

2018 SAFETY AND PRODUCTIVITY GUIDE FOR PERFORMANCE-DRIVEN INDUSTRIAL MANUFACTURING

By Bryan McWhorter

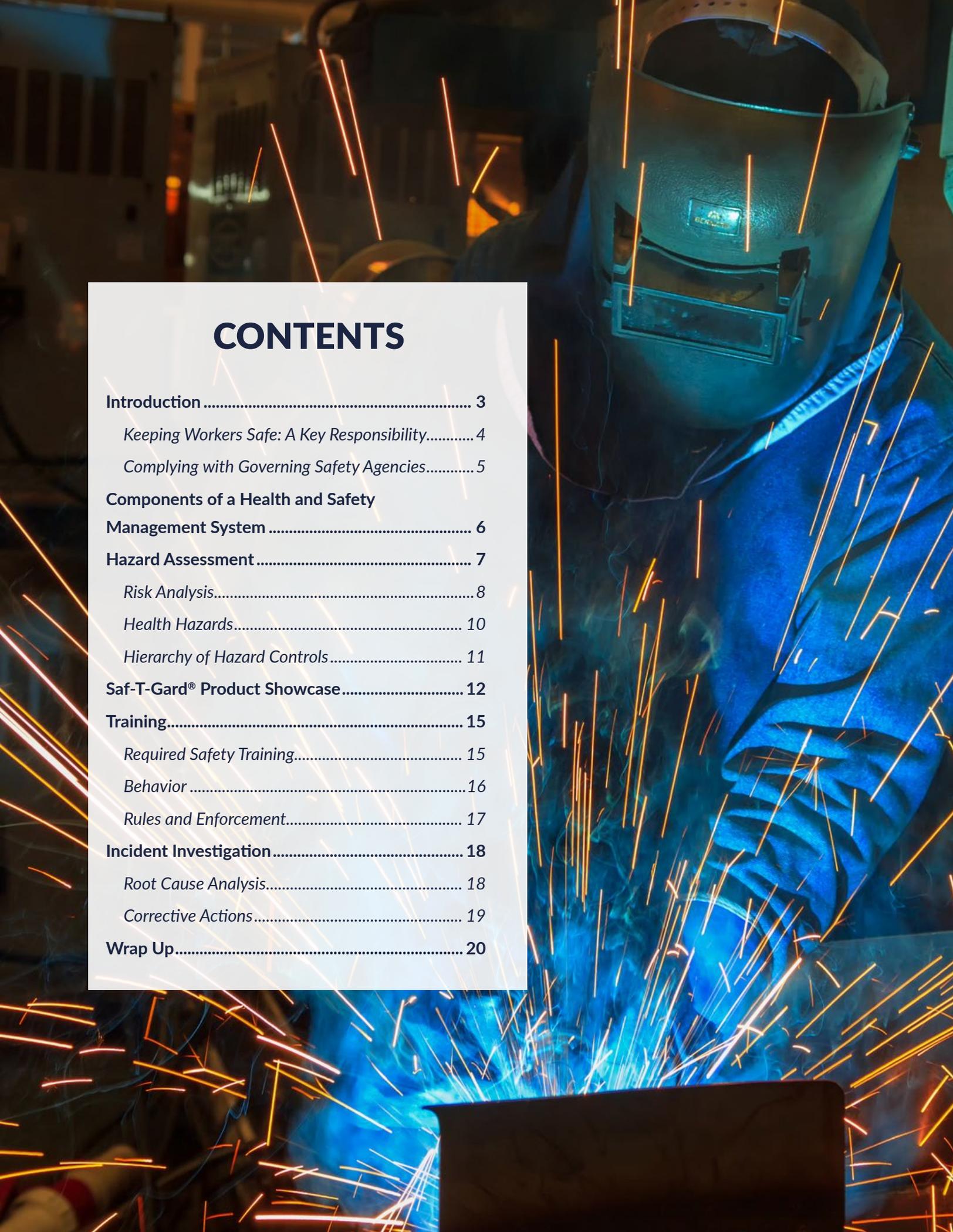
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International, Inc.

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Introduction

The modern factory is complex. It's made up of work cells and high-speed production lines, and it's driven by spreadsheets. As a manufacturer, your days are filled with challenges that must be met if you want to stay competitive.

Given all this, the only way to become or remain a world-class manufacturer is to be performance-driven. That means constantly monitoring and striving to improve in four key areas:



SAFETY

Reflects control and is an integral part of operating a sustainable business



COST

Cost control ultimately translates to profit



QUALITY

Defective products cost you more than cutting corners could save you



DELIVERY

Meeting customer demand is essential

All of these are critical, but safety has become a top performance metric in recent years. And with good reason: it protects your greatest assets, your employees. It's also a reflection of how stable your operation is.

The problem is that safety can conflict with other metrics. Factory workers might value safety (their own and their coworkers'), but they also know that they are being measured on their production performance. Knowing this, they might take unnecessary risks to minimize downtime and scrap rates or to improve their production yield.

Safety and productivity have often been at odds, but they don't have to be. Keeping workers safe doesn't have to come at the expense of productivity.

The secret to achieving that? Make safety part of your production system. That means implementing safe work practices for everything you do on the shop floor. And it needs to be sustainable – those processes need to be both repeatable and reliable.

Manufacturing environments expose workers to many types of serious hazards. It's up to managers to assess the risks and implement control measures to protect workers. It is also the responsibility of employers to follow the guidelines and standards laid out by governing safety agencies.

That can seem like an overwhelming task. But Saf-T-Gard is here to help. We've created this guide to assist you through it. In it, you'll find a simple framework for safety in manufacturing.

KEEPING WORKERS SAFE: A KEY RESPONSIBILITY

No one should have to put themselves in harm's way to earn a living, and certainly not in manufacturing. Thankfully, manufacturing shop floors can be optimized to minimize risks and protect workers.

We can't be complacent about safety. According to the U.S. Department of Labor, there were 5,190 fatal work injuries record in 2016. That's a 7% increase over the figures from 2015. But with a good understanding of how to identify and control hazards in the manufacturing environment, we can do our part to improve those statistics, instead of letting our workers become one.

COMPLYING WITH GOVERNING SAFETY AGENCIES

Employers can be so focused on ensuring compliance that they can lose sight of why it's so important in the first place. Meeting every standard might feel like a bother. But the purpose of agencies like OSHA isn't to drain your funds or make busy work – it's to keep your workers safe.

As a manufacturer, you must make sure you remain compliant with the regulations that pertain to your industry. What manufacturing managers may not know, however, is that regulatory agencies provide many tools and resources you can use to accomplish this. eTools and eMatrix, for instance, are online training tools developed and offered by OSHA. You can also find downloadable content, expert advice, and interactive training, complete with tests and quizzes to boost your confidence in the material you're reviewing.

And don't forget that you can work more directly with your governing agencies. Your tax dollars are funding these organizations and paying for their programs, so don't hesitate to reach out to them and learn about all the resources they provide. And if they ever come knocking on your factory's door following an incident, it won't hurt to have a (positive) history of working with them.

Components of a Health and Safety Management System

A safety policy is your stated commitment to safety, endorsed by management. What you include in it is crucial because, despite our best intentions, our effort rarely exceeds our commitment.

We suggest you begin with a written safety policy. Having a clear and comprehensive document available focuses everyone's attention and elevates safety as an important concern for both management and employees.

Your smartphone, your laptop, and your tablet all run on an operating system. It's how they allow you to make the most of them and access all of their capabilities. It guides all the activity that takes place on your devices. It's the same with your industrial manufacturing operation: its safety management system will guide everything that happens in it.

Here are its main components:



We'll review each of these and discuss how they improve safety and ensure compliance in manufacturing settings.

Hazard Assessment

Sharks are a risk if you're scuba diving off the coast of Australia.

Sunstroke and dehydration are risks if you're hiking in a desert.

Every environment poses its own unique set of risks. The factory floor is no exception, but we can't deal with dangers until we uncover them.

Hazard assessments are the starting point for all safety programs. It's the process by which we uncover unsafe conditions, unsafe behaviors, and unsafe policies. This is crucial – we can't address these unless they've been surfaced.

Not every danger can be eliminated but surfacing them is still important. That's because there's a big difference between dangers and hazards:



**DANGER = A RISK TO
EMPLOYEES FOR WHICH THERE
IS NO CONTROL IN PLACE**



**HAZARD = A DANGER THAT IS
MADE LESS RISKY THROUGH
SOME CONTROL MEASURE**

A danger is an emergency. It puts employees in imminent danger and needs to be dealt with immediately. But hazards? We can work around hazards all-day long and never be in any grave danger so long as we understand the risks and that there are control measures in place to keep us safe.

A control measure is any item or process meant to eliminate or mitigate a danger. In manufacturing environments, these include:

- Cut-resistant gloves
- Machine guards
- Lockout/tagout procedures
- Guardrails and personal fall arrest systems
- Ergonomic equipment and work practices
- Earplugs and earmuffs
- Faceshields and safety glasses
- Steel toe boots and shoes

You should perform a hazard assessment on all activities your employees engage in, not just the ones with obvious risks. Figure out where there is any potential for injury and whether there are control measures in place.

Once a hazard has been uncovered, your next step is to conduct a risk analysis to understand the risks associated with it.

RISK ANALYSIS

With a risk analysis, you'll give every identified risk a numerical value. This will allow you to prioritize your efforts and address the most pressing safety needs first.

Rate the risks based on three factors:

EXPOSURE

SEVERITY

PROBABILITY

Rate each from 1 to 10:

Low Risk: 1, 2, or 3

Moderate Risk: 4, 5, 6, or 7

High Risk: 8, 9, or 10

Then, multiply the risk ratings for all three factors to get the score for the individual work task.

Let's run through an example so we can see what this looks like in practice.

Each shift, the employees in one department have to climb a ten-foot ladder to check equipment located on a mezzanine.

Risk: Falling off the ladder to the mezzanine.

- Exposure: They must go up and down the ladder once an hour – Risk Score = 7
- Severity: A fall could result in severe injury and possibly a fatality – Risk Score = 8
- Probability: Going up a ladder does not often result in injury, but workers are performing the task several times a shift, increasing the likelihood of an incident – Risk Score = 4

Risk Assessment Score = Exposure x Severity x Probability = 7 x 8 x 4 = 224.

After all the risks are assessed and rated, prioritize corrective action based on which risk received the highest score.

If you're having trouble identifying hazards in your workplace, use the following approaches:

- **Facility Hazard Inspections (Safety Walks):** Have competent people use a safety inspection checklist to perform regular safety audits throughout the facility.
- **Activity Hazard Assessments:** Identify all activities that take place in the factory, from the shop floor to the warehouses and loading docks. Capture every activity and review each for hazards, including:
 - Do employees handle sharp objects and face possible cuts and lacerations?
 - Are employees working with chemicals that might require PPE?
 - Do employees require protection from caught-between hazards, fall hazards, or electrical hazards?

- **Bonus Tip:** Many manufacturers use flow charts of work activities as part of their efforts at continuous improvement (essentially, looking for better ways to save time and money, even a small amount). Simply add safety to these activities. It makes sense: you don't want to make a change without understanding what consequences it could have for the safety of your employees.

HEALTH HAZARDS

Potential health concerns need to be taken into account as well. These can come in a number of different forms, including:

- Exposure to substances (asbestos, silica, harmful chemicals)
- Repetitive work that affects workers over time (carpal tunnel syndrome, back problems, musculoskeletal disorders)
- Exposure to unsanitary environments (increased risk of infection and transmission of diseases)
- Exposure to extreme weather conditions
- High stress

Monitor, assess, and manage these health hazards the same way you do physical safety hazards. Once the risks are identified, possible assessments might include noise control studies or annual air sampling. Using trained professionals and third parties to perform safety inspections will ensure that no hazard goes overlooked.

Once you've uncovered these dangers, it's time to figure out how to control them. And your first step to doing this will be to follow OSHA's hierarchy of hazard controls.



HIERARCHY OF HAZARD CONTROLS

The hierarchy of hazard controls gives you a systematic way of running through control measures to find the one that will adequately reduce the risk presented by some danger in the workplace.

The hierarchy has five items, arranged in order as follows:

- **Eliminate** the hazard
- **Substitute** the risk for a lesser one
- Implement **engineering controls**
- Implement **administrative controls**
- Supply **personal protective equipment** to all exposed employees

Employers should first attempt to control the hazards with the higher methods on the list and only move on to the other measures if they are impossible, inadequate, or unreasonably impractical. In many cases, more than one control method will be required.

For instance, if workers use a very harsh chemical, start by evaluating whether it can be eliminated. If the work task requires the use of chemicals, move on to the second item: can it be substituted for a lesser risk? For example, the harsh chemical could be replaced with one that emits fewer harmful fumes or one that is less corrosive. (Notice that even if substitution is possible, it's unlikely to be adequate on its own and employees will still require adequate PPE for using the less harmful chemical.)

Saf-T-Gard® Product Showcase



**"Our Name
Says It All"**



Voltgard® Testing Services

OSHA, ASTM and NFPA standards mandate the use and testing of in-service rubber insulating equipment to protect workers from electrical hazards. The Voltgard® Test Lab is one of the largest independent testing facilities in the U.S. and is outfitted with state-of-the-art equipment to perform full-service testing and recertification of:

- Insulating Gloves
- Insulating Sleeves
- Insulating Covers
- Insulating Blankets
- Insulating Line Hose
- Insulated Hand Tools
- Insulating Plastic Guards
- Hot sticks & Live-Line Tools
- Rubber Insulating Matting
- Insulating By-Pass Jumpers
- Portable Grounding Jumpers
- Dielectric Overshoe Footwear



Saf-T-Gard® Product Showcase



4200 Series™ Hard Hat

Protective Industrial Products, Inc. is pleased to announce the launch of the PIP 4200 Series™ Hard Hats that are designed to provide certified head protection at affordable price points. Using a lightweight and UV-stabilized HDPE shell, these hard hats help keep workers protected and comfortable with less fatigue than most standard hard hats on the market. The 4200 Series Hard Hats meet both the ANSI/ISEA Z89.1 and CSA Z94.1 standards.



B2 Safety Eyewear



Visi-Gard® B2 Safety Glasses are made from a polycarbonate lens material that is hard-coated for scratch and impact resistance, filters more than 99% of UVA and UVB ultraviolet light and meet ANSI Z87.1+ High Impact Standards. The wraparound frame is lightweight and comfortable and offers a full panoramic view. The rubber ear tips provide a secure fit. Available in a clear frame with a clear, anti-fog lens, or a gray frame with a gray, anti-fog lens.



Nitrile Gloves



Protect against a wide range of solvents, acids, caustics, oils, greases and alcohols with Solva-Gard® Nitrile Chemical-Resistant Gloves. New ergonomic design provides a safe, secure fit while the patterned grip provides superior gripping capabilities on wet, slippery materials. Premium nitrile synthetic rubber is formulated to outperform ordinary rubber and neoprene gloves in many chemicals with excellent resistance to cuts, punctures, snags and abrasion. USDA accepted for use in food processing applications. Bright green color. Available in 13"/11 mil., 13"/15 mil., 14"/22 mil., 18"/22 mil., flock-lined 13"/15 mil., or flock-lined 13"/18 mil.

Saf-T-Gard® Product Showcase



Class 2, 5-Point Breakaway Safety Vest

Reflect-A-Gard® Class 2 5-Point Breakaway Vest is designed to break away harmlessly from the body in the event that it gets caught. Five breakaway points are shoulders (2), sides (2) and the center. Constructed of 100% polyester, lime mesh fabric for breathability and visibility. Features one inner pocket, two horizontal and two vertical reflective stripes to deliver ANSI/ISEA 107 Class 2 compliance.



Fast Pack® Liquid Concentrate Electrolyte Replacement Beverage

Water is necessary for hydration, but it does not contain the minerals lost during activity. Ensure rapid refueling of your worker's engines with ready-to-drink Sqwincher Fast Pack® Replenishment Drinks! Sqwincher contains an optimal balance of electrolytes that enhance wellness and productivity. Each 0.6 oz. Fast Pack conveniently yields one 6 oz. flavored drink. The package also doubles as a drinking cup. Just add water, and drink right from the pouch. This single-serving instant-drink configuration delivers added worker convenience, minimizes waste and prevents contamination. Fast Packs are available in several different formulas and flavors.



niroflex 2000® Metal Mesh Gloves

Today, you need the dual protection of Niroflex2000® Metal Mesh Gloves. Niroflex2000 is the first and only ultra-hygienic mesh glove designed to protect the hands of your workers and safeguard your food from contamination. More than 12,000 tiny reinforced links and the proprietary Niroflex clip closure system guarantee a secure, comfortable custom fit for every worker. Niroflex2000's natural hand shape and food-safe TPU (Thermoplastic Polyurethane) stiffener (on extended cuff styles) make it the most comfortable mesh glove available.

Training

You can implement the best safety controls, but you still won't get much out of them if your workers don't know about them. That's why OSHA requires employers to provide their workers with comprehensive safety training.

Once you've identified hazards in your workplace, you must ensure that every employee is trained to recognize these hazards and understand the control measures put in place to keep them safe.

Good recordkeeping also matters. Record and file any and all training administered. Not only will this help you manage the training and know when refresher training is required, it also gives you a way to show proof of compliance. If recordkeeping sounds daunting, there are quality apps and software that can make the work a lot easier.

REQUIRED SAFETY TRAINING

Your annual training needs will be based on the hazards that were identified by your hazard assessments.

Companies in the manufacturing sector are likely to deal with training topics such as:

- Bloodborne pathogens
- Excessive noise
- Lockout/tagout
- Confined spaces
- Ergonomic injuries
- Respiratory hazards
- Fall protection
- PPE

If you're wondering when an employee needs safety training, the answer is simple: before they go to work on any new job or are about to face a hazard for which they haven't received training. Employers who don't provide adequate training may be considered negligent for placing their employees in harm's way, which could harm the company's reputation, finances, and the morale of the workforce in the event of an accident.

Some safety topics will require stand-alone programs, including:

- **Hearing Conservation:** Covers the harmful effects of prolonged exposure to loud noise and outlines steps to protect one's hearing in noisy work environments.
- **Powered Industrial Trucks:** Managing and safely operating forklifts, electric pallet jacks, and other similar vehicles.
- **Respiratory Protection:** Training in the use, inspection, and fit testing of respirators.

While this sounds more complicated than using one overall safety training program, in reality, it is a very manageable approach. Safety training needs to cover a lot of ground, so you shouldn't rush through it.

BEHAVIOR

Let's face it, when employees show up on the factory floor, they're probably not thinking safety. They're thinking about the work. They're thinking about what they get paid to do and how their work will be measured. It's all about performance, which means:

- Production volume
- Shrinkage or scrap rates
- Machine or assembly line downtime
- Quality
- Delivery

That's going to create some safety vs. production dilemmas, and you need to address these. This means that safety rules must be enforced as part of normal working practices. We're quick to normalize behavior – good or bad. When safe work practices are made part of your production system, they become the norm, the way people work in your factory.

When encouraging safe behavior, be sure to focus on leading indicators of safety.

Accidents, near misses, and other safety events that have already happened are lagging indicators. They're helpful information, but they're limited. They show you what your safety performance was like, but they don't give you a good indication of what it will be like in the future.

Wearing PPE, adhering to safety rules, and conducting safety inspections are all leading indicators of safety. They're the kinds of things that make it less likely that an incident or accident will occur.

Leading indicators, in other words, predict lagging indicators. The more leading indicators are in place, the less fewer lagging indicators you should see in the future. And if you're lacking in leading indicators, you're likely to see a correspondingly higher rate of accidents and near misses.

Setting and following safe work practices are leading indicators. Do this and you're quite likely to see your accident rates go down, along with your insurance rates.

RULES AND ENFORCEMENT

Setting rules is only the first step. Those rules also need to be enforced.

Think about it: do you always follow every little rule you encounter? Likely, the answer is no. Unless there are consequences to breaking the rules, we'll bend them when it's convenient or they don't seem important. That's why enforcement is critical.

Workers tend to have a sense of what's important to management. If safety rules aren't enforced on the production floor, that sends the message that they must not matter. Safety rules can feel constricting, like they're getting in the way of getting the job done, so there's always that temptation to ignore them. Workers need to know in no uncertain terms that production never trumps safety.

Choosing not to enforce safety rules and practices is something else that can be viewed as negligence. And neglecting to enforce safety is the same as condoning unsafe work practices.

Incident Investigation

When safety professionals refer to an “incident,” they mean any undesirable event, such as an injury, property damage, or a near miss.

Even when incidents don’t result in serious injury or property damage (as is the case with near misses), you should take steps to avoid a future recurrence. Doing so will involve a thorough and timely investigation, a root-cause analysis, and proper recording and reporting.

You can’t turn back the clock and undo an accident, but you can learn from it. An incident investigation allows you to study the event in the hope of creating control measures that will stop them from happening again.

To perform an effective accident investigation, it’s best to have a set form to follow. This will give you a framework to follow and guide you through the process to ensure that you don’t miss anything.

Do the investigation as soon as possible after the incident, and make sure to speak with witnesses and take pictures if it’s possible.

ROOT CAUSE ANALYSIS

Perform a root cause analysis as part of your investigation. All this means is that you’re taking the time and effort needed to find the actual cause of the incident. Locating the root cause pays off. You don’t want a quick fix that doesn’t address the real problem.

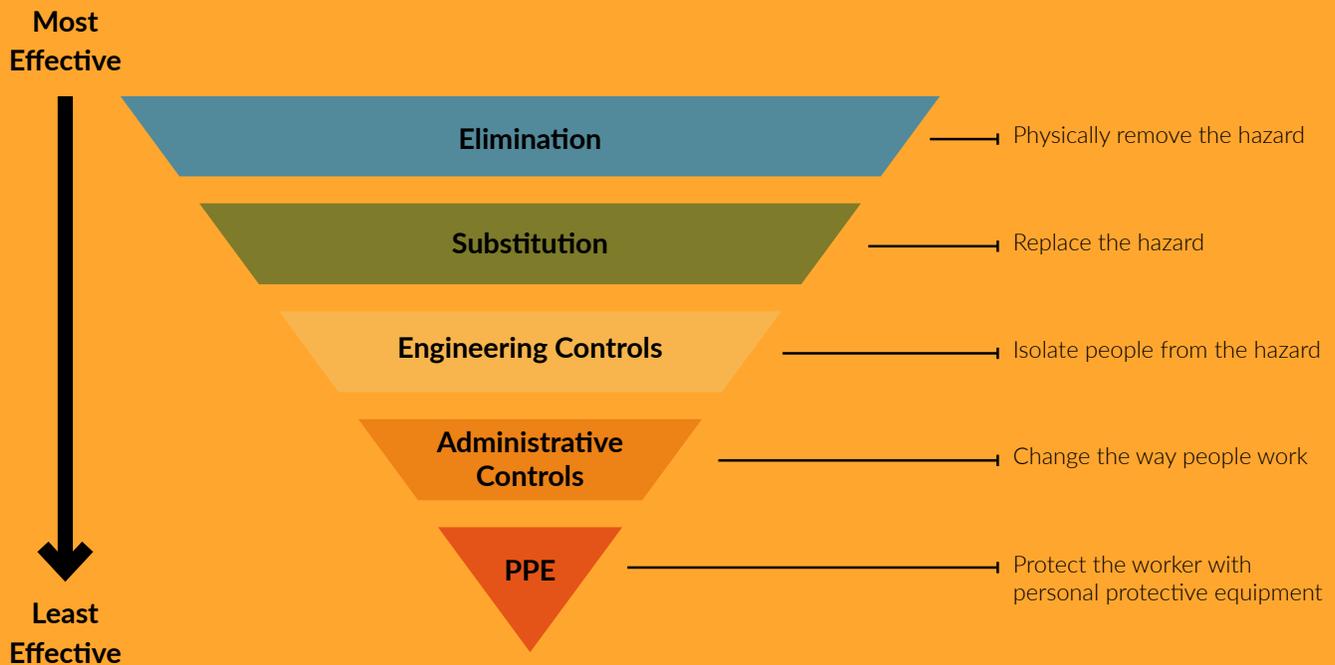
There are multiple methods you can use when performing a root cause analysis, such as the 5 Whys, Fish Bone Diagrams, Brain Storming, and using simple flow charts.

CORRECTIVE ACTIONS

The corrective action is the control measure you will put in place to guard against a future recurrence. Remember to follow the hierarchy of hazard controls when focusing your efforts.

Once you've implemented the new measure, confirm that it works. Set aside some time to reevaluate it on a regular basis. Observe the control measure for a set amount of time as a trial run. Once you're sure it works, you already have the solution in place and it's just a matter of recording the observation and celebrating your success.

Hierarchy of Controls



Wrap Up

Each topic we covered in this paper is a component of health and safety that can be integrated into your production system.

Infusing your health and safety practices into your production management system will eliminate the dilemmas between production and safety and ensure that workers don't sacrifice safety for the sake of keeping the line going or making a few more units.

Design standard work operating procedures (SOPs) to include personal protective equipment (PPE), lockout/tagout (LOTO), and other safety controls. If safety is not part of the routine work, it might not be thought of at all, even when things get riskier.

And remember, we covered safety topics that were important to industrial manufacturing in general. But every factory or manufacturing plant is unique and will require its own hazard assessment.

ABOUT THE AUTHOR

Bryan McWhorter is a productivity expert and safety professional with expertise in driving and teaching safety, leadership, and productivity tools. He's an accomplished author, having published 9 books and is a former national Tae Kwon Do champion.

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