

Lifting and Material Handling

Lifting heavy items is one of the leading causes of injury in the workplace. The Bureau of Labor Statistics reported that over 36 percent of injuries involving missed workdays were the result of shoulder and back injuries. Overexertion and cumulative trauma were the biggest factors in these injuries. Bending, followed by twisting and turning, were the more commonly cited movements that caused back injuries. Strains and sprains from lifting loads improperly or from carrying loads that are either too large or too heavy are common hazards associated with manually moving materials.

When employees use smart lifting practices, they are less likely to suffer from back sprains, muscle pulls, wrist injuries, elbow injuries, spinal injuries, and other injuries caused by lifting heavy objects. Please use this page to learn more about safe lifting and material handling.

Lifting Principles

Lifting Stages

1. Preparation
2. Lifting
3. Carrying
4. Setting Down

1. Preparation

Before lifting or carrying, plan out your lift. Think about:

- How heavy/awkward is the load? Should I use mechanical means (e.g. a hand truck) or another person to help me with this lift? Is it possible to break the load into smaller parts?
- Where am I going with the load? Is the path clear of obstructions, slippery areas, overhangs, stairs, and other uneven surfaces? Are there closed doors that need to be opened?
- Are there adequate handholds on the load? Do I need gloves or other personal protective equipment? Can I place the load in a container with better handholds? Should another person help me with the load?

2. Lifting

Get as close to the load as possible. Try to keep your elbows and arms close to your body. Keep your back straight during the lift by tightening the stomach muscles, bending at the knees, keeping the load close and centered in front of you, and looking up and ahead. Get a good handhold and do not twist while lifting. Do not jerk; use a smooth motion while lifting. If the load is too heavy to allow this, find someone to help you with the lift.

3. Carrying

Do not twist or turn the body; instead, move your feet to turn. Your hips, shoulders, toes, and knees should stay facing the same direction. Keep the load as close to your body as possible with your elbows close to your sides. If you feel fatigued, set the load down and rest for a few minutes. Don't let yourself get so fatigued that you cannot perform proper setting down and lifting technique for your rest.

4. Setting Down

Set the load down in the same way you picked it up, but in the reverse order. Bend at the knees, not the hips. Keep your head up, your stomach muscles tight, and do not twist your body. Keep the load as close to the body as possible. Wait until the load is secure to release your handhold.

Important Things To Remember

- Use mechanical means (e.g. hand trucks, pushcarts, etc.) when possible for heavier or awkward loads. Remember to obtain training and authorization before using a forklift.
- It is easier and safer to push than to pull.
- Keep loads as close to the body as possible and do not twist while lifting, carrying, or setting down a load. Nose, shoulders, hips, and toes should all be facing the same direction.
- Minimize reaching.
- As a general rule, bend at the knees, not the hips.
- Get help when needed. Do not lift or carry things you don't feel comfortable with, no matter how light the load.
- Plan ahead for all parts of the lift: lifting, carrying, and setting down.
- Try to utilize proper handholds while lifting. If an item does not have a good handhold, think of ways to remedy this, such as placing the item in a container with good handholds, creating a safe and proper handhold with an appropriate tool, etc.
- Use personal protective equipment where needed, such as gloves with good grip and steel-toed boots where appropriate.
- Implement rest breaks and job rotation for frequent and/or heavy lifting.
- Place items to be lifted within the "power zone". The power zone is close to the body, between the mid-thigh and mid-chest of the person doing the lifting. This is the area where the arms and back can lift the most with the least amount of effort.

Weight Of Objects

Heavier loads place greater stress on muscles, discs, and vertebrae.

Where possible, use mechanical means such as forklifts or hand trucks to transport heavy items. Ramps can be helpful in moving heavy items from one level to another. Materials that must be manually lifted should be placed at "power zone" height: about

mid-thigh to mid-chest of the person doing the lifting. Ensure that proper lifting principles (see above) are used. Try to order supplies in smaller quantities and/or break loads up into smaller, lighter quantities where possible. Is the container itself heavy? Perhaps a smaller or lighter container is available. Limit weight you lift to no more than 50 pounds. When lifting loads heavier than 50 pounds, use two or more people to lift the load.

Awkward Postures

Bending while lifting causes several problems for the back. It adds the weight of the upper body to the weight of the object being lifted. Bending and/or reaching moves the load away from the body and allows leverage to significantly increase the effective load on the back, leading to stress on the lower spine and muscle fatigue. Carrying loads on one shoulder, under an arm, or in one hand creates uneven pressure on the spine.

Move items close to the body and use the legs when lifting from a low location to minimize bending and reaching. Ensure proper housekeeping is taking place so that you may get as close to your lifting load as possible. Store and place materials that need to be manually lifted at the “power zone”: mid-thigh to mid-chest height. This can be accomplished by placing objects on shelves, tables, racks, or stacked pallets; or by using ladders or aerial lifts where necessary to elevate yourself and minimize overhead reaching. Roll-out decks in truck beds can be utilized to bring materials closer to the employee and eliminate the need to crawl into the back of a truck. Ensure that proper lifting principles (see above) are used, including avoiding twisting and holding the load close to the body.

High-Frequency and Long-Duration Lifting

Holding items for long periods, even if loads are light, increases the risk of back and shoulder injury since muscles can be starved of nutrients and waste products can build up. Repeatedly exerting, such as when pulling wire, can fatigue muscles by limiting recuperation times. Inadequate rest periods do not allow the body time to recover.

Plan ahead when beginning work that will require high-frequency and long-duration lifting. This way, the work can be organized in such a way so as to minimize the time workers spend holding loads. Adequate rest breaks can be planned in, as well as job rotation between employees. This includes both rotating tasks (employees trade off on differing tasks) and team work (two or more employees work together doing different parts of the same activity to reduce strain). Planning can also include the pre-assembly of work items to minimize the time spent handling them during the actual work.

Inadequate Handholds

Inadequate handholds, such as boxes without handles or oddly-shaped loads, make lifting more difficult, move the load away from the body, lower lift heights, and increase the risk of contact stress and of dropping the load.

Where possible, utilize handholds such as handles, slots, or holes that provide enough room for gloved hands. Try to use materials that are packaged with proper handholds (your supplier may be able to provide different containers), or move materials into containers with good handholds. Wear protective equipment to avoid finger injuries and contact stress. Ensure that gloves fit properly and provide adequate grip. Suction devices are helpful in lifting junction boxes and other materials with smooth, flat surfaces. Other tools may be available that can create temporary handles.

Environmental Factors

Be aware of extreme temperatures that can affect lifting and material handling. For example, muscle flexibility decreases in cold temperatures, and hot temperatures can lead to heat stress. Low visibility or poor lighting increases the chance of trips and falls.

Do what you can to adjust work schedules to minimize exposure to extreme temperatures or low visibility. Wear appropriate clothing for the temperature in which you will be working. Drink lots of water to avoid dehydration in excessive heat. Provide proper lighting for areas with low light and try to perform work during daylight hours when possible.

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<https://ehs.unc.edu/workplace-safety/ergonomics/lifting/>