



fast facts

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Avoid Injury When Lifting and Handling Heavy Materials

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Many jobs require lifting, pushing, pulling, holding, carrying, and throwing. About one in ten, however, requires extensive material handling. These activities occur throughout the Capitol Campus, but they are most commonly found in the House and Senate Office buildings and in the Library of Congress, particularly work done by maintenance workers and laborers.

Material handling can result in overexertion, which is the most costly injury in the United States, in terms of workers' compensation. Most overexertion injuries involve the trunk and back, but other parts of the body can be affected, such as the knees, shoulders, arms, legs and neck.¹ These strains may be "one-time" events. However repeated stresses from handling materials can weaken joints, pinch nerves, inflame tissues, damage muscles, and result in chronic illnesses.²

Risk Factors

Risk factors are characteristics of the job that increase the chance of sustaining an injury. The more risk factors present in a job, the greater likelihood of injury. Risk factors include:

- weights of objects handled;
- forces required to move objects;
- awkward positions, especially bending the back and reaching to grasp, hold, or lift objects;
- twisting, jerking or sudden motions; and
- frequency and duration of handling and holding.

To avoid injury from material handling, you should arrange your work to remove as many of these risk factors as you can. Plan and perform your activities so you:

- don't twist the torso while lifting, lowering, pushing, pulling and carrying;
- don't bend too much during lifting, carrying, lowering, pushing or pulling (if you can, keep the object in your "strike zone," or area between the knees and shoulders, during the entire lift);
- make sure your knuckles stay above waist height while pushing, pulling and carrying;
- don't reach with your hands held far away from your body while lifting, lowering or carrying an item ("hug" the object and keep it close to your torso);
- don't use handles that are hard to hold or that are located so the objects become unstable during handling (handles must be located below the center of gravity and so the weight on each side of the handle is equal);
- don't have a poor footing that might cause slipping or instability during lifting, lowering, pushing, pulling and carrying; and finally
- don't make sudden or jerking movements while lifting, lowering, pushing, pulling and carrying.



When preparing to lift, lower, and carry an object, you should:

- size up the load and if it’s too heavy, too big, or awkward to grasp and hold, you should divide it, get help, and/or use a mechanical lifting device (if the weight is unknown, lift each side slightly or slide the object to test it);
- check the load’s surface and if the object is soiled or oily so you won’t be able to hold it close, you should clean the surface or use protective clothing, such as an apron;
- inspect the handles and if your grip will be unsure, or if edges might “cut” into your hands, you should use gloves or other devices to help you hold the object;
- survey your route for obstructions that would keep you from getting close to the object to lift it; anything that would restrict your movement along the route; spills, obstructions, stairs, uneven surfaces, or other slip/trip hazards; and
- plan where to set the load down so it will be in your “strike zone.”

Guidelines for weight limits of objects to be lifted:

The following table provides advice for examining an object’s weight, location and distance before lifting the object:

Weight Limits of Objects to be Lifted (in pounds)								
Height Above Floor ►	Floor Level	10 inches Above Floor	20 inches Above Floor	30 inches Above Floor	40 inches Above Floor	50 inches Above Floor	60 inches Above Floor	More than 70 inches
Horizontal Reach ▼								
10 inches or closer	35	38	41	45	41	38	35	Do not lift. Get help in lowering the object.
15 inches away	23	25	28	30	28	25	23	
20 inches away	17	19	20	22	20	19	17	
25 inches away	14	15	17	18	17	15	14	
Further than 25 inches	Do not lift: Get closer to the object or get assistance with lifting it.							
<p>This table was developed from the NIOSH Lifting Guide.⁶ It applies only to lifting objects that have good handles, while using both hands, without twisting the trunk, and at a frequency no less than one object every 5 minutes. If these conditions do not apply, the weight of the object should be less than that listed in the table.</p> <p>“Height Above Floor” means the vertical distance of the hands above the floor either at the start or at the end of the lift. (Use whichever height matches the lower weight in the table.)</p> <p>“Horizontal Reach” means the horizontal distance of the hands away from the midpoint between the ankles either at the start or at the end of the lift. (Use whichever horizontal reach matches the lower weight in the table.)</p>								

When lifting and lowering an object you should:

- move close to the object;
- if the object is on or near the floor, squat down bending at the knees and hips with your back straight;
- firmly grasp the load with both hands, not just the fingers;
- draw the object close to your body and keep your weight centered;
- if the object is below the “strike zone,” lift slowly with your legs keeping your back straight;
- for objects in the “strike zone,” draw the object near the torso and then lift; and
- for objects above the “strike zone,” lower the object to the “strike zone” while keeping it as close to the upper torso as you can (sometimes it may be better to lower the object onto a table or other horizontal surface and then draw it near the torso and lift it).

When carrying an object you should:

- make sure you have a firm grip on a comfortable handle before moving the load;
- stand up straight and make sure the load is balanced;
- hold the load close to your body without flexing the arms, if possible;
- hold the load so it will not interfere with the legs while walking;
- make sure the load does not obstruct your forward vision to avoid trips, falls, or walking into something; and
- avoid any sudden movements that could upset the load balance.

When turning with an object you should:

- aim one foot toward your destination and don't twist your body; and
- use your feet (not your waist) to pivot or walk through the turn.

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Overexertion Injuries

- Direct compensation for overexertion injuries in the U.S. in 2006 was \$12.4 billion, exceeding the compensation costs of injuries combined for the second and third categories, which include various types of falls.
- A 20-pound sack of flour held 20 inches in front of your body places about 400 pounds of compressive force on your lower spine.
- The back has 300 muscles, 33 vertebrae, and discs between the vertebrae. Discs are fibrous cartilage surrounding a soft, gelatinous material. Discs maintain alignment of the vertebrae and cushion the forces imposed by daily activities. Over a period of time, stresses can tear the fibrous outer casing of the discs. The discs have no blood supply for healing. The inner contents can leak out of a disc, causing it to narrow. The results can be pinching, deterioration of the joints, inflammation, and pain.

References

- ¹ "Manual Material Handling: An Ergonomic Approach," Texas Department of Insurance, Division of Workers' Compensation, HS95-052B (1-05).
- ² "Workplace Safety Index," Liberty Mutual Insurance, April 2009.
- ³ "Lessons for Lifting and Moving Materials," Washington Department of Labor and Industries, F417-129-000, February 2000 Edition.
- ⁴ Checklist is based on the work from T. R. Waters, "Manual Materials Handling," in: *Physical and Biological Hazards of the Workplace* (2nd edition). Edited by P. Wald and G. Stave. New York: John Wiley and Sons, 2002.
- ⁵ "Ergonomic Guidelines for Manual Material Handling," National Institute for Occupational Safety and Health, Publication No. 2007-131, 2007.
- ⁶ "The NIOSH Guide for Lifting," National Institute for Occupational Safety and Health, Publication No. 94-110, 1994.
"Threshold Limit Values..." (includes guidance for lifting), American Conference of Governmental Industrial Hygienists (ACGIH), latest edition.



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