

Ergonomics

Identify Problems

An important part of the ergonomic process is a periodic review of the facility, specific workstation designs and work practices, and the overall production process, from an ergonomics perspective. This includes identifying existing problems, which can be obtained from reviewing the company's injury and illness logs, reports, workers' compensation records, and worker reports of problems. However, a more forward-looking approach, to be used in combination with reviewing injury and illness records, is to be proactive in identifying potential ergonomic issues that have gone unnoticed or resulted from facility changes, before they result in MSDs. Observations of workplace conditions and work processes, ergonomic job analyses, workplace surveys, and worker interviews are common proactive methods for identifying ergonomics related injury risks.

- Review Injury Records
- Observe Workplace Conditions
 - Risk Factors
- Encourage Early Reporting of Injuries
- Resources

Review Injury Records

Looking at your injury and illness data will help identify ergonomic problems. These data can be obtained from reviewing the company's Injury and Illness Logs, reports, workers' compensation records, first aid logs, accident and near-miss investigation reports, insurance company reports and worker reports of problems.

Observe Workplace Conditions

By looking critically at your workplace operations, you can identify risk factors and eliminate or control them as early as possible.

Risk Factors

The risk of MSD injury depends on work positions and postures, how often the task is performed, the level of required effort and how long the task lasts. Risk factors that may lead to the development of MSDs include:

- **Exerting excessive force.** Examples include lifting heavy objects or people, pushing or pulling heavy loads, manually pouring materials, or maintaining control of equipment or tools.

- **Performing the same or similar tasks repetitively.** Performing the same motion or series of motions continually or frequently for an extended period of time.
- **Working in awkward postures or being in the same posture for long periods of time.** Using positions that place stress on the body, such as prolonged or repetitive reaching above shoulder height, kneeling, squatting, leaning over a counter, using a knife with wrists bent, or twisting the torso while lifting.
- **Localized pressure into the body part.** Pressing the body or part of the body (such as the hand) against hard or sharp edges, or using the hand as a hammer.
- **Cold temperatures.** In combination with any one of the above risk factors may also increase the potential for MSDs to develop. For example, many of the operations in meatpacking and poultry processing occur with a chilled product or in a cold environment.
- **Vibration**, both whole body and hand-arm, can cause a number of health effects. Hand-arm vibration can damage small capillaries that supply nutrients and can make hand tools more difficult to control. Hand-arm vibration may cause a worker to lose feeling in the hands and arms resulting in increased force exertion to control hand-powered tools (e.g. hammer drills, portable grinders, chainsaws) in much the same way gloves limit feeling in the hands. The effects of vibration can damage the body and greatly increase the force which must be exerted for a task.
- **Combined exposure to several risk factors.** May place workers at a higher risk for MSDs than does exposure to any one risk factor.

In addition, observe whether workers are:

- Modifying their tools, equipment or work area
- Shaking their arms and hands
- Rolling their shoulders
- Bringing products such as back belts or wrist braces into the workplace

These behaviors can mean that workers are experiencing ergonomic issues. Talk with them and review their work to see if any risk factors for MSDs are present. Workers can identify and provide important information about hazards in their workplaces. Their opinions and suggestions for change also are valuable.

Once problem jobs are identified, conducting an in-depth ergonomic job analysis can help identify solutions to prevent MSDs. An ergonomic job hazard analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment.

Encouraging and Utilizing Early Reports of Injury

Comprehensive injury reporting is important to the success of an ergonomic process. The goal of this effort is to properly assess, diagnose, and treat MSDs. Early reporting, diagnosis, and intervention can limit injury severity, improve the effectiveness of

treatment, minimize the likelihood of disability or permanent damage, and reduce workers compensation claims. This will allow the employer to correctly identify work areas or specific tasks where injuries frequently occur or are most severe. This information helps direct the activities of the ergonomic team as well as to guide healthcare providers in making return-to-work and light-duty work decisions. OSHA's injury and illness recording and reporting regulation require employers to record and report work-related fatalities, injuries and illnesses.

- Frequently Asked Questions for Injury and Illness. Additional guidance to help employers comply with the recordkeeping requirements. The following table of contents provides links to additional guidance, or, if additional guidance has not been developed, to the regulation.

Encouraging and utilizing reports MSD symptoms:

- Reinforces worker training on recognizing MSD symptoms.
- Encourages early reporting of MSD symptoms.
- Allows for prompt medical evaluations for diagnosis, treatment and follow-up care.
- Reduces injury severity, the number of workers' compensation claims and associated costs and the likelihood of permanent disability.
- Provides guidance on return-to-work and work placement restrictions during the healing process.
- Guides job modifications.
- Provides a mechanism to track and trend MSD injuries.
- Enables assessment of the effectiveness of work changes.

Healthcare professionals are important ergonomic team members. They help injured workers recover more quickly and return to their jobs with appropriate restrictions and less risk for re-injury. It is necessary that these professionals are knowledgeable about the operations and work practices within the specific industry. Their knowledge will allow them to assist the injured worker during the healing process and in post-injury work placement.

Resources

Resources on Risk Factors

- Easy Ergonomics: A Practical Approach for Improving the Workplace. California Department of Industrial Relations (Cal/OSHA), (1999). Provides descriptions and examples of common factors that contribute to the development of MSDs.
- Work Related Musculoskeletal Disorders (WMSDs). Canadian Centre for Occupational Health and Safety. (December 12, 2005). Outlines common risk factors and their injuries.
- Musculoskeletal Disorders and Workplace Factors (PDF). DHHS (NIOSH) Publication 97-141. (July 1997). Reviews the majority of the relevant studies

available at the time and documents the relationship between MSDs and various workplace factors.

- National Research Council. *Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities*. Washington, DC: The National Academies Press, 2001. Presents the latest information on the prevalence, incidence and costs of musculoskeletal disorders and identifies factors that influence injury reporting.
- National Research Council. *Work-Related Musculoskeletal Disorders: A Review of the Evidence*. Washington, DC: The National Academies Press, 1998. Based on evidence presented and discussed at the two-day Workshop on Work-Related Musculoskeletal Injuries: Examining the Research Base and on follow-up deliberations of the steering committee assembled by the National Academy of Sciences/National Research Council.
- National Research Council. *Work-Related Musculoskeletal Disorders: Report, Workshop Summary, and Workshop Papers*. Washington, DC: The National Academies Press, 1999. Includes a steering committee report, workshop information and a review of interventions.

Resources on Job Analysis

- Job Hazard Analysis. OSHA Publication 3071, (Revised 2002). Explains what a job hazard analysis is and offers guidelines to help conduct your own step-by-step analysis.
- Easy Ergonomics: A Practical Approach for Improving the Workplace. California Department of Industrial Relations (Cal/OSHA), (1999).
- Assessment Tools. Department of Defense (DoD) Environment, Safety and Occupational Health Network and Information Exchange (DENIX), Ergonomics Working Group. Provides links to assessment tools and prevention strategies developed by the DOD Ergonomics Working Group.
- Manual Handling. Health and Safety Executive (HSE). Contains tools to help employers analyze lifting, carrying and team handling, repetitive upper limb tasks and pushing and pulling.
- *Analysis Methods and Tools for Ergonomists*. Thomas E. Bernard, University of Southern Florida, College of Public Health. Provides a suite of advanced tools, which may require outside training or direction or use by an experienced practitioner.
- Liberty Mutual Manual Materials Handling Tables ([PDF](#)). Liberty Mutual Research Institute for Safety, (2012). These tables present information about the percentages of men and women capable of performing manual material handling tasks without overexertion.
- Evaluation Tools. Provides links for some useful evaluation tools.
 - Washington State Department of Labor and Industries
 - Ergonomics Association
- Applications Manual for the Revised NIOSH Lifting Equation ([PDF](#)). DHHS (NIOSH) Publication 94-110, (September 2021). Contains a complete description of all terms in NIOSH's lifting equation with several sample calculations.

- Health Hazard Evaluations. National Institute for Occupational Safety and Health (NIOSH). NIOSH conducts investigations of possible health hazards in the workplace. This page allows a search for all NIOSH evaluations concerning ergonomics.
 - Ergonomic Evaluation of Surfacing and Finishing Tasks during Eyeglass Manufacturing - Minnesota. National Institute for Occupational Safety and Health (NIOSH) HETA 2010-0114-3168. (November 2012). An evaluation of potential ergonomic risk factors in eyeglass manufacturing.
 - Ergonomic Evaluation of Automatic Flat Sorting Machines - Colorado. National Institute for Occupational Safety and Health (NIOSH) HETA 2008-0293-3132. (June 2011). An Evaluation of potential ergonomic hazards among workers using the AFSM 100 machines.
 - Ergonomic Evaluation at a Steel Grating Manufacturing Plant. National Institute for Occupational Safety and Health (NIOSH) HETA 2008-0074-3081. (May 2009). An investigation on the high number of MSDs in employees working in the barline, welding, and saw areas.
 - Ergonomic Evaluation of Workers at a Cabinet Mill and Assembly Plant. National Institute for Occupational Safety and Health (NIOSH) HETA 2007-0038-3057, (March 2008). An evaluation of potential ergonomic hazards among cabinet makers.
 - Interpreters for the Deaf. National Institute for Occupational Safety and Health (NIOSH) HETA 92-0268-2477. (December 1994). An evaluation of the problem of MSDs among interpreters for the deaf.

Resources on Injury Rates

- Worker Health Charts: Musculoskeletal Health. Centers for Disease Control and Prevention (CDC). Provides descriptive occupational morbidity and mortality data in the United States. It includes figures and tables describing the magnitude, distribution and trends of the nation's occupational injuries, illnesses and fatalities.
- U.S. Department of Labor, Bureau of Labor Statistics (BLS): Nonfatal Occupational Injuries and Illnesses Requiring Days Away from Work. Contains summary and MDS statistics (incidence rates by industry), including data tables of nonfatal occupational injuries and illnesses that require days away from work in private industry, state government, and local government.

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