Ergonomics in the Workplace

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Presentation Goals

To share effective industry practices to build or enhance your Ergonomic Program!

• Common workplace risk factors
• How Ergonomics integrates with Safety Programs
• Introduce the NIOSH Elements
• Case Study: Successful Solutions
Ergonomics is....all about YOU!
...The study of work

...Optimizing Employee Well-Being and Productivity Through Designing the Job Environment to Fit the Person

...Working Smarter NOT Harder
What are some ergo injuries?

Tendonitis, trigger finger, carpal tunnel syndrome, ganglion cysts, tennis elbow, golfer’s elbow, white finger, chronic back pain........

How do they feel?

- Pain
- Numbness
- Tingling
- Clicking, popping, or jerky motions
Ergonomic Risk Factors

Repetitive Motion

The task includes motion that is repeated 4 times per minute or more.
Ergonomic Risk Factors

**Forceful Exertion**

The task includes maximum force exerted by one hand greater than 10 pounds (4 kg), for example: squeezing juice from an orange.
Ergonomic Risk Factors

Awkward Motion

The task includes one or more of the following: full arm reaches, twisting or bending of the back, wrist(s) bent at or near maximum range of motion, or working with one or more hands above chest height.

Stationary / Awkward Position

The task includes stooping, squatting, kneeling, crawling, working with the hands wide, full arm reaches, wrist(s) bent or hands above chest height) grasping, standing more than half of the time it takes to complete the task, or carrying oversized loads (wider
Ergonomic Risk Factors

Lifting

The task includes frequent (>= once/hour) handling of >20 lbs (10 kg) or occasional/infrequent (>= once/shift) handling 40 lbs (18 kg) or more.

Pushing / Pulling

The task includes pushing or pulling objects that are hard (exertions greater than 40 pounds) to move or to stop.
What is Manual Material Handling?

- Lifting and Lowering any item
  - Boxes, equipment, totes…
- Pushing or Pulling items
  - Wheeled carts, doors, gates…
- Carrying items
  - Bags, totes, boxes, trays, tools…

Any time you are using your muscles to move any item from one place to another!
Correcting the **Hazards** - Preventive Measures

**Corrective Actions:**
- Provide rolling ladder
- Minimize shelving height to minimize reach
- Secure shelving
- Relocate heavy object to middle shelves

**Corrective Actions:**
- Provide handles
- Wear gloves
- Use two-person lift rule
Ergonomic Risk Factors

Segmental Vibration

The task includes exposure to vibrating tools or work objects >2 hours continuously or over 50% of the work cycle.
Ergonomic Risk Factors

Sharp Edges & Temperature Extremes

COLD

warm
“Strategic Map for Creating Change and Continuous Improvement for Safety and Health”

1. Obtain Top Management Buy-In
2. Continue Building “Buy-In”
3. Build Trust
4. Conduct Self Assessments/Benchmarking
5. Initial Training
6. Establish a Steering Committee
7. Develop a Site Safety Vision
8. Align the Organization
9. Define Specific Roles
10. Develop a System of Accountability
11. Develop Measures
12. Develop Policies for Recognition
13. Awareness Training and Kick-off
14. Implement Process Changes
15. Continually Measure performance, Communicate Results and Celebrate Successes
16. On-Going Support

Source: Safety & Health Management Systems eTool
http://www.osha.gov/SLTC/etools/safetyhealth
Elements of Ergonomics Programs

NIOSH Publication No. 97-117:
Elements of Ergonomics Programs
A Primer Based on Workplace Evaluations of Musculoskeletal Disorders

http://www.cdc.gov/niosh/docs/97-117
7 Elements of Ergonomic Programs

1. Looking for Signs of Work-Related Musculoskeletal Problems
2. Setting the Stage for Action
3. Training – Building In-House Expertise
4. Gathering and Examining Evidence of WMSDS
5. Developing Controls
6. Health Care Management
7. Proactive Ergonomics
Recommended Program Structure

1. Mission Statement
2. Goals and Objectives of the Program
3. Scope
4. Roles and Responsibilities
   A. Management Leadership
   B. Employee Participation
   C. Ergonomics Team
5. Process
   A. MSD Management
   B. Job Hazard Analysis (Proactive and Reactive)
   C. Hazard Reduction and Control
   D. Education and Training
   E. Program Evaluation
6. Documentation
7. References/ Appendices

Customizable
Integrate into existing.
Critical ‘Must Haves’

- Short & Long Term Vision
- Defined, documented processes
- Cross-functional Team approach
- Integration in existing Processes
- Integration in Safety & Health Program
4C. Ergonomics Team

Responsible for:

- Identifying
- Prioritizing
- Analyzing
- Finding Solutions
- Re-evaluating
5. Process
• Defines the steps that should be taken to meet the program goals and fulfill the programs mission statement.
• Establishing a written process drives consistency in implementation and documentation efforts.
• Having a set process helps retain management commitment.
5A. MSD Management

- Collaboration of efforts among the groups
- Based on expertise, this team is responsible for:
  - Assessing the job/tasks
  - Treatment (including modified/alternative duty)
  - Systematic follow-up (including employee condition and work condition)
  - Trend analysis
5B. Job Hazard Analysis

• Identifying ergonomic-related hazards that exist in the workplace

• What triggers the analysis?
  – **Reactive** process – responding to a complaint of physical discomfort or a recorded injury/illness
  – **Proactive** process – performing analyses based on
    • Trends Analysis
    • Employee Survey
    • Lessons Learned
5B. Job Hazard Analysis Checklists / Tools:

- RULA / REBA
- NIOSH Lifting Equation
- Sue Rodgers Analysis
- Liberty Mutual Push/Pull Tables

http://personal.health.usf.edu/tbernard/ergotools/index.html
5B. Job Hazard Analysis

Proactive Process Analysis

– There is a push to design the risk out of the process prior to manufacturing

http://www.thefordstory.com/videos/?searchterm=ERGO+DAYS
5B. Job Hazard Analysis

Screenings
- Wide net
- Limited technical knowledge required
- Can be done by the non-expert
- Limited training needed to perform
- Limited time needed to complete the analysis

Deep Dive
- Confirm significance
- Requires technical knowledge
- Can be done by the non-expert but requires intense training
- Usually requires significant time to complete one analysis
5C. Hazard Reduction and Control

• The process and timetable for engineering and administrative control implementation,
• Evaluation
• Follow-up
• Documentation
5D. Education and Training

• Ergonomic Tips in existing media

• Classroom basics:
  – Ergonomics
    • Industrial Focus, Office Focus
  – Back Safety and Lifting Techniques
  – Engineering Design
  – Supervisor Guide to Ergonomics

• Awareness Fairs / Live Demos / Vendors

Reflective of company needs!
5E. Program Evaluation

There are several types of program evaluations that can be conducted.

- Audits: Self-Audit vs. External Audit
- General Evaluations: for effectiveness and continuous improvement
6. Documentation

- Standardization is the key!!
- Enables replication and consistency
- Tracking of Action Items
- Provides historical information
  - One central location for all cases
  - Long term reference that withstands ergonomist change
- Data collection and trend investigation
Case Study - Factory Virtual Design
Overall Ergonomic Activities

- Adjustable height carts at workstations for different height operators
- Adjustable height workstations
- Power Lift tables for incoming trays
- Roller ball gravity fed conveyor to present trays to employee
- Lazy Susan built into workstation to reduce reach
- DC Electric programmable tooling to replace manual torque tools and reduce repetitive motion
- Weight & size considerations for tray designs
- Adjustable mobile workstation platforms
- Scanners to reduce keying
- Monitors on Adjustable Arms for proper positioning
Manual Material Handling

BEFORE

AFTER
Improving posture – Monitor Arms
Portable Lift assists

http://www.alimed.com/Alimed/product/Hydraulic-Elevating-Carts,14604,142.htm

Mounted Lift assists

http://www.alumalift.com/Liftweek.htm

http://www.jjmanufacturing.com/strongarm_60.php
Improving Posture – Adjustable Workstations

BEFORE

AFTER
Reducing Grip Forces – Assembly Aids
Reducing Repetition –
Programmable Electric Torque Tools

BEFORE

AFTER
Reducing Reach – Tools on Balancers
Sources:

1. Safety & Health Management Systems eTool
2. Elements of Ergonomics Programs: A Primer Based on Workplace Evaluations of Musculoskeletal Disorders  
   *NIOSH Publication No. 97-117*
3. Various analysis tools and checklists
4. Professor Thomas E. Bernard, Univ. of South Florida
5. Ford Motor Company Ergo Day Event
6. North Carolina Ergonomic Center & ThinkErgo, LLC

Additional Resources:

- [http://www.bcpe.org/](http://www.bcpe.org/)

>>Go to Highlights section
  >>Click on “State Plan States” or “eTools”
Thank you for attending!

Any questions?