

## Shop Safety and Health – Updated 2014

There is potential for accidents, injuries and health hazards in the theatrical scene shop. It is important to be aware of them so that you are able to protect yourself and while being productive. There many safety tips scattered throughout the text for this class, so reminders about safety will come up in context as we progress through this class. This handout focuses on general safety in the shop, safety equipment and reasons why you should protect yourself. The intent of this handout is to inform you, not scare you. An informed scenic carpenter is, I hope, a safe scenic carpenter.

**General Shop Safety-** Your first time in this or any other shop, it is a good idea to look around it and familiarize yourself with the location of exits, fire extinguishers, first aid kits, telephones and water sources so that you know where these are if you or someone you're working with needs them. Whenever working in a shop, these areas need to be kept clear of scenery, materials, ladders or trash so they are always accessible in an emergency.

**Fire Extinguishers-** In the Valencia College Scene shop and PAC stage there are several fire extinguishers posted throughout. These are ABC fire extinguishers, which are made to put out all three of the most common types of fires likely to occur in the scene shop. These types of fires are:

<b>Class A</b>	Fires in ordinary combustibles, such as wood, cloth, paper and trash.
<b>Class B</b>	Fires in flammable liquids such as gasoline, oil, paints and grease.
<b>Class C</b>	Fires involving electrical equipment. If the electricity is turned off, the fire is reclassified as an A or a B.

Fire extinguishers are marked to indicate the type of fire on which it may be used. Be aware of what type of fire extinguisher is available before an emergency arises, so that valuable time isn't lost while checking. Check to make sure the fire extinguisher is fully charged before using. Pull the pin, squeeze the handle and aim at the base of the flames. Move the extinguisher in a sweeping motion from side to side.

Since many paints, solvents and adhesives used in scene shops are flammable they need to be stored in a flameproof cabinet to minimize the possibility of ignition.

**Emergency exits-**Be sure there is a clear exit from the shop or stage whenever work is occurring in those areas. Stop work and clear the exits if you see that they are blocked.

**General Safety Rules for power tools-** Specific rules are posted on or near each saw on the shop floor. These rules were published on page 243 (Safety Tip: The Scene Shop) in the Theatrical Design & Production, 7<sup>th</sup> edition by J. Michael Gillette.

1. **Do not force tools.** Let tools work at their own speed, never rush a task.
2. **Disconnect tools.** Unplug electric tools and remove the air hose from pneumatic tools when changing blades or other accessories.
3. **Protect cords and hoses.** Keep electric cables and air hoses away from the moving parts of the tool. Never carry a tool by the cord or disconnect it from a receptacle by a yank on the cord.
4. **Watch your hands.** Use a push stick when finishing a cut across a table saw, and avoid cutting small pieces of material that bring your hand too near a saw blade.
5. **Secure your work.** Whenever applicable, use a vice or clamps to hold work. Then both hands are free to operate the tool.
6. **Use tool guards and accessories.** Keep guards in place and use rip fences.
7. **Avoid distractions.** Do not be distracted or distract anyone else when operating a power tool.
8. **Alcohol, drugs or medication.** Do not operate power tools when under the influence of alcohol, medication, drugs, including over the counter drugs.
9. **Do not leave a tool running unattended.** Turn the power off and stay with the tool until it comes to a complete stop.
10. **Do not overreach.** Avoid overreaching. Maintain proper footing and balance when using power tools.
11. **Know the tools.** Know how to use them and adjust them.
12. **Do not operate a damaged tool.** Inform the Technical Director if a tool appears damaged, operates improperly or has a dull blade.

**Heights-** In the theater there are many times when you will work off the ground. Working on lighting, working on scenery and reweighting fly lines are examples of activities that usually take place while on a catwalk, ladder, scaffolding or personnel lift aka genie. Extra caution must be taken when working off the ground for your safety and the safety of anyone working below you.

**Ladders-** When working on a ladder, take note of the highest step that the ladder indicates may be stood upon. This is usually the third or fourth step from the top, depending on the height of the ladder. Never stand on the top of a ladder, because that is very unstable. Make sure that all four feet of the ladder are on the ground and stable, and that the braces are locked before climbing. Never climb a ladder with both hands full. Do not climb up the “wrong” side of a ladder, unless the ladder is made for that kind of use. For the safety of anyone moving a ladder, never leave tools on the top of a ladder, especially if they are not visible from the ground.

**Personnel Lifts (Genie)-** Personnel lifts and work platforms are often more convenient than ladders. Be sure to get training on the operation of each specific unit before using, as many have small differences in operation and these differences may impact safety. To use a personnel lift, start with the platform in its lowest position and move the lift to the desired location. Deploy the outriggers and engage the feet. The outriggers give the base of the lift a larger “footprint” or foundation, which makes it difficult to tip over when the platform is raised. The feet of the outriggers must be in contact with the ground to prevent the base from moving while the platform is raised. The operator then gets onto the platform and raises the lift to the desired height. The platform has a railing that comes up to about 42” from the platform, depending on the model of lift. The operator must stay completely within the railing while the lift is raised. After the operator’s task is completed, the lift must be lowered to the ground, the feet of the outriggers raised and the lift moved to its new position. NEVER attempt to move a personnel lift with a person in the basket and/or elevated off the ground. The “footprint” is large enough to prevent tipping of the lift when it is stationary; it is not large enough to prevent the tipping of a moving lift. Take note of the maximum weight allowed on any lift, make sure that the operator plus other items on the lift doesn’t exceed that limit. \*Genie is a common brand of personnel lift, one that is commonly used.

**Catwalk-** Make sure you empty your pockets and remove any tool or other loose item from your person that could potentially fall. If tools must be taken to the catwalk, secure them to your person with a lanyard, particularly over the stage where people are working. If it should happen that you drop something from a catwalk, shout “**HEADS!**” quickly to warn people working below. If you hear “HEADS!” while you are on the stage, cover your head with your arm and walk quickly away from the source of the shout.

If the catwalk has a railing, stay completely within the railing. If it does not, or if you need to exit the catwalk and still work in a high place, then you must wear a body harness with a lanyard that is secured to a stationary object that is strong enough to support your weight as a dynamic load (able to withstand a 5000 lb. Shock Load) to prevent falling.

When climbing any of the straight ladders to the Front of House lighting positions or to the loading gallery for the fly system, you **MUST** utilize the vertical fall arrest system. You will have to be trained by a Valencia Theater Department faculty or staff person before using the fall arrest system.

**Eye Protection-** Safety goggles are a must in any shop situation. Different types of goggles are appropriate for different work. The most rudimentary type is **impact glasses**. These simply shield your eyes from debris that may shoot off your work unexpectedly. Safety goggles must be worn whenever using saws, sanders, pneumatic fasteners and drills. They should fit close to your face, cover your entire eye socket and eyebrow area and wrap around the sides of your face or have side shields. Regular eyeglasses are not sufficient, because the *Occupational Safety and Health Administration* (OSHA), does not rate them for impact. Be sure to check and make sure that your impact glasses are marked with **Z-87**, which indicates that OSHA has rated them for impact. For indoor work the lenses of your glasses should be clear, not tinted. If working outdoors, tinting may be desirable.

**Splash goggles** are another type. These fully enclose your eyes from all sides-top, bottom, side and front. Scenic painters while mixing paint and handling solvents often use these. They are essential for people working with fiberglass chemicals, pour foams, urethanes, resins and other two-part chemicals. These goggles can be used for impact purposes as well, but keep in mind that impact glasses aren’t as effective as splash goggles when working with liquids.

**Full-Face shields** are another type of eye protection that protects the face as well. This are a good idea if there is a lot of flying debris or if a chemical process is particularly messy and puts your face in danger of coming in contact with the chemical.

**Eyewash Station-** There is an eyewash station by the sink area of the scene shop next to the lumber rack. If paint, solvent, sawdust or anything else gets in your eyes, they should be flushed with cool water immediately. Remove the red covers, turn on the water (NOT HOT) and press the button so the water comes out of the eyewash. Hold your eyelids open and allow the water to flush out your eyes. This is sufficient to remove most liquid or debris. Inform the instructor or Technical Director if you need more assistance.

**Hearing protection-** Hearing protection is often overlooked in scene shop situations. It may seem inconvenient in the short run to use earplugs whenever you use a saw, but the noise of power saws over time will cause damage to hearing if precautions are not taken. Having your earplugs on a lanyard is a common solution, or simply keeping your earplugs within reach when working in a shop situation, and get used to using them.

**Health hazards-** There are three primary routes for toxins to enter the body: Though inhalation, skin contact and ingestion. These toxins may cause **acute and/or chronic illnesses** if precautions to minimize exposure are not taken.

**Acute illness-** An acute illness is a reaction to a substance that happens within a short time of exposure. The cause of the illness is often easily identifiable and can commonly be dealt with by removing the substance causing the reaction. More serious reactions may need prompt medical attention. Acute illnesses can take the form of dizziness, nausea, vomiting, mental disorientation, rash and irritation to eyes or mucous membranes.

**Chronic illness-** Chronic illnesses are illnesses that occur months or years after exposure to a toxin. There is a wide range of chronic illnesses, from cancer to emphysema to sensitivity to substances (allergies). Because chronic illnesses happen so long after exposure, it is usually difficult to pinpoint the cause. There may actually be no ill effects to immediate exposure, which may lead the worker to believe that they don't need to protect themselves from the substance. Chronic illnesses are caused by prolonged and repeated exposure to the substance over time. \*Prevention is key! Prevention of acute and chronic illnesses caused by toxins in the shop is achieved by protecting **the three primary routes of entry of toxins to the body: inhalation, skin contact and ingestion.**

**Ventilation-** Keeping the amount of dust and fumes in the air in the shop to a minimum is a good start to preventing **the inhalation of toxins** in scene shop. Ideally, power saws and sanders have a dust collection system to vacuum away debris as it is being created, coupled with a filtered air handling system. Unfortunately, spaces that become scene shops rarely were planned to be scene shops, and that is often reflected in the lack of proper ventilation in many shops. A dust collection system is expensive and beyond the financial reach of many shops. A worker should be aware of this and be prepared to make accommodations by opening doors and windows to fresh air and positioning fans to direct dusty air out of the work area.

Whenever you are using the large power tools here in the VCC scene shop, be sure to turn on the dust collector attached to it. Check to make sure the correct branch is open and that the blast gate to your particular tool is open. If you are not getting good suction, check to make sure that blast gates to tools that are not being used are closed. There is a dust collection table available for sanding small objects.

Some painting and sculpting operations produce toxic fumes that shouldn't be allowed to spread throughout a scene shop or stage. Some scene shops have spray booths that isolate the fumes and direct them out of the work area while bringing in fresh air. Ventilation hoods fulfill this purpose as well. The work is performed under the ventilation hood, which sucks the fumes out of the shop. If it is necessary to use a spray booth or a ventilation hood, then it is necessary to wear a respirator, too. If neither, a spray booth or a ventilation hood is available, then the work should be done outdoors while wearing a respirator. This is the least satisfactory of the solutions.

**Respirators & Dust Masks** –A **dust mask** is usually a paper mask that fits over the mouth and nose. It should fit so that air must go through the mask before it goes into the lungs. These simple masks are for use when filtering particles out of the air, like sawdust or sanding dust. Dust masks are usually disposable, for use for a single day or work session before replacing.

A **respirator** is a rubber or soft plastic mask that fits snugly over the mouth and nose and has cartridges that the air must pass through before going to the lungs. Respirators filter out fumes as well as dust. There are different cartridges for respirators made to filter out different kinds of fumes, so check the filter before putting on the respirator. Respirator cartridges last for about six weeks, depending on use, care of respirator and type. Putting the date the cartridges were installed is a good practice to ensure the cartridges are not too old. A respirator must fit properly in order to be effective. Put the mask on and tighten up the head and neck straps.

Place your hands over the cartridges and try to suck air in. If any air comes in around the edges where the mask touches your face, adjust the straps and try the test again. Repeat until no air is able to come in around the mask. Next, block the exhalation valve with your hand and exhale. If any air escapes around the edges of the mask, adjust and repeat until no air escapes. This ensures that all air going to your lungs has been filtered. If you smell any chemicals while wearing a respirator, you need to either adjust the fit of the mask or change the filter cartridges. A respirator with replaceable filter cartridges can last a year or more if cleaned after each use and stored in a sealed plastic bag.

**Gloves-** There is different types of gloves for different protective uses. A basic **work glove** with leather palms is a good choice to prevent getting splinters or blisters from ropes or lumber. To reduce slipping in your grip, a glove with rubber or plastic palms are a good choice. For welding or handling very hot items, heavy leather **welding gloves** are needed.

The skin is not a barrier to most solvents, such as denatured alcohol, acetone, lacquer thinner and mineral spirits. Chemicals may be **absorbed** through the skin, enter the blood stream and damage your internal organs. To prevent the absorption of solvents through the skin on the hands, various moisture proof gloves are available. The most basic and cheapest are disposable **latex gloves**. Some people are allergic to latex and need to use other kinds of gloves, such as **neoprene**. These gloves are suitable for work with water-based paints, but when using oil based paints, mineral spirits, acetone, lacquer thinner and other solvent, **chemical resistant gloves** must be worn.

**Ingestion-** To prevent **ingestion** of any toxins in the shop, it is good practice to wash hands after working and before eating, drinking or smoking. Eating in the work area is not only unhygienic, it also increases the risk of dust or other contaminants getting on food. If having beverages in the work area is unavoidable, then be sure to cover the drink container to prevent contaminants from falling into them. Smoking with dirty hands puts contaminants on the outside of the cigarette, which are then burned and inhaled.

At the end of a work session, be sure to leave dust and contaminants in the workplace by brushing yourself off, removing hats and shoes, brushing dust out of your hair and changing clothes as soon as possible. Cleaning off dust and dirt minimizes exposure to contaminants found in a scene shop.

**Material Data Safety Sheet-** The MSDS should accompany all chemicals in the scene shop. This includes glue, paint, chalk, joint compound, epoxy-really any substance used in a scene shop. These are kept in a binder and may be viewed by workers at any time. This is true in professional shops as well. The purpose of MSDS is to inform anyone using the products of hazards associated with the product and how to prevent exposure to them. It also contains information about how to clean up spills and proper disposal of the substance. Many companies now have MSDS protocols for their products available on their websites.

**Disposal of Solvents, adhesives and paints-** Since pouring solvents, adhesives and paints down the drain is illegal, alternative disposal is necessary. Once dried out, most of these items may be disposed of as a solid, so allowing unwanted paint, joint compound or glue to dry out completely and then putting in regular garbage is acceptable. If the paint is all water-based, an even better solution is to mix all left over paint together and use it for primer for future projects.

Solvents and oil-based paints **CAN NOT** go down the drain either. If there is some left over oil based paint or stain, save it for the next project if possible. If not, allow it to dry completely to a solid. Solvents used to wash brushes and other paint equipment must be placed in a container, marked "used" and stored in a flameproof cabinet. Different employers have different practices for chemical disposal of this kind, be sure to know the proper method for that employer. Take care with oil-based stain or solvent soaked rags. If left in a heap, they may chemically react and burst into flame. Instead, lay them out flat and let them dry out completely. When dry, soak them in water, let them dry again and then put them in regular garbage. Only water-based paints can go down the drain, when in doubt, let it dry to complete solid and follow the above directions.

**Conclusion:** I hope this handout helps you be aware of many potential hazards and methods of protection in the work place. If you are informed of the risks up front, you can take steps to protect yourself and enjoy your work in the shop safely.