

UNIT VI - PLUMBING

Lesson 2: Plumbing Safety

Competency/Objective: Discuss safety practices for plumbing.

Study Questions

1. What are the different hazards associated with plumbing?
2. What are the tools needed for safe plumbing practices?
3. What are the proper methods for using tools and supplies associated with plumbing?

References

1. *Agricultural Structures (Student Reference)*. University of Missouri-Columbia: Instructional Materials Laboratory, 1999, Unit VI.
2. Transparency Masters
 - a) TM 2.1: Cutting Tools for Copper Pipe
 - b) TM 2.2: Flaring and Bending Tools
3. Activity Sheet
 - a) AS 2.1: Working with Plumbing Safely

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TEACHING PROCEDURES

B. *Review*

Many agricultural structures require some plumbing construction or repairs. Much of this work may be performed without outside help. A basic understanding of possible hazards and basic plumbing tools and their use is therefore desirable to perform these activities safely.

C. *Motivation*

Ask students if they have heard of or seen any accidents associated with working with plumbing. If possible, bring in newspaper clippings about serious accidents, such as trench cave-ins. Discuss the importance of safety.

D. *Assignment*

E. *Supervised Study*

F. *Discussion*

1. Referring back to the motivation, ask students to list some of the hazards associated with plumbing activities.

What are the different hazards associated with plumbing?

- a) Open trenches
 - 1) People can suffocate if the sides cave in and bury them.
 - 2) The sides should be carefully observed for signs of instability, such as loose and collapsing areas.
 - 3) These areas should be avoided until they have been excavated to a safe point.
 - 4) Heavy excavating equipment close to the sides of a trench can cause the earth to cave in.
 - 5) The equipment should be removed before anyone enters the area.
 - b) Plastic pipes cleaners and glues containing strong chemicals
 - 1) They may produce very strong, sometimes toxic, fumes.
 - 2) They may also irritate the skin.
 - 3) They can be flammable.
 - c) Fire
 - 1) In areas where septic or waste lines are present, methane gas may accumulate; it is flammable and can explode.
 - 2) A potential fire hazard occurs when using a propane torch, because the flame can cause a fire if it comes into contact with combustible materials.
 - d) Disorganized, untidy work sites
 - 1) Tripping and falling are common causes of injuries.
 - 2) Small sections of pipe left lying around can be particularly hazardous, since they tend to roll when stepped on.
 - 3) Ladders can tip over if they are not set on a level, solid surface.
2. Display examples or pictures of the tools with which students may not be familiar. Discuss other tools that are needed when working with plumbing. TMs 2.1 and 2.2 show different tools for working with copper pipe.

What are the tools needed for safe plumbing practices?

- a) General tools for plumbing practices

- 1) Shovel for digging shallow trenches for pipe
 - 2) Heavy earth-moving equipment for deeper trenches
 - 3) Level
 - 4) Claw hammer
 - 5) Ladder
 - 6) Tape measure
 - 7) Drill
 - b) Plastic pipe
 - 1) Adjustable wrench
 - 2) Hacksaw to cut pipes
 - 3) Sandpaper, a knife, or a scraping tool for smoothing the rough edges of pipe that has been cut
 - 4) Pipe cleaner to remove residue from cutting
 - 5) Pipe glue to join pipes
 - c) Copper pipes
 - 1) Propane torch and soldering material to join pipes together
 - 2) Pipe cutter
 - 3) Pipe bender
 - 4) Reamer to remove sharp edges after cutting the pipe
 - 5) Flaring tool to widen the end of the pipe
3. Describe the practices that should be followed to use plumbing tools safely. If possible, demonstrate the safe use of some of the tools brought in as examples for the previous question.

What are the proper methods for using tools and supplies associated with plumbing?

- a) Use protective clothing and gear.
 - 1) Heavy work pants
 - 2) Boots
 - 3) Gloves
 - 4) Eye protection
 - 5) Safety helmet, if injury from above is possible
- b) All tools should only be used according to the manufacturer's recommendations.
- c) When utilizing plastic pipe cleaners and cements, special attention should be given to any safety recommendations concerning ventilation, skin contact, or fire hazards.
- d) Extreme caution should be used when working with a propane torch; proper ventilation and the use of the protective clothing and gear listed above are a must.

G. ***Other Activities***

Ask a local plumber or a representative from a plumbers' union to come and speak to the class about plumbing safety.

H. ***Conclusion***

Being aware of the potential hazards and safety practices outlined above can reduce the chance of accidents while performing plumbing work. Safety should always be considered first to avoid accidents whenever possible.

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

For each of the questions, examples given as answers may vary.

1. Fire
2. Ventilation

3. Cave-in
4. To avoid tripping

J. ***Answers to Evaluation***

1. d
2. e
3. a
4. b
5. c
6. g
7. f

8. Answers may include any two of the following: heavy work pants, boots, gloves, eye protection, and safety helmet.
9. People can suffocate if the sides cave in and bury them.
10. Methane gas
11. Safety recommendations concerning ventilation, skin contact, or fire hazards
12. Because they can be particularly hazardous in terms of causing falls, as they tend to roll when stepped on

EVALUATION

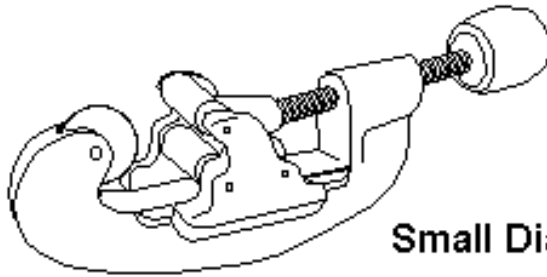
Match the description in the column on the left with the tool in the column on the right.

- | | |
|--|------------------|
| 1. Used for digging shallow trenches | a. Knife |
| 2. Tool for cutting pipes | b. Propane torch |
| 3. Tool used to smooth rough edges on cut pipe | c. Pipe cleaner |
| 4. Used to join copper pipes together | d. Shovel |
| 5. Removes residue from cutting | e. Hacksaw |
| 6. Used to widen the end of copper pipe | f. Pipe glue |
| 7. Joins plastic pipe together | g. Flaring tool |

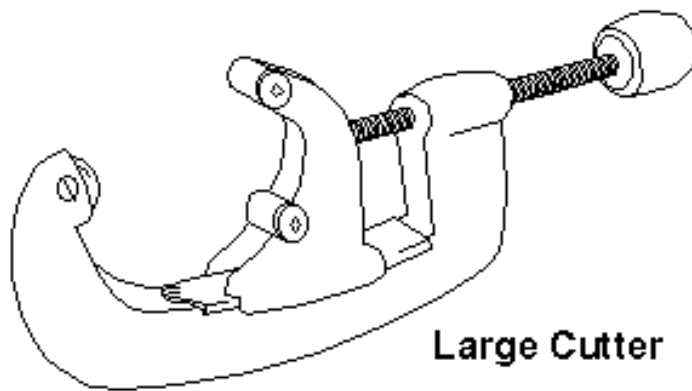
Complete the following short answer questions.

8. What are two items of protective clothing that can be worn to prevent injury?
 - a.
 - b.
9. Why can open trenches be dangerous?
10. What is the name of the flammable gas that can accumulate around septic lines?
11. When utilizing pipe cleaners and cements, what types of safety recommendations are important?
12. Why should small sections of pipe always be picked up immediately?

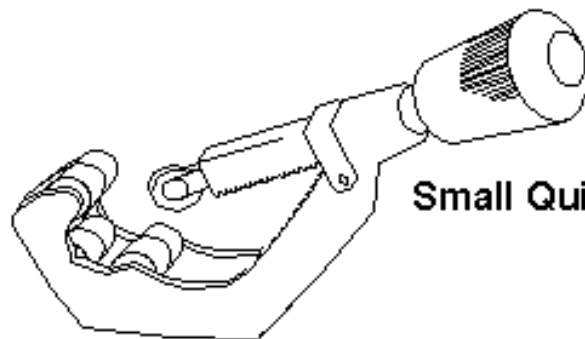
Cutting Tools for Copper Pipe



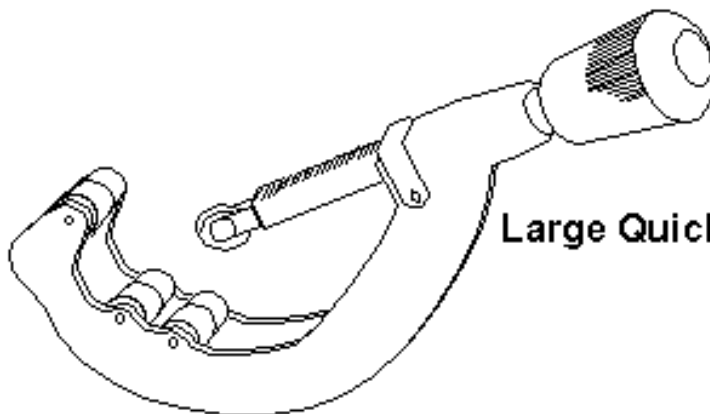
Small Diameter Cutter



Large Cutter

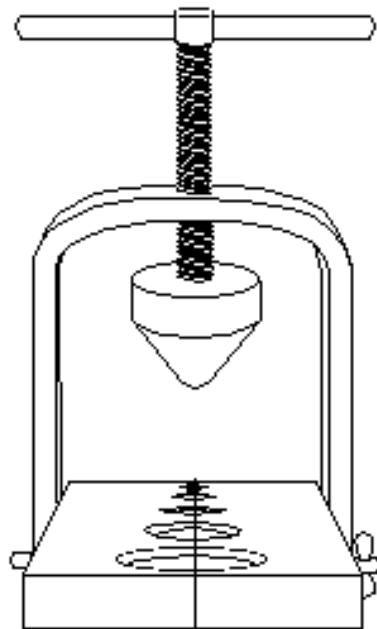


Small Quick-Opening Cutter

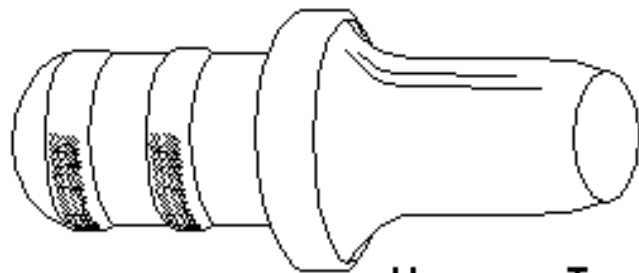


Large Quick-Opening Cutter

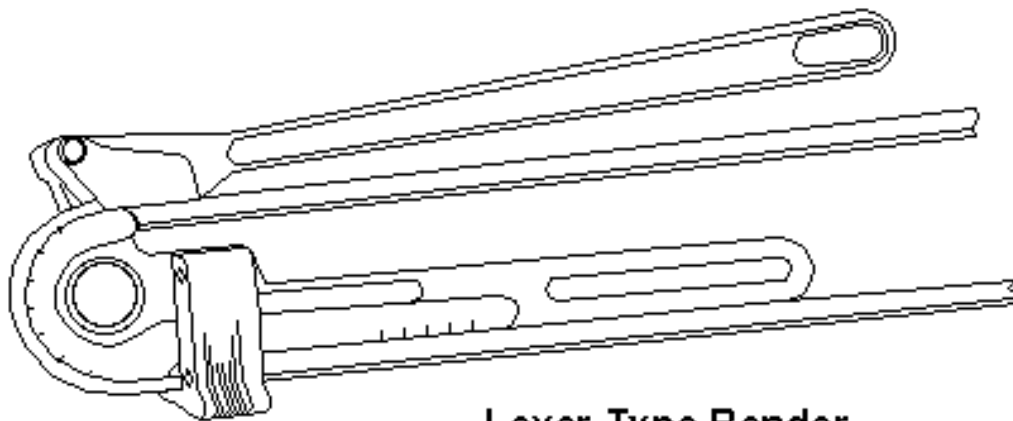
Flaring and Bending Tools



**Yoke and Screw
Flaring Tool**



**Hammer-Type
Flaring Tool**



Lever-Type Bender

Working with Plumbing Safely

Objective: Describe safety concerns associated with plumbing.

Answer the following questions concerning plumbing safety. Describe a situation in which each hazard might become a danger.

1. What is a serious hazard associated with propane torches used for soldering?

2. What is an essential precaution when working with plastic pipe cement?

3. What is the major concern when working in deep trenches?

4. Why should small sections of scrap pipe be picked up immediately?

