

Architecture Shop Safety Guide

*Important information for Students, Faculty, and Staff
in the Tulane School of Architecture*



Tulane University
Office of Environmental Health and Safety

Tulane University Architecture Shop Safety Guide

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INTRODUCTION

This safety guide provides basic information on the primary hazards associated with different mediums along with the safe use of tools and equipment typically handled in the School of Architecture.

This information is meant to make you a wiser and healthier architect—all that you have to do is 1) read this information, 2) know what you're dealing with before you start working in an area where hazardous materials or processes are used and 3) follow the recommended precautions. Improper use of equipment, poor work practices, inappropriate handling, storage, and disposal of hazardous materials can have dire consequences on your health and safety and can also lead to regulatory fines.

Remember: If you have any questions or concerns about safety, talk to your professor or graduate assistant---they are there to help you.

RESPONSIBILITIES

The Tulane University Office of Environmental Health and Safety (OEHS) serves the University community by providing technical support, information and training, consultation and periodic audits of environmental health and safety practices and regulatory compliance.

The Departmental Safety Representative (DSR) for the School of Architecture (“School” or “Architecture School”) serves as a liaison between the OEHS and the School. The DSR is a point of contact for School faculty, staff, and students for any environmental health and safety issues. Contact the Dean of the School of Architecture for information on the DSR.

The Architecture School’s Shop manager and student workers are responsible for ensuring that students receive and understand appropriate safety training on potential hazards and that students observe and implement the safe work practices and hazard control measures outlined in this Architecture Shop Safety Guide. Faculty members are responsible for communicating with their DSR on environmental health and safety issues and concerns.

Users (both student and faculty) are responsible for obtaining safety training and observing the general and shop-specific safety precautions outlined in this Architecture Shop Safety Guide. Students are responsible for reporting any injuries, hazardous materials spills, unsafe conditions or work practices to their course instructor.

Willful disregard for safety by students may result in expulsion from the shop and other disciplinary action. Overall environmental health and safety compliance by the Tulane School of Architecture will be handled through the Environmental Health and Safety Compliance Management System.

EMERGENCY RESPONSE PROCEDURES [\(P & P Section 1\)](#)

For any emergency, including fire, explosions, accidents and medical emergencies, contact Tulane Public Safety at 865-5200 or pick up an emergency phone located the first floor of Richardson Memorial. Tulane Public Safety will determine whether additional assistance is needed and will alert others as necessary.

FIRE

If you discover a fire, know and follow the acronym E.S.C.A.P.E.:

E valuate	the situation
S ecure	the area by notifying and removing all occupants from the immediate danger area
C lose	door(s) to the room or area where the fire is located, after all occupants are out of the room
A ctivate	the building fire alarm system
P hone	Tulane Public Safety (865-5200) and state the exact location of the fire
E xtinguish	the fire with a portable fire extinguisher, if possible and you are trained in how to do so

A fire contained in a small vessel (like a waste basket) can usually be suffocated by covering the vessel with a lid of some sort. If you have been trained in the proper use of a fire extinguisher, you may put out small, incipient stage fires (no bigger than a waste paper basket). Be sure to fight the fire from a position where you can escape and only if you are confident you will be successful.

If your clothing catches fire, drop to the floor and roll to smother the fire.

If you hear the fire alarm:

- Begin evacuation of the building using the nearest stairwell or ground floor exit door. Go to the designated assembly area (Academic Quad, also known as Gibson Quad) and stay with other building occupants. When Tulane Public Safety representatives arrive, notify them of the exact location and details of the fire.
- Do not re-enter the building until an "All Clear" is issued by Tulane Public Safety or Fire Department officials.

HAZARDOUS MATERIAL SPILL

Spills of hazardous materials (acids, solvents, etc.) should be confined in a safe manner, if possible. Spill containment techniques include diking or enclosing the spill, covering the spill with absorbent material, ventilating the area, closing the door to the spill area, etc. It may be necessary to unplug electrical equipment or turn off sources of ignition in the event of a solvent or flammable liquid spill.

In case of a hazardous material spill:

- Alert others in the immediate area and evacuate the area if necessary.
- If the spill can not be handled safely by Architecture School personnel, notify Tulane Public Safety. Tulane Public Safety will then contact OEHS staff for assistance with spill cleanup.

- Report the following details if known:
 - location of the spill,
 - chemical or product name,
 - approximate quantity spilled, and
 - other pertinent information

CHEMICAL EXPOSURE

The following procedures should be followed in the event of chemical exposure. ***In all cases, the incident should be reported to faculty, regardless of severity.*** Also refer to Injury/Illness procedures in the next section.

Chemicals on Skin

1. Immediately flush the affected area with water for no less than 15 minutes. Remove any contaminated jewelry or clothing to facilitate removal of residual material.
2. If medical attention is needed, call Tulane Public Safety and explain what chemicals were involved.
3. Review MSDS for any delayed effects.

Chemicals in Eyes

1. Flush eyes with water for at least 15 minutes. Hold eyelids open and rotate eyeballs so all surface areas can be rinsed. Use of an eyewash station is desirable so hands are free to hold the eyes open.
2. If applicable, remove contact lenses while rinsing. Do not attempt to reinsert them after rinsing.
3. Seek medical attention regardless of severity. Call Tulane Public Safety and explain what chemicals were involved.
4. Review MSDS for any delayed effects.

Chemical Inhalation

1. Provide fresh air (open windows, close chemical containers, provide fans).
2. If symptoms (headaches, nose or throat irritation, etc.) persist and medical attention is needed, call Tulane Public Safety and explain what chemicals were involved.
3. Review MSDS for health effects.

INJURY/ILLNESS (P & P Section 4)

If someone is injured while visiting, working or attending classes at the Architecture School, it is important that the incident be reported as described below.

In all cases, if the injury is serious, call Tulane Public Safety (865-5200) immediately!

Employees

Employees who suffer any work-related injury/illness must report the incident immediately to their supervisor and complete a [First Report of Occupational Injury/Illness](#) form. Supervisors are responsible for signing the form and assisting with the incident investigation.

If the injury is not serious or life-threatening but still requires medical attention, the employee should proceed to the nearest hospital or clinic, or to their personal physician for evaluation and treatment. A copy of the *First Report of Occupational Injury/Illness* form should be taken to the healthcare care provider. Registration personnel should be informed that the visit is work-related and payment is covered by Workers' Compensation. Personal health insurance should NOT be used for treatment of work-related injuries.

NOTE: A copy of the *First Report of Occupational Injury/Illness* must be submitted to the OEHS within 24-48 hours of the incident. (Fax to 988-2196) The original must also be sent to OEHS. The claim can not be processed unless the form is filled out completely and is on file in the OEHS Worker's Compensation Office. Delays in reporting could jeopardize Worker's Compensation benefits.

Visitors

Immediately notify Tulane Public Safety of any injury or illness involving visitors.

Students

In case of medical emergency, on-campus students should call Tulane Public Safety. Students who suffer an injury or become ill during classroom activities should notify the Shop manager immediately and report to the Student Health Center (SHC) for evaluation and treatment. If the injury or illness is related to on-campus activities or an unsafe condition in a University building that may require follow-up by OEHS, SHC personnel will have the student complete a [Student Report of On-Campus Environmental Injury or Disease](#) form which can be found on the OEHS website.

If the injury occurs during classroom activities, the Shop manager should complete a *Student Report of On-Campus Environmental Injury or Disease* form and forward a copy to OEHS regardless of whether or not the student reports to the SHC. Even minor injuries should be reported since these may indicate trends and/or the need for corrective actions.

GENERAL INFORMATION

POTENTIAL HAZARDS

Some materials and processes in architecture use or generate hazardous chemicals, harmful physical agents (infrared light, high temperature, high noise, etc.) or involve mechanical equipment that can cause serious injury. General information about potential hazards is provided below. Other important health and safety information is provided in the studio safety section of this guide. Be sure to review both the general information as well as applicable studio safety information.

Chemical Hazards ([P & P Sections 12 & 29](#))

How can art materials affect your health?

Your exposure to hazardous chemicals can occur by various routes of entry including inhalation, skin contact (dermal absorption), or accidental ingestion. (Injection is another potential route of exposure but it is most significant among healthcare workers.) Materials that become airborne either by evaporation (like solvents) or when disturbed (wood dust) are potential respiratory (inhalation) hazards. Welding operations can produce both metal fumes and toxic gases. Some compounds (like toluene) can also be absorbed through the skin so chemical protective clothing may be needed. Accidental ingestion of chemicals can occur when food, beverages or cosmetics are handled in contaminated areas or with dirty hands. This is why consumption of food, beverages, etc. is not allowed in areas where hazardous materials are present and why hand washing is so important.

Exposure to hazardous materials may cause immediate adverse health effects, delayed health effects, or possibly no observed effects. This will depend on the particular material, the duration and frequency of exposure, whether or not appropriate personal protective equipment was used, good hygiene practices and individual susceptibility.

You want to use the safest materials available. So how can you find out about the chemical hazards of materials you'll be using?

The two best sources of information on chemical hazards are the product's label and its [Material Safety Data Sheet \(MSDS\)](#). Manufacturer's labels include the name of the material, hazard warnings and information about special handling procedures, personal protective equipment and first aid instructions. If chemicals are transferred from the original manufacturer's container into a secondary container, the secondary container must be labeled with the material's identity and the appropriate hazard warning--words like Danger-Inhalation Hazard. Never transfer chemicals into old food and beverage containers unless the food label is removed or completely obscured. Similarly, containers that have been used for chemicals should not be reused for food storage.

MSDSs provide more detailed information on a specific product. For example, various solvents are commonly used in studio art classes. In selecting which product to use, consideration must be given to its toxicity, volatility, flashpoint, and waste disposal options. This information can be obtained from the MSDS. Toxicity can be determined by looking at the exposure limit; the lower the exposure limit, the more toxic the substance.

A product's potential to cause a fire or present an inhalation hazard is related to flashpoint (or ability to form an ignitable mixture) and its volatility or tendency to evaporate. The lower the flashpoint, particularly when it is at or below room temperature, the more hazardous the material. Volatility is measured by vapor pressure; the higher the vapor pressure, the more volatile the material. Acetone is extremely volatile and will evaporate almost immediately whereas mineral spirits are much less volatile.

OSHA regulations require Tulane to maintain an inventory of hazardous materials and MSDSs on each product. MSDSs on materials used at the School of Architecture are maintained in the shop. If you can't locate an MSDS, contact your instructor or OEHS for assistance.

Physical Hazards

Exposure to physical hazards of acoustic, electromagnetic, and thermal nature can cause adverse health affects. Physical hazards in the Architecture School may include high noise (woodworking and metal working operations), and optical radiation (infrared/ultraviolet light in welding and torch cutting).

Mechanical Equipment

Use of powered equipment (table saw, band saws, grinders, belt sanders, etc.) can present a variety of hazards: wiring/electrical hazards, moving parts (gears, pulleys, belts), high noise. Do not use equipment if you are not authorized to do so, haven't been trained, or are uncertain about what to do. Ask for help. Follow posted instructions for equipment use. Never operate mechanical equipment or power tools while under the influence of drugs, alcohol, medication or other conditions which may affect your mental alertness.

Fire/Shock (P & P Section 31)

Fires and electrical shock may be caused by overloaded circuits, extension cords, or damaged wiring. Report any obvious electrical problems (smoke, sparks, tripped circuits, damaged power cord, etc.) to your instructor. Do not use damaged equipment -- tag it with a warning label and remove damaged equipment from service. Do not use electrical equipment in wet or damp locations. Make sure electrical outlets in wet areas are equipped with ground fault circuit interrupters (GFCIs).

Hand Tools (non-powered)

Examples of non-powered hand tools that artists/architects may use include utility knives, chisels, snips, punches, hammers, etc. Hand tool injuries are often related to improper use or maintenance of the tool. Some ways to avoid hand tool injuries include:

- Inspect tools before use to make sure they are in good condition. Worn or defective tools should be repaired or discarded. Report any defective equipment to your instructor.
- Use the right tool for the job; don't use a wrench as a hammer. Also, use the correct size tool for the job.
- When using a knife, cut away from the body and keep hands and body clear of the knife stroke.
- Store tools safely. Sharp edges or blades should be protected or enclosed to prevent accidental contact.
- Keep tool cutting edges sharp so the tool will move smoothly without binding.
- Maintain a good grip and stand in a balanced position to avoid sudden slips. Avoid awkward postures - bending, twisting, reaching, etc.
- Consider using ergonomically designed tools (especially those that will be used frequently) that fit the hand well. The OEHS can provide assistance with selection of ergonomic hand tools.

Ergonomic Hazards (P & P Section 11)

Back injuries may occur from lifting heavy or awkward objects. If an object weighs more than 40-50 pounds, get someone to help you lift it. Use proper lifting techniques: keep your back straight, hold the load close to the body, flex your knees and lift with your legs. Never lift and twist at the same time.

The work of some architecture students may involve repetitive motion. Persons who spend a lot of time using computers are also at risk of repetitive motion disorders. Repetitive motion, particularly of the hands, wrists, and arms, can lead to painful inflammation of the muscles, tendons and nerves over time and cause the eventual deterioration of those tissues. Awkward positions and postures can also lead to musculoskeletal injuries. To prevent these injuries, select appropriate tools and try to use more neutral postures (for example, a straight wrist instead of a flexed wrist) while performing tasks. Further information on ergonomics can be obtained from the OEHS as well as the Internet.

Compressed Gas Cylinders [\(P & P Section 30\)](#)

Compressed gas cylinders must be properly secured in an upright position *at all times* by means of an appropriate stand, chain, or strap. (This includes empty cylinders.) The protective valve cap should remain in place until the regulator is attached. Some other safety precautions for gas cylinders are listed below:

- When moving cylinders, keep them in an upright position and use a cylinder cart or hand truck. Cylinders must be properly secured with a chain or strap, and have the protective valve cap in place while being moved. Do not roll or drag cylinders. Avoid dropping cylinders or allowing them to strike one another.
- Do not use oxygen fittings, valves, or regulators for other types of gases. Always use the proper valve connections.
- Cylinders containing flammable gases such as acetylene must be stored separately from oxidizers (oxygen) by either a 20 foot distance or by a non-combustible 5 foot high barrier. The only exception to this is an oxy-acetylene welding cart.

HAZARD CONTROL MEASURES

Typically, in dealing with known health and safety hazards, a variety of control measures are used to reduce, or better yet, eliminate the hazard. Control measures include engineering controls, work practice controls, and finally, use of personal protective equipment. Usually, more than one control method is used.

Engineering controls include: changes in the process, substitution, isolation, ventilation. Process changes might include changing from a paint spraying operation to paint brushing to minimize aerosol production. Substitution means using a less hazardous material or process instead of a more hazardous one (e.g., use of water-based paints instead of solvent-based paints or use of lead-free glazes and enamels.) Isolation means separating the hazardous operation from exposed personnel—either by distance or by placing barriers.

Ventilation controls include use of either general exhaust (dilution) or a local exhaust system. Dilution ventilation involves bringing in clean air to dilute the contaminated air and exhausting the diluted air to the outside via exhaust fans. Note: An open door/window or recirculating fan does not provide adequate ventilation for toxic gases and vapors. Local exhaust ventilation involves collection and removal of contaminants near their source so it is much more efficient and effective for some operations. Examples of local exhaust systems found in School of Architecture can be found in the Digital Output Lab (laser cutter exhaust fan) and in the Architecture Shop.

Work practice or administrative controls include training, good housekeeping and good work practices. For example: compressed air should not be used for cleaning since it causes settled dust to become airborne. Other work practice controls include proper storage of chemicals, keeping solvent containers closed when not in use, labeling of chemical containers, etc.

Personal protective equipment (PPE) includes use of respirators, hearing protection, eye protection (glasses or goggles), hand protection (gloves), face protection (face shield), foot protection. See [PPE and Clothing](#) section of this Architecture Shop Safety Guide for additional information.

NOTE: Suitable eye protection is required whenever there is a risk of chemical splash, flying particles or optical radiation (infrared and UV light).

FIRE SAFETY ([P & P Section 26](#))

See [Emergency Response Procedures](#) section of this Architecture Shop Safety Guide for additional information.

Preplan your response to a fire emergency. Review the Emergency Action Plan (EAP) for the Richardson Memorial building. (The EAP will be reviewed with instructors and staff at the start of each semester.) Know where the nearest fire alarm pull station, fire extinguisher, exit stairwells, and outside assembly area (Academic Quad) are located. Remember, elevators can not be used in a fire emergency.

Be familiar with the alarm system in your building. When you hear the alarm, evacuate the building immediately and do not return to the building until Tulane Police or Fire Department officials have issued the “all clear.”

In addition to knowing what to do in event of a fire, it is important to take the following precautions keep the building safe and to avoid causing a fire:

- Don't block access to emergency equipment such as fire extinguishers, fire alarm pull stations.
- Keep exit routes, aisles, stairwells and exit doors clear of obstructions.
- Don't store materials within 18 inches of an overhead sprinkler.
- Keep containers of flammable/combustible liquids capped when not in use.
- Use flammable/combustible materials in a well-ventilated area (preferably a chemical fume hood) and keep them away from sources of heat and ignition. *Note: Always remove butane lighters from pockets before working around hot processes such as welding and torch cutting.*
- Store flammable/combustible liquids properly. If the total quantity of flammable liquids in a single storage area exceeds 10 gallons, approved safety cans or a FM/UL approved flammable liquid storage cabinet may be necessary.

PERSONAL PROTECTIVE EQUIPMENT (PPE) & CLOTHING **(P & P Section 14)**

PPE includes eye and face protection (safety glasses, goggles, shaded lenses, face shields), head protection (hardhats), foot protection (steel-toed shoes), hand protection (gloves), hearing protection (ear plugs, ear muffs), and respiratory protection. Technically, PPE does not include clothing such as long pants, long-sleeved shirts, or closed-toe shoes but such apparel *can* provide an additional level of protection. Some clothing can actually be hazardous. For example, synthetic fabrics should not be worn around hot processes (i.e., welding, torch cutting) because they can catch fire, melt and cause serious burn injuries. Loose clothing (sleeves, neckties, scarves, etc.) and jewelry (rings, watches, etc.) can become caught in machinery; these items should be removed before starting work with power tools.

All users are encouraged to review the PPE selection and usage issues described below as well as shop and equipment specific PPE and clothing recommendations. Material Safety Data Sheets (MSDS's) also provide information on recommended PPE.

PPE is usually the last line of defense after other hazard control methods have been implemented. There are several drawbacks with use of PPE: Wearing PPE can be awkward or uncomfortable (especially in hot weather) and can sometimes get in the way. People often get a false sense of security when they use PPE and rely too heavily on it. Also, PPE protects only the person wearing it but the hazard still exists and may harm unprotected personnel. Problems such as incorrect fit, use of the wrong PPE for the job, use of damaged or poorly maintained PPE, can result in less than adequate protection. In order for PPE to be effective, the user must:

- Know when PPE is necessary,
- Know what kind of PPE is necessary,
- Know how to use PPE properly,
- Understand the limitations of the PPE (what it can and can not do),
- Know how to wear and adjust PPE
- Know how to properly maintain PPE

Selection of PPE first requires a hazard assessment to identify conditions or processes that can produce the following hazards:

- Falling objects
- Objects that could puncture the skin
- Objects that could roll over feet
- Toxic chemicals
- Heat
- Harmful dust
- Optical radiation (visible, ultraviolet, infrared light)
- High noise

More details on PPE and the hazard assessment process are provided in the EHS P & P Manual.

Hand Protection

Gloves are used to protect against cuts, punctures, burns, chemical absorption, or temperature extremes. It is important that the correct type of glove is used since the wrong glove may not provide the necessary protection. This is a particular problem with chemical absorption where the wrong glove may allow certain chemicals to reach your skin and you may not realize it. Glove selection begins with knowledge of the chemical composition of your art materials and that is determined from the MSDS. Glove manufacturers provide chemical resistance ratings for various types of gloves and chemicals. The OEHS can provide information or assistance with the selection of appropriate gloves.

Hearing Protection

As a general rule of thumb, if noise levels require you to raise your voice to speak with someone at a distance of about 3 feet, the noise level may be considered hazardous and use of hearing protection is recommended. Some activities in the shop can produce high noise levels. Users with frequent or prolonged exposures to high noise levels are strongly urged to use hearing protection in the form of ear plugs or ear muffs to prevent noise-induced hearing loss.

Respiratory Protection ([P & P Section 15](#))

Air contaminants (particles, vapors, fumes, etc.) can usually be effectively controlled with ventilation and good work practices such as minimizing the use of solvents and keeping solvent containers closed. In some instances, students may elect to use respirators as an extra measure of protection. (See [Shop Safety Hazards and Precautions](#) for details.)

One fundamental and important issue regarding respirators is the need for a good seal between the respirator and the user's face. A good facial seal cannot be obtained when the respirator comes into contact with facial hair. Persons with frequent exposures to airborne contaminants (such as dust produced by woodworking equipment) are strongly urged to shave their beards before wearing a respirator.

Respirators can be reused as long as they perform adequately and do not become contaminated. Keep your respirator in a sealed plastic bag when not in use and replace it as necessary.

Respirator selection, handling, and usage issues are surprisingly complex. If you have concerns about exposure to chemicals or toxic dusts, contact the OEHS for more specific information.

Eye and Face Protection

It is important to realize that face protection and eye protection are not the same thing. Use of a face shield alone does not provide adequate eye protection; eye protection is always required whenever a face shield is used.

Eyes must be protected against a variety of hazards. Specific information on eye protection is summarized in the following table:

ACTIVITY	POTENTIAL HAZARD	MINIMUM EYE PROTECTION
Sanding, grinding, chipping, woodworking	Impact, flying particles ¹	<ul style="list-style-type: none"> • Safety glasses with side shields or • Goggles (direct vent)
Chemical handling, pouring	Chemical splash ²	<ul style="list-style-type: none"> • Goggles (indirect vent) • If severe exposure, also wear faceshield
Welding (electric arc)	Optical radiation ³ , sparks	Welding helmet or welding shield (filter shade 10-14)
Welding (gas)	Optical radiation ³ , sparks	Welding goggles or hand shield (filter shade 4-5)
Torch cutting, brazing, soldering	Optical radiation ³ , sparks	Welding goggles or hand shield: <ul style="list-style-type: none"> • Cutting (filter shade 3-6) • Brazing (filter shade 3-4) • Soldering (filter shade 1.5-3)

¹Protection against impact or flying particles

Protection against impact or flying particles is available with three types of eyewear: safety glasses with impact-resistant lenses and side shields, flexible or cushioned goggles, and chipping or eyecup goggles. A combination of goggles and face shield is recommended for some processes where face protection is also necessary. Always look for the American National Standards Institute (ANSI) Z87 logo on eye and face protective equipment. *NOTE: Regular eyeglasses do not provide impact protection.*

²Protection against chemical splash

Selection of suitable protection against chemical splash depends on the particular chemical and the quantity involved. Typically, use of either goggles and a face shield or goggles with baffled ventilation will provide adequate eye protection.

If chemical splash to the eyes/face does occur, proceed to the nearest eyewash station and flush the eyes with water for 15-20 minutes. Follow other injury response and notification procedures described in the Emergency Response section of this guide.

³Protection against optical radiation

The type of protection needed against optical radiation depends on the type of radiation exposure. Carbon arcs and electrical welding require protection against ultraviolet (UV), visible and infrared radiation. UV radiation can cause conjunctivitis (“arc eye”), sunburn and skin cancer. A face shield is necessary as well as goggles. A general rule of thumb is to use the darkest shade possible that is compatible with visibility.

In welding or torch cutting operations, the concern is mostly with protection against visible and infrared radiation. Chronic exposure to infrared radiation can lead to development of cataracts. Shaded goggles are recommended where infrared radiation hazards are present.

Contact lenses

Recent evidence has shown that contact lens wearers are not at an excess risk of eye damage in the presence of potentially harmful chemicals, dusts, etc. as long as the proper eye protection is worn over them.

Equipment Maintenance

Protective eyewear and face shields should be inspected regularly for scratching, pitting, etc. and replaced if necessary. If the equipment is used by more than one person, it should be cleaned and disinfected after use. Equipment should be stored away from heat, light, and further contamination.

WORKING ALONE/UNSUPERVISED

Students are not allowed to work alone in the shop. Students may only work in the shop with the supervision of the Shop Manager or a shop worker.

Work involving hazardous equipment and processes really should not be done alone-especially after hours. Use of a buddy system is strongly recommended. Due to numerous security and safety hazards, the Architecture Shop is locked after hours. Keys may only be checked out to shop workers, during normal shop hours. Also, some equipment is locked out to prevent unauthorized usage.

Building security is in place to protect you. The Richardson Memorial building is accessible only to architecture students, faculty and staff by card swipe after normal work hours. ***Don't jeopardize the building security or your personal safety by propping windows and doors open.*** Tulane Public Safety (865-5200) should be notified of your presence in the building after hours. Anyone found not in compliance with safety and security practices will be subject to disciplinary action.

WASTE MANAGEMENT AND DISPOSAL

Several types of waste are generated in visual arts processes: solvents, oil-based paints, etc. Many of these wastes are considered hazardous waste by the U.S. Environmental Protection Agency (EPA) and require special handling. Hazardous wastes should be collected and disposed of via commercial disposal companies; they may not be poured down the drain or placed with regular trash. Hazardous waste disposal is arranged through the OEHS.

In order to minimize hazardous waste issues, consider the following:

- Don't purchase more of a material than you expect to use in the foreseeable future. Costs of disposal can exceed bulk purchase savings.
- Substitute with a less hazardous material whenever possible.
- Make sure all chemical and waste containers are properly labeled.
- Keep chemical and waste containers closed when not in use.
- Don't accept donations or gifts of potentially hazardous materials

In general, waste from the School of Architecture can be categorized into 2 categories: regular waste and hazardous waste.

- **Regular waste:**
Wood, sawdust, water-based paints (after drying in container)
- **Hazardous waste (commercial disposal through OEHS):**
Organic oils (linseed oil, tung oil, turpentine, etc.)
Enamel or oil-based paints
Solvents (mineral spirits, acetone, toluene, xylene, etc.)

Note: Refer to www.tucsonaz.gov/arthazards for general information concerning the proper management of hazardous materials in a studio. *Contact the OEHS for specific information on collection and disposal of wastes.*

GENERAL SAFETY SUMMARY

1. **Know your materials and their hazards.** Learn about the content of art materials and their hazards by reviewing labels and Material Safety Data Sheets (MSDSs). Whenever possible, try to use the safest materials and processes available. For example:
 - a. Choose water-based materials instead of solvent-based ones.
 - b. Eliminate toxic metals like lead and cadmium (e.g., use lead-free solders).
 - c. Apply coatings by brushing or dipping instead of spraying.
 - d. Choose products that do not create dusts and mists. If possible, avoid using materials in powder form or aerosol products or use them with local exhaust ventilation.

2. **Know where emergency equipment is located and what to do in the event of an emergency.** Examples include:
 - a. Eyewash stations and safety showers
 - b. Fire alarm pull stations, fire extinguishers, designated evacuation assembly area
 - c. Emergency phones
 - d. Injury response procedures (notification, recordkeeping, healthcare resources)
 - e. Locations of Material Safety Data Sheets (MSDSs)

3. **Practice good hygiene.** It's a simple way to avoid exposure to toxic substances.
 - a. Never eat, drink, smoke, chew gum/tobacco, or apply cosmetics in the shop or wherever there is a potential for chemical exposure.
 - b. Wash your hands and exposed skin thoroughly with soap and water after using any hazardous material or substance and before eating or smoking. Don't forget to wash under your fingernails. Keep nails trim and clean and do not bite nails.
 - c. Never use toluene, turpentine, or other solvents to remove paint, inks or stains from your skin. Baby oil can be used to remove paint.
 - d. Never hold brushes or tools in your teeth or mouth.

4. **Keep shop space clean and organized.** Continuous and diligent cleaning of the studio reduces the risk of accident and fire. Designate a separate area for work with potentially hazardous materials.
 - a. Dusty surfaces should always be wet mopped or cleaned with a shop vacuum. Sweeping or using compressed air stirs up the dust and creates an inhalation hazard. This is particularly important with toxic dusts such as clays and pigments.
 - b. Dusty work areas should be cleaned on a regular basis (preferably daily).
 - c. Clean up wet floors and small spills immediately.
 - d. Store tools and equipment when not in use and keep them in good working order.
 - e. Be neat. Pick up trip hazards and keep working and walking areas unobstructed.

5. **Use appropriate ventilation to reduce the level of airborne contaminants and prevent accumulation of flammable vapors.**
 - a. Be aware that floor fans or ceiling fans can sometimes stir up settled dust or cause air contaminants to be carried into a person's breathing zone. It's better to use exhaust ventilation to remove hot or contaminated air than it is to just use a fan to blow it around.
 - b. A common recommendation on product labels is **USE WITH ADEQUATE VENTILATION**. This is a non-specific phrase that provides little information but it does indicate that the product may contain odorous or potentially toxic materials and that it should be used outdoors or in a large open area.
 - c. If local exhaust or dilution ventilation systems are not working properly (e.g., if visible dust leakage or strong odors are noted), notify course instructor.

6. **Handle and store equipment and supplies properly.**
 - a. Don't block access to emergency equipment (fire extinguishers, fire alarm stations, etc.)
 - b. Keep exit routes, aisles, and exit doors clear of obstructions.
 - c. Choose appropriate containers. Avoid breakable glass containers whenever possible and don't put chemicals in empty food or beverage containers.
 - d. Don't store incompatible chemicals in close proximity. Refer to MSDS for information.
 - e. Store materials safely so they will not fall; don't store hazardous chemicals above eye level. Sharp edges or blades should be protected or enclosed to prevent accidental contact.
 - f. Make sure all containers are labeled with contents and hazard warning information.
 - g. Cover containers when not in use to prevent liquids from evaporating and powders from spilling.
 - h. Transfer materials carefully to avoid splashing or generating large amounts of dust.

7. **Wear appropriate clothing and personal protective equipment (PPE).**
 - a. Avoid wearing jewelry, loose long hair, or loose clothing around mechanical equipment.
 - b. Wear non-synthetic (cotton) clothing when working with hot objects (welding). Polyester and other synthetic clothing is prohibited for hot work projects.
 - c. Minimize exposed skin and avoid bare midriffs when working with hazardous chemicals or hot objects.
 - d. Do not go barefoot in the shop. Sandals and other open shoes should not be worn in the shop.
 - e. Store PPE properly and keep it readily accessible.

8. **Be a responsible user.** The information in this safety guide is designed to protect you, your fellow students, and the environment.
 - a. Follow the instructions of the Shop Manager and student workers. They are there to help you learn and ensure that you can do your work safely.
 - b. Do not use equipment if you are not authorized to do so, haven't been trained on it, or are uncertain about what to do. Follow posted instructions for equipment use. If you have questions, ask the Shop Manager or student worker.
 - c. Report unsafe conditions or damaged equipment to your instructor, Shop Manager or student worker immediately. If necessary, take the equipment out of service or place a warning tag/label on it.
 - d. Recognize your physical, emotional, and mental limits. Eat well-balanced meals and get plenty of rest each night. Do not operate mechanical equipment or power tools while under influence of drugs, alcohol or medication. Decreased alertness is a major cause of accidents.
 - e. Be considerate of the health and safety of the people around you and their activities. Communicate any known chemical or physical hazards that your project has the potential to create. Work safely and don't put others at risk.

If you have any health or safety concerns, discuss the issue with your instructor, Shop Manager or the student worker. You can also contact (anonymously if desired) Tulane's Office of Environmental Health and Safety (OEHS) for assistance.

Suggested Architecture Shop Safety Training Outline

- I. Architecture Shop Safety Guide**
 - A. Distribution and development
 - B. Office of Environmental Health & Safety (OEHS) contact info, Policies and Procedures Manual

- II. Responsibilities**
 - A. OEHS
 - B. DSR program and designee for Architecture
 - C. Faculty/instructors
 - D. Students

- III. Emergency Response Procedures**
 - A. Fire emergency (E.S.C.A.P.E)
 - B. Hazardous material spill
 - C. Chemical exposure (eyewash locations)
 - D. Injury/Illness
 - E. Emergency phones

- IV. Potential Hazards (Review each topic in section on pages 6-9)**

- V. Hazard Control Measures**
 - A. Engineering controls (local exhaust ventilation, process changes)
 - B. Work practice controls (training, housekeeping, good work practices)
 - C. Personal Protective Equipment (PPE)

- VI. Fire Safety**
 - A. Emergency Action Plan for Richardson Memorial, designated assembly area (Academic or Gibson Quad)
 - B. Fire safety precautions
 - C. Flammable/combustible liquids

- VII. Personal Protective Equipment (PPE) and Clothing**
 - A. Hazard assessment/hazards that may warrant PPE
 - B. Hand protection
 - C. Hearing protection
 - D. Eye and face protection
 - E. Respiratory protection

- VIII. Working Alone/Unsupervised**
 - A. Security
 - B. Supervision

- IX. Waste Management and Disposal**
 - A. Types of waste
 - B. Hazardous waste (handling, labeling, disposal)

- X. General Safety Summary (Review each item in section)**

SHOP SAFETY HAZARDS AND PRECAUTIONS

- [Digital Lab](#)
- [Drawing](#)
- [Metalworking](#)
- [Model Making](#)
- [Woodworking](#)

NOTE: Students are advised to also review specific instructions and procedures in the “Safety” binder located in the Shop

DIGITAL LAB

The primary hazards associated with computer use are visual and musculoskeletal stresses from prolonged use of the computer. Proper design of the computer work area, use of ergonomically designed equipment (mouse, chair), good work practices and maintaining a neutral body posture can help avoid potential problems.

ACTIVITY	HAZARDS	PRECAUTIONS
Use of the laser cutter	<ul style="list-style-type: none"> Release of various airborne contaminants 	<ul style="list-style-type: none"> Use only approved material in the laser cutter Always use local exhaust ventilation Do not use the laser cutter unsupervised unless you are trained to do so.
	<ul style="list-style-type: none"> Fire 	<ul style="list-style-type: none"> Use only approved materials in the laser cutter. Never use foam core.
Computer use	<ul style="list-style-type: none"> Musculoskeletal disorders such as carpal tunnel syndrome, neck strain, etc. 	<ul style="list-style-type: none"> Maintain a <u>neutral body posture</u>: <ul style="list-style-type: none"> Hands, wrists, forearms are straight, in-line and roughly parallel to the floor Head is level or bent slightly forward and in-line with the torso Shoulders are relaxed and upper arms hang normally at the side of the body Elbows are close to the torso Feet are fully supported by floor or footrest Back is fully supported with lumbar support Thighs and hips are supported by a well-padded seat and are parallel to the floor Place keyboard and monitor directly in front of you. Adjust chair height and arrange mouse and keyboard to achieve a neutral wrist posture. Use a mouse pad with a wrist rest. Change positions frequently. Stretch, get up and walk around periodically.
	<ul style="list-style-type: none"> Eyestrain from improper viewing distances, glare or reflections on the monitor 	<ul style="list-style-type: none"> Place monitor perpendicular to window. Use blinds or drapes to reduce glare. Tilt screen slightly to avoid glare from lights and windows. Use indirect or diffused lighting. Position monitor so top line of screen is at or below eye level. Place monitor directly in front of you and at least 20 inches away. Periodically clean and dust computer monitor.
	<ul style="list-style-type: none"> Electrical hazards 	<ul style="list-style-type: none"> Use only power cords provided in the Lab. Extension cords and power strips brought in from the outside are prohibited.

Other Important Notes:

- Food and drinks are not allowed in the Digital Lab.

For further information see: <http://www.osha.gov/SLTC/etools/computerworkstations/index.html>

DRAWING

Drawing media includes crayons, pencils, inks, felt-tip markers, oil pastels as well as dust-creating media such as charcoal and pastels which are often fixed with spray fixatives. Drawing media may contain various pigments, solvents, and binders. Some of these materials may cause allergic reactions in certain individuals; some materials may be carcinogenic or toxic by ingestion or inhalation and some may be absorbed through the skin. Accidental ingestion can occur due to eating, drinking, or smoking while working, and inadvertent hand to mouth contact. Carefully review Material Safety Data Sheets (MSDS) for the products you use and review specific hazard control measures.

ACTIVITY	HAZARDS	PRECAUTIONS
Solvent use	<ul style="list-style-type: none"> • Sanding can create inhalation and ingestion hazards. • Some natural resins may cause skin irritation or allergies. • Some solvents can evaporate quickly and contaminate the air creating an inhalation hazard. • Some solvents can be absorbed through the skin and can cause dermatitis with prolonged exposure. • Many solvents are flammable. 	<ul style="list-style-type: none"> • Review the MSDS • Use a chemical fume hood or work in a well ventilated area. • Avoid skin contact with solvents. Wear nitrile gloves. • Wash hands before eating, drinking, smoking
Spray application	<ul style="list-style-type: none"> • Airbrushes, and aerosol spray cans release very fine mist particles that can remain in the air for several hours and are readily inhaled. • Aerosol spray paints and other products contain propellants that are extremely flammable. • Spray application of some solvents and paints can create a flammable atmosphere. 	<ul style="list-style-type: none"> • Never spray solvent-based materials in or near the building except in designated spray booths. • Use water-based airbrushing paints and inks rather than solvent-based.
Drawing Media	<ul style="list-style-type: none"> • Dust from charcoal sticks, pastels, and colored chalks can cause problems for individuals with asthma • Pastels can contain toxic pigments which can be hazardous by inhalation or accidental ingestion. • Spray fixatives contain toxic solvents and flammable propellants. • Some drawing inks and permanent felt tip markers can contain solvents. 	<ul style="list-style-type: none"> • Don't blow off excess pastel or charcoal dust. • Wet wipe or mop dusty surfaces. • Wear a dust mask or N95 respirator if necessary • Never spray fixative in or near the building except in designated spray booths.

Other Important Notes:

1. Substitute less hazardous materials whenever possible. (i.e., use lead-free paints, use water-soluble or alcohol based materials instead of solvents, etc.) It's better for both you and the environment!
2. Do not use solvents to clean skin. Remove paint from your skin with baby oil then use soap and water.
3. Wash your hands with soap and water after working with drawing materials.

Observe posted instructions and procedures in the Shop "Safety" binder for the following:

- Solvent and fixative use

METALWORKING

The hazards associated with metalworking depend on the type of work performed and methods used. Students may weld, braze, solder, or torch cut metals. Melting metal can produce toxic gases as well as metal fumes (very small particles that can penetrate deep into the lungs). Carefully review Material Safety Data Sheets (MSDS) for the products you use and identify the hazardous materials in them.

ACTIVITY	HAZARDS	PRECAUTIONS
Welding, brazing, soldering	<ul style="list-style-type: none"> • A number of air contaminants are produced including toxic metal fumes and gases (ozone, oxides of nitrogen, carbon monoxide). • Base metals that are coated with paint can release toxic materials when heated. • Base metals such as stainless steel or galvanized steel can release highly toxic fumes (zinc, chromium). • Welding can produce ultraviolet and infrared radiation. • Heat and slag can cause serious burns and fires. 	<ul style="list-style-type: none"> • Review MSDS for base metals, welding rods, flux, etc. If possible, avoid using metals that contain lead, zinc, nickel, chromium and other toxic metals. • Remove any preservative coatings from base metal before welding or cutting. • Work in a well ventilated area • Wear a respirator if working on stainless or galvanized Steel • Wear shaded eye protection • Wear natural fiber clothing, sturdy close-toed shoes, leather gloves and other protective clothing,
Operating mechanical equipment	<ul style="list-style-type: none"> • Improper use of equipment can cause injuries. • Clothing, hair, fingers can get caught in moving equipment. • Damaged electrical cords, plugs and switches can cause fires or electrical shock. • Prolonged exposure to high noise levels can cause hearing loss. • Extended use of vibrating hand tools can cause damage to the muscles and tendons in the hand. 	<ul style="list-style-type: none"> • Don't use equipment without prior training. • Keep guards in place. • Use push sticks. • Always turn equipment OFF when making adjustments. • Remove watch, jewelry, tie back long hair. • Wear appropriate PPE (eye protection, hearing protection, etc.)

Other Important Notes:

1. Don't use equipment until you have been trained by the Shop Manager or an authorized student worker.*
2. Substitute less hazardous materials whenever possible.
3. Never store or use chlorinated hydrocarbons or flammable materials in the welding area.
4. Use a welding curtain to shield your work from others.
5. Don't let molten metal come in contact with water, grease, oil or other organic materials.
6. When finishing working or leaving the studio, wash hands thoroughly.

*** Observe posted instructions and procedures in the Shop "Safety" binder for the following:**

- Wood/Metal Shop Rules

MODEL MAKING

Model making can present exposures to toxic vapors from markers, spray adhesives, and other art supplies. Small scale, close-up work can increase the risk of exposure to hazardous vapors. Manufactured wood products can contain formaldehyde which can aggravate asthma problems. Toxic gases are released when cutting foam or foam board with hot wire. Markers and spray adhesives may contain solvents which can cause nerve damage with prolonged exposure.

Carefully review Material Safety Data Sheets (MSDS) for the products you use and review specific hazard control measures.

ACTIVITY	HAZARDS	PRECAUTIONS
Use of ink markers & spray adhesives	<ul style="list-style-type: none"> • Work with several ink markers at once can result in high exposures to solvents such as xylene or toluene. • Solvents can evaporate quickly and contaminate the air creating an inhalation hazard. • Many solvents are flammable. • Some spray adhesives contain solvents which cause respiratory irritation. 	<ul style="list-style-type: none"> • Review the MSDS. • Use water or alcohol-based materials instead of solvent-based. • Apply spray paints or spray adhesives outdoors or use local exhaust ventilation (spray booth). • Avoid skin contact with solvents. Wear disposable gloves. • Keep markers capped when not in use.
Cutting foam with hot wire	<ul style="list-style-type: none"> • Toxic gases are released when hot wire used (hazardous thermal decomposition products) 	<ul style="list-style-type: none"> • If possible, use other cutting techniques with foam. • Minimize use of hot wire for cutting foam. • Work in a well-ventilated area or use local exhaust ventilation.
Use of spray adhesives & fillers	<ul style="list-style-type: none"> • Chemical exposure can occur by inhalation of vapors or by skin contact 	<ul style="list-style-type: none"> • Avoid skin contact with spray adhesives & fillers. • Wear disposable gloves.

Other Important Notes:

1. Substitute less hazardous materials whenever possible. (i.e., use lead-free paints, use water-soluble materials instead of solvents, etc.) It's better for both you and the environment!
2. Wash your hands with soap and water after working with model making materials.
3. Also see Drawing safety hazards & precautions
4. Also see Woodworking safety hazards & precautions

Observe posted instructions and procedures in the Shop "Safety" binder for the following:

- Solvent and fixative use

WOODWORKING

Woodworking hazards include the wood itself, preservatives that may be present within the wood, hand and machine tools used to shape it, glues, and finishing compounds. Woodworking can use many different types of hard and soft woods including many exotic tropical woods. Carefully review Material Safety Data Sheets (MSDS) for the wood and other products you use.

ACTIVITY	HAZARDS	PRECAUTIONS
Working with wood	<ul style="list-style-type: none"> Dusts from many hardwoods are sensitizers and both hard and softwoods can cause allergic reactions of the eyes, skin, and respiratory system. Some woods may be toxic (particularly hardwoods) or treated with chemical preservatives. Dust produced during cutting/sanding operations can present inhalation hazards 	<ul style="list-style-type: none"> Review the MSDS. Wear gloves and a dust mask when working with treated or toxic wood. Clean up wood dust and debris frequently.
Operating mechanical equipment	<ul style="list-style-type: none"> Improper use of equipment can cause serious injuries. Clothing, hair, fingers can get caught in moving equipment. Damaged electrical cords, plugs and switches can cause fires or electrical shock. Prolonged exposure to high noise levels can cause hearing loss. Extended use of vibrating hand tools can cause damage to the muscles and tendons in the hand. 	<ul style="list-style-type: none"> Do not use equipment without prior training. Keep guards in place. Use push sticks. Remove jewelry (watch, rings, etc.) back long hair, roll up sleeves. Always unplug equipment and turn it OFF to clean or adjust it. Wear appropriate PPE (eye protection, hearing protection, etc.)
Using non-powered hand tools	<ul style="list-style-type: none"> Damaged or defective tools can cause injuries. Improper storage can damage the tool and/or cause injury. 	<ul style="list-style-type: none"> Report damaged equipment to instructor. Store tools neatly. Protect sharp edges.
Working with hazardous materials (coatings, adhesives, solvents)	<ul style="list-style-type: none"> Some materials contain toxic chemicals that can be hazardous by inhalation or skin contact. Some materials are flammable. 	<ul style="list-style-type: none"> Review the MSDS. Apply hazardous materials in a well-ventilated area (spray booth). Wear gloves to prevent skin contact with hazardous materials. Keep containers closed when not in use. Dispose of solvent soaked rags properly.

Other Important Notes:

- Do not use mechanical equipment until you have been trained by the Shop Manager or a student worker.
- Substitute less hazardous materials whenever possible.
- Use proper lifting techniques (and get help) when handling awkward or heavy materials.
- Clean floors and work surfaces after use.

*** Observe posted instructions and procedures in the Shop "Safety" binder for the following:**

- Wood/Metal Shop Rules

Credits

This document was written and prepared collaboratively by the Tulane School of Architecture and the Tulane University Office of Environmental Health and Safety. A special thanks go to the following Faculty, Staff and Students for their efforts, and for making this guide possible:

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