Controlling Hazards

Every workplace has the potential to expose an employee to occupational hazards which may result in injury or illness. Every employer has the responsibility of determining what hazards exist and how to properly control these hazards. One method that can be utilized to determine what hazards exist in an occupational setting is the job safety analysis. Once the hazards have been identified, a hierarchy of controls should be used to develop methods to protect employees from these occupational hazards. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective controls for an occupational hazard. One representation of this hierarchy can be summarized as follows:

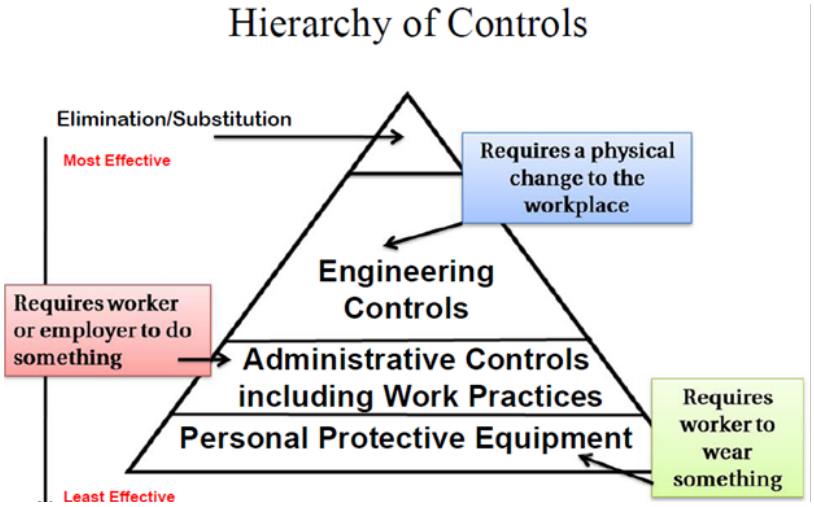

Photo Credit: OSHA.gov

The idea behind this hierarchy is that the control methods at the top of the list are potentially more effective and protective than those at the bottom. Applying this hierarchy is a systematic approach to identifying the most effective method of risk reduction. This normally leads to the implementation of inherently safer systems where the risk of illness or injury has been substantially reduced.

Control Methods

1. **Elimination and Substitution**
   The first consideration for controlling hazards is to eliminate the hazard or substitute a less hazardous material or process. While eliminating or substituting is the most effective method to reduce hazards, it also tends to be the most difficult to implement in an existing process as it may require major changes in equipment and procedures. One of the best times to utilize this method is during the design or development stage when making these changes can be inexpensive and simple to implement. While this method can be difficult to accomplish, it should not be overlooked in an existing process. One example of implementing this method in an existing process is utilizing a water-based paint in place of a solvent-based paint. This control measure minimizes flammable vapors as well as eliminates health concerns associated with solvent-based paints.

2. Engineering Controls

Engineering controls are physical changes to the work area or process that effectively minimize a worker's exposure to hazards. They are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can provide a high level of protection and are typically independent of worker interactions. The initial cost of engineering controls can be higher than the cost of administrative controls or personal protective equipment, but in the long term operating costs are frequently lower. In some instances, engineering controls can provide a cost savings in other areas of the process. An example of an engineering control is redesigning a workstation to minimize ergonomic injury.

3. Administrative Controls Including Work Practices

Administrative and behavior controls are frequently used with existing processes where hazards are not particularly well controlled using the above methods. Administrative and behavior control programs may be relatively inexpensive to establish but over the long term they can be very costly to sustain. This method for protecting workers has also proven to be less effective than other methods, and it may require significant effort by the affected workers. An example of an administrative control is a written safety policy outlining the rules that employees must follow to complete the job safely, such as a company policy on the safe lifting of loads.

4. Personal Protective Equipment (PPE)

It is important to thoroughly evaluate all other methods for controlling the hazard before utilizing PPE as the control. PPE should always be considered the last line of defense against a hazard because the PPE may "fail" (stop protecting the worker) with little or no warning and expose the employee to the hazard.

PPE is acceptable as a control method in the following situations:

- Engineering controls do not eliminate the hazard
- While engineering controls are being developed
- Administrative controls and safe work practices are not sufficient protection
- During emergencies

It is important to note that several of the above controls may be utilized simultaneously for a given hazard. For example, consider an operation that generates silica dust may:

- Install a ventilation system may be installed to control dust (**engineering control**),
- Train employees and post a sign is posted to warn employees of dangers (**administrative controls**), and
- Require goggles to be worn while operating the equipment (**personal protective equipment**).