

## **MACHINE GUARDING: THE SECOND ALTERNATIVE**

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It is often the tendency in industry to look at a dangerous situation and try to decide what the appropriate machine guarding technique or device should be employed. This practice may produce satisfactory results but it overlooks the first step in the safety hierarchy.

The National Safety Council defines the safety hierarchy as:

*First Priority: Design for minimum risk*

*Second Priority: Incorporate safety devices (including machine guards)*

*Third Priority: Provide warning devices*

*Fourth Priority: Develop and implement operating procedures and employee training programs.*

*Fifth Priority: Use Personal protective equipment.*

The first thought should be given to the design of the process. Remember the danger results from the combination of hazard and exposure. Eliminate either one and the dangerous condition no longer exists. Is it possible to eliminate the human from the process through automation? Can the operator be relocated to a safer position? Can the process be changed to eliminate the hazard? Obviously the ideal time to make these decisions is during the design of the process but other opportune times are during a renovation, machine rebuild etc. Often it is not possible to completely design out the dangerous condition but it is possible to greatly reduce the risk to a more acceptable level. The reason that this is the highest priority is that it eliminates the dangerous condition whereas the other alternatives do not.

The second alternative can, when used in conjunction with the design consideration, be very effective in eliminating the dangerous condition. Safety devices include the whole range of machine guarding techniques such as fixed or automatic mechanical guards, safety mats, light curtains, safety gates, machine interlocks etc. Care must be taken to assure that machines guards are not removed for maintenance and not reinstalled or the guards are not defeated by workers in an effort to speed up the process.

The third alternative should be employed when the first and second alternatives cannot be used to eliminate the dangerous condition. The provision of warning devices should alert the exposed people to the specific danger and be consistently applied. These devices include signage, warning alarms (horns and lights), warning strips and ropes etc.

A problem with this approach is the warnings are often ignored. Every year drivers are killed at railroad crossings because they ignore the crossing gates or lights.

The fourth priority is the development and implementation of operating procedures and employee safety training programs. Examples of such procedures and programs include Lock Out Tag Out, confined space entry, and fork truck operator licensing and training programs. In this area too, there is the problem with employees not following the protocol, not properly locking out a system before doing maintenance, operating a fork truck without the proper training, etc.

The fifth priority and least effective approach is the provision of personal protective equipment. This equipment is designed to protect the body from head from hard hats to safety shoes. Although this is often the least expensive alternative, it is also the least effective. A strong program of enforcement is needed to ensure that the required equipment is properly worn and maintained.

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<sup>i</sup> Accident Prevention Manual for Business and Industry, Engineering & Technology 11th edition, National Safety Council 1997