
Oregon State Agency Safety Advisor's Network

OFFICE ERGONOMICS CONSENSUS GUIDELINES FOR ADJUSTABLE CHAIRS, WORK SURFACES, AND PERIPHERALS

Acknowledgments

These Consensus Guidelines were developed during three symposiums held in Salem, Oregon. These Occupational Safety and Health (OSH) specialists serve Oregon's public employees. They assist agencies to maximize the use of budgeted funds and resources through the wise purchase, assignment and use of office seating and work surfaces. These OSH specialists also: provide direct consultation, education and skills training to employees and supervisors; advise managers in the development of policies on purchasing, training, and work practices; and, cooperatively share expertise and problem solve to minimize unnecessary loss due to employee injury.

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“Agency directors are to...develop, maintain and monitor a systematic program of safety and health that will...minimize the risk of work related illness and injury, and...further the ability of the agency to fulfill its mission.”

Governor's Executive Order on Workplace Safety and Health, March 1988

OREGON STATE AGENCY SAFETY ADVISOR'S NETWORK

OFFICE ERGONOMICS CONSENSUS GUIDELINES

**Chair Consensus Guidelines
Selection, Fit, and Adjustment of Office Seating**

State Agency Safety Advisors recommend:

1. Chairs assigned to public employees who are primarily performing seated office work should:
 - Have basic adjustability features.
 - Be in good repair.
 - Be removed from service promptly when broken.

2. Public employees who primarily perform seated office work should:
 - Be assigned chairs that fit their size range.
 - Be trained to use the adjustability features on their assigned chair.
 - Know how to position their chair and their workstation for proper body alignment and posture.
 - Change tasks, alter position and use rest breaks effectively.

3. Supervisors who manage office environments should be expected to:
 - Assist employees in the fit, selection and basic adjustment of their office chair.
 - Ensure employees are able to properly position themselves at their workstation.
 - Follow agency procedures and collectively bargained agreements to assign tasks throughout the workday that enable employees to alter posture and to use rest breaks effectively.

These guidelines were developed in order to provide:

- Consistency of approach to the evaluation of office chair selection and adjustment.
- The basis for training and recommendations to office employees and their supervisors regarding basic ergonomic set up of a seated workstation.
- Information for a data base to improve office furnishing selection and purchase.

These guidelines cover:

- Adjustable Chairs As An Essential Tool For Office Work.
- Measuring for Proper Chair Selection.
- Positioning of Employees at Seated Work Tasks.

Adjustable Chairs As An Essential Tool For Office Work

Office chairs used at workstations are more than pieces of furniture. Chairs are tools, essential to the safe and successful accomplishment of office work.

It is important:

- To choose the right tool (chair) for the job.
- To make sure it fits the employee.
- That the employee uses it correctly.

To meet the needs of most office work:

- Chairs should have basic adjustability features which include:
 - adjustable back height;
 - adjustable back tilt;
 - adjustable seat height; and
 - adjustable seat tilt.
- Chair arms, if selected as an option, should not interfere with the employees' ability to get close to the work to be done.
- Adjustments should be easily made from a seated position.

Chairs adjust in order to:

- Enable employees to readily change their seated position throughout the workday as tasks change.
- Allow employees to properly align themselves to the seated work to be done.
- Fit a range of employees who can be expected to use a chair over its use life.
- Be used by multiple people at one workstation.

Chairs having a seat pan slider mechanism will increase seatpan depth.

Purchase new chairs only through the state chair contract.

Measuring for Proper Chair Selection

People come in different sizes. So do chairs.

For health, safety and comfort, employees should be assigned chairs in their size range.

Measure the employee to determine the "size" chair the employee needs.

An employee's overall height and weight are **not** adequate to properly "fit" a chair.

Employees weighing more than 250 pounds require special considerations for safety purposes.

Positioning of Employees at Seated Work Tasks

In general, the basic goal when positioning an employee at seated office work is to achieve and maintain a NEUTRAL posture. That is:

Head and Back:

- The head is aligned over the shoulders.
- The chin is relaxed, not dropped down or pushed forward.
- The spine keeps its natural curves at the neck, mid-back and low back.

Upper Extremities:

- Shoulders are relaxed, not rounded or curved forward.
- Elbows are close to the sides, near hips.
- Forearms are parallel to the floor or extend slightly downward.
- Wrists are flat or neutral, not extended up or down.
- Hands and fingers are relaxed.

Lower Extremities:

- Pelvis is rotated forward so employee actually sits on the lower bones of the pelvis, not the low back (tailbone).
- Thigh - torso angle and knees lower than the hips is open to, at least 90° and preferably 125 ° to 130 ° to encourage blood flow.
- Feet are flat, parallel to the floor and solidly placed.

Three basic postures for seated work.

- Recline. Based on theories by Grandjean. This is the “automobile driver” posture. It is an “open angle” (at knee and trunk) posture.
- Forward Tilt. Based on work by Mandal. This is also an “open angle” posture, but puts the employee forward and closer to their work. This is the preferred position for keyboarding and intense work.
- 90-90-90. Derived from Staffel. Taught in school as “sitting up straight”. Not an “open angle” position.

Employees should be shown each and encouraged to use the most suitable for their workstation and job tasks. The position preferred for the work being done will affect the type of chair the employee will need.

Decisions about the type of chair, the chair’s features (such as seat depth, cylinder height, arms, slider mechanisms, etc.) must take into consideration:

- Variability of tasks which compose the employee’s work.
- Adjustability of the other furnishing/equipment.
- Preferred seated position of the employee at the work task.

The chair is usually the piece of equipment most often, and readily, adjusted. But the chair and other work surfaces must fit together to enable employees to successfully accomplish their job.

WORK SURFACE GUIDELINES – SEATED TASKS

SINGLE USER WORK STATIONS

Introduction - These are guidelines for seated work. They follow the premise that a worker must be in a neutral posture in an adjustable chair. The worker and work station should be assessed, considering the tasks to be performed, before implementing work station modifications.

1. Work Surfaces for Computer Tasks, Writing/Paperwork

A. Work Surface Height:

- Should be adjustable in one-inch increments or less, range from floor to top of work surface being 24" to 36".

B. Work Surface Depth:

- Should allow for the keyboard and monitor to be in a straight line of sight to seated user.
- Minimum depth including keyboard if not on a tray:
 - 30" deep rectangle work surfaces for monitors up to 17".
 - 40" deep corner work surface (from front edge to corner) for monitors up to 17".

C. Work Surfaces Having A Keyboard Tray Installed:

- Keyboard tray should be 26" inside wide to accommodate keyboard and pointing devices.
- Pointing devices should be used at the same height as the keyboard.

D. Corner-piece Work Surface:

- An efficient and economical use of space.
- Deeper than 40". This allows the user the greatest flexibility to position the monitor at the correct distance. Distance depends on monitor size and user's visual acuity.
- Using a keyboard tray with a corner-piece work surface provides an additional 8" of workspace depth. This allows use of a portion of the work surface for writing.
- Corner-piece work surfaces have a front diagonal or curved cut that should not impair the function of a keyboard tray.

- The corners of two rectangle surfaces work surfaces meet at a right angle. This corner space should not be used to support keyboards or pointing devices unless:
 - both surfaces are set to the correct keying height,
 - the depth is sufficient for the monitor, keyboard, slant board or document holder, and palm glide or wrist rest, and
 - the user can pull up to the computer work components that are in a straight line of sight to the seated user.

E. Monitor Height:

- Adjust monitor to the recommended height for the worker by using one of the following options:
 - Monitor set directly on work surface, i.e., for bifocal user.
 - Monitor placed on CPU on work surface.
 - Monitor supported by articulated monitor arm.
 - Monitor placed on monitor risers.
 - Monitor placed on paper reams or books as a temporary measure.

2. Work Surfaces for Non-Computer Tasks, Writing/Paperwork:

- Should extend to either side of the computer/keyboard surface, creating a “cockpit” configuration, to increase workflow efficiency.
- Should be:
 - Height adjustable from 24” to 36” in a minimum of 1” increments.
 - Depth not greater than 30”.
 - Minimum width 30 “.
 - Width depends on tasks to be performed, i.e., working with large blueprints frequently would require a wider work surface.
- Adjacent pieces used for work surface should have the same height adjustability.
- Furniture legs, supports, or posts should not impair movement between these surfaces.

3. Work Flow Organization:

- Consider equipment routinely used, the telephone, a calculator, Rolodex, etc. Also consider references needed, such as binders, computer reports, or texts.
- Position equipment most frequently used within easy reach.

4. Storage:

- A. Overhead storage, such as files or shelves, must not limit the height of the monitor.

- B. Attached or surface-hung pedestals must not limit the ability to lower the work surface or impair leg movement.
- C. File cabinets and drawers under work surfaces must allow for work surface height adjustability to 24”.
- D. Overhead storage should be installed in easily accessible locations to allow for an easy reach to material. Consider materials to be stored in overhead files and shelves, the way in which they will be used, and the frequency of use.
 - Is object large, bulky, or clumsy?
 - Is it used frequently?
 - Does worker have to stand to get to it?
 - Can the worker easily reach across the work surface to the storage height?
 - Is the object too heavy to lift down safely using only one hand?

MULTIPLE-USER WORK STATIONS

Measurements and guidelines for multiple-user work stations are the same as those for single user work stations above. In addition, the following guidelines apply:

1. Computer and work surfaces should be free standing and easily height adjustable by each user. Enough clearance should be allowed between adjoining surfaces to avoid pinching fingers during adjustment.
2. If computer work surface is not easily height adjustable:
 - Computer monitors should be on articulated monitor arms for easy adjustability.
 - Keyboards should be on adjustable keyboard trays or articulating arms.

SIT/STAND WORK STATIONS

Guidelines for sit/stand work stations are the same as those for single user work stations above. Measurements will vary as noted below for standing height work surfaces. In addition, the following guidelines apply:

1. Neutral posture should be maintained whether sitting or standing at work station.
2. Chairs should be consistent with the Chair Consensus Guidelines.
3. Sit/Stand Adjustability:
 - Minimum height range from floor to top of work surface or keyboard is 26” to 48”.

- Work surface to be height adjustable in 1” increments or less.
- Height easily adjusted by multiple users (crank, pneumatic, etc.)

COMPUTER PERIPHERALS CONSENSUS GUIDELINES

1. General Guidelines

- Peripheral equipment supports neutral posture for seated or standing office and computer work tasks.
- Peripheral equipment is not a substitute for a properly fitting chair (see Chair Consensus Guidelines).
- Peripheral equipment should be evaluated based on the posture, measurements, and tasks of the worker by means of an ergonomic assessment.
- Advertising which claims a product is “ergonomic” does not ensure that it will automatically fit the needs of a worker or work process.
- Try equipment out in the work environment with the employee(s) who will be using it before buying. Ask the salesperson to bring a demo sample to try before purchasing. One size does not fit all!

2. Questions to Ask Regarding Peripherals:

- Does it support neutral posture?
- Does it support efficient workflow?
- Will it work with your electronic/computer systems?
- Does it create any “side effects” or result in damage to employees or systems?

3. What Can Peripherals Do?

- Alleviate or reduce symptoms caused by static postures designed into office work.
- Provide relief to users who are experiencing constriction or over-exertion of body parts in the use of standard computer equipment.

4. Glare Guards, Monitor Visors, and Spectrum Lighting:

Eyestrain is a major complaint of workers. Glare is a main contributing factor of eyestrain and is caused by both natural and artificial lighting. The following steps may eliminate glare:

- Tilt the monitor down.
- Position the monitor to the side of natural light sources (not in front or behind).
- Remove light bulbs to lessen the candlepower.
- Add task lights to increase light for reading/writing work surfaces.

If the above steps do not eliminate glare then consider:

- Spectrum filters or lighting to soften light.
- Glare guards or glare screens. Use only those sanctioned by the American Optometric Association (AOA).
- Clean glare screens at regular intervals with specially prepared wipes or cloth.

5. Slant Board/Document Holder:

Use a slant board (inclined surface) or document holder to hold documents from which worker is keying or typing. A slant board provides inclination of the document. This allows the worker to maintain neutral neck alignment and reduces muscle load on the neck. Preferable placement of the slant board or document holder is between the monitor and keyboard. It can also be placed to either side of the monitor if there is not space to place between the monitor and keyboard.

- Slant board should be used only to make brief notes and markings to documents, not for continuous writing.
- There should be no glare from the slant board.

6. Telephone Headsets:

- Use to avoid static or awkward posture, "telephone neck".
- Necessary for workers:
 - Having a high volume of phone calls.
 - Having lengthy phone calls.
 - Who write or computer input while on phone calls.
 - Who spend 20% or more of the work day using the phone.
- Multiple styles available.
- Must be compatible with phone system.
- Phone shoulder rests are not an acceptable substitute.

7. Adjustable keyboard Trays:

- Allows individual workers to adjust as needed:

- Keyboard height and angle.
- Decreases fatigue on the muscles of the shoulder and neck.
- Reduces need to adjust work surface heights for different workers, particularly in multiple user work stations.
- Minimum width of 26" (inside measurement), wide enough to support the pointing device on the same level as the keyboard.
- Supports not to interfere with user's legs or knees.
- Should hold stable position, maintaining the adjustment made by each user.
- Should have a backstop or non-slip surface to prevent keyboard and pointing device from slipping off while in negative slope.
- Tray should be limited to 90 degree (flat) or negative slope. Forward or positive incline of keyboard tray puts wrists in non-neutral position.
- Adjoining work surfaces and drawers should not conflict for space while using keyboard tray.

8. Keyboard:

- Should permit user to maintain neutral posture.
- Should lay flat.
- Feet on bottom, designed to put keyboard in forward incline, should be closed or folded into keyboard base.
- Should be trial tested by the user in the work environment before purchase.
- Should be compatible with computer system with which it will be used.

9. Alternative Keyboard:

- Adjustable in width and pitch (lateral inclination).
- Should be referred for an ergonomic assessment for:
 - Symptoms of neck or arm pain.
 - For employees with wide shoulder span.

10. Mouse Pad Over Lay:

A mouse pad overlay is a platform that can slide over the number keys on the keyboard. The pointing device rests on the platform. The user's arm is then closer to the body while using the pointing device. This relieves muscle fatigue generated by using the mouse with an extended arm

11. Mouse pointing Device:

- Appropriate one is determined by a task analysis.
- Should be sized to the user's hand.
- Needs to be at the same level as the keyboard.

- Can be used on either the right or left side of the keyboard.
- Should be tested in the work setting for 30 days prior to purchase.
- Thumb track ball not recommended.
- Assure computer compatibility.

12. Alternative Pointing Device:

- Examples are trackballs, mini joysticks, “the eraser device”, touch pads, glide points, stylus with a digital pad, mice with extra keys, and alternative new designs.
- Studies indicate the non-dominant side of the body does better with the use of larger objects. Placing the pointing device at the non-dominant side of the body can relieve stress on the dominant side of the body.

Try an alternative pointing device when:

- Worker complains of arm pain and the pointing device is in the proper location.
- A standard mouse cannot be located in alignment with the keyboard.
- Worker grips pointing device tightly.
- Workers are very specific about the type of pointing device they will tolerate, regardless of ergonomic recommendations.
- Trackball pointing devices may have computer hardware compatibility problems associated with the communication of the programming.

13. Monitor Risers/Arms:

- Provide adjustability for multiple user work stations.
- Must safely and securely support the weight of the monitor.
- Should be easily adjustable.
- Should hold position each time it is set.
- Could consist of reams of paper or books as a temporary solution.
- Should not be phone books, as glossy covers may be slippery and unstable.

14. Other:

- Footrests may be necessary in certain situations.
- Ergonomic assessor should partner with Information Systems staff to assure computer systems compatibility.

- Buy chairs with the appropriate caster for the floor surface. Chair casters are uniquely designed, some to be used on carpeting, some to be used on hard-surface flooring.
- Floor mats are not recommended. Hard surface floor mats on top of carpeting create slip, trip, and fall hazards for the worker in a chair.

Commonly Used Furniture Terms

This glossary is designed to provide terms that you may come across when buying furniture. Not all of these terms were used in the consensus guidelines.

Conventional Furniture

Freestanding furniture consisting of desks, tables, credenzas, returns, files and bookcases.

Crank

A device which, when turned in one direction or the other, will direct a work surface to a new height position. Cranks are often found on adjustable height tables or adjustable height work surfaces.

Freestanding

Refers to furniture that relies on floor standing components for support. Typically, support may include various types of legs and/or pedestal storage.

Furniture Edges

angled - The front edge detail of a work surface, which has an edge angle other than right angled.

bullnose - The front edge detail of a work surface rounded at the top and bottom.

t-cap - Edging material with a spline attached that fits into the lateral edge of the work surface similar to tongue and groove where the tongue is attached to the edging material and the groove is within the work surface.

Keyboard Support

negative slope - Refers to the angle at which a computer keyboard support is positioned. The back side of the keyboard support is positioned below the front side.

keyboard tray - A device that holds a computer keyboard. It is usually attached to the front edge of the work surface holding the computer monitor.

articulating arm - An adjustable keyboard tray that holds a computer keyboard. The articulating arm allows for adjustments including height, depth, width and angle. It is usually attached to the underside of the work surface at the front where the user is sitting.

Panels

room dividers - Partitions that divide a space from floor to ceiling. Usually attached to a wall and stored in a closet. They fan-fold out to full extension and contracts to fit into the closet.

panel - Systems furniture component that is used to divide space and support components such as work surfaces and overhead storage. Available in various heights and widths. In addition, they can be specified as acoustic, tackable and powered. Finish materials include fabric and paint.

panel - A flat or curved surface which controls and/or defines space; provides privacy and a means for hanging components. See systems Business Industrial Furniture Manufacture Association (BIFMA).

screen panel - A non-load carrying space divider that is less than ceiling height. See freestanding panel (BIFMA).

freestanding panel - A panel intended to stand without the support of other panels. See screen panel. Usually used to define area of function, deny visual access or if specifically constructed, control or provide acoustical privacy (BIFMA).

partitions - A term used interchangeably with Panel.

Pedestals

pedestal - a self-contained storage unit with drawers or doors. It may be mobile, and may be used to assemble a desk product (BIFMA).

freestanding - A storage component which usually sits under a work surface and is unattached to that work surface. The top of the pedestal is finished with a cap so that it may also be used out in the open away from the work surface.

attached - A storage component, which is affixed to the underside of a work surface. Attached pedestals can be full-height and sit on the floor or be partial-height and suspend from the work surface.

pedestal base - A base that supports a unit by a single central structural member such as a spindle (BIFMA).

Peg-in-sleeve

Adjustment of a (table) surface by a peg method on the leg. Leg within a leg. A telescoping leg adjustment, mechanical, to be adjusted one time for a single user.

Pneumatic

Refers to a gas-filled cylinder, which allows a user to adjust the height of a chair with a lever.

Pointing Devices

Typically referred to as a mouse, track ball, or glide point, pointing devices are used to input information into a computer. They are usually used on a mouse pad located on the work surface.

Stand Alone

Refers to furniture that does not rely on other product for function or support.

Systems/Panel/Modular

modular - Components which may be repositioned or reused in different positions.

modular system - collection of related units, some of which are dimensional multiples of others, into various horizontal and/or vertical arrangements, to serve various purposes including storage, display, or shelving (BIFMA).

modular systems furniture - Modular furniture made up of independent work surface and storage units with panels used as end panels or space dividers. Includes all modular furniture components that collectively are required to complete a workstation (BIFMA).

panel hung - Components, which require a systems panel for support; typically attached to a panel with brackets.

panel supported systems - Individually connected panels and work surfaces, filing, storage and shelving components and accessories which receive their primary support from the panels and which, when combined, form complete workstations (BIFMA).

An office environment comprised of modular components including panels, work surfaces, pedestal and overhead storage, electrical and data cable storage.

panel/screen - non-load-bearing; All free standing screens that provide visual and/or acoustical separations, and are intended to be used to divide space but not used to physically support furniture items (BIFMA).

modular systems furniture - Modular furniture made up of independent work surface and storage units with panels used as end panels or space dividers. Includes all modular furniture components that collectively are required to complete a workstation.

Work Surface

corner - An area in an office or workstation where a computer is located. Usually a work surface, which has a 45° angle edge where the user sits.

rectangular or rectilinear - A work surface in the shape of a rectangle where the work surface length is greater than the depth of the surface.

Work Surface Cuts

Angular cut - A manufactured cutout of a corner work surface with a keyboard insert which allows the user to position closer to their computer monitor.

belly cut - A curvilinear cutout at the front of a rectangular or rectilinear work surface which allows the user to position closer to the computer monitor.