

the basic principles enumerated earlier. For many years, most of the standard machinery manufacturers have designed first-class serviceable guards for power transmitting parts of their equipment, which are available when specified on a purchase order. A manufacturer's guards usually are designed to be an integral part of the machine and are therefore superior to homemade guards in appearance and in convenience of arrangement. Few manufacturers provide satisfactory point-of-operation guards.

Often the reason given for not buying the protective guards and controls available from the manufacturer is that purchase of a machine is a capital expense which is closely budgeted, whereas construction of a guard by the maintenance department is a maintenance item and therefore acceptable. As a result, a large number of companies buy stripped-down machinery and make guards after the machinery has been installed. This is poor economy. Machine guards can be provided by the manufacturer more cheaply because his costs are spread over a number of machines.

In addition, safety engineers frequently encounter delays in getting guards constructed by the maintenance department which is busy with routine duties and it is difficult for maintenance personnel to find time for building guards.

Too often new equipment is immediately placed in operation with no protection for the operator and nearby workers. The hazards presented by an unguarded machine make a potent argument in favor of specifying inclusion of all guards available from the manufacturer when a machine is ordered.

The advantages of securing as much built-in protection as possible from the manufacturer are

- 1 The additional cost of guards designed and installed by the manufacturer usually is less expensive than the installation of guards by the purchaser.
- 2 Built-in guards conform closer to the appearance and operation of the machine.
- 3 A built-in guard may strengthen the machine, may act as an exhaust duct or oil retainer, or may serve some other functional purpose.

Substitution of direct-drive machines or individual motors for overhead line shaft transmission decreases the hazards inherent in transmission equipment. Speed reducers can replace multi-cone pulleys, and remote control oiling and adjustment devices make it unnecessary for employees to get too close to moving parts.

Point-of-operation guards Although the design and use of point-of-operation guards are discussed later in this chapter, Table 24-A was prepared as a quick reference to the principal types of point-of-operation guards or guard devices. (Table starts on page 666.)

Materials

The preferable material for guards under most circumstances is metal. Framework of guards is usually made from structural shapes, pipe, strapping, bar, or rod stock. Filler material generally is expanded or perforated or solid sheet metal or wire mesh (Table 24-B). The use of plastic or safety glass where visibility is required is widely practiced.

Guards made of wood have limited application. Their lack of durability and strength, relatively high maintenance cost, and flammability are objectionable. Wood guards, particularly when they become oil-soaked, can be ignited by nearby welding operations, by overheated bearings, by rubbing belts and defective wiring, and by other sources of heat.

Where resistance to rust or possible damage to tools and machinery is an important factor, guards of aluminum or other soft metal, or plastic are sometimes used. Plastic guards are coming into increased use where inspection of the moving parts is necessary. Shatter-proof glass is similarly used, particularly where visibility of guarded parts is a problem and where the flexibility of plastic is not required. Safety glass and plastic used where chips or other flying particles are likely to mar the surface may be protected by inexpensive and easily replaced cover glasses.

When a guard cannot be made to exclude lint, ample ventilation should be provided. Vents, too small to admit a hand, likewise should be built into the bottom of larger guards to let lint drop through. Larger guards also should have self-closing access doors for cleaning by brush, vacuum hose, or compressed air.