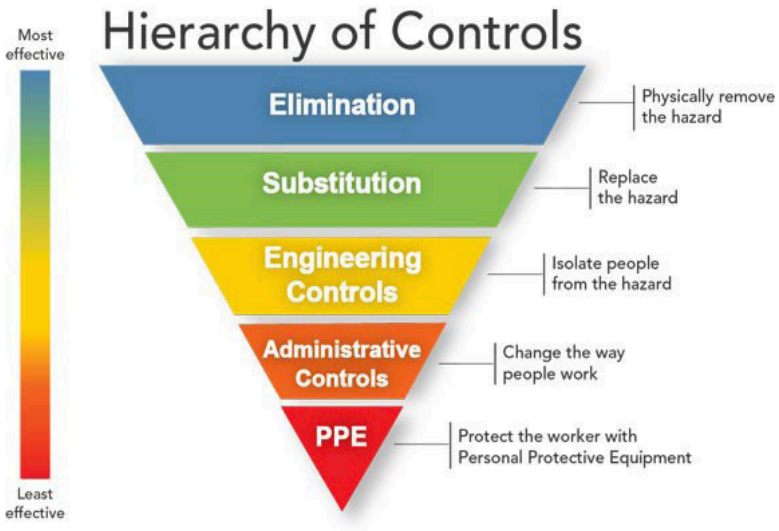
Identifying Hazard Control Options: The Hierarchy of Controls

What Is the Hierarchy of Controls?

The hierarchy of controls is a method of identifying and ranking safeguards to protect workers from hazards. They are arranged from the most to least effective and include elimination, substitution, engineering controls, administrative controls and personal protective equipment.

Often, you'll need to combine control methods to best protect workers. For example, a local exhaust system (an engineering control) requires training, periodic inspections, and preventive maintenance (administrative controls). You will also need to consider feasibility. (See "What Are Feasible Controls?" on page 2.)



Source: NIOSH.

Elimination

Elimination makes sure the hazard **no longer exists**. Examples:

- Ending the use of a hazardous material
- Doing work at ground level rather than at heights
- Stopping the use of noisy processes

Substitution

Substitution means changing out a **material** or **process** to reduce the hazard. Examples:

- Switching to a less hazardous material
- Switching to a process that uses less force, speed, temperature, or electrical current

Engineering Controls

Engineering controls reduce exposure by **preventing hazards from coming into contact with workers.** They still allow workers to do their jobs, though. Examples:

- Noise enclosures
- Local exhaust ventilation
- Guardrail system
- Machine guards
- Interlocks
- Lift equipment

Administrative Controls

Administrative controls change the way work is done or **give workers more information by providing workers** with relevant procedures, training, or warnings. They're often used together with higher-level controls. They include:

- **Procedures**, such as equipment inspections, planned preventive maintenance, checklists, lockout/tagout/tryout, infection prevention and control practices, changing work schedules, pre- and post-task reviews, and rotation of workers
- **Training** on topics such as hazard communication, permit-required confined space entry, lockout/tagout/tryout, and safe work procedures
- **Warnings,** such as signs, backup alarms, smoke detectors, computer messages, mirrors, horns, labels, and instructions

Personal Protective Equipment

Personal protective equipment (PPE) includes clothing and devices to protect workers. PPE needs constant effort and attention (including proper use and training) from workers. Higher-level controls aren't always feasible, and PPE might be needed in conjunction with other control measures. Examples:

- Safety glasses
- Personal Fall Protection Systems and related equipment
- Hardhats
- Respirators
- Hearing protection
- Protective clothing

What Are Feasible Controls?

To decide if a control is feasible, you need to know how well it can protect workers and whether it can be implemented successfully. Consider whether it is:

- Right for the hazard
- Appropriate, given how likely injuries/illnesses are
- Consistent with employer policies, laws, and regulations
- Not too burdensome to workers
- Recognized as an appropriate practice in the industry
- Effective, reliable, and durable
- Readily available
- Cost-effective, short- and long-term

How Can You Use the Hierarchy of Controls?

First you will need to identify the hazard(s) you are trying to control with workers and their representatives' participation.

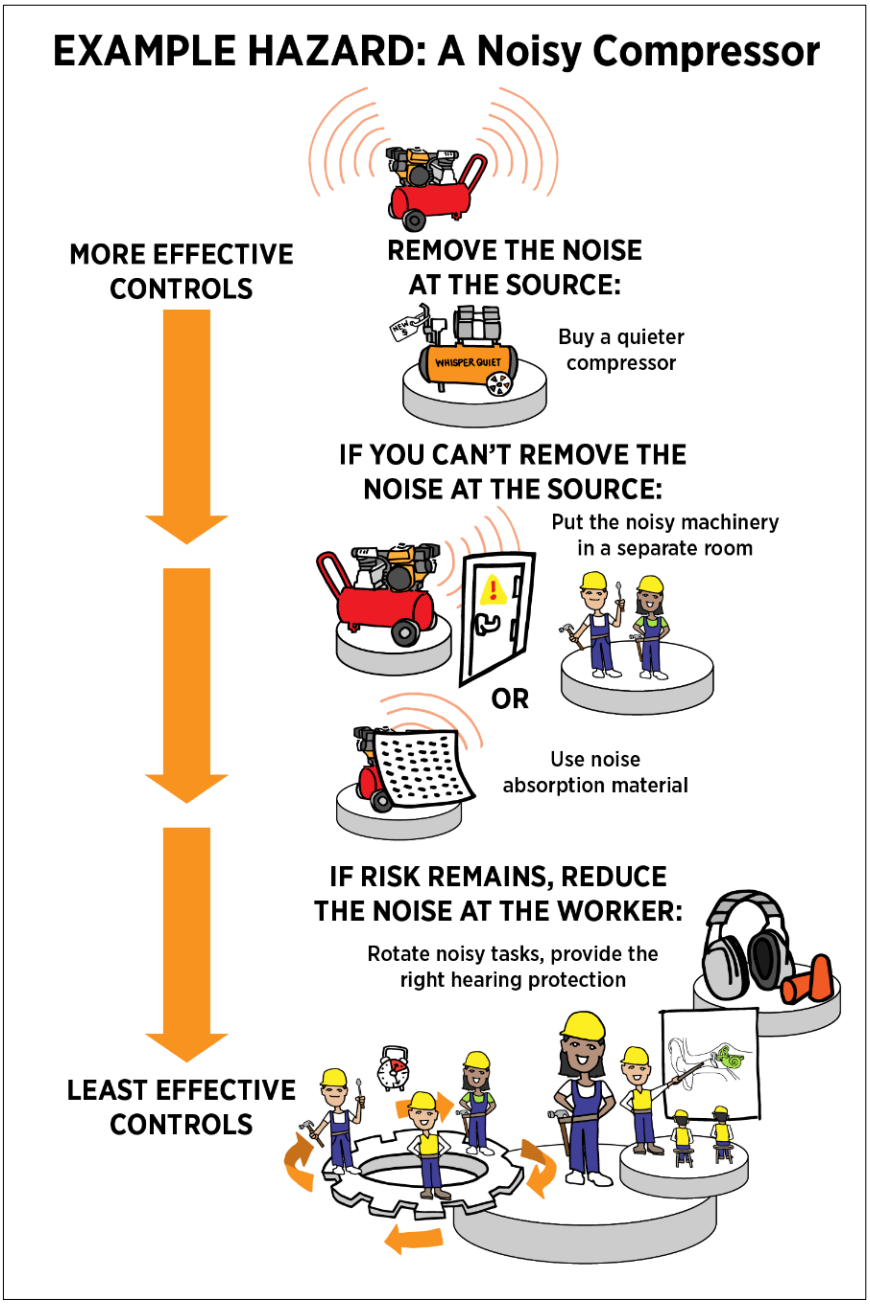
Then, think about how you can block the path between the worker and the hazard. Brainstorm ways the hazard can be eliminated, substituted, engineered out, administratively controlled, or what PPE can be used with other controls. Ask yourself:

- What are the pros and cons of each method?
- Are the controls feasible in our workplace? Why or why not?
- Where do the feasible controls fall in the hierarchy?

Collaboratively choose the control(s) that falls highest on the hierarchy. If it will take time to implement, use one or more of the lower options you identified as interim controls until the permanent solution is in place. Remember that you may need a combination of control methods (such as engineering controls plus administrative controls) to provide the best level of protection. Be sure to comply with any workplace regulations which may require specific types of control for certain hazards.

Try It in Your Workplace

Try applying the hierarchy of controls to hazards in your workplace. Brainstorm with workers and their representatives' possible controls at each level of the hierarchy. After brainstorming, go over the options and circle the control(s) to be implemented. See the example worksheet below and use the blank worksheet that follows.



HIERARCHY OF CONTROLS WORKSHEET

Remember, often a combination of controls is most effective.

Hazard or hazardous situation/activity: Driver operated fork truck struck a pedestrian in the warehouse area. There have been incidents and near misses in the past.

Control Method	New Hazard(s) Created
Elimination • Design the workplace and storage at intersections to eliminate blind spots. • Only allow people to go through the warehouse if they are necessary to the operation and fork trucks are not in operation. • Don't allow anyone from other departments to go through the warehouse to break areas or the cafeteria. • Automate delivery of materials using conveyors and AGVs (automatic guided vehicles).	• People may need to go through other hazardous areas to take inventory.
Substitution • Replace fork trucks with powered walk-beside forklifts or hand trucks.	• Stress on muscles.
Engineering Controls • Separate vehicles and pedestrians by installing pedestrian aisles, barriers, and crossings to keep people away from fork trucks. • Add mirrors to blind corners and motion detector/alarms. • Limit access points to the building. • Limit the speed of fork trucks.	• Maintenance workers have to use ladders when they clean the mirrors. • Stress or exertion on workers trying to keep up with production quotas using slower equipment.
Administrative Controls: Warnings • Put warning lights and backup alarms on fork trucks. • Put sensors on fork trucks or pedestrians.	• Backup alarms add to the noise level in the warehouse. • Workers can get alarm fatigue. • Controls not effective for the hearing- or visually impaired.
Administrative Controls: Procedures and Training • Limit who has access to areas where fork trucks are in operation. • Provide forklift training with annual refreshers. • Establish a safe distance, based on manufacturer's information, around fork trucks. • Don't allow anyone to move fork trucks 15 minutes before each shift start, lunch break, or shift end. • Scheduling work so that pedestrians are not in the area of fork trucks in use. • Require the use of headlights on fork trucks at all times. • Provide training to pedestrians and operators on where the blind spots are on fork trucks. • When inventory is taken, all fork truck operations cease.	• Safe distancing could impede communication between workers. • Fork truck drivers pressured to rush because of reduced time to use fork trucks.
Personal Protective Equipment • Require workers and visitors to wear high-visibility vests.	• Machinery can catch loose-fitting vests.

HIERARCHY OF CONTROLS WORKSHEET

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Hazard or hazardous situation/activity:_____

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Substitution	
Engineering Controls	
Administrative Controls: Warnings	
Administrative Controls: Procedures and Training	
Personal Protective Equipment	