SeaBRIGHT INSURANCE COMPANY

Supervisors' Safety Update

Ideas and Strategies for Leaders

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SAFEGUARD YOUR WORKERS BY SAFEGUARDING YOUR MACHINERY

By SeaBright Insurance Loss Control

We take them for granted--the machines that complete production tasks with greater speed, accuracy and efficiency than any manual method ever could. Machinery also reduces the physical demands of work that can lead to employee muscle strains and sprains. When much of the work is mechanical, the risk of personal injury is greatly reduced.

There is a down side to using machinery, however. Although their benefits are many, they can also expose workers to potentially dangerous moving parts. Any machine part or process, which could cause injury, must have safeguards to prevent that exposure. As a supervisor, one of your most important responsibilities is to see that none of your crewmembers are seriously injured by moving machinery.

The purpose of this *"Supervisors' Safety Update"* is to review the most typical locations, motions, and actions of machines that create hazards for workers. We will also discuss machine guarding code requirements and the most common types of safeguards in use today. The greater your knowledge about machine guards, the more effectively you can communicate safe work practices to your work team.

Hazardous Locations on Machines:

Dangerous moving parts are typically found in one or more of the following three locations. Some form of safeguarding is needed at these points.

1) Point of operation: This is the point at which cutting, shaping, boring, or forming of the stock is accomplished. It also includes any other point that creates a hazard when operators insert or manipulate materials during the machine's operation. A specific example would be the point of operation where a piece of lumber comes into contact with the moving blade of a table saw.

2. Power transmission apparatus: This includes all moving components of the mechanical system that deliver energy to the area of the machine that performs the work. Examples include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears. A specific example would be the belt and pulley apparatus of an air compressor.

3. Other moving parts: This includes all other parts of a machine that move while the equipment is functioning. Examples include reciprocating, rotating, and transverse moving parts. Other examples are feed mechanisms and auxiliary moving parts of the machine.

Hazardous Mechanical Motions of Machines:

A variety of mechanical motions can expose both the operator and other workers in the vicinity to hazards. The three most common types of hazardous motion are as follows:

1. Rotating Motion: Rotating shafts can grip clothing or bare skin and cause severe injuries if a body part is pulled into the machine. If a projecting set screw or key is on the rotating shaft, it is more likely to catch, and the danger of injury increases. Rotating gears or rollers create an "in running nip point," or pinch point, where they come into close contact with another rotating or stationary part.

2. Reciprocating Motion: The back and forth or up and down motion of moving parts may strike the worker or cause the worker to be caught between the moving part and a stationary object.

3. Transverse Motion: These motions involve parts that make straight movements in a continuous line, such as when the bed of a table is stationary, but the tabletop is not. A worker may be struck or caught in a pinch or shear point created by the transverse moving part.

Hazardous Mechanical Actions of Machines

The working action of the machine also produces a hazard if the operator is exposed to it. The four most common hazardous actions are:

1. Cutting: This action exists at the point of operation where a finger or other body part might come into contact with the cutting device. Another potential danger involves flying chips or scrap material that can strike the operator, particularly in the head, face, or eyes. Examples of machines that produce a cutting action are band saws, circular saws, and drills.

2. Punching: This action occurs when power is applied to a slide or ram for the purpose of blanking, drawing, or stamping material such as metal. The danger normally occurs at the point where the material is inserted, held, or withdrawn by hand. The operation of a power press machine is an example of punching action.

3. Shearing: This action exists whenever power is applied to a slide or knife-like surface in order to trim or shear metal or other materials. The hazard is created at the point of operation where the material stock is actually inserted, held, or withdrawn by hand. The operation of a pneumatic, hydraulic, or mechanical power shear is an example of a shearing action.

4. Bending: This action occurs whenever power is applied to a slide in order to draw or bend the metal or other material. Once again, the hazard occurs at the point of operation where the material stock is inserted, held, or withdrawn by hand. The operations of power presses, press brakes, or tubing benders are examples of bending actions.

Basic Requirements for Machine Safeguards

The purpose of a machine safeguard is to protect workers from the hazards created by the exposed moving parts of the machine. Machine guards should be inspected regularly for the following safety features:

a. Does it prevent contact? The safeguard must prevent the worker's fingers, hands, arms, or other body parts from making contact with the moving part. The best safeguard will completely eliminate the possibility of this contact.

b. Is it secure? Guards must be firmly secured to the machine. They should not be easy to remove or tamper with. Safeguards and safety devices should be made of durable material that will withstand normal usage conditions.

c. Does it protect the equipment from falling objects? The safeguard should ensure that small objects cannot fall into the moving parts of the machine. If hand tools or bolts make contact with a moving part, they could become hazardous flying projectiles.

d. Does it create a new hazard? A safeguard defeats its purpose if it creates a hazard of its own such as a shear point that could cause a laceration. The edges of safeguards should be rolled or bolted in order to eliminate sharp edges.

e. Does it interfere with work tasks? If the safeguard impedes a worker from performing the job quickly and comfortably, it might be removed or overridden by the worker. Properly installed guards should actually relieve a worker's apprehensions about being injured during fast operations.

f. Does it allow safe lubrication? Whenever possible, workers should be able to lubricate the machine without removing safeguards. The operator or maintenance worker may be able to avoid unnecessary exposure to a machinery hazard if oil reservoirs are located outside the safeguard or if a feeder line leads into the lubrication point.

Types of Machine Safeguards

There are many ways to safeguard machines. The type of operation, the size of the stock, the shape of the stock, the handling method, the physical layout, the type of material, and the production requirements and limitations are all items to be considered. In most cases, the machine's safeguards will have been installed by the manufacturer. Five types of safeguards are generally found:

1. Guards: Guards are barriers that prevent access to the dangerous area. The metal enclosure for a belt and pulley apparatus is a *fixed* guard. An *interlocked* guard shuts off or interrupts the power when the guard is opened or removed. A table saw should have an *adjustable* guard that adjusts above the blade to accommodate the size of stock be cut. A portable power saw should have a *self-adjusting* guard that adjusts accordingly around the exposed lower portion of the blade.

2. Devices: A safety device may stop the machine if a hand is inadvertently placed in the dangerous area; restrain or withdraw a hand from the dangerous area; require the operator to use both hands on the controls during operation; or provide some type of barrier during the hazardous part of the machine cycle. Power presses may have a *presence-sensing* device that interrupts the press when objects such as hands are detected in the sensory field. A press operator's hands may be protected by a *pullback* or *restraint* device such as attached cables that prohibit hands from reaching into the danger area.

3. Location or Distance: Machinery should be positioned or located so that the hazardous parts are safely removed from the operator and other workers. Dangerous parts or power transmission apparatus can be located against a wall or high enough from the working level to be out of the normal reach of workers.

4. Specialized Feeding or Ejection Methods: *Automatic* or *semi-automatic* feeder and ejection systems can eliminate the need for operators to work in proximity to the hazardous location. Chute and plunger feeds for stock are two examples of this type of safeguard.

5. Miscellaneous Aids: Most of these aids do not provide complete protection from the machine hazards. However, they may provide the operator with an extra margin of safety. Special stock-holding tools can be used to hold small pieces of stock at the point of operation so that the operator's fingers maintain a safe distance from the hazard. Push sticks or blocks are aids that may be used to feed small lumber stock into the saw blade of a table saw.

Conclusion

Supervisors cannot be *totally* responsible for the safety of work team members. Employees must also take responsibility for following safe work procedures. But supervisors are accountable for assuring that employees *understand* all safety procedures--including not only *what* must be done, but *why* it's important. Few experiences are more tragic than the loss of an employee's hand, limb or life, due to machinery hazards. So, inspect all the machinery safeguards in your workplace to assure that they are adequate. Train all operators in how to use safeguards and personal protective equipment. Also be sure that repair and maintenance workers clearly understand the lockout or tagout procedures to be followed before any safeguards are removed.

If you do not have Lockout/Tagout procedures in place, your SeaBright loss control consultant can provide samples and guidelines for developing your customized program.

Safeguard your workers by safeguarding all machinery!

(A sample Machinery Safeguard Checklist follows)

MACHINERY SAFEGUARD CHECKLIST

Work Area/Department _____ Date _____

Machinery/Equipment	Hazard & Location	Hazardous Motion	Hazardous Action	Safeguard/Work Rule
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				