



Forms

Contact List

SBMS Instructions

Help Desk

Find Subject Areas:

Index

Categories

Alpha

Show Side Menu

Search Subject Areas & Legacy Documents:

Contents: Ergonomics, Occupational

Effective Date: July 2003

Point of Contact: [Ergonomics Subject Matter Expert](#)

Section

Overview of Content (see section for full process)

[Introduction](#)

[1. Identifying the Need for Ergonomic Evaluations in Existing Processes](#)

- ⌘ Notify Line Manager, ESH Coordinator, or Facility Support Representative of work activity that creates ergonomic stress or causes ergonomic injury.
- ⌘ Report symptoms to Supervisor, obtain medical attention, and a formal workplace evaluation.
- ⌘ Identify ergonomic risks and obtain formal ergonomic review.
- ⌘ Reviewer initiates recommendations and corrective actions.

[2. Assessing Office Activities](#)

- ⌘ Request formal evaluation when changes to workstation are planned.
- ⌘ Conduct formal evaluation of task(s).
- ⌘ Make changes based on results of evaluation.
- ⌘ Determine if changes were effective or if further improvements are needed.

[3. Assessing Industrial Activities](#)

- ⌘ Identify ergonomic risk factors in significant hazard tasks.
- ⌘ Conduct a formal ergonomic evaluation of the task(s).
- ⌘ Make changes based on results of ergonomic evaluation and incorporate them into

4. Preventing and Correcting Ergonomic Problems

- evaluation and incorporate them into documentation.
- ⌘ Follow documentation to reduce risk.
- ⌘ Determine if changes were effective or if further improvements are needed.
- ⌘ Incorporate engineering controls into design of task or work process.
- ⌘ Incorporate work practice changes into work process.
- ⌘ Incorporate administrative controls on the job.
- ⌘ Provide staff with personal protective equipment.

Definitions

Exhibits

[Guidelines for Computer Workstation Specifications](#)

[Guidelines for Industrial and Construction Work](#)

[Guidelines for Office Ergonomics](#)

Forms

None

Training Requirements and Reporting Obligations

This subject area does not contain training requirements.

This subject area does not contain reporting obligations

References

[California OSHA, Poster on Ergonomics in Automotive Shops](#) web page

[California OSHA, Division of Occupational Safety and Health \(DOSH\) Publications](#) web page

[OSHA, Ergonomics](#) web site

[OSHA, Ergonomics: Contributing Conditions](#) web site

[Safety and Health Services Industrial Hygiene](#) web site

[Training and Qualifications](#) Web Site

Standards of Performance

All staff and guests shall comply with applicable Laboratory policies, standards, and
7/23/2003

procedures, unless a formal variance is obtained.

All staff and users shall identify, evaluate, and control hazards in order to ensure that work is conducted safely and in a manner that protects the environment and the public.

All staff and users shall ensure that they are trained and qualified to carry out their assigned responsibilities, and shall inform their supervisor if they are assigned to perform work for which they are not properly trained or qualified.

Management System

This subject area belongs to the **Worker Safety and Health** management system.

[Back to Top](#)

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Forms Contact List SBMS Instructions Help Desk

Find Subject Areas: Index Categories Alpha

Show Side Menu Search Subject Areas & Legacy Documents:

Introduction: Ergonomics, Occupational

Effective Date: **July 2003**

Point of Contact: [Ergonomics Subject Matter Expert](#)

Occupational ergonomic-related injuries are typically caused by the improper fit of the work area, equipment, and practices to the individual. Ideally, these injuries are prevented by adjusting the task to fit the individual rather than fitting the individual to the task. Injuries can be prevented by properly designing the job or workstation and choosing the appropriate tools or equipment for that job. Simple solutions often work best and can include the following changes to the workplace to reduce pain and cut the risk of disability:

- ✧ Adjustable tables and chairs, combined with adequate ergonomic training;
- ✧ Height adjustment or reorientation of the work surfaces;
- ✧ Tools with curved handles so the individual's wrists don't bend unnaturally;
- ✧ Lifting assist equipment;
- ✧ Frequent short breaks to rest muscles during office data entry;
- ✧ Varying tasks of assembly line workers to avoid repeated stress for the same muscles.

This subject area provides procedures and guidance on how to determine the need for professional ergonomic assistance when evaluating work operations for potential ergonomic hazards. Examples of ergonomic injuries include carpal tunnel syndrome, back injuries, and cumulative trauma disorders.

It is important to resolve occupational ergonomic issues before an individual experiences any symptoms. Symptoms may occur at work or during off-work hours. When symptoms occur during off-work hours, the association to causes resulting from work may not be determined. The probability of resolving an ergonomic issue is more likely if it is reported early.

[Back to Top](#)

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SBMS [Forms](#) [Contact List](#) [SBMS Instructions](#) [Help Desk](#)

Find Subject Areas: Index Categories Alpha

[Show Side Menu](#) Search Subject Areas & Legacy Documents:

Subject Area: *Ergonomics, Occupational*

1. Identifying the Need for Ergonomic Evaluations in Existing Processes

Effective Date: July 2003

Point of Contact: [Ergonomics Subject Matter Expert](#)

Applicability

This information applies to BNL staff and non-BNL staff who perform or plan work.

Required Procedure

<p>Step 1</p>	<p>Staff promptly notify their Line Manager, ESH Coordinator, or Facility Support Representative of any work activity that creates ergonomic stress, or involves equipment or work processes that could cause an ergonomic injury.</p> <p>Symptoms caused by ergonomic stress include:</p> <ul style="list-style-type: none"> ✦ shooting or stabbing pains (especially in arms, legs, or the back); ✦ burning, soreness, or stiffness of muscles; ✦ tingling or numbness (in hands or legs); ✦ color change in extremities (especially fingers or toes turning pale); ✦ swelling or inflammation of joints or extremities; ✦ loss of mobility or decreased range of motion; ✦ pressure or tightness in muscle groups; ✦ decrease in feeling/sensation (especially in hands, fingers, and legs).
<p>Step 2</p>	<p>Staff report the symptom(s) to their Supervisor. The Supervisor and ESH Coordinator assist the worker in obtaining medical attention from the Occupational Medicine Clinic (OMC), and a formal workplace evaluation from an Industrial Hygiene (IH) Representative.</p> <p>Note: Staff may consult directly with the OMC if they are uncertain a symptom is related to their work.</p>
<p>Step 3</p>	<p>Supervisors, Work Planners, and the ESH Coordinator (with input from staff) identify tasks with a significant potential for ergonomic risk and initiate a formal ergonomic review. A formal ergonomic review may be triggered by</p>

	<ul style="list-style-type: none">⌘ Observing operations for the presence of risk factors listed in the Industrial and Construction Work and Office Ergonomics exhibits, including:<ul style="list-style-type: none">⌘ Heavy lifting;⌘ Contact stress;⌘ Forceful exertion;⌘ Vibration;⌘ Awkward postures (including twisting, reaching, and turning);⌘ Repetitive movements;⌘ Staff comments and suggestions. Interview staff directly to see if possible problems exist in their operation;⌘ Injury Experience and Injury Record. Analyze injury information to see if higher injury trends occur within certain operations or job classifications.
Step 4	The ESH Coordinator identifies ergonomic risks and obtains a formal ergonomic review by contacting an IH Representative. The IH Representative recommends corrective actions to the line organization that is responsible for implementing them.

| [Continue to Next Page](#) |

[Back to Top](#)

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Forms
Contact List
SBMS Instructions
Help Desk

Find Subject Areas:

[Show Side Menu](#) Search Subject Areas & Legacy Documents:

Subject Area: *Ergonomics, Occupational*

2. Assessing Office Activities

Effective Date: **July 2003**

Point of Contact: [Ergonomics Subject Matter Expert](#)

Applicability

This information applies to BNL staff and non-BNL staff who identify ergonomic risk factors involving office work tasks (i.e., computer work, scanning, lifting, unloading supplies) and Industrial Hygiene (IH) Representatives who evaluate the task(s).

Required Procedure

Step 1	<p>When new or significant changes to a workplace are being planned, or new workstations are being purchased, the Supervisor or ESH Coordinator</p> <ul style="list-style-type: none"> ⌘ requests a formal ergonomic evaluation, or ⌘ follows the Guidelines for Computer Workstation Specifications. <p>Supervisors or other appropriate personnel identify ergonomic risk factors by</p> <ul style="list-style-type: none"> ⌘ Observing the operation to see if any of the risk factors listed in the Guidelines for Office Ergonomics are present; <ul style="list-style-type: none"> ⌘ Heavy lifting; ⌘ Contact stress; ⌘ Forceful exertion; ⌘ Vibration; ⌘ Awkward postures (including twisting, reaching, and turning); ⌘ Repetitive hand and wrist movement; ⌘ Observing if the equipment meets the Guidelines for Computer Workstation Specifications; ⌘ Identifying elements that require change (e.g., keyboard height, chair height, lumbar support); ⌘ Completing a Job Safety Analysis or OMC Job Assessment Form; ⌘ Contacting an ESH Coordinator or Facility Support Representative; or ⌘ Completing design documentation.
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Step 2	For operations identified with a significant injury potential or documented injuries, an IH Representative conducts a formal ergonomic evaluation of the task(s) and the workplace, and discusses changes to equipment (that can eliminate ergonomic stressors) with the individual and their Supervisor.
Step 3	The Supervisor incorporates changes to equipment and work processes based on the ergonomic evaluation recommendations. See the section Preventing and Correcting Ergonomic Problems for more information.
Step 4	After a formal evaluation is prompted by a reported occupational injury, the IH Representative reevaluates the task(s) to determine if the changes were effective or if further improvements are required.

Guidelines

Staff who require additional information on computer workstations, equipment, and work practices should contact the [Ergonomics Subject Matter Expert](#) or an [IH Representative](#).

A training class is available for frequent keyboard users (see the [Training and Qualifications Web Site](#)). The class provides guidance on potential ergonomic injuries, proper posture, workstation design and adjustment, and preventative measures.

A good technique for taking work breaks from intensive computer work is to schedule a recurring Outlook meeting (for yourself) very early in the morning with a "snooze" at a one hour delay. The "meeting notice reminders" will prompt you to take a break.

References

[Training and Qualifications](#) Web Site

| [Go to Previous Page](#) | [Continue to Next Page](#) |

[Back to Top](#)

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Forms
Contact List
SBMS Instructions
Help Desk

Find Subject Areas:

[Show Side Menu](#) Search Subject Areas & Legacy Documents:

Subject Area: *Ergonomics, Occupational*

3. Assessing Industrial Activities

Effective Date: **July 2003**

Point of Contact: [Ergonomics Subject Matter Expert](#)

Applicability

This information applies to BNL staff and non-BNL staff who identify ergonomic risk factors involving industrial and construction work tasks, and Industrial Hygiene (IH) Representatives who evaluate the task(s).

Required Procedure

Step 1	<p>Supervisors, Principal Investigators, Work Planners, or other appropriate personnel identify ergonomic risk factors in significant hazard tasks by</p> <ul style="list-style-type: none"> ⌘ Observing the operation to see if any of the risk factors listed in the Guidelines for Industrial and Construction Work are present, including <ul style="list-style-type: none"> ⌘ Heavy lifting; ⌘ Contact stress; ⌘ Forceful exertion; ⌘ Vibration; ⌘ Awkward postures (including twisting, reaching and turning); ⌘ Repetitive movements (including hands and bending); ⌘ Preparing or reviewing a completed Job Safety Analysis, OMC Job Assessment Form, or ⌘ Contacting an ES&H Coordinator or Facility Support Representative, or ⌘ Preparing or reviewing an Experimental Safety Review, Work Permit, or Radiological Work Permit (RWP) that addresses ergonomic protective measures; ⌘ Reviewing a Standard Operating Procedure (SOP), skill of the craft documentation, or other documentation for ergonomic hazards. <p>Note: When significant changes are being planned, the supervisor requests a formal ergonomic evaluation.</p>
Step 2	<p>For operations identified with a significant injury potential or documented injuries, an IH Representative conducts a formal ergonomic evaluation of the task(s).</p>

	Note: The IH Representative discusses changes to equipment (that can eliminate ergonomic stressors) with the individual and their Supervisor.
Step 3	The Supervisor makes changes based on the results of the ergonomic evaluation and incorporates them into Standard Operating Procedure (SOP), skill of the craft documentation, or other documentation.
Step 4	Staff follow Work Permit, Experimental Safety Review, SOPs, or skill of the craft documentation to reduce risk. See the section Preventing and Correcting Ergonomic Problems .
Step 5	<p>After the initial adjustments are made, the individual and their Supervisor reevaluate the task(s) to determine if changes were effective, or if further improvements are needed. Staff modify the work area, equipment, and practices to fit tasks, as necessary.</p> <p>After a significant formal evaluation is prompted by a reported occupational injury, the IH Representative reevaluates the task(s) to determine if the changes were effective, or if further improvements are required.</p>

Guidelines

A training class is available for those who frequently lift heavy loads (>30 lbs). The class provides guidance on potential ergonomic injuries, proper posture, lift techniques, and other preventative measures (see the [Training and Qualifications](#) Web Site).

References

[Training and Qualifications](#) Web Site

| [Go to Previous Page](#) | [Continue to Next Page](#) |

[Back to Top](#)

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Forms
Contact List
SBMS Instructions
Help Desk

Find Subject Areas:

[Show Side Menu](#) Search Subject Areas & Legacy Documents:

Subject Area: *Ergonomics, Occupational*

4. Preventing and Correcting Ergonomic Problems

Effective Date: **July 2003**

Point of Contact: [Ergonomics Subject Matter Expert](#)

Applicability

This information applies to Supervisors, ESH Coordinators, Work Planners, Principal Investigators (PIs), and other personnel who manage work.

Required Procedure

Step 1	Supervisors or PIs incorporate engineering controls into the design of a task or work process. Engineering controls are physical changes to a job that reduce ergonomic hazards and include changing or redesigning workstations, tool(s), facilities, equipment, materials, or processes.
Step 2	Supervisors or PIs incorporate work practice changes into the work process. Examples include proper lifting techniques (see the Guidelines for Industrial and Construction Work and Guidelines for Office Ergonomics exhibits), and keeping work areas clear and clean to prevent slipping, tripping, and awkward movements.
Step 3	Supervisors or PIs incorporate administrative controls on the job. Administrative controls are changes in the way that the work in a job is assigned or scheduled, which reduce the magnitude, frequency, or duration of exposure to ergonomic risk factors. Examples include <ul style="list-style-type: none"> ⌘ Worker rotation; ⌘ Increase task variety (task enlargement); ⌘ Increased rest breaks; ⌘ Changes in work pace.
Step 4	Supervisors or PIs provide, and staff use personal protective equipment to serve as a protective barrier between the individual and an MSD hazard. Examples include <ul style="list-style-type: none"> ⌘ Knee pads (i.e., for carpet layers);

- | |
|--|
| <ul style="list-style-type: none">≈ Vibration-reduction gloves;≈ Anti-fatigue mats. |
|--|

Guidelines

Staff who want additional information to correct work areas, equipment, and practices should do the following

- ≈ Go to the [Safety and Health Services Industrial Hygiene](#) web site to access BNL Ergonomics Bulletins.
- ≈ Use ergonomic assessing tools such as those found on the [OSHA, Ergonomics: Contributing Conditions](#) web site.
- ≈ Consult the [Ergonomics Subject Matter Expert](#) or [Industrial Hygiene \(IH\) Representative](#) for specific information on particular jobs.

References

[OSHA, Ergonomics: Contributing Conditions](#) web site

[Safety and Health Services Industrial Hygiene](#) web site

| [Go to Previous Page](#) |

[Back to Top](#)

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Guidelines for Computer Workstation Specifications

Component	Components of Good Design
keyboard surface	<p>Height and front edge tilt angle adjustable; 23 to 28 (59 to 71cm) inches from floor; Accommodates side by side keyboard and mouse placement (i.e., at least 27 inches [69 cm] wide); Leg clearance should be at least 1 inch; Palmrest in front of keyboard and mouse.</p> <p>BNL Stock item meeting specifications: S-98207 TRAY, KEYBOARD</p> 
monitor surface	<p>Accommodates placement of monitor so that the top of screen is at eye level; Entire screen in viewing range between 0° and 60° below horizontal plane passing through eyes.</p> <p>BNL Stock item meeting specifications: S-25724 DESK, COMPUTER. 60"WX30"DX29-1/2"H. (HON #66571NQ) S-25726 SHELF, 60"WX 93/8" D, FITS S-25724.</p> 
chair	<p>Seat pan and backrest upholstered over foam padding; Seat pan height adjustable while seated; Backrest height adjustable to provide lumbar support (size 6 to 9 inches high (15 to 23 cm) by 12 inches wide (30.5 cm); "Waterfall" front edge on seat pan; Swivel seat pan; Seat pan 15 to 17 inches deep (38 to 42 cm) and at least 17 inches wide (44 cm); Footrest provided if feet to no rest flat on the floor; Seat pan angle adjustable; Armrests adjustable in height (armrests are optional); Seat pan height allows support of upper leg by allowing feet to be fully on floor; Seat provides lumbar support by design (fixed or adjustable 6 to 60 inches (15 to 25.4 cm) above the seat or auxiliary pillow; Wheeled legs; 5-caster wheelbase.</p> <p>BNL Stock item meeting specifications: S-25709 CHAIR, SWIVEL. (HON MULTI-TASK #7703) S-25714 Adjustable arm kit</p> 

Guidelines for Industrial and Construction Work

Key Risk Factors/Hazards	
<ul style="list-style-type: none"> ○ Heavy lifting ○ Forceful exertion ○ Awkward postures (including twisting, reaching, and turning) ○ Repetitive movements. 	<ul style="list-style-type: none"> ○ Contact stress ○ Vibration
Key Preventative Measures	
Avoid extended reaches, repetitive motions, and awkward postures.	
Take posture breaks and exercise hands, arms, and shoulders	
Exercise to improve your body conditioning	
Maintain good neutral posture	
If you have trouble setting up your workstation so that it is comfortable, contact your Supervisor, ESH Coordinator, or the Ergonomics Subject Matter Expert.	
Preventative Measures: Do's and Don't Guidelines	
Neck	
Do:	Don't:
<ul style="list-style-type: none"> ?? Keep head in line with shoulders 	<ul style="list-style-type: none"> ?? Twist neck to either side more than 20 degrees repeatedly or for extended periods ?? Bend neck forward more than 20 degrees or back more than 5 degrees repeatedly, or for extended periods ?? Hold objects between head and shoulder (e.g., phone)
Forearm	
Do:	Don't:
<ul style="list-style-type: none"> ?? Keep forearms at 90 degrees or greater to the upper arm ?? Keep the forearms perpendicular to the shoulder line 	<ul style="list-style-type: none"> ?? Rotate forearm rapidly, such as when using a manual screwdriver ?? Work by reaching across the midline of the body or far out to the sides
Wrists	
Do:	Don't:
<ul style="list-style-type: none"> ?? Keep the wrist straight and move objects such as a mouse with your arm, not by moving your wrist <div style="text-align: center; margin-top: 10px;">  <p>The diagram shows five hand and forearm positions. From left to right: 1. 'EXTENSION' shows the forearm bent upwards. 2. 'FLEXION' shows the forearm bent downwards. 3. 'RADIAL DEVIATION' shows the hand tilted towards the thumb side. 4. 'NEUTRAL' shows the hand in a straight, upright position. 5. 'ULNAR DEVIATION' shows the hand tilted towards the pinky side.</p> </div>	<ul style="list-style-type: none"> ?? Bend wrist back more than 30 degrees or down more than 20 degrees repeatedly or for extended periods ?? Bend the wrist from side to side repeatedly or for extended periods (e.g., pipetting)

Fingers	
Do:	Don't:
?? Use entire hand for holding objects (e.g., mouse or equipment trigger) ?? Move objects such as a mouse with your arm, not by moving your fingers ?? Use a light grip when using the mouse	?? Grasp or hold objects for extended periods ?? Use a pinch grip repeatedly or to hold objects for extended periods
Shoulders	
Do:	Don't:
?? Relax your shoulders ?? Support the weight of your arms when possible	?? Slump your shoulders for extended periods ?? Raise elbows above chest height repeatedly or for extended periods
Torso	
Do:	Don't:
?? Keep your back straight ?? Provide lumbar and lateral support for your back when in a seated posture ?? Keep your work in front of your body ?? Rotate your whole body and stance rather than twisting at the waist ?? Use back support belts as a reminder to use proper lifting techniques.	?? Bend torso (forward, backward, or sideways) repeatedly or for extended periods ?? Twist your torso repeatedly or for extended periods ?? Overextend to reach objects
Legs and Feet	
Do:	Don't:
?? Distribute weight evenly on both legs ?? Vary your sitting and standing routine	?? Sit or stand for extended periods without changing position ?? Sit with legs hanging for extended periods ?? Sit on hard or unsuitable surfaces for extended periods
Knees	
Do:	Don't:
?? Pad the knees when kneeling ?? Distribute weight evenly on both knees	?? Kneel or squat for extended periods ?? Kneel on hard or sharp surface for extended periods
Push/Pull Load	
Do:	Don't:
?? Use rollers or casters for pushing or pulling loads ?? Use a hand truck or dolly with for moving objects ?? Use larger muscle groups (e.g., back or legs rather than arms) ?? Use mechanical aids	?? Push or pull loads by dragging directly on the floor surface
Gripping	
Do:	Don't:
?? Use entire hand for holding objects ?? Use containers or objects with handles or hand hold cutouts when possible	?? Grasp or hold objects requiring significant strength for long periods ?? Hold large objects without handles for extended

?? Grasp large objects around their center of gravity for balance, when possible	periods ?? Maintain awkward grip
Pinching	
Do:	Don't:
?? Find ways to eliminate pinch grips by using hand instead of fingers ?? Use light force when gripping writing instruments	?? Use a pinch grip repeatedly or to hold objects for extended periods
Hard/Sharp Objects	
Do:	Don't:
?? Use rounded corners and/or padded supports on contact surfaces ?? Use rounded handles for lifting and carrying objects	?? Push, sit, or lean on hard or sharp edged objects, (tables, railings, etc.) repeatedly or for extended periods ?? Allow hard or sharp objects to press against the skin (arms, palms, legs)
Striking Objects	
Do:	Don't:
?? Use the proper tools for the task	?? Use the body to hit objects (e.g., hand, foot, knee, hip) ?? Use the body to bump objects into position
Repetitive Motions or Patterns	
Do:	Don't:
?? Try to find alternatives to repeated motions, e.g., using macros when typing ?? Take frequent short breaks to stretch and relax ?? Rotate between different jobs that use different muscle groups ?? Try to reduce the number of motions	?? Perform identical or similar motions repeatedly or for extended periods ?? Use awkward postures
Behavior/Lifestyle Changes	
Ergonomic problems also occur outside working hours. Everything you do, hobbies, sports, leisure activities, and housework, has some sort of effect. Many times the symptoms that surface during off-work hours are ignored and the association is not made with events at work. To prevent further injuries during off hours, the same precautions should be taken at home as at work. The following are some changes that can help prevent injuries at home as well as at work. ?? Vary your work activities. ?? Improve physical conditioning. ?? Report symptoms early and get treatment.	
Ergonomic Hazards in Construction	
Process	Exposure
Chipping concrete with pneumatic chipping hammer	Vibration
Breaking up concrete in dumpster with jackhammer	Vibration
Spreading primer and epoxy-based marble chips or dust	Knee strain
Tamping subgrade for paving	Vibration
Setting tile with gravel and mortar mix	Knee strain
Cutting and installing drywall using utility knife and	Wrist strain

screw gun	
Sanding drywall joint compound	Wrist strain
Troweling, grouting, and setting tiles	Knee and wrist strain
Installing carpet with adhesives. Cleaning glue off carpet	Knee strain
Installing terrazzo floor system	Knee and Wrist strain
Chipping concrete slab with electric chipping hammer	Vibration
Other	Processes involved twisting, awkward postures, heavy lifting, and exposure to vibration.

For more guidance, see:

[OSHA Ergonomics](#) web site

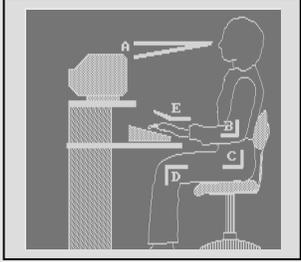
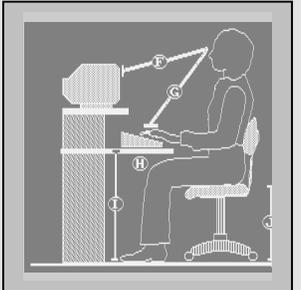
[California OSHA, Division of Occupational Safety and Health Publications](#) web page

[California OSHA, Poster on Ergonomics in Automotive Shops](#) web page

Guidelines for Office Ergonomics

Key Risk Factors/ Hazards	
<ul style="list-style-type: none"> • Heavy lifting 	<ul style="list-style-type: none"> • Contact stress
<ul style="list-style-type: none"> • Forceful exertion 	<ul style="list-style-type: none"> • Vibration
<ul style="list-style-type: none"> • Awkward postures (including twisting, reaching, and turning) 	
<ul style="list-style-type: none"> • Repetitive hand and wrist movement. 	
Computer Workstation Self-Checklist	
<p>Use the checklist below to aid in properly setting up your computer workstation. If any response is "No," adjust your work area (without major renovations, if possible) or seek professional assistance.</p>	
Yes/No	Guidance Question
	Is your chair adjusted properly? (Feet on the floor, hips and knees at 90 degree angles)
	Is there at least 1 to 2 inches above your knee under the keyboard or desk?
	Is your lower back supported properly? (Touching the back of chair while working)
	Is your chair height adjusted to support your legs properly? (Heels should reach the floor to support weight of legs while seated)
	Is your monitor directly in front of you approximately 16 to 32 inches away?
	Is the top of your screen approximately at eye level?
	Is your screen positioned to avoid reflections/glare (i.e., not tilted up)?
	Are glasses with corrective lenses (when needed) set for the distance of "eyes to monitor?" Bifocal, trifocal, and variable lens users may need a single vision lens set of glasses used for computer work. This prevents awkward head postures that can result in muscle strain.
	Is your mouse at the same level as your keyboard?
	Is your document holder placed next to the screen, if needed?
	Are your elbows at a 90-degree angle when keying?
	Are your wrists in a neutral position when keying (i.e., wrists are at a 180 degree angle and there is minimal to no extension and/or flexion (bending up or down))?
	Do you have a wrist rest for your keyboard and mouse?
	Is the lighting adequate, but not intense?
	Is your desktop free of a computer processing unit (CPU), printer, or other office equipment allowing you ample workspace in your immediate work area? Can you relocate it below the desk or outside the immediate work area?
	Do you have everything that you use within easy reach?
	Is your phone located within easy reach without overextending your arm?
	Do you rest your eyes during the day (i.e., look up and away periodically)?
	Are you remembering to change positions during the day so that a static (still) posture is not maintained?
	Do you take brief intermissions to exercise and stretch regularly throughout the day?
	Do you use proper lifting techniques when moving computer monitors, CPU, and office supplies?

Computer Workstation Set-up Guidelines

	PARAMETER	ACCEPTABLE RANGE	OPTIMUM	
A	Viewing Angle (eyes level <=> top of screen)	0 - 15°	0 - 15°	
B	Angle at ELBOW (upper arm <=> lower arm)	70 - 135°	90°	
C	Angle at HIP (upper thigh <=> body trunk)	90 - 105°	90°	
D	Angle at KNEE (upper thigh <=> lower leg)	60 - 100°	90°	
E	Angle at WRIST (lower arm <=> palm)		180°	
F	Distance from EYE to SCREEN	> 12"	> 12"	
G	Distance from EYE to KEYBOARD	17.7 - 19.7"	18"	
H	CLEARANCE between leg and underside of keypad	2 - 5"	5"	
I	Distance from FLOOR to KEYPAD HOLDER	23 - 28"	< 28"	
J	Distance from FLOOR to SEAT PAN	16 - 20.5"	Feet flat	

Key Preventative Measures

- Avoid extended reaches, repetitive motions, and awkward postures.
- Take posture breaks and exercise hands, arms, and shoulders (at least every two hours)
- Maintain good neutral posture
- Exercise to improve your body conditioning
- If you have trouble setting up a comfortable workstation, contact your Supervisor, ESH Coordinator, or Ergonomics Subject Matter Expert.

Preventative Measures: Do's and Don't Guidelines

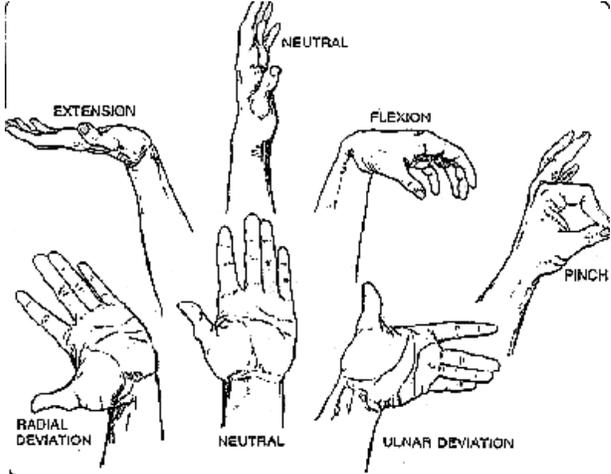
Neck

Do:

- Keep head in line with shoulders
- Place the most used document or monitor in front of you.
- Use a document holder if practical

Don't:

- Twist neck to either side more than 20 degrees repeatedly or for extended periods
- Bend neck forward more than 20 degrees or back more than 5 degrees repeatedly or for extended periods
- Hold objects between head and shoulder (e.g., phone)

Forearm	
<p>Do:</p> <ul style="list-style-type: none"> Keep forearms at 90 degrees or greater to the upper arm Keep the forearms perpendicular to the shoulder line 	<p>Don't:</p> <ul style="list-style-type: none"> Work by reaching across the midline of the body or far out to the sides
Wrists	
<p>Do:</p> <ul style="list-style-type: none"> Keep the wrist straight and move objects such as a mouse with your arm, not by moving your wrist Move objects such as a mouse with your arm, not by moving your wrist or fingers Consider supporting the heel of the hand with a properly adjusted, padded wrist rest to keep the wrist straight  <p>Good: Wrist rest helps keep wrist in neutral position</p>  <p>Bad: no wrist rest and sharp pressure point</p>  <p>Bad: no wrist rest and deviated wrist</p>  <p>Wrist Rest Bad: wrist rest causes wrist deviation</p>	<p>Don't:</p> <ul style="list-style-type: none"> Bend wrist back more than 30 degrees or down more than 20 degrees repeatedly or for extended periods Bend the wrist from side to side repeatedly or for extended periods (e.g., mouse, trackball) 
Fingers	
<p>Do:</p> <ul style="list-style-type: none"> Use entire hand for holding objects (e.g., mouse or equipment trigger) Use a light grip when using the mouse 	<p>Don't:</p> <ul style="list-style-type: none"> Grasp or hold objects for extended periods Use a pinch grip repeatedly or to hold objects for extended periods
Shoulders	
<p>Do:</p> <ul style="list-style-type: none"> Relax your shoulders Support the weight of your arms on padded surfaces when possible 	<p>Don't:</p> <ul style="list-style-type: none"> Slump your shoulders for extended periods Raise elbows above chest height repeatedly or for extended periods Do not rest arms on sharp edges

Torso	
Do:	Don't:
<ul style="list-style-type: none"> • Keep your back straight • Provide lumbar and lateral support for your back when in a seated posture • Keep your work in front of your body • Rotate your whole body and stance rather than twisting at the waist 	<ul style="list-style-type: none"> • Bend torso (forward, backward, or sideways) repeatedly or for extended periods • Twist your torso repeatedly or for extended periods • Overextend to reach objects
Legs and Feet	
Do:	Don't:
<ul style="list-style-type: none"> • Distribute weight evenly on both legs • Vary your sitting and standing routine • Support lower leg when seated by placing heel on floor, use a foot rest if needed 	<ul style="list-style-type: none"> • Sit or stand for extended periods without changing position • Sit with legs hanging for extended periods • Sit on hard or unsuitable surfaces for extended periods
Knees	
Do:	Don't:
<ul style="list-style-type: none"> • Pad the knees when kneeling • Distribute weight evenly on both knees 	<ul style="list-style-type: none"> • Kneel or squat for extended periods • Kneel on hard or sharp surface for extended periods
Push/Pull Load	
Do:	Don't:
<ul style="list-style-type: none"> • Use rollers or casters for pushing or pulling loads • Use a hand truck or dolly with large diameter wheels for moving objects • Use larger muscle groups (e.g., back or legs rather than arms) • Use mechanical aids, when applicable 	<ul style="list-style-type: none"> • Push or pull loads by dragging directly on the floor surface • Use a jerking motion to move heavy or "stuck" objects
Gripping	
Do:	Don't:
<ul style="list-style-type: none"> • Use entire hand for holding objects • Use containers or objects with handles or hand hold cutouts when possible • Grasp large objects around their center of gravity for balance, when possible 	<ul style="list-style-type: none"> • Grasp or hold objects requiring significant strength for long periods • Hold large objects without handles for extended periods • Maintain awkward grip
Pinching	
Do:	Don't:
<ul style="list-style-type: none"> • Find ways to eliminate pinch grips by using hand instead of fingers • Use light force when gripping writing instruments 	<ul style="list-style-type: none"> • Use a pinch grip repeatedly or to hold objects for extended periods
Hard/Sharp Objects	
Do:	Don't:
<ul style="list-style-type: none"> • Use rounded corners and/or padded supports on contact surfaces • Use rounded handles for lifting and carrying objects 	<ul style="list-style-type: none"> • Push, sit, or lean on hard or sharp-edged objects, (table edges, railings, etc.) repeatedly or for extended periods • Allow hard or sharp objects to press against the

	skin (arms, palms, legs)	
Striking Objects		
Do:	Don't:	
<ul style="list-style-type: none"> Use the proper tools for the task 	<ul style="list-style-type: none"> Use the body to hit objects (e.g., hand, foot, knee, hip) Use the body to bump objects into position 	
Repetitive Motions or Patterns		
Do:	Don't:	
<ul style="list-style-type: none"> Try to find alternatives to repeated motions, e.g. using macros when typing Take frequent short breaks to stretch and relax Rotate between different jobs that use different muscle groups Try to reduce the number of motions 	<ul style="list-style-type: none"> Perform identical or similar motions repeatedly or for extended periods Use awkward postures 	
Behavior/Lifestyle Changes		
<p>Ergonomic problems also occur outside working hours. Everything you do, hobbies, sports, leisure activities, and housework, has some sort of effect. Many times symptoms that occur during off-work hours are ignored and the association is not made with events at work. To prevent further injuries during off-work hours, the same precautions should be taken at home as at work. The following are some changes that can help prevent injuries at home as well as at work.</p> <ul style="list-style-type: none"> Vary your work activities. Improve physical conditioning. Be aware of symptoms and get early treatment from your healthcare provider. 		
Potential Quick Fixes		
Problem	Probable Cause	Corrective Measure
Neck pain	Monitor or documents too high/too low	Angle monitor downward; Lower or raise monitor, or lower or raise seated height; Use document holder.
	Arms extend for long periods	Move chair and body closer to mouse and keyboard
	Head held awkwardly to see through near vision part of prescription glasses	Purchase a set of glasses with focal distance set for the computer monitor
	Holding telephone between head and shoulder	Purchase a cradle for the handset or use hands-free head set
Shoulder pain	Arms extend forward for long periods	Move chair and body closer to mouse and keyboard so elbow is kept at a 90 degree angle
	Arm use for mouse is extended out to side	Place keyboard and mouse side-by-side in front of body
	Mouse or keyboard is too high	Raise chair for lower keyboard/mouse surface so elbow is a right angle.

Arm pain	Arm and elbow held too far to side causing front shoulder muscles to support arms	Move mouse and keyboard inward so that elbows lightly touch ribcage area.
Wrist pain	Wrist is extended up or down when typing on the keyboard	Significant Risk of permanent injury: Adjust keyboard or raise chair to allow straight wrists when typing. Seek <u>IH Representative</u> assistance if needed in designing workstation.
Finger pain	Compression of nerves in upper arm/shoulder joint from extending arm	Move mouse lower and in front of arm. Place keyboard and mouse side-by-side in front of body
	Compression of lower arm at elbow on hard armrest or surfaces	Significant Risk of permanent injury: Add padding to armrest surfaces or remove armrests.
	Compression of nerve in wrist from bending wrist during typing	Significant Risk of permanent injury: Adjust keyboard or raise chair to allow straight wrists when typing. Seek <u>IH Representative</u> assistance if needed in designing workstation.
Stiffness in appendages	Too hot or too cold air blowing directly on body part	Diffuse or block air flow
Eyestrain	Monitor or documents too far or too close	Relocate monitor or document so that all objects routinely used are at the same approximate distance. This eliminates repetitive eye refocusing.
	Air in area is too dry.	Use eyedrops as needed. Consider air humidification.
	Lighting is too bright or too dark	When work involves reading printed material, use bright overhead or task lighting on printed material Darken room lighting when only the monitor is needed for work Prevent glare on screen and work surfaces with proper angling of work surfaces



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Contact List

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Help Desk

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Index

Categories

Alpha

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Definitions: Ergonomics, Occupational

Effective Date: July 2003

Point of Contact: [Ergonomics Subject Matter Expert](#)

Term	Definition
acute muscular strain	Acute muscle strain occurs when a concentrated episode has overstressed the musculoskeletal system. The signs and symptoms of acute muscle strain generally may include pain within 24 hours of an injury to the musculoskeletal system.
carpal tunnel syndrome (CTS)	<p>Carpal tunnel syndrome (CTS) is a condition that results in the swelling and entrapment of the median nerve as it runs into the wrist through an opening called the carpal tunnel. The median nerve runs into the hand to supply sensation to the thumb, index finger, long finger, and half of the ring finger. The nerve also supplies a branch to the muscles of the thumb (thenar muscles).</p> <p>One of the first symptoms of carpal tunnel syndrome is numbness in the fingers. This is quickly followed by pain in the same distribution. The pain may also radiate up the arm to the shoulder and sometimes the neck. Other symptoms include fatigue, pain, tingling, weakness of grip, loss of dexterity, stiffness, cramping, numbness, cold, and burning. They may often occur during or after periods of rest or sleep.</p>
manual material handling	Manual material handling entails a person physically lifting, lowering, climbing, pushing, pulling, bending, and pivoting.
musculoskeletal disorder (MSD)	A variety of disorders experienced by affected workers that are caused by exposure to ergonomic stressors in the workplace. These disorders include muscle strains and tears, ligament sprains, joint and tendon inflammation, pinched nerves, herniated spinal discs, and other conditions. These conditions may develop gradually over time or may result from instantaneous events such as a single heavy lift. Pain, loss of work, and disability may result.
occupational ergonomics	Fitting the job to the person rather than the person to the job through evaluation and design of work places, environments, jobs, tasks, equipment, processes in relation to human capabilities, and interactions in the workplace.
repetitive motion	Motions are performed over and over again using the same muscles, tendons or joints. The amount of repetition can be

...cesses, ... of ... the amount of ...
controlled by the pace of the work, the recovery time provided (e.g.,
number and length of muscle-relaxing breaks), and the amount of
variety in work tasks.

[Back to Top](#)

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SBMS Instructions
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Revision History: Ergonomics, Occupational

Point of Contact: [Ergonomics Subject Matter Expert](#)

Revision History of this Subject Area

Date	Description	Management System
July 2003	This subject area provides procedures and guidance on how to determine the need for professional ergonomic assistance when evaluating work operations for potential ergonomic hazards. Examples of ergonomic injuries include carpal tunnel syndrome, back injuries, and cumulative trauma disorders.	Worker Safety and Health

[Back to Top](#)

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