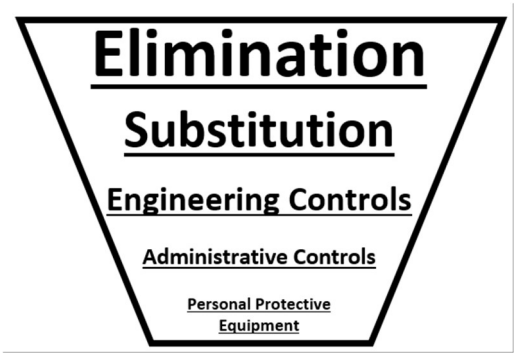
Fall Protection Hierarchy of Controls

Reading a great article in the October 2022 copy of Safety + Health magazine on the Hierarchy of Controls and had to write the next WAH article on the Hierarchy of Controls as it relates to fall hazards. The Hierarchy of Controls (HOC from here on, tired of typing it already) is a long-accepted principle, when put into practice, determines what the best control method for a hazard will be. The HOC can be applied to any hazard and provides guidance for control methods from the most preferred to the least. Controls that address the source of the hazard without worker actions are most preferred. Control methods move down the hierarchy as worker involvement increases and quality of protection decreases. The HOC was used to set the framework for the Fall Protection Hierarchy of Controls (FPHOC) when *ANSI Z359.2 Minimum Requirements for a Comprehensive Fall Protection Program* was first written. I've presented on the FPHOC numerous times and it's one of my favorite topics. It is universally applicable and one of the most important tools in any fall protection program.

The FPHOC follows the principles established in the HOC, but uses different terminology and has a couple of quirks that may create conflict or confusion within a fall protection program. I'll review and give examples for the FPHOC and hope to bridge any gap between the two.

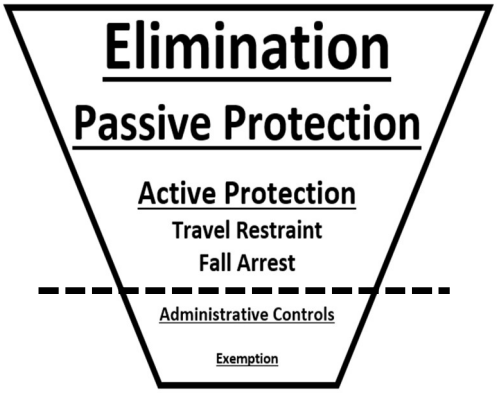
This is the HOC put out by NIOSH and numerous other sources.

Elimination: Physically remove the hazard.
Substitution: Replace the hazard with a safer alternative.
Engineering Controls: Isolate people from the hazard.
Administrative Controls: Change the way people work.
PPE: protect the worker with PPE.



This is how the FPHOC looks (WAHs interpretation).

Elimination: Remove the reason for exposure to the fall hazard.
Passive Protection: Barrier-type control measures that do not rely on actions by the person.
Active Protection: Harness and PPE-based control measures that do rely on actions by the person.
Administrative Controls: Adherence to a procedure while being exposed to a fall hazard.
Exemption: Fall protection not required.



Keep in mind that gravity is the source of risk with all fall hazards. It cannot be manipulated. Electricity can be turned off, chemical potency can be decreased, and engines can have governors installed, but gravity is untouchable (other than work at the space station). Using the HOC, we apply the same principles to fall hazards. Address the source of the risk first, and if that is not possible, protect the person from the source.

Looking at each category in the FPHOC:

Elimination: No elimination or substitution options exist for the constant force of gravity. We can really only weaken its result by minimizing the distance we fall or fall into something different. The best fall protection is to not work at height or be anywhere near a location where you can fall. Gravity is still acting on me when I'm walking around so the source of hazard is never eliminated. Elimination in regard to the FPHOC refers to removing the reason for working at height. Remove the source of the work, rather than the source of the risk. To "eliminate", all the reasons to work at height must be removed. It's a lofty goal and the majority of eliminations are unique to the work. Elimination of fall hazards is

difficult, but involving the people doing the work and discussing fall protection as early as possible certainly helps (*See ANSI Z590.3 - Prevention Through Design Guidelines For Addressing Occupational Hazards And Risks In Design And Redesign Processes*). Moving equipment to the floor, installing a lowering system for lights, and assembling things on the ground are common examples of elimination. Partial elimination of fall hazards is also possible by reducing the duration or frequency of work. Longer-lasting equipment or changing an access method can eliminate a portion of fall hazard exposure. Using an aerial lift or ladder to work at height is not elimination. The work is still there and the person is still in the air.

Passive Protection: Passive protection involves barriers that separate people from fall hazards. Guardrails at edges, covers over holes, nets under a work area, and walls are examples of passive protection methods. Passive protection methods are preferred because they DO NOT require user action. Once installed, they do their job in the background of the work. The user must still be at-height, but there are barriers encompassing the work, separating them from the fall hazard. Passive protection is often referred to as traditional protection or engineered controls since they often are built into existing structures. Passive protection is not elimination. The person is still in the air and must remain within the confines of the protection.

Active Protection: Active protection systems are harness-based solutions that DO require user action to be effective. A user must don a harness, make connections, adjust equipment, and do the work while wearing the additional PPE. A pretty big risk line is crossed between passive and active protection. The opportunity for error increases with active systems. There are several of critical connections and opportunities for errors. There are two sub-categories of active systems; travel restraint and fall arrest. The equipment used for both is very similar. Travel restraint prevents a fall where fall arrest allows it to occur. Travel restraint is always preferred over fall arrest. Another line of risk is crossed between travel restraint and fall arrest. Fall Arrest systems expose the user to increased arresting forces and suspension where some level of rescue is needed.

I have to note the dotted line in my illustration at this point. Depending on jurisdiction and industry, there are options below fall arrest systems. I made the dotted line because the next two categories, administrative controls and exemptions, are legally allowed for at-height work, but the only controlling feature is the awareness of the worker and adherence to a procedure. Full exposure to a fall still exists. The protective features of administrative controls are very low and although these are legal options, they do not offer enough security to be considered a control method since the full exposure still exists. No fall protection is required when the task is exempted. The FPHOC in ANSI Z359.2, and many other iterations of the FPHOC, ends with fall arrest. Administrative options and exemptions are found in the occupational health and safety laws of the jurisdiction governing the work (OSHA, State Plans, USACE, etc.).

Agree or disagree, administrative controls are allowed so they must be included in the fall protection discussion if they are a legal option. Organizations can evaluate the risk and make decisions based upon their safety philosophy when addressing these last two options. Many organizations disallow the use of administrative controls and put a tight grip around who and when exemptions are used.

Administrative Controls: Administrative controls are identified by (1) exposure to a fall hazard exists, and (2) adherence to a policy or procedure is the only protective feature. Using a portable ladder is an example of an administrative control (and an exemption). The user is at-height and exposed to a fall. The only protective feature is adherence to good ladder practice. Working between the edge of a building and a warning line being watched by a safety monitor is another example. The worker is exposed to a fall off the edge of the building and the only protective feature is his/her awareness and adherence to the safety monitors' commands. Fall hazard administrative controls are safety monitors (for both warning lines and controlled access zones), qualified climbers, first-person up applications, and fall protection plans during residential construction. Administrative controls are regulated by industry and task, so many times they are not available for use.

Administrative controls are ranked below PPE in the Fall Protection HOC because full exposure to the hazard still exists with no additional layer of protection. PPE provides a positive layer of protection that administrative controls do not.

Keep in mind that administrative controls that use distance as the protective feature are a little unique. For WAH, designated areas and working inside a warning line are very similar to passive systems and should be promoted over the use of active systems. As long as the person stays within the safe working area, there is no exposure. For example, when people are inside a warning line or designated area, the level of protection is very high. They are several feet away from the fall hazard and the only action required is to stay within the area. This is very similar to a guardrail, but distance is used as the protective feature rather than height and strength of the barrier. Once a person moves beyond the warning line, no protection is offered and active systems should be used.

Exemption: Exemptions to fall protection is another discussion to have. I understand doing nothing isn't a control, but like administrative controls, if exemptions exist, the discussion must be had. Federal OSHA and several State Plans have exemptions to fall protection. Portable ladder use is the most common, mentioned in Subpart D. Other exemptions are "first-person up" clauses. Regulators tolerate and many have written allowances for temporary exposure while setting up fall protection providing there isn't an alternate solution. Going on the roof of a house to set a fall protection anchor before the work begins is an example. Fall protection programs should not automatically default to exemptions. They should be avoided as other control methods are usually possible and people are still at risk. Shame on any person who purposely uses a thirty-foot extension ladder to avoid using fall protection. "Why didn't you provide fall protection using XXXX?" is a very difficult question to answer after a fall when exemptions are used.

There are several interpretations of the FPHOC. Many people consider safety nets a fall arrest system and passive protection methods are often divided into subcategories. There are discussions that fall arrest systems should have a hierarchy based upon fall distance, force, and rescue method. I don't disagree with any FPHOC interpretation I have seen. They all follow the HOC principles and differences are usually minor changes in terminology or clarification of one protective method or another specific to an employer or industry. No matter how it's interpreted or argued, what everyone does agree upon is the value the FPHOC offers to the people working on the fall protection program. Universally applicable and one of the most important tools in the program!

Kevin Denis
Work-at-Height, LLC.
denis@wahmember.com