

## RETHINKING THE HIERARCHY OF CONTROLS

By Wyatt Bradbury

The hierarchy of controls has long been a hallmark guide for safety and health professionals. In reality, the hierarchy needs little introduction in this forum from a theoretical standpoint. Its use is extensive; it is one of the early considerations taught to new professionals and even employees.

**Working down** the familiar inverted pyramid from the most effective controls of elimination and substitution, through engineering and finally to the less-effective administrative and PPE controls is a well-known journey that safety professionals use in roles ranging from training to prevention through design reviews and site walks. Yet, when looking at the procedures in place in large organizations and asking both safety and operational professionals what controls they use the most, the likely answers are administrative controls and PPE with limited application of higher-level controls.

“Control” has been defined as the power to influence or direct people’s behavior or the course of events. This implies that the control itself has such power; however, what happens when the control itself is dependent on application? Does it then still meet this definition, and should it be held in the same regard if there is potential for it to not be present?

Take administrative controls as an example. For administrative controls to be effective, they depend on five elements. Employees must:

- have knowledge of the control,
- have the tools and material to institute the control,
- have the capacity to adopt the control,
- have the psychological safety to institute the control, and
- not fail in implementation of the control.

Breaking these elements down, this means that employees must know that the control exists and how to implement

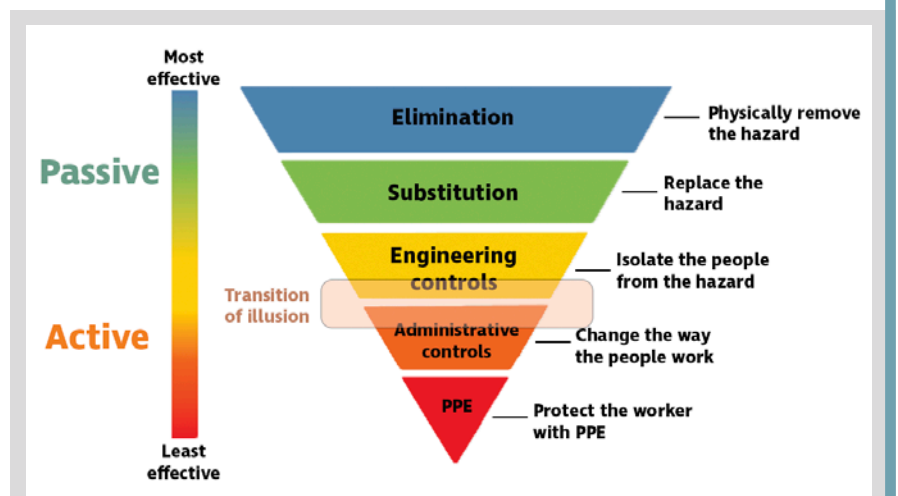
the control. The knowledge must be exact to the expectation of the control. The employee knowledge cannot be altered or different. Employees must have all applicable tools, materials and means by which to implement the control as it is expected.

Next, for employees to have the capacity to adopt the control, workload cannot be so great that it inhibits the implementation due to production pressures. Just as important, the cognitive load on employees cannot be such that they are unable to adequately implement the required steps. The employee needs the space, separation and time to effectively implement the control. In a nuanced contrast, psychological safety relates to the employee’s ability to speak up or implement the control without fear of reprisal. They need to feel emotionally safe in their ability to implement and to feel that any potential vulnerability is guarded. Finally, the employees cannot make mistakes as they implement the control. Considering these factors together,

administrative controls are dependent on fallible, human employees to accurately implement a process upon which their own safety is dependent.

Many of these same elements hold true when considering PPE. Administratively, PPE must be identified as needed, available and appropriately used. However, there is another perspective to this control: PPE often does not influence behavior. In fact, many employee actions that may be deemed risky take place while PPE is worn. Additionally, PPE does little to shape the course of events, often only mitigating the outcomes at most. Hard hats or helmets do not stop materials from being placed in a position where they can fall, nor do they keep materials from falling or keep employees from standing in a location where they could be struck by falling materials. Rather, hard hats or helmets try to absorb and dissipate the associated energy should an incident occur, with the goal of lessening the resulting harm.

**FIGURE 1**  
**HIERARCHY OF CONTROLS**  
**WITH TRANSITION OF ILLUSION**

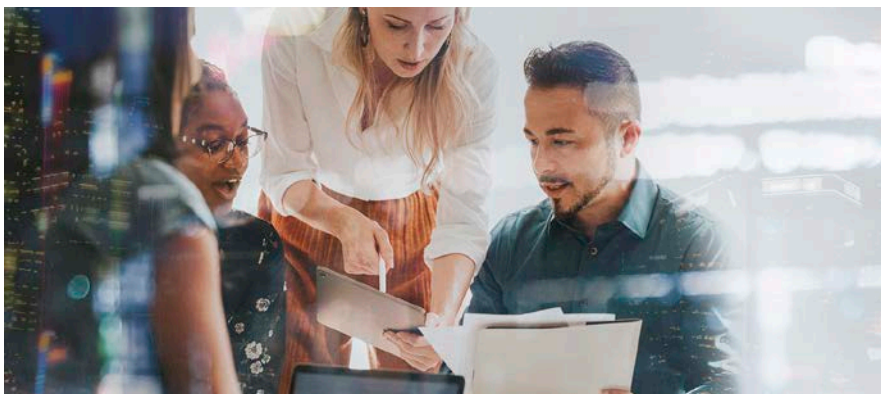


Note. Adapted from “About Hierarchy of Controls,” by NIOSH, 2024 ([www.cdc.gov/niosh/hierarchy-of-controls](http://www.cdc.gov/niosh/hierarchy-of-controls))

### Vantage Point

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## REFRAMING THE HIERARCHY OF CONTROLS



In contrast, once the other three types of controls are implemented and maintained, if applicable, they are always present and providing their intended protections. An employee need only perform their job duties within the confines of the control or work environment to be protected. Knowledge of the control is necessary, but the process is not dependent upon implementation of the control.

A challenging aspect of many engineering controls is that they may depend upon administrative processes to implement unless constructed in such a manner as to eliminate such administrative needs. For example, a lockout device should be installed in accordance with a lockout/tagout process. Guardrails are constructed and installed according to a policy and a set of standards. Local exhaust ventilation may even need to be turned on.

When looking at the hierarchy of controls, there exists not just a spectrum of effectiveness, but also a transition of illusion, with the illusion being that some items in the hierarchy are not actually controls at all. This transition of illusion is located between engineering and administrative controls, where the pyramid transitions from passive controls that do not require active employee participation to active controls (see Figure 1). PPE falls below this transition of illusion on the pyramid, located in the active zone because implementation of this control is dependent upon employee actions. Engineering and administrative controls straddle the passive and active zones respectively as well as the transition of illusion zone.

With this rethinking of the hierarchy of controls, how do we reduce risk to the point of achieving as low as reasonably practicable or acceptable risk? Passive controls, once implemented, are present and working unless an employee specifically works around them, misuses them or physically removes them. For

all intents and purposes, these controls can be depended upon to consistently provide protection to employees. Administrative controls and PPE, however, are not always present, used or effective. If the residual risk is deemed to be acceptable but the controls that make it so fall below the transition of illusion zone on the pyramid, then this cannot be an accurate calculation. In cases when the controls fall below the transition of illusion, failure to effectively implement controls or failure of control effectiveness is a real possibility. As a result, the risk cannot be reduced from the initial calculation because the controls are not guaranteed. Any reduction based on controls in the active section of the hierarchy plays into the illusion and imparts a false sense of safety and risk reduction.

The point is not to completely eliminate the use of administrative controls or PPE. From a business perspective, that would be a costly and foolish endeavor, and there are plenty of cases where these controls have effectively supported employee safety and health. That said, an alteration to how the hierarchy of controls is used is needed, particularly as it relates to risk reduction, residual risk and acceptable risk.

It is critical that when a risk is deemed acceptable, the control methods that provide risk reduction are not derived solely from the passive zone of the hierarchy of controls. If the controls are located below the transition of illusion, the possibility exists that with their failure, the residual risk might actually be closer to the initial calculation, thus invalidating the residual risk. It is critical that residual risk be identified and accepted before implementing controls from below the transition of illusion. This results in an understanding of the worst-case-scenario residual risk present, allowing administrative controls and PPE to continue the reduction but not be an additional point of failure that might

### •Prioritize passive controls.

Focus risk-reduction strategies on controls that do not depend on employee behavior to function.

•**Understand the transition of illusion.** Recognize that some controls can create a false sense of safety if relied upon as the primary reducers of risk.

•**Reevaluate residual risk.** Assess the true residual risk before applying administrative controls or PPE; treat these as supplemental rather than foundational safety measures.

•**Scrutinize administrative control effectiveness.** Ensure that employees have the necessary factors in place to implement administrative controls accurately.

•**Avoid inflated safety assumptions.** Do not consider active controls as reliable contributors to risk-reduction calculations unless their presence and proper use are guaranteed.

•**Redefine acceptable risk standards.** Accept residual risk only when it is supported by passive controls; use active controls to enhance, not define, acceptable safety thresholds.

lead to a lack of understanding of the true residual risk.

This new approach may make both safety professionals and companies uncomfortable. It raises many of the residual risk values present within organizations and forces them to have a more accurate benchmark of the realities of the risks they face and true effectiveness of their controls. Safety professionals must get comfortable looking beyond the illusion that exists when they overly depend on active controls that require inherently fallible humans to implement them with perfect accuracy. **PSJ**

**Wyatt Bradbury, M.Eng., CSP, CHST, CIT,** is the principal for health and safety at Avetta and an adjunct professor at the University of Alabama at Birmingham, where he teaches system safety and prevention through design, engineering ethics and acceptable risk, and safety management systems. Bradbury is also a Ph.D. student studying risk perception at West Virginia University. He is a member of the ANSI Z490.1 subcommittee, ANSI Z590.6 subcommittee, and ANSI Z10 committee. Bradbury is a professional member and advisory group member of ASSP's National Capital Chapter.

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