



Safety Culture

What Is the NIOSH Hierarchy of Controls, and How Can It Reduce Manufacturing Injuries?

Vanessa Jo Roberts | Mar 12, 2020

Safety challenges come at a business from all directions—making it tricky to set priorities and manage safety planning. That’s where the NIOSH Hierarchy of Controls comes in. Here’s how it works.

To get anything done, you need a plan and process. Safety is no different.

With its Hierarchy of Controls guidance, the National Institute for Occupational Safety and Health aims to help organizations develop a prioritization strategy for identifying and addressing workplace hazards.

“Controlling exposures to occupational hazards is the fundamental method of protecting workers,” the **NIOSH guidance** points out. “Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective control solutions.”

Often referred to as the “safety pyramid,” the hierarchy—in a nutshell—aims to provide safety professionals a concise recommended flow for how to best approach all workplace hazards.

The hierarchy is directly connected to a broader NIOSH initiative, **prevention through design**. The PtD approach essentially focuses on building in safety from the get-go, whether that’s about changing up processes, retooling workflows, revising shop floor operations, or even re-engineering systems and equipment.

Learn about PtD in our article “What Is Prevention Through Design and How Does It Impact Safety?”

The goal of both the hierarchy and PtD programs is to do away with as many hazards and risks as possible, remove the chances of injury and incident, and then address what remains.

6 Steps to Use in Tandem with the NIOSH Hierarchy of Controls

In its hazard prevention guidance, the Occupational Safety and Health Administration suggests using the Hierarchy of Controls pyramid to prioritize and address your business's hazards systematically.

OSHA recommends these six steps:

- Immediately eliminate or control your most serious hazards—those likely to cause death or serious physical injury.
- Establish interim controls to reduce risk while the safety team drafts and implements long-term solutions.
- Prioritize and select controls using a hierarchy that emphasizes an engineering approach—meaning build in safety and use prevention through design.
- Avoid any controls that could introduce new hazards.
- Before rolling out any controls, review possible options with workers to make sure controls will be both possible and effective.
- Combine control options if there are no single tactics to fully protect workers.

"What you want to get is everybody involved in the whole life cycle to be involved in the first question, which is, 'Can I eliminate this?' " explains Dennis Hendershot, a safety consultant at the Center for Chemical Process Safety, in a *Safety+Health* article. "There's no guarantee that you will be able to eliminate it, but there is a guarantee that you won't know unless you try."

Who Is Responsible for Safety?

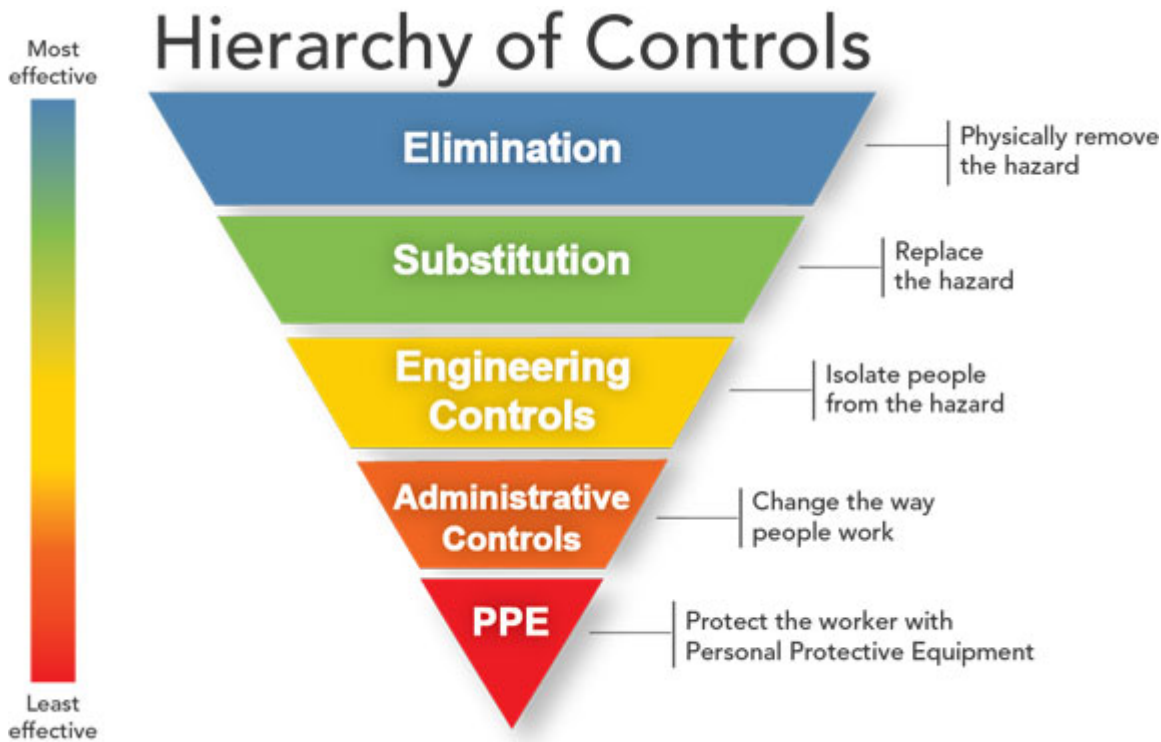
A key goal of the Hierarchy of Controls and PtD is to involve workers directly in safety planning and to foster a culture of safety through collaboration.

This aligns closely with the Occupational Safety and Health Administration's *hazard prevention recommendations*. OSHA suggests that businesses involve workers in safety planning because they "often have the best understanding of the conditions that create hazards and insights into how they can be controlled."

Specifically, OSHA says safety teams should review the risk information that they gather with workers to determine the types of hazards that a business might be exposing its workers to as well as to identify specific workers or groups of workers at risk of exposure.

What Are the 5 Levels of the Hierarchy of Controls?

Now is where the NIOSH safety pyramid comes into play. The safety team can use it to determine and prioritize the controls that will help eliminate or address risks to workers.



SOURCE: *NIOSH Hierarchy of Controls*

The inverted pyramid has five levels, ranging from most effective and wide sweeping to least effective and narrowest.

Here's a quick breakdown of the levels:

Level 1: Elimination

Doing away with a risk is ideal, but NIOSH notes that it's tricky to affect sweeping change in an existing process. But eliminating potentially deadly hazards must be addressed if those exist, OSHA says.

Some things are easier to fix than others but can still eliminate a hazard altogether. For instance, you could remove tripping hazards such as extension cords running across open areas of the shop floor.

Level 2: Substitution

At this level, a business might be able to substitute in a better control or make a temporary change until a final solution is implemented. Again, this can be difficult in long-ingrained processes or older environments. On an older machine, as an example, a kit can be used to add machines guards.

[Caveat: If a business is a startup or it's redesigning operations, always go for eliminating hazards, suggests Jonathan Bach, coordinator of NIOSH's Prevention through Design Initiative. "There's all kinds of ways that we can design out hazards, and it's being done more and more," he says in *Safety+Health*.]

Level 3: Engineering Controls

These *tactics* are designed “to remove the hazard at the source, before it comes in contact with the worker,” NIOSH says.

“The initial cost of engineering controls can be higher than the cost of administrative controls or PPE, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings in other areas of the process.”

During initial shop floor design, plans could include the creation of soundproof rooms and stations for loud machines, eliminating the potential hearing harm to nearby workers.

Level 4: Administrative Controls

When an environment is well established, creating policies for very specific hazards will work, but it’s not ideal because it doesn’t eliminate the risk.

The use of signage to indicate possible hazards near open pit areas as well as providing training and policies about the appropriate use of fall PPE when working in these areas are types of administrative controls that a business might implement.

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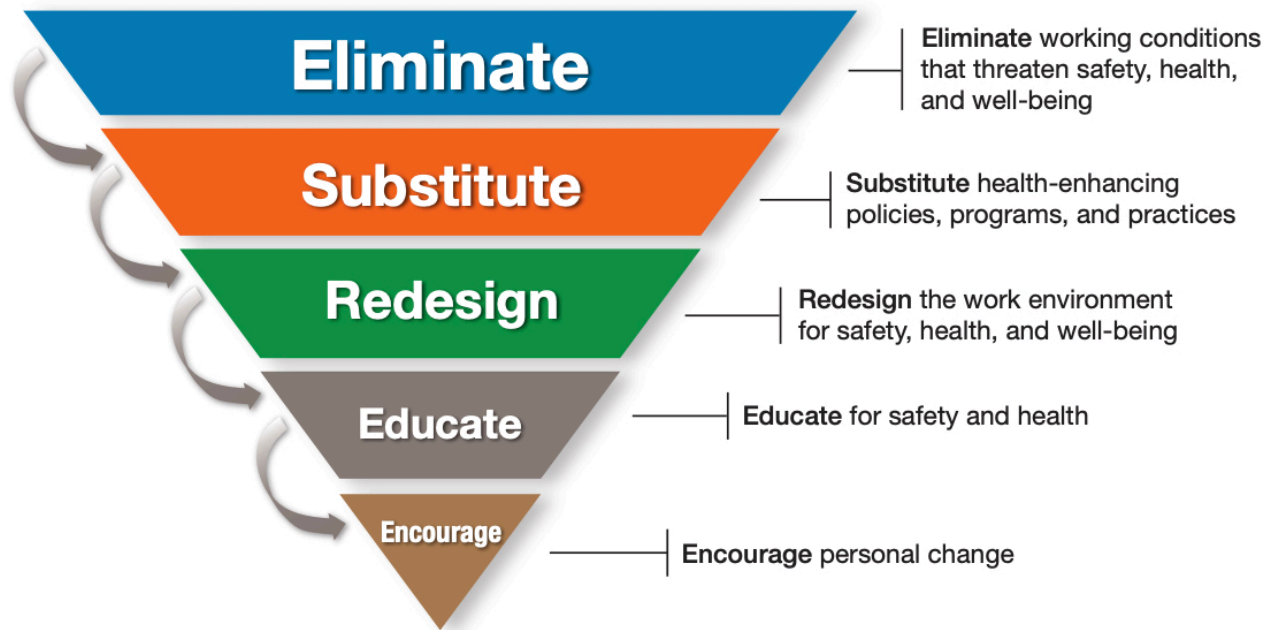
Level 5: Personal Protective Equipment

The last recourse to address a risk is PPE, such as ensuring workers at machines have the appropriate cut-resistant gloves and eyewear.

It’s absolutely necessary to protect workers from exposure to hazards that could harm or kill them, but NIOSH notes that there’s generally more chance for error and for an incident to occur when the control is PPE.

As part of a separate effort, called *Total Worker Health*, NIOSH has created an accompanying version of its Hierarchy of Controls that it says “emphasizes organizational-level interventions to protect workers’ safety, health and well-being.”

These focus more on behaviors and practices, with the aim of helping eliminate the hazards versus mediate to reduce the risk of exposure to workers.



SOURCE: "Fundamentals of Total Worker Health Approaches," NIOSH

Have you used the Hierarchy of Controls? If so, please share any best practices you established through use of the NIOSH guidance.

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