

## UNIT III - BUILDING CONSTRUCTION

### Lesson 1: Construction Safety

**Competency/Objective:** Describe safety practices associated with building construction.

#### **Study Questions**

1. What are safety factors to consider when working with heights?
2. What are safety factors to consider when working with construction equipment and tools?
3. What are safety factors to consider when working with structural elements?

#### **References**

1. *Agricultural Structures (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit III.
2. Activity Sheet
  - a) AS 1.1: Safety on the Construction Site



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#### TEACHING PROCEDURES

##### B. *Introduction*

Accidents occur in the construction and agriculture industries all the time. In combining the activities of the two industries, a very dangerous array of work conditions exists. Taking precautions is necessary when participating in any construction project around the farm. While every possible hazard involved in agricultural construction cannot be addressed in a single lesson, this lesson outlines some specific recommendations for safety in constructing agricultural structures.

##### C. *Motivation*

Discuss the Bureau of Labor statistics for 1997 given below. They indicate just how dangerous both the construction and agriculture industries can be. (Only the industry division for transportation and public utilities and the division for mining have a similarly high number of fatalities relative to the numbers for total employment.)

Percentage of total workforce involved in each industry division

Services	28%	
Retail trade		17%
Manufacturing	16%	
Government	15%	
Construction	6%	
Agriculture, forestry, and fishing	3%	

Percentage of total fatalities for all workplace incidents

Services	12%	
Retail trade		11%
Manufacturing	12%	
Government	10%	
Construction	18%	
Agriculture, forestry, and fishing	13%	

##### D. *Assignment*

##### E. *Supervised Study*

##### F. *Discussion*

1. Ask students if they have ever worked on a roof or on top of a tall ladder. Did they take any measures to keep injuries and accidents from occurring? Discuss safety measures that could be taken to prevent injuries.

**What are safety factors to consider when working with heights?**

- a) Equipment must be well maintained and in good working order.

- b) The base of a ladder or the legs of a scaffold must be evenly set on a solid, non-slippery surface.
  - c) Any applicable safety equipment, such as safety belts and boots with non-skid soles, should be used.
  - d) Use extra caution when carrying roofing materials and carry small, manageable loads.
  - e) Move slowly and carefully because roofs can be slick.
  - f) Do not attempt to work at heights if experiencing any dizziness or disorientation.
2. Have students look at an assortment of simple tools (hammers, screwdrivers, saws, drills, etc.) that might be used in construction. Ask them to imagine the kinds of injuries that could occur when using these tools. Do they know anyone who has been seriously injured when building something? Discuss safety factors to consider to prevent similar accidents.

**What are safety factors to consider when working with construction equipment and tools?**

- a) Keep tools well maintained and in proper working order.
  - b) Use tools and equipment for their intended purpose.
  - c) Follow the manufacturer's instructions for the use of equipment and tools and take heed of any safety recommendations.
  - d) Fatigue can lead to carelessness; take breaks as needed.
3. Ask students to list the different types of materials that may be used when constructing a building. What sorts of injuries might occur when working with these materials? Discuss the different factors that may prevent these injuries. Have students complete AS 1.1.

**What are safety factors to consider when working with structural elements?**

- a) Care should be taken when loading and unloading; avoid standing where materials (or the equipment handling them) could be a hazard in the event of a mishap.
- b) Care and good technique are necessary when lifting construction materials.
  - 1) They should be moved in some other way if possible, such as pushing, rolling, or sliding.
  - 2) If construction materials must be lifted, the best way to do so is to bend at the knees, keeping the back straight, and lift the object by straightening the legs; reverse the process when setting materials down.
  - 3) To turn, the feet should be moved to a new position; twisting at the waist should be avoided to prevent back injuries.
- c) Some materials, such as concrete, may be caustic and should be handled wearing protective clothing and boots.
- d) Electrical hook-ups should only be assembled by someone who is very knowledgeable and qualified to establish such service; sufficient grounding and circuit breaking devices must be in place.
- e) Materials and waste materials should be kept organized and out of the way while working to prevent tripping.

G. ***Other Activities***

Have the students (possibly working in small groups) search news articles for examples of construction accidents and bring them to class. Discuss how these accidents might have been avoided.

H. ***Conclusion***

The safety tips about working with heights, tools and equipment, and structural elements that are given in this lesson address only a few of the areas of concern. Every worker needs to pay attention and use good judgement. Staying alert can help avoid injury when working on agricultural structures.

I. ***Answers to Activity Sheet***

Suggested answers are given below.

- 1. Tools should be well-maintained; manufacturer's instructions and safety recommendations should be followed; tools should be used for their intended purpose; use protective clothing such as gloves, long pants, ear protection, and safety glasses.
- 2. Set the base of the ladder securely; carry small, manageable loads; use good lifting technique; move slowly on the roof; wear boots with non-skid soles when working on the roof.
- 3. Take care when unloading materials and avoid standing in their path in case of an accident; lift materials safely; wear protective clothing such as gloves and work boots.
- 4. Keep waste materials out of the way; lift materials safely; wear protective clothing such as gloves and a hard hat.

J. *Answers to Evaluation*

1. d
2. c
3. b
4. Answers may include any two of the following.
  - Keep tools well maintained and in proper working order.
  - Use tools and equipment for their intended purpose.
  - Follow the manufacturer's instructions for the use of equipment and tools and take heed of any safety recommendations.
  - Fatigue can lead to carelessness; take breaks as needed.
5. If you are experiencing dizziness or disorientation
6. To prevent tripping



EVALUATION

**Circle the letter that corresponds to the best answer.**

1. When lifting objects:
  - a. Bend at the waist.
  - b. Lift using only the arms.
  - c. Lift with the back bent.
  - d. Bend at the knees.
  
2. Which of the following is a safety factor to consider when working with heights?
  - a. Carry large loads of materials to prevent making too many trips.
  - b. Move quickly to avoid spending too much time moving around.
  - c. Set the base of a ladder evenly on a solid, non-slippery surface.
  - d. Wear tennis shoes to keep from slipping on the roof.
  
3. To turn when lifting materials:
  - a. Twist at the waist.
  - b. Reposition the feet.
  - c. Turn at the knees.
  - d. Reposition the arms.

**Complete the following short answer questions.**

4. What are two safety factors to consider when working with tools?
  - a.
  
  - b.
  
5. When should you not attempt to work on a height?
  
  
  
  
  
6. Why should materials and waste materials be kept organized and out of the way while working?





Name \_\_\_\_\_

**Objective:** Identify safety measures that should be taken in various construction situations.

1. You are beginning to construct wooden walls, using hammers, air nailers, saws, and other woodworking equipment.

2. You are roofing a new two-story house. Additional materials are on the ground and need to be moved onto the roof before you can continue roofing.
3. At the building site you are working on, they have just finished taking the forms off the concrete for the basement. You are ready to begin the flooring. The materials you need have just arrived on a truck from the lumber yard.
4. You are cleaning up the work site while other workers construct the roof. They throw the waste materials from the top of the building to the ground.

