Elements of Ergonomics Programs

This material follows the National Institute of Occupational Safety and Health (NIOSH) Suggested Elements of Ergonomics Programs
Developing an Ergonomics Program - Introduction

- Work Related Musculoskeletal Disorders (disorders of the muscles, nerves, tendons, ligaments, joints, or spinal discs) have increased dramatically in the last decade.
- Disorders are not typically the result of an acute event but reflect more gradual development.
- Severity can range from mild to chronic and debilitating.
Musculoskeletal Disorders (MSDs)

- Persistent Signs of Discomfort, Fatigue, or Pain
- The Work Environment or Performance of Work Contribute Significantly to Development of MSDs
- (OR) Working Conditions Make Existing MSDs Worse or Last Longer
Musculoskeletal Disorders

- MSDs - Especially Those Involving the Back - are Among the Most Costly Occupational Problems
- MSDs Can Cause Great Suffering and Pain Among Workers and Reduce Productivity and Cause Worker Dissatisfaction
- Quality of Products or Services May Be Decreased Due to MSDs
Ergonomics

- The Science of Fitting Workplace Conditions and Job Demands to the Capabilities and Limitations of the Working Population
- Effective Ergonomics Promotes Productivity, Reduces Injury Risks, and Increases Worker Comfort and Satisfaction
Comprehensive Ergonomics Program - Components

- Recognition and Identification of Work Related MSD Problems
- Job or Worksite Evaluations
- Employee Involvement and Participation
- Implementation of Hazard Controls
- Training and Education
- Health Care Management
Recognition and Identification of MSD Problems

- Injury Records Review (OSHA logs or workers compensation claims)
- Comparison to Industry Averages
- Worker Visits to Clinic
- Jobs With Repetitive, Forceful Exertions in Awkward Postures; Frequent or Heavy Lifting; or Vibrating Equipment
Setting the Stage for Action

◆ Integrate Ergonomics Into Company Safety and Health Program
◆ Expressions of Management Commitment
◆ Commitment of Adequate Resources Including Training the Workforce, Bringing in Outside Experts, and Implementing Improvements
Setting the Stage for Action

- Treat Ergonomics Efforts as Furthering the Company’s Goals
- Expect Full Cooperation of the Total Workforce
- Assign Lead Roles to Designated Persons
- Give Ergonomics Efforts Priority With Other Cost Reduction, Productivity, or Quality Efforts
Setting the Stage for Action

- Set Goals To Address Specific Operations, Prioritize the Riskiest Jobs
- Release Time or Other Compensatory Arrangements for Employees Expected to Handle Assigned Tasks for Ergonomics Efforts
- Provide Information to All Involved, Including Injury Data, Productivity Data, Etc.
Worker Involvement - Benefits

- Enhances Worker Motivation and Job Satisfaction
- Added Problem Solving Capabilities
- Greater Acceptance of Change
- Greater Knowledge of the Work and Organization
- Workers Frequently Are the Best Source of Ideas to Fix Problem Jobs
Who Should Participate?

- Safety and Hygiene Personnel
- Health Care Providers
- Human Resources Personnel
- Engineering Personnel
- Maintenance Personnel
- Ergonomists or Ergonomics Specialists
- Worker and Management Representatives
Alternative Approaches

- Joint Labor-Management Committee Approach
- Work Group Approach (Team Approach)
- Individual Input Approach (Provide Employees With a Communication Facility and Respond to Input Received)
Build In-House Expertise

- Provide Ergonomics Awareness Training
- Training in Job Analyses and Control Measures
- Training in Problem Solving
Ergonomics Awareness Training - Objectives

- Recognize Risk Factors for MSDs and Understand Methods for Controlling Them
- Identify Signs and Symptoms of MSDs and Be Familiar With Company Health-Care Procedures
- Know the Process the Employer is Using to Address and Control Risk Factors
- Know the Procedure for Reporting Risk Factors
Training in Job Analyses and Control Measures - Objectives

- Demonstrate Job Analysis for Identifying Risk Factors for MSDs
- Select Ways to Implement and Evaluate Control Measures
Training in Problem Solving - Objectives

- Identify Departments, Areas, and Jobs With Risk Factors Through Records, Walk-Through Observations, and Surveys
- Identify Tools and Techniques For Conducting Job Analyses
- Develop Skills in Team Building and Problem Solving
- Recommend Ways to Control Hazards
Indicators of Musculoskeletal Disorders - Health and Medical

- Employee Reports of Physical Stress
- Review OSHA Logs and Other Existing Records
- Calculate Rates for Comparisons
  - Plant Medical Records
  - Insurance Claims Records
  - Absentee Records
  - Job Transfer Applications
Indicators of Musculoskeletal Disorders - Health and Medical

- Symptoms Surveys
  - Respondent Asked to Rate Level of Discomfort for Different Areas of Body
  - Type, Onset, and Duration of Symptoms Reported

- Periodic Medical Examinations

- Employee Interviews
Identifying Risk Factors in Jobs

- Awkward Postures (Extremes of Joint Movement)
  - Twisting or Bending While Lifting or Carrying
  - Wrist Deviations
  - Overhead Work (Arms Raised)
  - Extended Reaching
  - etc.
Identifying Risk Factors in Jobs

- **Forceful Exertions** (Including Lifting, Pushing, and Pulling)
- **Forces Increase With...**
  - Weight or Bulkiness of Loads
  - Speed of Movements
  - Use of Awkward Postures
  - Presence of Vibration
  - etc.
Identifying Risk Factors in Jobs

- Repetitive Motions
  - Frequent and Similar Motions Every Few Seconds
  - Increased Risk When Repeated Forceful Exertions in Awkward Postures
Identifying Risk Factors in Jobs

- **Duration of Exposure**
  - Amount of Time a Person is Exposed to Risk Factors
  - The Longer the Period of Continuous Work, the Longer the Required Recovery or Rest Time
Identifying Risk Factors in Jobs

- **Contact Stresses**
  - Physical Contact of Body Areas With Hard or Sharp Objects
  - Desk Edges, Tool Handles, etc.
  - Can Inhibit Nerve Function and Blood Flow
Identifying Risk Factors in Jobs

- Vibration
  - Localized Exposure to Vibrating Object, Such as a Power Handtools
  - Whole-Body Exposure to Vibration When Standing or Sitting on Vibrating Equipment
Identifying Risk Factors in Jobs - Additional Conditions

- Cold Temperatures
- Insufficient Pauses or Rest Breaks for Recovery
- Machine Paced Work
- Unfamiliar or Unaccustomed Work
Screening Jobs for Risk Factors

- Walk-Through Observational Surveys to Determine Obvious Risk Factors
- Interviews With Workers and Supervisors
- Use of Checklists for Scoring Job Features Against a List of Risk Factors
Job Analysis

- Break Job Into Its Various Elements or Actions
- Measure or Quantify Risk Factors
- Identify Conditions Contributing to Risk Factors
- Usually Performed by Persons With Considerable Experience and Training
Job Analysis - Steps

- Complete Description of the Job is Obtained
- Employees are Interviewed
- Job is Divided Into Discrete Tasks
- Each Task is Then Studied to Determine Specific Risk Factors
- Risk Factors May Be Further Evaluated
Job Analysis - Tasks

- Tasks Described in Terms of
  - Tools, Equipment, and Materials Used to Perform the Job
  - Workstation Layout and Physical Environment
  - Task Demands and Organizational Climate
Job Analysis - Detailed Data Collections

- Observe Workers Performing Tasks to Furnish Time Activity Analysis
  - Job/Task Cycle Data
  - Use Videotape
  - Still Photos of Postures, Workstation Layouts, Tools, etc.
Job Analysis - Detailed Data Collections

- Workstation Measurements
  - Work Surface Heights, Reach Distances, etc.
  - Measure Tool Handle Sizes, Weighing Tools and Parts, Measure Parts
  - Determine Characteristics of Work Surfaces, Such as Slip Resistance, Hardness, Edges
Job Analysis - Detailed Data Collections

- Workstation Measurements
  - Measure Exposures to Cold, Heat, Whole-Body Vibration, etc.
  - Biomechanical Calculations (muscle forces required to complete task or pressure on spinal discs based on load lifted, e.g., NIOSH Lifting Guide, etc.)
  - Special Questionnaires, Interviews, and Subjective Rating Procedures
Developing Controls

- **Types of Controls**
  - **Engineering Controls**: Reduce or Eliminate Potentially Hazardous Conditions
  - **Administrative Controls**: Changes in Work Practices and Management Policies
  - **Personal Equipment**
Engineering Controls - Design the Job

- Workstation Layout
- Selection and Use of Tools
- Work Methods
Strategies for Job Design

- Change the Way Materials, Parts, and Products Can Be Transported (e.g., use mechanical assist devices rather than manual handling)
- Change the Process or Product to Reduce Risk Factors (e.g., maintain the fit of plastic molds to reduce the need for manual removal of flashing, etc.)
Strategies for Job Design

- Modify Containers and Parts Presentation (e.g. height adjustable material bins, etc.)
- Change Workstation Layout (e.g., use height adjustable workbenches, etc.)
- Change the Way Parts, Tools, and Materials are to be Manipulated (e.g., use fixtures to hold workpieces, etc.)
**Strategies for Job Design**

- Change Tool Designs (e.g., pistol handle grips for knives to reduce wrist deviations, etc.)
- Change Assembly Access and Sequence (e.g., remove physical and visual obstructions, etc.)
Administrative Controls

- Reduce Shift Length or Curtail Overtime
- Rotate Workers Through Several Jobs With Different Physical Demands
- Schedule More Breaks for Rest and Recovery
Administrative Controls

- Broaden or Vary Job Content
- Adjust the Work Pace
- Train Workers to Recognize Risk Factors for MSDs
- Instruct Workers in Work Practices That Can Ease Task Demands
Personal Equipment - Is it Effective??

- Wrist Supports, Back Belts, Vibration Attenuation Gloves
- Are Not a Barrier Against Risk Factors for MSDs (as hard-hats, safety shoes, safety goggles, etc., are barriers against hazards)
- Evidence of Their Effectiveness Remains Inconclusive
Gathering Ideas for Controls

- Trade Associations May Have Information About Good Control Practices
- **Insurance Companies that Offer Loss Control Services**
- Consultants and Vendors Who Deal in Ergonomic Specialty Services and Products
- Visits to Other Worksites Known to Have Dealt With Similar Situations
Implementing Controls

- Trials or Tests of Selected Solutions
- Making Modifications or Revisions
- Full Scale Implementation
- Follow-Up to Evaluate Control Effectiveness
Implementing Controls

- Designate the Personnel Responsible
- Create a Time-table
- Consider the Logistics Necessary for Implementation
Evaluating Control Effectiveness

- Use Risk Factor Checklist or Other Job Evaluation Method
- Repeat Symptoms Survey and Compare With Prior Results (often in conjunction with checklist or other job analysis method)
- Should Occur 1 - 2 Weeks After Implementation (short term evaluation)
Evaluating Control Effectiveness

Agent Term Evaluations

- Reduction in Incidence Rate of MSDs
- Reduction in Severity Rate of MSDs
- Increase in Productivity or Quality of Products or Services
- Reduction in Job Turnover or Absenteeism
Health Care Management - Employer Responsibilities

- Provide Education and Training Regarding Recognition of Symptoms and Signs of MSDs
- Encourage Early Reporting of Symptoms and Prompt Evaluation by Care Provider
- Give Care Provider Opportunities to Become Familiar With Jobs and Tasks
- Modify Jobs/Tasks or Accommodate Limitations
- Ensure Privacy of Medical Information
Health Care Management - Employee Responsibilities

- Follow Workplace Safety and Health Rules
- Follow Work Practice Procedures Related to Their Jobs
- Report Early Any Signs or Symptoms of MSDs
Health Care Management - Health Care Provider Responsibilities

- Acquire Experience and Training in Evaluation and Treatment of MSDs
- Seek Information and Review Materials Regarding Employee Job Activities
- Ensure Employee Privacy and Confidentiality
- Evaluate Symptomatic Employees
Health Care Management - Health Care Provider Responsibilities

- Evaluate Symptomatic Employees, Including...
  - Medical Histories and Symptoms
  - Descriptions of Work Activities
  - Physical Examinations
  - Initial Assessments or Diagnoses
  - Consider Opinions as to Whether Occupational Risk Factors Caused, Contributed to, or Exacerbated Conditions
  - Follow-Up Examinations to Document Improvements
Health Care Management - Health Care Provider Responsibilities

- *Become Familiar With Employee’s Job or Tasks*
- *Do Periodic Walk-Throughs of the Plant*
- *Review Job Analysis Reports or Job Descriptions*
- *Review Photographs or Videotapes of Jobs or Tasks*
Early Reporting

- Employers Should Encourage Early Reporting
- Employers Should Not Establish Policies Which Discourage Reporting of Symptoms
- Provide Symptomatic Employees Prompt Access to Evaluation by Health Care Provider
**Treatment and Restricted Work**

- Care Providers Should Determine Physical Capabilities and Work Restrictions of Affected Workers
- Employers Should Assign Workers to Tasks Consistent With Restrictions
- Use Light Duty or Temporary Job Transfers
- Avoid Complete Removal From Work
- Immobilization Devices are for Off-The-Job Time - Particularly During Sleep
Proactive Ergonomics

- To Emphasize Ergonomics at the Design Stage of Work Processes
- To Design Operations That Ensure Proper Selection and Use of Tools, Job Methods, Workstation Layouts, and Materials
- Build a More Prevention-Oriented Approach Using Knowledge Gained From the Ongoing Ergonomics Process
Proactive Ergonomics

- Design Strategies Should Emphasize Fitting Job Demands to the Capabilities and Limitations of Workers
- Design Strategies Should Target Causes of MSDs - Engineering Approaches are Preferred Over Administrative Approaches
Sources of Additional Information and Assistance

- National Institute of Occupational Safety and Health (NIOSH)
  - NIOSH Publications
  - NIOSH Health Hazard Evaluations
  - 1-800-35-NIOSH

- OSHA
- OSHA Voluntary Protection Programs
Questions and Answers