PRE-TECHNICAL STUDIES

GRADE 8

PERSONAL SAFETY WEAR IN THE WORK ENVIRONMENT





WHAT IS PERSONAL PROTECTIVE EQUIPMENT (PPE)?

PPE- means personal protective equipment or equipment you use to guarantee your (own) safety.

Personal protective equipment (**PPE**) is protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and harmful gases.



Face and Eye Protection

PPE includes safety goggles and face shields and should be used for tasks that can cause eye damage or loss of vision, sprays of toxic liquids, splashes, and burns.

Safety Tips:

- Check if safety glasses
- Ensure that there are no cracks or deformities on the lenses.
- Ensure the strap is in good working condition and is firmly sealed to the cheek and forehead.
- Clean and disinfect after use.



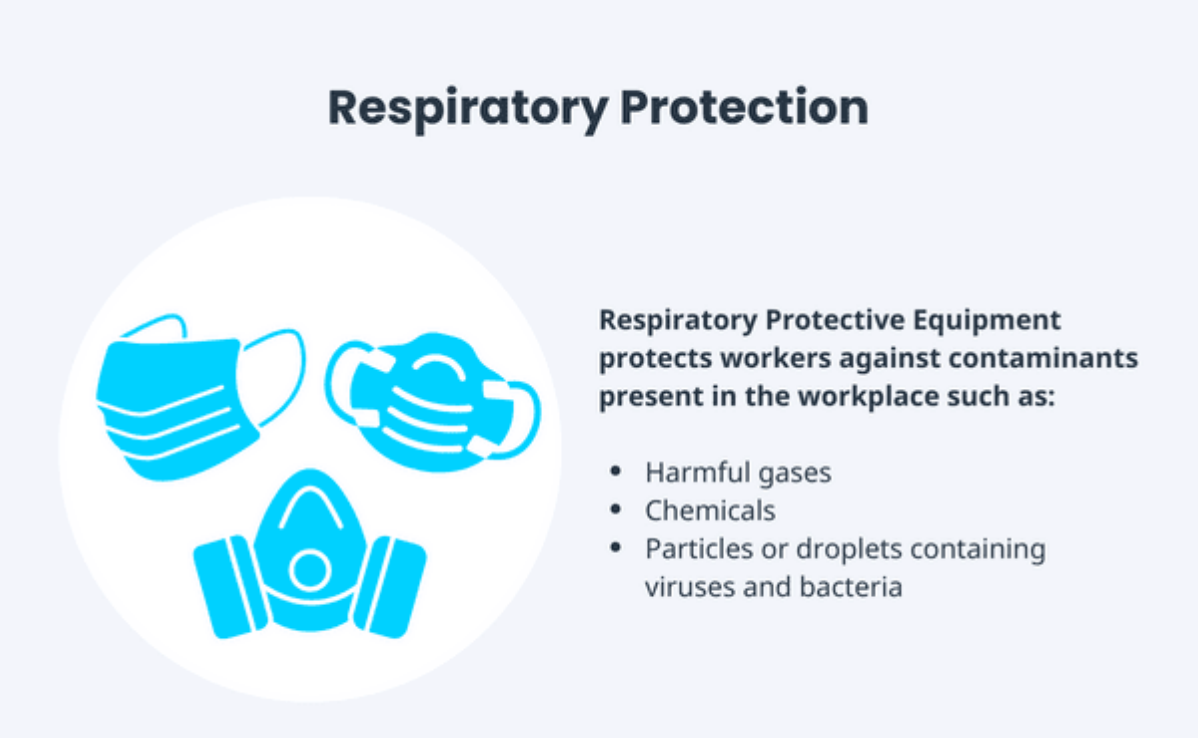
Respiratory Protection

PPE includes full-face respirators, self-contained breathing apparatus, gas masks, N95 respirators, and surgical masks are used for a task that can cause inhalation of harmful materials to enter the body. This includes harmful gas, chemicals, large-particle droplets, sprays, splashes, or splatter that may contain viruses and bacteria such as COVID-19, viral infections, and more.

Safety Tips:

- Ensure that the equipment is fit-tested and the employee has undergone proper training before wearing one.
- Carefully read the instructions to determine if it is designed to help protect against the hazards you may face.
- Change filters on half-mask or full-mask respirators frequently.
- Replace disposable respirators with every use.
- Surgical masks are not to be shared with anyone.
- Avoid touching the surgical mask after wearing it.
- Change surgical mask timely and should be disposed of after use.

- Replace the mask immediately if it is damaged or soiled.



Skin and Body Protection

PPE includes the following categories to protect employees from physical hazards:

Head Protection





PPE includes hard hats and headgears and should be required for tasks that can cause any force or object falling to the head.

Safety Tips:

- Ensure that there are no dents or deformities on the shell and connections are tightened inside.

- Do not store in direct sunlight as extreme heat can cause damage.
- Choose appropriate cleaning agents as it can weaken the shells of hard hats and may eliminate **electrical** resistance.
- Always replace a hard hat if it was used for any kind of impact, even if the damage is unnoticeable.

Body Protection



PPE includes safety vests and suits that can be used for tasks that can cause body injuries from extreme temperatures, flames and sparks, toxic chemicals, insect bites and radiation.

Safety Tips:

- Ensure that they are clean and free from cuts and burns.
- Always get a good fit to ensure full body protection.
- Ensure bodysuit is heat-resistant clothing when working with high-temperature hazards.

Hands Protection

PPE includes safety gloves and should be used for tasks that can cause hand and skin burns, absorption of harmful substances, cuts, fractures or amputations.



Safety Tips:

- Ensure hand protection fits perfectly with no spaces and is free from cuts, burns, and chemical residue.
- Always replace them if any sign of contamination was observed.
- Use rubber gloves when working with heat and electricity to reduce the risk of burn or electrical shock.

Foot Protection

PPE includes knee pads and safety boots and should be used for tasks that can cause serious foot and leg injuries from falling or rolling objects, hot substances, electrical hazards, and slippery surfaces.



Safety Tips:

- Ensure boots have slip-resistant soles that can protect against compression and impact.

- Ensure the sole plate is in good condition to prevent punctures.

Fall Protection



PPE includes safety harnesses and lanyards and should be strictly used for tasks that can cause falling from heights and serious injury or death.

Safety Tips:

- Ensure that the straps are free from tears, deformities, and burn marks.
- Check the buckles if connected securely and tightly.
- Dispose of the equipment if used after a falling incident.



Hearing Protection

PPE includes ear muffs and plugs and should be used for tasks that can cause hearing problems and loss of hearing.

Safety Tips:

- Ensure the equipment fit the ear canal perfectly.
- It is recommended to use formable earplugs to fit different sizes of ear canals.
- Use protectors that reduce noise exposure to an acceptable level to have room for communication.
- Ensure earplugs are clean and in good condition.





Other examples of PPE include:

- safety glasses or goggles
- safety shoes
- high-visibility clothing or vests
- heat-resistant gloves
- anti-vibration gloves
- welding PPE such as helmets and flame-resistant clothing

- chemical-resistant suits or aprons
- safety harnesses and lanyards

Use PPE always and anywhere where necessary. Observe the instructions for use, maintain them well and check regularly if they still offer sufficient protection.

Why is it Important to wear PPE?

- prevent unnecessary injury in the workplace;
- protect employees from excessive chemical exposure;
- prevent the spread of germs and infectious diseases including COVID-19;
- help businesses comply with regulatory requirements(
- Improve employee productivity and efficiency.
- Supports worker during work e.g. safety shoes, safety rope

Important safety rules in the workplace

Here are examples of safety rules in a workplace:

1. Follow the dress code

It is important to dress according to the workplace dress code. This may prohibit jewelry or open-toe shoes, for example. Often a workplace may require employees to wear specific footwear and long sleeves and pants in order to protect against common workplace accidents. Dress codes can promote professionalism and also help keep employees safe.

2. Wear safety gear

Safety gear is necessary in labs, around machinery and on construction sites, for example. Companies include safety gear in the dress code when it is necessary for your job. Safety gear is a precaution against hazardous materials and potentially dangerous working conditions.

3. Maintain personal hygiene

Maintain your personal hygiene, such as cleanliness, to help prevent illness at work. Good hygiene can also help promote health and self-esteem, which reduces risks.

4. Take responsibility for your personal safety

To take responsibility for your personal safety means ensuring that you follow safety procedures. If employees rely on themselves to keep the workplace safe, this can create a safe environment for all. Responsibility also prevents negligence, which can limit on-the-job accidents.

5. Maintain a clean workspace

It is important to keep your desk or other personal workspaces clean. Be sure to put away supplies when they are not in use. Gathering necessary materials before starting a task can help keep a clean workspace. Maintaining your work area promotes organization and attentiveness, both aspects of promoting safety in the workplace.

6. Follow work procedures

A company creates work procedures to help comply with safety protocols and best practices, so if you follow work procedures, safety standards are likely met. It is important to follow procedures even if you think performing a task differently might save time. Often there'll be an employee handbook or safety station where the company provides their work procedures.

7. Learn how to act in an emergency

Learn emergency protocols including where to go in case of a fire or during a natural disaster such as a tornado. Much like work procedures, companies design emergency protocols with strong consideration for safety regulations. Knowing where to go or how to behave during an emergency protects you as well as your coworkers.

8. Report accidents if they occur

Report accidents to the managers or other personnel when they occur. If you injure yourself or cause an accident, be sure to report it and follow procedure immediately to help reduce the risks of further harm or endangering coworkers. This helps to get proper treatment for your injury and addresses the possible causes of the incident to prevent it from happening again. It is important to follow company policy and report even minor incidents. Your employer may require a written report of the incident as well.

9. Report unsafe conditions

If you observe an unsafe practice or condition such as faulty equipment, it is helpful to report this so that personnel can address the situation and make corrections to prevent an incident. Unsafe conditions pose a threat to your coworkers and to you, so reporting a potentially dangerous situation is in the best interest of all employees. Consider marking any unsafe condition to protect others who may encounter it while you go to report it.

10. Lift objects carefully

Professionals advise lifting by squatting and using your knees when picking items up instead of bending at your waist because this can cause strain on your back and may result in injury. Use equipment if necessary or ask for help in lifting heavy items. Back pain is a common workplace injury that you can avoid with proper posture and using caution in actions that you often repeat at work, such as carrying materials.

11. Operate machinery that you are familiar with

Only operate machinery that employers authorize you to use. Some types of workplace equipment, such as forklifts, require training. Training can prevent misuse and provide proper safety knowledge and skill for machines. It is important to become familiar with all equipment that is in regular use at work.

12. Use break times

Taking breaks can maximize employee attentiveness because they are well-rested. Breaks provide other benefits, such as time to relax and reduce stress. During

breaks, you may need to sit or stretch to maintain personal safety and prevent muscle injury.

13. Stay in your work zone

While working, try to stay in your designated work area. This allows you to be familiar with your surroundings and increases the likelihood that you understand the rules of conduct in the area. If you visit another working area, try to find a professional who can help you navigate the area so you are confident in your surroundings.

14. Stay alert and attentive

Being alert and attentive to your surroundings in a work environment helps identify risks. It is important to limit distractions as well and ensure you focus on tasks at work. Taking care to be mentally present while working helps you actively follow procedures and practice caution.

15. Keep exits clear

Try to keep walkways clear and take care not to block exits. This prevents falls and helps people leave the room or building safely and quickly in the event of an emergency. In small spaces keeping walkways clear can be difficult but it may be useful to practice a walk-through to ensure that employees can maneuver safely around equipment.

16. Ask for help

If you require assistance, ask for help. This greatly reduces the risk of having an accident and helps foster a safe work environment by setting an example. Refer to company protocol when performing tasks or operating equipment, and if protocol suggests doing a task with another employee, do not attempt the task alone.

17. Use caution signs

Use caution signs when applicable. For example, wet floor signs prevent slips on a floor after you mop or after a spill. Areas at work may require barriers or signs when equipment such as forklifts are in use. Another example is road signs to notify drivers of workers or highway cleanup crews. It is important to place

caution signs while working and read and obey caution signs placed by others.

18. Use proper equipment

Use the equipment a procedure recommends to help prevent an accident. Companies usually provide equipment to limit strain on employees and to comply with safety regulations. It is also important to learn how to operate any equipment that is available before using it for work.

19. Eat in designated areas

Employers sometimes restrict food and drink to specific areas at work to prevent spills, contamination and unsafe conditions. Having liquids around machines risks spills that can cause malfunctions and eating where you work can cause contamination and possibly result in illness. If your workplace requests employees eat in a certain place or restrict food and drinks in a work environment, it is important to observe this rule.

20. Follow safety guides

Follow all safety guides put in place to protect you and your coworkers. Companies design safety rules to prevent incidents. Sometimes rules result from a previous accident which is why it is important to report your injuries as well as unsafe conditions. If you do not understand why a safety rule exists, you can ask your employer for clarification.

21. Use tools, equipment and machinery properly

Proper use of tools and machinery can prevent injuries. Only operate machines you are trained or certified to use and ensure that they are cleaned and maintained regularly. You should always use machines and equipment for their intended purposes. Use equipment such as a wheelbarrow or a forklift to help you lift and move heavy items to prevent straining or injuring yourself.

22. Report any unsafe conditions

Fix any unsafe conditions or workplace hazards as soon as you notice them. If it is dangerous for you to remove the risk, notify a supervisor right away.

23. Wear all necessary safety gear

Always wear the necessary safety equipment. The proper safety gear in your workplace could be reflective gear, fire-retardant clothing, industrial work wear or something as simple as nonslip shoes. Be sure to always wear a breathing mask if your space has debris or dust, or if you have to deal with toxic or dangerous chemicals or fumes.

24. Keep your workplace clear from clutter

Having a clean workspace will positively impact your job satisfaction and keep you and your coworkers free from danger. You could trip and fall over scattered objects and they could hide another hazard you cannot see.

25. Stay hydrated

Drink enough water to remain alert and avoid dehydration. Even in the winter, it is essential to stay hydrated with water and warm liquids to prevent lightheadedness and lack of focus.

26. Practice good posture when sitting or lifting

Use ergonomic desks and keyboards to avoid straining your wrists and arms. Sit up straight, keep your shoulders in line with your hips and lift with your legs when you are moving objects. Poor posture can cause strain on your back, neck and shoulders, which can lead to serious injury.

27. Take regular breaks

Look away from your computer screen regularly to avoid eye strain. Taking regular breaks allows your body an opportunity to rest from the tasks you are doing. When you return, you will be more focused and have a higher level of concentration.

28. Be aware of your surroundings

Being aware of your surroundings is paramount to avoiding workplace injuries. Here are some things to be aware of in your environment:

- Look for spills or items on the floor that could be tripped over.

- Note the appropriate safety equipment and gear for each task you are doing.
- Choose mechanical aids such as a forklift or wheelbarrow to help lift items and encourage others to do the same.
- Keep emergency exits clear and uncluttered so they are accessible in the event of an emergency.
- Use tools and machines properly to avoid injury and encourage other workers to do the same.
- Label hazardous areas and materials with appropriate signage.
- Know where the first aid kits are and which staff members are trained to administer first aid if an injury occurs.
- Know of the emergency procedures in the event of a fire, flood or earthquake.
- Only use secure, steady ladders and never use boxes or anything else as an improvised ladder.
- Test railings first before using them to make sure they are secured properly.

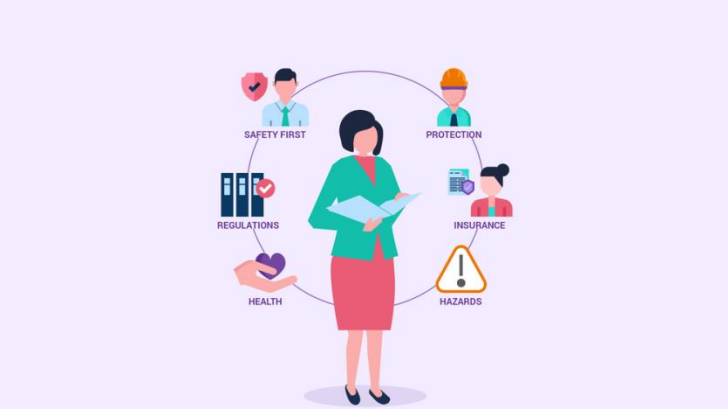
29. Never take shortcuts

Procedures exist to keep workers safe. Though skipping a step or not wearing safety gear may save you time, it isn't worth getting injured over. Use every tool and machine according to the instructions.

30. Remain aware of new safety procedures

Though it is the responsibility of the company to make staff aware of new safety procedures, it is your responsibility to make sure that you fully understand the information. If you're unsure about a new procedure, ask questions

Benefits of a safe and healthy work environment -





Summary

- The safer the work environment, the more productive it is. Productive employees are an asset to all companies. For instance, productive employees can produce more output in less time, reducing operational costs.
- Workplace safety promotes the wellness of employees and employers alike. Better safety equates to better health. **Healthier employees** do tasks more efficiently, and they are happier in general.
- There are very few accidents in a safe working environment. This results in less downtime for safety investigations and reduces costs for worker's compensation. This also reduces the time needed for employees to heal from injuries.
- Damage to industrial equipment creates costs for replacement and repair. Avoiding workplace injuries and damage to industrial equipment will incur fewer expenses and increase profit.
- If employers are concerned about the safety of their employees, the employees are more confident and comfortable in general. Also, **absenteeism** rates drop, and employees are more focused on doing their tasks.

1. Increased productivity and efficiency

- As mentioned earlier, your employees need to focus entirely on their work, and to do so, they need to be relieved of the worries and stress that come with unsafe and unhealthy working conditions.
- If the employees at your workplace are constantly under the stress regarding the future of themselves as well as their dependents, they will not be able to live up to the amount of productivity and efficiency that is required of them, and which is necessary for the company.

2. Reduced compensation cost

- As the common saying goes, "Prevention is better than cure". Indeed, instead of having to pay a huge sum to compensate for poor employee health, it is much easier to invest in a healthy and safe workplace.
- Every time an unfortunate accident or health hazard occurs, you will have to bear the expenses of both the compensation claims of your employees and well the hiring costs for temporary staff.
- Not to mention, these incidents would also come up with a huge ordeal of paperwork. Instead, it is much better to come up with a safe and healthy workplace that will reduce the probability of such occurrences by a lot.

3. Reduced absenteeism

Absenteeism reduces work productivity and hampers teamwork. In case of illness and accidents, an employee is likely to be frequently absent from work. However, with workplace safety, you can cut off the problem at the root, promote employee health, and reduce absenteeism.

4. Build a good brand name and culture

Public Relations are essential for a company, and good workplace health and safety have a great PR value. It helps build a good brand name, as well as create a healthy, productive workplace culture.

Healthy work culture will result in better employee retention and will provide job satisfaction to your workforce.

5. Build morale

Having workplace safety and health in place will improve the relationship between your employees with their employers.

Actions speak louder than words, and this action on your part will show your employees that you care about them and are willing to invest in their future.

6. Attract better employees as well as more investors and partners

Following up on the previous point, a healthy and secure workspace and work culture will attract more and more talented employees to your company, as well as encourage investors and partners to associate with you.

7. Promote corporate responsibility

- While individual responsibility is important, it is also essential for companies to take up ownership and responsibility for themselves and their employees.
- It creates a good system and sets precedence for other companies to follow suit.
- If all, or at least most, companies engage in a safe and healthy work environment, it will create a more sustainable, and safer work environment overall.

Ways to Promote Health and Safety in the Workplace

Now that we have gone into why you should have a healthy and safe workplace, let's focus on answering this question, how can you promote health and safety in the workplace!

1. Safety training

Comprehensive safety training, including various safety programs and training courses on fire safety, handling of safety equipment, emergency exits, and more safety practices, should be provided to your employees right when they are on boarded.

Also, the training should be reinforced at repeated intervals to keep your employees updated about their safety measures.

2. Wellness programs

Wellness programs are a collection of initiatives undertaken by employers to encourage health and fitness and other healthy habits amongst employees. They act as preventive measures to intercept illnesses even before they occur so that you can cut off the weed right at the root.

3. Paid leaves

It is quite normal for your employees to fall sick at some point. Thus, it is imperative to offer them paid leaves, so that they can take some time off and fully recover.

It is also important so that in case of contagious diseases, they do not spread the disease to your other employees, thus risking their safety.

4. Regular checkups and Medical consultations

It is always a good idea to catch disease at its first stage and ward it off at the earliest. This means getting regular checkups. Simultaneously, in situations of emergencies, it is very handy to have medical consultations by professionals.

By offering these facilities to your employees, you can save them a lot of inconveniences, and encourage healthy behavior.

5. Reward good health and safety practices

- A great way to make good habits stick is to reward them with proper incentives. Incentives can be something as simple as a discount coupon or name the Employee of the Week. This will also add to the job satisfaction factor of your employees.

FIRES

Consequences of Fire



Fires can be devastating and cause significant damage to property and human life. Unfortunately, fires can happen anywhere and at any time, and it is essential to know the most common causes to prevent them from happening.

The consequences of fire can devastate the natural environment, human life, and property. Some of the most significant consequences of fire include:

1. Property Damage



Fires can cause significant damage to property, including buildings, vehicles, and personal belongings. The damage can be particularly severe in the workplace because of valuable equipment, inventory, and important documents.
For instance, a fire in a manufacturing facility can destroy expensive machinery, raw materials, and finished products.

2. Business Interruption

Business interruption is another significant consequence of the fire. Even if the fire does not cause any property damage, the workplace may need to be closed for a period of time to be cleaned and repaired, which can result in lost revenue and customers.

During this downtime, employees may be unable to work, resulting in a loss of productivity and income for both the employees and the business.

3. Injuries And Fatalities

Workplace fires can also result in injuries and fatalities, with devastating consequences. Burns and smoke inhalation are two of the most common causes of injuries in workplace fires. Victims may require extensive medical treatment, including surgery, skin grafts, and long-term rehabilitation, depending on the severity of the burns.

Smoke inhalation can also cause serious respiratory problems, such as asthma or lung damage, which can have long-term health consequences.

4. Emotional Trauma

Witnessing a fire or experiencing the loss of a coworker in a fire can be emotionally traumatizing, leading to anxiety, depression, and post-traumatic stress disorder (PTSD). Employees who experience a workplace fire may feel shaken and vulnerable and struggle to cope with the event's aftermath.

Even if not physically injured, they may experience significant emotional distress, affecting their ability to work and carry out their daily activities.

5. Litigation

Litigation is another potential consequence of workplace fires. If someone is injured or killed in a fire at the workplace, the employer may be held liable and face legal action. This can be costly and time-consuming, damaging the employer's reputation.

The legal fees, settlements, and other expenses associated with litigation can add up quickly and have a significant impact on the financial stability of the business.



6. Loss Of Productivity

A loss of productivity is another significant consequence of fires. After a fire, employees may need to spend time cleaning up and repairing the damage caused by the fire, which can take away from their regular work duties.

Additionally, there may be insurance claims to file and paperwork to complete, which can be time-consuming and further disrupt the workday. The longer the disruption lasts, the greater the impact on productivity, which can have financial consequences for the business.

7. Increased Insurance Premiums

Increased insurance premiums are another potential consequence of workplace fires. After a fire, a business may see an increase in its insurance premiums. This is because insurance companies view businesses that have experienced a fire as higher risk and more likely to file a claim in the future.

As a result, insurers may increase the premiums for the business's property and liability insurance policies. These higher premiums can significantly impact the business's bottom line.

8. Damage To Brand Reputation

Damage to brand reputation is another significant consequence of workplace fires, particularly if the incident receives media coverage. A fire at a business can attract significant media attention, damaging the company's brand

reputation. Customers may perceive the business as unsafe or unreliable, leading to a loss of trust and decreased revenue.

Additionally, negative publicity can spread quickly through social media, further damaging the business's reputation. The impact on brand reputation can be particularly devastating for small businesses, which may have fewer resources to recover from the damage caused by the fire.

9. Occupational Health And Safety Issues

Occupational health and safety issues are another potential consequence of workplace fires. Fires can release hazardous materials like smoke, chemicals, and other toxic substances. This can pose a serious risk to the health and safety of employees, particularly those who work close to the fire or are responsible for cleaning up the aftermath.

In addition, firefighters and other first responders who respond to the fire may also be at risk for exposure to these hazardous materials.

10.Financial Loss

Financial loss is another significant consequence of workplace fires. Repairing or replacing damaged equipment, materials, and property can add up quickly and significantly impact a business's finances.

In addition, the business may experience a loss of revenue due to the interruption of normal operations or the need to close temporarily. This can be particularly difficult for small businesses that may not have the financial resources to absorb the costs of a workplace fire. Furthermore, if the business cannot recover from the financial losses caused by the fire, it may have to close permanently.

11.Regulatory Fines And Penalties

Regulatory fines and penalties would be another potential consequence of workplace fires, especially if the fire was caused by violating safety regulations. Regulatory agencies such as OSHA (Occupational Safety and Health Administration) can investigate workplace fires and determine whether any safety regulations were violated.

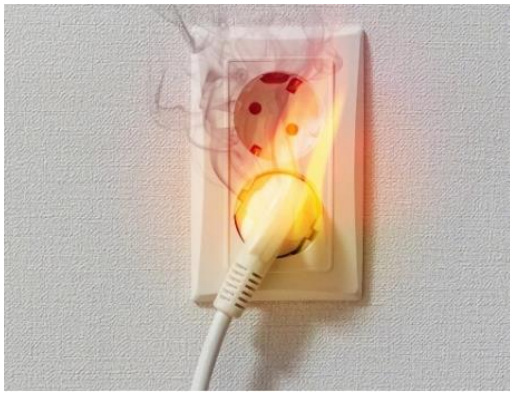
The agency may impose fines and penalties on the business if violations are found. These fines and penalties can be significant and add to the financial losses caused by the fire.

Causes of Fire in the Workplace



There are many potential causes of fires in the workplace, and employers and employees need to be aware of them to minimize the risk of a fire occurring. Some common causes of fires in the workplace include:

1. Electrical Problems



Electrical problems are among the leading causes of workplace fires. These issues can occur in any industry and result in significant damage, injuries, and even fatalities. The following are some common electrical problems that can lead to fires in the workplace:

A. Overloading Electrical Circuits And Outlets



Overloading occurs when too many devices or appliances draw power from the same electrical circuit or outlet. This can cause the circuit to overheat, resulting in a fire. Common signs of overloading include flickering lights, warm or discolored outlets, and frequently tripped circuit breakers. To prevent overloading, ensure that the electrical load does not exceed the capacity of the circuit or outlet, and avoid using multiple high-wattage appliances simultaneously.

B. Damaged Or Frayed Wiring

Damaged or frayed wiring can expose the conductor, leading to electrical shorts and sparking. This can ignite nearby flammable materials, causing a fire. Regularly inspect the wiring for signs of damage, and replace any damaged or frayed wires immediately. Also, ensure that all electrical work is performed by a licensed electrician.

C. Misuse Of Extension Cords And Power Strips

Extension cords and power strips can contribute to fires if they are improperly used. Overloading power strips, using damaged extension cords, or running cords under carpets or through walls can cause overheating and create fire hazards. When using extension cords and power strips, follow the manufacturer’s guidelines and ensure they are rated for the intended use. Additionally, avoid using them as a long-term solution for powering equipment.

D. Outdated Electrical Systems

Older buildings may have outdated electrical systems not designed to handle the power demands of modern technology. This can lead to overloading and other electrical hazards. If you suspect your workplace has an outdated electrical system, consult a licensed electrician to assess the system and make any necessary upgrades.

E. Tips For Preventing Electrical Fires

To minimize the risk of electrical fires in the workplace, consider the following tips:

- ✓ Regularly inspect and maintain electrical systems, including wiring, outlets, and circuit breakers.
- ✓ Replace damaged or frayed wiring immediately.
- ✓ Use extension cords and power strips according to the manufacturer's guidelines and avoid overloading them.
- ✓ Upgrade outdated electrical systems to meet modern power demands.
- ✓ Train employees on properly using electrical equipment and reporting any potential electrical hazards.

By addressing these common electrical problems, you can help reduce the risk of workplace fires and create a safer environment for employees.

2. Smoking Materials



Improper use and disposal of smoking materials, such as cigarettes, cigars, and e-cigarettes, are leading causes of workplace fires. These fires can result in

significant property damage, injuries, and even fatalities. To minimize the risk of fires caused by smoking materials, consider the following:

A. Cigarettes, Cigars, And E-Cigarettes

When not extinguished properly, smoking materials can smolder for hours before igniting nearby flammable materials, such as paper, upholstery, or trash. In addition, malfunctioning e-cigarettes and their batteries have been known to cause fires and explosions.

B. Designated Smoking Areas And Proper Disposal Of Smoking Materials

To reduce the risk of fires related to smoking materials:

- ✓ Create designated smoking areas away from flammable materials and building entrances. These areas should be clearly marked and equipped with appropriate receptacles for disposing of cigarette butts and other smoking materials.
- ✓ Train employees on adequately disposing of smoking materials and ensuring they are fully extinguished before disposal.
- ✓ Regularly clean and maintain smoking areas, including removing accumulated cigarette butts and other debris.

C. Fire-Resistant Materials And Ashtrays

In designated smoking areas, use fire-resistant materials, such as metal or ceramic ashtrays, to minimize the risk of fires. Regularly empty and clean ashtrays to prevent the buildup of smoking materials. Additionally, consider providing fire-resistant trash receptacles in smoking areas to prevent fires caused by the improper disposal of smoking materials.

D. Implementing A Smoking Policy In The Workplace

A comprehensive smoking policy can help reduce the risk of fires related to smoking materials. This policy should include the following:

- ➢ Designating specific smoking areas and ensuring that employees are aware of their locations.
- ➢ Providing guidelines for the proper disposal of smoking materials.

- Regularly communicating the importance of fire safety related to smoking materials.
- Enforcing the policy consistently and addressing any violations promptly.

Addressing the risks associated with smoking materials can help protect your workplace from fires and create a safer environment for employees.

3. Human Error

Human error is often a contributing factor in workplace fires. Mistakes or oversights can lead to dangerous situations and increase the risk of fires. Here are some common human errors that can cause fires and how to address them:



A. Unattended Cooking or Heating Appliances

Leaving cooking or heating appliances unattended can lead to overheating or ignition of nearby flammable materials. To prevent fires caused by unattended appliances:

- Encourage employees to always stay in the area when using cooking or heating appliances.
- Set timers to remind employees to check on appliances regularly.
- Ensure that all appliances are turned off and unplugged when not in use.

B. Improper Storage of Flammable Materials

Inappropriately storing flammable materials, such as chemicals, solvents, or combustible materials, can increase the risk of fires. To prevent fires related to the improper storage of flammable materials:

- Follow industry-specific guidelines and regulations for the storage of flammable materials.
- Clearly label flammable materials and store them in designated, well-ventilated areas away from ignition sources.
- Train employees on the proper handling and storage of flammable materials.

C. Inadequate Training On Fire Safety Procedures

Lack of proper training can lead to mistakes and oversights that increase the risk of fires. To ensure employees are well-prepared to prevent and respond to fires:

- Provide regular fire safety training, including fire prevention strategies, proper use of fire extinguishers, and evacuation procedures.
- Conduct fire drills to familiarize employees with evacuation routes and procedures.
- Encourage employees to report any potential fire hazards or concerns to management.

D. Tips For Reducing Human Error-Related Fires

Reducing the risk of fires caused by human error involves creating a culture of safety and vigilance. Consider these tips to minimize human error-related fires:

- Establish clear guidelines and procedures for fire prevention and safety.
- Train employees on fire safety procedures and the proper use of equipment.
- Encourage open communication about potential fire hazards and the importance of reporting concerns.
- Regularly evaluate and update fire safety procedures to address new risks or changes in the workplace.

By addressing human error, you can significantly reduce the risk of workplace fires and create a safer environment for employees.

4. Combustible Dust



Combustible dust is a serious fire hazard in certain industries, especially those that process powders, grains, or other finely divided materials. This dust can accumulate on surfaces and equipment and ignite, causing a fire or explosion. Here are some common combustible dust-related fire hazards and ways to address them:

A. Industries At Risk For Combustible Dust Fires

Industries that handle, process, or store combustible dust are at risk for fires and explosions. These industries include food processing, chemical manufacturing, wood processing, and metalworking. To minimize the risk of fires caused by combustible dust:

- Identify potential sources of combustible dust in the workplace.
- Train employees on the hazards of combustible dust and the importance of proper housekeeping and ventilation.

B. Proper Housekeeping And Dust Control Measures

Proper housekeeping and dust control measures can help prevent the accumulation of combustible dust and minimize the risk of fires. To control combustible dust:

- Develop and implement a comprehensive housekeeping program that regularly cleans all surfaces and equipment, particularly those that come into contact with combustible dust.

- Use vacuum systems equipped with explosion-proof and dust-tight fittings to collect combustible dust.
- Use wet cleaning methods, such as mopping and damp sweeping, to prevent dust generation.

C. Proper Ventilation Systems

Proper ventilation systems can help control combustible dust buildup and reduce the risk of fires. To ensure proper ventilation:

- Install an effective ventilation system that provides adequate airflow and removes combustible dust.
- Ensure that ventilation systems are regularly inspected and maintained by qualified personnel.
- Monitor airflow and air quality in areas where combustible dust is present.

Addressing combustible dust-related fire hazards can protect your workplace from fires and explosions. It's essential to train employees on the hazards of combustible dust, implement proper housekeeping and dust control measures, and ensure that ventilation systems are designed and maintained to control the buildup of combustible dust.

5. Arson



Intentional fires set by employees or outsiders can cause significant damage to the workplace, jeopardizing the safety of employees and visitors. These fires can be

challenging to prevent, but implementing certain security measures can help deter arson. Here are some common arson-related fire hazards and ways to address them:

A. Intentional Fires Set By Employees Or Outsiders

Arson is a deliberate act of setting fires, and it can be difficult to prevent or predict. Motivations for arson can vary from vandalism or theft to revenge or personal conflicts. To minimize the risk of arson:

- Implement security measures, such as surveillance cameras, guards, and access control systems, to deter and detect potential arsonists.
- Train employees on the importance of fire safety and report any suspicious activities or behaviour.
- Conduct background and reference checks on all job applicants, especially those with access to flammable materials or sensitive workplace areas.

B. Security Measures To Deter Arson

Security measures can help deter arson and minimize its impact. To secure your workplace from arson:

- Install surveillance cameras in strategic locations, including entrances, exits, and areas with flammable materials.
- Use access control systems to limit access to sensitive areas of the workplace.
- Hire security guards to patrol the premises, especially during non-business hours.
- Conduct regular fire safety and security training for employees.

C. Fire-Resistant Building Materials And Design

Fire-resistant building materials and designs can help prevent the spread of fires caused by arson. To minimize the damage caused by arson:

- Use fire-resistant materials like concrete, brick, or steel to construct the building.
- Install fire-resistant doors and windows, and keep them closed when not in use.

- Ensure the building has fire suppression systems, such as sprinklers and fire extinguishers.
- Regularly inspect and maintain fire suppression systems to ensure their proper functioning.

By implementing security measures and using fire-resistant building materials and design, you can help prevent and minimize the impact of fires caused by arson. It's also essential to remain vigilant and create a culture of safety that encourages employees to report any suspicious activities or behavior.

6. Heating Equipment



Heating equipment is another common cause of fires in the workplace, especially during colder months. To minimize the risk of fire, it's essential to properly maintain and operate these devices. Here are some potential heating-related fire hazards and ways to address them:

A. Space Heaters

Space heaters can be a convenient way to provide additional warmth in the workplace, but they also pose a fire risk if not used correctly. To prevent fires related to space heaters, follow these guidelines:

- Ensure that space heaters are placed on a stable, level surface and at least three feet away from flammable materials such as curtains, furniture, or paper products.

- Never leave space heaters unattended or running overnight.
- Use space heaters with built-in safety features, such as tip-over switches and overheat protection.
- Plug space heaters directly into the wall outlet and avoid using extension cords or power strips.
- Regularly inspect space heaters for damage or malfunction and discontinue use if any issues are found.

B. Central Heating Systems

Central heating systems, including forced-air, radiant, and baseboard heating, can cause fires if not properly maintained. To reduce the risk of central heating-related fires:

- Schedule annual inspections and maintenance by a licensed professional.
- Regularly clean and replace air filters to prevent dust and debris buildup, which can cause overheating.
- Keep vents and air ducts free of obstructions to ensure proper airflow.

C. Boiler And Furnace Malfunctions

Boilers and furnaces produce heat in many commercial and industrial settings. Malfunctions in these systems can result in fires or even explosions. To prevent boiler and furnace-related fires:

- Schedule regular inspections and maintenance by a qualified professional.
- Safety devices like pressure relief valves and flame supervision systems function correctly.
- Monitor for signs of overheating, leaks, or other potential hazards, and address any issues promptly.

D. Proper Maintenance And Safety Precautions For Heating Equipment

By following proper maintenance and safety precautions, you can significantly reduce the risk of fires caused by heating equipment in the workplace:

- Schedule regular inspections and maintenance for all heating equipment.
- Train employees on the safe use and operation of heating devices, including space heaters and central heating systems.

- Establish clear guidelines for the placement and use of space heaters.
- Monitor heating equipment for signs of malfunction or potential hazards and address any issues promptly.

These steps to ensure the safe operation of heating equipment will protect your workplace from fires and contribute to a more comfortable and productive work environment.

7. Poor Housekeeping



Poor housekeeping can contribute significantly to workplace fires. The accumulation of clutter, waste materials, and debris can block emergency exits, create fire hazards, and impede the ability of employees to evacuate the building quickly. Here are some common poor housekeeping-related fire hazards and ways to address them:

A. Accumulation Of Clutter And Waste Materials

The accumulation of clutter and waste materials can create fire hazards by providing fuel for fires and impeding the ability of employees to evacuate the building quickly. To prevent fires caused by clutter and waste materials:

- Implement a comprehensive housekeeping program that includes regular cleaning of all surfaces and areas of the workplace.
- Encourage employees to keep their work areas clean and free of clutter.

- Establish procedures for properly disposing of waste materials, such as paper, cardboard, and other combustible materials.

B. Blocked Emergency Exits And Fire Doors

Blocked emergency exits and fire doors can prevent employees from quickly evacuating the building in the event of a fire. To prevent fires caused by blocked emergency exits and fire doors:

- Ensure that all emergency exits and fire doors are clearly marked and accessible.
- Develop and practice emergency evacuation plans to ensure employees are familiar with evacuation routes and procedures.
- Regularly inspect emergency exits and fire doors to ensure they function correctly.

C. Regular Cleaning And Maintenance Schedules

Regular cleaning and maintenance schedules are essential in preventing fires caused by poor housekeeping. To maintain a clean and safe workplace:

- Establish regular cleaning and maintenance schedules for all areas of the workplace.
- Train employees on the importance of housekeeping and the proper use of cleaning equipment and supplies.
- Conduct regular inspections of the workplace to identify and address potential fire hazards.

By addressing poor housekeeping-related fire hazards, you can protect your workplace from fires and ensure the safety of employees and visitors. It’s essential to implement a comprehensive housekeeping program, ensure that emergency exits and fire doors are accessible, and establish regular cleaning and maintenance schedules to maintain a safe and healthy workplace.

8. Mechanical Friction



Mechanical friction can generate heat and sometimes lead to workplace fires. Overheated machinery, equipment, or their components can ignite flammable materials, liquids, or dust in the vicinity. Here are some common mechanical friction-related fire hazards and ways to address them:

A. Overheated Machinery And Equipment

Machinery and equipment can overheat due to friction between moving parts, excessive use, or mechanical failures. Overheating can cause fires by igniting nearby flammable materials or even the lubricants used in the equipment. To prevent fires related to overheated machinery and equipment:

- Ensure that machinery and equipment are operated according to the manufacturer's guidelines.
- Monitor equipment for signs of overheating, such as excessive noise, vibration, or smoke, and address any issues promptly.
- Maintain proper ventilation in areas where machinery and equipment help dissipate heat.

B. Lack Of Proper Maintenance

Fires caused by mechanical friction can often be attributed to a lack of proper maintenance. Poor maintenance can lead to excessive wear, misalignments, and other issues that increase friction and the risk of fires. To prevent fires related to poor maintenance:

- Establish a regular maintenance schedule for all machinery and equipment, including cleaning, lubrication, and inspection of components for wear or damage.
- Follow the manufacturer's recommendations for maintenance and repairs.
- Train employees on the importance of machinery and equipment maintenance and their role in preventing fires.

C. Importance Of Regular Inspections And Repairs

Regular inspections and timely repairs are crucial in preventing fires caused by mechanical friction. Inspections can identify potential issues before they lead to overheating or other hazards. To ensure the safety of your workplace:

- Schedule regular inspections of machinery and equipment by qualified personnel.
- Address any identified issues or concerns promptly, including repairs or replacements of worn or damaged components.
- Maintained detailed records of inspections, repairs, and maintenance to track the condition of machinery and equipment over time.

By addressing mechanical friction-related fire hazards, you can protect your workplace from fires and ensure the safe operation of machinery and equipment.

9. Flammable Liquids And Gases



Flammable liquids and gases are present in many workplaces and pose a significant fire hazard if not stored and handled properly. These substances can ignite easily and spread quickly, causing fires and explosions. Here are some common flammable liquid and gas-related fire hazards and ways to address them:

A. Common Flammable Substances In The Workplace

Many workplaces commonly use flammable substances, including gasoline, solvents, paints, propane, and natural gas. Identifying all flammable substances in the workplace is crucial to minimize the risk of fires.

B. Proper Storage And Handling Procedures

Proper storage and handling procedures can help prevent flammable liquids and gas ignition. To store and handle flammable substances safely:

- Store flammable substances in approved containers labeled and secured in designated storage areas away from ignition sources.
- Avoid storing flammable substances near heat sources or in areas with poor ventilation.
- Use appropriate protective equipment, gloves, and safety goggles when handling flammable substances.
- Use grounded equipment and containers to prevent static electricity buildup.

C. Emergency Response Plans For Flammable Liquid And Gas-Related Fires

Emergency response plans are crucial in a fire or explosion caused by flammable liquids or gases. To develop an effective emergency response plan:

- Establish an emergency response team and train them on the proper procedures for responding to flammable liquid and gas-related fires.
- Develop evacuation procedures and ensure that all employees are aware of them.
- Install and maintain fire suppression systems, such as sprinklers and fire extinguishers, in areas where flammable substances are present.
- Test fire suppression systems regularly to ensure that they are functioning correctly.

You can protect your workplace from fires and explosions by addressing the risks of flammable liquids and gases. Identifying all flammable substances, implementing proper storage and handling procedures, and developing and practicing emergency response plans to ensure employees are prepared to respond to a fire or explosion caused by flammable liquids or gases.

10. Negligence



Negligence is a factor that can contribute to workplace fires, particularly in situations where employees fail to follow safety protocols or fail to report potential hazards. Here are some common negligence-related fire hazards and ways to address them:

A. Failure To Follow Safety Protocols

Employees who fail to follow safety protocols, such as smoking in prohibited areas, overloading electrical circuits, or mishandling flammable liquids, can create fire hazards. To prevent fires caused by negligence:

- Train employees on safety protocols and the importance of following them.
- Develop and enforce policies and procedures related to safety protocols.
- Conduct regular safety audits to ensure that employees are following safety protocols.

B. Failure To Report Potential Hazards

Employees who fail to report potential fire hazards, such as damaged electrical cords, malfunctioning equipment, or blocked fire exits, can also contribute to workplace fires. To prevent fires caused by failure to report potential hazards:

- Encourage employees to report any potential fire hazards immediately.
- Develop a system for reporting and addressing potential fire hazards.
- Conduct regular inspections to identify potential fire hazards.

By addressing negligence-related fire hazards, employers can help prevent workplace fires and protect the safety of employees and visitors. Training employees on safety protocols, encouraging them to report potential hazards, and conducting regular inspections to ensure the workplace is safe and free of fire hazards is essential.



Conclusion

Fires can cause devastating consequences, and it is important to understand their causes to prevent them from occurring. While some causes of fires are unavoidable, such as natural disasters, others can be prevented with proper education and precautions.

Some common causes of fires include cooking equipment, electrical malfunctions, smoking materials, candles, and heating equipment. These causes can be prevented by specific actions such as ensuring proper ventilation, installing smoke detectors, and correctly using the equipment.

It is important to be vigilant and take necessary precautions to prevent fires from occurring and protect yourself and your property from their devastating consequences. Remember that prevention is the key to avoiding these dangerous and destructive events.

Injuries caused by fire in the work environment

a. **Burn Injuries**



There are four categories, or degrees, of burn injuries, signifying the depth to which tissue is damaged:

- **First degree burns**. This injury is comparable to sunburn. The victim can expect minor pain and redness (erythema) on the epidermis, the top layer of skin. Generally, the burn will heal over a few days. Some evidence suggests that these burns may be associated with an increased risk of skin cancer later in life.
- **Second degree burns**. The damage extends to the lower layers of the skin—the papillary or reticular dermis. Blisters form, and the site is moist and extremely painful to the touch. Bacterial infection and cellulitis are risks with this category of burns. Healing may require several weeks to a month.
- **Third degree burns**. The skin is charred at all layers and appears dry and leathery. The site is usually painless because of nerve damage. Natural healing is impossible; the skin must be surgically excised and skin grafts used. The chance of infection is very high.
- **Fourth degree burns**. The skin is incinerated at all layers; muscle tissue and bone are charred. Severe nerve damage renders the injury site painless. This

is a life-threatening injury that may require amputation or extensive plastic surgery. The risk of infection and gangrene is very high.

b. Respiratory Injuries



The combinati on of suffocation (also called asphyxiation) and smoke inhalation during a Wilmington residential fire can be devastating. Breathing injuries are the primary causes of death in U.S. house fires.

There are three different components of these injuries:



- **Oxygen-depleted air**. A burning fire consumes oxygen from the air. The remaining mix of nitrogen, carbon monoxide, and carbon dioxide cannot keep a person alive. Carbon monoxide is toxic and bonds more closely than oxygen to the hemoglobin in the blood, making it difficult to revive a patient with oxygen therapy alone. Prolonged exposure to oxygen-depleted air causes confusion, drowsiness, and death.

- **Inhaled hot gases**. Inhaling super-heated combustion products can scorch and scar nasal passages and lung tissue. This can lead to permanent and disabling lung problems. 
- **Smoke**. Smoke consists of carbon particles, ash, volatile organic compounds, and a variety of toxic gases including hydrogen sulfide. These can damage the respiratory system permanently, congest or obstruct breathing, and cause seizures and coma.

Fire Hazards and Control Measures





Fire hazards refer to any situation, substance, or event that has the potential to cause a fire or increase the likelihood of a fire occurring. Fire hazards, including homes, workplaces, and public buildings, can be found everywhere. Control measures are actions taken to minimize or eliminate the risk of a fire occurring.

Some common fire hazards include:

1. Electrical Fires

Electrical fires are caused by faulty wiring, overloaded circuits, or malfunctioning electrical appliances. They can occur due to damaged or frayed cords, improper use of extension cords, and outdated or non-compliant electrical systems.

Electrical fires are particularly dangerous because they can start inside walls and spread rapidly, often going unnoticed until significant damage has occurred. Regular inspection and maintenance of electrical systems and practicing safe usage of electrical appliances can help prevent electrical fires.

2. Cooking Fires

Cooking fires are the leading cause of home fires and injuries. They typically occur when food or cooking oil overheats, creating flames that can quickly spread to nearby combustible materials. Unattended cooking, grease buildup, and the improper use of cooking appliances contribute to the risk of cooking fires.

To prevent these fires, it is essential to never leave cooking unattended, keep flammable items away from heat sources, and properly maintain and clean cooking appliances.

3. Heating Equipment Fires

Heating equipment, such as furnaces, space heaters, and fireplaces, can cause fires when they malfunction or are used improperly. These fires often occur when combustible materials are placed too close to heating devices or when heating equipment is not adequately maintained.

To prevent heating equipment fires, follow manufacturer guidelines for usage and maintenance, keep flammable materials at a safe distance, and have heating systems inspected regularly by a professional.

4. Smoking-Related Fires

Smoking-related fires typically occur when lit cigarettes, cigars, or pipes come into contact with flammable materials like upholstery, bedding, or curtains. These fires can be particularly deadly, as they often start when occupants are asleep or unaware.

To prevent smoking-related fires, never smoke in bed, ensure proper disposal of smoking materials in fire-resistant containers, and avoid smoking while under the influence of alcohol or medication that may cause drowsiness.



5. Arson And Intentional Fires

Arson is the deliberate act of setting fire to a property intending to cause damage or harm. These fires can be challenging to predict and prevent, often resulting from criminal or malicious intent. However, implementing security measures, such as surveillance cameras and access control systems, can deter potential arsonists and help identify them if a fire does occur.

6. Combustible Dust Fires

Combustible dust fires can occur in industrial settings where fine particles of materials, such as wood, coal, or metal, accumulate and become airborne. If these particles come into contact with an ignition source, they can create a powerful explosion. Proper housekeeping, ventilation, and

dust collection systems can help prevent the accumulation of combustible dust and reduce the risk of fires.

7. Flammable Liquid And Gas Fires

Flammable liquids and gases can ignite and cause fires if they come into contact with heat, sparks, or flames. Common flammable substances include gasoline, propane, and certain chemicals. Proper storage, handling, and disposal of these materials are crucial for preventing fires. Additionally, it is essential to follow safety guidelines when using equipment or appliances powered by flammable liquids or gases.

8. Wildfires

Wildfires are uncontrolled fires in forests, grasslands, or other natural areas. They can be caused by natural factors, such as lightning, or human activities, including campfires, discarded cigarettes, or arson.

Wildfires can spread rapidly and cause extensive damage to property, wildlife, and the environment. Preventing wildfires involves practicing fire-safe behaviors outdoors, maintaining defensible space around structures, and following local fire restrictions and guidelines.

Fire Prevention Measures

Fire prevention measures are steps to reduce the risk of fire occurring or spreading. Some common fire prevention measures include:

1. Fire Risk Assessments

Fire risk assessments are comprehensive evaluations conducted to identify fire hazards in a building or facility. They involve inspecting the premises, reviewing building plans, and analyzing fire protection systems.

The assessment helps determine the risk level of a fire outbreak and provides recommendations to mitigate these risks. Regular fire risk assessments are essential for maintaining a safe environment and ensuring compliance with fire safety regulations.



2. Proper Storage And Handling Of Flammable Materials

Flammable materials, such as chemicals, liquids, and gases, can pose a significant risk if not stored or handled correctly. Proper storage and handling procedures include using appropriate containers, labeling materials clearly, maintaining adequate ventilation, and segregating incompatible substances. Implementing these measures reduces the chances of a fire starting or spreading due to the mishandling of flammable materials.

3. Fire-Resistant Building Materials And Design

Utilizing fire-resistant building materials and design techniques can slow fire spread and limit structural damage. These materials, such as fire-resistant drywall, insulation, and doors, can withstand high temperatures and help maintain the structural integrity of the building during a fire. The fire-resistant design also includes creating fire compartments and providing adequate means of escape to ensure occupants can exit safely in the event of a fire.

4. Fire Detection And Alarm Systems

These systems are designed to detect the presence of fire, smoke, or high temperatures and alert occupants or emergency services. Smoke detectors sense the presence of smoke, while heat detectors identify rapid temperature increases.

Gas detectors, on the other hand, detect the presence of combustible or toxic gases. These devices can be connected to a central alarm system, which will notify occupants and emergency services in case of a fire.

5. Fire Suppression Systems

Fire suppression systems are designed to control or extinguish fires, minimizing damage and protecting occupants. Fire extinguishers are portable devices that use chemicals, foam, or other agents to smother a fire.

Sprinkler systems are installed in buildings and release water when triggered by heat or smoke. Clean agent systems use inert gases or chemicals to suppress fires without causing harm to people or the environment. These systems can be automatic or manual, depending on the specific application.

6. Emergency Planning And Preparedness

This involves creating fire escape plans, conducting fire drills and training, and establishing emergency communication systems. Fire escape plans are essential for ensuring occupants know the quickest and safest routes to exit a building in case of a fire. Regular fire drills and training sessions help familiarize occupants with evacuation procedures and the proper use of fire safety equipment.

Emergency communication systems, such as public address systems and emergency call boxes, allow for rapid dissemination of information during a crisis, enabling people to respond efficiently and effectively.

7. Systems Of Work

Systems of work must be designed to minimize fire risk. The degree to which this is done and the exact procedures implemented should be decided through the risk assessment process.

An example of a safe system of work applied to fire safety is using a permit-to-work system to control hot work (where naked flames or a significant ignition source will be created).

Typical Precautions For Control Of Hot Work:

- Combustible and flammable materials are removed from the work area.
- Items that cannot be removed are covered with fire-retardant blankets.
- The floor is swept clean.
- Any wooden floor is damped down.

- A suitable fire extinguisher is at hand.
- A “fire-watcher” is present in the area while the work is carried out.
- The work area is visited routinely after the work has finished checking the area for smoldering.

8. Good Housekeeping

Good housekeeping is fundamental to fire safety and is about keeping the workplace:

- Waste-free by removing waste regularly (e.g. emptying full litter bins) so that it does not build up and increase the fire risk as a potential fuel source.
- Tidy so that combustible and flammable materials are returned to safe storage after use (e.g. solvents returned to the solvent store).
- Well-ordered so that fuel and ignition sources separate (e.g. ensuring fan heaters are not obstructed).

Pedestrian routes should also be kept clear (e.g. with no obstructions by the fire-escape door), so they can be used during a fire evacuation.

Fire escape plans



If on fire

- Stop, Drop, Cover and Roll
- Smother the flames with a blanket
- Move away from heat source

First aid for burn injuries

- Protect your own safety at all times
- For all burns apply cold running (tap) water for at least 20 minutes
- If running water not available, wet 2 cloths and alternate them onto the burn every 2 minutes
- Keep the rest of the body warm
- Do NOT use ice, butter, creams, etc.
- Remove clothing and jewellery as they can hold heat on the burn and jewellery can stop blood flow to the burn.
- Seek medical attention for any burn bigger than a 20 cent coin, or that blisters or if there are any concerns.

Ensure that all adults in the household know and understand proper first aid. Where appropriate, children should be taught general first aid principles.

S **Strip** hot clothes & jewellery.



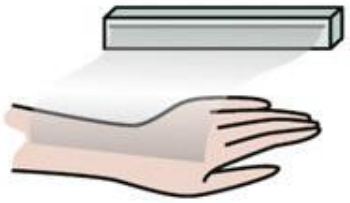
T **Turn on cool tap** (never use ice). Run burn under cool water for 10 minutes. Keep the rest of the person warm.



O **Organise** medical assistance (999, A&E, GP).



P **Protect** burn with cling film or clean cloth (Do not use dressings, fluffy cloth, creams or lotions).



Basic First Aid for Fire-Related Injuries

In fire-related incidents, injuries can occur due to burns, smoke inhalation, or other factors. Understanding basic first-aid techniques can help alleviate pain and minimize further damage. Here are some important considerations:

Treating Burns



- Move the injured person away from the source of the burn.
- Run cool (not cold) water over the burned area for at least 10 minutes.
- Cover the burn with a sterile non-stick dressing or clean cloth.
- Seek medical attention for severe burns, burns to sensitive areas, or if the burn covers a large area.

Dealing with Smoke Inhalation

- Move the person to a safe area with fresh air.
- Encourage the person to cough and breathe deeply to help remove any smoke or debris from the lungs.
- If breathing difficulties persist, seek immediate medical attention.
- Do not underestimate the potential harm caused by smoke inhalation, even if there are no visible injuries.

Handling Different Types of Fires

Fires are classified into different types based on the fuel involved. Each type requires a specific approach for extinguishing it safely. Here are the four main classes of fires and their characteristics:

Class A Fires

Class A fires involve ordinary combustible materials, such as wood, paper, or fabric. Extinguish these fires using water or a suitable fire extinguisher designed for Class A fires.

Class B Fires

Class B fires involve flammable liquids, such as gasoline, oil, or alcohol. Extinguish these fires using foam or carbon dioxide (CO2) fire extinguishers specifically designed for Class B fires.

Class C Fires

Class C fires involve energized electrical equipment, such as appliances or electrical panels. In these situations, it is crucial to shut off the power supply first before extinguishing the fire using an appropriate fire extinguisher.

Class D Fires

Class D fires involve combustible metals, such as magnesium or titanium. These fires require special extinguishing agents designed for Class D fires, as regular extinguishing methods may be ineffective or even dangerous.

Evacuation Procedures

In the event of a fire, quick and safe evacuation is vital. Here are the key steps to follow during an evacuation:

Alerting Others

Immediately notify others about the fire by activating fire alarms or verbally informing them. Time is of the essence, and early warning can save lives.

Assessing the Situation

Before moving towards an exit, assess the situation for any potential hazards or obstacles. If necessary, choose an alternative evacuation route.

Escaping Safely

Move swiftly but calmly towards the nearest exit, following the predetermined escape plan. Crawl low if there is smoke, as cleaner air is closer to the floor. Do not use elevators during a fire.

Fire Safety in Specific Settings

Fire safety practices may vary depending on the specific setting. Here are some considerations for different environments:

Home Fire Safety

Install smoke detectors on each floor of your home.

Keep flammable materials away from heat sources.

Develop and practice a family fire escape plan.

Teach children about fire safety and the hazards of playing with fire.

Workplace Fire Safety

Familiarize yourself with workplace fire safety protocols and evacuation plans.

Attend fire safety training sessions provided by your employer.
Keep work areas clean and free from clutter.

Report any potential fire hazards to the appropriate authority.

School Fire Safety

Schools should have well-maintained fire alarm systems and conduct regular fire drills.

Educate students about fire safety and the importance of following fire evacuation procedures.

Ensure that fire exits are clearly marked and accessible.

Have a designated assembly area for students and staff during evacuations.

Fire Safety Equipment and Maintenance

Regular maintenance of fire safety equipment ensures its effectiveness when needed. Consider the following:

Fire Sprinkler Systems

Fire sprinkler systems automatically detect and suppress fires. Regular inspections and maintenance are essential to ensure their proper functioning.

Fire Alarm Systems

Fire alarm systems provide early warning of a fire. Test these systems regularly and replace batteries as needed. If a fire alarm is faulty, report it immediately for prompt repair.

Fire Extinguisher Maintenance

Fire extinguishers should be inspected and serviced annually by professionals. Ensure that they are easily accessible, properly labeled, and have clear instructions for use.

Conclusion

Fire safety is a critical aspect of protecting ourselves and others from the devastating consequences of fires. By understanding fire safety principles, implementing preventive measures, and being prepared to respond effectively, we can minimize the risk of fires and mitigate their impact. Additionally, knowledge of basic first aid techniques for fire-related injuries equips us to provide immediate assistance and support to those in need. Remember, fire safety is a collective responsibility. By taking proactive measures, spreading awareness, and practicing fire safety in our homes, workplaces, and schools, we can create a safer environment for everyone.

Firefighting methods



Cooling method



The principle of this fire extinguishing method is to spray the fire extinguishing agent directly on the burning object to reduce the temperature of combustion below the ignition point and stop the combustion. Or spray the fire extinguishing agent on the material near the fire source, so that it will not form a new fire point due to the heat radiation of the flame.

The cooling fire extinguishing method is one of the main methods of fire extinguishing, and water and carbon dioxide are commonly used as fire extinguishing agents to cool down and extinguish the fire. The fire extinguishing agent does not participate in the chemical reaction in the combustion process during the fire extinguishing process. This method is a physical fire extinguishing method.

Isolation method

The isolation fire extinguishing method is to isolate or remove the burning material from the surrounding unburned combustible material, interrupt the supply of combustible material, and stop the combustion due to lack of combustible material. The specific methods are:

1. Remove combustible, combustible, explosive and combustion-supporting materials near the fire source;

2. Close the valves of combustible gas and liquid pipelines to reduce and prevent combustible substances from entering the combustion zone;
3. Try to block the scattered flammable and combustible liquids;
4. Demolition of flammable buildings adjacent to the fire source to form a space zone to prevent the spread of fire.

Asphyxiation

The suffocation fire extinguishing method is a fire extinguishing method that prevents the air from flowing into the combustion zone or uses the incombustible zone or dilutes the air with incombustible substances, so that the burning substance does not get enough oxygen and extinguishes. The specific method is:
1. Cover the burning material with incombustible or non-combustible substances such as sand, cement, wet sack, wet quilt;
2. Spraying water spray, dry powder, foam and other fire extinguishing agents to cover the burning material;
3. Fill containers and equipment in fire with water vapor, nitrogen, carbon dioxide and other inert gases;
4. Airtight fire buildings, equipment and holes;
5. Spray non-combustible gas or non-combustible liquid (such as carbon dioxide, nitrogen, carbon tetrachloride, etc.) into the combustion area or on the combustion material

Electrical accidents



Electrical hazards

A hazard is something that has the potential to cause harm. Electricity is a hazard, as it can cause severe injury and even death.

The main hazards are:

- Contact with live electrical parts resulting in electric shock and burns.
- Electrical faults, causing fires.
- Fire or explosions from electricity igniting a flammable or explosive atmosphere.
  Uncontrolled electrical hazards can cause
- ❖ Electrical injuries.
- ❖ Severe pain
- ❖ Heart failure
- ❖ Breathing difficulties
- ❖ Muscle spasms, which can cause other injuries such as fractures
- ❖ Tissue, nerve and muscle damage
- ❖ Burns
- ❖ Electrocution
- ❖ Arc flash
- ❖ Electric shock
- ❖ Other serious injuries
- ❖ Fires or explosions, posing a threat to life, property, and the overall safety of a place and its occupants

Electric shock

A person can receive an electric shock if they come into contact with live electrical parts or if electricity arcs. An electric shock can result in minor or severe harm. It can also cause death, which is known as electrocution.

Coming into contact with live electrical parts can:

- Cause severe pain.
- Stop the heart from beating properly.
- Prevent a person from breathing.
- Cause muscle spasms, which can cause other injuries such as fractures.
- Cause tissue, nerve and muscle damage.

The injuries from an electric shock are varied and will depend on:

- **The voltage and current –** The higher the voltage and current, the likelihood of death increases. However, just 50 volts AC can cause a person's heart to stop and prevent breathing.
- **The path of the current –** If it travels through vital organs, it can cause more damage.
- **The length of exposure to the current –** Injuries will be more severe if exposed for longer.
- **The resistance –** Wet skin reduces resistance and allows for the current to flow more freely.

It is the electrical current that makes electricity dangerous, as it can flow through the body. Alternating current (AC) is considered more dangerous than direct current (DC), as it can cause internal damage even at a smaller magnitude. However, both AC and DC are dangerous, above a particular voltage, and have different effects on the body. The voltage allows the current to enter the body, as it reduces the resistance.

It is not always the electric shock that causes injury either. It can contribute to other accidents, e.g. falling from a ladder whilst working at height.

Burns

When an electrical current flows through the body, it heats tissues as it travels, which can cause severe burns and internal tissue damage.

Electrical burns can be severely disabling and can leave extensive scarring. Severe burns may even result in major surgery and amputations. Burns are more common with high voltages, but they can occur at 230 volts if the current flows for longer.

Burns can also occur when a person:

- Receives an electric shock due to arcing (jumping). Arcing also creates ultraviolet radiation, which can damage a person's eyes.
- Touches electrical equipment that has become hot due to a fault (thermal burns).
- Is caught in a fire caused by an electrical fault.

Fire and explosion

Workers do not have to come into direct contact with electricity to be harmed by it. Electricity can be an ignition source, which can cause fires and even explosions if there is an explosive atmosphere.

Electrical accidents involving fires and explosions can result in multiple fatalities, severe injuries and extensive property damage. Injuries can vary depending on the seriousness of the fire/explosion and how far a person is from the event.

Most electrical accidents and injuries occur as a result of the following:

- Not isolating electrical installations and equipment properly before working on them.
- Working on or near live electrical systems thought to be dead.
- Inadequate information and instruction provided on electrical risks.
- A lack of training and competence to undertake tasks involving electricity. Inadequate training is one of the main causes of electrical accidents.
- An unsafe safe system of work.
- Using electrical equipment in wet conditions or touching it with wet hands.
- Faulty, damaged and defective electrical systems, wiring and equipment.
- Misuse of electrical equipment and appliances.
- Poor design, construction and installation of electrical installations and wiring.
- Overloading of electrical systems causing them to overheat, e.g. plugging too many devices into a circuit and using incorrectly rated fuses.
- Inadequate maintenance, inspection and testing of electrical systems and equipment.

The risk of an electrical accident will be higher for those working directly on or adjacent to live electrical equipment and with higher voltages. However, all workers and others on the premises are at some risk where electricity is used in the workplace

In addition to the hierarchy of control, other measures can also minimize electrical risks.

Here are some tips:

Do

- Ensure the power supply is regularly tested by a competent person and taken out of service if unsafe.
- Keep isolators and other electrical systems clear at all times and clearly identify them with signs.
- Ensure anyone working with electricity is trained and competent. The level required will depend on the task, e.g. maintenance of electrical equipment will require a higher level of training and competence.
- Use portable electrical equipment safely, e.g. not misusing it, using it for its intended purpose and storing it properly after use.
- Fully pull out electrical extension reels when in use to prevent overheating.
- When defrosting raw foods, keep them away from other foods to prevent cross-contamination.

- Complete a pre-use check of electrical equipment to ensure it is safe.
- Switch off and unplug electrical equipment during maintenance, cleaning, repairing or adjusting.
- Switch off all non-essential electrical equipment at the end of the working day. Not only is this safer, but it also saves energy.

Do not

- Do not overload sockets, as this can cause overheating and fire.
- Do not force a plug into a socket if it does not fit.
- Do not route electrical cables where they could be damaged or where someone could trip. Use cable protectors if they cannot be re-routed.
- Do not use electrical equipment with wet hands or near water.
- Do not keep liquids by electrical equipment, e.g. open drinks next to computers.
- Do not plug multiple extension leads together (daisy-chaining).
- Do not pull electrical equipment out of a socket by its lead. Always grip the plug.

Electrical shock: First aid



The danger from an electrical shock depends on the type of current, how high the voltage is, how the current traveled through the body, the person's overall health and how quickly the person is treated.

An electrical shock may cause burns, or it may leave no visible mark on the skin. In either case, an electrical current passing through the body can cause damage inside the body, cardiac arrest or other injury. Under certain circumstances, even a small amount of electricity can be fatal.

When to contact your doctor

A person who has been injured by contact with electricity should be seen by a health care provider.

Symptoms of an electrical injury

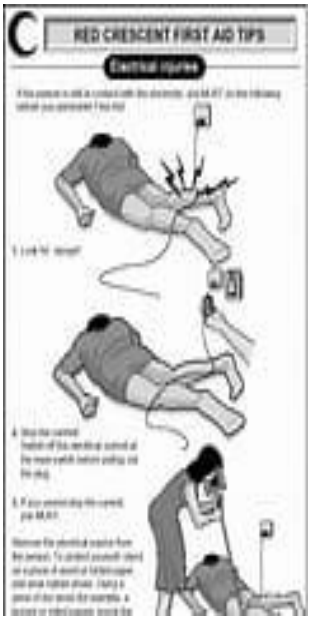
- ✓ Often, the main symptom of the electrical injury is a skin burn.
- ✓ High-voltage injuries may cause severe internal burns.
- ✓ If muscle damage is extensive, it swells to the extent that the arteries are compressed.
- ✓ Toddlers who bite or suck on extension cords can burn their mouth and lips, causing added deformities and growth problems of the face and other facial structures.
- ✓ A minor shock may cause muscle pain causing the person to startle and / or fall.
- ✓ The electricity may also cause abnormal heart rhythms causing heart problems or exacerbating current ones.
- ✓ The nerves and brain may also be affected which may cause memory and behavioral problems.

Caution

- Don't touch an injured person who is still in contact with an electrical current.
- Call your local emergency number if the source of the burn is a high-voltage wire or lightning. Don't get near high-voltage wires until the power is turned off. Overhead power

lines usually aren't insulated. Stay at least 20 feet (about 6 meters) away — farther if wires are jumping and sparking.

- Don't move a person with an electrical injury unless there is immediate danger.



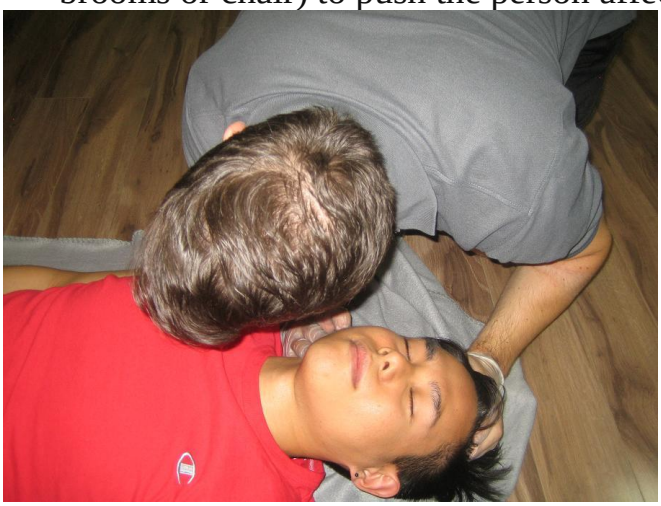
When to seek emergency care

Call your local emergency number if the injured person experiences:

- Severe burns
- Confusion
- Difficulty breathing
- Heart rhythm problems
- Cardiac arrest
- Muscle pain and contractions
- Seizures
- Loss of consciousness

Take these actions immediately while waiting for medical help:

1. Turn off the source of electricity, if possible. If not, use a dry, nonconducting object made of cardboard, plastic or wood to move the source away from you and the injured person.
2. Begin CPR if the person shows no signs of circulation, such as breathing, coughing or movement.
3. Try to prevent the injured person from becoming chilled.
4. Apply a bandage.
5. Separate the person from the current source before giving any first aid.
6. Call the emergency number or nearby medical responders (if available).
7. If the electricity source cannot be turned off, use insulating objects (such as brooms or chair) to push the person affected away from the current



Electrical Injuries: first aid

Electrical injuries occur when an electrical current passes through the body that causes inadvertent damage and burns to the internal organs thereby affecting their functions. Faulty electrical lines, machinery and appliances may result in an electrical injury. Others causes of electrical injuries may occur with contact with household wiring or power lines. There are a number of factors that determine the intensity of the injury such as the type of current, the duration of exposure and many others. This page will outline the symptoms and management of an electrical burn. This page is for learning purposes only. To learn to recognize and manage minor and severe electrical burns register for a Canadian standard first aid course with one of our training providers.

First Aid for an electrical injury



Check for breathing

- ✓ Separate the person from the current source before giving any first aid. Turn off the electrical current, unplug the cord, turn off or remove the fuse from the fuse box. Simply turning off the appliance or machine may not stop the electricity flow.
- ✓ Call the emergency number or nearby medical responders (if available)
- ✓ If the electricity source cannot be turned off, use insulating objects (such as brooms or chair) to push the person affected away from the current. Do not use wet or metal objects and ensure that you are standing on something dry and does not conduct electricity such as rubber mat or newspapers
- ✓ Once the person is away the source of electricity, check the person's airway and breathing pattern as well as the person's pulse.
- ✓ If you notice a burn in the person's body, remove the clothing over the affected area and rinse the burned area with cool running water until the pain subsides. Do not apply anything (ice, water, toothpaste or ointments) on the affected site; do not break the blisters; never remove the dead skin.
- ✓ If the person fainted and become unconscious, lay him down his back with his head slightly lower than the rest of the body and cover him with a warm blanket.

- ✓ If you suspect cervical or spine injury related to electrical injury, never move the person.
- ✓ Speak to a doctor about medication for pain.

Composite materials

A composite material is a combination of two materials with different physical and chemical properties. When they are combined they create a material which is specialized to do a certain job, for instance to become stronger, lighter or resistant to electricity.

They can also improve strength and stiffness. The reason for their use over traditional materials is because they improve the properties of their base materials and are applicable in many situations

Common composite materials include

- Masonry and reinforced concrete









- Composite wood, such as Plywood





- Reinforced plastics, such as fiberglass







- Ceramic matrix composites




- Metal matrix composites



- Various other advanced composite material



- 

What are the Different Types?

Some common composite materials include:

- **Ceramic matrix composite:** Ceramic spread out in a ceramic matrix. These are better than normal ceramics as they are thermal shock and fracture resistant
- **Metal matrix composite**: A metal spread throughout a matrix
- **Reinforced concrete**: Concrete strengthened by a material with high tensile strength such as steel reinforcing bars
- **Glass fibre reinforced concrete**: Concrete which is poured into a glass fibre structure with high zirconia content
- **Translucent concrete**: Concrete which encases optic fibres
- **Engineered wood**: Manufactured wood combined with other cheap materials. One example would be particle board. A specialty material like veneer can also be found in this composite
- **Plywood**: Engineered wood by gluing many thin layers of wood together at different angles
- **Engineered bamboo**: Strips of bamboo fibre glued together to make a board. This is a useful composite due to the fact it has higher compressive, tensile and flexural strength than wood
- **Parquetry**: A square of many wood pieces put together often out of hardwood. It is sold as a decorative piece
- **Wood-plastic composite**: Either wood fibre or flour cast in plastic
- **Cement-bonded wood fibre**: Mineralized wood pieces cast in cement. This composite has insulating and acoustic properties
- **Fiberglass**: Glass fibre combined with a plastic which is relatively inexpensive and flexible
- **Carbon Fibre reinforced polymer**: Carbon fibre set in plastic which has a high strength-to-weight ratio
- **Sandwich panel**: A variety of composites that are layered on top of each other
- **Composite honeycomb**: A selection of composites in many hexagons to form a honeycomb shape.
- **Papier-mâché**: Paper bound with an adhesive. These are found in crafts
- **Plastic coated paper**: Paper coated with plastic to improve durability. An example of where this is used is in playing cards
- **Syntactic foams**: Light materials created by filling metals, ceramics or plastics with micro balloons. These balloons are made using either glass, carbon or plastic

Careers related to use of composite materials

Careers in the fibre glass and plastics industry





1. Grinder

Primary duties: Grinders are responsible for operating, maintaining and repairing machines that break large plastics into smaller pieces for processing purposes. They follow specified instructions and engage in a variety of grinding activities. Grinders work closely with other plastics employees to prevent loss of production and keep production efficient. Prior to a grinding operation, they inspect machinery to prevent any potential malfunctions. They also lubricate the grinding wheels so the machine is able to grind more effectively. After grinding plastics, they may also use hand tools to file or finish the surface of the plastic product.

2. Blow molding technician

Primary duties: Blow molding technicians are responsible for operating machines that mold plastic objects by blowing air into the plastic, causing it to expand. They assemble blow molding machines, maintain them and make repairs as necessary. They also provide instructions to the employees who cut and prepare the molded parts. Blow molding technicians ensure the general cleanliness of blow molding machines and may perform thorough inspections of both the machines and any blow molding equipment prior to using them. They may also assist with the training of additional molding personnel and educate them about important safety processes.

3. Patternmaker

Primary duties: Patternmakers are responsible for creating plastic foundry patterns and making sure that patterns conform to the desired specifications. They use measuring instruments like scales and micrometers to measure plastic items and operate machines like drill presses to produce more distinct patterns. They may also adapt or repair a damaged pattern or a template and use computer-aided design software to produce new designs. Patternmakers frequently work with plastic manufacturers and other professionals to ensure their patterns are accurate.

4. Plastic manufacturer

Primary duties: Plastic manufacturers are responsible for molding, casting and assembling products made from plastic, including combs, dishes, toys, car parts and a number of other items. They ensure the machines that help to construct the items function properly. During blow molding, injection molding and compression molding, they engage in quality control processes to ensure the products meet the specified requirements. They may use blenders or color mixers to produce colored plastic materials and mix different colors together. When working around hot machines and plastics and drilling and cutting plastic parts, manufacturers often employ safety precautions to prevent potential accidents.

5. Quality control technician

Primary duties: Quality control technicians are responsible for performing inspections of finished plastic goods, checking the dimensions of goods to ensure they're compliant with desired specifications, monitoring for various defects and establishing a system to report and repair defects. Technicians often help to train the plastics employees who create and assemble the plastic goods and instruct them on how to best exceed customer expectations and produce high-quality goods. They create and implement a set of quality control standards and communicate any quality issues to production managers and supervisors. They may also conduct regular audits of a facility's overall operations.

6. Production supervisor

Primary duties: Production supervisors are responsible for managing and leading plastics and manufacturing employees. They coordinate production activities with suppliers to optimize machines, employees and processes.

Production supervisors create production schedules for employees to follow to ensure the timely shipment of goods, review production and operating reports, help solve maintenance and manufacturing issues, document operations procedures and establish channels of communication to allow for additional accountability between management and employees. They may also assist with the preparation of new moldings, equipment and supplies, and train and educate new plastics employees on production processes.

7. Mold maker

Primary duties: A mold maker in the plastics industry is responsible for producing precision moldings and ensuring that they can mass-produce each molding with a high degree of accuracy. Precision moldings are plastic moldings that eventually become high-quality consumer goods. Mold makers mix modeling materials with other substances to create molds. They also adapt and modify molds for plastic injection moldings and other operations. Prior to the molding process, a mold maker might use measuring and gauging tools to perform an inspection before a large-scale molding operation. They may also provide assistance to millwrights and machinists during the injection molding process.

8. Maintenance manager

National average salary: $70,148 per year

Primary duties: Maintenance managers in the plastics industry are responsible for making repairs to manufacturing equipment, improving injection molding and managing other maintenance employees. They help manage the movement of plastic molds to and from manufacturing facilities, track expenditures and labor costs to ensure compliance with the manufacturing facility's budget and implement programs to reduce costs and improve production processes. They also manage bids for construction work and research new processes to implement to improve output. Maintenance managers frequently monitor plastics employees to ensure they're in compliance with health, safety and environmental regulations and ordinances.

9. Assembler

Primary duties: In the plastics industry, assemblers are responsible for assembling a variety of plastic products, in addition to tools and machinery. They create, decorate and package finished goods according to specifications and work instructions. Assemblers often inspect and test the finished goods for defects prior to packaging them and notify a production manager if they find any. They may also label the product according to available instructions and meet with supervisors and other plastics personnel to discuss the implementation of new safety regulations and work standards.

10. Plastics engineer

Primary duties: Plastics engineers are responsible for designing and creating materials, molds, tools and other items made from plastic. They develop and assemble new injection molding equipment, manage plastics projects, provide other engineers with assistance during the plastics production process and ensure other engineers follow any applicable safety requirements. They also work to find ways to lower the cost of manufacturing and analyze customer requirements to ensure all molded products are of high quality. Plastics engineers may also perform tests of the finished products and establish specifications for new product designs.

11. Injection mold operator

Primary duties: Injection mold operators are responsible for assembling and operating machines that shape plastic. They implement quality control measures to ensure each mold meets the required specifications, manage any issues that might arise during the molding process, make any necessary repairs to machinery and perform routine maintenance and order new parts, if necessary. Injection mold operators help to ensure that the work environment is safe and that all employees follow any applicable health and safety regulations. They may assemble a variety of molding equipment according to design directions or building blueprints and clean the equipment after using it.

12. Plant manager

Primary duties: Plant managers in the plastics industry are responsible for the daily operations of a plastics department or manufacturing facility. They help supervise plastics employees and provide them with regular operational and

developmental training. Plant managers develop and implement strategic plans to enhance production and make quality improvements. They review manufacturing processes and look for opportunities to make innovations, reduce costs and improve the quality of finished goods. They may also research different types of plastics to determine which ones are likely to be the most effective

Careers in Construction (With Salaries and Duties)





The construction industry offers a variety of careers with work on commercial, industrial, private or civil engineering projects. Whether new construction, renovations and remodeling or performing maintenance and repairs, the construction field is a strong employment option for many. Knowing about the various careers in construction and what they do and earn can help you decide if it's the field for you.

1. Tile setter

Primary duties: A tile setter covers walls, floors, ceilings and stairs with various tile materials, like ceramic, porcelain, marble, terrazzo or mosaic. They mix and apply setting materials like grout, ensure the proper placement and clean the tiles after installation. Tile setters often work for construction companies or masonry contractors or are self-employed.

2. Drywall finisher

Primary duties: A drywall finisher measures, cuts and sets drywall panels around mechanical structures, wall frames or other building elements and can create simple or ornamental surfaces through various application methods and tools. They apply the finish material and restore or maintain plaster or putty on partitions, ceilings and interior or exterior walls. Drywall finishers even out dents, apply the desired coating or color and level off the top layers of the exterior of a building.

3. Quantity surveyor

Primary duties: A quantity surveyor is responsible for setting and managing the budgets for construction projects. They visit job sites and review blueprints to prepare estimates, and they negotiate contracts to secure specific prices for their clients. Quantity surveyors also complete administrative tasks, such as documents detailing and recording project costs and reconciling project versus company finances.

4. Roofer

Primary duties: A roofer is a skilled trade worker who specializes in roof construction. They replace, repair or install the roof on nearly any type of architecture from single-family homes and garages to large-scale buildings, like hospitals, schools or shopping malls. They are knowledgeable about various roofing styles, like gabled, flat, gambrel or hip roofs. Roofers help customers or project managers choose from tiles, wood shingles, metal or other roofing materials and coordinate to ensure projects finish on time.

5. Elevator technician

Primary duties: An elevator technician, also called an elevator mechanic, installs, assembles, replaces or maintains large equipment like elevators, escalators, moving walkways, or chairlifts. They may do large-scale installations, like assembling several pieces of each equipment type at an airport or shopping mall, or do smaller installations, like one elevator in an office building.

6. Sprinkler fitter

Primary duties: A sprinkler fitter is a type of plumber who installs, modifies, inspects, tests, and repairs sprinkler systems. They install new fixtures or repair and replace outdated ones by soldering and welding tubes, pipes and fittings. Sprinkler fitters also educate the public about the importance of fire prevention and using sprinkler systems, doing speaking engagements or working with community leaders. Most sprinkler fitters work for plumbing or construction companies, though some are independent contractors.

7. Foreperson

Primary duties: A foreperson coordinates and supervises a crew of workers within their trade, like masonry, electricians or general contractors. They keep track of schedules, project deadlines or milestones, deliveries or supplies and ensure workers skillfully do their job. Forepeople can also work within subsets of the construction field, too, like hardscaping and landscaping on the exterior spaces of construction projects, for example.

8. Millwright

Primary duties: A millwright handles the installation, maintenance and setup of industrial machinery and equipment used on construction sites. They use specialized tools, like welders or hydraulic bolters, to align and replace the individual parts of machinery. Millwrights also handle moving machinery on- and off-site.

9. Cabinetmaker

Primary duties: A cabinetmaker reads architectural blueprints and builds the woodwork, cabinetry, furniture and other ornamental design elements for a project. They work with materials like laminate, wood and fiberglass to build or repair pieces. Most cabinetmakers work for furniture manufacturers, construction companies and contractors or are self-employed.

10. Glazier

Primary duties: A glazier is a construction worker who works with glass installation. From insulated glass that keeps warm or cool air to tempered glass that breaks less, glaziers install or replace windows, mirrors, skylights, storefronts, display cases or shower doors. Some glaziers also work with plastic, marble, granite and other glass substitutes used in construction.

11. Solar installer

Primary duties: A solar installer, sometimes called a photovoltaic (PV) installer, assembles and maintains rooftops or other systems that turn sunlight into energy. They read renderings to measure, cut and bold the framing and solar modules and perform electrical current checks to ensure the system works under code and standards.

12. Sheet metal mechanic

Primary duties: A sheet metal mechanic fabricates and installs thin metal sheets for various construction applications. They fasten metal seams, weld, bold and build support framework. Sheet metal mechanics often work for fabrication plants, construction companies, factories or even aircraft builders.

13. Civil engineer

Primary duties: A civil engineer designs and oversees public construction and public works projects, such as airports, bridges and roads. They research potential project locations to learn about the areas, use software to design structures and present their ideas. Civil engineers often have administrative tasks, such as submitting permits, managing the project and preparing

14. Structural engineer

Primary duties: A structural engineer is a specialized type of civil engineer focused on developing structures that withstand pressure, such as bridges and dams. They evaluate existing structures or plans for structures to determine how gravity and lateral loads may affect them, prepare cost estimates, submit permits and supervise construction. When necessary, structural engineers may advise on the best way to demolish structures safely.

15. Architect

Primary duties: An architect draws plans and designs buildings, whether for new construction, redevelopment or renovation. They have high-level design and drawing skills to create safe, functional and unique designs for projects of all sizes, like housing developments, libraries, airports, government buildings, churches, shopping plazas, highways and city planning projects.






Career options in ceramics include:

- Pottery or ceramics instructor
- General art teacher
- Ceramic artist
- Pottery designer
- Ceramic manufacturer
- Assistant Professor- Design (Ceramics)
- Ceramic Engineer
- Ceramic and Glass Designer
- Design Studio Assistant
- Model Maker
- Product Designer

Careers in the paper industry

1. Production operator

Primary duties: A production operator is a manufacturing professional who works in assembly lines to inspect and complete products. These operators assess line machine performance to troubleshoot potential issues for production efficiency. Production operators remove defective materials or products from assembly lines to ensure quality control measures.

2. Print technician

Primary duties: A print technician manages printing equipment, programming and set up. These technicians review product specifications to calibrate printers

with the correct color control or page arrangement settings. Print technicians collect printed pages for cutting, compressing, assembling and binding.

3. Screen printer

Primary duties: A screen printer works with their clients to develop print designs, patterns and stencils. These professionals operate printers, mix and load ink, along with preparing materials for printing. Screen printers perform maintenance on their machines to reduce potential errors, such as inkblots, smudges or misprints.

4. Printer

Primary duties: A printer manages the development of print product designs and implementation. These professionals may design books, labels or newspapers, along with deciding on printing methods to accomplish those designs. Printers supervise print orders to ensure they remain consistent with client demands.

5. Production worker

Primary duties: A production worker packages completed products in the manufacturing process. These workers review products and process them on conveyor belts for final packaging. Production workers operate packing machinery, along with cleaning and maintaining them for a safe work environment.

6. Press operator

Primary duties: A press operator operates presses to produce an image or text on materials. These operators develop printing plates with their client's desired designs, along with setting up machinery to ensure that prints are successful and free of errors. Press operators clean and maintain their equipment to ensure printing accuracy.

7. Wood finisher

Primary duties: A wood finisher handles chemical treatment products to achieve certain effects or looks on wood products. These finishers sand, shape and treat wood with solutions to alter their texture, color and durability. Wood finishers might spray, brush or rub finishing products to restore or seal them.

8. Print manager

Primary duties: A print manager oversees printing production processes and product quality. These managers train and supervise printing personnel to maintain operational standards. Print managers review completed print products to identify errors and areas for improvement with workflow or equipment management.

9. Bindery operator

Primary duties: A bindery operator is a publishing professional who operates paper binding machinery. These operators inspect and prepare binding materials to ensure accuracy. Bindery operators remove unwanted products or byproducts from machine operating areas to maintain a clean and safe work environment.

10. Framer

Primary duties: A framer is a construction professional who builds or repairs wooden frames for buildings. These professionals may specialize in framing for residential, commercial or industrial buildings or for floors, roofs or walls. Framers read blueprints and communicate with contractors to determine wood materials and construction methods.

11. Sales associate

Primary duties: A sales associate is a company or brand representative who provides customers with product recommendations or solutions. These associates engage customers and answer their questions to persuade them to purchase a product. Sales associates listen to customer demands to help them find the product that fits their needs.

12. Maintenance mechanic

Primary duties: A maintenance mechanic programs and repairs machinery. These mechanics test and troubleshoot equipment to identify problem areas and perform repairs. Maintenance mechanics perform preventative maintenance and parts replacements to ensure machine functionality and optimization.

13. Laboratory technician

Primary duties: A laboratory technician is a scientific professional who provides research and experimentation support. These technicians label, categorize and

document laboratory samples, along with operating equipment to test them. Laboratory technicians enter their test results in a

14. Quality specialist

Primary duties: A quality specialist tests and reviews products for defects or malfunctions. These specialists assess component qualities and functions to determine if they meet product specifications. Quality specialists identify inconsistencies and develop strategies to minimize production errors for higher-quality results.

15. General manager

Primary duties: A general manager handles the daily operations of a business, from staffing to marketing. These managers hire, train and supervise personnel to enforce business standards and safety regulations. General managers perform business evaluations to identify areas for improvement and implement goals and budgets.

16. Carpenter

Primary duties: A carpenter is a construction professional who installs and repairs wood structures. These professionals inspect frameworks and wood components to identify damages and develop methods to repair or improve them. Carpenters work with other construction professionals, such as installers, inspectors or roofers