Controlling health and safety hazards

Hazards can be found anywhere—in any workplace, every home, any environment. The reality is that safety hazards can be anticipated, recognized, and controlled. Employers, supervisors, and employees make choices every day about whether or not to recognize a safety hazard and how to control it to prevent injury.

The Occupational Safety and Health Administration (OSHA) requires that employers recognize potential hazards, inform employees about them, and control hazards as best they can to prevent employee injuries or illnesses. Methods for controlling hazards fall into three categories, listed below in the order of effectiveness.

Hierarchy of controls

First and best choice
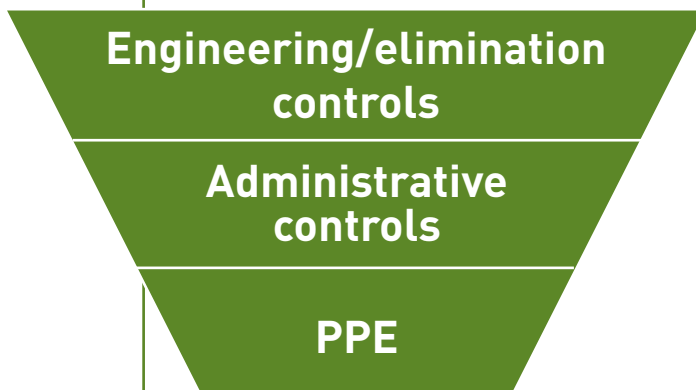
1 Engineering/elimination controls

Engineering controls eliminate or reduce a hazard by addressing the design of the work process. Engineering control strategies include reducing the hazard (ventilation, for example), isolating it from where employees are working (enclosing or relocating a noisy machine), or replacing a hazardous substance with a safer one. An interlocking device, such as the lock on the common household washing machine lid during the spin cycle, is an example of an engineering control because it prevents a person's arms or hair from being caught in the fast-spinning agitator.

2 Administrative controls

Administrative controls include policies, procedures, training, safety rules, job rotation, signage, or temporary barriers to warn of a hazard or describe safe procedures Administrative controls are often necessary while engineering controls are being researched, designed, and implemented. Employers often assume they will cost less than engineering controls to implement, but the cost and effort to sustain a training program or a tedious procedure can easily exceed the cost of an engineering control.

3 Personal protective equipment (PPE)

Personal protective equipment (PPE) such as safety glasses, gloves, hearing protection, respirators, safety boots, and hardhats place a barrier between worker and the hazard, but they don't prevent the occurrence of the incident. PPE is considered the least effective method of controlling a hazard because it depends on proper selection and fit, employee compliance, and availability.

Engineering/elimination controls

Administrative controls

PPE

Practical examples of controlling hazards with engineering controls, administrative controls, or personal protective equipment (PPE)

Before engineering controls

After engineering controls

Potential hazard: repetitive loading of materials onto machinery

Engineering controls

Eliminate lifting by installing conveyer belts and machines that move products from one process to the next. Use hand trucks, pallet jacks, rolling tables, forklifts, cranes, scissor lifts, etc., for material-handling purposes. Lighten the load by packing in boxes with less capacity or by using lighter materials (for example, replace wooden boxes with plastic boxes). Add casters to the items that need to be moved.

This publishing company replaced a manual loading task—100 pounds lifted 50 times per hour—with a vacuum lift.

Administrative controls

Specify the limit that can be lifted manually (for example, 40 pounds). Establish policies and train employees to use material-handling equipment. Fill boxes partially or specify tasks that require team lifts. Work with your SAIF safety management consultant to provide Safety In Motion® training.

PPE

Not applicable (Back belts are not considered PPE.)

Potential hazard: nursery workers reported glove tearing exposing skin to pesticides and sanitation chemicals

Engineering controls

Engineering controls were explored, but deemed impractical at this time. Handling transplanted materials manually is a more reliable and cost-effective way to prevent product damage.

Administrative controls

Supervisor referred to safety data sheets (SDS)* and pesticide labels and discovered that manufacturer's recommendations for the type of glove were vague. Employer requested more specific direction by phone.

Field tests determined that vinyl gloves were damaged after 30 minutes of use, nitrile gloves sustained 2 hours of use without damage. PPE assessment certification was modified, requiring nitrile gloves.

PPE

The safety committee performed field tests and documented findings. They recommended changes to PPE policy. Workers were trained on how to use the proper gloves, how to put them on and remove them, and when to replace them.

*Under the new Globally Harmonized System for the Classification and Labeling of Chemicals, the name material safety data sheets (MSDS) has been shortened to safety data sheets (SDS).

Potential hazard: unguarded table saw

Engineering controls

Replace saw with a Saw Stop, or equivalent product, designed to stop the blade when electrical current is broken

Administrative controls

Biesemeyer manufactures an after-market table saw that mounts on an articulating arm and is useful for angled cuts. Implement policy to require supervisor's approval prior to making a cut without the guard in place.

PPE

Hearing protection, safety glasses, and respiratory protection may be required for controlling exposures to noise, flying particles, and dust.

T-square guard mounts to the table saw and can be lifted away from the blade when the cut requires a closer look.

Go to
sawstop.com
to see demonstration with hot dog.

Engineering or administrative control?

Knives are stored randomly in a drawer. To prevent cuts while reaching into the drawer, the employer installed a magnetic strip for knife storage. However, training and routine inspections (administrative controls) are also necessary to ensure the practice remains in place.

Can PPE control this hazard?

Probably not. Cut-resistant gloves are used when cutting meat, but they are generally donned just before performing the task. It is unlikely that a worker would wear the cut-resistant gloves to search for a knife in a drawer.

Knives are stored randomly in a drawer

Magnetic strip for knife storage

Identifying and implementing engineering controls

When safety hazards are significant or persistent, engineering controls are the most effective way to control them. Simple issues such as broken extension cords or a missing guard can often be addressed with minimal time, money, and effort. However, reducing or eliminating such hazards as high noise levels, chemical exposures, or ergonomic challenges may require a more systematic approach and a significant investment of time and resources.

Groundwork

Build relationships.
Build positive relationships with key partners in your company such as maintenance, engineering, human resources, finance and management. Building good relationships with people who can help get things done is essential to finding and implementing solutions.

Compile a resource list.
Develop and maintain lists of vendors and consultants to call for advice. Searching the internet can provide good results, but local experts, such as a SAIF or Oregon OSHA consultant, or an equipment vendor, can be more helpful.

Tap employee knowledge.
Take advantage of employees' knowledge by soliciting input about safety hazards and ideas for solutions. Those who operate or maintain equipment can often predict potential outcomes, good or bad, of a given solution.

Solution for simple or inexpensive health and safety issues:

1 Seek input from employees and advice from consultants or vendors.

2 Determine the best solution and implement it as soon as possible.

3 Follow up to determine that solution is effective.

Complex or costly solutions

The process for solving problems can be broken down into a series of repeatable steps or best practices. It doesn't have to be complicated, but it helps to follow a routine,, track the steps in writing, assign responsibilities, and provide progress reports.

A sample process might include:

1. Assemble a review team that includes workers, experts from your resource list, maintenance, engineering, finance, and management personnel appropriate for your project.

2. Conduct a hazard review, outlining the number of injuries, the severity and cost, the cost of potential OSHA fines, the cost of any damaged product, the cost of time spent managing the hazard as it is managed currently.

3. Research and brainstorm alternative solutions (see "Brainstorming for best practices in controlling health and safety hazards").

4. Discuss the best solutions and develop a consensus for how to proceed. Develop an implementation plan, including responsibilities, timeline, finances, training, etc.

5. Implement solution.

6. Periodically evaluate solution and prepare report to management.

7. If solution requires improvement, start at Step 1 again.

Additional thoughts for consideration

Consider the hierarchy of controls.
When identifying solutions, balance effectiveness, costs, and benefits of each solution. Engineering solutions may appear to be more costly, but they are usually more effective. They may provide the added savings of increased process efficiency. The costs of administrative controls are often hidden, requiring significant staff time.

Convince management.
Management staff often has to approve the funding of projects. Avoid the shortcut of simply presenting the single best solution. Be sure to describe the cost of not making a change, as well as the cost of other solutions proposed.

Approach holistically.
As you hone in on a solution, think about the impact of the control selected. Will there be scheduling, flow, or process changes? Will employees need to be

trained on new procedures or equipment? Do you need to develop new policies? Considering these aspects up front will help you implement the process and reduce the likelihood of injuries.

Identify multiple solutions.
Brainstorm ideas and research options. This will provide you with choices to present to management and back-up plans to use if your chosen solution does not work out.

Conduct a pilot program.
When a safety hazard is present in multiple locations or processes, it may be beneficial to launch a pilot to see how the proposed solution works before implementing throughout the entire company.

Review controls.
Periodically review implemented controls to make sure they are effective. Reviews can also reveal room for further improvement.

Development of policies

Because collaboration increases buy-in, work with both management and employees to develop and implement new safety policies. Management sees the big picture and employees typically have a stronger understanding about the work itself.

Solicit feedback from employees about existing safety policies and provide this information to management. Again, employees typically have a thorough understanding about job tasks, work environment, hazards, controls, etc., so their opinions are valuable.

Policies should be in writing. This will help create a record as well as a reference in case there are any questions about the details. Also, Oregon OSHA specifically requires you to put certain policies, such as respiratory protection and lockout-tagout, in writing.

Collaborate

Solicit feedback

Provide information

Put policies in writing

Implementation of policies

Inform employees about policy changes well in advance. Most people don't like surprises, and early notification will give employees a chance to provide additional input. Explain why the new safety policies are being implemented.

Provide thorough training to ensure detailed understand of your new policies. Management expectations should be clear and concise, and communicated not only when policies are implemented, but should be ongoing. Repeating and demonstrating expectations will serve as a reminder to your employees. It will also communicate that it's important to management that employees follow safety policies.

Observe workers and work processes to identify gaps in the implementation process. Identified issues are excellent opportunities for re-evaluation of policies, employee coaching, etc.

Recognize employees who follow the rules and hold accountable employees who don't. You can use steps from the communication section of the supervisors safety guide to coach employees. A simple "thank you" can often be a very effective way to reinforce positive employee behavior.

Recognize employee achievements when they make improvements. Follow up with disciplinary action when employees show conscious disregard for your organization's policies and procedures.

Be fair and consistent with recognition and disciplinary action. For example, a safety violation should be addressed the same, whether an action results in an accident or a near miss.

Provide feedback to management to let them know what is working and what isn't. Ideally, things that aren't working should be followed up by suggestions for improvement. And remember, employees can be a highly valuable source.

Inform employees

Provide training

Observe workers

Give employees recognition for following the rules

Hold employees accountable

Recognize improvements

Follow through with discipline

Be fair and consistent

Provide feedback

Brainstorming for best practices in controlling health and safety hazards

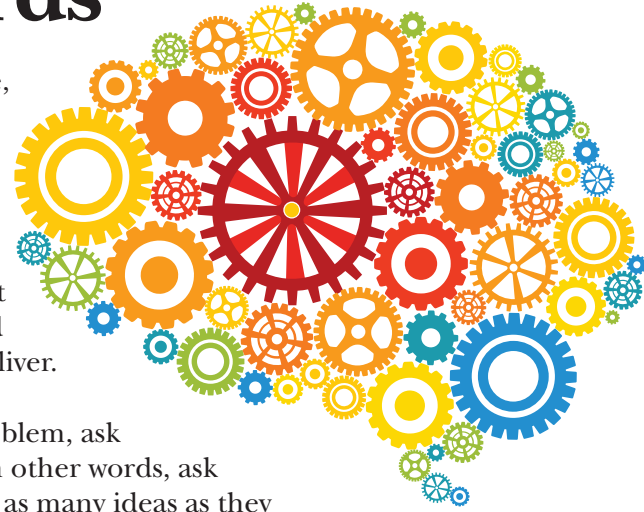Gather your brainstorming team and state the problem you want to solve.

For example:

There were five slip-and-fall injuries last year. We want to identify what workers are slipping on and determine if we can put additional safeguards in place to prevent such injuries. Four of the injuries were minor, but one resulted in a broken collar bone, two surgeries, and 85 days of lost time.

Your team should include those who work in that area, as well as at least one representative from any part of the production or design chain who might be affected by the hazard or the control. If the task is related to assembling the product, include product designers. And the maintenance staff will have insights into why liquid may be leaking from equipment.

If, in the example above, falls occurred in the course of providing a service, include those who market your services. Is there a difference between what marketing promises and what production can deliver.

After describing the problem, ask for unscreened ideas. In other words, ask the participants to offer as many ideas as they can, without judgment. Ideas may come from previous investigation, as well as the current incident. For now, try to avoid discussing costs, implementation hurdles, and time constraints. Assure participants that they will have the chance to evaluate concerns and criticisms before any decisions are made, but it is important not to screen out an idea that may have some value. Discourage competition.

▶ Ground rules:

1. **More ideas make better solutions.** Be sure that each perspective has a chance to offer suggestions.

2. **Defer judgment.** Welcome unusual approaches and combinations of ideas. A solution assumed to be costly may not be as bad as initially thought, especially if another participant knows where or how to secure the solution at a lower price.

▶ Classification:

Once you are confident that all ideas have been proposed, classify them into engineering, administrative, and PPE.

▶ Evaluation:

Now you can work through the evaluation process. Think of the details that determine whether each proposal could succeed or fail; for example, who would write the policy or fabricate the machine part, others who should be involved, and the best time of year to implement the plan.

Finally, determine the cost in time as well as dollars. Predict the effectiveness of each solution. A solution promising that an injury will never, ever happen again should be given a higher priority than one that is less effective and more difficult to manage. When you consider the cost of the solution, be sure to compare it against the total cost of the problem. Injury costs are a small part of a hazard's price. Be sure to include the time spent responding to the injuries, replacing the worker, repairing the equipment, even the cost of everyone involved in this brainstorming session.

Hazard and safety concern report

Reported by (optional): _____ **Date:** _____

Reported to: _____ **Date:** _____

Observation details: **Date:** _____ **Time:** _____ **Location:** _____

Describe hazard or unsafe work practice (be specific):

_____
_____
_____
_____
_____

List any suggestions you may have for how to control hazard or prevent injuries:

Engineering controls: _____
_____
_____
_____

Administrative controls: _____
_____
_____
_____

Personal protection equipment (PPE): _____
_____
_____
_____

Action taken by whom and when:

_____
_____
_____
_____

Safety policy feedback form

Reported by (optional): _____   **Date:** _____

Reported to: _____   **Date:** _____

Policy/policies in question:

_____

_____

_____

_____

Detailed description of concerns and solutions if applicable:

_____

_____

_____

_____

_____

_____

_____

_____

_____

Additional comments and recommendations (supervisor section):

_____

_____

_____

_____

Copy sent to: _____   _____

_____   _____

Signature: _____   **Date:** _____

Brainstorming for best practices form

Discussion leader: _____   **Date:** _____

Participants: _____   **Date:** _____

_____

_____

Summary of health or safety issue:

_____

_____

_____

Possible solutions:

	Description	Who, how, when, where	Cost, time needed, effectiveness
Engineering			
Administrative			
PPE			

SAIF Corporation
www.saif.com

As your workers' compensation insurance carrier, we provide many guides, articles, and other resources to assist companies and their safety committees identify and mitigate risks. Go to www.saif.com, select the link from the left menu that says, "Safety and health."

Oregon OSHA
osha.oregon.gov

Go to the Oregon OSHA website and explore their menus. The "A-Z Topic List" is an easy place to start if you are looking for information about a specific topic like ammonia. Specific regulations are found in "Rules and Laws."

Also, check out "Education & training" where classroom training, conferences, and online courses are available.

Federal OSHA
www.osha.gov

The eTools at federal OSHA are a great source of information to include in training. Go to the "A to Z Index" and scroll down to "E."

OSHA's Quick Cards and Fact Sheets are also great communication tools.

State of California Department of Industrial Relations (Cal/OSHA)
www.dir.ca.gov/dosh

Although we do not use California regulations, the California State OSHA program has useful references. This is a link to the publications available on their web site.

Washington State Department of Labor and Industries
lni.wa.gov

Again, we use Oregon regulations, but some of the Washington State Department of Labor and Industries, Division of Occupational Safety and Health safety topics and training materials are very well-written. Click on the Safety & Health tab to access content.

Links to websites that provide additional information or resources on identifying hazards in the workplace.

WORKSAFE BC

www.worksafebc.com/en

British Columbia's workers' compensation and occupational safety and health regulatory agency's web site is excellent. They even have great online, on-demand videos.

AGRICULTURE

National Ag Safety Database

nasdonline.org

TRUCKING
or

FORKLIFT
OPERATION

Trucking Injury Reduction Emphasis(TIRES)

keeptruckingsafe.org

HEALTH CARE

The Oregon Coalition for Health Care Ergonomics (OCHE)

Posts regarding resources for prevention of needle sticks.
hcergo.org

National Institute for Occupational Safety and Health (NIOSH)

CDC Workplace Safety and Health

Safe Lifting and Movement of Nursing Home Residents
www.cdc.gov/niosh/docs/2006-117/pdfs/2006-117.pdf

ERGONOMICS

Federal OSHA

Ergonomics: Success Stories

Ergonomic success stories from many industries are highlighted
www.osha.gov/SLTC/ergonomics/success_stories.html