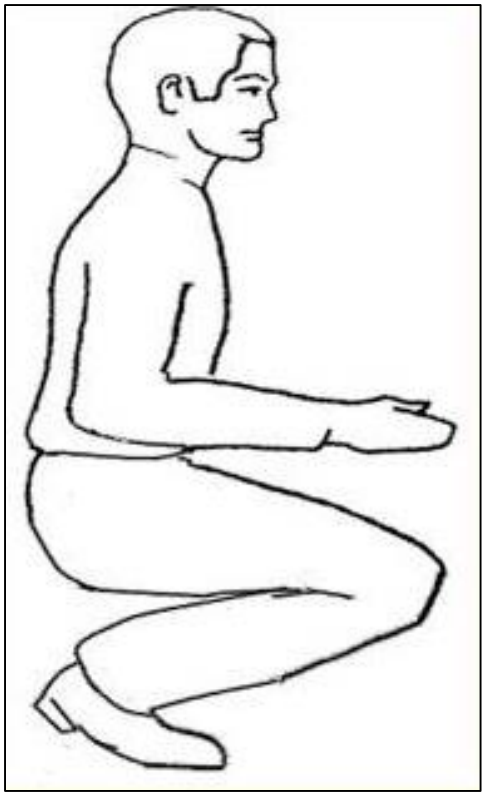
Ergonomic Control Methods

– Squatting for more than 2 hours per day



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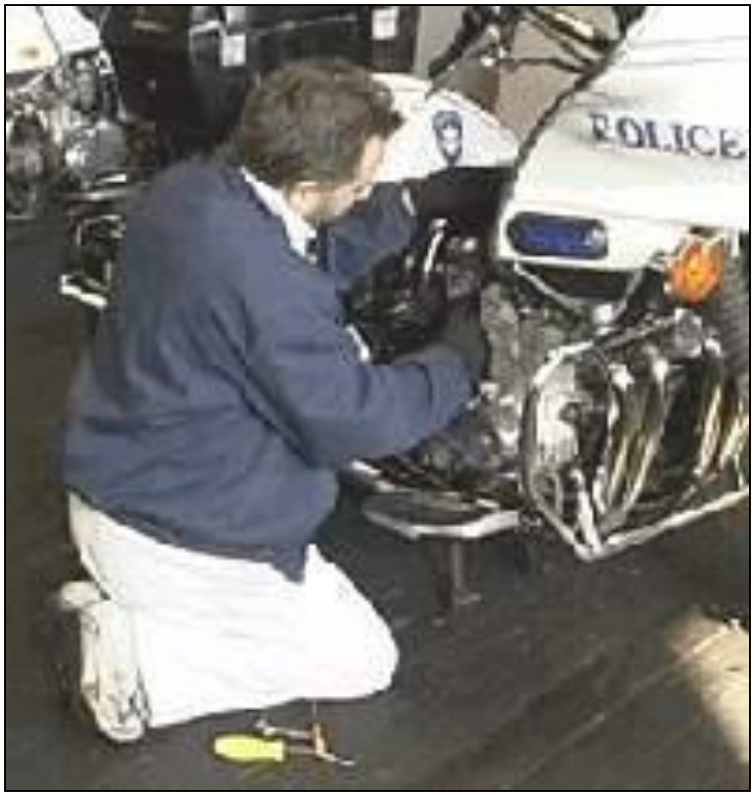
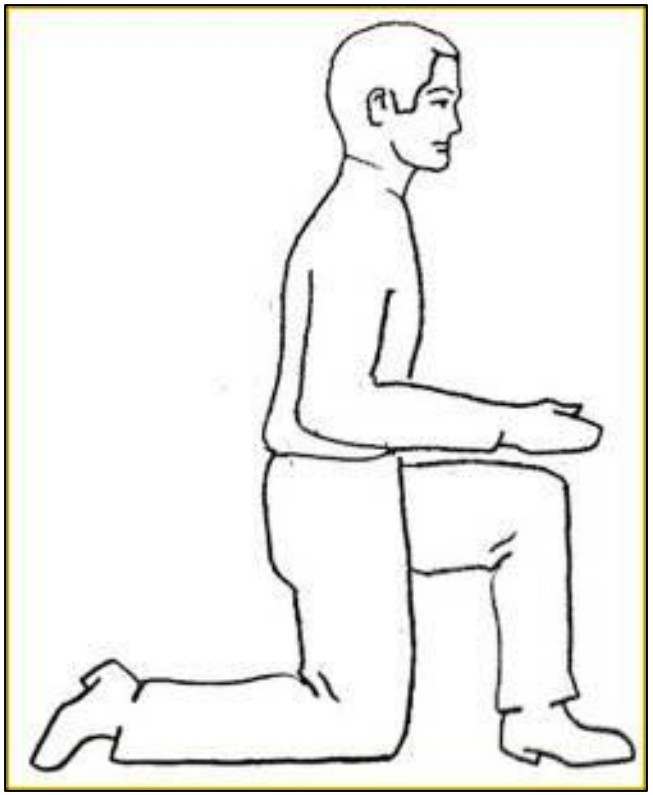
Ergonomic Control Methods

– Kneeling for more than 2 hours per day





Source: OSHA

Ergonomic Control Methods

- Awkward body postures - **solutions**
  - Raise and/or tilt the work for better access
  - Use a stool for ground-level work

Source: OSHA

Source: NIOSH

Source: OSHA

Ergonomic Control Methods

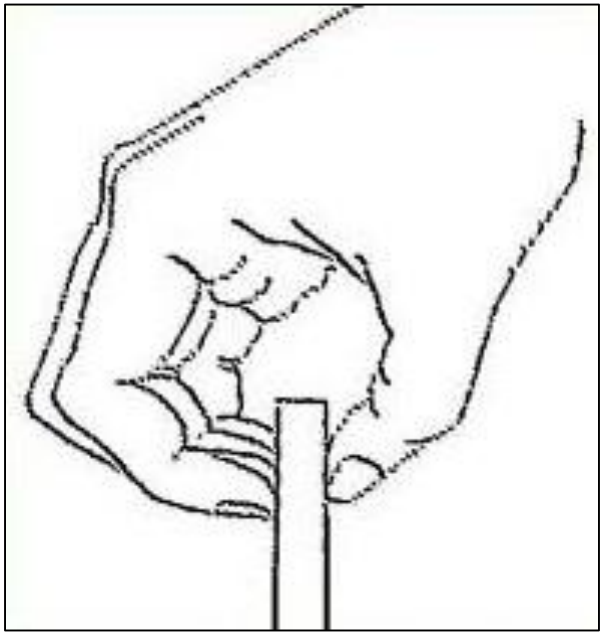
- Awkward body postures - **solutions**
  - Use tools with longer handles
  - Alternate between bending, kneeling, sitting, and squatting

Ergonomic Control Methods

- Awkward grips - **hazards**
  - Gripping 10 or more pounds or force for 2 or more hours per day

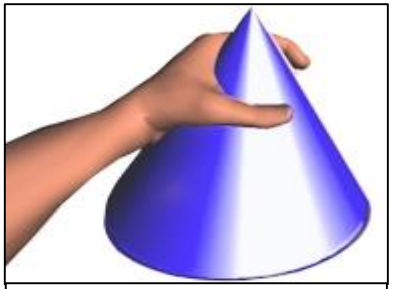
Ergonomic Control Methods

- Awkward grips - **hazards**
  - Pinching 2 or more pounds of weight or 4 or more pounds of force for 2 or more hours per day

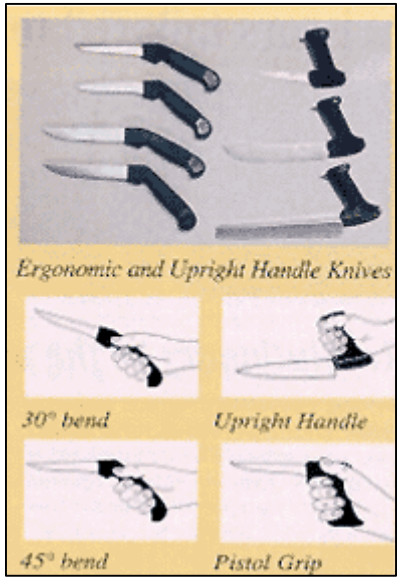


Ergonomic Control Methods

- Awkward grips - **solutions**
  - Design work layout to reduce hand-carrying
  - Reduce amount of items carried at one time
  - Use non-pinch grip postures
  - Use ergonomically designed tools/aids
  - Use job/task rotation



"C" shaped posture



Ergonomic Control Methods

- Repetitive motions - **hazards**
  - Repeating same motion for more than two hours per day with hands, wrists, elbows, shoulders, or neck

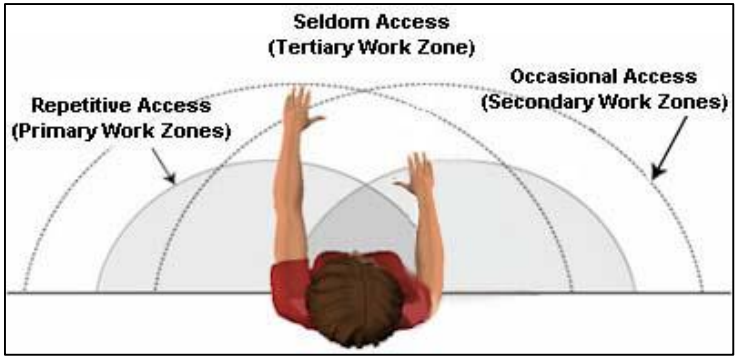
Ergonomic Control Methods

- Repetitive motions - **hazards**
  - Intense keying for more than 4 hours per day

Source: OSHA

Ergonomic Control Methods

- Repetitive motions - **solutions**
  - Arrange work to avoid unnecessary motions
  - Let power tools and machinery do the work
  - Spread repetitive work out during the day
  - Take stretch pauses
  - Rotate task with co-workers if possible
  - Change hands or motions frequently



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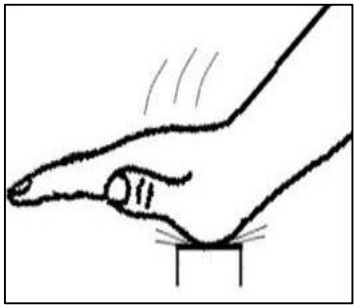
Ergonomic Control Methods

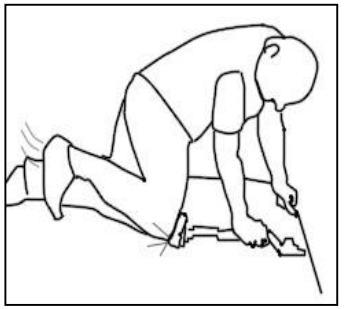
- Localized pressure on body part - **hazards**
  - Pressing the body/part of the body against hard or sharp edges
  - Standing/kneeling for prolonged periods on hard surfaces
  - Using tools with hard handle surfaces or short handles

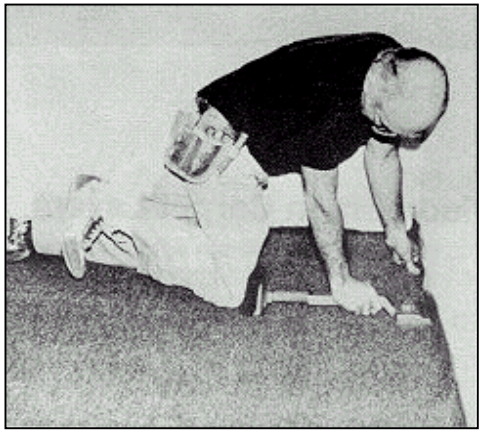
Source of graphics: OSHA

Ergonomic Control Methods

- Localized pressure on body part - **hazards**
  - Using hands/knees as a hammer more than 10 times in 1 hour or more than 2 times per day (long-term)



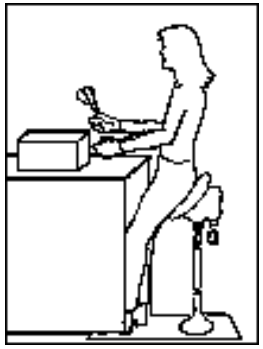




Source of graphics: OSHA

Ergonomic Control Methods

- Localized pressure on body part - **solutions**
  - Use tools with longer handles
  - Use tools with padded grips
  - Alternate between bending, kneeling, sitting, and squatting; use sit/stand stools or tables



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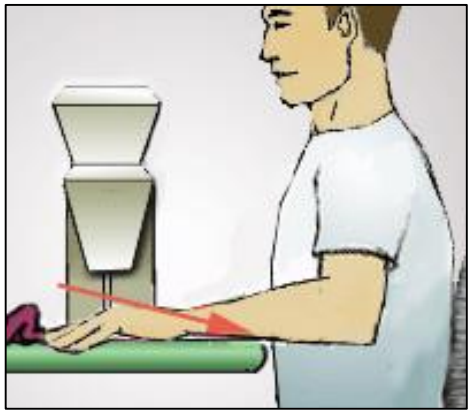
Ergonomic Control Methods

- Localized pressure on body part - **solutions**
  - Pad table edges or use tables/desktops with rounded edges
  - Use wrist rests, anti-fatigue mats, knee pads, shoe inserts or other items that reduce stress on body parts



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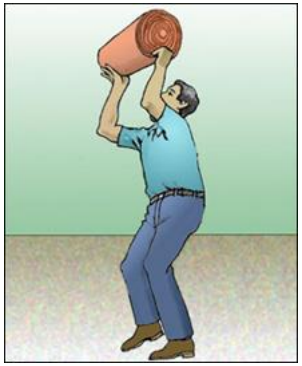
Ergonomic Control Methods

- Lifting objects - **hazards**
  - Lifting more than
    - 75 lbs. once/day
    - 55 lbs. ten times/day
    - 10 lbs. more than twice/minute or for more than 2 hours/day
    - 25 lbs. above shoulders, below knees, or at arms length more than 25 times/day



Source of graphics: OSHA

Ergonomic Control Methods

- Lifting objects - **hazards**
  - Heavy, frequent, and awkward lifting

Source of graphics: OSHA

Ergonomic Control Methods

- Lifting - **solutions**
  - Managing for safer lifting
    - Plan lifts
    - Minimize lifting distances
    - Position materials to power zone levels
    - Avoid manually lifting/lowering loads to/from floor
    - Identify/reduce unstable or heavy loads
    - Reduce frequency of lifting and duration of lifting tasks
    - Provide clear access

Source of graphics: NIOSH

Ergonomic Control Methods

- Lifting - **solutions**
  - Employee guidelines for safer lifting
    - Stretch before lifting
    - Check for tags on loads
    - Test load for stability and weight
    - Plan the lift
    - Use proper lifting techniques – grip; two hands; smooth, even motions; load close to body; legs to push up and lift load; avoid twisting; alternate with less physically demanding tasks; rest breaks
    - Get assistance when necessary

Ergonomic Control Methods

Environmental ergonomic hazards:

- Amplify/increase risk of MSDs
- Examples
  - Hot weather
  - Cold weather – affects worker coordination and dexterity
  - High-temperature indoor (steam rooms, attics)
  - Cold-temperature indoor (walk-in freezers, cold process rooms)
  - Low visibility

Employer/Employee Requirements

General Duty Clause

- **Each Employer:**
    1. Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
    2. Shall comply with occupational safety and health standards promulgated under this Act.
- **Each Employee:**
    1. 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.

Employee/Employer Requirements

Report signs or symptoms if:

- Pain is persistent, severe or worsening
- Pain radiates
- Symptoms include numbness or tingling
- Symptoms keep you from sleeping at night
- Fingers blanch or turning white

Employee/Employer Requirements

Getting involved:

- Look at jobs
- Come up with solutions
- Work with solutions
- Take part in training
- Take responsibility for changing the way you do your job
- Help to make sure efforts are successful

Five Key Points to Remember

- Ergonomics can help you on your job
- WMSDs can happen in jobs with risk factors
- Risk factors can be reduced and WMSDs prevented
- Reporting signs and symptoms early is important
- You can help your company put ergonomics changes into place

Knowledge Check

1. Ergonomics is the science of ___.
   a. designing the job to fit the worker
   b. fitting the worker to the job
   c. lifting injuries
   d. safety and health

Answer: **a. designing the job to fit the worker**

Knowledge Check

2. MSDs account for approximately ___ of all injuries and illnesses.
   a. 1%
   b. 10%
   c. 33%
   d. 54%

Answer: **c. 33%**

Knowledge Check

3. Which of the following is an example of an ergonomic risk factor?
   a. Neutral postures
   b. Rest
   c. Repetition
   d. Personal protective equipment

Answer: **c. Repetition**

Knowledge Check

4. Ergonomic hazards can be prevented or reduced by which of the following control methods?
   a. Engineering controls
   b. Proper work practices/administrative controls
   c. Personal protective equipment
   d. All of the above

Answer: **d. All of the above**

Reference

1. Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers (The Strategyzer series) by Alexander Osterwalder and Yves Pigneur | Jul 13, 2010
2. Reimagining Innovation: The Future of Exponential Leadership by Aaron Bare and N. Forbes Shannon | Aug 20, 2020
3. Testing Business Ideas: A Field Guide for Rapid Experimentation (The Strategyzer Series) by David J. Bland and Alexander Osterwalder | Nov 12, 2019
4. Unlocking the Customer Value Chain: How Decoupling Drives Consumer Disruption by Thales S. Teixeira, Greg Piechota, et al.
5. Build a Business, Not a Job: Grow Your Business & Get Your Life Back by David Finkel and Stephanie Harkness | Jun 21, 2017
6. The Insider's Guide to Culture Change: Creating a Workplace That Delivers, Grows, and Adapts by Siobhan McHale | Feb 11, 2020
7. The Prosperity Paradox: How Innovation Can Lift Nations out of Poverty by Clayton M. Christensen, Efosa Ojomo, et al.
8. Competing Against Luck: The Story of Innovation and Customer Choice by Clayton M. Christensen, Taddy Hall, et al.