

### Test -- Guarding – Regulations and Information

1. Accessible rotating shafts with no protruding parts (i.e. set screws, universal joints, etc) need to be guarded. Yes \_\_\_\_, No \_\_\_\_
2. Drive belts from motors to drive pulleys need to be guarded a) one side, b) two sides, or 3) all sides?
3. A guard is legal that covers more than one independently-controlled machine component? Yes \_\_\_\_, No \_\_\_\_
4. Machine guards should be designed so that it takes how many miners to remove or install them? a) one, b) two
5. A locked door or gate, which keeps personnel from contacting moving machinery is an acceptable guard. True \_\_\_\_, False \_\_\_\_
6. List three things to consider when evaluating a material for possible use in making a guard.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
7. Conveyors with adjacent travelways must be equipped with: a) a properly-positioned handrail, b) A properly positioned and tensioned stop cord, c) either.
8. Guarding by Location' requires that the machine hazard be how many feet above a surface where personnel may walk? a) 2, b) 3, c) 5, d) 7, e) 9
9. Machine guards prevent workers and equipment from contacting moving machine parts or belts, but what other hazard can they protect against? \_\_\_\_\_
10. Give 2 reasons why it is important that guards be easy to remove and replace. \_\_\_\_\_
11. What 4 characteristics of expanded metal or screen mesh make them desirable as guard material?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
12. What 4 characteristics a machine guard must have to be considered effective.
13. What two materials are commonly used to make guards that allow workers to inspect the guarded machinery without removing the guard?
14. When must a drive belt 10 feet off the ground from a walkway be guarded?

### Answers and Notes on Guarding questions

1. Yes -- Any accessible rotating shaft presents the hazard of catching clothing, hair, etc.
2. All sides -- Miners may be regularly exposed to only one side, but all sides that are accessible need to be guarded.
3. No -- Independently controlled machine components must have their own guards. Removing a guard that covers more than one machine exposes hazards on a machine different from the one being serviced. The machine not being worked on is unguarded and may not be locked out.
4. One -- Guards requiring more than one miner to install or remove them are inefficient and, there is a temptation to operate the equipment without replacing the guard. Guards on hinges are an option.
5. False -- Area guards are not acceptable to MSHA. Experience has shown that if a space is provided between a guard and a hazard, someone will eventually be exposed to the hazard. An 'Area' guard 1) is often used to guard more than one machine at a time and 2) there is usually a large enough space between it and the machine to allow a person to place themselves between the guard and the hazard.
6. Things to consider when choosing material for guards:
  - a. Does the material itself present a hazard? (Sharp points or edges.)
  - b. Is the material strong enough to prevent a person from contacting the hazard being guarded?
  - c. Can the material withstand the normal operating vibrations of the equipment?
  - d. Are any openings in the material large enough to allow workers to contact the hazard?
  - e. Is the material light enough to allow easy removal and replacement?
  - f. Of the materials commonly available at mines, expanded metal and sizing screen are see-through; yet sturdy, conveyor belting can help with soundproofing; and solid metal is strongest. Avoid materials that can burn if the hazard being guarded is near a heat source.
7. c -- Stop cords should be positioned and tensioned so that anyone falling toward the conveyor will trip the stop cord.
8. d -- Consider using guards on equipment that is higher than 7 feet above walkways because most workers can reach higher than 7 feet.
9. Prevent broken machine parts or belts from causing injury to area personnel. Guarding fan blades and other rapidly moving machine parts help protect area personnel even when these parts are out of reach. All belts must be guarded if a broken belt could injure a person.
10. a) If the guard is difficult to remove or replace, chances are, it will be left off. b) Unwieldy or heavy guards are a material handling problem, possibly resulting in injury. Design your guards to save time and prevent back injuries during maintenance.
11. 1) Workers can see through them to assess problems without removing guard. 2) They are lightweight, yet strong. 3) They prevent material buildup within the guard by allowing it to fall through. 4) The guard can be cleaned inside & out (i.e. water spray) without removal. 5. No special openings need be made to install extended grease fittings. Old Screen mesh is readily available for use as guard material at many mines.
12. Guards should:
  - a. Be considered a permanent part of the machine.
  - b. Be installed as close to the hazardous machine part as feasible.
  - c. Prevent access to the moving machine part.
  - d. Be designed (to the extent possible) so that one person can physically install or remove them.
  - e. Be able to withstand the vibration & shock of normal machine operation.
  - f. Not present a hazard themselves.
13. Expanded metal and screen material or 'screen cloth'. These materials must not have openings in them large enough to allow fingers, etc, to contact the machinery. Whenever a breaking belt could fly off and injure a worker. Guards not only protect workers from contacting moving machine parts; they protect workers from flying machine parts and belts if they break.
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