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STAIRWAYS AND LADDERS

MODULE DESCRIPTION

This module provides information on the safety concerns and precautions associated with various types of stairways and ladders.

OBJECTIVES

After completing this module, the participant will be able to:

- Identify the different types of ladders.
- Describe the safety guidelines and requirements for ladders.
- Identify the different types of stairs.
- Describe the safety guidelines and requirements for stairways.

MODULE OUTLINE

1. Stairways and Ladders

Remember, falls cause the majority of general industry accidents and are responsible for many accidental deaths. In fact, falls are the second leading cause of fatalities each year.

2. Elevated Surfaces

Fixed Industrial Stairs

- Stairs must be free from hazards that could cause a fall.
- Handrails must be sturdy and in the right place.
- Tread width, rise, platform, and overhead clearance must meet OSHA stair construction guidelines.

Portable Ladders

- Movable ladder parts must operate freely, yet with stability.
- Ropes cannot be frayed or badly worn.
- Rungs must be free from grease, oil, or other slippery materials.
- Ladders that present a potential hazard must be discarded.

Fixed Ladders

- Fixed ladders must have specific load requirements.
- Rungs and side rails must be positioned appropriately.
- Only specific materials may be used when constructing fixed ladders.
- Some fixed ladders may require additional fall protection, such as cages, platforms, or safety harnesses.

3. Types of Portable Ladder

Portable Ladders

- **Extension ladder:** Extension ladders offer the greatest length in a general-purpose ladder. This ladder consists of two or more sections that travel in guides or brackets, allowing for adjustable lengths. The sections must be assembled so that the sliding upper section is on top of the lower one. Each section must overlap its adjacent section by a minimum length, which is based on the overall length of the ladder. Make sure the ladder has a non-slip base and be careful if you use it on an oily, metal, or concrete surface. Place the ladder securely and tie it off to prevent slipping.
- **Step ladder:** The standard stepladder has flat steps and a hinged back. It is self-supporting and non-adjustable. An industrial model, designed for heavy service demands, has oversize back legs, heavy-duty flat steps, and knee braces that increase rigidity and durability. Step ladders should only be used on surfaces that offer firm, level footing such as floors, platforms, and slabs. Remember never to stand on or work from the top step.
- **Straight Ladder:** Straight ladders are non self-supporting, have one section, and have a fixed length (which is determined by the length of the side rails). If a straight ladder is going to be used on a slippery surface, it must have slip-resistant feet or be secured to prevent it from sliding.
- **Two-Way Ladder:** Two-way ladders are similar to an industrial step ladder; however, each side of a two-way ladder has steps. The extra set of steps offers convenience and versatility one person can work from either side or two people can use the ladder at the same time, one on each side.
- **Platform Ladder:** Special-purpose ladder that has a large, stable platform from which a person can work at the highest standing level.

Fixed Ladders: A fixed ladder is any ladder that is permanently attached to a structure, building, or piece of equipment

- Important points to remember concerning fixed ladders are:
 - o Any fixed ladder with a climbing distance of 20 feet or more must be equipped with a cage to help ensure the safety of the climber
 - o When a climbing distance is 30 feet or more, landing platforms must be in place every 30 feet. Platforms will be offset from the adjacent section of ladder to help break the distance of a free fall.
 - o Fixed ladders will be constructed with a pitch between 90 and 75 degrees, measure from the backside of the ladder.
 - o Never use a fixed ladder with a pitch greater than 90 degrees from the horizon.

4. Ladder Maintenance

One of the key factors in the safe use of ladders is properly maintaining your ladder. Ladders wear out when used just like any other tool. A ladder that has not been properly maintained can be extremely unsafe to use.

The four main points of ladder maintenance:

- Always check to make sure your ladder isn't missing any rungs. If it is, you could potentially injure yourself by falling.
- Always make sure that your ladder is clean and ready to be used before you climb it, or else you might slip and fall.
- Always check to make sure none of the rungs on your ladder are cracked or otherwise weakened. If they are weak, they could break while you are standing on them.
- Always check to make sure the treading on the steps of your ladder is intact. Otherwise, you could slip and fall.

If a ladder is missing rungs, is dirty, has cracked or weakened rungs, or has loose treading, you should immediately take the ladder out of use and place a visible sign on it that reads Do Not Use.

When using a step ladder, you should always check to make sure:

- The hinge is in good working condition.
- The ladder opens easily and smoothly.
- The hinge has a working lock mechanism to ensure the ladder does not collapse on itself while in use.

When using an extension ladder, you should always check to make sure:

- All moveable and extendable parts are in good working condition.
- Moveable and extendable parts are loose enough to easily slide.
- The locking mechanism is working to ensure that the ladder stays in position while in use.

Just as with any other piece of equipment, if a ladder is used improperly, it can become a potentially deadly hazard.

To protect yourself and others when using ladders in the workplace, remember these rules:

- Only use a ladder for its intended purpose.
- Never exceed the maximum load rating of a ladder.
- Do not carry items up a ladder that may affect your balance and cause you to fall.
- Keep at least one hand on the ladder at all times while climbing.
- Always face a ladder when climbing up or down.
- Never use the top of a stepladder as a step.
- Do not use a ladder on unstable or uneven ground.
- Never use a ladder that is obviously damaged or marked as Do Not Use.
- When using an extension ladder to reach an upper level, the length of the ladder must extend 3 feet or more past the walking surface above.

5. Stairway Requirements

Stairs are also a major source of fall hazards in the workplace, and OSHA has specific regulations to help you StaySafe while using them. The main things you need to know are that the stairs must be free from hazards that could cause a fall and they must have handrails that are sturdy and in the right place.

OSHA requirements also cover the construction of stairs, including guidelines that determine the rise and tread width of each step, the size of the stairway platforms, and the required overhead clearance. Before we discuss these requirements, let's take a more in-depth look at the types of stairs.

There are two types of stairways: fixed industrial stairs and temporary stairs.

Any area of work where it is necessary to travel between two or more levels on a regular basis must be equipped with fixed industrial stairs to provide a permanent point of access for workers.

A fixed stairway should:

- Be able to support 1,000 pounds or more.
- Have a minimum width of 22 inches.
- Have a clear vertical overhead distance of at least 7 feet over any given stair tread.

Temporary stairways are stairs where permanent treads and/or landings are to be filled in at a later date. Pan stairs are a type of temporary stairway that serves as a form to be filled in with concrete once the stairs have been set in place.

Pan stairs can only be used if they are filled with filler material to at least the top edge of each pan. Metal pan landings and metal pan treads must be secured in place before they are filled. Also, all treads and landings must be replaced when worn below the top edge of the pan.

In addition to the construction of the stairs themselves, it is also important that stairways be properly guarded by either a stair rail or a handrail.

A stair rail is a vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels.

A handrail is a rail used to provide employees with a handhold for support.

The OSHA regulations for hand and stair rails are as follows:

- Handrails and the top rails of stair rail systems must be capable of withstanding, without failure, at least 200 pounds of weight applied within 2 inches of the top edge in any downward or outward direction, at any point along the top edge.
- Stairways with four or more risers, or that are higher than 30 inches, must be equipped with at least one handrail.
- Temporary handrails must have a minimum clearance of 3 inches between the handrail and the wall, stair rail system, and other objects.
- Handrails must provide adequate handhold for employees to grasp to prevent falls.
- Stairways with four or more risers, or more than 30 inches high must have a stair rail along each unprotected side or edge.
- If there is a fall hazard of 6 feet or more on an exposed side of the stairs, a stair rail system must be provided to prevent workers from falling off the side.

When constructing stairways, the following must be considered:

- Stairways must be installed at a point of access when there is an elevation break of 19 inches or more.
- Stairways must be installed at a uniform angle between 30 and 50 degrees.
- Stairways must have uniform riser height and tread depth, with less than a inch variation.
- Stairway landings must be located every 12 feet or less of vertical rise, and must be at least 30 inches deep and 22 inches wide.
- Unprotected sides of landings must have standard 42 inch guardrail systems.
- Where doors or gates open directly onto a stairway, a platform must be provided that extends at least 20 inches beyond the swing of the door.

When inspecting treads you should check for:

- Improper design
- Traction
- Structural strength
- Level surface
- Items protruding from the walking surface, such as nails or screws

When inspecting stair railing and handrails, check for:

- Structural integrity
- Proper placement and number of rails
- Clearance between other objects
- Smoothness of the railing