Minnesota Department of Employee Relations

Ergonomics Guideline

2001

Minnesota Department of Employee Relations
Safety and Industrial Hygiene Unit

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Introduction

Purpose of the Guideline

This guideline will assist management and those responsible for the safety and health of state employees by providing tools and resources to develop a safe, functional and effective work environment. The intended use of this document is in conjunction with other health and safety initiatives that address workplace hazards.

Ergonomics Defined

Ergonomics is the science of fitting the job to the person, rather than the person to the job. This process is achieved by evaluating and designing workplaces, environments, job tasks, equipment and processes in relationship to human capabilities and interactions in the workplace. The goal of ergonomics is to enhance human performance while improving safety, health, comfort and job satisfaction. The ergonomics process should not be regarded as separate from other health and safety initiatives that address workplace hazards. The process of obtaining management leadership, employee participation, MSD (Musculoskeletal Disorder) management, job hazard analysis, hazard reduction and controls, and program evaluation are key elements to the success of any health and safety initiative. This guideline will include specific ergonomic principals for addressing risk factors and work related musculoskeletal disorders.

Benefits of Ergonomics

Designing workplaces with ergonomic principles will result in benefits such as increased productivity and employee satisfaction, decreased injury rates and associated medical, rehab and legal expenses, as well as decreased user turnover, and sick leave.

MSD's (Musculoskeletal Disorders) and Risk Factors

Musculoskeletal Disorders are injuries and disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs. MSD's are associated with various signs and symptoms that represent physical findings, and physical indications respectively, that a person may be developing an MSD. Examples of MSD signs are: decreased range of motion, deformity, decreased grip strength, and loss of muscle function. Examples of MSD symptoms are: pain, numbness, tingling, burning, cramping and stiffness. Typically, MSD's affect the neck, back, shoulders, arms, wrists, hands, fingers, and legs. Examples of MSD's include: Carpal Tunnel Syndrome, Epicondylitis, Synovitis, Raynaud's Syndrome, Tendinitis, Trigger Finger, De Quervain's Disease, Rotator Cuff Tendinitis, Muscle Strains and Sprains, Disc Injuries, Sciatica, and Carpet Layers Knee. These disorders are not typically the result of any instantaneous or acute event (such as a slip, trip, or fall) but reflect a more gradual or chronic development. Workplace risk factors, along with personal characteristics (i.e., physical limitation or existing health problems) and psychosocial factors, are thought to contribute to the development of MSD's. MSD's also reduce worker productivity and may cause worker dissatisfaction.

Risk Factors

Risk Factors are elements or components of a task that increase the probability of cause or contribute to musculoskeletal disorders. Example of occupational risk factors that cause or contribute to MSD'S are jobs requiring repetitive, forceful, or prolonged exertions of the hands; frequent or heavy lifting, pushing, pulling, or carrying of heavy objects; and prolonged awkward postures. Vibration and cold may add risk to these work conditions. Jobs or working conditions presenting multiple risk factors will have a higher probability of causing a musculoskeletal problem. The level or risk depends on the intensity, frequency, and duration of the exposure to these conditions and the individual's functional ability to physically handle the job demands that might be involved. Non-occupational activities such as racquet sports, gardening, carpentry, knitting, and playing musical instruments involve risk factors and have also been associated with the cause or contribution to MSD's.

Management Leadership and Employee Participation

Management leadership and employee participation are essential to the success of an ergonomics initiative. Utilizing a team approach will broaden the focus of the ergonomics process. A successful team may include but is not limited to: management, end user, human resources, facilities management, purchasing, interior design consultants, furniture manufactures, safety, industrial hygiene, ergonomics, building engineer, and information systems. A commonly used macroergonomics approach is the use of participatory ergonomics, a method whereby employees are centrally involved from the beginning. The employees are involved in front-end analysis, to do problem solving in identifying job hazards, generate solutions and help implement the program elements.

Management Leadership

Will entail active participation through involvement, communication, policy making, role modeling, and evaluation of ergonomic practices. Management will assign appropriate personnel and support their efforts by providing decision-making authority, resources, and training to support the ergonomics process. Management will ensure that all policies support and encourage prompt reporting and control of workplace hazards and MSD's, and encourage employee participation.

Employee Involvement (Ergonomics Team)

Establishment of an ergonomics team or inclusion of ergonomics as part of the safety committee responsibilities is recommended to achieve maximum employee participation. A well balanced team will include employees from all levels ensuring a mix of expertise and practical experience. (Please refer to DOER's Safety and Industrial Hygiene website for information on safety committees http://www.doer.state.mn.us/ei-safih/saftyih.asp.) Training for all ergonomics team members should include reporting procedures of signs and symptoms for MSD's, recognition and general ergonomics awareness information, formal awareness instruction and job specific information, training in job analysis and controlling risk factors, as well as training in problem solving techniques. The ergonomics team will actively participate through development, implementation and evaluation of job hazard analysis and controls. Feedback regarding the effectiveness of the program and implemented control measures should be reported on a regular basis (i.e. quarterly).

Employee Involvement

All employees will be encouraged to promptly report workplace hazards and MSD's, following agencies policy and procedures. Follow up and communication from management is expected in a timely manner (1-3 days). When appropriate employees will be encouraged to participate in evaluation processes such as job hazard analysis, symptoms surveys, interviews, and feedback regarding control or process change. Employees will be expected to implement knowledge gained from training regarding safe work practices, methods, and application of new equipment and or tools.

Data Collection

Collecting and analyzing data will provide focus in determining high risk work areas, job tasks, and processes that may be contributing to work related musculoskeletal disorders. Thorough data collection will reveal; MSD incidence rates and associated costs, injury trends, the need for further analysis or review of modifications and can serve as baseline information for program evaluation.

There are primarily two types of data collection methods. One method involves analyzing existing records such as OSHA 200 logs, First Reports of Injury and Workers Compensation Data. The other method requires a "hands on" approach utilizing tools such as surveys, observation, job task analysis, and employee interviews. Both methods should be used on an ongoing basis to prevent injuries and improve productivity.

Data Collection Methods/Analysis of Existing Records

Inspecting the logs of injuries and illnesses can provide information about the nature of MSD's. Information contained in OSHA 200 logs, workers compensation claims, insurance claims, accident investigation reports, absentee records, and job transfer information will help identify trends, and spot high risk jobs or job tasks.

Workers Compensation Database

The workers compensation database contains information about the nature, body part, cause, and source of injuries, as well as medical and lost time costs. Any state agency paying an administration fee can request the Department of Employee Relations to create a worker's compensation loss report that can be used to identify trends in work place injuries and illnesses. Contact the State Safety and Industrial Hygiene Unit at 651-297-3055 for additional information.

First Report of Injury (FRI)

A First Report of Injury should be completed on all work-related injuries and illnesses that result in the need for medical treatment or lost time from work. These reports will indicate how, when and where the injury occurred, what part of the body was affected and if medical attention or lost time occurred. Refer to DOER's Supervisor's Worker's Compensation Handbook for more information http://www.doer.state.mn.us/ei-wc/WCHANDBK/wchbk.htm. (Appendix D includes a blank FRI.)

OSHA 200 Logs *(OSHA has revised the Record Keeping Standard, the new 300 Log will come into effect January 1, 2002)*

This log is used for recording and classifying recordable occupational injuries and illnesses and for noting the extent and outcome of each case. These logs are helpful for determining specific information regarding the numbers and seriousness of injuries in the workplace. Please check with your agency's safety professional, workers compensation coordinator or your human resource/personnel department to identify who is responsible for keeping this log at your location.

"Hands On" Data Collection Methods

In addition to reviewing and analyzing logs and reports, a "hands on" data collection approach can help identify risk factors that are not visible on paper. These data collection methods should be conducted on an ongoing basis, as part of normal business procedures. These methods may include surveys, walkthroughs, employee interviews, observation, job task analysis and encouragement of early reporting practice. The practice of "hands on" data collection can help determine and prioritize appropriate controls measures to take against risk factors.

Survey

Survey's are used to help identify risk factors and the relationship with physical discomfort. These relationships and reports of discomfort may go unnoticed if data from existing records is the only method of analysis. Surveys can also serve as a baseline when implementing an ergonomics process then reissued to measure progress. When using a survey assume that any discomfort or symptoms may be associated with some increased risk for MSD's. Compared to OSHA logs, surveys can provide a more sensitive way to determine who has symptoms and who does not. Surveys can be designed to include specific information regarding physical symptoms, job tasks, environmental conditions, employee behaviors, and psychosocial issues. This type of survey can help target and prioritize areas of risk.

Walkthrough, Observation and Employee Interviews

Informal walkthroughs, observation of work tasks and employee interviews should be performed on a regular basis (weekly, monthly, or quarterly) as part of the normal work procedures. This type of analysis is proactive and can help identify near miss incidents, and potential risk factors prior, to high levels of MSD reporting. Individuals from the ergonomics team or safety committee would be appropriate to conduct an informal walkthrough incorporating observation and employee interview techniques. While performing a walkthrough there are several risk factors that the observer should be watchful for, those include:

- **Repetition** is considered the number of times that a motion or movement pattern is performed. Highly repetitive tasks that are performed for prolonged periods of time. For example continuous keyboard and or mouse activities for more than 4 hours total in a workday, or repeating a cycle of motions more than 2 times/minute for more than 2 consecutive hours in a workday. Fatigue and muscle tendon strain may result, especially if adequate recovery time is not allowed.
- **Force** is the amount of muscular effort required to perform a task. Force is involved with activities such as lifting, carrying, pushing, pulling, pinching, grasping, or prolonged holding. Note the frequency, duration, and amount of weight manipulated. The use of excessive forces may result in injury to the muscles, tendons, ligaments and spinal discs.

- **Awkward postures** increase stress to the joints, muscles, tendons, ligaments and nerves. Examples of awkward postures include; twisting, bending at the waist, reaching overhead, reaching behind the body, reaching beyond one arms length, wrist deviations, kneeling or squatting and the use of poor body mechanics. Damage to the musculoskeletal system, and spinal discs can result.
- **Contact Stress** occurs when using the hand or knee as a hammer or when any part of the body is in repeated or continuous contact with a sharp or hard surface, such as narrow tool handles or non-rounded desk edges. Contact stress causes compression to the soft tissues, specifically muscles, nerves, and tendons, and blood vessels resulting in damage to those areas.
- **Vibration** exposure occurs when a specific part of the body comes in contact with a vibrating object, such as a power tool. Exposure to whole-body vibration can occur while standing or sitting in vibrating environments or objects, such as large machinery or trucks. Long term exposure to vibration can cause skeletal, motor and cardiovascular changes.
- **Other Conditions** that can influence the presence and magnitude of the risk factors for MSD's can include: cold temperatures, insufficient pauses and rest breaks for recovery, static loads, machine paced work, unfamiliar or unaccustomed work, and psychosocial factors.

Note: OSHA devised Action Triggers that identify high risk jobs. OSHA Table W-1 Basic Screening tool will help determine whether an employee's job meets the Action Trigger: http://www.osha-slc.gov/ergonomics-standard/regulatory/tableW-1.pdf. This table is also available in Appendix D of this document.

Job Analysis

Job analysis breaks a job into its various elements or actions, describes them, measures and quantifies risk factors inherent in the elements and identifies conditions contributing to the risk factors. During the job analysis, the job is divided into tasks. The tasks involved in most jobs can be described in terms of the following: the tools, equipment and materials used to perform the job, the workstation layout and physical environment, and the task demands and organizational climate in which the work is performed. There are a wide variety of methods and tools that are used while performing a job analysis, including but not limited to: interviews, observation, videotaping, still photos, specific weights and measurements (heights, distances, force) and exposure information. While performing a job analysis, focus on the risk factors that are causing or contributing to MSD incidents. Interview the employees, and observe their work methods evaluating the magnitude, frequency, and duration of exposure to the risk factors.

Job Hazard Analysis Tools	
Tools	**Source**
Job Strain Index Jobs involving highly repetitive hand motions Keyboarding/Data processing Packaging Inspecting	AIHA Journal, 56(5): 443-458 Available at the U of M Bio-Med Library Web-based version: http://sg-www.satx.disa.mil/hscoemo/tools/strain.htm
Revised NIOSH Lifting Equation Manual handling involving lifting weights > 10 lbs. Package sorting, handling or delivery Stationary lifting	National Institute for Occupational Safety and Health, January 1994 (DHHS, NIOSH publication No. 94-110) Web-based version: http://www.industrialhygiene.com/calc/lift.html
Snook Push/Pull Hazard Tables Jobs involving pushing or pulling or carrying objects Food service Laundry Housekeeping/Janitorial	Ergonomics, 1991, 34(9): 1197-1213 Available at the U of M Bio-Med Library
Rapid Upper Limb Assessment (RULA) Production/assembly work Janitorial/Maintenance Telephone operator Dentist/Dental technicians	Applied Ergonomics, 1993, 24(2): 91-99 Available at the U of M Science and Engineering Library

Job Hazard Analysis Tools	
Tools	**Source**
Rapid Entire Body Assessment (REBA) Patient lifting/handling Nurses/Nurses aides Housekeeping/Janitorial Dentists/Dental technicians	Applied Ergonomics, 2000, 31: 201-205 **Not** available at U of M Library
ACGIH Hand/Arm (Segmental) Vibration TLV Production work using vibrating or power hand tools Regular use of vibrating hand tools (grinding, sanding, chipping, drilling, sawing)	1998 Threshold Limit Values for Physical Agents in the Work Environment, 1998 TLVs, and BEIs. Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices, pp 109-131. Web site: http://www.acgih.org/
GM-UAW Risk Factor Checklist Assembly work Production work Small parts assembly	Available at UAW-GM Center for Human Resources Health and Safety Center 1030 Doris Road Auburn Hills, MI 48326
Washington State Appendix B Assembly/Production work Keyboard/Data processing Maintenance Patient lifting/handling Food Service Garbage collection Package delivery/sorting	Available in the Appendix of this document, or Web site: http;//www.lni.wa.gov/wisha/

Hazard Reduction and Control Measures

Once risk factors have been identified during the job analysis phase efforts need to be made to control or reduce those hazards. The goal of hazard control and reduction is to reduce MSD hazards to the extent that they are no longer reasonably likely to cause MSD's that result in work restrictions or medical treatment beyond first aid. A hierarchical approach to controlling hazards needs to be implemented. Beginning with the most important and effective control, methods include: engineering controls, work practice controls, administrative controls and lastly personal protective equipment (PPE).

- **Engineering controls** are physical changes to a job that reduce MSD hazards. Examples of engineering controls include changing or redesigning workstations, tools, facilities, equipment, materials, or processes.
- **Work practice controls** are changes in the way an employee performs the physical work activities of a job that reduce or control exposure to MSD hazards. Work practice controls involve procedures and methods for safe work. Examples of work practice controls for MSD hazards include: using neutral postures to perform tasks (straight wrists, lifting close to the body), the use of two-person lift teams, and observance of micro-breaks.
- **Administrative controls** are changes in the way that work in a job is assigned or scheduled that reduce the magnitude, frequency or duration of exposure to risk factors. For example: employee rotation to tasks that involve different muscle groups, job task enlargement, alternative tasks, employer-authorized changes in work pace.
- **Personal protective equipment (PPE)** is equipment employees wear that provides a protective barrier between the employee and an MSD hazard. Examples of PPE are anti-vibration gloves and carpet layer's knee pads. Generally, PPE should only be used as a supplement to engineering, work practice or administrative controls. In a situation where other controls are not feasible PPE can be used to reduce exposure to risk.

Regular follow up evaluations are necessary to track your progress and ensure that the controls are working as intended and have not created new risk factors or MSD's. These evaluations should be performed approximately 1 month after controls have been implemented. This amount of time will allow the employees to become accustomed to the controls. The same risk factor checklist or methods of job analysis that first documented the risk factor or hazard should be used during the follow up evaluation. This would also be a good time to reissue a symptom survey comparing the results and determining the effectiveness of symptom reduction. If the hazards are not substantially reduced or eliminated, further interventions needs to occur.

Medical Management

The incorporation of early reporting of MSD's, near miss incidents, ongoing communication between management and employees, risk factor identification and modification, as well as training will help prevent MSD's. However, even the most proactive safety and health programs may not prevent all MSD's from occurring. When an MSD does occur, effective medical management is a critical step in maintaining and creating a safe and healthy work environment for all employees. The employer, employee, and the health care provider have responsibilities in the area of medical management.

Employer Responsibilities

- Provide education and training to employees regarding the recognition of MSD's
- Encourage early reporting of symptoms
- Provide prompt and effective MSD management
- Provide access to a HCP (health care professional)
- Provide HCP with a description of the employee's job, including physical work activities, risk factors and MSD hazards
- Request employee to obtain written medical opinion and any work restrictions or limitations from HCP
- Modify jobs or accommodate employee's with restrictions or limitations pertaining to their MSD

Employee Responsibilities

- Follow applicable workplace safety and health rules
- Follow work practice procedures related to their jobs
- Report early signs and symptoms of MSD's
- Follow all HCP prescribed physical restrictions and limitations at work and home
- Obtain written medical opinion and any work restrictions or limitations from HCP, and provide copy to employer
- Fully participate in the medical rehabilitation process if applicable

Health Care Professional Responsibilities

- Acquire experience and training in the evaluation and treatment of MSD's
- Review and understand employee's job description and activities
- Provide employer with employee's medical condition as related to the physical work activities, risk factors and MSD hazards in the employee's job
- Recommend work restrictions and or employee's physical abilities as related to the employee's MSD, including time off work for recovery, if necessary, and required follow-up
- Inform employee about work-related or other activities that could impede recovery from the injury

Please review the" Supervisor's Worker's Compensation Handbook" for general information about the state's Workers' Compensation Program at http://www.doer.state.mn.us/ei-wc/WCHANDBK/wchbk.htm

Training

Ergonomics training compliments efforts to address workplace safety and health problems. Training efforts and methods will vary based on specific needs of management, supervisors, employees and the types of job tasks and risk factors, that are present in the job. It is recommended that training be required every 3 years for each employee in jobs that involve "high risk" tasks, each of their supervisors or team leaders and other employees involved in setting up and managing the ergonomics program. The training required for each employee, supervisor, team leader or member of the ergonomics team must address the following topics, as appropriate:

- The employer's ergonomics program and the employee's role in it;
- The signs and symptoms of MSD's and how to report them;
- The risk factors and any MSD hazards in the employee's job;
- The employer's plan and timetable for addressing the MSD hazards that have been identified;
- The controls used to address MSD hazards and;
- The employee's role in evaluating the effectiveness of the controls.

In addition to the topics mentioned above, employee's who are responsible for setting up and managing the ergonomics program must be trained in the following:

- How to set up, manage, and evaluate an ergonomics program;
- How to identify and analyze MSD hazards and select and evaluate controls to reduce or eliminate the hazard.

Training must be provided in language that employee's understand. The employer must give employee's an opportunity to ask questions, about the ergonomics program or content of the training and receive answers to those questions.

Training opportunities come in many different forms, a combination approach is recommended to address different learning styles. Some examples of training include but are not limited to; speakers, PowerPoint or slide presentations, panel discussions, informational meetings, interactive computer programs, videotapes, and written literature or posters. Remember to evaluate the effectiveness of your training methods to measure knowledge gained or improvements in skill. Evaluations such as pre and post quizzes, review of class objectives, establishment of action plans and behavioral observations are a few meaningful ideas.

The Department of Employee Relations, Safety and Industrial Hygiene Unit has a number of different training methods available to state agencies. On our website http://www.doer.state.mn.us/ei-safih/saftyih.asp we have made available; literature, handouts, an Office Ergonomics PowerPoint presentation, computer based interactive safety training, and videos.

Some additional resources include:

Publications

American National Standard Institute: Publishes ergonomic guidelines such as its ANSI/HFS 100-1988 Standard on visual display terminal workstations. Call (212) 642-4900 or http://www.ansi.org/

The Occupational Safety and Health Administration (OSHA): Offers at no cost many ergonomic resources. Call (202) 219-4667 or http://www.osha.gov

The National Institute for Occupational Safety and Health (NIOSH): Offers at no cost many ergonomic resources. Call 1-800-356-4674 or http://www.cdc.gov/niosh/homepage.html

Ergonomic Design for People at Work: By Eastman Kodak Co. Call the publisher, Van Nostrand Reinhold, at (606) 525-6600

The Ergonomic Office: Bryce G. Rutter Ph.D., Marvin J. Dainoff, Ph.D., Metaphase Publishing (314) 432-0300, e-mail: metaphase@aol.com

The Internet

Minnesota Safety Council: www.mnsafetycouncil.org

National Safety Council: www.nsc.org

National Institute for Occupational Safety and Health: www.cdc.gov/niosh/homepage/html

Occupational Safety and Health Administration: www.osha/gov

CTDNEWS: www.ctdnews.com

Ergoweb: www.ergoweb.com

Ergodyne: www.ergodyne.com

3M: www.mmm.com

Program Evaluation

Program evaluation should take place on an on going basis or at least once every three years. A variety of evaluation methods should occur. A review of data contained in workers compensation records, first reports of injury, and OSHA 200 logs noting any decreases or increases of MSD's and monies associated with those injuries. Also perform "hands on" evaluation methods including survey's walkthroughs, employee interviews, observation, and job task analysis. Determine whether the program is achieving positive results as demonstrated by a reduction in the number and severity of MSD's, increases in the number of jobs where MSD hazards have been successfully controlled, a reduction of sick days or turn over in problem job areas, and positive feedback from employees.

Remember to actively solicit employee feedback regarding controls, monitor changes to ensure that new hazards do not occur and encourage early reporting.

Record Keeping

An important part of documenting a successful ergonomics process is Record Keeping. Records suggested to keep in a written or electronic version are as follows:

- MSD reports
- Employer response to MSD reports
- Job hazard analysis
- Hazard control measures
- Ergonomics program evaluation
- Work restrictions, time off of work, and HCP (health care professional opinion)

The above records should be made available (except the HCP opinions) upon request for examination and copying, to employees. The HCP opinion must be made available upon request to the employee who is the subject of the opinion.

Organizing your records can be a challenge; here are some suggestions:

- Keep one notebook or computer file with a copy of your written ergonomics guideline and agency policy.
- Keep one notebook or computer file of employee MSD reports, ensure confidentiality where applicable.
- Keep one notebook or computer file of completed job hazard analysis and controls that have been implemented.
- Keep one notebook or computer file containing your agencies program evaluation efforts.
- Keep one notebook or computer file containing all ergonomics training activities with attendance sheets.
- All material containing confidential information is usually contained by the agencies Human Resource Department. Please check with your agency to ensure that proper procedure is followed.

Resources

It is important for management and employees to know and understand the wide variety of resources that are available to help promote a safe, functional and effective work environment. Ultimately it is the responsibility of each agency to provide a safe work environment for their employees. Several resources are listed in the Job Analysis and Training Sections of this document. Along with those resources, most state agencies have a designated safety professional, while the Department of Employee Relations/Safety and Industrial Hygiene Unit provides consultation services to state agency who pay an administration fee for Workers Compensation. The Department of Employee Relations also provides Disability Management Services for employees involved with workers compensation claims, and offers an array of health promotion opportunities through the Employee Health Promotion Program. In addition to personnel resources, the Minnesota Department of Administration/Materials Management Division arranges contracts for the purchase of goods and services (for example: ergonomic seating, modular furniture, height adjustable furniture, safety glasses, safety shoes, etc.). Your agencies purchasing department will be able provide information regarding contracts.

Internet Resources:

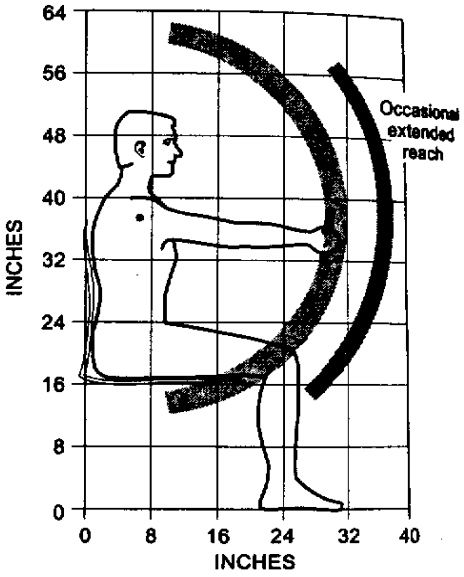
Minnesota Department of Employee Relations
Safety and Industrial Hygiene Unit: http://www.doer.state.mn.us/ei-safih/saftyih.asp
Disability Management Program: http://www.doer.state.mn.us/ei-dismg/disabmgt.htm
Employee Health Promotion Program: http://www.doer.state.mn.us/ei-sehpp/sehpp.htm
Minnesota Department of Administration website: http://www.admin.state.mn.us/
State of Washington website: http://www.lni.wa.gov/wisha/ergo/rule_dev/ergoprop.htm and http://www.wa.gov/lni/
Cornell University Ergonomics website: http://ergo.human.cornell.edu/

Appendix A: Definition of Terms

Ergonomics Principles help improve the fit between humans and machines and environments.

Work Space Design

- Design clearances for the knees, legs, feet, elbows and head for the largest users who are planning to use the workspace (95%).
- Design reaches for the smallest users who are planning to use the workspace (5% female).
- Objects reached frequently should be positioned close to the body.
- Objects that are large or heavy should be positioned in front of the worker.



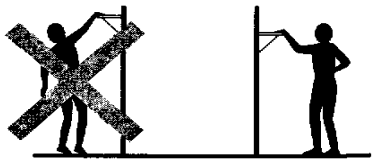
Adjustability Requirements - Do not take a "one size fits all" attitude. Consider the following approaches:

- Adjust the workplace: The shape, location, and orientation of the workplace can be adjusted to the user (i.e., change a users reach distance by lowering the height of a piece of equipment).
- Adjust the worker position relative to the workplace (change the seat height or use a platform or stool to achieve vertical adjustability).
- Adjust the workpiece: Use a lift table or forklift to raise or lower the height of a workpiece. Jigs, clamps or other fixtures can stabilize a workpiece for easy viewing, orientation, and manipulation.
- Adjust the tool: The use of adjustable or telescoping handles can allow for differing reaches.

Visibility and Normal Line of Sight - The normal line of sight or preferred direction of gaze is 10-15 degrees below the horizontal plane. VDT's should be positioned so the top ¼ of the screen is at or slightly lower than eye level.

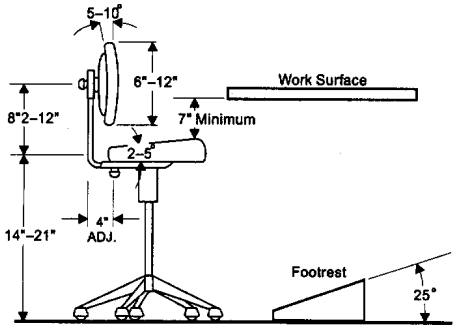
Sitting verses Standing - Both sitting and standing for prolonged periods of time can be stressful to the body, job should be designed to allow for postural changes.

- Standing is commonly used in job that involve frequent movement in large work areas, heavy lifting, or activities requiring excessive force with the hands or upper extremities. The use of anti-fatigue matting and wearing comfortable appropriate shoes can increase a standing workers comfort.



STANDING WORK:
Shelf heights to which a free-standing person can reach and place a hand flat on a shelf should not exceed 60 in.

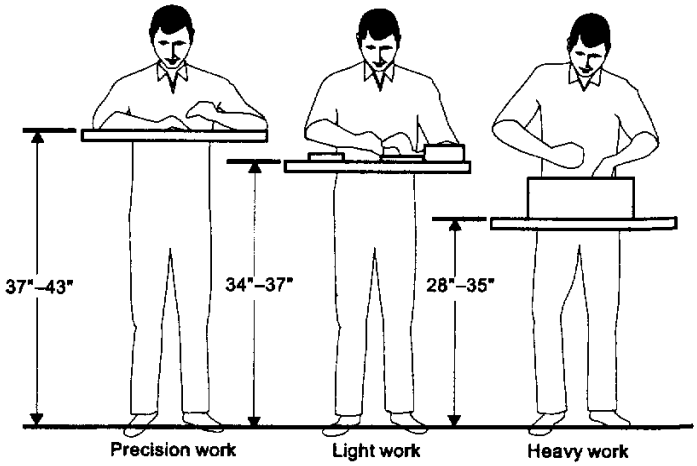
- Sitting allows better arm control, improved sense of balance and better blood circulation. Ensure adequate clearance for the legs, knees, and feet. Provide adjustable seating and instruct the users on why, when and how to operate various adjustments.



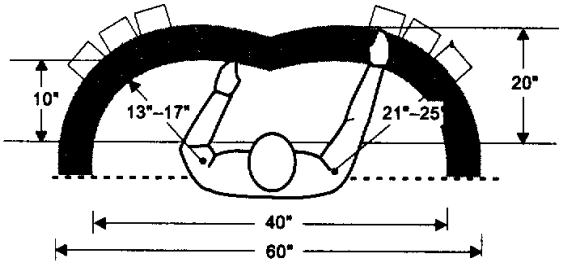
Work Surface Height - The tasks being performed should determine the optimal work surface height for seated or standing work. The general rule of thumb is to design standing work heights 2-4 inches below elbow level and seating working height at elbow level.

Standing Work

- Precision work
  2-4" above elbow level
- Light work
  4-6" lower than elbow level
- Heavier work
  6-15" lower than elbow level



Work Surface Depth - Designs need to account for a users "normal" and "maximum" work area. The "normal" work area in a horizontal plane is the area covered by a sweep of the forearm with the elbow close to the body. Items that need to be reached frequently should be positioned in the "normal" zone. The "maximum" work area is the area covered by a sweep of the arm in a forward outstretched position. Items that need to be reached occasionally or rarely should be positioned in the "maximum" zone.



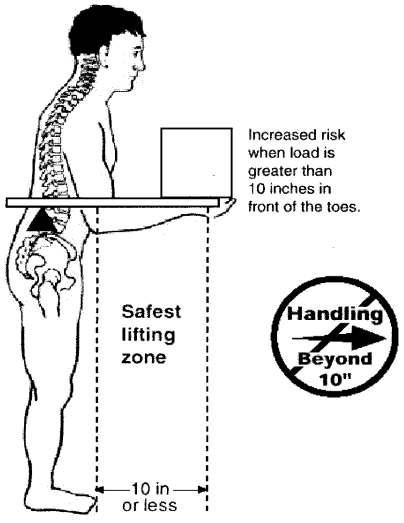
SEATED WORK:
Primary ☐ and secondary ■ areas for table top work
Optimal work surface height varies with the work performed:
Precision work = 31–37 in.
Reading/writing = 28–31 in.
Typing/light assembly = 21–28 in.

Manual Material Handling - Over-exertion injuries, especially in the lower back account for about ¼ of all reported occupation injuries in the United States. These injuries continue to be the most costly. (any figures that I can put in here) When designing workplaces and devices for material handling consider using the design parameters outlined in the NIOSH lifting equation.

Horizontal Distance of Load from Body - The distance from the low back to the hands when handling an object in front of the body. The greater the distance, the larger the compressive forces on the vertebrae and discs. The horizontal distance combined with the weight of the object is the most important factor in producing the greatest stress on the back. Engineering controls should attempt to eliminate the following characteristics which increase the horizontal distance whenever possible:

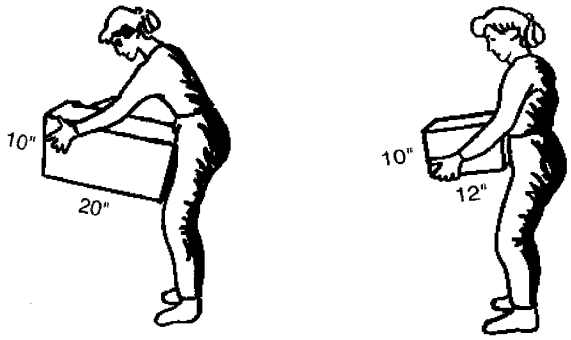
- Wide objects (distance in front of the body).
- Obstacles or barriers between the worker and the object.
- Tasks requiring extended reaches in front of the body to handle objects.
- Lifting objects near floor level.

A general guideline is to design for products that can be handled within 10" or less from the front of the toes.



Horizontal Distance Example: Large awkward packaging increases the horizontal distance and compressive forces on the spine.

Control Measure: Request the supplier to reduce the size of the packaging, thus reducing the horizontal distance.



Weight of Object - Weight can be controlled by reducing the weight of the object by reducing the package contents, or the size of the object. Another tactic can be applied, that is, increasing the weight of the object to a point where it is impossible for one person to handle, and mechanical assist becomes essential. Mechanical assists range from simple overhead hoists to hydraulic lift tables and electric powered vacuum lifts. One other solution is to require team lifts. This makes sense when all other approaches are not feasible. It is critical to train the workers involved in this process and to match their physical size and strength appropriately

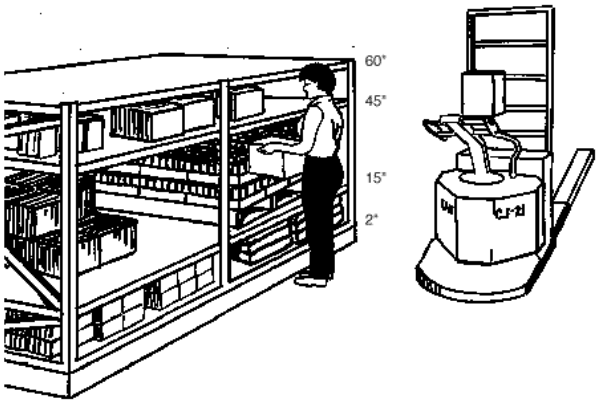
Frequent Handling for Long Periods - The more frequently materials are handled, the greater the chance of worker fatigue, which contributes to the probability of injury. The following are methods to reduce the repetitive nature of jobs:

- Engineer the repetitive process out of the job
- Slow production down
- Increase staff size
- Cross-train employees to perform several jobs
- Eliminate piece-rate and incentive programs
- Reorganize work methods

Vertical Location of Objects - Materials should be stored at heights that allow a majority of the work force to handle objects between mid-thigh and shoulder height. In most cases the design should accommodate the shortest workers. If it is impossible to store most of all materials between mid-thigh and shoulder height, store the heaviest and or most frequently handled materials in this range.

Vertical Lift Example: Employees lift heavy materials (50-80 lbs.) off the floor and lower.

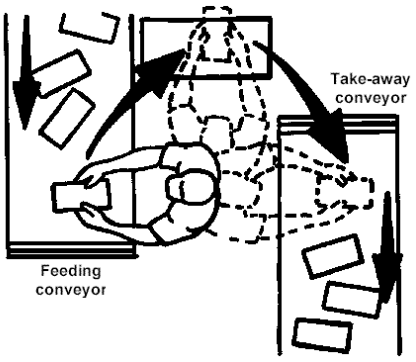
Control: The storage rack was redesigned to place the heaviest materials between 15" - 45", moderately heavy items are placed between 2" - 15", and light materials placed between 45" - 60".



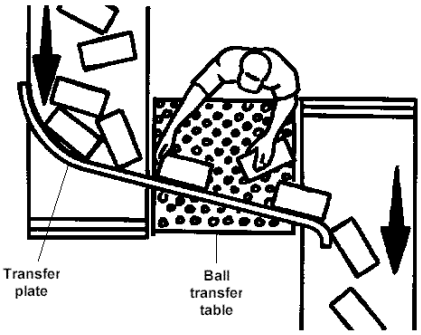
Twisting while Lifting and Bending Forward - Although good training on proper technique may reduce twisting movements in some employees, a well designed layout of storage areas, equipment, and materials will do much more than just telling employees to step and turn before lifting.

Twisting while Lifting and Bending Forward Example: Old design requires lifting and torso twisting.

Control: New design eliminates most twisting, bending and lifting.



Old design

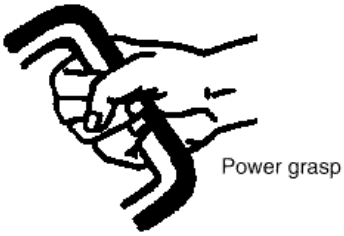


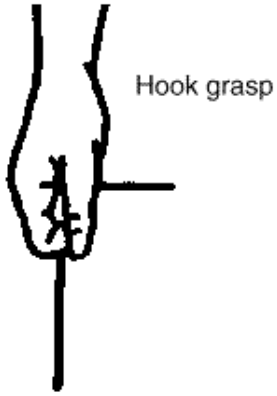
New design

Handholds - By providing handles or handholds on objects to lifted or carried the chance of dropping loads decreases. Also when lifting objects from the floor, less bending is required.

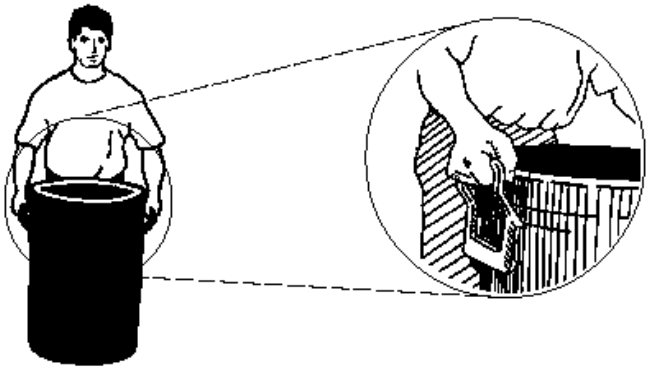
Handhold Guidelines

- Handholds should be designed to accommodate a very large hand.
- Typically, the best design allows for the "power grasp" which is the most powerful grasp.
- The next best design allows for the "hook grasp". This grasp reducing the amount of bending or squatting when lifting from the floor.
- Provide handholds with rounded or curved edges.
- Locate the handholds at or slightly above the center line passing through the center of mass of the object.





Handhold Example: The best design has rounded handles where a "power grasp" can be used while lifting and maneuvering the object.



Health Care Professionals (HCPs) are physicians or other licensed health care professionals whose legally permitted scope of practice (e.g., license, registration ore certification) allows them to provide independently or to be delegated the responsibility to carry out some or all of the medical management of an MSD.

Macroergonomics addresses performance and safety problems by including analysis of the organization's personnel, social, technological, and economical subsystems; that is, it evaluates the larger system as well as the person-machine system for the individual worker.

Work-related means that an exposure in the workplace caused or contributed to an MSD or significantly aggravated a pre-existing MSD.

Work restrictions are limitation, during the recovery period, on an employee's exposure to MSD hazards. Work restrictions may involve limitation on the work activities of the employee's current job (light duty), transfer to temporary alternative duty jobs, or temporary removal from the workplace to recover.

Appendix B: Common MSD's

Upper Extremity Injuries

Carpal Tunnel Syndrome

Compression of the median nerve in the carpal tunnel, which can occur from ongoing swelling (tenosynovitis) of the finger flexor tendons inside the carpal tunnel.
Symptoms: Night pain, numbness/tingling in the median nerve distribution, loss of strength and grip (increased incidence of dropping items).
Cause: Repetitive wrist motion (flexion, extension, ulnar and radial deviation), or sustained pressure over the wrist.

Synovitis

Joint inflammation
Symptoms: The involved joint may be swollen, red, or warm. Movement as well as rest will result in pain and stiffness of the joint.
Cause: Rarely seen without a history of aggravation or injury. Joints that have undergone degenerative changes are more vulnerable to inflammation after overuse or over-stress.

Raynauds Syndrome (White Fingers Syndrome, Vibration White Finger)

Vascular insufficiency of the hands and fingers.
Symptoms: Sensation that the fingers are "dead". Usually the middle finger is most affected, becoming white or bluish, cold and numb.
Cause: Repeated exposure to vibration and cold. Usually associated with power tools.

Tendinitis

Tendnitis and Tenosynovitis are inflammation of the tendon and the synovial membrane of the tendon sheath, respectively. Common sites for these inflammations are:

Rotator Cuff Tendinitis (Shoulder)

Inflammation of the tendon of the supraspinatus muscle and the tendon of the long head of the bicep muscle. This inflammation causes an impingement beneath the coraco-acromial ligament.
Symptoms: Shoulder pain especially with overhead activity, and decreased range of motion. The discomfort may extend into the deltoid muscle.
Cause: Repetitive overhead activities, which lead to swelling and vascular compromise.

Epicondylitis (Elbow)

Lateral epicondylitis is inflammation of the tendons of the finger extensor muscles.
Symptoms: Discomfort that extends from the outside of the elbow into the forearm, and may cause a decrease in grip strength (painful handshake).
Cause: Repetitive or static use of the finger extensor muscles.

Medial epicondylitis is inflammation of the tendons of the finger flexor muscles.
Symptoms: Discomfort that extends from the outside of the elbow into the forearm.
Cause: Repetitive or static use of the finger flexor muscles.

De Quervains Disease (Thumb)

Inflammation of the tendon sheaths of the abductor and extensor muscles of the thumb.
Symptoms: Wrist pain near the dorsal side of the thumb that may radiate up the forearm or into the thumb. Swelling and tenderness to touch may also be present on the dorsal side of the thumb.
Cause: Usually results from repetitive overuse in activities that require simultaneous thumb and wrist movements (i.e., wringing motions of gripping tools in ulnar deviation).

Trigger Finger

Tenosynovitis of the flexor tendon in the fingers. The condition has usually progressed to the stenosis or "triggering"phase by the time the symptoms are noticed.
Symptoms: Abrupt catch during flexion or extension of the finger.
Cause: Repeated gripping action with flexed wrist or using tools with triggers, especially if the handle is too large.

Back Injuries

Muscle Strain

Stretching or tearing of the musculotendinous unit.
Symptoms: Loss of motion, function, or strength due to discomfort (dependent upon severity).
Cause: Overstretching or overstressing muscle, a strength imbalance, or a sudden contraction against resistance.

Muscle Sprain

Stretching or tearing of a ligament.
Symptoms: Localized pain, swelling and instability.
Cause: Abnormal force such as over-stretching, or over-stressing.

Disc Injuries

There are several stages of severity that range from bulging to herniated.
Symptoms: Varying degrees of back pain which may radiate into the extremities.
Cause: Cumulative trauma resulting from ongoing postures of forward flexion.

Sciatica

Compression of the sciatic nerve at the base of the spine or compression of the spinal roots that contribute to the sciatic nerve.
Symptoms: Pain radiating into one or both buttocks and descending the back of the leg, often to you foot. The pain can be sharp or dull, shooting or burning, intermittent or continuous.
Cause: The sciatic nerve may be pinched between vertebrae, or its passageways are narrowed by arthritis or swelling of a sprained ligament in the area, and it becomes irritated and tender. Also a disc may bulge and press on the nerve.

Lower Extremity Injuries

Carpet Layer Knees

Bursitis of the pre-patellar or superficial infrapatellar bursa. Bursitis is inflammation of the bursa.
Symptoms: Discomfort with kneeling, swelling of the knee may be present.
Cause: Prolonged kneeling.

Tarsal Tunnel Syndrome (Ankle/Foot)

Inflammation of the posterior tibial nerve as it courses under the flexor retinaculum, on the medial side of the ankle.
Symptoms: Vague pain in the sole of the foot that is described as a burning or tingling type of pain. Symptoms are often made worse by activity and reduced by rest. There may also be pain to touch along the course of the nerve.
Cause: Excessive pronation of the foot, arthritic problems, trauma, and obesity.

Eye Strain

Computer Vision Syndrome *(OSHA does not consider this condition an MSD.)*

Overexposure to computer monitors or video display terminals (VDT's).

Symptoms: Dry burning eyes, blurred vision, delayed focusing, altered color perception, and headaches.

Cause: Stems from a combination of individual visual problems and poor office ergonomics.

Appendix C: Record Keeping

State of Minnesota
Department of Employee Relations
Employee Insurance Division – Workers Compensation
P.O. Box 64081
St. Paul, MN 55164-0081
(612) 296-6521

First Report of Injury

See Instructions on Reverse Side, Type or Print.
All dates must be entered in MM/DD/YY format.

1. OSHA Case#

EMPLOYEE 2. Name (last, first, middle) | 3. EMPLOYEE SOCIAL SECURITY NO.:

4. Home address (include county and zip) | 5. DATE OF CLAIMED INJURY: | **Do Not Use this Space**

6. Sex: ___ Male ___ Female | 7. Marital Status: ___ Married ___ Not

8. Job Classification Code / Classification Title | 9. Date of Birth ____/____/____ | 10. Date Hired: ____/____/____

11. Dept/Location Code | 12. Home Phone No. (Area Code, No.) | 13. Apprentice: No___ Yes ___

WAGE INFORMATION
14. Average wage/week | 15. Rate per hour: | 16. Hours per days:

17. Days per week: | 18. What is the weekly value of: MEALS: $_____ LODGING: $_____ 2nd INCOME: $_____

19. Employment Status: ☐ Full time ☐ Part time ☐ Seasonal ☐ Volunteer ☐ Other (attach 26 week wage statement for part time or irregularly scheduled employee.)

OCCURRENCE 20. Place of injury
State of Minnesota
Department
Location where injury occurred (Include job site, city, zip)
On employer's premises? ☐ Yes ☐ No

21. Date of first day of lost time:

22. Date employer notified of injury: ____/____/____

23. Return to work date: ____/____/____

24. Date employer notified of lost time: ____/____/____

25. Date of death: ____/____/____

26. Time of day of injury: ☐ AM ☐ PM

27. DESCRIBE NATURE OF INJURY OR ILLNESS IN DETAIL. BE SPECIFIC
Part of body affected | Nature of injury (cut, sprain, burn, etc.)

28. DESCRIBE EMPLOYEE'S ACTIVITIES WHEN INJURY OCCURRED

29. PHYSICIAN (full name, title, address and phone number)

30. HOSPITAL/CLINIC (name and address)

31. Witness and phone number:

EMPLOYER 32. **STATE OF MINNESOTA**
Department
Employer's Street Address
City, State, Zip
36. Print supervisor's name and phone number:

33. Date form completed: ____/____/____

34. Unemploy. ID No.:

35. SIC code

37. Employer's Representative, print full name, title and phone number:

SEND REPORT IMMEDIATELY – DO NOT WAIT FOR DOCTOR'S REPORT CONTAINS ALL ITEMS REQUIRED BY OSHA FORM 101

EMPLOYER STOP HERE – DO NOT USE THIS SPACE

N P S T OCC

INSURANCE 38. CARRIER (name, address and phone number)
State of Minnesota
Dept. of Employee Relations
Employee Insurance Division – Worker's Compensation
P.O. Box 64061
St. Paul, MN 55164

42. CARRIER CLAIM NUMBER

39. Insurer ID No.: **791 0805000**

41. Insurance Class Code:

43. Date insurer received notice:

40. ADJUSTER Name and Address:

44. Adjuster ID No.:

PE-00629-01 (1-93) Copies to: Insurer, Employer, Employee, and Workers' Compensation Division (if no insurer) Printed on Recycled Paper

REPORTING INFORMATION

This form is to be completed by the employee's immediate supervisor. Complete this form in its entirety. All applicable data is required. Use only this form to report an employee's work related accident resulting in an injury or an illness that requires medical treatment or the employee loses time from work. Please type or print legibly. Submission of this report does not imply liability under the Workers's Compensation Law.

A death or serious injury occurring during the course of employment must be reported to the Department of Employee Relations, Employee Insurance Division within 48 hours after it occurs. The death or serious injury may be reported initially by telephone, facsimile or personal notice within the 48 hour period, but then must be followed by the written or electronic report of injury within seven (7) calendar days.

FORM INSTRUCTIONS

Employee Information

Item 1) OSHA Case No.: Leave blank.

Item 2) thru 7) Self-explanatory. Required information on injured employee and the date of claimed injury. If the actual date is unknown due to continuous nature of injury, use date employee became aware there may have been a work-related injury.

Item 8) Employee's classification code (6-digit number) and the employee's classification title. Your agency's personnel office has this information.

Item 9) Date of birth of injured employee.

Item 10) Date employee was hired by the State of Minnesota (not agency).

Item 11) 6-digit code identifying location where injury occurred. Your agency's personnel office has this information.

Item 12) Employee's home phone – need area code/telephone number.

Item 13) Check "Yes" if employee was in an apprenticeship program at the time of claimed injury.

Wage Information

Item 14) To compute the average wage/week, multiply the number of work hours per day by the employee's hourly rate. Then multiply the result by the number of days per week. If the employee does not work the same number of hours each week or received differential or overtime pay in at least half of the 26-week time period preceding the injury, a 26-week wage statement must be attached.

Item 15) Employee's current hourly rate.

Item 16) The number of hours worked per day.

Item 17) The number of days worked per week.

Item 18) Record employee's additional income if appropriate such as second employment wages.

Item 19) Check the appropriate employment status.

Occurrence

Item 20) Place where accident occurred. Check appropriate box to answer whether or not the claimed injury occurred on or off the employer's premises.

Item 21) Fill in the first day the employee lost any time from work, even if you paid the employee for the full day.

Item 22) Be sure to fill in the date you **first** became aware of the injury or illness. This is used to determine whether the form is filed late. You have seven (7) calendar days from the date you became aware of the injury to report to and received by the Department of Employee Relations, Employee Insurance Division, Workers' Compensation Program.

Item 23) If the employee has not returned to work by the time you are filing this form, leave the box blank and call the Workers' Compensation Program when the employee returns to work. If the employee has returned to work, indicate the date on the form. Be sure to notify the Workers' Compensation Program immediately if the injured employee starts missing time due to this injury.

Item 24) Record the date you were notified that the employee lost time from work. This item will be completed by the Department of Employee Relations upon notification by the agency that an employee is losing time after the First Report of Injury had previously been submitted by the agency.

Item 25) A death must be reported to the Department of Employee Relations within 48 hours of an employee's death.

Item 26) Time the injury occurred and check the a.m. or p.m. box.

Item 27) Describe body part (i.e., right hand, left leg, neck, shoulder, etc.) affected or injured and nature of injury such as cut, sprain, or burn.

Item 28) Describe the cause of the accident such as a fall, struck by, or overexertion and name of the object such as a person, vehicle, machine or substance.

Item 29) Physician's name who treated the employee for his/her injury or illness.

Item 30) Name of the hospital or clinic who provided medical treatment to the employee.

Item 31) Name (first and last) of any witness(es) to the accident and the telephone number.

Employer

Item 32) Employee's agency name and address.

Item 33) Date form is completed by the agency.

Item 34) Do not fill in. The Department of Employee Relations will complete this.

Item 35) To be assigned by the Department of Employee Relations.

Item 36) Employee's supervisor's name and telephone number.

Item 37) Agency's representative, title, and telephone number. This should be your agency's director, personnel director, or workers' compensation coordinator.

Insurance

Item 38) thru 44) Do not fill in. The Department of Employee Relations will add this information.

Minnesota Department Of Employee Relations
Office Ergonomics Follow-Up Form

Follow-Up Date: _____ Person Performing Follow-Up: _____

Agency Name: _____

Contact Person/Client: _____

Phone Number Contact/Client: _____

Date of Initial Evaluation: _____

Type of Evaluation (circle one): **agency-wide** **one-on-one**

General Comments: _____

_____

_____

Recommendation and Modifications	Was it Followed	Additional Information
Seating	Yes / No	
Work Surface Furniture	Yes / No	
Keyboard/Mouse Surface	Yes / No	
Monitor	Yes / No	
Additional Accessories	Yes / No	
Job Task Organization	Yes / No	
Employee Responsibilities	Yes / No	
Supervisor/Contact Responsibilities	Yes / No	

Additional Information: _____

_____

_____

Request for additional follow-up (*circle one*): **Yes / No**

Proposed date for follow-up: **1 / 2 / 3** months other: _____

Appendix D: Evaluation Tools

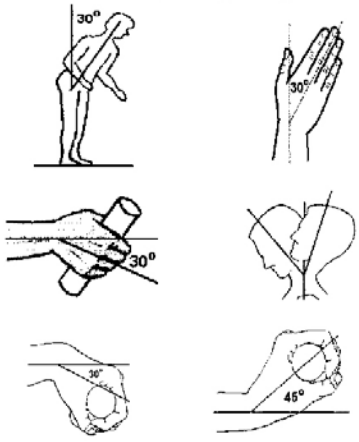
Table W-1 - Basic Screening Tool

You need only review risk factors for those areas of the body affected by the MSD incident.

		Body Part Associated With MSD Incident			
Risk Factors This Standard Covers	**Performing job or tasks that involve:**	Neck/ Shoulder	Hand/ Wrist/ Arm	Back/ Trunk/ Hip	Leg/ knee/ Ankle
Repetition	(1) Repeating the same motions every few seconds or repeating a cycle of motions involving the affected body part more than twice per minute for more than 2 consecutive hours in a workday.	√	√	√	√
	(2) Using an input device, such as a keyboard and/or mouse, in a steady manner for more than 4 hours total in a workday.	√	√		
Force	(3) Lifting more than 75 pounds at any one time; more than 55 pounds more than 10 times per day; or more than 25 pounds below the knees, above the shoulders, or at arms' length more than 25 times per day;	√	√	√	√
	(4) Pushing/pulling with more than 20 pounds of initial force (e.g., equivalent to pushing a 65 pound box across a tile floor or pushing a shopping cart with five 40 pound bags of dog food) for more than 2 hours total per day;	√	√	√	√
	(5) Pinching an unsupported object weighing 2 or more pounds per hand, or use of an equivalent pinching force (e.g., holding a small binder clip open) for more than 2 hours total per day;		√		
	(6) Gripping an unsupported object weighing 10 pounds or more per hand, or use of an equivalent gripping force (e.g., crushing the sides of an aluminum soda can with one hand), for more than 2 hours total per day.		√		

Table W-1 - Basic Screening Tool - continued

You need only review risk factors for those areas of the body affected by the MSD incident.

Risk Factors This Standard Covers	Performing job or tasks that involve:	Body Part Associated With MSD Incident: Neck/ Shoulder	Hand/ Wrist/ Arm	Back/ Trunk/ Hip	Leg/ knee/ Ankle
Awkward Postures	(7) Repeatedly raising or working with the hand(s) above the head or the elbow(s) above the shoulder(s) for more than 2 hours total per day;	√	√	√	
	(8) Kneeling or squatting for more than 2 hours total per day;			√	√
	(9) Working with the back, neck or wrists bent or twisted for more than 2 hours total per day (see figures:) 	√	√	√	
Contact Stress	(10) Using the hand or knee as a hammer more than 10 times per hour for more than 2 hours total per day;		√		√
Vibration	(11) Using vibrating tools or equipment that typically have high vibration levels (such as chainsaws, jack hammers, percussive tools, riveting or chipping hammers) for more than 30 minutes total per day;	√	√	√	
	(12) Using tools or equipment that typically have moderate vibration levels (such as jig saws, grinders, or sanders) for more than 2 hours total per day.	√	√		

Ergonomics Survey

Minnesota Department of Employee Relations Safety and Industrial Hygiene Unit

The purpose of this survey is to provide you an opportunity to tell us about your computer work and related comfort and productivity issues, which are components of ergonomics. To achieve our goal or providing you better Office Ergonomics assistance, it is very important that you complete the survey. We need and value your feedback.

Date**:** _____
Agency: _____ Age:_____ Sex: ☐ Female ☐ Male

1. Check the job category that most closely matches your present job.
☐ Technical ☐ Supervisor/Manager
☐ Office Administrative ☐ Other (write in)_____

2 How many years have you been working in this type of position? _____
3. How long have you been employed by the State of Minnesota? _____

4. On average, how many hours a day do you use the computer at work?
☐ 0-less than 2 hrs ☐ 2-to less than 4 hrs ☐ 4-to less than 6 hrs ☐ 6-to less than 8 hrs

5. On average, how many hours a day do you use the computer at home?
☐ 0-less than 2 hrs ☐ 2-to less than 4 hrs ☐ 4-less than 6 hrs ☐ 6-less than 8 hrs

6. On average, how many hours a day do you spend sitting at work?
☐ 0-less than 2 hrs ☐ 2-less than 4 hrs ☐ 4-less than 6 hrs ☐ 6-less than 8 hrs

7. On the average how much time do you spend each day performing the following tasks?

	0-less than 2 hrs	2-less than 4 hrs	4-less than 6 hrs	6-less than 8 hrs
A. Keying/Mousing	☐	☐	☐	☐
B. Telephone use	☐	☐	☐	☐
C. Handwriting	☐	☐	☐	☐
D. Meetings	☐	☐	☐	☐
E. Office machines (e.g. copier, fax)	☐	☐	☐	☐
F. Filing	☐	☐	☐	☐

8. Please check the following categories as they relate to your work station or office.

	Satisfied	Neutral	Dissatisfied
A. Work surface area	☐	☐	☐
B. Work surface height	☐	☐	☐
C. Storage space	☐	☐	☐
D. Privacy	☐	☐	☐
E. Chair	☐	☐	☐
F. Air Quality	☐	☐	☐
G. Lighting	☐	☐	☐
H. Monitor Glare	☐	☐	☐
I. Noise	☐	☐	☐

9. Is it easy for you to obtain necessary ergonomic accessories (i.e. document holder, footrest, wrist rest) from within your agency?
☐ Yes ☐ No

10. Do you know how to request an ergonomics evaluation of your workstation?
☐ Yes ☐ No

(Ergonomics Survey continued)

11. Have you ever made changes to your workstation or work habits based upon ergonomics training?
☐ Yes ☐ No

12. In the past three months, have you experienced discomfort while performing your job or discomfort you feel resulted from your job?
☐ Yes ☐ No If yes, please answer question 12 A-C. If no skip to question 14

A. Are you receiving treatment from a health care professional for your discomfort?
☐ Yes ☐ No
B. Have you made changes to your workstation and/or work habits necessary to address your discomfort?
☐ Yes ☐ No
C. Do you have a current workers' compensation claim, or documented disability for this discomfort?
☐ Yes ☐ No

13. In the past three months indicate your work-related discomfort level. Frequency indicates how often your discomfort occurs. Productivity indicates how often your discomfort interferes with you being able to perform your job. Severity indicates how intense your discomfort is. Each category has a five point scale as indicated in the key below.

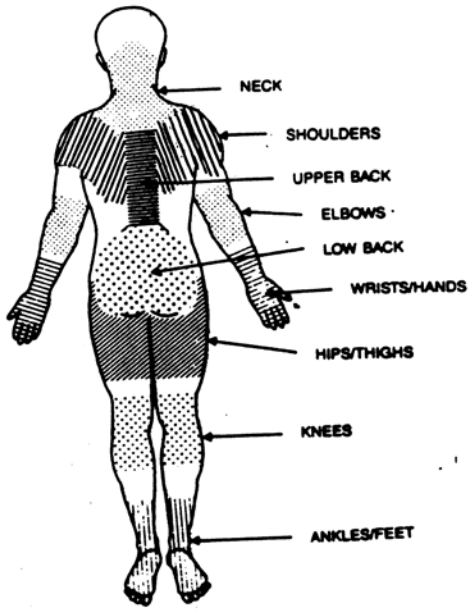
Key

Frequency:	Never = 1	Quarterly = 2	Monthly = 3	Weekly = 4	Daily = 5
Productivity:	Never = 1	Quarterly = 2	Monthly = 3	Weekly = 4	Daily = 5
Severity	No Pain = 1	Minimal = 2	Noticeable = 3	Significant = 4	Excruciating = 5

For statistical reasons please mark every category.

	Frequency	Productivity	Severity
A. Headache	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
B. Eyestrain/Vision	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
C. Neck	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
D. Shoulders	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
E. Elbows	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
F. Wrists/Hands	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
G. Upper Back	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
H. Low Back	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
I. Hips/Thighs	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
J. Knees	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
K. Ankles/Feet	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

In the picture on right you can see the approximate position of the parts of the body referred to in the questionnaire. Limits are not sharply defined, and certain parts overlap. You should decide for yourself in which part you have had your discomfort (if any).



Tray 4–A. Symptoms Survey Form

Symptoms Survey: *Ergonomics Program*

Date _____ _____ _____

_____ _____ Job Name _____

Plant Dept #

_____ _____ _____ years _____ months

Shift Hours worked/week Time on THIS Job

Other jobs you have done in the last year (for more than 2 weeks)

_____ _____ _____ _____ months _____ weeks

Plant Dept # Job Name Time on THIS Job

_____ _____ _____ _____ months _____ weeks

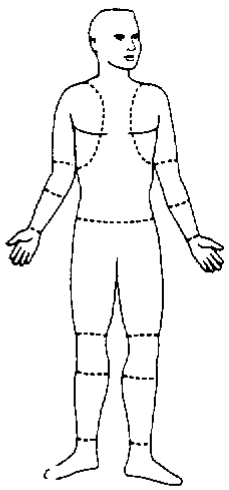
Plant Dept # Job Name Time on THIS Job

(If more than 2 jobs, include those you worked on the most)

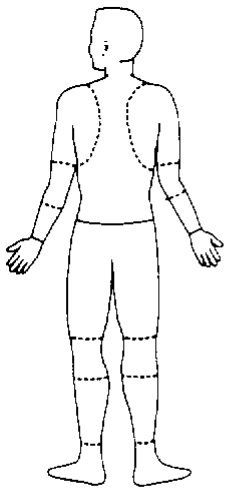
Have you had any pain or discomfort during the last year?

__ Yes __ No (If NO, stop here)

If YES, carefully shade in area of the drawing which bothers you the MOST.



Front



Back

(Continued)

Tray 4–A (Continued).

(Complete a separate page for each area that bothers you)

Check Area: ☐ Neck ☐ Shoulder ☐ Elbow/Forearm ☐ Hand/Wrist ☐ Fingers
☐ Upper Back ☐ Low Back ☐ Thigh/Knee ☐ Low Leg ☐ Ankle/Foot

1 Please put a check by the words(s) that best describe your problem

☐ Aching	☐ Numbness (asleep)	☐ Tingling
☐ Burning	☐ Pain	☐ Weakness
☐ Cramping	☐ Swelling	☐ Other
☐ Loss of Color	☐ Stiffness	

2 When did you first notice the problem?_____ (month)_____ (year)

3. How long does each episode last? (Mark an X along the line)

1 hour 1 day 1 week 1 month 6 months

4 How many separate episodes have you had in the last year?_____

5 What do you think caused the problem?_____

6 Have you had this problem in the last 7 days? ☐ Yes ☐ No

7. How would you rate this problem? (mark an X on the line)

NOW

None Unbearable

When it is the WORST

None Unbearable

8. Have you had medical treatment for this problem? ☐ Yes ☐ No

8a. If NO, why not?_____

8a. If YES, where did you receive treatment?

☐ 1. Company Medical Times in past year _____

☐ 2. Personal doctor Times in past year _____

☐ 3. Other Times in past year _____

Did treatment help? ☐ Yes ☐ No _____

9. How much time have you lost in the last year because of this problem?____ days

10 How many days in the last year were you on restricted or light duty because of this problem?
days

11. Please comment on what you think would improve your symptoms

_____

_____

_____

Department of Employee Relations
VDT Workstation Evaluation

Employee Interview

Evaluation Date _____ Evaluator _____

Employee _____ Concern _____

In your current work environment, what works well? _____

_____

In your current work environment, what does not work well? _____

_____

If you have discomfort, what specific task or tasks contribute to your discomfort? _____

_____

Are there any non work related activities that contribute to your discomfort? _____

_____

_____

Daily Job Tasks as Described By Employee:
In an eight hour day, describe how you spend your time. This will help determine the appropriate space requirements. Please circle all that apply.

1. **Computer use _____ hours**
   - Describe your computer use.
     Data Processing CAD/Design
     Other_____
     E-mail Research

     _____
   - Keyboard use _____ hours (Position all input devices at or slightly lower than elbow height.)
     Continuous or intermittent keystrokes
     Single or multiple keyboards _____#

     _____
   - Mouse use _____ hours (Position all input devices at or slightly lower than elbow height.)
     Single mouse
     Multiple mouse _____#

     _____
   - Monitor size 15inch / 17inch / 21inch / flat screen (Position the monitor directly in front of the user at eye level and 25-36" away from the eyes. Position the monitor perpendicular to windows.)
     Continuous or intermittent viewing Single monitor
     Multiple monitor _____# Monitor size _____

     _____

Employee_____

2. **Telephone use _____ hours**
   Long conversations (>5 min) Short conversations (<5 min)
   Combined with computer use, writing, or information retrieval

   _____

3. **Writing on hard copy _____ hours**
   Combined with telephone use/computer use
   - Describe a typical document _____

4. **Reading from a hard copy _____ hours**
   Combined with computer use Document holder needed
   - Describe a typical document _____

5. **Alternate Tasks**
   Attending meetings _____ hours Office machines_____ hours
   Filing _____ hours Other_____ hours

   _____

6. **Material handling** 0-10lbs._____ 11-25lbs._____ over 25 lbs._____
   - Describe frequency: rarely occasionally frequently constantly
   - Describe materials _____

7. **Sitting _____ hours Standing _____ hours Walking _____ hours**
   - Is there a need or a desire to perform some job tasks in a standing position? Yes / No
   - Please describe _____

Employee Specific Measurements
Work surface height is determined by the seated elbow height of the end user. Pre-measuring the end user's elbow height will allow you to determine the correct height for the keyboard/mouse and reading/writing work surface.

Measurements
Seated elbow height _____ inches
Recommended height for the keyboard/mouse surface _____ inches
(At seated elbow height)
Recommended height for reading and writing work surface _____ inches
(2 inches higher than seated elbow height)

Minnesota Department of Employee Relations
VDT Workstation Evaluations

Posture Evaluation

Evaluation Date _____

Employee Name _____

Back, Legs, and Feet

Questions	Yes	No	Recommendations
1. Does the chair have the following features?			
a) pneumatic height adjustment	☐	☐	
b) adjustable arms (vertically and horizontally)	☐	☐	
c) adjustable backrest (vertically and horizontally)	☐	☐	
d) 5 star base with casters	☐	☐	
e) padded seatpan with a waterfall edge	☐	☐	
2. Does the user know how to adjust their chair?	☐	☐	
3. When seated, the hips are slightly above knees, with feet firmly positioned on the floor or on a footrest?	☐	☐	
4. Is there 1-3 inches between the edge of the seat and the back of the knees?	☐	☐	
5. The lumbar support is positioned significantly below beltline?	☐	☐	
6. There is ample thigh, leg, and foot clearance?	☐	☐	

Posture Evaluation

Arms, Wrists and Hands

Questions	Yes	No	Recommendations
1. The keyboard/mouse surface is adjustable?	☐	☐	
2. The keyboard and mouse are positioned at or slightly lower than elbow height?	☐	☐	
3. Wrists are in a neutral/straight position while keying and/or mousing?	☐	☐	
4. Fingers are in a neutral position while keying and/or mousing?	☐	☐	
5. Wrists are held off worksurface or wristrest while keying or mousing?	☐	☐	
6. Elbows are relaxed by side while keying and/or mousing?	☐	☐	
7. Shoulders are relaxed while performing work tasks (keying , mousing, writing, reading)?	☐	☐	
8. The arms of the chair are adjusted to allow for relaxed shoulders?	☐	☐	
9. Keying force is low?	☐	☐	
10. Tools and equipment frequently used are within one arms reach and below shoulder height?	☐	☐	

Posture Evaluation

Evaluation Date _____

Employee Name _____

Arms, Wrists and Hands (continued)

Questions	Yes	No	Recommendations
11. Writing tools are held with a light grip?	☐	☐	
12. Palm, wrist, or forearm is not resting on sharp edge of worksurface while keying, mousing, or writing?	☐	☐	

Head, Neck, and Eyes

Questions	Yes	No	Recommendations
1. Head and neck are positioned in a neutral posture while viewing VDT.	☐	☐	
2. Top 1/4 of the VDT is positioned at or slightly lower than eye level? (If bifocals are used to view VDT, the top 1/4 of the VDT is significantly below eye level.)	☐	☐	
3. VDT is positioned directly in front of keyboard & user?	☐	☐	
4. VDT is clean and free of flicker?	☐	☐	
5. VDT is positioned 25 to 36 inches from users eyes?	☐	☐	
6. VDT is free of glare?	☐	☐	

Posture Evaluation

Head, Neck, and Eyes (continued)

Questions	Yes	No	Recommendations
7. VDT is positioned perpendicular to outside light source?	☐	☐	
8. Brightness and contrast are adjusted appropriately?	☐	☐	
9. Display colors are appropriate?	☐	☐	
10. Light levels are appropriate for tasks?	☐	☐	
11. Document holder is appropriate for tasks?	☐	☐	
12. Hard copies are properly positioned and illuminated?	☐	☐	
13. Headset or speaker phone used if task appropriate?	☐	☐	
14. Eye exam in the last 1-2 years?	☐	☐	
15. Special eye correction used?			
a) bifocals	☐	☐	
b) trifocals	☐	☐	
c) computer vision correction	☐	☐	
16. Opportunity to rest eyes every 30 minutes?	☐	☐	

Posture Evaluation

Evaluation Date _____

Employee Name _____

Job Task Organization

Questions	Yes	No	Recommendations
1. Job tasks can be rotated throughout day?	☐	☐	
2. Stretching incorporated into daily routine?	☐	☐	
3. Breaks are utilized?	☐	☐	
4. Work space appropriate for tasks?	☐	☐	
5. Ample storage is available?	☐	☐	

Comments:_____
_____
_____

Minnesota Department of Employee Relations
VDT Workstation Evaluation

Summary of Recommendation and Modifications

Evaluation Date _____ Evaluator _____

Employee Name _____ Employee Phone # _____

Supervisor /Contact Name _____ Supervisor/Contact Phone # _____

Agency _____ Concern _____

RECOMMENDATIONS AND MODIFICATIONS:

Seating:
☐ Chair adjusted ☐ Alternate seating recommended ☐ Request 2 week trial
Suggestions: _____
_____

Work surface/Furniture: (primary work surface)
☐ No adjustment required ☐ Bi-level computer table_____
☐ Adjust reading/writing surface height to _____" ☐ Additional storage_____
☐ Adjust keyboard/mouse surface height to _____" ☐ Align computer and keyboard
☐ Relocate equipment _____
Suggestions: _____
_____

Keyboard/Mouse Surface: (other than primary work surface)
☐ Adjust platform height to _____" ☐ Design to accommodate keyboard/mouse ☐ Articulated mechanism
Suggestions: _____
_____

Monitor:
☐ Adjust viewing distance to: 25"- 36"- 48" ☐ Modify light level _____
☐ Adjust height to: Top 1/4 / lower than eye level ☐ Use window treatments
☐ Increase refresh rate to 70/75/80 Hz ☐ Anti-glare shield
Suggestions: _____

Additional Accessories Needed:

Footrest: ☐ _____#
Suggestions: _____

Document Holder: ☐ work surface (typing stand style) ☐ attach to monitor
☐ writing/reading slope
Suggestions: _____

Employee Name_____

Wrist Rest: ☐ keyboard only ☐ mouse only
☐ keyboard and mouse ☐ calculator
Suggestions _____

Telephone: ☐ longer cord ☐ relocate on desk_____
☐ speaker phone ☐ headset
Suggestions: _____

Writing Tools: ☐ large grip pen/pencil
Suggestions: _____

Alternative Input Device:
☐ split keyboard with mouse ☐ Microsoft split
☐ trackball ☐ glide point
☐ alternate split keyboard
Suggestions: _____

JOB TASK ORGANIZATION:
☐ rotate job tasks at least 1x / hour ☐ job task enlargement
☐ utilize breaks ☐ decrease excess material

EMPLOYEE RESPONSIBILITIES:
☐ orient self to seating/furniture adjustment features ☐ rotate job tasks
☐ incorporate stretching into daily routine w/o task interruption ☐ alter postures on keyboard/mouse
☐ stand and walk more frequently ☐ consult eye doctor
☐ rearrange work area to reduce reaching ☐ follow work restrictions (MD)

SUPERVISOR/CONTACT RESPONSIBILITIES:
☐ decide and inform employee regarding equipment recommendations
☐ encourage employee to alter work habits as described
☐ discuss and implement job task enlargement options if available
☐ address employee work restrictions (MD)

Comments: _____
_____
_____

If you would like more information about ergonomics, please visit the Department of Employee Relations Safety and Industrial Hygiene website at www.doer.state.mn.us/ei-safih/ergo.htm.

[Regulatory Text]

Appendix D-2 to §1910.900: VDT Workstation Checklist

Using this checklist is one, but not the only, way an employer can comply with the requirement to identify, analyze and control MSD hazards in VDT tasks. This checklist does not require that employees assume specific working postures in order for the employer to be in compliance. Rather, employers will be judged to be in compliance with paragraph (k) and (m) of OSHA's standard if they provide the employee with a VDT workstation is arranged or designed in a way that would pass this checklist.

If employee exposure does not meet the levels indicated by the Basic Screening Tool, you may STOP HERE.

WORKING CONDITIONS **The workstation is designed or arranged for doing VDT tasks so it allows the employee's . . .**	**Y**	**N**
A. Head and **neck** to be about upright (not bent down/back).		
B. Head, neck and **trunk** to face forward (not twisted).		
C. Trunk to be about perpendicular to floor (not leaning forward/backward).		
D. Shoulders and **upper arms** to be about perpendicular to floor (not stretched forward) and relaxed (not elevated).		
E. Upper arms and **elbows** to be close to body (not extended outward).		
F. Forearms, wrists, and **hands** to be straight and parallel to floor (not pointing up/down).		
G. Wrists and **hands** to be straight (not bent up/down or sideways toward little finger).		
H. Thighs to be about parallel to floor and **lower legs** to be about perpendicular to floor.		
I. Feet to rest flat on floor or be supported by a stable footrest.		
J. VDT tasks to be organized in a way that allows employee to vary VDT tasks with other work activities, or to take micro-breaks or recovery pauses while at the VDT workstation.		
SEATING **The chair . . .**	**Y**	**N**
1. Backrest provides support for employee's lower back (lumbar area).		
2. Seat width and **depth** accommodate specific employee (seatpan not too big/small).		
3. Seat front does not press against the back of employee's knees and lower legs (seatpan not too long).		
4. Seat has cushioning and is rounded/ has "waterfall" front (no sharp edge).		
5. Armrests support both forearms while employee performs VDT tasks and do not interfere with movement.		
KEYBOARD/INPUT DEVICE	**Y**	**N**

The keyboard/input device is designed or arranged for doing VDT tasks so that . . .		
6. Keyboard/input device platform(s) is stable and large enough to hold keyboard and input device.		
7. Input device (mouse or trackball) is located right next to keyboard so it can be operated without reaching.		
8. Input device is easy to activate and shape/size fits hand of specific employee (not too big/small).		
9. Wrists and **hands** do not rest on sharp or hard edge.		
MONITOR The monitor is designed or arranged for VDT tasks so that . . .	**Y**	**N**
10. Top line of screen is at or below eye level so employee is able to read it without bending head or neck down/back. (For employees with bifocals/trifocals, see next item.)		
11. Employee with bifocals/trifocals is able to read screen without bending head or neck backward.		
12. Monitor distance allows employee to read screen without leaning head, neck or trunk forward/backward.		
13. Monitor position is directly in front of employee so employee does not have to twist head or neck.		
14. No glare (e.g., from windows, lights) is present on the screen which might cause employee to assume an awkward posture to read screen.		
WORK AREA The work area is designed or arranged for doing VDT tasks so that . . .	**Y**	**N**
15. Thighs have clearance space between chair and VDT table/keyboard platform (thighs not trapped).		
16. Legs and **feet** have clearance space under VDT table so employee is able to get close enough to keyboard/input device.		
ACCESSORIES	**Y**	**N**
17. Document holder, if provided, is stable and large enough to hold documents that are used.		
18. Document holder, if provided, is placed at about the same height and distance as monitor screen so there is little head movement when employee looks from document to screen.		
19. Wrist rest, if provided, is padded and free of sharp and square edges.		
20. Wrist rest, if provided, allows employee to keep forearms, wrists and hands straight and parallel to ground when using keyboard/input device.		
21. Telephone can be used with head upright (not bent) and shoulders relaxed (not elevated) if employee does VDT tasks at the same time.		
GENERAL	**Y**	**N**
22. Workstation and equipment have sufficient adjustability so that the employee is able to be in a safe working posture and to make occasional changes in posture while performing VDT tasks.		
23. VDT Workstation, equipment and accessories are maintained in serviceable condition and function properly.		
PASSING SCORE = "YES" answer on all "working postures" items (A-J) and no more than two "NO" answers on remainder of checklist (1-23).		

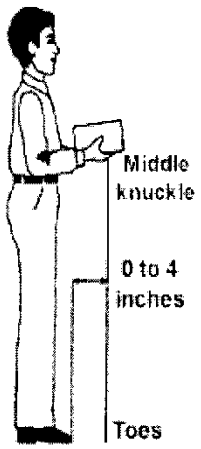
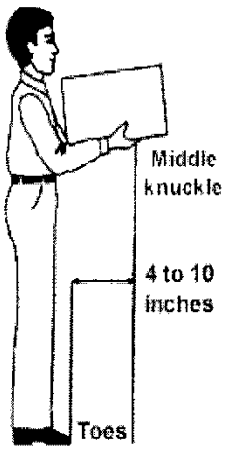
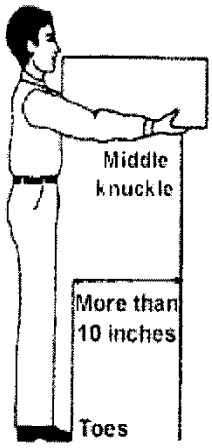
Lifting Hazard Assessment Worksheet

(To be used when manually handling 10 pounds or more)

STEP 1:

Determine if the lift is Near, Middle or Far (body to hands)

- *Use an average horizontal distance if lift is made every 10 minutes or less.*
- *Use the largest horizontal distance if more than 10 minutes pass between lifts.*

NEAR LIFT	MIDDLE LIFT	FAR LIFT
		

STEP 2:

Find the Lifting Zone and estimate the weight lifted (pounds)

- *Use an average weight if a lift is made every 10 minutes or less.*
- *Use the heaviest weight if more than 10 minutes pass between lifts.*
- *Enter 0 in the total score if the weight is less than 10 pounds.*

	NEAR LIFT	MIDDLE LIFT	FAR LIFT
DANGER ZONE	More than 51 lbs 5 points*	More than 35 lbs 6 points	More than 28 lbs 6 points
CAUTION ZONE	17 to 51 lbs 3 points	12 to 35 lbs 3 points	10 to 28 lbs 3 points
SAFE ZONE	Less than 17 lbs 0 points	Less than 12 lbs 0 points	Less than 10 lbs 0 points

* If lifts are performed more than 15 times per shift, use 6 points. **IF 0, STOP HERE**

STEP 2 SCORE (enter 0, 3, 5 or 6):

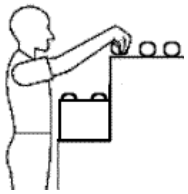
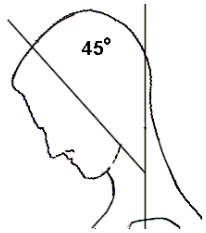
Resource: Washington State

STEP 3: Determine the points for other risk factors • *Use occasional lifts if more than 10 minutes pass between lifts* • *Use the more than 1 hour points if the risk factor occurs with most lifts and lifting is performed for more than 1 hour*	Factor	Occasional Lifts Performed For 1 Hour or Less in Total Per Shift	Lifts Performed for More Than 1 Hour in Total Per Shift	
	Twist torso during lift	1	1	
	Lift one-handed	1	2	
	Lift unstable loads (people, liquids, or loads that shift around or have unequal weight distribution)	1	2	
	Lift between 1 to 5 times per minute	1	1	
	Lift more than 5 times per minute	2	3	
	Lift above the shoulder	1	2	
	Lift below the knuckle	1	2	
	Carry objects 10 to 30 feet	1	2	
	Carry objects farther than 30 feet	2	3	
	Lift while seated or kneeling	1	2	
			STEP 3 SCORE):	
			TOTAL SCORE (Add scores from steps 2 and 3)	

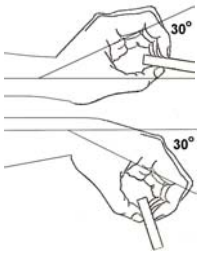
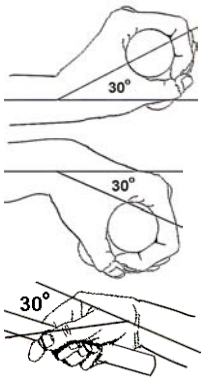
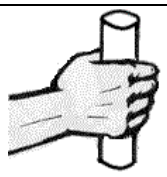
Resource: Washington State

Washington State Appendix B

For each "caution zone job" find any physical risk factors that apply. Reading across the page, determine if all of the conditions are present in the job. If they are, a WMSD hazard exists and must be reduced (see WAC 296-62-05130(4), specific performance approach).

Awkward Postures				
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	Check (✓) here if this is a WMSD hazard
Shoulders	Holding the hand(s) above the head or the elbow(s) above the shoulder(s)	More than 4 hours total per workday		❑
	Repetitively raising the hand(s) above the head or the elbow(s) above the shoulder(s) more than once per minute	More than 4 hours total per workday		❑
Neck	Bending the neck, without added support, 45º or more	More than 4 hours total per workday		❑
Back	Bending the back forward to work, without added support, more than 30º	More than 4 hours total per workday		❑
	Bending the back forward to work, without added support, more than 45º	More than 2 hours total per workday		❑

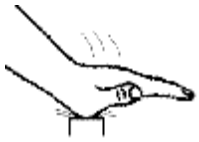
Awkward Postures (continued)				Check (✓) here if this is a WMSD hazard
Body Part	**Physical Risk Factor**	**Duration**	**Visual Aid**	
Knees	Squatting	More than 4 hours total per workday		❑
	Kneeling on hard surfaces	More than 2 hours total per workday		❑
	Kneel on soft or padded surfaces	More than 4 hours total per workday		❑

High Hand Force					
Body Part	**Physical Risk Factor**	**Combined with**	**Duration**	**Visual Aid**	Check (✓) here if this is a WMSD hazard
Arms, wrists, hands	Pinching an object(s) weighing more than 2 lbs. per hand	Highly repetitive motions	More than 3 hours total per workday		❑
		Wrists bent 30° or more	More than 3 hours total per workday		❑
		No other risk factors	More than 4 hours total per workday		❑
Arms, wrists, hands	Gripping an object(s) weighing more than 6 lbs. per hand	Highly repetitive motions	More than 3 hours total per workday		❑
		Wrists bent 30° or more	More than 3 hours total per workday		❑
		No other risk factors	More than 4 hours total per workday		❑

Highly Repetitive Motions

Body Part	Physical Risk Factor	Combined with	Duration	Check (✓) here if this is a WMSD hazard
Neck, shoulders, elbows, wrists, hands	Using the same motion with little or no variation every few seconds (excluding keying activities)	No other risk factors	More than 6 hours total per workday	❑
	Using the same motion with little or no variation every few seconds (excluding keying activities)	Wrists bent 30° or more **AND** High, forceful exertions with the hand(s)	More than 2 hours total per workday	❑
	Intensive keying (for example, data entry)	Awkward postures	More than 4 hours total per workday	❑
		No other risk factors	More than 7 hours total per workday	❑

Repeated Impact

Body Part	Physical Risk Factor	Duration	Visual Aid	Check (✓) here if this is a WMSD hazard
Hands	Using the hand as a hammer more than once per minute	More than 2 hours total per workday		❑
Knees	Using the knee as a hammer more than once per minute	More than 2 hours total per workday		❑

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

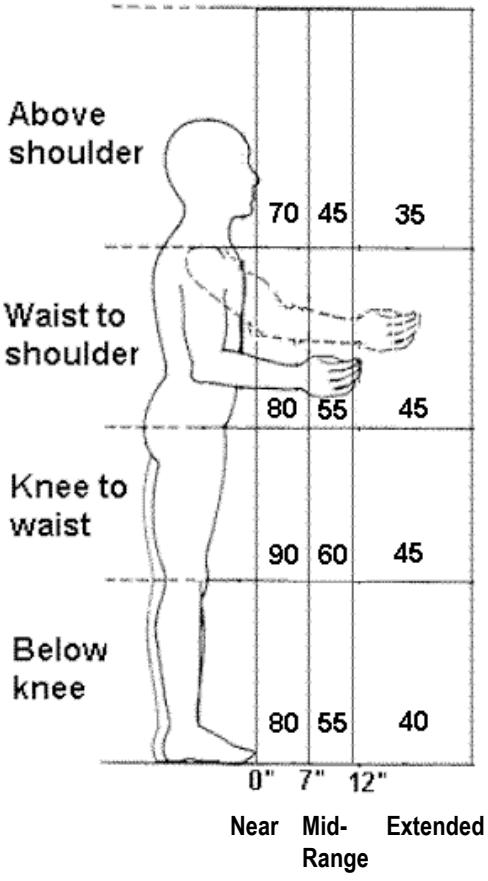
Heavy, Frequent or Awkward Lifting

Step 1 **Find out the actual weight of objects that the employee lifts.**

Actual Weight = _____ lbs.

This analysis only pertains if you have "caution zone jobs" where employees lift 10 lbs. or more (see WAC 296-62-05105, Heavy, Frequent, or Awkward lifting) and you have chosen the specific performance approach.

Step 2 **Determine the Unadjusted Weight Limit.** Where are the employee's hands at the beginning of the lift? Mark that spot on the diagram below. The number in that box is the Unadjusted Weight Limit in pounds.



Unadjusted Weight Limit: _____ lbs.

Step 3 **Find the Percentage Modifier.** Find out how many times the employee lifts per minute and the total number of hours per workday spent lifting. Use this information to look up the Percentage Modifier in the table below.

How many lifts per minute?	For how many hours per workday?		
	1 hr or less	1 hr to 2 hrs	2 hrs or more
1 lift every 5 mins	100%	95%	85%
1 lift every min	95%	90%	75%
2-3 lifts every min	90%	85%	65%
4-5 lifts every min	85%	70%	45%
6-7 lifts every min	75%	50%	25%
8-9 lifts every min	60%	35%	15%
10+ lifts every min	30%	20%	0%

Note: For lifting done less than once every five minutes, use 100%

Percentage Modifier: _____%

Step 4 **Calculate the Weight Limit.** Start by copying the Unadjusted Weight Limit from Step 2.

Unadjusted Weight Limit: _____ lbs.

If the employee twists more than 45 degrees while lifting, subtract 10 pounds from the Unadjusted Weight Limit. Otherwise subtract 0.

Twisting Adjustment: – _____ lbs.

Adjusted Weight Limit: = _____ lbs.

Multiply the Adjusted Weight Limit by the Percentage Modifier from Step 3 to get the Weight Limit. **X**

Percentage Modifier: _____ %

Weight Limit: = _____ lbs.

Step 5 **Is this a hazard? Compare the Weight Limit calculated in Step 4 with the Actual Weight lifted from Step 1. If the Actual Weight lifted is greater than the Weight Limit calculated, then the lifting is a WMSD hazard and must be controlled.**

Note: If the job involves lifts of objects with a number of different weights and/or from a number of different locations, use Steps 1 through 5 above to:
1. Analyze the two worst case lifts -- the heaviest object lifted and the lift done in the most awkward posture.
2. Analyze the most commonly performed lift. In Step 3, use the frequency and duration for all of the lifting done in a typical workday.

WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

Vibration

Use the instructions below to determine if a vibration hazard exists.

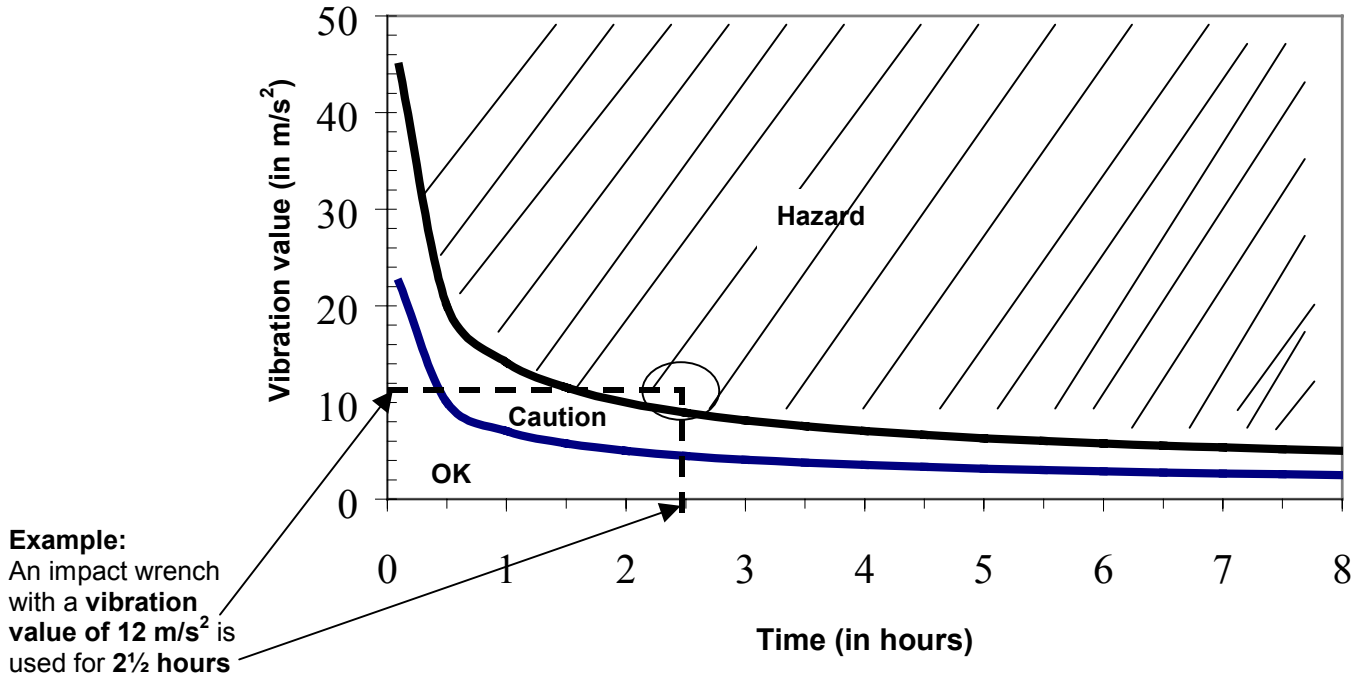
Step 1. Find the vibration value for the tool. (Get it from the manufacturer, look it up at this website: http://umetech.niwl.se/vibration/HAVHome.html, or you may measure the vibration yourself). The vibration value will be in units of meters per second squared (m/s^2). On the graph below find the point on the left side that is equal to the vibration value.

Note: You can also link to this website through the L&I WISHA Services Ergonomics website: http://www.lni.wa.gov/wisha/ergo

Step 2. Find out how many total hours per workday the employee is using the tool and find that point on the bottom of the graph.

Step 3. Trace a line in from each of these two points until they cross.

Step 4. If that point lies in the cross-hatched "Hazard" area above the upper curve, then the vibration hazard must be controlled. If the point lies between the two curves in the "Caution" area, then the job remains as a "Caution Zone Job." If it falls in the "OK" area below the bottom curve, then no further steps are required.



Example:
An impact wrench with a **vibration value of 12 m/s²** is used for **2½ hours** total per day. The exposure level is in the Hazard area. The vibration must be controlled.

Note: The caution limit curve (bottom) is based on an 8-hour energy-equivalent frequency-weighted acceleration value of 2.5 m/s^2. The hazard limit curve (top) is based on an 8-hour energy-equivalent frequency- weighted acceleration value of 5 m/s^2.

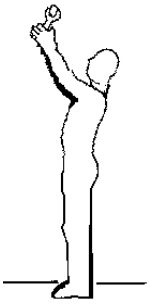
WAC 296-62-05174 Appendix B: Criteria for analyzing and reducing WMSD hazards for employers who choose the Specific Performance Approach.

WAC 296-62-05172 Appendix A: Illustrations of physical risk factors

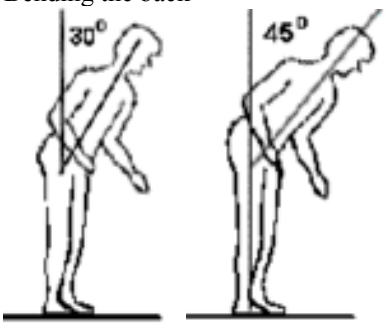
The following illustrations are provided as reference only. Some users of this rule may find the pictures aid their understanding of the text in WAC 296-62-05105.

Awkward Postures

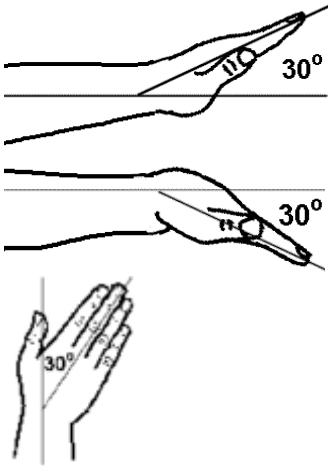
Raising the hands above the head



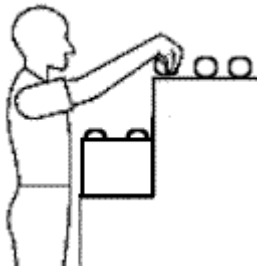
Bending the back



Bending the wrist

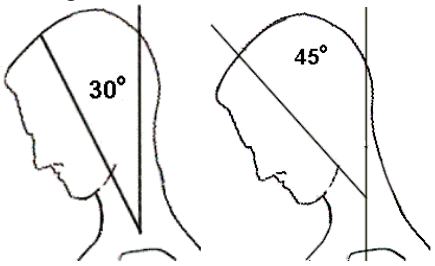


Raising the elbows above the shoulders

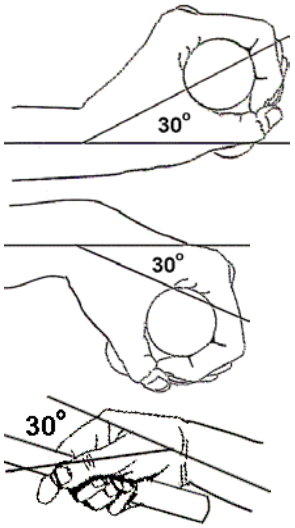


Squatting

Bending the neck

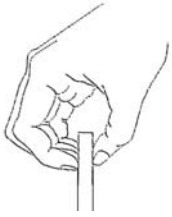


Kneeling

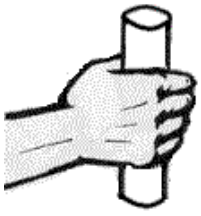


High Hand Force

Pinching 2 lbs.

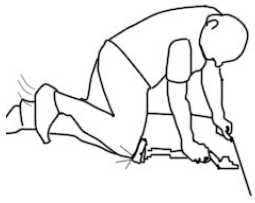


Grasping 6 lbs.



Repeated Impacts

Using the knee as a hammer



Using the hand as a hammer

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