Ergonomics

- A body of knowledge about human abilities, limitations and other characteristics and the application of this information to the design of tools, machines, systems, tasks, jobs and environments for safe, comfortable and effective human use. (Alphonse Chapanis)

- The science of fitting workplace conditions and job demands to the capabilities of the working population. (NIOSH, 1997)
Ergonomics: Multidisciplinary Science

Anatomy
Physiology
Psychology
Biomechanics
Anthropometry
Engineering

GOAL – to fit the job to the person
vs. fitting the person to the job!
Musculoskeletal Disorders: MSDs

- Disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal disks
- Disorders that reflect gradual or chronic development
- Disorders diagnosed by the medical history, physical examination or other medical tests
- Disorders with several distinct features or defined by the location of the pain
Work-Related MSDs: WMSDs

- Disorders to which the work environment and the performance of work contribute significantly
- Disorders that are made worse or longer lasting by work conditions
WMSDs: National Problem

- The most prevalent lost-time injuries and illnesses in every industry
- The most costly occupational problems
- Span diverse workplaces and operations
- Cause pain and suffering among workers
- Decrease productivity and the quality of products and services
WMSDs: Magnitude of the Problem

- 70 million physician office visits annually
- 130 million total health care encounters
- Nearly 1 million people took time away from work to treat or recover from WMSDs
- Economic burden - $54 billion annually
OSHA Comprehensive Ergonomics Plan

- Industry-specific guidelines
- Enforcement measures
- Compliance assistance
- Ergonomics research
Industry-Specific Guidelines

- March, 2003: Ergonomics Guidelines for Nursing Homes
- May, 2004: Ergonomics Guidelines for Retail Grocery Stores
- September, 2004: Ergonomics Guidelines for Poultry Processing
Guidelines vs. Standards

- Advisory in nature
- Informational in content
- Not a new standard or regulation
- Do not create any new OSHA duties

The Guidelines will not be used for enforcement.
Ergonomics Guidelines: Structure

- Introduction
- Process for Protecting Workers
- Identifying Problems
- Implementing Solutions
- Training
- Additional Resources
Process for Protecting Workers

- Provide management support
- Involve employees
- Identify problems
- Implement solutions
- Address reports of injuries
- Provide training
- Evaluate ergonomic efforts
Ergonomics Program: Benefits

- Fewer injuries among workers
- Reduced workers’ compensation costs
- Additional benefits:
  - Reduced staff turnover and related costs
  - Improved employee morale
  - Increased job satisfaction
Industry-Developed Ergonomics Guidelines

- American Apparel and Footwear Association
- American Furniture Manufacturers Association
- National Telecommunication Safety Panel

http://www.osha.gov/SLTC/ergonomics/outreach.html
Enforcement

- Coordination of inspections with a legal strategy for successful enforcement
- Target serious ergonomics violations
- Use special ergo inspection teams to work closely with legal experts
Enforcement: General Duty Clause

OSH Act 1970, Section 5(a)(1):

“Each employer 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.”
General Duty Clause: Elements

- Is there exposure to a hazard?
- Is it a recognized hazard?
- Is it likely to cause death or serious injury?
- Is there a feasible means of abatement?
The Department places special emphasis on industries using the General Duty Clause where ergonomics hazards exist and employers are not making good faith efforts to prevent injuries.
Enforcement: Update

April 2002 through August 31st 2007:

- Conducted 4,034 inspections involving MSDs
- 17 citations to 14 companies
- Sent 571 Ergonomic Hazard Alert Letters
- Sent 103 letters acknowledging employers’ efforts
Enforcement

Enforcement activity initiated in several ways:
- Ergonomic LEPs
  - Auto-parts manufacturing
  - Hospitals
  - Meatpacking
  - Warehousing
- SST
- Complaints/referrals
Ergonomic enforcement is a process:
- CSHO evaluates a site
- If the AO believes the case should go forward, the REC is contacted and if the RO (with RSOL) agree...
- **Ergonomic Response Team (ERT)**
  - Consists of RECs, agency ergonomists, industrial hygienist, industrial engineer, attorneys, physicians, and others
  - All with ergonomics experience.
  - ERT reviews potential cases and makes recommendations to the Assistant Secretary
Inspection outcomes:
- No further action
- Acknowledgement letter
- Ergonomic Hazard Alert Letter (EHAL)
- Citation
Enforcement

Citations:
- All cases have been settled
  - 11 Nursing Homes
  - 2 Beverage distribution companies
  - 2 Grocery distribution warehouses
  - 1 Printing company
  - 1 Metal door fabrication factory
- 3 cases (6 citations) resulted in CSAs
  - Approximately 72,000 employees
Enforcement: EHALs Follow-up Policy

Signed: April 2007

Purpose: …to determine whether identified hazards and deficiencies have been addressed

Scope: …applies to any ergonomic inspection for which an ergonomic hazard alert letter (EHAL) has been issued
EHALs Follow-up Policy: Initial Contact

- Phone call
- Explain this is follow-up to original inspection
- Attempt to speak to original management contact
- Fax original EHAL and Follow-up letter
- Request:
  - Measures taken to address EHAL
  - OSHA 300 logs since close of inspection
  - Estimated # of full-time employees or work hours for exposed employees for time period corresponding to OSHA 300 logs
Outreach and Assistance

Provide tools to help workplaces reduce and prevent ergonomic injuries

- Provide expertise to assist businesses & workers
- Support programs through training grants, curriculum development and other means
- Design compliance assistance tools, new partnerships and recognition programs
- Encourage others to develop best practices
Outreach and Assistance: Increasing Resources

- Providing general and guideline-specific outreach, assistance and support

- Featured resources and programs:
  - OSHA Website
  - Cooperative Programs
  - Training and Education
Outreach and Assistance: OSHA’s Website

OSHA has a four-pronged comprehensive approach to ergonomics designed to quickly and effectively address musculoskeletal disorders (MSDS) in the workplace. The four segments of OSHA’s strategy for reducing injuries and illnesses from MSDS in the workplace are:

- Guidelines: OSHA is developing industry-specific or task-specific guidelines for a number of industries based on current incidence rates and available information about effective and feasible solutions.
- Enforcement: What guidelines does OSHA provide?
  - Nursing Homes
  - Farming
  - Retail Grocery Stores
  - Poultry Processing

OSHA has issued draft guidelines for Nursing Homes.
OSHA to develop Ergonomics Guidelines for Retail Grocery Stores, Poultry Processing.

www.osha.gov/SLTC/ergonomics/index.html

Any company listed on the site or its products does not constitute endorsement by OSHA. Moreover, citations to Web sites external to OSHA do not constitute OSHA endorsement of the sponsoring organizations or their programs and/or products. Furthermore, OSHA is not responsible for the content of those Web sites.
Industry-Specific Ergonomics eTools

- Ergonomics: Solutions for Electrical Contractors
- Baggage Handling
- Computer Workstations
- Grocery Warehousing
- Poultry Processing

- Sewing
- Printing
- Healthcare
- Beverage Delivery

http://www.osha.gov/SLTC/ergonomics/outreach.html#eTools
Outreach and Assistance: Training and Education

OSHA has developed training programs to address ergonomic hazards:

- Course 225 – Principles of Ergonomics Applied to WMSDs
- 20 education centers
- Training is key to safety and health
Ergonomics Research

- National Advisory Committee on Ergonomics (NACE)
- Research gaps identification: application of ergonomic principles in the workplace
- Work with NIOSH and through NORA: encourage research in needed areas
Ergonomics Research: NACE Recommendations

- Develop guidelines for 16 industries:
  - Nursing Homes*
  - Trucking & Courier
  - Air Transport Scheduled
  - Hospitals
  - Groceries
  - Wholesale
  - Motor Vehicle-Equipment
  - Motor Vehicles and Car Bodies
  - Plumbing, HVAC
  - Department Stores
  - Retail Grocery*

- Best practices and success stories
Ergonomics Research: NACE Recommendations

- Gaps in research about MSDs
  - Examine validity of techniques used to diagnose MSDs.
  - Examine the role of psychosocial factors.
  - Develop animal models to study the effects of physical loading on living tissues.
  - Examine validity and reliability of existing exposure assessment methods.
  - Determine economic impact of ergonomic interventions.
  - Address multi-factorial causes of MSDs.
  - Describe natural history of MSDs.
  - Study factors concerning causation, diagnosis, duration of disability, and other outcomes related to MSDs.
Guiding points for the future

- Ergonomics is a noun, not an adjective. - ...it is used as such in formal documents. - Hazards exist in the form of poorly designed work practices and/or workplaces. - Ergonomics is a process that can be beneficially used to address job and workplace design. - ... Improved safety characteristics occur in concert with productivity improvements. - **Once workers no longer need to devote maximum energy to “overcoming” the demands of their work practices and/or workplaces, they can devote those same energies to productivity and quality aspects of their jobs.** - The pursuit of a single definition of MSDs has not reached consensus. - OSHA should continue development of guidelines independent of any final definition of MSDs.
Ergonomics Research: NACE Recommendations

Guiding points for the future

- MSDs are a consequence of exposures to risk factors of multi-factorial nature. - Although the exact cause of specific MSD may not be known, and the precise effectiveness of an intervention may not be predictable, objective of ergonomics is to reduce... the demands ...of doing the work by controlling these exposures. - To this end a number of tools and guidelines may be useful. - **Ergonomics should be included in comprehensive occupational safety and health programs.**
- It must be recognized there are non-occupational components that also contribute to the development .... of MSDs. -....these components are best addressed by educating the workforce concerning such non-work hazards.

www.osha.gov/SLTC/ergonomics/recommendations.html
Ergonomics: Comprehensive Approach

Goals:
- Decrease ergonomic hazards
- Reduce injuries and illnesses
- Help employers prevent MSDs
- Ensure flexibility and encourage innovation
Telecommunication Industry: Prevalence of WMSDs

Call Centers: New Area for Ergonomic Research

- Call Center
- Contact center
- Customer interaction center
- Call Centre

“A work environment in which the main business is conducted via telephone while simultaneously using a VDT Workstation”

(HSE 2006, UK)
Call Centers: Risk factors for MSDs

- Awkward postures
- Static postures
- Repetitive movements
- Use of excessive force
- Contact stress

- High workload
- Task complexity
- Time pressure
- Routine work
- Low job control
- Performance monitoring
- Customer diversity
- Mental stress
Call Center Ergonomics: Recommendations

- Improved workstation design
- Proper placement of input devices
- Ergonomics training
- Adequate pauses and rest breaks
- Adequate environmental conditions
- Headset selection
- Stretching
Call Center Ergonomics: Additional Information


- Code of Practice: Occupational Safety and Health in Call Centres. Commission for Occupational Safety and Health, Western Australia, 2005.


Utility Cover Removal: Industry-Specific Problematic Task

- Heavy manual lifting
- Forceful exertions
- Excessive pulling force
- High speed jerking movements
- Awkward postures
- Unfavorable environmental conditions
Utility Cover Removal: Effect of Tool Design

Potential Ergonomic Solutions: Kneeling Tasks

Balance snapsit

www.balansprodukter.se
Potential Ergonomic Solutions: Wire Stripping

Kinetic Reflex Wire Stripper

“Bend the tool not the hand”

www.idealindustries.com
Potential Ergonomic Solutions: Cutting

WireMan Pliers

Electrician’s Jab Saw

www.idealindustries.com
Potential Ergonomic Solutions: Screwdriving

Black & Decker Cordless Pivot Screwdriver

CRAFTSMAN High Performance Screwdriver

“Bend the tool not the hand”
Potential Ergonomic Solutions: Low Height Tasks

Walkstool

www.walkstool.com

Adjustable Work Stool

Pneumatic Stool
Potential Ergonomic Solutions: Handling Wire Reels

Hand Truck Wire Cart

Wire Cart

www.greenlee.com
Potential Ergonomic Solutions: Lifting Tasks

Design features:
- Mobile with multiple speeds
- Compact and easy to stow or transport
- Full range of motion
- Operator controls movement
- Leveling and stability provided by jacks
- Gripping attachments for specific tasks
- Power choices: on-board battery, compressed air or 110-V cord
- Braking on lifting arm for load control
- Loads lifted: 50 – 600 lbs

Mobile manipulator

DHHS (NIOSH) Publication No. 2007-111
Additional Ergonomics Resources

- Ergonomics
- Human Factors
- International Journal of Industrial Ergonomics
- American Journal of Industrial Medicine
- Journal of Occupational & Environmental Hygiene
- Journal of Occupational Rehabilitation
- WORK: Journal of Prevention, Assessment and Rehabilitation
- Applied Ergonomics
- Ergonomics in Design
Additional Ergonomics Resources

- NIOSH: Ergonomics and MSDs
  [http://www.cdc.gov/niosh/topics/ergonomics/](http://www.cdc.gov/niosh/topics/ergonomics/)

- European Agency for Safety and Health at Work


- Canada’s National Occupational Safety & Health Resource
  [http://www.ccohs.ca/](http://www.ccohs.ca/)

- Cornell University Ergonomics Web
  [http://ergo.human.cornell.edu/](http://ergo.human.cornell.edu/)

- University of Michigan Center for Ergonomics
  [http://www.engin.umich.edu/](http://www.engin.umich.edu/)
Safety and Health Add Value

• To Your Business
• To Your Workplace
• To Your Life
The Challenge

- Adding value
- Working together
- Moving the dialogue forward
- Reducing ergonomic injuries
Occupational Safety and Health Administration

1-800-321-OSHA

www.osha.gov