15 MATERIALS HANDLING AND STORAGE

ANSWERS—QUIZ 1

1. b
2. a
3. a
4. b
5. a
6. a
7. b
8. d
9. b
10. Handlers should wear safety shoes and stout gloves with leather palms. Other protective items, such as goggles, aprons, and leggings, may also be required for certain types of materials.
11. Fall-protection measures include the following controls:
    - elimination of the hazard by reorganizing the work
    - prevention of falling by the use of guardrails, including aerial lifts
    - fall-arrest systems for horizontal and vertical travel
    - warning lines six from an edge
12. Maximum permissible limit (MPL) and action limit (AL) are the two limits that have been established for lifting.
13. Workers should wear gloves or hand laps when handling flat glass. Their wrists and arms should be protected with leather cuffs and safety sleeves. The worker should wear a leather apron, leggings, safety glasses, and also safety shoes with metatarsal guards.
14. Hooks, crowbars, and rollers are the most commonly used hand tools for the manual lifting of materials.
15. Three major sources of chemical injury in pipeline work are as follows:
    - failure of packing in valve stems or of gaskets in bolted flanges
    - failure to check that valves are closed and locked and the lines drained before tension is released on flange bolts
    - opening the wrong valve
16. Compressed gas cylinders should be stored in the upright position on a smooth floor with valve covers in place. All cylinders should be chained or fastened firmly against a wall, post, or other solid object. Different kinds of gases should either be separated by aisles or stored in separate section.
17. Liquid oxygen is used in flame cutting, welding, metallizing, or heating. Liquid nitrogen is used in freezing food, and stripping scrap rubber from tires and cables. Liquid helium has made possible the rapid development of superconductivity.
18. When burlap sacking is stored in high stacks, heat is generated by the weight. This sets the stage for spontaneous combustion. One way to reduce this hazard is to cut the size of the stack by breaking it up into smaller stacks. This can be done either by making smaller stacks (which would increase the number of stacks and take more space) or by placing blocks at intervals in the stack so that, in effect, there would be a number of small piles, one atop the other. Provide additional protection by constructing the storage room of fire-resistant materials and by having sprinklers and dust-tight lights.
19. The magazine must be of approved fireproof and bulletproof construction, and located at a safe distance from railroads and other buildings. Matches, flammable materials, metal, or metal tools should not be allowed in the magazine. Floors must be clean and free from loose explosives. The floors, which are usually made of wood, should be blind-nailed, with no nail or bolthead exposed. Magazines should be kept clean, dry, and well ventilated. Only portable lights, approved for such use, should be permitted in the magazine. The surrounding area must be kept clear of brush, leaves, debris, and other flammable material. Blasting caps or detonators must never be kept in the same magazine with other explosives.

ANSWERS—QUIZ 2

1. a
2. b
3. a
4. a
5. b
6. b

7. c
8. a
9. c
10. The benefits of mechanized handling are fewer injuries, lower workers' compensation expenses, increased efficiency, and a more productive workplace.
11. Four-wheeled trucks should be pushed rather than pulled. Pushing an object rather than pulling on it causes less stress to the lower back and protects the worker's heel from being caught under the truck back.
12. Handlers should be aware of the following three hazards:
    - running wheels off bridge plates or platforms
    - colliding with other trucks or obstructions
    - jamming their hands between the truck and other objects

13. The back belt debate focuses on two issues:
    - employees are rarely trained in proper lifting techniques or even how to use the belts correctly, and
    - wearing a back belt can give a false sense of security-people think they can lift more than they can.
14. Prevent static electricity from accumulating on surfaces by maintaining relative humidity of 60 to 70 percent. If this cannot be maintained, use a ground to minimize static buildup.
15. The following questions should be considered for an appraisal of materials-handling injuries:
    - Can the job be engineered to eliminate or reduce manual handling?
    - Can the material be conveyed or moved mechanically?
    - In what ways do the materials being handled (e.g., chemicals, dusts, rough and sharp objects) cause injury?
    - Can employees be given handling aids, such as properly sized boxes, trucks, or hooks that will make their jobs safer?
    - Would protective clothing, or other personal equipment, help prevent injuries?
    - Would training and more effective management help reduce injuries?
16. Three types of properly analyzed lifting tasks are as follows:
    - Those above the MPL should be viewed as unacceptable and require engineering controls.
    - Those between the AL and MPL are unacceptable without administrative or engineering controls.
    - Those below the AL are believed to represent nominal risk to most industrial work forces.

ANSWERS—CASE STUDY

1. Floors must be level or piles of stored materials may topple over. The strength of the floor has to be checked before power trucks can be used. A structural expert also has to determine the floor load capacity to know how much material can be safety stored in various areas. And ramps should have nonskid surfaces with a slip-resistant foot strip in the center for hand trucks.
2. Aisles should be wide enough to enable employees to move about freely while handling material and to allow safe passage of loaded equipment. Traffic-control devices, such as stop signs, can help. Mirrors placed at blind intersections help prevent collisions.
3. The worker should wear safety goggles and leather gloves, and should use a cutter designed for the work. Before cutting any strapping, the worker should make sure that no one is standing close enough to be hit by loose ends of the strapping. To cut bands safely, the worker should place one gloved hand on the nearest portion of the strapping. Then, if the strapping springs, it will be held to one side and fly away from the worker's face.