



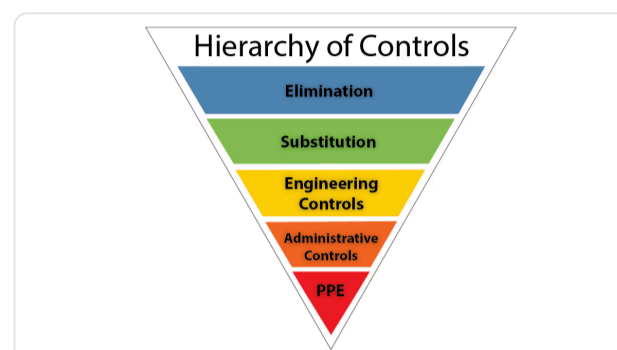
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[HIERARCHY OF CONTROLS](#)

About Hierarchy of Controls

KEY POINTS

- The hierarchy of controls identifies a preferred order of actions to best control hazardous workplace exposures.
- Elimination, substitution, and engineering controls are more effective because they control exposures without significant human interaction.
- Administrative controls and personal protective equipment can also be effective at reducing workers' exposures to hazards.



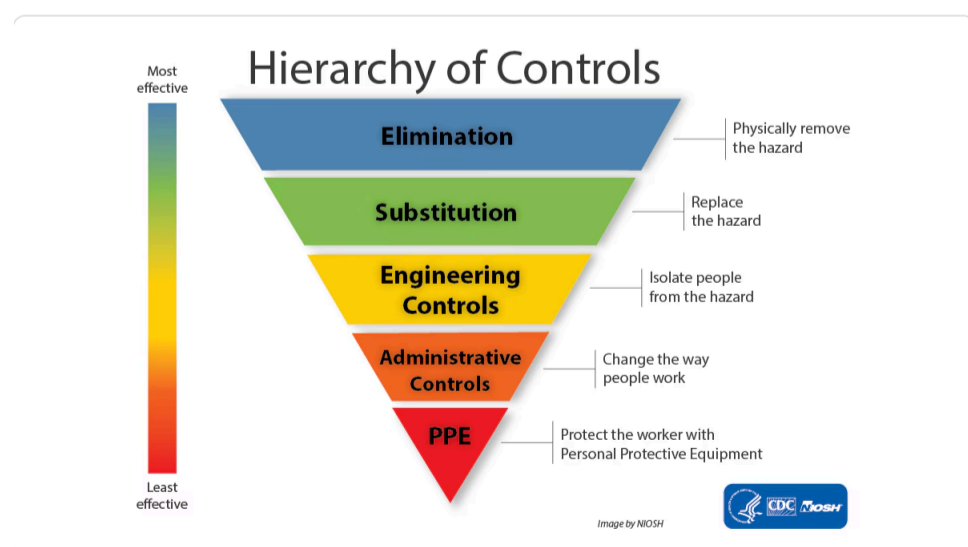
Overview

Controlling exposures to hazards in the workplace is vital to protecting workers. The hierarchy of controls is a way of determining which actions will best control exposures.

The hierarchy of controls has five levels of actions to reduce or remove hazards. The preferred order of action based on general effectiveness is:

1. Elimination
2. Substitution
3. Engineering controls
4. Administrative controls
5. Personal protective equipment (PPE)

Using this hierarchy can lower worker exposures and reduce risk of illness or injury.



The hierarchy of controls should be followed from top to bottom.

Elimination

Elimination removes the hazard at the source. This could include changing the work process to stop using a toxic chemical, heavy object, or sharp tool. It is the preferred solution to protect workers because no exposure can occur.

Substitution

Substitution is using a **safer alternative** to the source of the hazard. An example is using plant-based printing inks as a substitute for solvent-based inks.

When considering a substitute, it's important to compare the potential new risks of the substitute to the original risks. This review should consider how the substitute will combine with other agents in the workplace. Effective substitutes reduce the potential for harmful effects and do not create new risks.

Elimination and substitution can be the most difficult actions to adopt into an existing process. These methods are best used at the design or development stage of a work process, place, or tool. At the development stage, elimination and substitution may be the simplest and cheapest option. Another good opportunity to use elimination and substitution is when selecting new equipment or procedures. [Prevention through Design](#) is an approach to proactively include prevention when designing work equipment, tools, operations, and spaces.

Engineering controls

Engineering controls reduce or prevent hazards from coming into contact with workers. Engineering controls can include modifying equipment or the workspace, using protective barriers, ventilation, and more. The NIOSH [Engineering Controls Database](#) has examples of published engineering control research findings.

The most effective engineering controls:

- Are part of the original equipment design
- Remove or block the hazard at the source before it comes into contact with the worker
- Prevent users from modifying or interfering with the control
- Need minimal user action for the controls to work
- Operate correctly without interfering with the work process or making the work process more difficult

Engineering controls can cost more upfront than administrative controls or PPE. However, long-term operating costs tend to be lower, especially when protecting multiple workers. In addition, engineering controls can save money in other areas of the work process or facility operation.

Administrative controls

Administrative controls establish **work practices** that reduce the duration, frequency, or intensity of exposure to hazards. This may include:

- Work process training
- Job rotation
- Ensuring adequate rest breaks
- Limiting access to hazardous areas or machinery
- Adjusting line speeds

Personal protective equipment (PPE)

PPE is equipment worn to minimize exposure to hazards. Examples of PPE include gloves, safety glasses, hearing protection, hard hats, and respirators. When employees use PPE, employers should implement a PPE program. While elements of the PPE program depend on the work process and the identified PPE, the program should include:

- Workplace hazards assessment
- PPE selection and use
- Inspection and replacement of damaged or worn-out PPE
- Employee training
- Program monitoring for continued effectiveness

Employers should not rely on PPE alone to control hazards when other effective control options are available. PPE can be effective, but only when workers use it correctly and consistently. PPE might seem to be less expensive than other controls, but can be costly over time. This is especially true when used for multiple workers on a daily basis.

When other control methods are unable to reduce the hazardous exposure to safe levels, employers [must provide PPE](#).[↗] This includes:

- While other controls are under development
- When other controls cannot sufficiently reduce the hazardous exposure
- When PPE is the only control option available

Administrative controls and PPE require significant and ongoing effort by workers and their supervisors. They are useful when employers are in the process of implementing other control methods from the hierarchy. Additionally, administrative controls and PPE are often applied to existing processes where hazards are not well controlled.

Train and evaluate

Training and evaluation can help ensure selected controls are successful. Employers should correctly train workers and supervisors on how to use controls. Workers and their supervisors should evaluate controls on a regular basis. Regular evaluation can check whether controls are effective in reducing workers' exposures and identify potential improvements.

SOURCES

CONTENT SOURCE:

[National Institute for Occupational Safety and Health](#)