

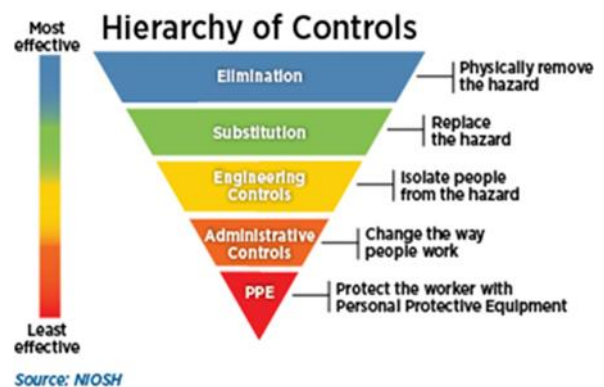


The Hierarchy of Controls: Does It Work for Fire Investigations?

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The National Safety Council first introduced the hierarchy of controls in 1950. It was designed to show companies and businesses that they can manage and control occupational safety hazards and that some control measures are more effective than others. Since then, the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA), among others, have adopted this model in the U.S. as a risk reduction methodology. You will find it referenced in the 2024 edition of NFPA 921.



Over the years, multiple versions of this safety concept have been created. For example, NIOSH adapted it to fit its Total Worker Health program, and the Canadian Center for Occupational Health and Safety modified it for its Chemical Hazards and Alternatives project. UL's Fire Safety Research Institute presented a version that focuses on fire scene safety approaches. This model also appears in the current and previous editions of the NFPA 921 Guide for Fire and Explosion Investigations.

Starting with its 2018 edition, the hierarchy of controls is also a core feature in NFPA 70E, Standard for Electrical Safety in the Workplace. One of the most significant differences between the NIOSH version and the NFPA 70E one is the introduction of awareness. Defined as "educating workers on the hazards and providing information on making safe decisions," awareness extends administrative controls (Gojdics, 2019). They add this after the engineering controls.

The problem is that many believe that this traditional model, in any form, doesn't fit the unique situations of many of today's worksites. I suggest this includes fire investigations. Consider these points:

- ✓ If this model works and is followed, why are reported worker injuries increasing?
- ✓ Human nature isn't readily and easily controlled
- ✓ Mixed organizational cultural messages can muddy or even override these controls
- ✓ It can be unclear and confusing in some situations
- ✓ It doesn't adequately consider human factors, such as perception or attention control, decision-making, off-site influences, or distractions, among others
- ✓ It is biased towards in-plant applications, not lone workers or worksites like post-fire scenes
- ✓ It has a bias towards acute injuries, not ongoing lower-level exposures (St. Aubin & Pater, 2023)

In addition, a problem with the traditional model is that controlling workplace hazards is not a one-is-better-than-the-other approach. The pyramid design and the name of the conventional model imply that one approach should be used before another and that a higher level is better than a lower one. This is just not true. There is typically no one-size-fits-all solution to workplace hazard mitigation, especially post-fire scenes. In reality, multiple overlapping needs and viable solutions can exist for a workplace hazard, and some steps must be taken well before a hazard is even identified. The traditional model must communicate the information needed to reduce post-fire scene hazards effectively.

Although OSHA uses this traditional model, it argues that its regulations require combining control methods to best protect workers and that workplace hazards require combining methods to provide the best level of protection (Bliss & Serne, 2024). This cannot be accomplished with the traditional model, which relies on outdated messaging and meaningless color coding. In short, this conventional infographic doesn't meet the needs of the fire investigation workforce or many others.

Some countries have taken a different, and arguably better, approach to hazard-reduction messaging. For example, WorkSafe Australia takes a hybrid approach and groups substitution, isolation, and engineering controls together, indicating that these measures offer similar layers of protection. New Zealand takes this a step further, including guidance on risk management and noting that selecting hazard control options may require multiple levels or types to effectively control workplace hazards (Bliss & Serne, 2024). However, some newer models still attach higher and lower effectiveness levels.

As with many other workplaces, in the post-fire environment, we need to control safety hazards to the best of our ability and limit worker exposure to the health and safety hazards that are almost always present. This requires a two-part approach. We need to manage

overall exposure control policies and practices up front, before any work is performed, to protect workers from the health and safety hazards of the post-fire environment and ensure they understand the goals and expectations of a safe workplace. This requires policies, preparation, and training before anyone ever goes to a scene. Once at a post-fire scene, workers need to understand how to remove hazards or modify their work plan to eliminate or reduce the hazards they find.

Because workers can use multiple hazard reduction and control methods at any given scene, which collectively lead to a safer work environment, the messaging should refer more clearly to worker safety methodologies. Removing the word hierarchy allows the worker to select from available control methods to make the scene as safe as possible, recognizing that most post-fire scenes cannot be made entirely safe. Selecting the most appropriate control methods is part of site safety and risk assessment, and you may need to choose more than one option at any scene. This concept better reflects OSHA’s position that combining control methods is often required to provide the best level of worker protection (Bliss & Serne, 2024). A better model would look like this.

Worker Safety Control Methodology
Hazard Control Remove the hazard from the work environment Reduce the hazard to a more acceptable level Replace a substance or process to reduce the hazard Redesign the process or task to prevent exposure to the hazard
Exposure Control Manage the system, policies, programs, and work practices Train workers about procedures and warnings Warn workers of hazards using signs and briefings Protect workers with adequate and appropriate PPE

While the four hazard control methods range from highest to lowest worker protection, you can mix and match them at each scene for the best possible safety solution. Exposure control methods are used alongside hazard controls. Therefore, these control sets are not assigned numbers or hierarchy levels.

Using active voice, clarity, and simplicity facilitates messaging from the employer and improves the worker’s learning process. This connected safety control methodology is much easier for workers to understand and apply in the field.

For fire investigation safety leadership to be effective today, the traditional hierarchy of controls should be replaced with an infographic that clearly describes hazard mitigation options. For this to be effective, investigators must also consider factors that influence hazard

resolution, including the safety culture present and the human factors involved in any fire scene exam. You can't control every contributing factor at an incident scene. Still, we can manage safety behaviors by recognizing the influencing factors and using them to our advantage. Establishing ground rules and promoting compliance through education can help build a strong fire scene investigation safety culture.

References

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