CASE WESTERN RESERVE UNIVERSITY

Performing Arts and Venue Safety Manual

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Introduction

Theater and Performing Arts Safety

The purpose of Case Western Reserve University's *Performing Arts and Venue Safety Manual* is to provide faculty, staff, and students who work or participate in the performing arts with a general overview of potential hazards and related safe work procedures. This manual is designed to cover a production from start to finish, but it is applicable to ANY event and will help you evaluate any health and safety risks you might encounter along the way.

Performing arts activities at universities may include dance, theatre, music, presentations or parties; the wide array of possibilities create various health and safety challenges. These activities might be in academic settings, student-run clubs, or professional productions. Every event is unique, and the risks must be evaluated each and every time. The phases of production might involve the staff and students of multiple departments in design, construction, front of house management, and event coordination. Challenges include physical, chemical, and mechanical hazards, working at height, material handling, crowd management and many others. Additionally, evaluating risks for new productions and training students is complex due to constantly changing show dynamics. Presented works encounter similar risks while adding the barriers of contract requirements and the incorporation of touring personnel and equipment. Student organizations introduce other complications as they produce works, often with less oversight but still with significant risks. Overall, integrating safe practices in university performing arts is crucial for the safety of faculty, staff, students, and the public. This manual is designed to establish a common frame of standards and procedures to bring some of these differences together.

Responsible Parties

In the dynamic and evolving world of performance it is vital to have well-defined roles and responsibilities to ensure clear communication and decision making.

Upper Management
Deans and department chairs are responsible for ensuring an effective safety program is implemented in all areas under their scope of responsibility. For performing arts activities, this includes all facilities where employees and students work or are involved with production activities. Upper management must assign and authorize designated individuals to establish and support the key processes and procedures of the safety plan.

Supervisors, Faculty and Staff

Supervisors, faculty and staff play a critical role in the execution of the safety plan and are authorized to:

- develop safe work practices and procedures,
- enforce health and safety rules,
- stop work activities that pose imminent danger,
- ensure routine documented safety inspections occur,
- provide or coordinate safety training,
- make available and ensure proper use of personal, protective equipment (PPE),
- report and investigate injuries and incidents,
- maintain health and safety documentation associated with the safety plan,
- work with CWRU EHS to ensure programs are audited and remain current.

Employees and Students

Employees and students have an obligation to:

- obtain appropriate training for designated activities,
- use PPE as required and directed,
- report unsafe conditions, malfunctioning equipment and other safety concerns,
- report all work-related injuries and incidents,
- understand what to do in the event of an emergency,
- follow and understand all aspects of the safety program,
- not deviate from procedures without authorization from a faculty or staff member.

Environmental Health and Safety (EHS)

EHS is responsible for:

- providing health and safety consultations to all levels of individuals within the CWRU organization,
- assisting with the implementation of safety programs,
- developing and providing safety training,
- performing safety inspections,
- conducting job or task hazard evaluations,
- overseeing incident investigations,
- monitoring compliance.

Campus Risk Management

Campus Risk Management is required to:

- provide risk mitigation and injury management services,
- identify and evaluate emerging risks in cooperation with EHS,
- monitor the Enterprise Risk Management (ERM) program's standards and effectiveness,
- manage incident and injury claims, including workers' compensation claims,
- coordinate transitional return-to-work activities, and
- review contractual agreements.

Hazard Identification and Correction

Identifying and correcting hazards in performing arts activities is crucial for an effective safety program. Campus safety programs include regular safety inspections with the EHS office for documenting hazards and corrective actions. Self-inspections must also be conducted. Using the provided checklists, they should include general quarterly or annual facility checks (housekeeping, electrical safety, etc.).

Specialized systems like counterweight rigging, motorized rigging, orchestra lift systems should be inspected based on the frequency of use, manufacturer guidelines, and recommended industry best practice. These systems are typically not inspected or maintained by your campus facilities staff but may be by EHS specialists. At a minimum these systems should receive a thorough and documented inspection by a qualified person annually. This can be performed by an in-house staff member provided they have sufficient experience and training through accredited courses in each system, a comprehensive external inspection should be performed every two to three years based on use and industry guidelines.

Hazard identification also involves process-related safety evaluations for activities like costume dying, hanging lights with a personnel lift, removing trap door or pit fillers, or rehearsing near an orchestra pit.

Reporting unsafe conditions is also vital and employees should know how to report hazards anonymously without fear of reprisal. Overall, safety inspections, hazard evaluations, and reporting are key to maintaining a safe work environment in performing arts.

Communication and Training

Supervisors serve as the primary contact for health and safety information related to your work areas and activities. This information can be disseminated through various channels, including emails, newsletters, posters, or during meetings. Supervisors are responsible for providing essential EHS resources and references relevant to an individual's role. This includes safety training, safety data sheets (SDS), warning labels, job hazard analysis (JHA) details, emergency response procedures, and safe work practices.

On-the-job training is another vital aspect of the training process. It involves direct instruction and guidance during the execution of tasks at the workplace, complementing the foundational safety training obtained through reading materials, videos, instructor-led sessions, or online content. All training must be documented and kept with this plan in each location.

The safety plan mandates that training needs to be identified for each individual and operation, with appropriate training provided based on the task's complexity and hazards. All new employees, or those undertaking new tasks or operations, must receive training, *especially when new hazards are introduced* into the workplace. Supervisors need training to recognize potential hazards faced by their employees and students must be experienced and knowledgeable about regulations and safe work practices to mitigate these risks.

EHS can help in identifying specific training requirements for different tasks within theater and performing arts (e.g., set construction, costumes, lighting).

The act of documenting training includes regular reviews of the safety manual, a general safety awareness training record, and site-specific safety training.

Accident Investigation and Injury Reporting

Two critical situations that require thorough investigation to pinpoint and address their causes are:
An accident; defined as an unexpected event causing injury, illness, or property damage.
A near miss; which holds potential for harm but does not cause significant damage, are both critical situations requiring a thorough investigation to pinpoint and address their causes.

In case of an accident, it is imperative for employees and students to immediately report to their supervisors to ensure swift medical attention and follow-up actions. Life-threatening injuries necessitate an urgent call to 216-368-3333. This will activate the communication chain required per the CWRU *University Emergency Response Handbook*.

For serious injuries, such as death, amputations, or hospitalizations exceeding 24 hours, the Occupational Safety and Health Administration (OSHA) must be notified within eight hours, underscoring the importance of prompt communication with Campus EHS, even during off-hours or weekends.

Employees, including staff and faculty, who suffer injuries requiring medical attention should be referred to the office of Risk Management and Insurance for processing workers' compensation claims within 24 hours of the incident. Prompt reporting of any injury or suspected illness to a supervisor is crucial.

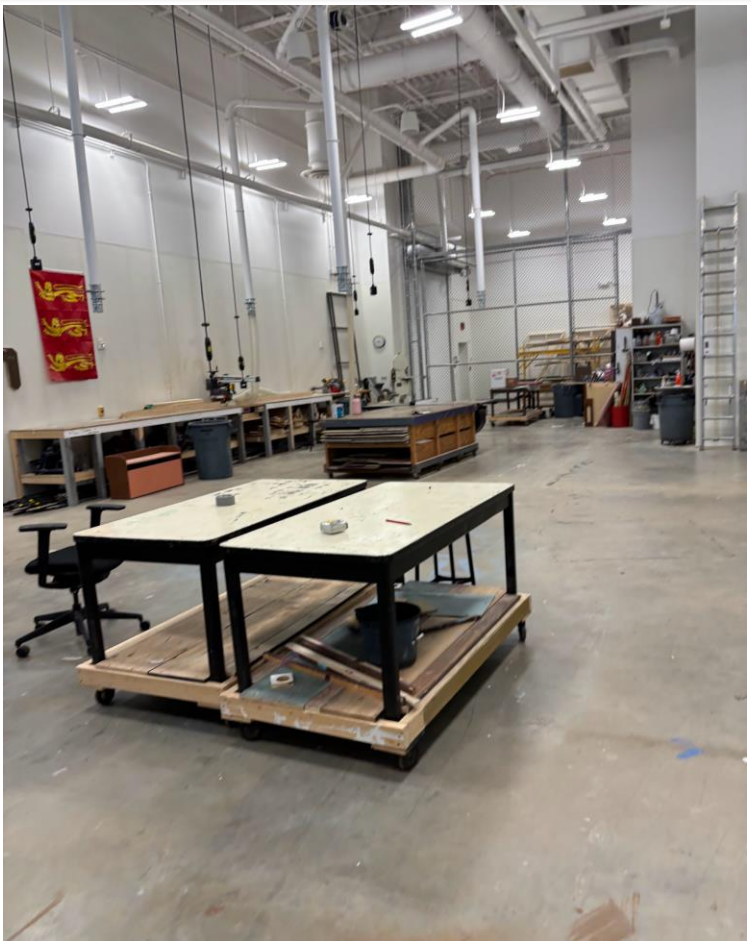
Following the initial medical response and notifications, EHS or Risk Management may guide supervisors through the accident investigation process, offering the necessary documentation and advice. While they may lead investigations in severe cases, trained supervisors are typically responsible for examining near misses or minor accidents and communicating their findings to their teams. The process following the completion of these investigations involves determining the root cause of the accident and employing preventative measures to reduce the chances of a similar incident happening in the future. Additionally, it is important to document the investigation's findings for future reference.

Accidents causing injuries and illnesses are, by definition, unplanned and unexpected. Thankfully they don't occur frequently, but being well versed in campus procedures is critical. Trained supervisors who understand these procedures before accidents occur, ensure a quick response and follow up with proper documentation and notification.

Summary

Performances, concerts and presentations happen at every level of CWRU and in a variety of forms. The *Performing Arts Safety Manual* can provide faculty, staff, and students with a general overview of performing arts hazards, related safe work practices and safe event planning. To review safety programs, training, or emergency plans, you can check with supervisors, venue/department managers, or the EHS office.

Scenic



The scene shop is a dynamic environment that encompasses a wide range of operations including wood and metal construction, crafts, painting, and graphics. This diversity of activities necessitates a comprehensive approach to safety, injury risks from power tools, given the varied potential chemical exposures, tripping hazards, and other dangers inherent in such a workspace.

To ensure the safety of all employees and students, strict adherence to established safety policies, training requirements, and the use of personal PPE is mandatory **following these guidelines:**

Depending on the specific layout of your performing arts department, these areas may be separate rooms or distinct sections within a larger, divided shop. Each area presents its own set of hazards, from sawdust and paint spray to upholstery lint and wet glues and dyes.

To mitigate the risks associated with these varied activities, the scene shop may employ several strategies. These can include the use of temporary barriers, mobile worktables, and tools on rolling stands to maintain flexibility and adaptability in managing the space. Ventilation and dust collection systems are crucial in controlling airborne particles and gasses, while policies on storing supplies in sealed plastic containers, flammables cabinets, and using dust covers over sensitive equipment like sewing machines or computers help maintain a clean environment. In addition, physical barriers may be rigged to divide the shop temporarily as needed, further reducing cross-contamination of different work areas.

Guards are provided on all machines and must be observed and used. Guards may be removed for cleaning purposes, but the device must be de-energized and in a state of lock out.

Fall Protection

Live entertainment often entails working in environments with significant fall hazards, such as ladders, catwalks, elevated storage areas, and the edges of stages. It is imperative to implement fall protection systems to safeguard cast and crew from falls that occur from elevations of 7.5 feet or higher. In certain situations, fall protection might also be necessary at lower heights.

Refer to the codes of safe practice, which cover a range of areas including mobile elevated work platforms, catwalks, elevated work surfaces, ladders, scaffolds. It's also crucial to review and understand the specific fall protection trigger heights outlined in these codes.

Due to the temporary and dynamic nature of set construction, there are times when conventional fall protection systems may be impractical or even hazardous. In such cases, it is essential to follow a tailored fall protection plan, designed by a ***qualified person***[1] specifically for the site. This plan should:

- be regularly updated and readily available on-site,
- be overseen by a ***competent person***[2] knowledgeable in fall hazards and prevention,
- outline measures to reduce or eliminate fall risks for workers who can't be protected by standard systems,
- identify specific locations where traditional fall protection methods are inadequate
- implement a safety monitoring system,
- specify protection methods for each job role,
- document the fall rescue plan
- detail the procedure for investigating fall incidents.

[1] See definitions and OSHA 29 CFR 1926.32(l)
[2] See definitions and OSHA 29 CFR 1926.32(f)

Rigging in Set Construction

Rigging is the securing of scenery or equipment to hardware allowing it to be lifted, lowered, or held over the stage. With the complex tasks and equipment involved, a deep understanding of design factors[3] and load capacities for each component is essential. It is mandatory for employees to be trained before operating any rigging equipment. Key safety guidelines for rigging include:

- conducting regular inspections of rigging equipment, especially before use, after any modifications and at routine intervals,
- ensuring counterweights or sandbags are securely fastened to prevent displacement,
- immediately reporting and removing any ropes that are damaged or defective,
- avoiding shortening chains and ropes by knotting (which reduces breaking strength)
- adhering to the safe load capacity of the rigging system without exception,
- following established safety protocols during the loading, unloading, or operation of rigging systems,
- alerting personnel on stage and in the grid area before moving any rigged objects,
- maintaining control over moving pieces at all times to ensure safety,
- accessing catwalks only after receiving proper training and authorization and,
- securing all rigging equipment when not in use to prevent accidental movement or usage

[3] the ratio between the working load limit and breaking strength

Power and Hand Tools

Employees must be trained in the proper use of power and hand tools, including applicable safety features, guards, and the required personal PPE. Each tool has specific guidelines (many of which can be found in the Codes of Safety), the following are general safety procedures for all tools.

- Receive in person training and be observed using the tools for the first time by a supervisor.
- Complete general shop training/orientation.
- Follow all manufacturers' instructions on the use and care of the tools.
- Inspect tools before use to check for any defects such as frayed wires or damaged hand tools. Remove defective tools from service and report findings to your supervisor.
- Never carry or hoist a power tool by its power cord.
- Unplug power tools before loading them, changing blades or bits, making adjustments, or cleaning them.
- Never use power tools on wet surfaces or in wet weather.
- Never alter or remove any machine or blade guards.

Pneumatic Tools

Pneumatic tools have become essential for building sets; powered by compressed air, they provide both speed and precision. This increased efficiency shortens build times and allows for a variety of fasteners to be used. The most common air powered tools found in a shop are staplers and nailers. Higher end shops may also have pneumatic sanders or sprayers, but their higher rate of airflow requires larger capacity compressors and tanks. While pneumatic tools are favored for their speed, reliability and ease of use, they do present some hazards that can lead to serious injury. Such as:

Air Pressure Hazards

- Compressed air can penetrate skin, resulting in air injection. It is vital that pressure levels are regulated. Air exhausts on tools can also vent directly into the operators face or eyes if improperly positioned. Pneumatic tools can produce high noise levels. Over time, some carpenters experience hearing loss on their dominant side from tool noise.

Flying Objects

- Pneumatic tools like nail guns or staplers can misfire or send fasteners flying at high speeds if not handled properly. Another risk is ejected material such as dust or debris from fasteners exiting material.

Hose-Related Hazards

- Air hoses, which supply power to pneumatic tools, can tangle, creating a trip hazard in workspaces, especially in busy environments like theatre shops. If a

hose becomes disconnected or damaged, the sudden release of air pressure can cause the hose to whip around violently, potentially hitting/injuring bystanders.

Repetitive Stress Injuries

- Using pneumatic tools for long periods can lead to ergonomic issues, Tools that vibrate excessively can cause hand-arm vibration syndrome (HAVS), leading to numbness, pain, and decreased grip strength over time.

Lack of maintenance or improper storage can lead to malfunctioning tools. Before use, always inspect tools and hoses for damage or broken mechanisms. If found, take them out of service until they can be repaired.

Welding

Welding involves the use of high heat to join metals together and, in some processes, to add a filler material to make a secure joint. It's a skill used across various industries, including manufacturing, construction, and automotive repair. Given the inherent risks associated with the intense heat, bright light, and potentially toxic fumes produced during welding, adhering to safety protocols is paramount

PPE

Wearing an auto-darkening welding helmet protects your eyes from the intense light and UV radiation and your face from sparks and hot metal. Long-sleeved jackets and trousers made from durable, flame-resistant materials protects against sparks, spatter, and heat. Use insulated gloves designed for welding to protect your hands from heat, sparks, and electric shock. Wear safety glasses with side shields under your welding helmet for additional eye protection. Utilize earplugs or earmuffs to protect against noise and prevent hot sparks from entering the ear canal. Wear dry, insulated gloves to protect against electric shock. When working in poorly ventilated areas or with materials that produce hazardous fumes, use an appropriate respirator. Check with EHS and your supervisor to ensure proper ventilation devices are in place.

Workplace Safety

Ensure adequate ventilation in the welding area to disperse harmful fumes and gasses. Use local exhaust ventilation systems for indoor welding or weld outdoors if possible. Be sure to keep a fire extinguisher nearby and remove flammable materials from the welding area to prevent fire hazards. Inspect welding equipment for damaged cords or connectors before use. Position yourself so that you are not directly inhaling fumes and ensure your welding approach does not expose your body to sparks and spatter.

Health Hazards

Be aware of the specific metals you are welding and the potential fumes they may emit.

Certain materials, such as galvanized steel, can release toxic zinc fumes. Protect your skin from UV radiation by covering exposed skin with protective clothing. Prolonged exposure to noise from welding can lead to hearing loss. Use adequate ear protection, especially in confined spaces.

Training and Awareness
Receive proper training in welding techniques, equipment use, and safety practices. Stay informed about the latest safety standards and guidelines. Be knowledgeable in first aid procedures for burns and exposure to fumes. Know the location of first aid kits and emergency showers or eye wash stations.

Equipment and Maintenance
Routinely inspect welding machines, cables, clamps, and protective gear for wear or damage.
Use the correct settings for your welding machine based on the material and thickness to minimize hazards. Perform regular maintenance on welding equipment as recommended by the manufacturer to ensure safe operation.

Lockout/Tagout

Lockout/tagout (LOTO) is a method of preventing equipment from being set in motion and endangering workers. Failure to properly isolate and de-energize energy sources can be fatal. CWRU has extensively documented LOTO procedures; these sheets and associated tags are found physically attached to the equipment and machinery documented in the program. Compliance with the University's LOTO policy is mandatory for your protection and the protection of others. Although the application of LOTO is often limited to electrical energy, you should understand that other power sources, including mechanical, hydraulic, pneumatic, chemical, and thermal energies, require similar procedures and care to ensure your safety. Another source of energy that must be dissipated is often stored energy, such as in electrical batteries, capacitors, and springs. Even gravity is a potential energy source. See the ***CWRU LOTO Safety Program*** for details.

Ladders

Every ladder should be inspected on a frequent and regular basis to ensure they are maintained in good working order. Ladders should be free of grease, oils, or other slippery conditions and every component should be free of damage. Defective ladders should immediately be removed from service and the defect should be reported to your supervisor. Place ladders only on stable surfaces. Boxes, tables, chairs or other secondary platforms should never be used to prop up or change the height of any ladder. For more information on ladder safety read the ***CWRU Ladder Safety Written Program***. It is important to remember, anyone who uses a ladder must be trained; ladders over 4' that are stored against a wall should be secured to prevent tipping; ladders must only be used to the weight loading listed on the ladder.

Mobile Elevated Work Platforms

MEWP refers to all mobile elevating work platforms, including aerial lifts, aerial work platforms, vertical mast lifts (genies), scissor lifts, cherry pickers and similar equipment. They are essential tools in various industries, providing access to hard-to-reach areas for tasks like maintenance, construction, and installation. However, their use comes with significant hazards that can lead to serious injuries or fatalities if not properly managed. Understanding these hazards is crucial for ensuring the safety of operators and those working around MEWPs.

Training and Authorization

Much like Powered Industrial Trucks, MEWP training is specific to the piece of equipment and the location of operation. Operators must be trained and familiarized with each individual piece to be authorized.

Types and Groups

- Group A MEWPs move vertically but stay within the chassis or tipping lines
- Group B MEWPs can move beyond the machine's chassis or tipping lines (wheels or outriggers).

Each Group is subdivided into types:

- Type 1 MEWPs can only travel with the platform in a stowed position.
- Type 2 MEWPs can travel elevated and are controlled from the chassis.
- Type 3 MEWPs can travel elevated and are controlled from the platform.
- Type 2 and 3 can be combined if both controls are present.

- **Falls:** The primary hazard associated with MEWPs is the risk of falling from height. Even when using guardrails and harnesses, there is still a danger of falling due to improper use, equipment failure, or unexpected movement.[4]
- **Inspection:** Regularly inspect and maintain the MEWP according to the manufacturer's recommendations. Conduct pre-use inspections to identify any potential issues, such as leaks, worn parts, or malfunctioning controls, and take the machine out of service if any defects are found. MEWPs must have documented full annual inspections. This is coordinated by the facilities.
- **Overhead Obstructions:** MEWPs can collide with overhead obstacles such as beams, ceilings, or other equipment, leading to operator injury or equipment damage. These collisions can cause the platform to become unstable or lead to crushing injuries. Operators should wear hardhats or bump caps when these hazards are present.

Personal Protective Equipment

PPE is equipment used to prevent or minimize exposure to hazards. It may include eye, face, head, foot, hand, or respiratory protection, and the use of other equipment to help protect you against injury or illness. It is the last line of defense and effective use of PPE relies on the user.

Your supervisor will identify the necessary PPE for work areas and the tasks at hand and training will be provided as needed. Every individual needs to understand and follow the requirements provided during training and should also communicate with

[4] Harnesses are not required when buckets/platforms have guard rails. Those guards serve as fall protection the same way a catwalk guard rail does.

supervisors if additional needs arise through other hazards. Remember to ask questions and consult with the EHS department for more information.

When working with tools, it is imperative to wear eye and face protection as flying debris and other materials can cause temporary or permanent eye damage, and in some cases, even blindness. Chemical splashes, sparks, hanging or swinging objects, and glare are all dangerous and require the use of appropriate PPE for the eye and face. Overhead work and bump hazards require considering hard hats.

It is necessary to follow a multistep process when using a respirator. Also, keep in mind, if you need a respirator, then more than likely, everyone around you needs one as well. Consult with EHS and your supervisor before considering using a respirator so that engineering controls and other methods can be used initially, thereby eliminating the need for a respirator. See the Codes of Safety for procedures.

Regarding the instructions and protocol for using paint, when possible, all painting, staining and chemical work should occur in the spray booth. Wear gloves to keep chemicals, paints, and glues off your skin and refer to the ***EHS Lab Safety Manual*** and the ***Respiratory Protection Program*** for more details.

Lifting and handling

Strain and back pain from lifting and material handling are some of the most frequent types of injuries. Scenic pieces are often awkward, heavy, or oddly shaped, and not built with ease of handling in mind, which makes them difficult to lift properly.

Preparation
Assess the load before lifting, evaluating the weight, size, and shape of the object. Consider if it is bulky or has uneven distribution of weight, which may affect how you handle it or if you need a second person. Plan your route ensuring there are no obstructions or hazards along your path. Be aware of the space required to navigate through doorways, turns, and any inclines or declines.

Lifting Techniques
Keep your feet shoulder-width apart, providing a stable base for lifting. This stance helps maintain balance and distributes the load evenly. Always bend at the knees, not the waist, to engage the strength of your leg muscles. Keep your back straight but not rigid. This position protects your spine and helps in engaging the core muscles.

Carrying the Load
Keep the load as close to your waist as possible. The further away from the body, the more strain it puts on your back. Avoid twisting by turning your whole body in the direction you want to go, rather than twisting at the waist while carrying a load.

Team Lifting
When lifting with a partner, communicate clearly. Decide who will lead and coordinate movements to ensure a synchronized lift and walk. Ensure the weight is evenly distributed between the lifters. Adjust positions if one person is taking more load than the other.

Mechanical Aids
For heavy or awkward objects, utilize tools like dollies, hand trucks, or forklifts. Understand and follow the safety guidelines for each tool. If you use mechanical aids, make certain you are trained or certified as required. Improper use can lead to accidents.

PPE
Wear shoes with good grip and adequate support. Depending on the environment, steel-toed boots or other safety shoes may be necessary. Use gloves that provide a good grip and protect your hands, especially when handling rough or sharp objects.

Posture and Rest
Take regular breaks to help prevent fatigue. Fatigue can lead to a decrease in concentration and an increase in the risk of injury. Gentle stretching before and after lifting can help reduce muscle stiffness and injury risk.

Chemical Hazards

Those working in set construction, costume design, and makeup should be aware of and become familiar with the physical and health hazards associated with chemicals like paints, adhesives, dyes, glues, and makeup products. Some materials may be impregnated with fire retardants or other chemicals. Consider this when cutting and handling material. Every chemical container must retain its original manufacturer's label displaying names, hazard warnings and manufacturer details. If chemicals are transferred to other containers, then these containers must be clearly labeled with the corresponding information

All workers are required to obtain and understand the SDS for each product, which includes details on physical properties, flammability, health hazards, and emergency procedures. An inventory of chemicals and associated SDS shall be kept and all

employees and students should be trained on understanding the information and where it is located. Workers must also complete the hazard communication training through the EHS office. In addition, supervisors will discuss the specific products used in set construction or costume design including storage and disposal.

Keep in mind, there are specific product guidelines in areas such as ventilation, consumption prevention, container management, fire safety and aerosol cans as indicated below.

Ventilation
Know the ventilation needs for products used, especially in enclosed spaces like costume shops or makeup rooms.

Consumption Prevention
Avoid eating or drinking near work areas to prevent ingestion of hazardous materials. Wash hands thoroughly before breaks.

Container Management
Keep chemical containers closed when not in use.

Fire Safety
Manage ignition sources carefully, particularly around flammable liquids and always store flammable materials—paints and solvents—in a flammable liquid cabinet.

Aerosol Cans
Do not puncture or expose aerosol cans to high heat. All used aerosol cans, unwanted paints, glues, dyes, solvents, oils, etc., must be sent off as hazardous waste.

Disposal
Generating hazardous waste is often a byproduct of chemical use and unavoidable when working with such a wide variety of materials. Use the ***CWRU Hazardous Waste Information Form*** to request the pickup and removal of these materials. You can contact the EHS department for more information and guidance regarding proper storage until collection, proper labeling of waste containers and any special handling requirements.

Confined Spaces

In the context of theater, performing arts, and related facilities, recognizing and managing confined space hazards is a crucial aspect of ensuring safety. These spaces, by their nature, present unique risks and require specific safety protocols. The definition of a confined space is the following: a space large enough for a person to enter and perform work, with limited or restricted means of entry or exit, and not intended for continuous human occupancy.

Confined spaces that you might encounter in the performing arts may include but are not limited to: orchestra pit lift areas (the space underneath the pit); elevator pits (often found in theaters with stage lifts; trap door spaces; grids; inside scenic elements or under raised temporary stages; house cove lighting positions (used for stage lighting setups); catwalks; mechanical spaces.

In the interest of safety, ONLY workers trained according to the ***Campus Confined Space Entry Program*** should enter these spaces. Untrained individuals should never attempt rescue operations in confined spaces due to the high risk of injury or death. Consult the EHS department for detailed information on the specific confined spaces in your facility.

Certain tasks and materials may be restricted in some confined spaces or other sensitive spaces. All necessary safety equipment used in a confined space must be available and in good condition. Workers must be familiar with all emergency protocols specific to the confined space. Always maintain communication with someone outside of the confined space and regularly check for hazardous conditions like toxic gasses or oxygen deficiency.

Housekeeping

During set construction and rehearsal periods, work areas in theater environments can become particularly congested, elevating the risk of accidents. To ensure safety and efficiency certain protocols must be followed.

Post-session cleaning is an important protocol that should become routine. Workers need to maintain a habit of cleaning up after every work session. As a result, hazards are minimized, and the space is kept well organized.

Dispose of trash and waste materials in designated receptacles immediately after use. Clutter is a major problem in workspaces. With this in mind, avoid accumulation. It is neither safe, nor appealing and can be a dangerous eyesore.

Remove scrap lumber, unused materials, and other debris on a regular basis. Accumulated clutter not only poses a tripping hazard but can also become a fire risk. At all times, store materials and equipment properly when they are not in use. In addition to being out of the way, this practice preserves their condition and makes them easy to locate.

All tools must be returned to their designated storage area. This prevents them from becoming tripping hazards and helps maintain an organized and efficient workspace. Make sure you remain alert and ALWAYS be aware of your surroundings, especially in areas where both set construction and rehearsals are taking place simultaneously. If you notice a potential hazard, inform your colleagues and take immediate steps to rectify it. The risk of fire is significantly reduced by keeping the area clear of unnecessary debris, especially flammable materials like scrap wood and paper. Stages should be “made safe” every day. When a space is shared with rehearsals this process should occur with extra focus on screws and other sharps while cleaning. Debris and equipment should be cleared to the edges and tidied, and any construction hazards marked and guarded. Any hazards that cannot be mitigated should be communicated to stage managers and directors. Similarly, anytime there is a work stoppage (shift changes, breaks, end of workday) current tasks should be made safe before a worker steps away leaving anything unattended.

Safe Storage

Proper storage of materials is crucial for the safety of employees, students, performers, and audience members in any facility. To ensure a safe environment, observe the following storage procedures.

Flammable Materials

- Always store flammable and combustible materials in designated flammable storage cabinets. This reduces the risk of fire hazards.

Sprinkler System Compliance

- Vertical clearance: Store materials *at least 18 inches below* all sprinkler heads to ensure effective operation in case of a fire.
- Horizontal clearance: Maintain a *minimum distance of 36 inches* horizontally from sprinkler heads to prevent obstruction.

Ceiling Clearance

- In areas without sprinkler heads, keep materials stored at least 24 inches below the ceiling. This helps in maintaining clear air circulation and reduces fire risks.

Exit Accessibility

- Never block exits with stored materials. Clear pathways are essential for safe evacuation during emergencies.

Access to Firefighting Equipment

- Ensure that firefighting equipment like extinguishers, hose stations, and alarm pull stations are always accessible and not obstructed by stored materials.

Electrical Equipment Safety

- Maintain an *unobstructed space of at least 36 inches in all directions* from electrical service equipment. This is important to prevent electrical hazards and to allow safe access for maintenance and emergencies.

Props

The creation and sourcing of properties is an important step towards creating the world of a production. Prop design and fabrication typically requires a skill set that bridges the gap between scenery and costumes. To that end, review both of those sections and be familiar with the tools and hazards found in each. Theatres dedicate a large amount of time and space to the making of and storage of props. See the codes of safety section on storage when evaluating how best to store your stock of props. Decorative materials such as curtains, draperies, streamers, fabrics, cotton batting, straw, hay, vines, leaves, stalks, and moss must be noncombustible or flame resistant or be rendered so with commercially available products. Certain types of decorative materials may be used only with approval. Contact EHS if you have any questions about the approved use of decorative materials. Some areas you may encounter while working with props include:

Work Rooms/Dirty Rooms

In some spaces, this may just be a scene shop and not a props specific area. Dirty rooms have construction hazards and debris and are primarily wood or metal working spaces. They are considered “dirty” due to contaminants in the air, or on surfaces that may interfere with or damage finishes.

Clean Rooms

These rooms are free of major construction hazards. They are primarily used for graphics and cutting/draping fabric. As the name implies, in a “clean” room your paper goods and fabrics will remain clean and may have computer stations, large format printers, sewing machines, or hand tools. Extra care is taken to preserve the environment and keep outside contaminants from entering.

Craft Rooms

Quite simply put, these are work rooms. They might be the entirety of the props workspace for some theatres or departments, they may overlap and share duties with costume or scene shops. You might find crafts paints, soldering tools, electronics, and a variety of specialty materials.

Special Props

Some productions call for special props, such as weapons or live animals. These props pose unique risks that require special handling procedures, messaging, and precautions to ensure the safety of performers, crew, and audience.

Stage Weapons Safety

In an era of increased gun violence, threats to mass gatherings and heightened tension, the use of staged violence and weaponry is increasingly fraught and should be implemented with great caution and intention. For generations authors have used staged conflict to compellingly drive narratives forward, sometimes at great risk to actors and audiences. Staged combat and “prop” weapons should be regarded with the same respect as their real-world counterparts because they can often carry the same potential for serious and life-threatening injuries. The Society of American Fight Directors (SAFD) defines weapons as “Any object, prop, or body part utilized in an offensive action.” This definition makes clear that even innocuous objects that don’t appear overtly dangerous, when wielded with intent and purpose in the right (or wrong) hands can be a threat. The range of options includes firearms, stun guns, air rifles, edged weapons like knives, swords, daggers or axes, and found objects such as darts, mops, bricks, or chairs, and is limited only by a fight director and creative team’s imagination. Additionally, arsenals may include implements like pitchforks, slingshots, whips, grenades, chemical agents like pepper spray and decorative “hanger” weapons that appear functional but are not built to withstand the rigors of actual use.

General Safety for all Weapons

There are several rules and procedures in place to provide for the safe use of prop weapons regardless of the type of prop weapon. Real or modified real weapons are strictly prohibited. CWRU fire code prohibits air rifles, guns, and gunpowder on campus.

Firearms Safety and Edged weapons

Handling prop weapons on a stage or in a theater environment requires strict adherence to safety protocols to ensure the safety of the actors, crew, and audience. Whether the weapons are real, replicas, or prop weapons designed specifically for theatrical use, it is crucial to treat them all with the same level of caution. Here is a guide to managing weapons in a theater setting.

Edged Weapons

Piercing weapons are included in the category of edged weapons. Examples include, but are not limited to, knives, swords, rapiers, razors, arrows and bows (recurve and

crossbow), pitch forks, maces, hatchets, axes, saws, spears, kunai, throwing stars, and darts.

Only a certified Armorer may prepare, store, present for use, or otherwise handle a weapon for theatrical use. The use of firearms, even those firing blanks, is prohibited in CWRU productions. Even blanks can cause harm to actors. All personnel utilizing other weapons in a production must be trained and follow the strict word of the armorer as to use and must return the weapons to the armorer promptly upon leaving the stage.

Types of Theatrical Weapons

Replica Weapons
Realistic copies of real weapons that approximate the weight and handling but are not real weapons.

Prop Weapons
These are designed specifically for use on stage. They may be made of lighter or safer materials to create “stunt” props, or the edges may be dulled or thicker to increase durability for repeated use.

Decorative Weapons
Are weapons not suited for use. Sometimes referred to as “hangers” because they are made to hang on a wall and are not fight worthy. They are often made of stainless steel which will not tarnish but is also too brittle and inflexible or are made with substandard construction. These are fine as set dressing or as props for non-fighting ensemble, but nothing more.

Prohibited Weapons

- Functional firearms including the use of live rounds, blanks, caps, or other explosive devices.
- Live edge (sharp) blades, swords, knives, arrows, axes. No cutting implements are allowed unless they have been dulled and rendered incapable of cutting or piercing by a qualified individual.

Safety Protocols

Any time staged violence occurs, whether or not a weapon is used, a **Fight Captain** shall be appointed. They are a member of the cast and are responsible for the management, safety and maintenance of weapons used in production. The Fight Captain also conducts a fight call, which is the mandatory fight rehearsal prior to every

performance where fights are conducted first at half speed and then at show speed. This is when the Fight Captain verifies fight safety and takes any corrective action needed. The Fight Captain should know all the fights, in some cases this might be the Stage Manager.

Training
Actors and stage crew must be trained in the safe handling of weapons. This includes knowing how to safely carry, hand off, and use the weapon in performance and a training log should be kept.

Inspection
The Fight Captain should inspect all weapons before and after each performance or rehearsal to evaluate and determine they are in safe working condition and do not have the potential for injury. If a weapon is found with damage or with edge burrs that could catch and tear costumes or skin, they should be removed from service and replaced or reconditioned before the fighting continues. Additionally, combatants should be trained to do a secondary inspection and safety check to personally verify condition. In situations where a firearm capable of firing blanks is used but firing will not occur, any combatant who is threatened with said firearm should be presented with the weapon to verify it is empty and inert and should then be given back to the stage manager or fight captain to be secured until use.

Handling and Storage
Weapons must be controlled at all times. When they are not in active use for rehearsal or show calls, they must be stored securely and should only be accessible to authorized personnel.

Guidelines are as follows:

- Store all weapons in lockboxes, locked cabinets or rooms.
- Restrict access to the weapon storage areas to authorized CWRU staff.
- Secure weapons used in rehearsals in their transportation cases or other secured areas when not in use.
- Store all weapons in secure areas at the end of each performance.
- Only use weapons as intended by the choreographer of the production.
- Never play with weapons or engage in horseplay onstage or off.
- Never remove the weapons from the stage/backstage area
- Only stage management, designated department staff, and designated crew members may maintain, hand off and receive, and store the weapons.
- Store weapons in a safe, protected manner while they are backstage and not standing by for use onstage.

- Immediately clean and inspect weapons post show.
- Use a checklist for each show to ensure all requirements are met.
- Only CWRU personnel, students, performers, and crew members who have received documented training on weapons' handling guidelines will be permitted to use, handle, maintain, or store weapons.

Safe Direction

Care should be taken during the direction/blocking phase, to prevent weapons being pointed at anyone offstage or at the audience. Weapons can also be aimed off line of their target in most cases without impacting audience sight lines. Firearms should always be treated as if they are loaded and capable of causing harm.

Legal and Ethical Considerations

Ensure compliance with local and federal laws regarding the use of prop weapons, including permits and regulations. Remember that the audience should fear for the ***characters*** safety, never the safety of actors, crew or audience.

Permission & Notification

- Inform the cast and crew that a prop weapon will be used in the production.
- The director or department must notify and supply a schedule of performance to CWRU Police whenever a prop weapon is to be used on stage. This can prepare police and security with additional context if they receive calls regarding a weapon on campus and can preempt misunderstandings or conflict.
- Post signage and warnings to alert the audience and other building occupants to the presence of a prop weapon.
- Restrict access and handling of weapons, to authorized stage management representatives, performing arts supervisors, performers, and crew.
- No personal weapons may be used.
- Use of real weapons, functional or disabled is prohibited.

Sensitivity

Be sensitive to the impact that the use of weapons might have on audience members and performers, especially in light of current events or personal experiences. Consider additional content warnings as warranted by subject matter. Further, it would be good practice to update and familiarize yourself with evacuation procedures in the event of an emergency or a panic.

Risk Management
The theatre director must Conduct a risk assessment for the use of any weapon in a production. Consider potential hazards and implement measures to mitigate them.
Emergency Procedures
Develop and communicate clear procedures for handling emergencies related to weapon use. Separate from evacuation plans, these procedures account for injuries, near misses, illness, show stoppages, and potential crowd reactions.

Record Keeping
Keep detailed records of all weapons used, including their maintenance, use in rehearsals and performances, and any incidents they are involved in.

Alternative Methods
Where possible, consider using non-weapon props or creative stage techniques to convey action without the need for actual weapons.

Live Animals

Incorporating live animals into performing arts productions introduces unique hazards and challenges that necessitate careful consideration and planning. The presence of animals can lead to potential risks not only for the performers, crew, and audience but also for the animals themselves. These risks range from physical injuries such as scratches, bites, contusions, and broken bones to the transmission of illnesses through direct contact, secretions, or even airborne pathogens. Additionally, there's the possibility of flea infestations and allergic reactions among the cast and crew. To safeguard the well-being of both humans and animals within a theatrical setting, adherence to a structured set of procedures is essential. Arrangements for housing, feeding and overall care for the animals is required before an animal may be used or considered.

CWRU Pet Policy states: Dogs, cats, birds and other pets or animals are not permitted in any university-controlled building or on campus grounds, except for those animals that are specifically exempted by this policy. Specifically, animals are prohibited from being in offices, classrooms, hallways, and all other areas in any academic or administrative building. Exempted animals are service animals and research animals.

Prohibited Animals
The use of poisonous animals is strictly prohibited in any production.

Conducting a Risk Assessment
Begin with a thorough risk assessment to pinpoint potential hazards linked to integrating animals into your production. This should cover all aspects from illness and injury risk to fire hazards presented by animal care materials.

Seek the expertise of the Campus Institutional Animal Care & Use Committee (IACUC) for guidance in conducting this assessment. The EHS department can facilitate contact with the IACUC. Additionally, involve experienced individuals such as zookeepers, University personnel familiar with animal care, professional animal trainers, or veterinarians as necessary.

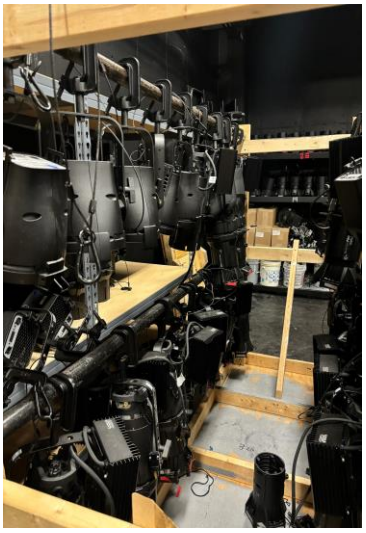
If the inclusion of animals is deemed viable following the risk assessment, collaborate with the IACUC to outline specific control measures which are crucial for ensuring the protection of all parties involved, including the animals.

Inform all potential performers and crew members about the inclusion of animals in the production. Transparency regarding the types of animals and any associated risks is key to preparedness and safety.

Develop and implement an animal care plan in partnership with the IACUC. This plan should detail the care, handling, and safety protocols for the animals involved. Consult the Risk Management department to address any insurance issues or contractual obligations related to the use of live animals.

Lighting

Lighting in the performing arts serves not just to illuminate the stage but to direct the audience's focus, set the scene's mood, and enhance the storytelling. Each production brings its unique lighting needs, from the soft glow of a romantic scene to the stark shadows of a thriller. However, working with stage lighting entails significant risks, including falls, electrocution, fire hazards, and injuries from heavy equipment. Recognizing these hazards is the first step in mitigating potential accidents and ensuring the safety of performers, crew, and audience alike.



Dimmer Rooms

Dimmer rooms can have high electrical risks and should only be maintained by qualified employees. Never hot swap[5] dimmer modules. Anytime rack maintenance occurs it should be properly shut down, locked out and tagged out. Only then should a dimmer module be removed and replaced with another. This limits the potential of arc flash and the hazardous potential of exposed busbars inside the rack. Dimmer rooms should be considered the same as other electrical rooms and should not be used as storage and the area surrounding dimmer racks should be free and clear. Dimmer racks should be cleaned at least annually. Vacuum dust from racks after they have been properly de-energized following LOTO procedures.

Fire Hazards

Stage lighting can generate intense heat, posing a fire risk, especially when close to flammable materials. To mitigate this:

- Use only approved lighting equipment and accessories.
- Ensure a safe distance between hot lights and combustible materials like curtains, paper, plastic, and textiles.
- Your venue's fire prevention training will outline fire safety systems.
- *Open flames such as candles are prohibited. Use a led alternative.*

Electrical Safety

Whether it is a small amount of power used for LED fixtures, phantom power down audio lines, or large power sources with hundreds of amps like dimmer racks or power distros/company switches, even the smallest electrical shock can be dangerous. The inherent risk of working with the high voltages encountered through performing arts lighting is high. There are some basic steps that should be taken so that a simple tingle that causes discomfort doesn't become a more significant fatal shock.

- Adhere to safe electrical practices, including lockout/tagout procedures, to prevent accidental electrocution.
- Regularly inspect lighting equipment for wear and exposed wiring.
- Report and address even minor electrical issues immediately to prevent escalation.

[5] Pulling modules without powering down and locking out the dimmer rack.

- Never plug/or unplug hot fixtures, If a light is on and you need to unplug it to do work or replace a lamp, ensure that it is turned off at the control board first. Stage lamps are under immense pressure and can easily explode if bumped in the wrong way. This lessens the risk of a lamp exploding while you have it exposed and reduces electrical risks.
- Inspect electrics[6] regularly for damage that could expose wiring, loose screws or bolts and that they are sufficiently away from flammable hazards such as curtains.
- *Use of props such as tesla coils, Jacob Ladders and Van de Graaff generators require a written approved safety plan. These devices can cause fire and injury. Actors with pacemakers or other implants may be affected.*

Risk of Falls

Installing and focusing lights often requires working at heights on ladders, personnel lifts, catwalks or scaffolding. To prevent falls:

- Identify fall hazards during planning.
- Implement appropriate fall protection measures like guardrails and fall arrest systems.
- Train staff on fall prevention and the use of protective equipment.
- *All lifts, harnesses and support devices must be inspected at least annually or in accord with manufacturer, ANSI, or OSHA requirements*

Focus Tracks and Bosun Chairs

Focus tracks are an apparatus that tracks from side to side, used to access lighting positions where ladders, lifts or scaffold are impossible or impractical (raked stages, scenic obstructions, etc). They are extremely dangerous, must be specified and installed by a professional, and used only with the proper training and attention to safety. Bosun chairs travel vertically and are similarly dangerous to operate, therefore they, and other chair systems for lifting personnel, are prohibited from use.

[6] Battens/pipes with lighting that have attached electrical raceways or breakouts.

Overhead Lighting Safety

Why are they called “lights” if they’re so darn heavy! There's a risk of severe injury from falling equipment that is highest any time a light is being moved or worked on. Additionally, whenever overhead work is occurring, pockets should be emptied, and any tools (wrenches) being used should be tethered to your person to minimize dropping hazards.

- Announce that there is overhead work occurring and clear the area directly below. Remember that theatres are often dark, and you may not be able to see if the area is clear so communication is important.
- If using a rope system to lift equipment to a higher level, communicate clearly when the load is on the line and secure, and when it is moving. Be sure to not stand below a load that is being lifted.
- Ensure all lights are securely fastened in their hanging position and tethered with a safety cable.
- During focus, electricians[7] should take a moment to verify everything is safely hung before moving on to the next fixture.

Follow Spots

Spotlights are any fixture that is physically manipulated by an operator to track an actor on stage. Spots carry their own risks and operators should be trained so they know how to properly control and maintain the light and what to do in an emergency. When follow spots are on rolling stands, ensure that the stand is stable, and stationary, and that the operator is able to reach all the components while standing or has an appropriate height chair. Be aware of the extreme heat that a spotlight can generate and provide gloves or arm protection if needed and additional water if in an enclosed area such as a spot booth.

Inspection, Maintenance, and Storage

Regular inspection and maintenance are key to preventing electrical malfunctions and fire hazards.

- Conduct visual inspections for signs of wear or damage to plugs and jackets, floor pockets and raceways.
- Keep lighting instruments/equipment clean, dust-free, and store in a dry area.
- Ensure that all electrical equipment is inspected according to your performing arts department’s specific requirements.

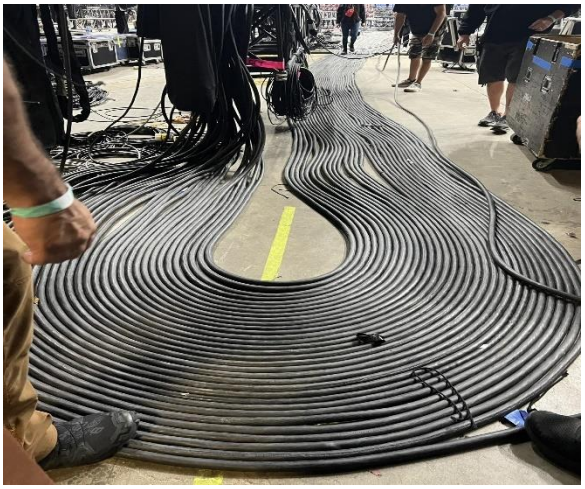
[7] Lighting specialized stagehands, not certified electricians.

- When storing fixtures, coil the power cords and push shutters in. Reverse the process when hanging lights, open shutters, uncoil power cord and ensure a safety cable is present.

House Lighting

House lighting in all performance spaces must meet or exceed the requirements laid out in the Life Safety Code for egress and emergency lighting.

NFPA 101 Section 7.8.1.3 (3) states: “In assembly occupancies, the illumination of the walking surface[8] of exit access shall be **at least a minimum 0.2 ft-candles (2.2 lux) during periods of performances** or projections involving direct light.”



Cable Management/Trip Hazards

Cable management is an often overlooked but crucial component of keeping stages and audiences safe. Well planned cable runs make for more efficient strikes, keep tripping and fire hazards low and make troubleshooting easier. Improperly run cables can leave tangled messes that are not only dangerous but can also be a distraction to patrons in smaller venues or in blackboxes where so much is exposed. There are multiple levels to good cable management starting with the paperwork, moving to the stage deck and ultimately to the air and catwalks.

- Plan cable routes carefully to avoid tangles, tripping hazards and how to cross doorways, aisles.

[8] Aisles

- Cables passing in front of or through doorways must be carefully examined. If the door is fire rated, what precautions have been taken to continue that fire rating? Are doors secure so that they aren't capable of closing and severing electrical connections.
- Guard cables in high foot traffic areas with runners that are taped down or if practical with cable ramps (yellowjackets), ideally with high visibility yellow stripes to alert cast and crew of trip hazards.
- Label cables clearly and use the shortest possible cables to reduce excess.
- Note which cables/fixtures are connected to which circuits for reference during patching and focus.
- Be sure to leave sufficient slack at the fixture to allow for focusing.
- Never tie down an instrument's power cord, these should remain free to be quickly disconnected in an emergency or for servicing, and do not tape connections together.
- Never wrap cables around beams, handrails or battens to secure them. Extra lengths of cable should be coiled and secured.
- Secure cables without over-tightening, using Velcro ties, tie line, or electrical tape to prevent damage.

Audio and Video

Audio and Video Equipment Safety in Performance Venues

There are many actions that overlap with lighting operations, so it is important to review the rigging and lifting guidelines as well as falls from heights that were mentioned in previous sections. Installing projectors and speakers involves many of the same risks, but audio introduces additional risks in the form of hearing hazards produced by high volume levels.

While seemingly different departments, audio and video are often intertwined for a variety of reasons. This leads to a wide variety of equipment from amplifiers and speakers to microphones, audio and video mixers, computers and projectors. Projection and video walls are an increasingly popular form of design that has seen rapid growth in the last decade. Also often wrapped up in these departments are program/camera feeds that are typically sent around a venue so that stage managers can see a stage is safe and clear for transitions, so actors and crew can hear where in the action they are, and for use at front of house for ushers to know when to reseat patrons.

Electrical Safety

Typically, the alternating current that is found in most power lines has a frequency of 60hz which can often manifest as problems with audio equipment. Known as 60 cycle hum, grounding issues can plague audio systems. Well planned venues have isolated grounding systems that account for the use of audio equipment. These isolated systems have a physically separate ground than the rest of the electrical system with the intention of providing a clean ground for audio. These typically manifest as orange wall plugs but may also be represented by a simple orange dot. Whenever possible, these should remain dedicated audio plugs to prevent interference with other electrically “noisy” devices).

Equipment with ground plugs that have been broken or removed should not be used until the ground is repaired and electrical ground lifts (3 to 2 prong adapters) should never be employed as it physically defeats a device's grounding.

Strict adherence to grounding requirements, safe work practices, lockout/tagout procedures, and regular training on electrical safety are crucial to mitigating shock risks. All equipment must be installed according to the manufacturers’ recommendations and must comply with all regulations and codes. Amp racks should be cleaned at least annually. Vacuum dust from racks and amps after they have been properly de-energized following LOTO procedures. Avoid cleaning with compressed air, it can contain lubricating oil that can damage electronic components

Suspended and Stand-Mounted Equipment

Line arrays, subwoofers, large speaker cabinets, and some projectors can be very heavy loads. Installing speakers and other audio equipment at height necessitates identifying fall exposures and utilizing proper fall protection measures. Comprehensive training on these measures reinforces a culture of safety.

Properly rigging suspended speaker units may be a complicated process needing the expertise of a qualified individual such as a certified rigger to ensure hanging hardware is correct and capable of suspending large loads with a proper safety factor built in. Any

flown/swagged cable drops should be marked with caution tape and provide safe clearance for any movement or traffic needs.

Tripods and crank up stands present trip/fall and tip hazards, and supervisors should train employees on proper placement to prevent accidents. Additional speaker related hazards include monitors on stage edges that could be a falling danger for pit musicians, so these should be clearly marked and secured as needed.

Noise Exposure

High decibel levels pose risks of hearing damage. Conduct sound level assessments for events expected to have high noise levels and provide hearing protection as needed, following guidelines for exposure to sounds above an 85-decibel 8-hour time-weighted average. Consult the *CWRU hearing program* for more details.

Video and Projection Equipment
Handling heavy projectors and other video equipment demands attention to proper body mechanics and, when necessary, fall protection. Utilize ladders safely and in accordance with established codes of safe practice and your ladder safety training.

Cable Management
Effective cable management is critical to both audio and lighting setups to prevent tripping hazards and maintain an organized workspace. The same cable management requirements for lighting apply to audio and video cabling as well.

Inspection, Maintenance, and Storage
Regular inspection and maintenance are key to preventing electrical malfunctions and ensuring the longevity and safe operation of audio and video equipment. Training for those responsible for these tasks is mandatory to identify and rectify potential issues promptly.

Program, Paging, and Video Feeds

While not every venue is equipped, when they are present, program feeds are a great convenience for actors and crew alike to be aware of show progression without needing to be physically present on the stage deck. Paging systems allow stage managers to make time calls leading up to a show, page actors to the stage, or make general announcements throughout the backstage areas. Video feeds of the stage could be as

simple as a front of house or balcony view providing an overview of the stage from an audience perspective. This allows people backstage to see the action occur from a performance perspective. Other feeds often include a top down or “birds’ eye” view of the stage which provides stage managers vital placement and spacing information and allows them to see transitions and spike marks from above. This insight into whether a stage is clear or if scenery is on the proper marks may prevent hazards with flown scenery or with choreography or stage automation. Stage views may also be included if other angles need to be observed by a stage manager to safely call a show and those angles are often discovered during the rehearsal process. In the case of musicals, there may also be a conductor camera to provide an indication of pit readiness at the top of acts, and to allow cast members to better follow along with a conductor’s timing or musical cues.

Despite serving different purposes, all these systems come together to ensure clear communication between stage management, backstage, and often front of house and can be vital in emergency situations for communicating with physically distant areas of a venue quickly.

Supervisor Training
Supervisors play a critical role in training team members on the proper setup, operation, and dismantling of audio and video equipment, emphasizing the importance of electrical safety, fall protection, and noise level management.

Special Effects

The most magical, spectacular and effortless moments in theatre are sometimes the exact opposite backstage. In their own ways, effects are often technical ballets needing weeks of planning, complicated safety systems, and have precise, unforgiving specifications that must be met for an effective performance. These could be larger than life moments such as flying, disappearing through a trapdoor, or pyrotechnics. Or these could be simpler, immersive elements such as fog, haze, or snow, evoking a larger surrounding world, unseen to an audience but setting a tone for the action on stage. These mechanical illusions can significantly enhance the storytelling and visual impact of a production, but also introduce specific risks that must be managed.

Comprehensive Review and Approval Process

The inclusion of special effects should undergo thorough review and approval by relevant authorities, possibly including the Campus Risk Management director, the EHS

office, and the Campus Fire Marshal. This collaborative approach ensures that all potential hazards are identified and mitigated.

Atmospheric Effects: Smoke, Fog, and Haze[9]

These effects, while visually striking, can pose risks from chemical exposure to exacerbating respiratory conditions. It is crucial to:

- Use devices and materials approved for theatrical use, ensuring they are operated within safe parameters.
- Post warnings prominently in programs and entrance points to inform attendees of their use.
- Consult with the EHS department to evaluate the impact on air quality, particularly in confined spaces.
- Consult with the EHS department to evaluate the impact to fire systems.
- Ensure all fog fluids used are approved for audience use and check the SDS for warnings and directions for safe use.
- Read and understand Actor's Equity Association's guidelines and regulations.
- Use of Smoke, Fog and Haze must be communicated to the front of house staff.

Lasers and Strobe Lighting

Given their potential to induce photosensitive reactions or cause direct eye damage, the use of lasers and strobe lights requires:

- Clear warnings, communicated to audiences and performers.
- Adherence to safety standards for laser classification and operation.
- Seeking guidance from the Campus Risk Management director and laser safety officer.
- Proper training for those impacted by laser use shall be provided as needed.
- Restrictions on outdoor use without explicit approval from regulatory bodies like the FAA to avoid endangering aircraft.
- Use of strobe lights or strobing effects must be communicated to Front of House staff so that they can prepare in the event of a patron suffering an epileptic emergency.
- A formal written safety plan for laser use is required.

[9] Smoke is a solid particulate produced by combustion. Fog and haze are liquid droplets. PLASA and AEA have guidelines

Open Flames and Pyrotechnics-Prohibited

The use of pyrotechnics on CWRU's campus is prohibited and follows a strict permitting procedure through the city of Cleveland. The EHS Fire and Life Safety Specialist works to ensure the successful filing of this permit to the city.

- Seeking approvals from the Campus Risk Management director and fire marshal, ensuring all activities comply with local fire codes and regulations.
- Implementing strict controls, including having trained crew members with fire extinguishers on fire watch standing by and using flame-retardant materials in sets and costumes.
- Prohibiting the use of explosives, any open flame, or pyrotechnic effect.
- CWRU is a smoke and tobacco free campus; Smoking should never be permitted backstage, in dressing rooms, audience areas, or lobbies.

"Cold spark" Machines

Cold spark machines have become cheaper and far more widely available in the last 10 years. They are often marketed as a safer alternative to other pyrotechnics. The selling point that most manufacturers use is the ability to pass a hand through the jet of sparks without being burned. The reality, however, is complicated. These devices ignite titanium alloy powders at temperatures near 500 degrees Celsius and the sparks are known to singe ceilings and fabric and have ignited paper in the path of the jet. They also generate dust from the spent powder that can present maintenance problems for video and lighting equipment nearby and due to the burning metal, they require a class D fire extinguisher in the immediate vicinity. The reality is that these are touted as pyrotechnic simulators but in the state of Ohio, they require all the same permits and a state pyrotechnics license to operate.

Snow, Confetti, and Foam

These types of effects are typically considered low risk; however, they do still carry some inherent hazards. Shredded paper, plastic, and mylar are all standard materials for use as snow or confetti. These can present fire and dust hazards, and care should be given how they are deployed. Mechanical dispensers such as snow pockets or drums should be safely installed and operated. Additionally:

- Never reuse materials. It is enticing to sweep up fallen snow and recycle it to keep costs down, but you run the risk of contamination from moisture or other debris on the floor.
- Be aware to distance these materials from any point of ignition.
- Use flame proofed materials whenever possible.
- For any chemically produced effects, check the SDS for warning to prevent possible irritant or ingestion hazards.
- Clean up any materials as quickly after use as conceivable. Every type carries slip and trip hazards that actors should be made aware of. Have a cleanup plan to implement during scene shifts or post-show.

Confetti cannons

Use of confetti cannons on stage isn't very common, but they are often a staple found at sporting events. These effects carry compressed gas hazards and much like firearms, need to be treated as loaded and dangerous, at all times. Improper operation and storage can turn compressed gas cylinders into projectiles. The output should be directed so that materials are launched into the air at a safe distance, and with a suitable safety barrier or demarcation in front of the device to prevent accidental discharge or impact. In outdoor use, consider the environmental impact of your effect and utilize biodegradable materials.

Water

On occasion, a script may call for a pool or rain on stage. Creative license allows for interpretation of these moments that may not be literal. If water is unavoidable, for the safety of actors you must consider how the water is treated and for the safety of the facility and others, you must consider the weight of said water and where it goes if the containing vessel fails. Electricity and water don't typically get along and care should be taken to keep them apart at all costs. Rain effects can be built with a catch trough allowing it to safely pass through a stage floor which will reduce slip risks, they can also be designed as a visual plane between the stage action and audience, making the hazards easier to contain.

Pools and tubs need to have great thought put into them during the construction phase. A gallon of water weighs roughly 8 pounds. This doesn't seem like much, but when you consider your typical bathtub contains 40-70 gallons of water, you can easily add 500 pounds to a stage in water alone and this doesn't consider the outward pressure it exerts on walls. Lastly the physical interaction of actors and water also needs to be addressed.

- Prior to the first day when the actors and stage managers will be first introduced to the water hazard, a qualified individual should conduct an assessment of all areas and the work planned between the actors, stage managers and the water hazard(s). A plan should be developed to reduce and/or eliminate the risks for the actors and stage managers.
- No later than the start of the first day the water hazard is introduced, there should be an orientation and training covering the safety measures and hazards (e.g., slipperiness, electricity used in or around water, microphones and their transmitters placed on Actors, etc)
- EHS should be contacted and consulted any time a water effect or pool is utilized.
- Water should always be clean. It should be filtered, drained, cleaned, and refilled with fresh, clean water on a regular basis to ensure that it is free of any and all contaminants before the Actors are directed to be in the water.
- The pH levels of the water must be measured and should meet the Centers for Disease Control and Prevention (CDC) recommendations.
- The water temperature should be no less than 99 degrees and the air temperature in the theater should be between 72 and 76 degrees.

Methods of drying off should be readily at hand and a person with appropriate first aid training should be made available whenever someone is in the water. EHS can provide further resources and consultation.

Pits, Trap Doors and Other Elevation Changes

Stage edges are a commonly overlooked area of safety and one easiest to address. To reduce fall incidents:

- During onstage work employ barriers to physically guard against the change in elevation. The Roe Green Theatre in MPAC has an orchestra net that is designed to prevent a fall. The stage edge should still be barricaded
- Mark elevation changes with phosphorescent tape or lighting to indicate edges.
- Lock and secure trap doors and pit access when not in use.
- Conduct regular inspections of ladders, stairs and other devices before each performance and rehearsal to ensure stability and safety.
- Identify hazards in the planning and construction phases and install temporary fall protection measures or railings as needed during rehearsals.

Trapdoor illusions are often for the quick entrance or exit of an actor. These effects take careful planning because you are effectively launching a person through physical or hydraulic means or dropping them from a height in a controlled manner. Use of trapdoors in this manner requires notification of EHS and a written safety plan, outlining the identified hazards and the methods of ensuring actor and operator safety.

Flying and Rigging Safety

The act of flying performers poses a risk to the performers, crew and audience below as well as the performer being flown. Obtain approval from the Campus Risk Management before planning any activity involving the flying of performers. Once you have received approval, engage the expertise of a company led by a professional technical engineer with extensive experience in safely rigging performers and objects for theatre. Flying plans must be submitted to EHS for final approval to be given.

General Guidelines

For intricate rigging and flying operations, collaboration with professional engineers and ETCP[10] certified riggers ensure that all safety and technical standards are met, minimizing risks to performers, crew, and the audience.

Regular training sessions for the crew on the safe operation, inspection, and maintenance of pits, trap doors, and rigging equipment are vital. Awareness of the potential hazards and the necessary precautions can significantly reduce the likelihood of accidents. Adherence to the *Performing Arts and Venue Safety Codes of Safety* and consultation of guidelines on trigger heights and controlled access zones provide a framework for implementing safety measures effectively.

Safety Above the Audience

For items to be suspended above the audience, especially those that are unusually heavy or large, seek approval from the Campus Risk Management and consult EHS for guidance. Adhere strictly to rigging guidelines and consider enlisting specialized rigging companies for complex tasks beyond the scope of regular operations.

[10] Entertainment Technician Certification Program (See Definitions)

Aerial Silks

Only trained and experienced aerialists should perform on aerial silks. Performers should have a strong understanding of the equipment and be skilled in executing moves safely.

All rigging must be installed by certified professionals with experience in aerial rigging. The rigging should be inspected regularly by a qualified rigger, particularly before each performance or rehearsal. If aerial silks are utilized, notify EHS.

Drones

The use of drones in entertainment is growing at a rapid pace. Drone photos and video of events are becoming popular for promotional uses, but also drones as performance is a growing field with the number of shows increasing every year as a replacement for fireworks.

Key facts about drones, any flight outdoors is subject to FAA regulations. Indoor flights are not under FAA jurisdiction because indoors it is considered private airspace. However, any pilot flying in any situation other than recreational, personal use, MUST have a part 107 license.

Basic Guidelines

- Always maintain visual line of sight (VLOS)
- Any drone flown indoors must have prop guarding
- Never fly above people or moving vehicles
- You must include signage indicating that a drone is operating, and that filming is occurring and entering indicates patron consent.
- Have an emergency plan for loss of control.

Costume Shop

A costume shop is a vibrant and creative studio where the magic of theater, film, and performance comes to life through clothing. It is the heart of costume design and construction, bustling with skilled artisans who draft patterns, sew, embellish, and tailor costumes to bring characters to life on stage or screen. From historical garments to fantastical outfits, the costume shop combines artistry with craftsmanship, utilizing a wide array of fabrics, trims, and techniques. Beyond mere clothing, the costume shop creates visual stories, helping actors transform into their roles and enhancing the overall aesthetic and authenticity of a production. With every stitch, a costume shop weaves together the visual tapestry of a performance, contributing significantly to the narrative and audience experience.

A costume shop is equipped with various tools and equipment essential for designing, constructing, and altering costumes. Here’s an overview of some common tools and techniques.

Sewing Machines

There was a national average of 1 trip to an emergency room a day for the past 10 years for household incidents relating to sewing machines. In 2022 alone there were 2,448 sewing machine incidents and if we compare the last 5 years of data the rate of injury has increased 12%[11]. These rates don't include statistics on industrial use, or sergers, which operate with cutting edges, more speed, and through thicker materials.

- keep fingers well away from the work area to avoid being caught and pulled in by a foot or feed dog and sewing yourself to your work. Consider using finger guards.
- Turning off the machine while threading helps prevent accidental activation.
- Ensure you're using the appropriate needle. A bent or dull needle can break and cause injury.
- Avoid loose sleeves or bracelets and tie back long hair.

Cutting

Whether using shears, rotary cutters, utility knives or powered scissors

- Always cut away from your hands and body.
- Always use a cutting mat with rotary cutters to protect surfaces and maintain blade sharpness.
- Keep the cutting line clear
- Retract blades when not in use and store cutting tools in a safe place.
- Carry scissors with your hands on the closed blades, with the point down. As the saying goes, "never run with scissors" walk slowly with an eye on your surroundings.
- Take dull scissors and knives out of service and have someone trained to replace or sharpen blades do so before they are used again.
- Handle pounce wheels and other sharp tools with care to prevent puncture wounds.

Steamers and Irons

Irons and steamers are essential tools for maintaining the appearance of clothing and fabrics. However, improper use can lead to burns, fires, and other accidents. The industrial versions, often found in shops, operate at even more extreme temperatures than their household counterparts.

- Never leave an iron turned on; turn it off when you are done using it.

[11] Date from the Consumer Product Safety Commission (CPSC) via the National Electronic Injury Surveillance System (NEISS)

- Do not leave irons and steamers unattended while they come to temperature, this helps reduce accidental burns.
- Always start at the lowest heat settings and increase gradually as needed, being aware of the heat tolerances of the fabrics you are using.
- Never use an industrial steam box iron until properly trained.
- Never set a gravity-feed iron on its back; place it on its base plate or rubber heat-resistant pad.
- Wear heat resistant gloves when steaming or handling hot garments.
- Prior to leaving the area, ensure irons are unplugged.
- When steaming, keep the steamer nozzle away from your body, especially your face, hands, and feet. Use slow, smooth motions to avoid hot water spitting.
- When using multiple steamers or irons simultaneously, be sure they are spread out over multiple circuits to avoid overloading.

Dye vats

Dyeing fabric in a costume shop involves working with chemicals, hot water, and heavy equipment, all of which can present hazards.

- Ensure all personnel involved in dyeing operations are properly trained in the use of dye vats, chemicals, and safety procedures. Review Safety Data Sheets (SDS) for all dyes and chemicals used.
- Work in a well-ventilated area, preferably with fume hoods or exhaust fans to avoid inhalation of fumes.
- Wear chemical-resistant gloves (e.g., nitrile) to protect your hands from dye, chemicals, and hot water and eye protection to protect against splashes.
- Monitor the temperature of dye vats closely. Use a thermometer to ensure the water is at the correct temperature for dyeing, and avoid overheating, which can cause burns or scalds.
- Use appropriate tools like tongs, paddles, or stirring rods to handle and stir fabrics in the dye vat. Avoid using your hands directly in the dye vat.

Ergonomics and Repetition

Working in a costume shop involves various tasks that can lead to repetitive stress injuries (RSIs) and other musculoskeletal issues if proper ergonomic practices are not followed. RSIs are injuries to the musculoskeletal system caused by repetitive motions, overuse, or maintaining awkward postures for extended periods. Common stress injuries include carpal tunnel syndrome, tendonitis, and lower back pain. Sewing, cutting fabric, pressing with irons, working at computers, and standing for long periods are all tasks that can contribute to RSIs.

When laying out sewing stations, use adjustable chairs that support your lower back. Your feet should rest flat on the floor or a footrest with your knees at a comfortable 90-degree angle. Use cutting tables that are waist height to reduce bending and strain, if they are adjustable, they can be set to the correct height for individual users. Finally, anti-fatigue mats can reduce the strain placed on legs and back while standing for long periods of time. See the ergonomics section of this document for more information and contact EHS for specific questions.

Storing Costumes

Costume storage presents several possible hazards ranging from fire to injuries. Depending on how costumes are stored, they can increase the fire load in a building and can damage or impede fire suppression systems. They also present falling object and fall risks during the storing and retrieval process. These should all be considered as costumes are pulled and replaced at the end of a production.

GENERAL STORAGE PRACTICES

- Storage areas must always be clean and dry.
- Keep stored items at least eighteen (18) inches below fire suppression sprinkler heads. (with exceptions for storage along walls)[12]
- Keep stored items at least twenty-four (24) inches from the ceiling in areas that are not sprinklered. (with exceptions for storage along walls)
- Never obstruct doors, doorways, or exit pathways.
- Maintain a clear, unobstructed space of at least thirty-six (36) inches, in all directions, from electrical service equipment, fire extinguishers, fire hose stations, and fire alarms.
- Never hang stored items on or from fire suppression sprinkler pipes or sprinkler heads
- Label sprinkler pipes and utilize warning signs to the effect of *“Never hang anything from sprinkler pipes or heads”*
- Include these storage regulations in orientation trainings to ensure performers and crew understand the requirements.

Step ladders or warehouse ladders should be provided as needed and allowed by the space. Exits and egress routes should be clearly marked and maintained with at least 28 inches of clear width[13]. Storage shelves should be equipped with lips on leading edges, guards, netting or other devices to prevent accidental falls. Heavy and large

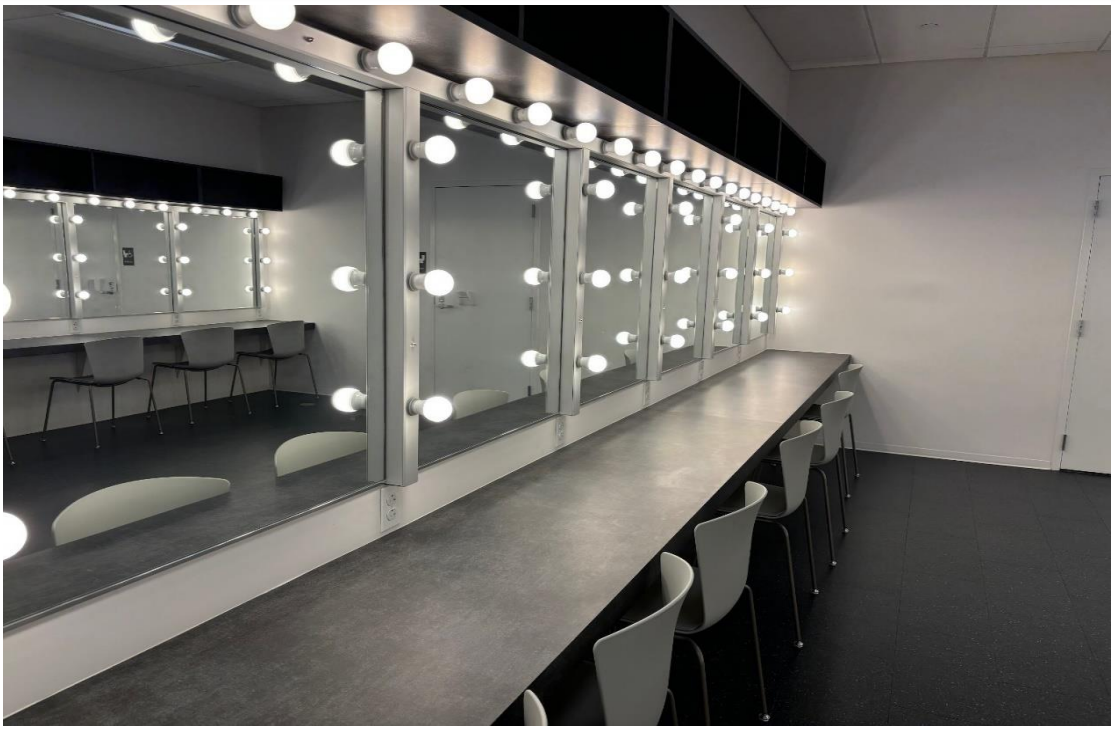
[12] **IFC 315.3.1 Ceiling clearance**

[13] OSHA 1910.36(g)(2)

items should be stored nearer to the ground to maintain a safe center of gravity and to ease the retrieval process.

Costumes, draperies and other fabrics should be cleaned before being returned to storage. Stock should be evaluated regularly for cleanliness; this improves general housekeeping by reducing dust and allergen accumulation.

Hair and Makeup



With large houses and bright lights washing out actors' features, makeup plays an important role in creating characters that connect with audiences. This could be a simple heightening of features to help emotions read from a distance or could be as extravagant as a fully green witch, a monstrous beast, or a cantankerous ogre. Numerous accounts exist throughout history of heavy metal poisoning derived from makeup recipes. While recipes and methods have evolved, there are still many toxic hazards that exist, from aluminum and other metals in makeup and deodorants to formaldehyde and solvents in nail products.
Inhalation, ingestion and absorption are all exposure routes to consider when it comes to cosmetics. It is important to choose products that are nontoxic and conform to FDA standards and carry cosmetic grade certifications. Acrylic craft paints are an appealing option because of their vibrant colors but should be avoided due to toxicity and allergy risks. When possible, use surgical adhesive in place of spirit gum. Rather than dying actors' hair, opt for wigs for any drastic style or color changes. Take stock of the types of medical tapes and their various uses in the makeup and audio fields.

Be aware That cosmetic grade does not mean reaction free. People with sensitive skin may still experience discomfort and skin irritation from paints, makeups and glues. In these instances, the products should be removed and replaced with another option, preferably a “sensitive skin” product. Continual monitoring for skin reactions through the run of a production and reporting any changes is vital for actor well-being.

Application

Always avoid communal makeup. Sharing makeup and applicators can result in transmission of diseases and every actor should have a personal supply. If there are shared cosmetics such as powders or creams, the original should be divided into smaller containers as needed to remain contaminate free. Every container must be clearly labeled with the contents and the name of the performer using it. Do not place applicators back into a shared makeup container and should a shared container be contaminated, dispose of it.

When applying makeup:

- Ensure all applicators and tools are clean before starting
- Wash your hands prior to handling tools or makeup
- Ensure the performers face has been washed
- Clean and sanitize tools between uses and when finished.
- Makeup artists should change gloves or wash hands between each application if working on multiple performers.

Removal

Remove makeup fully and as soon as reasonably possible following performances. Soap and water is an effective and safe method, cold creams, makeup wipes and exfoliating cleansers are helpful as well. Avoid the use of solvents to remove makeup, nail treatments or glue from prosthetics. A careful skin care routine is as important to an actor's skin health as the application is.

Storage

Regular housekeeping routines keep your makeup supplies in good, sanitary condition. Clean and sanitize surfaces, tools, and brushes, keeping them in clean bags or tubs that are well labeled. Store makeup in cool and dry locations and regularly check expiration dates and quality, disposing of anything expired or dried up. It is a good policy to replace any stored goods on a 6-month rotation.

Handling

Hair dyes, sprays, and treatments, nail polish and adhesives are to be treated with the same respect as other hazardous chemicals addressed in previous chapters. Understanding and keeping the SDS and inventory will help you identify the hazards of the products being used. Avoid ingestion by not allowing eating or drinking in work areas, in costume or in dressing rooms. Keep containers closed except when they are in use and be aware of pressurized and flammable aerosols and their proximity to heat sources like curling irons. For more information, reference the sections on hazardous waste disposal and hazardous waste communication or contact the EHS department for guidance.

Hazardous Waste Handling

Storage, and Disposal for Theatrical Performances, Prop Shops, and Costume Shops

Theatrical productions, prop shops, and costume shops often require the use of various hazardous materials and special effects to create captivating performances and realistic sets. While these elements can add excitement and realism to a production, they also pose potential risks to the environment and human health if not handled, stored, and disposed of properly. This section outlines best practices for managing hazardous waste associated with theatrical productions, including special effects and pyrotechnics. Before delving into the specific guidelines for handling, storage and disposal, it is crucial to identify the types of hazardous waste commonly found in theatrical settings. These may include but are not limited to:

Scenic, Costume, and Prop Materials	Paints and coatings containing toxic chemicals
	Fire retardants
	Solvents and adhesives
Special Effects Materials	**Smoke cartridges**
	Fog machines and fluids
	Dry ice
	Pyrotechnic devices (fireworks, flares, etc.)
	Chemical snow and foam

Handling, Storage, and Disposal Guidelines

Maintain a detailed inventory of all hazardous materials used in productions, including expiration dates and quantities. Clearly label all hazardous materials with appropriate hazard symbols, safety information, and expiration dates. Make sure flammable materials are stored in flammable cabinets when not in use.

Hazardous Waste Storage

Store hazardous materials in designated, well-ventilated areas away from public access. Remember that while they are no longer wanted, they still possess the same hazards as when they were new so store, handle, and treat them the same way as new materials. Use secure and labeled containers for storage. All containers of hazardous waste must be labeled with the contents, the quantity, the words hazardous waste, and the date they were filled. EHS has tags available to use for this purpose.

It is important to separate hazardous materials into compatible classes so that if broken and mixed, they do not react. For example, do not store acid and bases together and do not put bleach and ammonia or acrylics together as it can make chlorine gas. Keep pure solvents and paints in a flammable cabinet. If you have ANY questions, please contact

EHS. Make sure that storage areas are fire-resistant and equipped with safety equipment such as fire extinguishers.

Spill Containment
It is essential to have a spill containment kit readily available in areas where hazardous materials are used. Staff must be trained on proper spill response procedures to reduce risks. Though it is unlikely a major release will occur in your area, you should prepare and know what to do if a bottle breaks or if someone glues their fingers together.

Training and Awareness
Conduct regular training sessions for staff on the safe handling and disposal of hazardous materials. It is required by EHS that all workers in your area take hazard communication training which covers the above topics and others. Ensure all employees are familiar with MSDS for the products they use.

Disposal
In the EHS Hazcom training class, the use of the hazardous waste pickup sheet is covered. If you need a refresher or if you have questions, call EHS and we will guide you in preparing the sheet. This sheet is delivered to the EHS offices and used as a work order to remove the hazardous waste from your area.
Do not dispose of hazardous materials in regular trash or wastewater systems.

Recycling and Reuse
In general, the EHS department will handle this for you, but if you have any ideas, let us know. Consider environmentally friendly alternatives to hazardous materials whenever possible.

Front of House

“The play’s the thing” for Hamlet and for pretty much any patron attending a performance, but before they can get to the action on stage or screen, the first people they will meet are the front of house staff. These staff members are the public facing representation of a theatre and ultimately the university. Their most important responsibilities are fire and life safety, but they have many other more visible duties. Front of house personnel are the front line for patron relations, lobby control and crowd management.

Preparation

Depending on the venue, the type of performance or event, the needs and structure can be drastically different. There are some constants that remain the same and must be addressed to ensure a prepared staff and safe event. Establishing and understanding emergency plans, routine maintenance, and security are tantamount. Other areas of responsibility can include the auditorium, the lobby, box offices, concessions, restrooms, the building exterior, but also possibly HVAC, coat rooms, and parking areas.

Required training

Front of house staff are often a combination of employees, students and volunteers, working a variety of jobs. Their responsibilities and training should be reviewed long before the arrival of patrons and should focus on specifics. Box office staff answering phones and selling tickets have different expectations and duties than a bartender or usher. To that end, training should include:

- Specific job duties,
- Dress code for their position,
- House rules and expectations,
- Recognition of hazards,
- Policies for addressing difficult or unruly patrons,
- Emergency response duties.

Patron safety

Patron safety is the highest priority and actions taken to those ends, ensure performer and crew safety as well. Patron safety starts at the planning stage, well before you welcome guests into a space and it continues until their experience ends and they exit your grounds. Documented safety inspections should be conducted regularly including nighttime lighting, building exteriors, fire safety and emergency systems. Many of these inspections are covered by the EHS, Facilities and Public Safety departments, however it is good practice to understand and perform your own checks as the primary occupants of a building. SEE FIRE SECTION

Prior to performances and events review occupancy ratings for the venue. If temporary seats (including tables and chairs) are used, ensure that the AHJ (Authority having jurisdiction) has approved of the configuration. Staff should also verify that programs were printed with appropriate warnings based on the planned and approved use of strobe lights, lasers, pyro/haze, weapons or animals. These warnings should also be included as lobby signage (often found near entrances), and a contingency to announce these warnings verbally if needed.

It’s Ohio, so we need to talk weather. Prior to the arrival of audiences, ensure arrangements have been made with facilities and grounds to clear any leaves, storm debris, ice or snow that may impede or create slip hazards as patrons enter and exit buildings. For more weather contingencies, see the section on emergency plans.

Food safety

Whenever food is made available (either as concessions, or event catering) organizers and front of house staff must ensure compliance with campus food and beverage rules. Verify that appropriate food and drink licenses and permits are obtained and prominently displayed.

Additional Security

There are times when due to threats, content matter, or high-profile speakers where additional event security may be required. Staffing is handled through the Division of Public Safety at a rate of $47/hr per security officer or $62/hr per police officer. Shifts are a minimum of 3 hours. Additional charges of $25/hr will be added per vehicle if one is required. You may request a specific number of people, however CRWU PD may override that request based on several factors they use in evaluation.

- Security requests must be submitted at least **seven (7)** business days before the event.
- If you don't receive confirmation within 48 hours of your request (not including weekends), contact publicsafety@case.edu.
- You must provide a speed type for billing upon service request.
- Officer duties and special concerns should be discussed with Public Safety prior to the event.
- An on-site contact person must be available.
- Cancellations require 24-hour notice to avoid being charged the 3 hour minimum per officer.

House managers

Must ensure the prohibition of photography (especially flash photography) and video recording for the safety of performers and for licensing liability. They must also enforce any regulations on food and beverage in auditorium spaces

Preshow

There is typically a distinction between opening doors and opening house. The concept is the same but there are specific checks and exchanges that must occur between these events. Front of house staff can do house checks during this interim period but should be aware that a production may be running final checks of their own during this period. Actions such as sound checks, fight calls, and stage prep may be happening, and they should be given deference for use of the performance space. Prior to doors opening, the House Manager must ensure a facility walkthrough has been conducted.

The focus of this final inspection is to identify hazards that may have developed since the previous routine inspection. The focus on fire and life safety reduces the possibility of fires and verifies that patrons will be able to evacuate safely in an emergency. Hazards identified in this walkthrough must be corrected immediately. If they can't be corrected a determination of the severity of the hazard must be made and if needed (in consultation with other parties) the show shall be postponed or canceled. These could be weather hazards such as developing storms

Exits

- Ensure aisles, stairs and exit paths are unobstructed.
- When temporary seating is used, verify that aisle widths meet code requirements.
- Ensure no tables (concessions, merchandise, informational) obstruct access to exits.
- Ensure no curtains or drapes obscure or block view or access to exits.
- Ensure exit doors are clearly marked and that nothing will impede their operation.
- Ensure a clear area of 6' on either side of exit doors to allow the convergence of evacuees.
- Ensure exit doors open easily and do not impede egress.
- Check the exterior side for obstructions.
- Ensure that there is a clear path from every exit door to a safe place of refuge or the predetermined rally point.
- Ensure all exit signs are illuminated, and that emergency lighting is functioning.
- Check auditorium aisle pathways have clear illumination.

Fire systems

- Ensure all fire extinguishers are in place and seals are unbroken.
- Verify that charge gauges are in the green zone and inspection tag is up to date.
- Ensure all fire hoses are mounted and undamaged.
- Ensure access to extinguishers and alarm stations are unobstructed with 36" of horizontal clearance and unobscured.[14]

Facility

- Ensure warnings signs are posted in the lobby for the planned use of strobes, lasers, pyro, weapons, live animals and prohibiting photography.
- Ensure that informational signs are positioned so that patrons can see them prior to auditorium entry, but that they don't obstruct egress routes.

[14] The definition of "unobstructed" is often applied following the nfpa-70E, Article 110.26 set-back requirement.

- Check for trip and fall hazards.
- Ensure entry rugs are level, and that lobby floor is dry and will remain dry as patrons arrive.
- Ensure exterior entries are clear and free of debris, trash and ice.
- Ensure restrooms are clean, dry, safe and stocked
- Verify that cleaning tools and supplies are nearby and immediately available to clean up spills or respond to illness.

Showtime

As you approach the time of house opening (typically 30 minutes before the start of the show) a second set of conditions must be met. The House Manager should be in contact with stage management and should discuss how control is handed off for the start of the show and how to call for holds due to technical issues once a show has begun. Every venue has different policies, and these nuances should be covered as part of specific training for each venue. A basic outline of best practices is laid out below.

Once a show or event has begun, after a brief window to allow for late comers (15-30 minutes) consider locking the exterior doors. This provides a layer of security by preventing bad actors from entering a building unnoticed while staff and patron attention is focused elsewhere.

Front of house personnel are responsible for controlling crowds, enforcing house rules, emergency response, incident investigation and safety announcements. The House Manager must be on premises prior to the first patron's arrival until the last patron has left, unless there is a procedure to delegate patron safety to another party. Non-emergency announcements may be made using a microphone from a booth or calling position.

Preshow Fire Announcement

- Theaters
- Motion picture theaters
- Auditoriums
- Other similar assembly occupancies with occupant loads exceeding 300 where there are noncontinuous programs

must make an audible announcement or project an image, prior to the start of each program that notifies occupants of the location of the exits to be used in case of a fire or other emergency.

In an emergency

The House Manager will go to the stage and provide information to the audience regarding the emergency and provide instruction for their expected actions following (evacuating, sheltering in place, moving to another location etc). It is important that the House Manager is visible for this announcement as it is a reassurance and provides face-to-face interaction, keeping the situation calm and managed. Ushers must be trained in procedures outlined in the Emergency Response Plan and lead patrons to assembly points. After the emergency has ended, work with EHS to complete an incident investigation.

In the event of injuries and illness

For minor injuries, provide first aid immediately. Ensure that universal precautions are used and stocked in first aid kits to reduce the risk of bloodborne pathogen exposure. These include CPR safety masks, latex gloves, and materials to clean, bandage and if needed apply pressure to wounds.

Serious Injuries

For non-minor injuries such as head injuries, loss of consciousness, stroke, heart attack or symptoms, loss of breathing or deep wounds. Call medical services immediately by calling 216.368.3333 or 911 and be sure that you know where you are. Unless the call comes from a landline, dispatchers may not be able to determine precise locations. 1 caller with clear, concise information saves vital response time. Notify superiors of injuries immediately and post personnel at entry points and along the route to assist in directing emergency responders to the injured person's location.

Automated External Defibrillators

are available around campus, if you have received CPR training you should have also had AED training. That said, because of their automated nature and diagrams, they are designed so that anybody can use them, regardless of training. Announcements will be made, and instructions will be given. Follow the instructions given by the device and any training you have received.

Investigation

As soon as an injured or ill person's needs have been met, begin gathering information for an incident investigation. Obtain information from the individual and any patrons with them and any witnesses to the event, including:

- Names
- Address
- Phone number
- Medical conditions or medications (first responders will also need this information)
- What was seen or heard

Document this information and report the event to EHS and risk management.

Crowd management

Tragic events have shown us that fire isn't the only thing that can cause a rush to the emergency exits. Trained staff can save lives and prevent trampling, crushing and surge injuries.

The NFPA[15] life safety code (12.7.6.1) requires 1 trained crowd manager at every assembly to facilitate an orderly response to an emergency. Additional crowd managers must be supplied when the occupancy load exceeds 250 at a rate of one manager per 250 occupants. By NFPA definition, assembly occupancy is any gathering of 50 or more people for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses. Crowd managers are a vital component of life safety and should not be overlooked.

Post show

When it is believed that all patrons have departed, cleanup operations should begin, food and beverages stored, exit doors should be secured and any incident report and performance reports should be completed and submitted. House Managers should do a sweep of the building to ensure patrons have exited before finishing shutdown procedures.

[15] National Fire Protection Association

Strike

When a show has concluded its run, a concert has ended, a touring production drops its final curtain, or simply when the party is over, it's time to pack it all up and send everyone on their way. Sometimes that is a complicated process involving deconstruction of sets and lighting, removal of risers and temporary seating, and restoring a venue back to a blank slate. Strike can be loud, busy and disorienting for the untrained and for volunteers that may be assisting. For this reason, it is important that a trained and qualified person supervises the action.

There can be costs associated with a strike that should be planned for as part of a production budget. These costs could include dumpster rental, laundry fees and the cost of hiring workers to assist with various tasks. A strike plan should include all the areas where work will be conducted, and the order of events and the crews involved. For something like a one-off event or a roadshow strike might continue until it is finished. When working with student crews, strike may occur over a period of days. No matter the duration, proper planning is required.

Schedule

The determination of WHEN a strike will occur depends on the venue schedule, availability of crew, labor contracts, and safety considerations. It is common in professional settings where a show needs to move on to another stop (often the very next day) for Strike to begin immediately following a show. Often a fresh strike crew is brought in and can mean a long day for the show crew if they aren't relieved at this time. More injuries occur during extended or unusual hours, and this should be taken into consideration. When possible, building time into the schedule to allow for a slower, more gradual strike reduces risks because crews are not pressed to work quickly which can lead to haphazard work and to skipping safety measures in the name of "time saving".

Planning

During the planning process, determine who will distribute PPE, what PPE will be needed, who will install safeguards for the stage edge, who will maintain oversight of strike safety, and who will complete a final walk through to ensure strike is complete. Delegating specific responsibility allows crews or departments to work simultaneously and efficiently.

Distractions

Distractions during strike activities increase the risk of injury. Strikes are already noisy. It is not unusual to have to shout to be heard. Prohibit the use of personal entertainment devices or music. Distractions can also be caused by unauthorized personnel “visiting” the strike. If students or visitors must be there to observe the operations, require them to adhere to all safety rules and precautions expected of the crew, and require them to be continuously supervised.

Training

Begin strike with a safety meeting and orientation. During this time the plan should be explained including the delineations of strike leaders and each crew's assigned tasks. This training should also include how to handle pieces being discarded or saved, warning crew to remove nails and staples from pieces or hammer them flat, cleaning as you work and picking up screws, bolts and other debris that could become trip hazards. Explain the PPE requirements, what they must wear, when they must wear it, and how to receive/return PPE. Lastly, cover any house rules and how to communicate for exceptionally hazardous tasks that need complete focus like derigging large scenic elements, group lifts or other specialized moments that are anticipated.

Review

It is important to review each production and strike in a “postmortem”. In this review you should objectively discuss what went well, what went poorly, what should be done differently, any incidents or near misses, and any needs that went unfilled. While this strike review can happen simultaneously with a production review, it is generally more effective to have it at a shop level so that crews can more easily weigh in and more time can be spent discussing and documenting the process and action plans for the future.

Emergency response plans

Building Coordinators are responsible for writing and updating building Emergency Action Plans. These plans can be found on the Public Safety division's website. In the event of campus wide emergencies or severe weather, the university notifies the community through the Spartan Safe app. In the app you can receive real time announcements and instruction as well as find campus maps and emergency plans. Spartan Safe is an opt out system. In the event that an emergency does not impact the entirety of campus, the development of venue specific response plans is required for the safety of students, staff, performers, crew and patrons. Assistance in creating these plans and conducting training for staff, performers, and crew can be provided by EHS, Risk Management and the Public Safety Division.

Assign duties

Emergency plans need to be specific and thorough, assign duties based on skill sets and the authority to carry out assigned tasks. Consider building conditions throughout the day. Will what is happening change based on who is present and the response needed? What events might occur during performances, rehearsals, during classes or a typical workday? How do you evacuate patrons with mobility issues? And how might those events occur differently under those conditions. Personnel that are assigned emergency response duties should have those duties clearly detailed in action plans and should receive initial and recurring training. Ensure that venue specific site plans are compatible with campus response plans found online and in the Spartan Safe app.

Evacuation

In the event of an emergency that requires evacuating patrons and staff, announcement procedures must be defined. There must be clarity on how the need to evacuate is communicated to cast, crew, building staff, and patrons. Determine who specifically will make announcements. In an evacuation, stage management is responsible for assisting cast/crew and front of house is responsible for assisting patrons. In class settings,

instructors are responsible for students. These requirements apply to all EAP's regardless of venue or location.

All site-specific plans should have a primary evacuation route and a secondary route in the event that the first is blocked. Included in this planning should be an assessment of accessible routes and areas of refuge where evacuees who are unable to exit can shelter until help arrives. It is important to use stairs, not elevators, take ONLY essential items and to move quickly but in an orderly manner.

Assembly points

An assembly point is an area outside of a building for evacuees to gather and regroup. It should be far enough removed (at least 300 feet) that any building hazards are no longer a threat and out of the anticipated path of first responders.

Training

Everyone in a building that assists others with evacuating should be familiar and comfortable with these routes, refuge areas and assembly points. Maps documenting routes and refuge should be posted and visible at all times.

Shelter in place

There are times when the university may issue a shelter in place order. This could be due to weather events, power outages or active threats. Determine how a show stoppage occurs and is communicated and how action is to resume after an all clear. How will the facility be secured and where will patrons shelter to be protected?

Fire

In case of fire:

- Activate the building fire alarm.
- Call the campus emergency line at 216-368-3333, be specific about where the fire is.
- Activate the fire curtain, in some cases this may involve breaking a glass cover (see the fire equipment section)
- Evacuate the building, closing doors after each area or room is cleared.
- Immediately go to the assembly area and remain there for further instruction, never reenter the building.
- Attempt to extinguish a fire ONLY if you have been trained, feel comfortable, the fire is small, can be extinguished in less than 10 seconds or if you have no other choice.

Chemical spills and exposure

Hazardous materials can put people in immediate danger from exposure, contact, inhalation or ingestion. If there is a danger or noxious fumes, evacuate the area. As soon as possible, call the emergency line at 216-368-3333. After the emergency has ended, report all chemical spills to EHS. All personnel who work with hazardous chemicals or in an area where they are used or stored need to be trained in the response procedures.

Contact with eyes and skin

- Flush the skin immediately with running water. For eyes, keep them in contact with water from an eye wash station for at least 15 minutes and do not wait to remove contact lenses.
- Seek immediate medical attention for eye contact and for any chemical burns.
- Provide a Safety Data Sheet for the specific chemical exposure to medical personnel when they arrive.

Inhalation

- Immediately seek fresh air.
- Remove anybody that is unresponsive to fresh air.
- As you exit, turn on any exhaust ventilation and leave the door open
- Provide first aid as needed and if symptoms don't subside or a person remains unconscious, seek medical attention.
- Provide any applicable SDS to medical personnel

Ingestion

- Follow safety guidelines prohibiting eating, drinking, or serving food where chemicals are used or stored.
- Seek medical attention for incidents of ingestion and provide SDS to medical personnel.

Power outage

Many buildings on campus have backup power generators to cope with power loss situations. Be aware that generators can take a few minutes to initiate and restore power and that trip and fall incidents greatly increase during power losses from people trying to move in the dark.

- If there is no immediate danger, stay where you are and wait for directions from the front of house or stage management staff.
- Report the power outage to the CWRU Non-Emergency line at 216-368-3300
- If after 5 minutes you are still in the dark, the building may not have a generator, or it may not be functioning properly. At that point proceed with caution to an area lit with emergency lighting.

- If asked to evacuate, proceed cautiously to the nearest exit and move to the assembly point or at least 300 feet away from the structure.

Medical

A medical emergency is an injury or illness that poses an immediate risk to a person's life or health.

- Immediately call CWRU Public Safety at 216-368-3333 or 911
- Unless you are trained, do not render assistance above basic first aid.
- Utilize universal precautions while delivering aid. If the injured person is able, allow them to clean, bandage or apply pressure to the wound themselves. Be sure to wear gloves, use a CPR mask if giving CPR and wash hands immediately after removing gloves.
- AEDs and Stop the Bleed kits are located in wall mounted cabinets in buildings and populated areas.
- Clear the area of unnecessary people
- Have someone meet and escort the medical team to the injured person.
- Notify supervisors or the person in charge for any non-minor injuries
- Remain after the person's needs are met to assist the incident investigation.

Weather

Severe weather events include high winds, tornadoes, and hail. The process for how a performance is delayed or canceled must be spelled out in advance. Determine how a final decision will be made and when that decision will occur, leaving time to notify patrons of the change. Continuous monitoring is required as severe weather approaches.

- Seek shelter away from windows, doors, skylights, or other objects that could cause injury if knocked or blown over.
- Have established locations that you can move patrons to if you need to shelter a large number of people
- Do not use elevators

Training

Emergency response training should be conducted and documented for all students, new crew members, performers, front of house staff and volunteers. It is imperative that people understand the procedures and any responsibilities they have during anticipated emergency situations. Front of house and backstage personnel should also receive first

aid, CPR and AED training. This training should be conducted annually, when response plans change, or as needed when new employees or students join.

Drills

Part of the annual training should include documented practice drills. Track and record the time it takes to fully evacuate a building, find and retrieve AEDs or how to move a group to an area of refuge. Review safety plans afterwards to identify areas of improvement. EHS, risk management and Public Safety are here to assist and can provide guidance. There may be times throughout the year when these departments conduct drills that may be unannounced.

As the distance between training or instruction grows your memories and skills may fade. Being vigilant every day and aware of hazards as you encounter them is important to keeping response times fast and your knowledge in the foreground even during the chaos of productions, teaching classes and managing students. Report issues as you see them to the appropriate departments and continue to examine spaces critically for hazards as they develop.

Fire Systems

EHS ensures that exit signs, emergency lighting systems, and fire suppression systems are inspected regularly and are functioning properly. Additionally, EHS verifies that fire extinguishers are inspected, replaced annually, that fire alarm control panels are free of faults with up to date inspections. Although these occur on a regular basis, there are times between these inspections where situations may change. You should not rely solely on the knowledge that these checks occur and should maintain your own system of periodic checks of the areas in which you work. Should you encounter burnt out exit signs, alarm faults, or out-of-date inspections please contact EHS with the details, for the issue to be rectified.

Flame retardant

In the early days we referred to “fireproofing” or “flame proofing” which led to the belief that materials could be treated once and made truly flame*proof,* and the materials would be good for life. The reality is that any material will ignite if placed near a hot enough source. Our hope in treating materials is to increase the temperature at which materials ignite, slow the spread of flames and to ensure that materials self-extinguish when the source is removed. The increasing use of IFR[16] materials has helped stem some of the

[16] Inherently Fire Resistant

complacency about flame retarding because their properties are *inherent*, but when schools and venues across the country have had the same drapes for upwards of 20 years, it's a good bet they have out of date flame certifications. Some believe that fires do not occur often enough to merit special attention. The reality is that the list of catastrophic fires continues to grow every year, and our memory is short.

Fire codes require that materials purchased for use in public assembly venues must be flame resistant. There's a phrase: "codes are written in blood" because we can look at horrific examples of theatre and nightclub fires full of preventable deaths that are still fresh in some minds. The NFPA has publications specifically on flame-retarding (NFPA 701 and 703) and the North American Flame Retardant Alliance is one of the primary sources for research and new information.

- Soft goods should be labeled and dated with the most recent application of flame retardant.
- Signed and dated certificates (flame certs) shall be maintained and curtains shall be checked once a year. If a curtain fails to pass a flame test, the stage may not be used until the full set of curtains has been tested and passes. The same is true of any scenery used on stage
- Scenery should be backpainted[17] with flame treated paint.

Extinguishers

- Fire extinguishers must be inspected annually and must have a tag marking when that inspection occurred.
- Direct and clear access to extinguishers shall be maintained at all times. Nothing should block physical access.
- Extinguishers should not be on the floor. They must be mounted or secured in a labeled enclosure. This prevents the potential that they are covered, blocked, hard to find, and keeps them from being knocked over and possibly damaged.
- It is vital that the proper classification of extinguishers is used for the types of exposure in a given area. ABC types are the most often recommended.
- Do not mistake an ABC inspection tag (an extinguisher servicing company) as a label for the TYPE of extinguisher.
- Consider requirements for fire watches, outdoor events and other situations where hazards or gathered crowds may necessitate extinguishers beyond the permanently installed options already in a building.

[17] The act of painting the reverse or non visible side of scenery to cover any exposed raw lumber. Typically done with basic black.

Fire Hoses

There was a time where fire hose cabinets were required to be included on stage. This is no longer the case[18] for good reason. Counterweight rigging is inherently dangerous to begin with, even without the additional hazards of fire and water. There have been times when firefighters refuse to enter a burning stage due to the hazards presented by rigging as it fails. Flown scenery changes weight as it burns, in the same way that spraying water on curtains changes their weight as it is absorbed into the fabric. Both situations can result in weight imbalances greater than what the rigging and its components are rated for. This can cause runaway linesets to crash to the ground or impact the grid. This is one reason why it is imperative to activate the fire curtain and evacuate a stage if a fire should break out. It is *not* advised to stay on stage and attempt to fight a fire with a wall mounted hose if one is present. Fire hoses in *every* building should be viewed as being there for fire department use only.

Smoke hatches

Smoke hatches must open automatically to release heat, smoke and toxic fumes in the event of a fire emergency[19]. They serve to draw heat and smoke up and away from the stage. Any rooftop venting system, no matter its design, should be cycled by release and reset on a frequent basis. Roof top vents are often neglected and as buildings age it is too common to see them chained shut or sealed up. There are arguments that smoke hatches provide far greater protection than fire curtains for keeping smoke and combustion byproducts out of audience areas.

[18] The NFPA's 2018 Life Safety Code (101) removed the hose and standpipe requirements for stages.
[19] IBC 910 Heat & Smoke Vents, IBC 410 Stages & Platforms, IBC 3004 Hoistway Vents, NFPA 204 Standard for Smoke and Heat Venting

Fire Curtains

The job of a fire safety curtain is to protect the audience from the spread of fire and smoke between the auditorium and the stage. Much like the other components of a fire safety system, it should be inspected yearly. In the interim, the fire safety curtain should be operated regularly to ensure proper function. In the past fire curtains were primarily constructed using asbestos. These curtains are still in existence and can be found in some older venues. Modern fire curtains are made of glass cloth which is highly resistant to the passage of heat and smoke. The basic components of most fire curtains are simple. Counter balanced rigging means the weight of the curtain is offset with weight somewhere else. In an emergency, when activated, additional weight is added to the curtain side making it heavier which, in turn, causes it to close. Gravity does the work. This activation could be from pulling the release pin or trigger that secures the curtain, or a fusible link in the system could get hot enough to melt and release the line. The sides of the curtain are enclosed by steel smoke pockets. It is important to keep these fire pockets and the “fire line” where the curtain will fall, completely clear[20]. To function properly the curtain must seal to the ground. If something prevents that, it won’t reach the specified fire rating and, in some cases, could cause a chimney effect that exacerbates the fire. This means no scenery, cables, or other obstructions may cross the curtain at any time.

Fire code[21] requires that the fire curtain is to be down when the stage is not in use. Too often this rule is ignored, and curtains go untested and fail when needed most.

20.7.1.1* The fire safety curtain assembly shall be closed at all times except when there is an event, rehearsal, or similar activity.

A.20.7.1.1 Having the fire safety curtain assembly in a closed position has many advantages. First, the fire safety curtain gets moved and used, helping to ensure that during an emergency it will perform as expected. Second, problems with the fire safety curtain will be noticed while it is being closed or reset, and maintenance can be performed in a timely fashion. Third, the technicians, janitors, and users are conscious of the fact that there is a fire safety curtain and that the area below it, along with the vertical guide pockets, needs to be kept clear of obstructions. Fourth, technicians, janitors, and users become familiar with the fire safety curtain and its workings, are less afraid to use it, and are less likely to overlook this piece of safety equipment.

[20] NFPA 101
[21] NFPA 80 20.7.1.1

Occupancy

All environments and spaces where people gather are subject to the rules of the NFPA life safety code for capacity. These ordinances shall be firmly enforced. One of the most blatant life safety violations is disregarding legal occupancy limits, followed by obstructed egress routes. Room capacities should be posted, and front of house staff should ensure that this limit is not exceeded.

Theatre Maintenance

Maintenance is not the glamorous side of performance art, but it is a step that can't be overlooked in the production process. Much like emergency response plans, if everyone assumes someone else is responsible, you'll be faced with inaction in the name of "deferred maintenance".[22] Clear, proactive plans prevent damage, injuries and prolong the life of equipment and facilities.

Routine inspections are the primary method of determining what systems need repaired and evaluating needs. Beginning with observations and evaluations allows for simple problems to be corrected quickly and, over time, reveals patterns if issues are recurring. As inspection cycles progress and corrective plans are implemented you may you're your actions are effective, that the outcome wasn't as intended, or that there are deeper root causes than your initial observation revealed. If the latter outcomes occur, reevaluate, and continue developing new plans until you reach the desired outcome. Theatres and the performing arts are dynamic and fast changing, minor problems and simple wear and tear can quickly evolve into hazardous conditions. Recognizing these moments and correcting them leads to a safer environment for everyone involved.

To be effective, this cycle of inspection should identify some key points.

- Who is responsible for inspections
- When they occur
- How will they be managed and documented and how corrective actions are applied.

[22] Deferred maintenance may seem like an enticing method of saving budget, but often results in higher long term costs, inopportune failures, and possibly catastrophic health and safety repercussions.

Preventative

Scheduled preventative maintenance ensures facilities continue to function over their lifespan with all their parts operating as intended. Depending on the type of maintenance, the responsibilities may fall to Performing Arts Departments, some may be performed by Facilities or EHS and others may be external contractors. Every department and venue manager should be clear on what needs to be inspected or serviced, who will do the work and the timeline on which it must be completed. Scheduled maintenance often occurs on a similar timeline as inspections so that they coincide or can be completed shortly after if inspections reveal the need for corrective measures. Some examples have clear delineation of responsibility and others are overlapping; they include but are not limited to:

- **Elevators-** The Facilities Department takes responsibility for elevator inspection and repairs; this typically occurs during the summer break. Current inspection certificates should be posted in each elevator.
- **Backup Generators-** Generators should be tested monthly and serviced yearly. The facilities department conducts this work. Follow manufacturers guidelines for routine maintenance.
- **HVAC Systems-** The Facilities Department will replace air filters on a regular schedule, a log should be maintained that records filter changes.
- **Aerial lifts (MEWPS)-** Are inspected annually by the Facilities Department, any damage that is discovered should be reported and documented. Follow Manufacturers guidelines on servicing pumps, hydraulic systems and batteries.
- **Stage Curtains-** After every performance, curtains should be inspected for dirt, tears and other damage. Do not tape tears, repair them using pins or by sewing. Ensure softgoods remain clean by either brushing them or vacuuming them semi-annually. Start at the top and work towards the bottom, repeating the process on the back side. If the curtain is not an IFR fabric, then it must be retreated every 2 to 5 years and after any washing or dry cleaning that occurs. Replace softgoods when dry rot is found and when fabric frays on its own or begins to easily tear.
- **Scene Shop Tools-** Shop managers should follow maintenance schedules laid out by the owner's manuals for each machine. At times this may require outside contracted services.
- **Costume Shop Tools-** Shop managers should follow maintenance schedules laid out by the owner's manuals for each machine. At times this may require outside contracted services.
- **Spray Booths and Hoods-** OSHA requires yearly testing of ventilation hoods and after any repairs. Contact EHS to arrange these inspections. Work with Facilities to determine how often replacement or cleaning of filters should occur

and who will be responsible for that work. Maintain a log of inspections, filter changes and maintenance.

- **Fly Systems-**Dept/EHS - Counterweight rigging, hemp rigging and motorized rigging systems require annual inspections and servicing by competent personnel. Arrange for external inspections every 3 years in addition to the annual in-house inspections. Maintain records of inspections and repair/service activities.
- **PIT equipment and MEWPS-** Inspected annually. Follow manufacturers maintenance schedule.
- **Asbestos-** There are many buildings on campus that were built prior to 1982 and could have asbestos. It was a common fireproofing material found in fire curtains and even as artificial snow. It can be found in pipe wraps, “popcorn” ceilings, sprayed on coatings, electrical insulation in lighting. Even after 1982[23] items in buildings could contain asbestos. If you’re doing work and suspect an area could contain asbestos contact EHS.
- **Cranes and Hoists-** Inspected annually by EHS.

EHS and Facilities can aid in developing an inspection and maintenance program

Routine

Routine maintenance is a key to good housekeeping and a robust process often uncovers potential issues before they can become hazards. It keeps your facility clean and sanitary for students, staff and patrons. CWRU has cleaning crews that help empty trash and maintain floors, surfaces and bathrooms. If you notice a specific need for cleaning or attention, contact customer service at 216.368.2580 or submit a work request. Complete an event notification/ service request 2 weeks prior to your event if you are hosting an event on campus that requires support from Facilities Services such as custodial, trash removal, sprinkler shut off, or electrical services.

Cleaning

There are times when productions may need to undertake additional cleaning. Whether it is cleaning up material debris or salt and snow that have been tracked into hallways, or replacing nearly empty soap in a bathroom, these details should be part of performance prep. These duties are shared by departments, House Managers, and production crews to ensure a venue is ready to receive an influx of patrons.

[23] 1982 marked the first bankruptcy due to legal issues regarding asbestos followed by a ban on all new asbestos in 1989

Many contracted cleaning responsibilities do not extend to the stage. Stages should be dry mopped and wet mopped prior to every performance as part of preshow preparation. This ensures a safe and clean surface for performers. Remember that this preshow mopping should typically be just water, this prevents leaving behind any soap residue that could cause dancers or actors to slip. Communicate with cleaning crews and work to provide training on fall hazards due to seating or areas they may encounter in your facility.

Eyewash Stations

Emergency eye wash stations should be regularly inspected. However, they must also be operated monthly to ensure that the water lines are clean and clear. Routine flushing of the water in the pipes ensures that any rust or debris is removed. It is good practice for shop managers to develop a schedule for flushing, where stations are operated until the water is clean, and keeping a log to verify it is ready for use in an emergency.

Codes of Safety

This portion of the Performing Arts and Venue Safety Manual is designed as a quick reference manual, outlining codes of best practice and providing forms to log training.

Before beginning any work all new employees, students and volunteers, must receive an initial overview of the department and facility before being given authority to access spaces, tools and equipment. These overviews should include an orientation for emergency response plans.

The general safety awareness checklist must be filled out for each individual and initialed to confirm each training has been completed. Supervisors should use the training matrix to determine what areas of training individuals should receive based on the areas of their work. The codes are intended to be used as training tools, giving the basic requirements for each topic. They should be reviewed at the start of any job assignments with refreshers given after extended periods of absence or when unsafe work practices have been identified. The areas of focus can be found following, in alphabetical order.

Safety Awareness Training

Before beginning any work in a new space, students, employees and volunteers must receive an overview of the facility and areas where they will work, any safety plans, response plans and life safety equipment.

There should be a log for every new student, employee or volunteer. Use of this form is not required, but an equivalent record should be kept on file. Ensure every applicable area is reviewed and initialed for confirmation.

Student/Employee/Volunteer Name:_____ Case ID:_____

Supervisor/Instructor/PI's Name:_____

Department/Organization:_____ Facility:_____

Area of Focus	Date of Review	Initials
Injury Prevention An overview of OSHA right to know, how to report hazards, department or facility specific plans/rules.		
Access Restrictions Review the requirements needed to become authorized to work in certain areas, access facilities or work in catwalks, grids, or other hazardous work locations.		
PPE and Work Attire Address the location, training and need for proper PPE, and clothing requirements for various areas or activities.		
Hazcom Review how to access and understand Safety Data Sheets and hazard labels		
Fire Safety Review the locations and use of fire alarm pull stations and fire extinguisher, procedures and how to activate fire curtains		
Emergency Exits and Egress Routes Review primary exit routes and assembly areas.		
Life Safety Equipment Review the location of first aid kits, AED, and eyewash		
Emergency Contacts Identify campus emergency numbers, EHS contacts		
Codes of Safety Evaluation Review the training matrix to determine which codes must be covered based on work assignments		

Codes of Safety Training Record

Student/Employee/Volunteer's Name:_____ Case ID:_____

Supervisors Name:_____

☐ Set Construction	☐ Costumes	☐ Props	☐ Lighting
☐ Audio/Video	☐ Special Effects	☐ Hair and Makeup	☐ Front of House
☐ Strike	☐ Maintenance	☐ University Events	☐ Student Groups

Using the areas of focus selected above and the training matrix, identify the topics to review and the date they are completed. Keep this sheet and add to it as new topics are added.

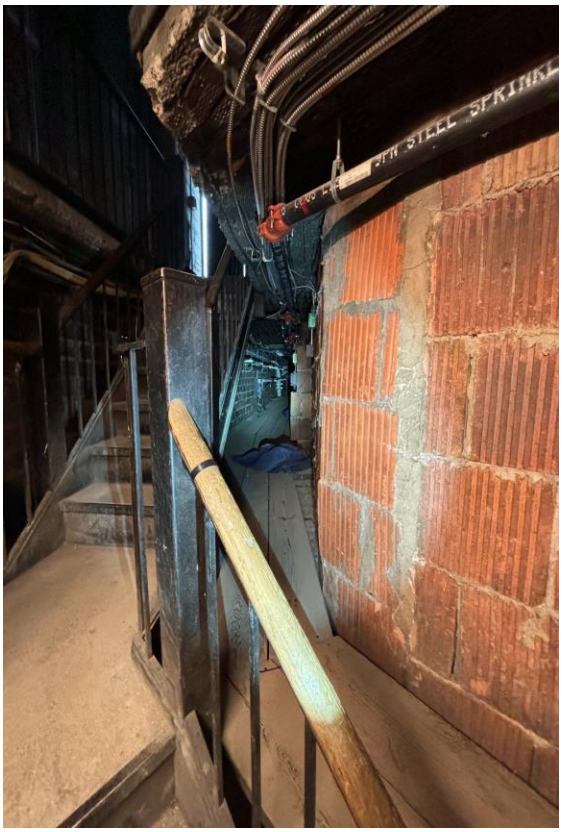
Topic	Date	Initials
☒ Performing Arts and Venue Safety Manual		
☒ Safety Awareness		
☐ Confined Space		
☐ Cosmetics		
☒ Electrical Safety		
☒ Emergency Plans		
☒ Ergonomics		
☐ Eyewash Station		
☐ Fall Protection Catwalks		
☐ Fall Protection Controlled Access		
☐ Fall Protection Fixed Ladder		
☒ Fall Protection Portable Ladder		
☐ Fall Protection Scaffolding		
☒ First Aid		
☒ Hazcom		
☒ Heat Illness		
☒ Housekeeping		
☐ Lockout/Tagout		
☐ Machine Guards		
☒ Material Handling		
☐ Mobile Elevated Work Platforms		
☐ Outdoor Structures		
☐ Paints/inks/dyes		
☐ Paint Booth		
☒ PPE		
☐ Props - edged		
☐ Props - Firearms		
☐ Props - Animals		
☐ Respiratory Protection		
☐ Rigging-General		
☐ Rigging-Hoists		
☐ Rigging-Rope		
☒ Storage		
☐ Tools and Machines -General Shop Safety		

Training Matrix

If you are assigned or work in any of the areas in the column headings, you must review the code of safe practices (and corresponding chapters) marked with an X in each column. Record the date the code was reviewed on the General Safe Awareness sheet.	Set Construction	Costume Shop	Props	Lighting	Audio	Special Effects	Hair and Makeup	Front of House	Strike	Maintenance	University events	Student Clubs
General Safety Awareness	X	X	X	X	X	X	X	X	X	X	X	X
Confined Space	X			X	X	X			X	X		
Cosmetics		X					X					
Electrical Safety	X	X	X	X	X	X	X	X	X	X	X	X
Emergency Action/Response	X	X	X	X	X	X	X	X	X	X	X	X
Ergonomics	X	X	X	X	X	X	X	X	X	X	X	X
Eyewash Stations	X	X	X			X	X		X	X		X
Fall Protection - Catwalk Safety	X		X	X	X	X			X	X		X
Fall Protection - Controlled Access	X		X	X	X	X			X	X		X
Fall Protection - Fixed Ladder	X		X	X	X	X			X	X		X
Fall Protection - Portable Ladders	X	X	X	X	X	X	X	X	X	X	X	X
Fall Protection - Scaffolds	X	X	X	X	X	X			X	X		X
First Aid	X	X	X	X	X	X	X	X	X	X	X	X
Hazard Communication	X	X	X	X	X	X	X	X	X	X	X	X
Heat Illness	X	X	X	X	X	X	X	X	X	X	X	X
Housekeeping	X	X	X	X	X	X	X	X	X	X	X	X
Lockout/Tagout	X	X		X	X	X			X	X	X	X
Machine Guards	X	X	X			X			X	X	X	X
Material Handling - Loading and Unloading	X	X	X	X	X	X	X	X	X	X	X	X
Material Handling - Lifting	X	X	X	X	X	X	X	X	X	X	X	X
MEWP	X		X	X	X	X			X	X	X	X
Outdoor Structures	X			X	X			X	X	X	X	X
Paints, Dyes and Inks	X	X	X			X	X			X		X
Personal Protective Equipment	X	X	X	X	X	X	X	X	X	X	X	X
Props - Edged Weapons			X			X		X				
Props - Firearms			X			X		X				
Props - Live Animals			X			X		X				
Respiratory Protection	X	X	X			X			X	X		X
Rigging - General	X			X	X				X	X		X
Rigging - Hoists and Winches	X			X	X				X	X		
Rigging - Ropes, Cords and Chains	X			X	X				X	X		X
Storage	X	X	X	X	X	X	X	X	X	X	X	X
Tools and Machines - General Shop Safety	X	X	X			X			X	X		X
Tools and Machines - Hand and Power	X		X			X			X	X		X
Tools and Machines - Saws - Circular	X		X			X			X	X		X
Tools and Machines - Saws - Table	X		X			X			X	X		X
Tools and Machines - Welding/Soldering/Brazing	X		X			X			X	X		X

Confined Space Identification

Confined spaces present unique hazards that can lead to serious injury or death if not properly identified and managed. This code of safety outlines the process for identifying confined spaces, assessing risks, and ensuring safe working conditions in accordance with regulatory standards.



Definition of Confined Space

A confined space is defined as an area that:

- **Limited Openings:** Has limited or restricted means for entry or exit.
- **Not Designed for Continuous Occupancy:** Is not intended for continuous human occupancy.
- **Potential Hazards:** Contains or has the potential to contain hazardous conditions, such as toxic or flammable gases, oxygen deficiency, or other dangerous substances.

Examples of confined spaces in performing arts facilities:

- Orchestra pit lifts
- Elevator pits
- House cove (ceiling) lighting positions
- Utility runs and access areas

Contact EHS for assistance in identifying confined spaces and the requirements for each area. For more information consult the EHS website for details on the Confined Space Entry Program and request training in procedures.

Cosmetics

Theatrical cosmetics are essential for achieving the desired look on stage, but improper use can lead to health risks such as skin irritation, allergic reactions, or infections. This code of safety provides guidelines for the safe use, application, and storage of theatrical cosmetics to protect performers and makeup artists.

Product Selection

- **Professional-Grade Products:** Use only professional-grade cosmetics specifically designed for theatrical use. Avoid using everyday cosmetics, which may not hold up under stage lights or be safe for prolonged wear.
- **Hypoallergenic Options:** Whenever possible, choose hypoallergenic, non-comedogenic[24], and fragrance-free products to minimize the risk of skin irritation or allergic reactions.
- **FDA-Approved:** Ensure that all products are FDA-approved for use on skin, particularly for use around the eyes and mouth.

Personal Hygiene

- **Hand Washing:** Makeup artists and performers must wash their hands thoroughly with soap and water before and after applying makeup.
- **Clean Tools:** Use clean brushes, sponges, and applicators for each application. Clean and disinfect tools after each use to prevent contamination.
- **Avoid Cross-Contamination:** Never share makeup products or applicators between performers to avoid spreading infections. Each performer should have their own set of products or use disposable applicators.

Application Safety

- **Skin Preparation:** Cleanse and moisturize the skin before applying makeup to create a barrier and reduce irritation. Use a primer if necessary to protect the skin.
- **Safe Removal:** Remove makeup with gentle, non-irritating removers designed for theatrical cosmetics. Avoid scrubbing and moisturize the skin after removal to maintain skin health.
- **Avoid Sensitive Areas:** Be cautious when applying makeup near sensitive areas such as the eyes and mouth. Avoid using products not specifically designed for these areas.

[24] Comedogenic: pore-clogging

- **Airbrushing Precautions:** When using airbrush makeup, ensure the area is well-ventilated, and the artist wears a mask to avoid inhaling particles.

Special Effects Makeup

- **Prosthetics and Adhesives:** Use only skin-safe adhesives (e.g., medical-grade adhesives) for applying prosthetics. Performers should remove prosthetics carefully to avoid skin damage.
- **Latex Sensitivity:** Be aware of latex allergies. Use latex-free products for individuals with known sensitivities, and always check with performers about potential allergies.
- **Specialty Products:** Follow manufacturer instructions when using specialty products such as body paints, glitter, or stage blood. Avoid getting these products in the eyes or mouth and use them sparingly on sensitive skin.

Storage and Handling

- **Proper Storage:** Store cosmetics in a cool, dry place away from direct sunlight to prevent degradation. Keep products tightly sealed when not in use.
- **Expiration Dates:** Regularly check expiration dates on all products. Discard any cosmetics that are past their expiration date or show signs of spoilage (e.g., changes in color, texture, or smell).
- **Labeling:** Clearly label all products to avoid confusion or misuse.

Sanitation and Disinfection

- **Surface Cleaning:** Clean and disinfect all work surfaces before and after makeup application. Use sanitizing sprays or wipes to maintain a clean environment.
- **Tool Disinfection:** Disinfect makeup brushes, sponges, and other tools after each use with appropriate cleaning agents. Replace sponges and puffs regularly to prevent bacterial growth.
- **Product Disinfection:** For shared products (if unavoidable), use a spatula or similar tool to remove the product, rather than dipping applicators directly into containers. Wipe down the surfaces of products like lipsticks or pressed powders with alcohol before use.

Allergy and Sensitivity Awareness

- **Performer Allergies:** Obtain a list of known allergies or sensitivities from each performer before applying makeup. Have alternative products available if needed.
- **Emergency Procedures:** Be prepared to manage allergic reactions. Keep antihistamines and emergency contact numbers readily available. Train makeup artists to recognize signs of an allergic reaction and respond appropriately.

Costume Shop General Safety

Ensuring safety in a costume shop involves understanding the potential hazards associated with various devices and implementing appropriate safety measures. Below is a general overview of safety requirements, followed by specific considerations for certain pieces of equipment that require additional precautions.

General Safety Guidelines

- **Authorization and Supervision**
  - Students must complete safety training and receive authorization before using any equipment or tools in the shop.
  - A trained supervisor or instructor must be present when the shop is in use.
- **Personal Protective Equipment (PPE)**
  - Wear safety glasses or goggles when cutting, sewing, or working with chemicals like dyes or adhesives to protect your eyes from debris, splashes, and fumes.
  - Wear closed-toe, non-slip shoes to protect your feet from sharp objects, heavy materials, and spills.
  - Use appropriate gloves when handling hot tools (like irons and steamers), hazardous chemicals, or sharp objects.
- **Tool and Equipment Safety**
  - Maintain focus on the task at hand. Avoid using phones, headphones, or engaging in distracting conversations while operating machinery
  - Ensure that sewing machines are in good working condition.
  - Use sharp scissors, rotary cutters, and knives with caution. Always cut away from your body
  - Use irons, steamers, and heat presses with care. Place hot tools on heat-resistant surfaces and turn them off when not in use. Be mindful of hot surfaces and steam to avoid burns. Never leave hot irons unattended.
- **Emergency Procedures**
  - Familiarize yourself with the location of emergency exits, fire extinguishers, first aid kits, and eyewash stations.
  - Report any accidents, injuries, or unsafe conditions to the supervisor immediately.
- **Ergonomics and Workspace Organization**
  - Maintain good posture when sewing, cutting, or working at tables to prevent strain. Use adjustable chairs and tables to ensure comfortable working heights.
  - Take regular breaks to stretch and rest, especially during repetitive tasks like sewing or cutting, to prevent repetitive stress injuries.
  - Organize tools and materials to minimize reaching, bending, and lifting. Keep frequently used items within easy reach.

Tools - Dye Vat

Dye vats are essential for fabric dyeing and creating custom textiles used in costumes, set designs, and props. These vats require careful handling of chemicals and strict safety protocols to ensure the protection of personnel from chemical exposure, spills, and equipment-related hazards during the dyeing process.

Personal Protective Equipment (PPE)

- **Protective Clothing:** Wear chemical-resistant aprons, gloves, and full-body protective clothing to prevent skin contact with dyes and chemicals.
- **Eye Protection:** Use safety goggles or face shields to protect against splashes.

Equipment Safety

- **Vessel Integrity:** Regularly inspect dye vats for signs of wear, corrosion, or leaks. Ensure vats are properly maintained and free of damage.
- **Temperature Control:** Monitor and control the temperature of dye vats according to process specifications. Avoid overheating, which can cause chemical reactions or equipment damage.
- **Agitation Systems:** Ensure that agitation or stirring systems in dye vats are functioning correctly to prevent uneven dye distribution. Never insert hands or tools into vats while agitation is active.
- **Emergency Shutoff:** Ensure that all dye vats are equipped with accessible emergency shutoff controls. Train all personnel on how to use these controls in case of an emergency.
- **Ventilation Systems:** Operate dye vats in a well-ventilated area or use local exhaust ventilation to remove harmful fumes and vapors. Ensure ventilation systems are regularly maintained.

Spill and Waste Management

- **Spill Kits:** Keep spill kits accessible near dye vats. Kits should include absorbent materials, neutralizing agents, and personal protective equipment.
- **Spill Response:** Immediately clean up spills according to the spill response plan. Report significant spills to the appropriate authorities and follow all required cleanup and reporting procedures.
- **Waste Disposal:** Dispose of dye waste, chemicals, and contaminated materials according to EHS disposal guidelines. Never pour waste chemicals down drains or dispose of them improperly.

- **Inspect Before Use:** Before using the iron, inspect it for any signs of damage, such as frayed cords, leaks, or malfunctioning parts. Do not use the iron if any issues are found.
- **Proper Setup:** Ensure the iron is placed on a stable, heat-resistant surface. Gravity irons should be securely hung or placed on appropriate stands to avoid tipping or spills.
- **Temperature Control:** Adjust the iron's temperature according to the fabric type and allow it to heat up fully before use. Avoid overheating, which can damage fabrics and pose a burn hazard.
- **Steam and Water Levels:** For steam irons, regularly check and fill the water reservoir as needed. Use distilled water if recommended to prevent mineral buildup. Never open the reservoir or gravity-fed water supply while the iron is hot or pressurized.

Tools - Serger

- **Pre-Use Inspection:** Before operating, inspect the serger for any signs of wear, damage, or malfunction, such as loose screws, damaged cords, or broken needles. Do not use the machine if any issues are detected.
- **Proper Setup:** Ensure the serger is placed on a stable, level surface. Check that all parts, including the presser foot and needle, are securely fastened.
- **Threading:** Always turn off the serger and unplug it before threading, changing needles, or performing any maintenance. Follow the manufacturer's instructions for threading to prevent jams and ensure proper operation.
- **Needle Safety:** Use the correct type and size of needle for the fabric being sewn. Replace dull or bent needles immediately to avoid breakage, which could cause injury.

Tools - Steamers

Equipment Safety

- **Pre-Use Inspection:** Before each use, inspect the steamer for any signs of damage, such as frayed cords, leaks, or malfunctioning parts. Do not use the steamer if any issues are found.
- **Water Reservoir:** Use only clean, distilled water in the steamer to prevent mineral buildup. Never overfill the water reservoir, and always ensure the cap is securely fastened before use.

Temperature Control: Allow the steamer to heat up to the correct temperature before use, and ensure that the steam output is functioning properly. Avoid overheating, which can increase the risk of burns.

Dust Collection

Dust collection systems are crucial in various work environments for maintaining air quality and reducing the risk of respiratory problems, fires, and explosions caused by airborne particles. Proper use and maintenance of these systems is essential to ensure their effectiveness and longevity. Here is a guide on the use and maintenance of dust collection systems.

Proper Operation
Always operate the dust collection system when using equipment that generates dust, such as saws, sanders, and routers. Ensure that the system is adjusted to the correct settings for the type of dust being collected.

Adequate Ventilation
Using dust collection systems in well-ventilated areas further increases their efficiency in removing airborne particles.

Training
Train all personnel on the proper use of the dust collection system, including how to adjust settings and what to do in case of a malfunction.

Maintenance of Dust Collection Systems
Inspect systems regularly for signs of wear or damage, especially in hoses, filters, and dust collection bags. Check for any leaks in the ductwork and seals.

Cleaning and Replacing Filters
Clean or replace filters as recommended by the manufacturer or more frequently if the system is used heavily. Clogged filters reduce the efficiency of the system and can cause it to malfunction.

Dust Removal
Regularly empty the dust collection bags or bins. Overfilled containers can hinder the system's performance and pose a fire hazard.

Checking Airflow
Monitor the airflow of the system. Reduced airflow can indicate clogged filters, full dust bags, or other issues that need addressing.

Hose and Duct Maintenance
Check hoses and ducts for clogs and clean them out. Clogged hoses can reduce the efficiency of the system and potentially cause overheating.

Motor and Fan Maintenance
Ensure that the motor and fan are functioning correctly. Listen for any unusual noises that might indicate a problem.

Record Keeping
Keep a log of all maintenance activities, including dates, actions taken, and any parts replaced. This record can help track the system's performance and identify recurring issues.

Safety Considerations

Fire Hazards
Be aware of the potential for fire hazards, especially when collecting dust from materials like wood. Regular cleaning and maintenance are crucial. Assure that the system is equipped with appropriate fire suppression features if necessary.

Explosion Risk with Combustible Dust
When handling combustible dust (like sawdust or metal powders), ensure the dust collection system is designed to handle such materials safely and complies with NFPA standards.

Electrical Safety
Ensure that all electrical components of the system are in good condition and that the system is properly grounded.

Electrical Hazards

Electrical systems and equipment are integral to theatrical productions, powering lights, sound systems, special effects, and more. However, they also pose significant risks, including electric shock, fire, and equipment damage. This code of safety outlines best practices to minimize the risks associated with electrical hazards in a theatrical environment.

General Electrical Safety

- Only qualified and trained personnel should handle, install, or repair electrical equipment. All work should comply with relevant electrical codes and standards.
- Regularly inspect all electrical equipment, wiring, and connections for signs of wear, damage, or malfunction. Schedule routine maintenance to ensure systems are in good working condition.
- Maintain at least 36 inches of clearance around all breaker panels and dimmer racks.
- Always de-energize and lock out electrical circuits before performing any maintenance or repair work.
- Use and test GFCI’s
- Use only UL-listed or CE-marked electrical equipment to ensure it meets safety standards.
- Use grounded, three prong plugs. Do NOT use ground lifts (3 to 2 prong) adapters to defeat grounding.
- Ensure audio equipment is properly grounded to prevent ground loop damage and shocks.
- Never connect audio and lighting on the same circuits.
- Never use extension cords in place of permanent wiring. If equipment is powered from an extension cord for more than 30 days, permanent solutions should be installed.[25]
- Never wrap cables or power cords around raceways or pipes.
- Protect cables from vehicle and pedestrian traffic.

[25] NEC 400.8(1)

- Check lighting instruments, audio equipment and machinery for wear, exposed wires and damaged plugs.
- Vacuum dust from equipment with intake or exhaust fans regularly. (intelligent lighting, dimmer racks, amp racks, lighting/sound boards, etc)
- Use only compressed/canned air that is labeled for electronics to blow dust out of components. Air from compressors can be contaminated with oil that damages electronics.
- Ensure high voltage sources are well labeled (disconnects, company switches, motorized systems, etc).
- Apply Lockout/tagout controls when performing any maintenance or cleaning of applicable equipment.

Avoid using

- Homemade extension cords with Romex, or boxes with knockouts
- Modified cords
- Cords with exposed wires or damaged insulation

Emergency Action Plans

This code outlines the specific actions and responses required during various emergency situations, including fires, chemical spills, shelter-in-place scenarios, medical emergencies, power outages, and severe weather. These procedures are designed to protect the safety of all personnel and ensure a swift and effective response. Venue specific plans and procedures should be developed but these aspects are consistent for almost every eventuality.

General Preparedness

- **Emergency Action Plan (EAP):** Develop and maintain a comprehensive EAP that addresses all potential emergencies. Ensure that the plan is accessible to all employees and regularly updated.
- **Training:** Provide regular training to all employees on emergency procedures, including specific actions for each type of emergency.
- **Drills:** Conduct regular emergency drills (e.g., fire drills, shelter-in-place drills) to ensure that all personnel are familiar with procedures and can respond effectively.
- **Emergency Contact Information:** Post emergency contact numbers and instructions prominently throughout the facility. Ensure that all employees know how to quickly reach emergency services.
- **Reporting:** know how to report emergencies and damaged equipment and how to submit incident reports.

Fire Emergency Actions and Responses

- **Alert:** If you see a fire, immediately activate the nearest fire alarm and notify others in the vicinity.
- **Evacuate:** Follow the designated evacuation routes. Do not use elevators. Close doors behind you to contain the fire. Activate the fire curtain.
- **Assist:** Help those who need assistance, but do not delay your own evacuation. Guide them to the nearest safe exit if possible.
- **Assemble:** Proceed to the designated assembly point outside the building. Do not re-enter the building until instructed by emergency personnel.
- **Fire Extinguishing:** Only attempt to extinguish the fire if the fire is small, you are trained, and you have a clear escape route. Use the appropriate fire extinguisher.

Chemical Spill Emergency Actions and Responses

- **Alert:** If a chemical spill occurs, immediately alert those in the area and evacuate if necessary. Notify your supervisor or the designated emergency contact and the emergency line **216.368.3333**
- **Isolate:** If safe to do so, isolate the spill by closing doors and using PPE and spill containment materials. Avoid direct contact with the chemical.
- **Ventilate:** Increase ventilation in the area, but only if it can be done safely (e.g., turning on exhaust fans or opening windows without risking exposure).
- **Flush:** Use eyewash stations or sinks to immediately flush eyes and skin if they have been exposed.
- **Evacuate:** Evacuate the area if the chemical is hazardous or the spill is large. Ensure that everyone is moved to a safe distance.

Shelter-in-Place Emergency Actions and Responses

- **Alert:** If a shelter-in-place order is given, immediately notify all personnel and direct them to designated shelter areas.
- **Seal:** Close all windows, doors, and ventilation systems to prevent outside air from entering if the emergency involves airborne hazards.
- **Supplies:** Gather emergency supplies, such as water, food, first aid kits, and communication devices, in the shelter area.
- **Stay Calm:** Keep all personnel calm and informed.
- **Monitor:** Continue to monitor the situation via official channels (e.g., weather reports, public safety announcements) and remain in the shelter until the all-clear signal is given.

Medical Emergency Actions and Responses

- **Assess:** Quickly assess the situation to determine the severity of the medical emergency. If the person is unresponsive or not breathing, call emergency services immediately and administer first aid to the extent you are trained and comfortable with and observe universal precautions.[26]
- **CPR/AED:** If trained, begin CPR or use an Automated External Defibrillator (AED) if necessary.
- **First Aid:** Follow first aid procedures based on the type of injury or illness.

[26] Universal precautions are a standard set of guidelines to prevent the transmission of bloodborne pathogens from exposure to blood and other potentially infectious materials by means of wearing nonporous articles such as medical gloves, goggles, and face shields.

- **Stay with the Victim:** Remain with the injured or ill person until help arrives. Keep them calm and provide reassurance.
- **Emergency Services:** When calling emergency services, provide clear and accurate information about the location, nature of the emergency, and any first aid that is being administered. Stay with the injured person and post personnel along the route to escort responders.

Power Outage Emergency Actions and Responses

- **Shelter:** Shelter in place until backup power turns on; or after a few minutes of darkness, carefully navigate to an area with emergency lighting. Wait for power restoration or further instruction.
- **Shut Down Equipment:** Determine the extent of the power outage and shut down non-essential equipment to prevent damage when power is restored.

Severe Weather Emergency Actions and Responses

- **Alert:** Monitor weather alerts and notify all personnel of the approaching severe weather. Provide specific instructions based on the type of weather event (e.g., tornado, hurricane, flood).
- **Shelter:** Move all personnel to the designated shelter area if the weather poses an immediate threat. For tornadoes, seek shelter in a basement or interior room without windows. Wait till an all-clear signal is given.
- **Secure Property:** Secure outdoor equipment and close all windows and doors to protect against wind or flying debris.

Ergonomics

This code of safety outlines the ergonomic risk factors that can lead to discomfort, injury, or long-term health issues in the workplace. By identifying and addressing these risk factors, organizations can create a safer and more comfortable work environment, reducing the likelihood of musculoskeletal disorders (MSDs) and other ergonomic-related injuries.

Recognizing these factors can help reduce ergonomic injuries.

Repetitive Movements: Performing the same motion or series of motions repeatedly can lead to strain and injury over time, particularly in joints, tendons, and muscles.

Awkward Postures: Working in awkward or unnatural positions (e.g., twisting, reaching overhead, bending at the waist) can increase the risk of strain and injury.

Forceful Exertions: Tasks that require significant physical effort, such as lifting, pushing, pulling, or gripping with excessive force, can lead to musculoskeletal injuries.

Static Postures: Holding the same position for an extended period, whether sitting or standing, can lead to muscle fatigue and discomfort, particularly in the back, neck, and legs.

Contact Stress: Continuous contact between sensitive body parts (e.g., wrists, elbows, knees) and hard or sharp surfaces can lead to localized pressure and discomfort.

Vibration Exposure: Prolonged exposure to vibrations from tools, machinery, or vehicles can increase the risk of injuries.

Environmental Factors: Poor lighting, extreme temperatures, and noise can contribute to ergonomic stress, leading to increased risk of injury or discomfort.

Work Pace and Workload: High work pace and excessive workload can increase the risk of ergonomic injuries by forcing employees to rush or skip proper techniques.

Avoid these risks by taking frequent breaks and alternating tasks, maintaining comfortable body positions, using the correct tools, and arranging workstations at the right height to eliminate awkward postures. Contact EHS for more training and ergonomic resources.

Eyewash Stations

Clear procedures for the use of eyewash stations ensures effective and immediate response in the event of eye exposure to harmful substances. Proper usage of eyewash stations is crucial for preventing serious eye injuries and maintaining workplace safety.

Accessibility and Location

- **Immediate access:** Ensure that eyewash stations are installed in all areas where hazardous chemicals, irritants, or particles are present. They should be easily accessible within 10 seconds (approximately 55 feet) of potential exposure areas. Time is critical and wasted seconds can result in irreparable eye damage, never hesitate to use safety equipment.
- **Clear pathways:** Keep the path to the eyewash station clear of obstructions at all times. Ensure that the station is well-lit and clearly marked with signage.
- **Know your stations:** All employees working in areas where eyewash stations are required should be familiar with their locations and how to use them.

Operation and Maintenance

- **Activation:** Eyewash stations should be designed for hands-free operation, allowing the user to activate the flow of water with a single motion, such as pushing a lever or stepping on a foot pedal.
- **Water Temperature:** The water delivered by the eyewash station should be tepid, typically between 60°F and 100°F (16°C and 38°C), to avoid further injury or discomfort.
- **Regular Maintenance:** Conduct weekly inspections and tests of eyewash stations to ensure proper operation. Flush the system to prevent the buildup of bacteria or sediment.
- **Service and Repairs:** Promptly address any malfunctions or damage to eyewash stations to ensure they are always operational when needed.

Emergency Usage Procedure

- **Immediate Action:** Immediately go to the nearest eyewash station. If you wear contact lenses, do not delay removing them.
- **Activate Station:** Activate the eyewash station and position your face in the stream of water. Keep your eyes open, using your hands to hold your eyelids apart if necessary.
- **Flushing Duration:** Flush your eyes continuously for at least 15 minutes, ensuring that the water reaches all parts of the eyes. Roll your eyes around to facilitate this.
- **Seek Medical Attention:** After flushing, seek immediate medical attention, even if symptoms seem to improve. Inform the medical personnel about the substance involved.

Fall Protection - Catwalk

Catwalks provide access and serve as crossovers above the stage floor. They should always be treated as elevated work platforms and as such carry the same requirements for fall protection.

General Safety Guidelines

- **Authorization:** Only authorized personnel who have received proper training on catwalk safety and fall protection are permitted to access catwalks.
- **Supervision:** New or inexperienced workers should be accompanied by a trained supervisor when accessing catwalks for the first time.
- **Lighting:** Ensure adequate lighting on catwalks at all times. Use portable lights or headlamps in areas where fixed lighting is insufficient.
- **Signage:** Clearly mark access points with signage indicating when fall protection is required. Post signs at all hazard points, such as open edges or gaps.
- **Tool Management:** Secure tools and equipment to prevent them from falling. Use tool belts or tethered tools whenever possible, never leave loose tools overhead.
- **Communication:** Maintain communication with ground-level personnel at all times and keep the area beneath the work area clear of personnel.
- **Guards:** If guardrails or chains are removed to load objects onto catwalks, replace them immediately following loading.

Fall Protection Equipment

- **Harnesses:** Use a full body harness with a dorsal D-ring attachment when work requires you to lean through or over guardrails. The harness should be properly fitted and inspected before use.
- **Lanyards:** Use **shock-absorbing lanyards or self-retracting lifelines** attached to a secure anchor point on the catwalk. Ensure that lanyards are of appropriate length to allow movement without creating additional fall risks. Avoid crossing or wrapping your body.
- **Anchor Points:** Anchor points must be rated to withstand at least **5,000 pounds** per worker attached. Contact EHS if you're unsure of anchoring points.
- **Guardrails:** Catwalks should be equipped with guardrails that meet or exceed OSHA standards. Guardrails should include a top rail, mid-rail, and toe board to prevent objects from falling.

Fall Protection - Controlled Access

Controlled access areas are used when a fall hazard exists but traditional fall protection will not work. This could mean a lack of guard rails (a stage edge when the pit is lowered), or during load in/strike. Controlled access areas require fall protection plans and competent monitoring.

A safety monitor should be in place to warn personnel if they are unaware of the fall hazards, stay within sight and communication range of those they are monitoring. Should avoid distraction or multitasking, restrict access to the area as laid out by the fall protection plan, and remove any personnel who fail to comply with the plan.

Fall Protection - Fixed ladder

Fixed ladders are permanently attached to structures or equipment. They often provide access to catwalks, grids and loading bridges. When used in performance either as a scenic element or as access from trap door pits, they must conform to the same standards.

Authorized Use: Only personnel trained in ladder safety and fall protection are authorized to use fixed ladders. Ensure that all users are familiar with this code of safety and remove all loose items from pockets. Allow one (1) person on the ladder at a time.

Three-Point Contact: Maintain three points of contact (two hands and one foot, or two feet and one hand) on the ladder at all times while climbing or descending.

Rung Spacing: Rungs should be uniformly spaced, typically between 10 and 14 inches apart. Rungs must be designed to prevent slipping.

Cages and Fall Protection[27]: Ladders over 24 feet high should be equipped with cages, wells, or personal fall arrest systems. Ladders installed after November 19, 2018, must have a ladder safety system[28] or personal fall arrest system.

Safe Access Points: Ensure safe and stable access to the ladder, with proper clearance for workers to mount and dismount safely.

[27] 1910.28(b)(9)

[28] OSHA 1910.21(b) defines this as a system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems.

Fall Protection - Portable ladders

The list of forms that portable ladders come in is long. Most commonly you'll find step ladders, double sided step ladders, extension ladders, platform ladders, and rolling merchandise ladders. Reference the EHS ladder training documents for more information.

General Guidelines

- **Authorized Use:** Only personnel trained in ladder safety are authorized to use portable ladders. Ensure that all users are familiar with this code of safety.
- **Inspection Before Use:** Inspect the ladder before each use for any signs of damage, such as cracks, corrosion, loose rungs, or missing parts. Do not use any ladder that is damaged or unstable. Immediately label and take damaged ladders out of service.
- **Ladder Selection:** Choose the right ladder for the job, considering the height, weight capacity, and type of work. Use ladders made of non-conductive materials, such as fiberglass, when working near electricity.
- **Drop Hazards:** Never stand, walk or work under ladders that are in use.
- **Weather Conditions:** Avoid using portable ladders in adverse weather conditions, such as strong winds, rain, or ice, which can make the ladder slippery and increase the risk of falls.

Setting Up the Ladder

- **Stable Surface:** Place the ladder on a stable, level surface. If the ground is uneven or soft, use a ladder stabilizer or secure the feet to prevent slipping. Never use a folding ladder in an unfolded position.
- **Proper Angle:** Set the ladder at the correct angle. The base should be one foot away from the wall for every four feet of ladder height (the 4-to-1 rule).
- **Securing the Ladder:** If necessary, secure the ladder at the top or bottom to prevent it from moving. For extension ladders, ensure the locking mechanisms are engaged before climbing.
- **Extension Ladders:** Extend the ladder at least three feet above the landing point if using it to access a roof or platform. Ensure that the overlap between sections meets the manufacturer's specifications.

Climbing and Descending

- **Three-Point Contact:** Maintain three points of contact (two hands and one foot, or two feet and one hand) with the ladder at all times while climbing or descending.
- **Face the Ladder:** Always face the ladder when climbing up or down. Do not climb with your back to the ladder.

- **Hands-Free Climbing:** Do not carry tools or materials in your hands while climbing. Use a tool belt, backpack, or hoist items up separately.
- **One Person at a Time:** Only one person should be on the ladder at a time unless the ladder is specifically designed for multiple users.

Working from the Ladder

- **Safe Working Height:** Do not stand on the top two rungs of a stepladder or the top three rungs of an extension ladder. Ensure you have a stable base and enough ladder above your working position.
- **Avoid Overreaching:** Keep your body centered between the ladder rails. Do not lean or overreach to the side. Instead, move the ladder to a new position.
- **Tool and Equipment Management:** Secure tools and materials to prevent them from falling. Use tool belts or trays designed for ladders to keep your hands free.
- **Stable Positioning:** Do not move or shift the ladder while standing on it. Climb down and reposition the ladder if needed.

Fall Protection - Scaffolding and Elevated Work Platforms

This code of safety is designed to ensure the safe use of scaffolding in theatrical environments. Proper setup, use, and maintenance of scaffolding are critical to preventing falls and other accidents in a theatre setting. OSHA defines scaffolding as *“any temporary elevated or suspended platform and its supporting structure”*. Scaffolding used as a scenic element must have the use and procedures approved of by EHS.

General Guidelines

- **Authorized Personnel:** Only trained and authorized personnel are permitted to erect, modify, or dismantle scaffolding. All users must be familiar with scaffolding safety protocols.
- **Pre-Use Inspection:** Inspect the scaffolding before each use. Check for damaged or missing parts, stability, and proper assembly. Do not use scaffolding that is damaged or incomplete.
- **Load Capacity:** Ensure that the scaffolding is rated to support the weight of the workers, tools, and materials. Do not exceed the manufacturer’s specified load capacity.
- **Ladders:** Never use ladders on top of scaffolding to gain extra height.

Erecting and Dismantling Scaffolding

- **Stable Base:** Set up scaffolding on a firm, level surface. Use base plates, mud sills, or other stabilizing components to ensure a stable foundation. Ensure all components are locked in place and secure.
- **Guardrails and Toeboards:** Install guardrails and toeboards on all open sides of the scaffolding that are more than 6 feet above the ground or floor. Ensure that guardrails are between 38 to 45 inches high.

Using Scaffolding

- **Stable Positioning:** Ensure that scaffolding is positioned securely and that wheels (if applicable) are locked before climbing. Do not attempt to move scaffolding while workers are on it.
- **Three-Point Contact:** Maintain three points of contact (two hands and one foot, or two feet and one hand) while climbing onto or off scaffolding.
- **Platform Safety:** Ensure that platforms are fully planked, with no gaps between planks. Do not stand on or work from unsupported or unstable platforms.
- **Tool and Equipment Management:** Secure tools and materials to prevent them from falling. Use tool belts, buckets, or hoists to keep tools and materials organized and prevent accidents.

Fall Protection

- **Personal Fall Arrest Systems:** When working at heights above 10 feet where guardrails are not practical, workers must use personal fall arrest systems (PFAS) connected to a secure anchor point.

First Aid

The university's shops, where sets are constructed and costumes are made for productions, can be a bustling environment with various potential hazards. First aid knowledge and preparedness are crucial to address injuries or health issues that may occur. Here's a guide highlighting common injuries and their immediate treatment:

Treatment for Cuts and Abrasions

- Clean the wound with mild soap and water.
- Apply gentle pressure with a sterile bandage or clean cloth to stop bleeding.
- Once the bleeding has stopped, cover the wound with a sterile dressing.
- Change the dressing daily or as needed.

Treatment for Splinters

- Use sterilized tweezers to gently remove the splinter. Do not squeeze the splinter out.
- Clean the area with soap and water after removal.
- Apply antiseptic cream and cover with a bandage.

Treatment for Punctures

- *Stop the bleeding***.** Apply gentle pressure with a clean bandage or cloth.
- Clean the area with soap and water after removal.
- Apply antiseptic cream and cover with a bandage.

Treatment for Eye Injuries, e.g., Dust or Chemicals in the Eye

- Do not rub your eye.
- Seek the nearest eyewash station
- For dust, encourage blinking to promote tearing, which can help wash out the particle. If ineffective, flush the eye gently with clean water.
- For chemicals, immediately flush the eye with running water for at least 15 minutes and seek medical attention.

Treatment for Burns (from Welding, Hot Surfaces or Chemicals)

- For minor burns, cool the burn under running cool water for at least 10 minutes.
- Apply burn gel in a thick layer to the injury. Do not apply ice or any other creams or ointments.
- Cover the burn with a sterile, non-fluffy dressing or cloth.
- Seek medical attention for more serious burns.

Treatment for Falls and Sprains

- For falls resulting in minor injuries, rest and elevate the injured part.

- Apply an ice pack or a cold compress to reduce swelling.
- Use a bandage or support if necessary.
- Advise the injured person to seek medical attention if pain or swelling persists.

Treatment of Inhalation of Fumes

- Move the person to fresh air immediately.
- Keep them calm and seated in a position that eases breathing.
- If they are having difficulty breathing, call emergency services.
- Monitor them closely until help arrives, or symptoms improve.

Treatment for Heat Exhaustion

- Move the person to a cooler place.
- Have them lie down and elevate their legs.
- Make them drink water or a sports drink slowly.
- Cool their skin with water or damp cloths.

First Aid Kits

A well-stocked first aid kit should be checked and restocked on a regular basis and should include:

- Sterile gauze and bandages of various sizes
- Adhesive tape
- Antiseptic wipes and cream
- Sterilized tweezers and scissors
- Disposable sterile gloves
- Burn gel and dressing
- Eye wash and eye bath
- Cold packs
- Pain relief medication (as permitted)
- Instructions for basic first aid procedures

Additional Considerations

Ensure staff and volunteers are trained in basic first aid and CPR.
Have a clear, accessible emergency plan that includes locations of first aid kits, emergency exits, and contact information for local emergency services.
Regularly review emergency plans and first aid kits to update and remove out of date items.

AED

An Automated External Defibrillator (AED) is a portable medical device used to treat sudden cardiac arrest by delivering an electric shock to the heart. The AED is designed to be simple to use, with voice and visual prompts guiding users through the process, making it an essential tool in emergency situations to help restore a normal heart rhythm before professional medical help arrives. There are more than 125 on campus. Nearly every building has at least one, find the nearest AED to where you are located. When they are properly charged there should be a green light that blinks.

Stop the Bleed Kit

To prevent such unnecessary deaths, the Case Western Reserve University Department of Resiliency and CWRU EMS are working together to help the community “Stop the Bleed.” A campaign launched by the federal government, Stop the Bleed empowers bystanders to provide aid in the event of an emergency, similar to initiatives to train individuals to perform CPR and first aid. The campaign instructs individuals on how to apply a tourniquet and pack wounds to control bleeding. Through these methods, bystanders can give a victim crucial time.

These public access kits, which have enough supplies to save one or two lives each, have been co-located with AED kits across campus and placed in CWRU police and mobile security vehicles.

To participate in an upcoming Stop the Bleed, CPR, AED, and first aid training opportunities contact CWRU EMS

These kits should be checked periodically for expired products.

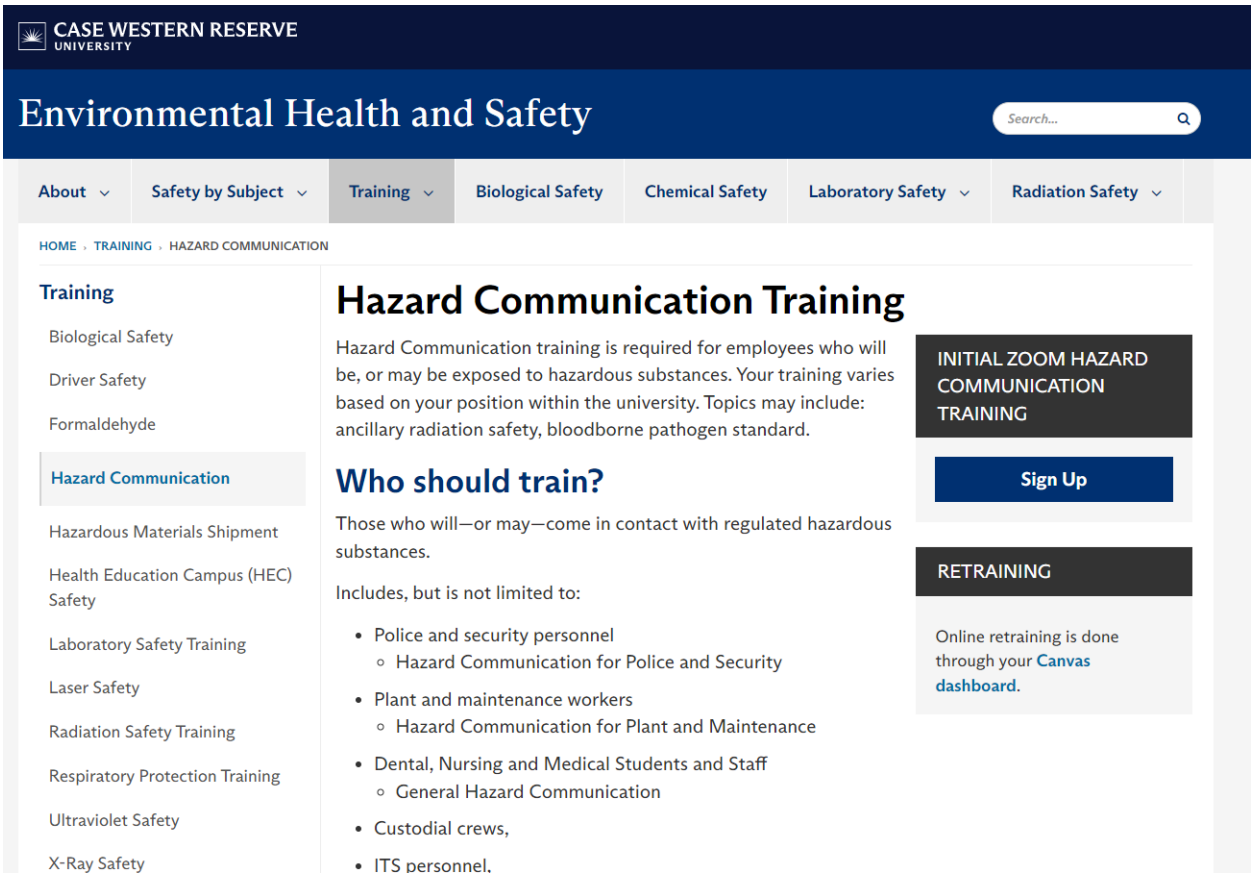
Naloxone/Narcan

Naloxone is a medicine that rapidly reverses an opioid overdose. It is an opioid antagonist. This means that it attaches to opioid receptors and reverses and blocks the effects of other opioids. Naloxone can quickly restore normal breathing to a person if their breathing has slowed or stopped because of an opioid overdose. Naloxone has no effect on someone who does not have opioids in their system. University Health and Counseling services will provide naloxone for free with no prescription and will provide training. On Campus, each AED case should also have a dose of Naloxone for emergencies.

Hazard Communication

All applicable personnel must be aware of hazardous substances in the workplace and trained to understand safety protocols. The goal is to protect workers from chemical, physical, and biological hazards by providing information about the risks and necessary precautions. Topics may include: ancillary radiation safety, bloodborne pathogen standard, chemical inventories and labeling and PPE.

EHS offers this online training every Tuesday from 10:30am-12:00pm. The signup link is located on the EHS website in the Hazard Communication section of the training tab.



Heat Illness

Heat risks are not limited to outdoor events and venues. Hot lights, heavy costumes, exertion during set construction or dance rehearsals can all lead to issues of dehydration. Consult the *Heat Stress Prevention Program*[29] on the EHS website for procedures and training.

Environmental Considerations

- **Monitor Conditions:** Regularly monitor temperature and humidity levels in the theatre, particularly in areas where workers or performers are exposed to heat, humidity, intense physical exertion, heavy costumes/clothing or PPE.
- **Adjust Lighting:** Reduce the use of intense lighting, when possible, especially during rehearsals or breaks, to decrease the ambient temperature.
- **Ventilation:** Ensure that the theatre is well-ventilated, with fans or air conditioning systems functioning properly to circulate cool air.
- **Hydration:** Ensure water is always available, that you are PRE-hydrating and RE-hydrating. Alcohol and caffeine dehydrate the body and exacerbate conditions.

Recognizing Symptoms of Heat Illness

- **Heat Cramps:** Muscle spasms or pains, often in the abdomen, arms, or legs, that may be caused by heavy sweating during intense physical activity.
- **Heat Exhaustion:** Symptoms include heavy sweating, weakness, dizziness, nausea, headache, and moist, pale skin.
- **Heat Stroke:** A severe condition with symptoms such as confusion, fainting, dry skin (no sweating), high body temperature, and possible unconsciousness. This is a medical emergency.

Immediately report symptoms of heat illness to supervisors and instructors and summon medical assistance if symptoms worsen or do not resolve after aid has been given.

[29] https://case.edu/ehs/sites/default/files/2018-02/Heat-Stress-Prevention-Program.pdf

Housekeeping

The crunch of impending openings and/or event dates approaching often leads to an increase in clutter and mess. Maintaining a clean and organized environment on stage and in shops is essential for safety, efficiency, and overall workplace well-being. This code of safety provides guidelines for proper housekeeping practices to minimize hazards and create a safe working environment.

General Housekeeping Guidelines

- **Clean Workspaces**: Keep work areas, including workbenches, floors, and storage spaces, clean and free of clutter. Regularly dispose of waste materials and keep tools and equipment stored properly when not in use.
- **Daily Cleanup:** Perform a thorough cleanup of work areas at the end of each shift and sweep at least daily, but more frequently when needed. Ensure all trash is removed, tools are returned to their proper places, and materials are stored safely.
- **Spill Management:** Immediately clean up any spills, including liquids, powders, or debris, to prevent slips, trips, and falls. Use appropriate cleaning materials for different substances and follow chemical safety guidelines when handling hazardous spills.
- **Ongoing Awareness:** Promote ongoing awareness of housekeeping practices through regular safety meetings, reminders, and signage. Encourage workers to take responsibility for maintaining a clean and safe workspace.
- **Reporting Hazards:** Encourage workers to report any hazards or unsafe conditions immediately. Address reported issues promptly to maintain a safe working environment.
- **Storage:** Store and secure ladders when not in use, secure stored materials in a manner that prevents them from falling, coil power tool cords when stored.

Waste Management

- **Regular Disposal:** Dispose of waste materials, including scrap wood, fabric offcuts, and packaging, on a regular basis. Use appropriate containers for different types of waste, such as recycling bins and hazardous waste disposal units.
- **Chemical Waste:** Follow proper procedures for disposing of chemical waste, such as paints, solvents, and adhesives. Do not pour chemicals down drains or discard them in regular trash receptacles.
- **Sharp Waste:** Dispose of sharp objects, such as broken glass or used blades, in designated sharps containers to prevent injury.

- **Flammable Waste:** Do not allow combustible waste, such as paper, sawdust, or fabric scraps, to accumulate. Dispose of these materials in metal containers with lids to reduce the risk of fire.

Floor and Aisle Maintenance

- **Clear Walkways:** Keep aisles and walkways clear of obstructions at all times. Ensure that materials, tools, and equipment are not left in areas where people walk, especially in emergency exit routes.
- **Trip Hazards:** Identify and remove trip hazards, such as loose cords, uneven flooring, and misplaced tools. Secure cords and cables with cable covers or tape, and repair damaged flooring promptly.
- **Regular Inspections:** Conduct regular inspections of floors, stairs, and ramps to identify and address potential hazards. Repair or report any damage, such as cracks or loose steps, immediately.

Record Keeping and Inspections

- **Housekeeping Checklists:** Use housekeeping checklists to ensure that all areas are regularly cleaned and maintained. Supervisors should review checklists daily or weekly, depending on the area’s use.
- **Routine Inspections:** Conduct routine inspections of the shop and theatre spaces to identify and correct any housekeeping issues. Document inspections and corrective actions taken.

Lockout/Tagout

Improper use of lockout/tagout procedures can be fatal. For full training and procedures contact EHS and review the LOTO program on the EHS website.[30] Examples of energy that must be controlled comes in the form of electrical, thermal, mechanical, hydraulic, and stored. This is not an all-encompassing list which is why identification of site specific LOTO hazards is vital.

- **Preparation:**
  - Apply LOTO whenever work on tools or machines occurs and any time when the unexpected activation of a device could cause injuries.
  - Notify affected employees about the shutdown and LOTO procedure.
- **Isolation:**
  - Disconnect or isolate the energy sources and dissipate or block stored energy. This may involve switching off breakers, closing valves.
- **Lockout:**
  - Apply locks to all energy-isolating devices to ensure they remain in the "off" position. Only authorized personnel should apply their personal lock.
- **Tagout:**
  - Attach a clearly visible tag to each lock indicating the name of the person who applied the lock, the date and reason for the lockout.
- **Verification:**
  - Attempt to start or operate the equipment to verify that all energy sources are isolated. Ensure there is no residual energy.
- **Maintenance or Repair:**
  - Perform the necessary maintenance or repair work safely.
- **Restoration:**
  - Ensure all tools and materials are removed, guards are reinstalled, and workers are clear.
  - Remove locks and tags after verifying that the work is complete.
  - Re-energize the equipment in accordance with standard operating procedures.
  - Notify affected employees that the equipment is back in service.

Important Reminders:

- **One Lock, One Key:** Each person working on the equipment should apply their own lock and keep the key.
- **Never Remove Another's Lock:** Only the person who applied the lock can remove it. If necessary, follow CWRU procedures for emergency lock removal.
- **No Shortcuts:** Follow the full LOTO procedure every time, even if the job seems quick or routine.
- **Communication:** Maintain clear communication with all affected employees throughout the LOTO process.

[30] https://case.edu/ehs/sites/default/files/2018-02/LOTO-Written-Program.pdf

Machine Guards

Machine guards are essential safety features designed to protect operators from direct contact with moving parts, flying debris, sparks, and other hazards associated with machinery operation. Proper use and maintenance of machine guards are critical components of workplace safety in industries ranging from manufacturing to woodworking. Here is a general guide on the importance of guards on machines, encompassing various types of equipment.

Importance of Machine Guards

Machine guards serve as physical barriers between the operator and the moving parts of machinery, preventing accidental contact that could result in injuries such as cuts, abrasions, amputations, or worse. They help to contain or deflect flying debris, sparks, and other materials that could cause injury or fires. Guards contribute to a safer working environment, helping to reduce the risk of work-related accidents and injuries.

Types of Guards

- ***Fixed Guards***-These are permanent parts of the machine that do not move while the machine operates. They provide a solid barrier between the operator and the dangerous parts.
- ***Interlocking Guards-***These guards automatically shut off or disengage the machine's power when opened or removed, ensuring the machine cannot operate when the guard is not in place.
- ***Adjustable Guards-***These provide a barrier that can be adjusted to accommodate various sizes of material being processed.
- ***Self-adjusting Guards-***These automatically adjust to the movement of the stock or the machine part, offering protection while allowing for the progress of work.

General Safety Instructions for Machine Guards

Machine guards should be inspected regularly for signs of damage or wear. Any issues should be addressed immediately to ensure the guard continues to provide effective protection. Guards should be properly installed and maintained according to the manufacturer's instructions. They should not be modified or removed without authorization.

Operators should receive training on the proper use of machine guards, including how to adjust them and what to do if a guard is damaged or missing. Ensure that guards do not create additional hazards by obstructing the operator's view or making it difficult to operate the machine safely. Follow all relevant workplace safety regulations and standards related to machine guarding to ensure compliance and protect workers.

Additional Guards Safety Tips

Always use machine guards as intended. Never bypass or disable them to speed up production. When removing guards for maintenance or cleaning, follow lockout/tagout procedures to ensure the machine is not accidentally started. Educate all workers about the importance of machine guards and encourage a culture of safety that prioritizes the use of guards at all times.

Material handling, loading and unloading

Loading and unloading trucks and trailers may happen infrequently, which makes review procedures even more important so that crews are prepared when the situation arises.

General Guidelines

- If PIT (powered industrial truck) equipment is employed, ensure all operators are trained and have current EHS certifications. Contact EHS if a forklift will be used inside a trailer.
- Prior to unloading, develop a plan outlining where offloaded items will be stored and who will manage the unloading.
- Ensure that truck wheels have been chocked or dock locks have been engaged, and that trailer jacks are engaged if the tractor has been removed.
- **Inspection:** Inspect the trailer, loading dock, and surrounding area for hazards such as uneven surfaces, debris, or insufficient lighting. Ensure the trailer is properly secured and stabilized before beginning.
- **Balanced Loading:** Load heavier items first and distribute weight evenly across the trailer to prevent tipping or shifting during transport.
- **Securing Equipment:** Use straps, ropes, load bars or other securing devices to prevent equipment from shifting during transport.
- **Clear Pathways:** Ensure that the area is clear of obstacles and designate a path for moving equipment from the trailer to the storage or staging area.
- **Spotters:** Use spotters to guide the process, especially when moving large or heavy items. Spotters should be positioned where they can see both the equipment and the workers.
- **Awareness:** Keep hands clear of crushing hazards (this can be exceptionally true if moving road cases).
- **Guarding:** Ensure edges of docks are marked, place barriers to control access, place signage to warn pedestrians away from the loading/unloading area.

Material handling, safe lifting and moving

Carrying heavy loads, positioning large pieces of scenery, moving rigging counterweights, transporting equipment cases, and traveling on ramps are just some examples where hazards exist. Improper lifting technique can lead to injury.

Before You Lift

- Warm up and stretch muscles.
- Plan your path of travel.
- Utilize dollies and carts when possible
- Never lift a load you don't believe you can handle alone.

When You Lift

- Bend at the knee, not your waist
- Keep the load close to your body
- Use handles if available
- Maintain a comfortable and natural body position.
- Lift with your legs
- Lift smoothly and move smoothly.
- Communicate with anybody assisting you.

When You Move

- **Transport:** Do not "bite" the heels of people ahead of you during transport with the case you are pushing. Densely packed loads carry momentum, ensure that momentum is constantly controlled. If pushing up or down a ramp, ask for more hands if needed and keep the load in front of you.
- **Pushing:** Use a low center of gravity and push as low as you can on a load. Strange shapes or poorly balanced loads can tip when pushed from a higher center of gravity. Keep hands towards the outside edges of a load to improve turning leverage.
- **Thresholds:** When pushing cases, dollies, and heavy loads, rather than pushing squarely so that 2 wheels hit a threshold or large bump, use a diamond pattern. By leading with a corner, you ensure that only one-wheel crosses at a time making it more stable. The lower surface area allows you to cross the obstacle with less force.

Mobile Elevated Work Platform (MEWP)

Formerly known as Aerial Work Platforms, new standards implemented in 2020 simplified classifications and training requirements for the usage of lifts.

Training and Competence

- Only trained and certified personnel should operate MEWPs in theatres. Operators must be familiar with the specific type of MEWP, including its manual, safety features, controls, and limitations.
- **Theatre-Specific Training:** Operators should receive additional training that addresses the unique challenges of working in a theatre environment, such as navigating narrow spaces, working around rigging, and managing low lighting conditions.

Pre-Operation Safety

- **Pre-Use Inspection:** Conduct a comprehensive inspection of the MEWP before each use. Check for any signs of damage, wear, or malfunction, including tires, controls, safety devices, and power sources. Do not use the MEWP if any issues are found.
- **Work Area Inspection:** Inspect the work area for hazards such as overhead obstacles, uneven or unstable surfaces, debris, or other equipment that could pose a risk during MEWP operation. Ensure the area is clear of personnel who are not involved in the operation.
- **Ground Stability:** Verify that the ground or stage surface is stable, level, and capable of supporting the MEWP's maximum weight. ***Be cautious of trapdoors, orchestra pits, and other potential floor hazards*.** Ensure that stage surfaces are rated to handle the full possible weight capacity of any lift.

Operational Safety

- **Safe Speed and Control:** Operate the MEWP at a safe speed, especially when maneuvering in tight spaces or around stage equipment. Use slow, deliberate movements to avoid collisions or sudden shifts in balance.
- **Overhead and Side Clearance:** Ensure there is adequate clearance from overhead structures, lighting rigs, curtains, and scenery. Be mindful of side

clearance when moving the platform to prevent contact with walls, set pieces, or other equipment.

- **Stability During Operation:** Always position the MEWP on a stable, level surface before raising the platform. Use outriggers or stabilizers if necessary to enhance stability. **NEVER** loosen outriggers to move a lift while the bucket is elevated.
- **Weather Considerations:** If working outdoors, monitor weather conditions closely. Avoid using MEWPs in high winds, rain, or other adverse weather conditions that could compromise safety.
- **Fall Protection:** Ensure that guardrails are in place and secure. Operators should wear appropriate fall protection equipment, such as harnesses and lanyards, when required by the specific MEWP being used. Harnesses aren't required if the MEWP has guard rails, unless the occupant will be stepping off the lift to another level.

Personnel Safety

- **Restricted Access:** Only essential personnel should be allowed in the vicinity of the MEWP during operation. Use barriers or signage to keep non-essential personnel at a safe distance.
- **Communication:** Establish clear communication protocols between the MEWP operator and ground crew, especially during complex movements or when working in low-light conditions. Use radios, hand signals, or other agreed-upon methods to maintain coordination.
- **Lighting:** Ensure adequate lighting is provided in the work area, especially in darkened theatres. Portable lighting may be necessary to safely navigate and operate the MEWP.

Equipment Safety

- **Load Capacity:** Never exceed the MEWP's rated load capacity. Distribute weight evenly on the platform and avoid carrying unnecessary tools or equipment that could cause imbalance.
- **Electrical Safety:** Maintain a safe distance from overhead power lines and other electrical hazards. Ensure that the MEWP is properly grounded if required.
- **Securing Tools and Equipment:** Secure all tools and equipment on the platform to prevent them from falling or becoming entangled in moving parts. Use tool lanyards where appropriate.

Emergency Preparedness

- **Emergency Procedures:** All operators should be familiar with emergency procedures, including how to lower the platform safely in the event of a power failure or other emergency. Know the location of the emergency stop controls.

- Incident Reporting: Report any accidents, near-misses, or equipment malfunctions immediately. Investigate the cause and implement corrective actions to prevent future incidents.

Post-Operation Safety

- **Safe Shutdown:** Lower the platform completely and turn off the MEWP after use. Secure the machine to prevent unauthorized use and ensure that all safety devices are in place.
- **Storage**: Store the MEWP in a designated area, away from high-traffic zones. Ensure that it is protected from damage and that the battery (if applicable) is properly charged or disconnected.

Continuous Improvement

- **Regular Safety Audits:** Conduct regular safety inspections of the MEWP and its operating environment. Address any issues promptly to maintain a safe working environment.
- **Ongoing Training:** Provide regular refresher training for operators, including updates on safety protocols and any changes in theatre-specific procedures.
- **Feedback and Improvement:** Encourage operators to provide feedback on safety practices and MEWP performance. Use this feedback to improve safety protocols and ensure equipment is well-maintained.

Outdoor Structures (tents, stages, canopies)[31]

Festival stages, fundraising galas, receptions, weddings, there are many events that use a variety of outdoor structures. Anytime an outdoor structure is raised there are considerations that must be made. Choose a site that is level, stable, and free from overhead hazards like power lines, trees, or structures. Inspect the ground for any underground utilities or obstacles that could interfere with tent stakes or anchors.

- **Anchoring and Securing:** Secure the tent with appropriate anchors or stakes based on the site's ground conditions and expected weather. Use tensioning devices, such as ratchet straps, to maintain the structural integrity of the tent. All tents must be secured, even 10x10 pop up tents can be toppled by wind and cause damage or injury
- **Anchor Inspection:** Inspect any water ballasts daily for leaks. If periods of high wind occur check that water and concrete ballasts have not shifted and that stakes are still firmly secured in the ground.
- **Weather:** If high winds are expected, reinforce tent anchoring or consider taking it down. Any outdoor stage with a roof or flown equipment MUST have a wind plan and anemometer, with continuous monitoring of incoming weather and wind speeds. The plan must also have a lightning strike procedure. When the weather hits trigger levels, the roof and any gear must be lowered and secured. Establish wind speed thresholds for tent evacuation or takedown. Typically, tents should be evacuated if wind speeds exceed 30-40 mph
- **Fire-Resistant Materials:** Use tents made from fire-resistant materials. Check for compliance with local fire codes and regulations regarding tent use at public events.
- **Emergency Exits:** Maintain clear, unobstructed exits and pathways for quick evacuation in case of fire or other emergencies. Mark exits with visible signs, especially if the tent is used at night or in low-light conditions.
- **Generators:** Place generators away from the tent to avoid exhaust fumes entering the enclosed space. Ensure that generators are on stable ground and properly ventilated to prevent carbon monoxide buildup.
- **Occupancy Limits:** Adhere to the tent's maximum occupancy limits as specified by the manufacturer and local regulations. Monitor crowd density to prevent overcrowding, which can compromise safety.

[31] https://tsp.esta.org/tsp/documents/docs/ANSI%20E1.21%20-%202024.pdf

Paints, Inks, Dyes and Adhesives

This code of safety provides guidelines to ensure the safe handling, storage, and use of paints, dyes, inks, and adhesives in theatres, scenery shops, and costume shops. Adhering to these practices will help prevent accidents, health risks, and environmental hazards.

General Safety Guidelines

- **Awareness:** Ensure all personnel are aware of the hazards associated with the materials they are using, including potential toxicity, flammability, and inhalation risks.
- **Safety Data Sheets (SDS):** Keep Safety Data Sheets (SDS) for all materials readily accessible. Review these sheets to understand the proper handling, storage, and first aid measures for each substance.
- **No Open Flames:** Keep all sources of ignition, such as open flames, sparks, and smoking materials, away from areas where flammable paints, dyes, inks, or adhesives are used or stored.
- **Proper Containers:** Store all paints, dyes, inks, and adhesives in their original containers with labels intact. Ensure that lids and caps are securely closed when not in use to prevent spills and vapor release.
- Clean up spills immediately
- Never eat, or drink where chemicals are used or stored.

Personal Protective Equipment (PPE)

- **Gloves:** Wear chemical-resistant gloves when handling paints, dyes, inks, and adhesives to protect the skin from harmful substances.
- **Respiratory Protection:** Use appropriate respirators or masks when working with materials that produce harmful vapors, fumes, or dust. Ensure proper fit and that the filters are appropriate for the specific chemicals.
- **Eye Protection:** Wear safety goggles or face shields when there is a risk of splashing or exposure to airborne particles.
- **Protective Clothing:** Wear long sleeves, aprons, or coveralls to protect clothing and skin from spills and splashes. Use clothing that is resistant to chemicals where necessary.

Ventilation

- **Work in Well-Ventilated Areas:** Always use paints, dyes, inks, and adhesives in areas with adequate ventilation. When possible, perform tasks outdoors or in areas with active ventilation systems, such as fume hoods or exhaust fans.
- **Avoid Confined Spaces:** Do not use volatile substances in small, enclosed spaces unless they are equipped with proper ventilation systems to remove fumes.

Handling and Application

- **Mixing and Diluting:** When mixing or diluting substances, do so slowly and in well-ventilated areas. Use tools and containers specifically designated for each type of material to avoid cross-contamination.
- **Application Tools:** Use appropriate tools for applying paints, dyes, inks, and adhesives. Clean tools immediately after use and store them properly.
- A**void Inhalation and Skin Contact:** Minimize exposure to vapors by keeping containers closed when not in use and by using applicators rather than pouring directly from the container.

Waste Management

- **Waste Disposal:** Dispose of paints, dyes, inks, adhesives, and contaminated materials (e.g., rags, brushes, containers) according to hazardous waste regulations. Do not pour chemicals down drains or into trash bins. Reference the Hazcom Safety Standard and Contact EHS if further guidance is needed.
- **Minimizing Waste:** Mix only the amount of material needed for the task to reduce waste. Reuse or recycle materials when possible.

Paint Booth

Painting and operations within a paint booth involve specific hazards, including exposure to harmful chemicals and fumes, fire risks from flammable materials, and respiratory issues. Ensuring safety in these environments requires strict adherence to protocols designed to minimize risks. Here's a comprehensive guide to safety for painting and paint booth operations

PPE
Use appropriate respirators to protect against inhalation of harmful vapors and particulates. Ensure the respirator is approved by the National Institute for Occupational Safety and Health for the specific type of vapors and particulates present in the paint. Wear safety goggles to prevent eye irritation or injury from splashes and vapors. Use gloves resistant to chemicals, along with coveralls or aprons, to protect skin from contact with paint and solvents. Utilize earplugs or earmuffs in areas where high noise levels are generated by equipment.

Ventilation and Air Quality
Ensure that the paint booth is equipped with a proper ventilation system designed to remove harmful fumes and supply fresh air. Use air filters capable of capturing paint particulates and replace them regularly according to the manufacturer’s recommendations. Regularly check air quality to ensure that hazardous substance concentrations do not exceed safe levels.

Fire Safety
When dealing with flammable materials, store paints, thinners, and other flammable supplies in approved, fire-resistant cabinets when not in use. Prohibit smoking, open flames, and sparks in or near the paint booth area. Ensure that appropriate fire extinguishers are readily accessible, and that staff are trained in their use.

Safe Handling of Paints and Solvents
Keep Safety Data Sheets for all chemicals on hand for reference in case of emergency and to inform workers of specific hazards. Dispose of paint waste, empty containers, and soiled rags in accordance with local environmental regulations to prevent pollution

and fire hazards. Have a spill response plan in place, including spill kits with absorbent materials and protective gear for cleanup.

Equipment and Machinery Safety
Perform regular inspections and maintenance on paint booths and associated equipment to ensure they are in good working condition and free from defects.

Grounding and Bonding
Ground and bond equipment to prevent static electricity buildup, which could lead to sparks and fire. Train workers on the safe operation of paint booths and associated equipment, emphasizing the importance of adhering to operating manuals and safety protocols.

Training and Emergency Preparedness
Provide comprehensive training on the safe handling of paints and solvents, equipment operation, PPE use, emergency response, and fire safety. Develop and communicate a clear emergency response plan for fires, chemical spills, and exposure incidents, including evacuation routes and assembly points.

PPE

Personal Protective Equipment is the last line of defense to protect you from hazardous tasks. It should be provided to you by supervisors or employers any time it is needed. EHS can provide guidance on hazards and appropriate PPE.

General PPE Practices

- **Use:** Wear the correct PPE for the task and in the manner directed by training.
- **Inspection:** Inspect PPE before each use for signs of damage or wear. Replace any damaged or expired equipment immediately.
- **Fit and Comfort:** Ensure PPE fits properly and is comfortable to wear for the duration of the task. Improperly fitting PPE can reduce effectiveness and may cause additional hazards.
- **Clean:** Sanitize and clean according to instructions after every use

Head and Eye[32] Protection

- Wear an ANSI[33] approved hardhat when there are low head clearances or potential for falling objects.
- Wear safety glasses or a face shield when there might be flying debris.
- Wear goggles when there is potential for chemical splashes.
- Wear a welding helmet with the correct level of shading when welding or brazing.
- Wear ear plugs or earmuffs in areas of sustained noise or with levels over 85dB.

Hand Protection

- Wear the appropriate gloves for the task. Example: Nitrile for chemical, Leather for heat.
- Do not wear gloves when they can be caught by machine movement or rotation.

Foot Protection

- Wear steel toe shoes where there is a danger of crushing or rolling objects. If working with electricity, use shoes with composite toes.

Fall Protection and respiratory protection are covered in their own sections.

[32] https://case.edu/ehs/laboratory-safety/personal-protective-equipment/eye-protection
[33] American National Standards Institute (ANSI) Z89.1

Props - Edged Weapons

Swords and other weapons immediately get people's attention and add excitement to a production. They can bring a level of realism or can be an indicator of zany hijinks to follow. Piercing and blunt weapons also fall under these same guidelines.

General Guidelines

- Authorization: Only trained and authorized personnel should handle weapons. Ensure that all performers and crew members receive proper training before using these items.
- Supervision: Weapons must be overseen by a designated weapons handler or fight choreographer or stage manager who is responsible for their use, maintenance, and safety protocols.
- Inspection: Inspect all weapons before each use to ensure they are in good condition. Check for cracks, burrs, loose fittings, and sharp edges that could cause unintended injury.
- Notify: Notify Campus Law Enforcement when weapons will be used. NEVER use personal weapons in a production
- Ensure: Edges must be dull and tips must be blunted
- Review: Safety precautions and weapons checklists must be observed prior to training, rehearsal and performances.

Handling and Use

- Rehearsals: Conduct thorough rehearsals for all scenes involving weapons. Focus on choreography, timing, and spacing to prevent accidents.
- No Improvisation: Do not deviate from the choreographed routine during performances or rehearsals. Improvisation with weapons is strictly prohibited.
- Safe Distance: Maintain a safe distance between performers during fight scenes or any use of swords and edged weapons. Ensure that all movements are controlled and deliberate.
- Blunted Edges: Always use blunted or dulled swords for performances. Sharp or live blades should never be used.
- No Horseplay: Swords and edged weapons should never be used for horseplay or non-scripted activities. Treat all weapons as dangerous at all times.

Storage and Transport

- Secure Storage: Store weapons in a locked and secure location when not in use. Access should be limited to authorized personnel only.
- Proper Transport: When transporting weapons, use protective sheaths or cases. Carry them in a way that avoids pointing them at others and minimizes the risk of accidents.
- On-Stage Storage: During performances, store weapons on stage only in designated areas where they cannot be accidentally accessed by unauthorized individuals.
- Strung Weapons: Bows and other weapons held under tension, must be unstrung with tension released in storage. NEVER dry fire a bow.

Props - Firearms

The display of firearms is not to be taken lightly, in the climate of our current world their use comes with additional inherent risk beyond the immediate risk of handling. Injury and death can occur from improper use of blank rounds and the potential to cause crowd panic can also result in injury. Contact EHS if prop firearms will be used in a production. Use the form.

General Guidelines

- **Authorization:** Any time prop firearms are to be displayed on stage (whether they are to be fired or not) CWRU Department of Public Safety must be notified.
- **Authorization:** Only trained and authorized personnel should handle firearms. This includes actors, prop managers, and anyone directly involved in scenes where firearms are used.
- **Weapons Manager:** Appoint a qualified weapons handler/manager and fight captain to oversee all aspects of firearm safety, including handling, use, and storage. The weapons manager is responsible for enforcing safety protocols and conducting inspections.
- **Real vs. Fake:** Never use real firearms or firearms that have been modified.
- **Inspection:** The weapons handlers/fight captains must inspect all firearms before each use to ensure they are in safe working condition. This includes checking for any obstructions in the barrel and ensuring the firearm is free from live ammunition.

Handling and Use

- **No Live Ammunition:** Under no circumstances should live ammunition be brought into the theatre or near any rehearsal or performance space. Only blanks or inert rounds may be used, and only under strict control. Treat EVERY firearm as if they are loaded, at all times.
- **Clear Communication:** Before each use, the weapons manager must clearly announce the presence of firearms and explain the safety procedures to all cast and crew members.
- **Loading:** Never load a weapon until it is ready to be used.
- **Handoff:** When handing weapons over to others, make eye contact, state whether it is loaded or unloaded, offer the weapon grip first and with the weapon pointed down, wait for a thank you response before releasing control.
- **Trigger Discipline:** Actors and anyone handling a firearm must keep their finger off the trigger until it is time to fire the weapon as part of the performance.
- **Pointing Firearms:** Firearms should never be pointed directly at another person, even during performance. Use camera angles/sightlines or stagecraft to create the illusion of pointing without actually doing so.

- **Controlled Firing:** Firearms should only be fired when absolutely necessary for the performance, and only in rehearsed sequences. Avoid firing in close proximity to other performers. Never dry fire a weapon.
- **Ear Protection:** Provide ear protection to all performers and crew members when firearms are being fired, especially in enclosed spaces where noise can be amplified.

Rehearsals

- **Dry Runs:** Conduct rehearsals with firearms using replicas or unloaded weapons to practice choreography and timing. Ensure that all actors are comfortable with the sequence before introducing blanks or other effects.
- **Limited Firing:** Only introduce firing blanks into rehearsals once the sequence is well-rehearsed, and only under the supervision of the Fight Director.
- **Safe Distances:** Establish and enforce safe distances between actors, crew, and the audience during any rehearsal involving the firing of blanks.

Storage and Security

- **Secure Storage:** Firearms must be stored in a locked, secure location when not in use. Access should be strictly controlled.
- **Transport:** When transporting firearms, they should be carried in locked cases. Avoid public exposure of firearms during transport to prevent misunderstandings or alarm.
- **On-Stage Storage:** During performances, firearms should be stored in designated, secure areas backstage when not in use. Only the actor and the weapons manager should have access to these firearms.

Special Effects and Blanks

- **Use of Blanks:** Blanks can still cause injury due to the pressure and debris expelled when fired. Ensure that all safety precautions are observed, including maintaining a safe distance from other performers and crew. Stage blanks of ½ or ¼ loads should be used.
- **Muzzle Flash and Sound:** Consider the effects of muzzle flash and sound on the audience and crew. Use additional safety measures, such as clear announcements and protective barriers if necessary.
- **Testing:** Test all firearms and blanks in the presence of the weapons manager before each performance to ensure they function correctly and safely.

Emergency Procedures

- **First Aid Kits:** Have first aid kits readily available and stocked with supplies specific to treating injuries that could result from firearm use.
- **Incident Reporting:** Immediately report any accidental discharges, injuries, or near misses involving firearms to the designated safety officer or stage manager.

Conduct a thorough investigation and review safety procedures to prevent future incidents.

- **Emergency Drills:** Conduct regular safety drills to ensure all cast and crew members know what to do in the event of a firearm-related emergency.

Training and Communication

- **Firearm Safety Training:** Provide comprehensive training on firearm safety for all personnel who will be handling or working near firearms. This training should cover the specific risks associated with blanks and theatrical firearms.
- **Regular Updates:** Keep safety protocols and training materials up to date with the latest safety standards and practices.
- **Clear Communication:** Maintain open communication lines between all parties involved in the use of firearms. Ensure that everyone is aware of the procedures and their roles in maintaining safety.

Audience Safety

- **Barriers and Distance:** Maintain a safe distance between the stage and the audience during scenes involving firearms.
- **Pre-Show Announcements and Signage:** Inform the audience before the show that firearms will be used, to prevent any alarm or misunderstanding.

Props - Animals

“Toto, I've a feeling we're not in Kansas anymore.”

Live animals are a challenge and carry quite a bit of risk. They can cause injuries to performers and crew, can transmit illnesses, cause allergic reactions and in turn they themselves can be injured by performers and crew. Combine these factors with the care and feeding needed, live animals are not recommended.

If a production has need of a live animal contact EHS and the Institutional Animal Care and Use Committee (IACUC) for approval and assistance.

Respiratory protection

Respirators protect the respiratory system from inhalation of hazardous atmospheres. Respirators provide protection either by removing contaminants from the air before it is inhaled or by supplying an independent source of respirable air.

Categories

Air-Purifying Respirators - Ambient air passes through a filter, cartridge, or canister to remove contaminants before breathing. Different contaminants require different filters. Because these respirators use surrounding air, they cannot be used in oxygen-deficient environments.

- N-95/N-99/N-100 Disposable Respirators are single-use respirators generally approved only for nuisance dusts, such as cement and hay dusts. These respirators are not designed to filter chemicals.
- Half mask and full facepiece respirators provide protection against dust and particulates as well as chemical mists, fumes, vapors, gasses, or any combination of these contaminants.
- Powered Air-Purifying Respirators (PAPRs) contain a portable blower that pushes ambient air through a filter and supplies purified air to the wearer. The powered type is equipped with a tight-fitting facepiece or a loose-fitting helmet, hood, or suit.

Atmosphere-Supplying Respirators– These respirators provide a breathable atmosphere, independent of the surrounding air. These respirators include Self-Contained Breathing Apparatus (SCBA) and Air-Line Respirators.

To wear a respirator, employees must complete the following steps:

1. Complete the *OSHA Respirator Medical Evaluation Questionnaire*[34]
2. Submit to a medical evaluation by CWRU Health Services to ensure that wearing a respirator will not be a health hazard,
3. Attend Respirator Training to learn how to wear and maintain a respirator safely.
4. Complete a Fit Test at the EHS office to ensure that the respirator fits properly and securely. Call 216.368.2907 to schedule a time.

[34] https://case.edu/ehs/media/1691

Rigging - General

Rigging systems must be built to support scenery and equipment that can easily weigh a thousand pounds, but also must be designed within the engineering limits of the building containing the system. Due to the overhead nature of rigging, run away systems or failures can cause catastrophic damage and injury. All rigging, no matter the style, has capacity limits that must be followed. Rigging cannot be learned solely from a book. It must always include hands-on training.

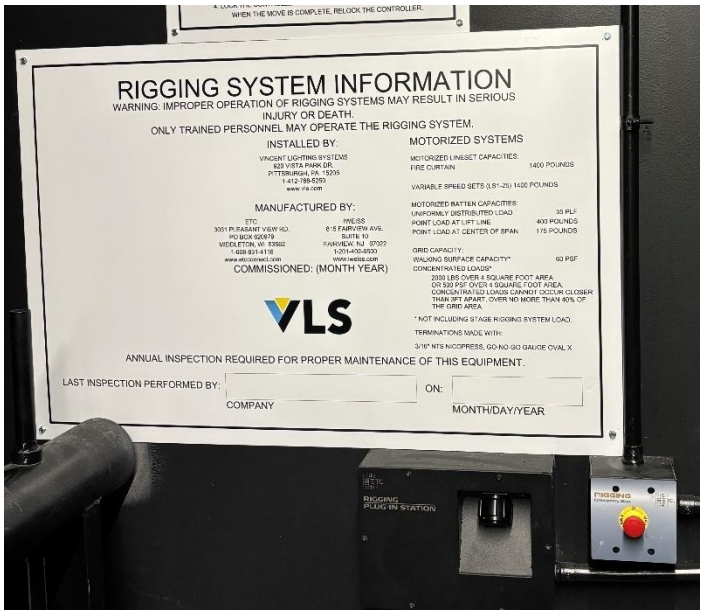
Improper training, understanding, and distractions while operating a rigging system can be extremely dangerous and may result in death.

General

- Maintain visual contact with moving pieces at all times.
- Audibly warn people on the stage or grid before moving any rigged scenery or other objects *(Ex: Attention on deck, lineset 2, downstage, coming in.)* Wait for a response. If you hear no acknowledgement, call out the announcement again.
- Create a communication system of warnings and work phrases standard for your space and ensure all cast and crew are trained on those warnings and phrases.
- Conduct documented rigging inspections. Ensure in-house inspections are conducted by trained personnel at least annually. Ensure a documented inspection by an external, independent rigging professional or company occurs every 3-5 years based on use and noted problems.
- Create a log of all installed equipment, manufacturer, date of installation, installer, relevant commissioning documents, inspections and a list of problems, repairs and maintenance that is performed.
- Listen for abnormal sounds, metal on metal, grinding, changes in motor sounds, and stop immediately and inspect more closely for problems.

- Ad-hoc inspections should occur daily on any piece of rigging you operate. Visually inspect for wear and tear, changes in systems, or damage to equipment and scenery/softgoods.

Motorized



- Do not exceed weight limit for battens (1400lbs) for Roe Green.
- Watch the stage and path of the batten, not the controller screen when operating.
- Lock controller and shutdown whenever the system is not in use.

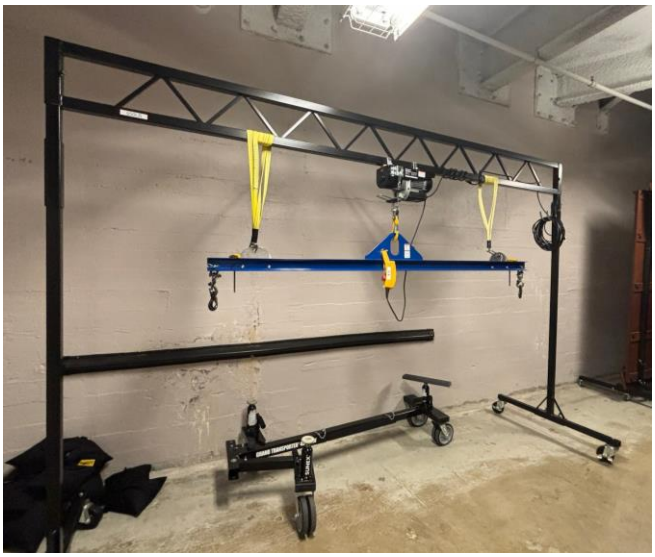
Counterweight

- Keep the area below loading bridges clear as weight is being moved.
- Clearly announce to weight loaders the lineset and the number of bricks being added or removed. Loaders should repeat the information back to confirm.
- Use 2 people to load counterweights, one to retrieve and hand weights over and one to load or unload weight.
- Load the batten first, and the arbor second. Reverse this for unloading.
- Place spreader plates every 2 feet between stacks of weights on the arbor
- Always secure the top plate when finished loading.
- Clearly label lock rail with what is on each line.
- Ensure operators know how to recognize and report out of balance or difficult to move linesets.

CWRU has no spaces with loading bridges

Rigging – Hoists, Winches, and Cranes

Hoists, winches and chain motors are found all over the CWRU campus. They are in use as engine hoists, stacking motors, for transferring equipment between levels, and in performance could be hoisting truss, screens, securing fire curtains, or lifting scenery or equipment towers.
This code of safety provides general guidelines, but each device and location have different parameters for safe operation. Operators must receive formal, documented training on proper use before they are authorized for use.



- Never exceed the rated lifting capacity.
- Verify the capacity rating for anchor points and support beams
- Use only proper, rated gear. Ensure slings, shackles etc. are clearly labeled with the Safe Working Load and that it is not exceeded.
- Inspect gear prior to use. If labels are missing or damaged, strands are damaged, rust or deformations are found, remove the piece from service and destroy it.
- Ensure all hoist hooks have safety latches that close the throat.
- Never exceed 45 degrees on sling angles.
- Never leave suspended loads unattended.
- Never stand under a load
- Maintain visual contact with moving pieces at all times.
- Whenever a new hoist or motor is purchased EHS should be contacted to be included in our inventory for the Crane, Hoist and Sling Program[35]. EHS ensures these are inspected annually and accurately tracked.

Rigging and lifting should only be performed by experienced users. If you are unsure of loads, ratings or proper procedures, contact EHS for more guidance.

[35] https://case.edu/ehs/sites/default/files/2022-05/Crane%2C%20Hoist%20and%20Sling%20Safety%20Program.pdf

Rigging - Rope, Chain, Cable

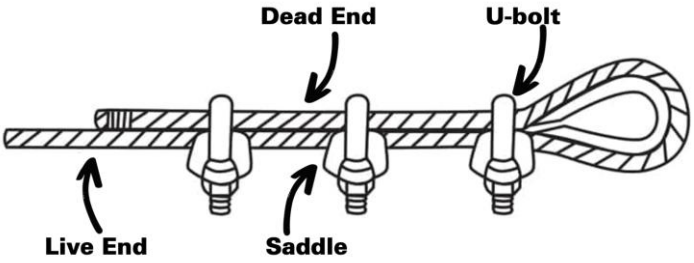
Ropes, chains and galvanized aircraft cable (GAC) are often found overhead as you enter a theatre. They are used to lift lighting equipment to catwalks, secure curtains to battens, speakers to anchor points, orto stabilize and secure equipment. Even in static conditions where it remains stationary and undisturbed, it all requires maintenance and care to continue operating safely. Some uses involve permanent installations, and some are used ad hoc as needed.

Fiber Rope

- Inspect rope prior to use. Damage to the outer jacket, shedding, breaks of the internal core and other wear and tear or smells of rope rot should be reported.
- Take care to avoid abrading ropes. When possible, run rope through a pulley or sheave[36], to allow it to run freely and do not drag ropes on the ground.
- Avoid kinking ropes.
- Use ropes of appropriate length. Never knot 2 ropes together. If joining is unavoidable, ropes should be spliced by someone experienced.
- Store ropes away from heat, moisture, chemicals and sunlight, never allow ropes to freeze.
- Wear gloves with hemp ropes or other fibrous/splintery ropes and report excessive shedding.

Wire Rope

- Inspect regularly for, wear, deformation, kinking, broken wires, friction and obstructions.
- Report damage immediately and replace rope if any strands are broken.
- Ensure that loops that have been installed have a thimble (of appropriate size) inside to protect the wire. It prevents the load from crimping the wire.
- Ensure that any rope clips (crosby's) in use are properly installed with the U-bolt over the dead side of the rope and the live side is saddled. "Never saddle a dead horse"



Chains

- Inspect before each use for wear, stretched and worn links.
- Never twist or knot chains and take slack up slowly, ensuring links seat properly
- Never exceed a chain's load capacity.

[36] Pronounced "shiv"

Storage

Well organized and planned storage reduces the possibility of injury, helps create a culture of good housekeeping and allows for faster locating of items tagged for retrieval.

General Storage Guidelines

- Clearly designate and label storage areas for different types of materials and equipment. These spaces should be clean and dry.
- Store frequently used items in easily accessible areas to minimize the need for reaching, bending, or climbing. Less frequently used items should be stored higher or lower, depending on their size and weight.
- Label all storage containers, shelves, and drawers clearly. This helps in locating items and ensures that materials are returned to the correct place after use.
- Ensure that storage areas are well-ventilated, especially when storing chemicals, paints, or other materials that could emit harmful fumes.
- Keep stored items at least 18 inches below sprinkler heads and 24 inches from the ceiling in non-sprinklered areas (except along walls).
- Maintain 36 inches of clearance from electrical equipment, and fire systems.

Material and Equipment Storage

- Store heavy items on lower shelves or the floor to prevent accidents from lifting or dropping. Use appropriate lifting techniques to move heavy items.
- Organize small tools and supplies in labeled bins, drawers, or toolboxes. Keep these items in a specific area to prevent clutter and loss.
- Store long or bulky items, such as lumber, pipes, or fabric rolls, horizontally on racks designed to support their weight. Ensure they are securely fastened to prevent tipping or falling.
- Store sharp tools, such as knives, scissors, and swords, in secure locations with protective covers or sheaths. Keep these items out of reach of unauthorized personnel.

Lighting
Coil cords, close shutters, ensure clamps are finger tight on the storage pipe, and store gel away from heat sources.

Costumes
Never hang items from sprinkler heads or pipes and maintain clear aisles.

Audio
Use proper lifting techniques when moving large speakers or heavy amps. Store the heaviest items on the ground or lowest possible shelves to avoid strain and to maintain a low center of gravity.

Tools
Keep guards and protective covers in place when storing sharp objects, coil power cords and hoses.

Show Critical Locations
Keep areas needed to run a show free of obstructions tools and stored items. This includes bridges, catwalks, fly rails, crossovers, pit areas, and booths.

Chemicals
Store flammable materials in NFPA approved cabinets, Store oxidizers in separate cabinets and corrosive acids and bases separately.

Scene Shop General Safety

Wood and metal working tools are dangerous, and all users require training in safe operating procedures. This training must be documented, retraining must occur in the event of incidents or violations. Shop managers shall be responsible for these logs and determining what training should occur for their particular uses. This Code of Safety serves as reference and provides the basic procedures that should be followed in campus shops. If you are unclear or do not understand tasks, equipment or safety procedures, ask for assistance from instructors, supervisors or EHS. If procedures are overlooked severe injury can occur.

General Safety Guidelines

- **Authorization and Supervision:**
  - Students must complete safety training and receive authorization before using any equipment or tools in the shop.
  - A trained supervisor or instructor must be present when the shop is in use.
- **Personal Protective Equipment (PPE):**
  - Always wear appropriate PPE, N-95 dust masks when sanding, safety glasses for debris risks, hearing protection (even if you aren't the operator), gloves for material handling, full length pants, closed-toe shoes. Consult EHS for more PPE guidance.
  - Long hair must be tied back, and loose clothing or jewelry should be secured or removed to avoid entanglement.
  - Use ventilation/dust collectors and air filters if they are available.
- **No Distractions:**
  - Maintain focus on the task at hand. Avoid using phones, headphones, or engaging in distracting conversations while operating machinery or tools.
  - Never leave machinery running unattended.
- **Housekeeping:**
  - Keep the work area clean and free of clutter. Regularly sweep up dust, metal shavings, and debris.
  - Plan ahead to leave time for clean up
  - Store tools and materials in designated areas when not in use.
- **Emergency Procedures:**
  - Familiarize yourself with the location of emergency exits, fire extinguishers, first aid kits, and eyewash stations.
  - Report any accidents, injuries, or unsafe conditions to the supervisor immediately.

Tools - Hand and Power

Hand tools carry inherent risk due to sharp edges and moving parts they often aren't given the same critical attention that larger tools receive. Haphazard operation and a lack of consideration can greatly increase the associated risks. The power tool classification encompasses anything with a power source: Electric, liquid fueled, pneumatic (air), hydraulic, and powder actuated.

General Safety

- Always wear appropriate PPE, N-95 dust masks when sanding, safety glasses for debris risks, hearing protection (even if you aren't the operator), gloves for material handling, full length pants, closed-toe shoes. Consult EHS for more PPE guidance.
- Long hair must be tied back, and loose clothing or jewelry should be secured or removed to avoid entanglement.
- Inspect tools before each use for damage or defects.
- Be aware of your surroundings and ensure observers are a safe distance away.
- Service and maintain tools according to manufacturer's recommendations
- Clean up any mess or debris generated by the tool after it is used.

Hand Tool Safety

- Use the right tool for the job, not everything is a hammer.
- Remove any damaged tools from service. Inspected for cracked handles, cracks due to metal fatigue, mushroomed heads on impact tools, or loose components.
- Tools capable of piercing should be carried with the point towards the ground.
- Cut away from your body

Power Tool Safety

- Never use a tool with a guard that has been altered or removed.
- Do not carry tools by power cords or hoses
- Keep fingers away from switches and triggers when plugging a device in.
- Disconnect devices before servicing or making adjustments. This includes reloading staples or nails, and changing bits or sandpaper.
- Keep hoses and power cords away from heat and out of situations where they could be cut or rolled over.
- Whenever possible, secure work pieces. (vises, clamps, screws etc)
- Keep a hand on any power tool that rotates or moves so that you maintain control of the device until the energy has been dissipated after shutdown. (sanders, routers, etc)

Tools - CNC Router

Operating a CNC router involves precision and adherence to safety protocols to prevent accidents and ensure efficient machining. Here's a comprehensive guide to safely using a CNC router.

Before Operation

PPE

- Wear safety glasses or goggles to protect against flying debris.
- Hearing protection is crucial due to the noise generated by the CNC router.
- Depending on the material being machined, a dust mask or respirator may be necessary to prevent inhalation of harmful particles.

Machine Inspection and Preparation

- Inspect the CNC router for any signs of damage or wear, particularly on the cutting tools and the spindle.
- Ensure all moving parts are lubricated and free from obstruction.
- Check that the workpiece is securely clamped to the machine bed to prevent movement during operation.
- Verify that the dust collection system is connected and functional to manage sawdust and debris efficiently.

Software Setup

- Load the correct program for your project into the CNC router’s control software.
- Double-check the tool paths and settings for accuracy against your project requirements.
- Perform a dry run without the cutting tool engaged to verify the path and ensure there are no errors in the programming.

During Operation

Operating the CNC Router

- Stay clear of the machine bed while the router is in operation. Moving parts and debris can cause injury.
- Monitor the operation closely without interfering directly. If an emergency arises, use the emergency stop button to halt the machine immediately.
- Adjust feed rates and spindle speeds according to the material being machined and the type of cutting tool used.
- Double-check the tool paths and settings for accuracy against your project requirements.

Focus and Awareness

- Maintain a high level of focus and avoid distractions. The CNC router should never be left unattended while in operation.
- Be aware of emergency shutdown procedures and the location of emergency stop buttons.

Safe Practices

- Never attempt to adjust the workpiece or change tools while the machine is running.
- Keep hands and other body parts away from moving parts during operation.
- Regularly check the condition of cutting tools. Dull or damaged tools can break or cause the machine to malfunction.

After Operation

Machine Shutdown

- Turn off the CNC router and wait for all moving parts to come to a complete stop before leaving the machine or starting post-operation procedures
- Disconnect the router from the power source if maintenance or repair is required.

Clean-Up and Maintenance

- Clean the machine and work area of all debris and dust. A clean machine is essential for accurate operation and extends the life of the equipment.
- Inspect tools and bits for wear and replace them as necessary.
- Perform regular maintenance checks as recommended by the manufacturer, including checking for loose components and ensuring that the spindle and axes move smoothly.

Documentation

- Log the operation details, including any issues encountered and how they were resolved. This can help in troubleshooting future operations and maintaining a record for maintenance purposes.

Tools - Drill Press

Using a drill press requires adherence to specific safety instructions to prevent accidents and ensure a safe working environment. Here are the essential safety instructions for operating a drill press.

Before Operation

PPE

- Obtain training and authorization.
- Wear safety glasses or goggles to protect your eyes from flying debris.
- Use hearing protection if working in an environment with constant loud noise.
- Remove loose clothing, jewelry, and secure long hair to prevent entanglement in moving parts.

Inspection and Setup

- Inspect the drill press for any damage or wear. Check the chuck and bit for tightness and condition.
- Ensure the drill press is securely anchored to the floor or workbench.
- Select the correct drill bit for your material and secure it properly in the chuck.
- Adjust the table or workpiece to the correct height, ensuring it is firmly locked in place and that you won't drill into it.

Work Area Preparation

- Keep the floor around the drill press clean and free of oil, grease, and scrap material to prevent slips and trips.
- Ensure adequate lighting and ventilation in the work area.

During Operation

Operating the Drill Press

- Use a clamp or vise to securely fasten the workpiece to the table. Never hold the workpiece by hand while drilling.
- Adjust the speed according to the material and drill bit size. Refer to the drill press manual for recommended speeds.
- Use the feed handle to apply steady pressure. Do not force the drill bit into the workpiece; let the tool do the work.
- Keep hands and fingers away from the rotating drill bit.

Focus and Awareness

- Stay focused on the drilling task. Do not be distracted or engage in conversation while operating the drill press.
- Be aware of the location of the emergency stop button or switch.

Safe Practices

- Do not attempt to remove chips or cuttings from the drill bit or workpiece while the machine is running. Use a brush or other tool to clear away debris after

the machine has stopped.
- Never reach over or across the rotating drill bit.
- If the drill bit binds in the workpiece, turn off the drill press immediately and carefully remove the bit from the workpiece.

After Operation

Power Down

- Turn off the drill press and wait for it to come to a complete stop before making adjustments or removing the workpiece.
- Disconnect the drill press from the power source if maintenance or repair is required.

Clean-Up

- Clean the drill press and surrounding area. Remove all chips, dust, and debris.
- Return all tools and accessories to their designated storage areas.

Maintenance

- Perform regular maintenance checks as recommended by the drill press manufacturer. This includes lubricating moving parts, checking for loose bolts, and ensuring safety guards are in place and functional.

Tools - Grinders (Angle, Die, Dremel)

Angle Grinders
Due to their power and the nature of tasks they perform, angle grinders warrant additional caution. Use a guard at all times and be aware of kickbacks. Only use discs rated for the grinder's RPM and for the material you are working with. Use both hands for better control and stability.

Die Grinders
When using die grinders, especially with metal, be mindful of sparks and metal shavings. Work in a well-ventilated area away from combustible materials.

Dremel Tools
Given their use for detailed work, ensure a stable work surface and consider using a flexible shaft attachment for intricate tasks.

PPE

- Wear safety glasses or goggles to protect eyes from flying debris.
- Ear protection is recommended to guard against noise.
- Dust masks or respirators should be used when generating significant dust.
- Use gloves for grip and protection but ensure they are tight-fitting to avoid getting caught in moving parts.

Preparation

- Inspect the tool for damage or wear before use. Check cords, batteries, and accessories.
- Ensure the work area is clean, well-lit, and free of flammable materials.
- Securely clamp down the workpiece to prevent movement.

Operation

- Select the appropriate bit or accessory for the material and task at hand.
- Keep hands and body parts away from rotating parts and cutting edges.
- Apply steady pressure without forcing the tool. Let the tool do the work.
- Turn off the tool and wait for all moving parts to stop before setting it down.

Post-Use
Disconnect the tool from the power source before changing accessories or performing maintenance. Clean the tool and work area removing dust and debris and then, store the tool and accessories in a safe, dry place.

Additional Safety Tips
Always use the tool at the correct speed setting for the material. Be mindful of the potential for entanglement with loose clothing or long hair. Understand the specific risks associated with the material you are working on, such as toxic dust from certain types of wood or metal. Maintain a firm grip and body control to manage torque or kickback, especially with more powerful tools.

Tools - Miter (Chop) Saw

Miter saws, also known as “chop saws”, are designed for making straight and angled cuts in wood and other materials. Here are key safety instructions.

PPE

- Wear safety glasses or goggles to protect against flying debris.
- Use ear protection due to the high noise levels.
- Dust masks are recommended, especially when cutting materials that generate harmful dust.

Before Operation

- Inspect the saw for damage or wear, particularly the blade and safety guards.
- Ensure the work area is clean, well-lit, and free of obstructions.
- Securely clamp the material to be cut, ensuring it cannot move during the cutting process.

During Operation

- Keep hands and fingers well away from the blade’s path.
- Use the saw's handle to lower the blade smoothly through the material without forcing it.
- Wait for the blade to reach full speed before beginning the cut and allow it to stop completely before lifting the saw.

After Operation

- Disconnect the chop saw from the power source before changing blades or performing maintenance.
- Clean the saw and work area, removing all sawdust and debris

Tools - Radial Arm Saw

Radial arm saws are versatile tools for crosscutting, ripping, and more intricate cuts. Due to their complexity, they require strict adherence to safety guidelines.

PPE

- Safety glasses or goggles are essential to protect from flying particles.
- Hearing protection should be used to minimize noise exposure.
- Dust masks are advisable to avoid inhalation of sawdust.

Before Operation

- Check the saw for any signs of damage especially, the blade, guards and the arm’s adjustment mechanisms.
- Make sure the cutting area is clear of obstructions and that the workpiece is securely fastened.
- Verify the blade is appropriate for the material and type of cut.

During Operation

- Maintain a firm stance and keep your body to the side of the blade path to reduce risk in case of kickback.
- Control the saw's arm with both hands when making cuts to ensure stability and accuracy.
- Never reach under the blade while it is spinning, and avoid cross-arm cutting, which places your arm over the blade's path.

After Operation

- Turn off the saw and wait for the blade to come to a complete stop before making adjustments or removing the workpiece.
- Disconnect the saw from the power source before changing the blade or performing any maintenance.
- Clean the saw, especially the guard and blade, to ensure it remains in good working condition.

General Safety Practices for Both Saws

- Regularly inspect and maintain the saws to ensure they are in safe working order.
- Always use the saws for their intended tasks, adhering to the manufacturer’s guidelines.
- Keep the work area clean and free of tripping hazards.
- Understand and practice emergency stop procedures.

Tools - Pneumatic (nail and staple guns)

For nearly every hand and power tool there is a pneumatic (air powered) counterpart. The primary pneumatic tools encountered in shops are staplers, brad and finish nailers. They can greatly decrease the time needed to fasten pieces during assembly. However, they can also easily fire projectiles across a room if used improperly.

Personal Protective Equipment (PPE)

- Eye Protection: Always wear safety goggles or a face shield to protect your eyes from flying debris, nails, or fasteners.
- Hearing Protection: Use earplugs or earmuffs to protect your hearing from the noise produced by pneumatic tools.
- Hand and Body Protection: Wear durable work gloves to protect your hands. Avoid loose clothing, jewelry, and tie back long hair to prevent entanglement in moving parts.

Pre-Use Inspection

- Tool Condition: Inspect the pneumatic tool before each use. Check for signs of wear, damage, or malfunction, such as cracks or missing components. Make sure all screws and fasteners are secure.
- Air Hose and Connections: Check the air hose for leaks, cracks, or wear. Ensure that all connections between the tool and air compressor are secure and undamaged.
- Compressor Settings: Ensure the air pressure does not exceed the tool's maximum operating pressure. Over-pressurization can cause the tool to malfunction or result in serious injury.

Operating Procedures

- Correct Air Pressure: Set the air compressor to the appropriate pressure level recommended for the specific tool. Never exceed the tool’s rated air pressure.
- Controlled Operation: Maintain a firm grip on the pneumatic tool while operating. Keep hands, fingers, and other body parts away from the trigger and discharge area when not in use.
- Tool Activation: Only engage the trigger when the tool is properly positioned against the workpiece. Avoid dry firing the tool, as this can cause damage and create safety hazards.
- Trigger Control: Be cautious when using tools with contact trip triggers. Use sequential triggers where possible to reduce the risk of accidental discharge.

Avoiding Hazards

- Never hold a piece of material directly behind or immediately next to where you are nailing/stapling. Unseen knots or defects can cause fasteners to bend and change direction causing them to exit the material in an unexpected location. You also run the risk of puncturing fingers or hands if the incorrect length of fastener is used.

- Disconnect Power When Not in Use: Always disconnect the pneumatic tool from the air supply before changing accessories, performing maintenance, or leaving the tool unattended.
- Hose Management: Keep the air hose out of high-traffic areas and ensure it is not kinked or twisted. This helps prevent trips and falls, as well as accidental tool activation.
- Fastener Safety: When using nailers or staplers, never point the tool at yourself or others, even if it is disconnected. Ensure that no one is in the line of fire before operating.
- Routine Maintenance: Follow the manufacturer’s guidelines for routine tool maintenance, including lubrication and cleaning. Regularly inspect the air compressor, hoses, and tool for wear or damage.

Tools - Router

Routers are versatile tools capable of various tasks, including shaping edges, cutting grooves, dados, and creating intricate joinery. It can also be used for decorative carving, template routing, and can come with a variety of bases for different tasks.

PPE

- **Eye Protection:** Always wear safety goggles or a face shield to protect your eyes from wood chips, dust, and debris.
- **Hearing Protection:** Use earplugs or earmuffs to protect your hearing from the high noise levels produced by routers.
- **Respiratory Protection:** Wear a dust mask or respirator to prevent inhaling wood dust, which can be harmful over time.

Pre-Use Inspection

- **Router and Bits Check:** Inspect the router for any damage or wear before use. Ensure that the power cord and switch are in good condition. Check the router bit for sharpness, cracks, or defects. Replace any damaged bits immediately.
- **Workpiece:** Check the material for defects and obstructions that could damage bits.

Safe Work Environment

- **Work Area Preparation:** Ensure that your work area is clean, well-lit, and free of clutter. Avoid working near flammable materials, as routers can produce sparks.
- **Stable Workpiece:** Secure the workpiece firmly using clamps or a bench vise to prevent movement while routing.

Operating the Router

- **Correct Positioning:** Hold the router firmly with both hands to maintain control. Keep a stable stance with feet shoulder-width apart for balance.
- **Router Direction:** Always move the router against the rotation of the bit (typically counterclockwise for outside edges) to maintain control and avoid kickback.
- **Speed Control:** Adjust the router speed according to the material and bit size. Larger bits should be used at lower speeds to prevent overheating or damage.
- **Start and Stop Safely:** Always turn off and unplug the router before changing bits or making adjustments. Wait for the router to stop completely before setting it down after use.

Avoiding Hazards

- **Kickback Prevention:** Keep the router bit in motion to avoid the risk of kickback. Never force the router through the material; let the tool do the work.
- **Changing Bits:** Bits are often very hot after use. Avoid burns by allowing them to cool down or by wearing gloves.
- **Cable Management:** Keep the power cord out of the way and clear from the cutting area to prevent accidents or damage.
- **Avoid Loose Clothing and Jewelry:** Ensure that long hair, loose clothing, and jewelry are secured to prevent them from getting caught in the rotating router bit.

Tools - Sanders (vertical and horizontal)

Horizontal / Vertical Sander

Using a horizontal sander safely is crucial to prevent accidents and ensure a smooth operation. Here are safety instructions tailored for the use of a horizontal sander.

Before Operation

PPE

- Wear safety glasses or goggles to protect your eyes from sanding debris.
- Use hearing protection to guard against prolonged exposure to noise.
- Dust masks or respirators are recommended to prevent inhalation of dust particles.
- Remove loose clothing, jewelry, and ensure long hair is tied back to avoid entanglement with the sander.

Inspection and Preparation

- Check the horizontal sander for any signs of damage or wear. Ensure the sanding belt is properly secured and in good condition.
- Verify that all guards are in place and securely attached.
- Ensure the work area is clean, well-lit, and properly ventilated to manage dust.
- Confirm the sander is securely mounted or clamped to a stable work surface.

Workpiece Preparation

- Inspect the material to be sanded for any metal objects like nails or staples that could damage the sanding belt or cause injury.

During Operation

Operating the Sander

- Turn on the dust collection system if available to minimize airborne dust particles.
- Start the sander before making contact with the workpiece.
- Gently feed the workpiece against the motion of the sanding belt. Do not force the material; let the sander do the work.
- Keep fingers and hands away from the sanding belt while the machine is in operation.
- Use push sticks or holders for small pieces to keep hands at a safe distance from the sanding surface.

Focus and Awareness

- Stay focused on the sanding task. Avoid distractions and be mindful of your hand placement at all times.
- Be aware of the direction of the sanding belt's movement to feed the workpiece accordingly and prevent kickback.

Safe Practices

- Never leave the sander running unattended. Turn it off if you need to step away, even for a short period.
- Do not attempt to sand small pieces without proper holding devices.
- Avoid adjusting the machine or changing sanding belts while the sander is running.

After Operation

Power Down

- Allow the sander to come to a complete stop before turning it off.
- Disconnect the sander from the power source if performing maintenance or changing the sanding belt.

Clean-Up

- Clean the machine and surrounding area of all dust and debris after use. Use a vacuum or dust collection system to remove dust particles.
- Inspect the sanding belt for wear or damage and replace if necessary.

Maintenance

- Regularly check the sander for loose components, damaged belts, and ensure guards are intact and functional.
- Lubricate moving parts as recommended by the manufacturer to keep the sander in good working condition.

Additional Considerations for Vertical Sanders

- Vertical Space: Ensure there is adequate vertical space above the sander for the size of the pieces being worked on.
- Many vertical sanders allow the table angle to be adjusted. Ensure this is set correctly for your task and securely locked before beginning.
- When using the sander for edge work, ensure the workpiece is firmly supported against the table or work support.

Tools - Saws

Common within all work areas of the shop is the use of various types of saws, such as table saws, circular saws, jig saws, and hand saws. All employees must receive documented training before operating any type of saw. Using a saw can be extremely dangerous if safe and proper operating procedures are not learned and followed.

Wear the proper PPE
Proper PPE consists of safety glasses, goggles, and when necessary, a face shield. Reminder: Face shields alone **do not** qualify as wearing appropriate eye protection. It is also possible to get chips from below. This makes wearing goggles a necessity. Even if you are not operating power tools and woodworking machines, always wear hearing protection. Wear tight-fitting work gloves only when handling materials. Never wear gloves while working with power tools.

Appropriate shop attire must be worn when using hand and/or power tools including full-length pants (or equivalent) and closed-toe shoes.

In addition to the codes of safe practices for specific types of saws, here are some general safety guidelines.

- Obtain training and understand the device in use.
- Always talk to your instructor or supervisor if you discover a faulty machine or tool or if you are not fully qualified to operate the machine or tool.
- Remove rings, watches, necklaces, other jewelry, and loose clothing and leave them in your locker or bag.
- Restrain long hair to keep it away from machinery, tools, and points of operation. This is vital as fatalities have occurred from long hair getting caught in rotating equipment.
- Inspect tools and machinery prior to starting to ensure they are safe to use.
- Immediately lockout and tagout damaged machinery and power tools and report it to your supervisor. For additional information regarding lockout and tagout, read the CWRU Lockout/Tagout Policy for more information.
- Shut off and disconnect all power tools and machinery from their power source prior to making adjustments or changing out components; wait for the machine/tool to come to a complete stop.
- Never leave machinery or power tools running unattended.
- Sweep up and clean away sawdust and scraps as needed throughout the work process to keep the floor free of slip, trip, fall hazards and the work area clean. Sweep and clean again prior to leaving the area.
- Keep saws in good condition, making sure they are sharp and clean for optimal performance. Follow manufacturer instructions for lubricating and changing accessories.
- Use proper ventilation to remove smoke and dust.
- Never operate the saw while under the influence of drugs, alcohol, or medication that could impair your judgment or motor skills.

Tools - Welding/Brazing/Soldering

In theatre production, welding, brazing, and soldering are essential techniques used to fabricate and repair metal components for set construction, props, and rigging. Welding, which typically uses high heat to fuse metals, is often used for larger, load-bearing pieces, while brazing involves joining metals using a filler material that melts at a lower temperature than the base metals. Soldering is similar to brazing but is generally for more delicate work such as electronics or small parts. Both processes require strict safety protocols due to the risks of burns, fumes, and eye injuries. Students and employees must be properly trained to be authorized to do any of this work.

General Guidelines

- Use appropriate PPE for each task, leathers, gloves, fire retardant jackets, welding helmets.
- Inspect all equipment before use, checking for leaks, openings, and that self-shading lenses are functional.
- Require shaded goggles or welding helmets for anyone that might be observing the welding process.
- Shield the welding area with non-combustible materials or screens to protect adjacent workers from infrared rays.
- Conduct welding, soldering and cutting operations in well-ventilated areas that have been made fire safe and with 35’ of clear space.
- Maintain a fire watch whenever cutting, welding, or soldering and ensure they have a suitable extinguisher ready for use.
- Do not consume or store food or drinks in the welding area.
- When work has been completed, thoroughly clean hands with soap and water.

Arc Welding

- Always turn off the welder and disconnect the power source when not in use or when leaving the work area.
- Never unplug a machine while it is in the “on” position.
- Remove electrodes from the holders when leaving the work area.
- Avoid welders flash or “arc eye” by wearing the appropriate filter lens. Ensure observers completely cover their skin to avoid ultraviolet burns.
- Avoid accident arcs by being aware of your surroundings and proximity to material that may complete welding circuit

DEFINITIONS

AHJ: Authority Having Jurisdiction. Typically, a fire marshal.

ANSI: American National Standards Institute.

Apron: The area of a stage in front of the proscenium. Alt: A piece of PPE that protects against splashes.

Arbor: A carriage or rack that contains weights, usually flame cut steel or cast iron, in sufficient quantity to balance a load.

Atmospherics: Particulate air effects used for a variety of purposes.

Automated rigging system: Uses a single winch with a short drive shaft for each line set. The shaft holds a series of cable drums. Each drum has an associated pulley which directs a lift line to the loft blocks. The motors are powerful enough to lift the loads without counterweights being necessary. Motors may be single-speed or variable speed.

AWG: American Wire Gauge. A method of specifying wire diameter.

AWP: Aerial Work Platform. Typically, a single person, personnel lift. (SEE MEWP)

Backdrop: The rear curtain on the stage with fullness and is part of the cyclorama set. This name is also given to the rear curtain of a full scene, whether sky drop, a painted drop, or the formal curtain with fullness.

Basket: To form a closed loop around something, such as an overhead support beam, by connecting both ends of a length of steel to a shackle so that the loop does not tighten on the object.

Batten: A steel pipe used to support scenery, curtains, and lighting. Usually suspended from the grid or roof structure as a part of a rigging system.

Belaying pin: A wooden or metal pin designed to be inserted in a hole in a pin rail to which running rigging is secured.

Bight: The bend of a line, rope or cable.

Boom: A vertical pipe for mounting lights, may be attached to a weighted base.

Border: A curtain, which does not reach the stage floor – usually it is much wider than it is high.

Breaking strength: The load at which failure will occur in a component.

Bridle: Any suspension configuration in which a lift line is divided into 2 or more tension

load path elements angled downward from the lift line termination and connected to the batten.

Cam-locks: Single wire connector for large wire, 2/0 or 4/0. Locked in place by rotating 1/2 turn after insertion. Comes in colors to indicate which leg is which. The most common size on stage is Rated at over 400 amps. Also available in a mini-cam size for #1 cable, rated at 100 amps. *SEE ALSO: Feeder, Company Switch, and Safety Disconnect.*

Catwalk: A structure (usually steel) over the stage and/or audience area used by personnel to cross from one side to the other and used to technical elements like lighting, speakers, or projectors. Present in Roe Green Theatre, Kalberer black box, Silver Hall, Schmitt Auditorium, Strosacker Auditorium, Ford Auditorium?

Choker: To form a loop around something that slides tight and grabs under load, basically forming a lark's head or "tie-line knot" around the object. Commonly used to attach a spanset to a truss.

Clean room: A designated area for fabric layout, draping, paper goods or graphics work. A space that is free of airborne contaminants or dust.

Clew: A device, typically a flat steel or aluminum plate with multiple holes, used to connect several lift lines into a single line.

Company switch: A large capacity disconnect box located backstage, used for the connection of portable dimmer racks or other temporary electrical equipment. *SEE ALSO Safety Disconnect Switch and Feeder.* Present in Maltz, TVUC, both gyms in Veale.

Competent person: Defined by OSHA as someone capable of identifying existing and predictable hazards in the workplace that are unsanitary, or dangerous to employees and who has the authority to implement immediate corrective measures.

Counterweight system: A device for flying scenery by the use of weights, pulleys, blocks, ropes, and arbors. It operates by using the weights to offset the weight of the scenery or drapery over the stage, allowing it to fly. *SEE ALSO: Automated Rigging*. Present in Maltz, Eldred, Thwing Ballroom (main curtain).

Craft room: A support space that may have specialized functions or equipment like dye vats, hot plates, or spray booths.

Cyclorama: “Cyc” (pronounced psych)- A large curtain of canvas, muslin or other material preferably in one piece with no seams. Usually the most upstage drape, often white (natural) or light blue in color. Historically cycloramas were curved drapes, modern usage refers to straight drops.

Dead Hung: Battens or similar equipment that is permanently supported from the grid and cannot be easily lowered or adjusted. Static. Present in Thwing Ballroom, Eldred

Designated person: A person selected or assigned by the owner or user as being competent to perform specific duties.

Design factor: The ratio between the working load limit and the ultimate strength of a product. See SAFETY FACTOR.

Dimmer: A means of electrically controlling the light output from a lamp or fixture.

Dimmer rack: Several dimmer circuits mounted in a cabinet. Can be permanently installed or a portable rack. High Voltage.

Dirty room: Primarily a wood and metal working space. Even when a dirty room has been cleaned, its primary purpose is the dirty work of cutting, building, and finishing.

Doofer: A stand in rehearsal prop. It will do for now. “We don’t have the real thing, but I have a doofer.”

Dope: A general term for multiple techniques. A thick, often textured, treatment of scenic surfaces. Typically, some kind of mixture of glues, plaster, spackle, elastomeric compounds. As uses vary, no specific “standard” recipe exists.

Drop: A fabric curtain, which reaches the stage floor.

Duvetyne: “Duve” A soft, sturdy twill weave fabric with a napped surface, often used as a curtain or masking fabric.

Dynamic Load: The increased force that results from a change in the speed or direction of an object.

ESTA: Entertainment Services and Technology Association.

ETCP: Entertainment Technician Certification Program. An industry-wide program of rigorous assessments for professional technicians.

Feeder: Defined by the NEC as “All circuit conductors between the service equipment or the source of a separately derived system and the final branch-circuit overcurrent device.” *SEE ALSO: Camlocks.*

Fire resistance: The ability of a material, product, or assembly to withstand fire or give protection from it for a period of time.

Fire retardant: A liquid, solid, or gas that tends to inhibit combustion when applied on, mixed in, or combined with combustible materials.

Fire watch: A temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more competent persons for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire and notifying the fire department.

Flagging: Used during focus. To wave your hand repeatedly in front of a light, disrupting the beam so it stands out and can be distinguished from other lights.

Flame retardant: So constructed or treated that it will not support flames.

Fleet angle: The angle between the centerline of a rope as it enters or exits a sheave groove, and the plane defined by the centerline (pitch) circle of that groove.

Fly gallery: The location from which rigging devices are operated. Sometimes a raised area overlooking the stage, sometimes at stage level. Also known as the fly floor or rail.

Fog: A mixture of liquid droplets in air that reduces visibility and reflects light, producing visible clouds or volutes (spiral plumes similar to the top of an ionic column) in the air.

FOH: Front of House. Depending on context this could mean the audio mixing position/booth location and associated crew, or it could refer to box office and audience facing management staff.

FR: (Flame Retardant) Fabrics that are woven from threads that do not meet fire codes but are topically treated with a flame retarding chemical so that the product meets fire safety codes. FR chemical remains adhered to the fibers of the fabric, making the fabric flame retardant, but possibly on a temporary basis. Any future wetting of the fabric will dissolve the chemical and likely remove all or portions of the chemical from the fabric. This renders all or portions of the fabric NFR.

GAC: Galvanized Aircraft Cable, wire rope used as part of rigging systems, to suspend objects, and internally in some spansets.

Ghost light: A light left on stage as a preventative safety measure when a theatre is unoccupied, allowing for safe movement and visibility for anyone entering the space.

Ghost load: An additional load used to make a resistance dimmer operate properly when the capacity or wattage of an instrument is smaller than the dimmers capacity. Also required by some electronic dimmers for very small loads.

Go/NoGo Gauge: a gauge to check the accuracy of swaging tool. It ensures wire ropes are properly swagged.

Grid: The structural framework of beams over the stage used to support the rigging system. Short for gridiron.

Ground rigger: The person responsible for assembling rigging hardware on the ground and coordination of hauling operations.

Guide: A device or assembly of devices that connect a counterweight arbor or tension block to the guide rails in order to control the path of its travel.

Guide rails: A means of guiding the counterweight arbor throughout its travel in the

vertical plane, but which also limits horizontal or twisting motions of the arbor. Typical examples are T- or J- shaped members.

Guillotine: A large one-piece drop with fullness rigged to be hoisted or lowered.

Haze: An accumulation in the atmosphere of very fine, widely dispersed, solid or liquid particles giving the air an opalescent appearance.

“Heads!”: If the voice comes from above, it means something has been dropped or there is some other immediate danger from above. Do not freeze, move away to protective cover immediately. If the voice comes from the fly rail, it means a pipe or scenery is moving and you should stand clear.

Headblock: The stationary block assembly above and closest to the counterweight arbor or pin rail. The head block permits lift lines to change direction. In some counterweight systems, the head block is also grooved to allow the operating line to change direction by 180 degrees.

Hemp system: A rigging system of hemp (now manila fiber) ropes and counterweight. Hemp systems have additional inspection needs.

House: The area an audience occupies in a theatre or performance space.

Idler assembly: An assembly of sheaves and housing, used to support only the self-weight of the lifting media reeved through it. Idler blocks are used for the same purpose as sag bars except that idlers provide reduced coefficient of friction.

Interlock: Devices or switches used to prevent improper or unsafe operation or access to equipment and/or electrical panels.

IFR: (Inherently Fire Retardant) Fabric woven with threads that yield a product that meets fire code standards, without being subject to any special processing or addition of chemicals. IFR fabrics are expected to remain flame retardant for their lifetime, even after repeated washings.

JHA: Job Hazard Analysis. A step-by-step analysis of potential hazards associated with a task.

Lift line: Any fiber or wire rope reeved through block(s) and attached to a load. Lift lines operate singly, as spot lines, or in "sets" of several lift lines working together to support a load.

Line set: A system of multiple lift lines, operated together to raise, lower, or suspend a load; all of the mechanical, component subsystems required for supporting, positioning, and operating those lift lines as a system.

Load in: The “arrival” phase of a production. Installing scenery, lighting, other equipment or elements in a theatre in preparation of a run. Can also be the put in of instruments for a concert.

Loading gallery: A load bearing, elevated personnel access and work area, located to permit counterweight loading and unloading at the arbor.. Also known as Loading Platforms, Loading Bridges, or Weight Decks.

Locking collar: A device placed on a counterweight arbor rod to reduce unintended vertical movement of counterweights on the arbor.

Lock rail: A metal framework attached at one side of the stage on which the rope of a rigging system is attached. Found in Eldred.

Loft: The space between the stage deck and the roof of the stage. Commonly called the flies or fly loft.

Loft blocks: The pulleys or sheaves directly above the batten used to change the direction of the working lines from horizontal to vertical.

Marley: Trade name for a type of portable dance floor covering; thin rubberized sheets, 4 to 5 ft. wide. Loosely used as colloquial name for any dance floor.

Marry: 1) To attach two pipes and or arbors together so they work as a unit. **2)** Binding two lines together temporarily, either end to end or side to side.

Masking: Flats, scenery or softgoods used to cut off from view of the audience, any part of the stage which should not be seen.

MEWP: Mobile Elevated Work Platform. Personnel lifts; often referred to as “genies” after a prevalent brand.

Motorized rigging: A system of electric hydraulic motors used to raise and lower battens or counterweight arbors or carriages.

Mousing: The act of protective wiring to prevent unwanted movement, such as wiring the throat of a hook to prevent rigging from jumping out of the hook, or interweaving wires in the barrel of a turnbuckle to prevent end bolts from unscrewing.

Mule block: A supplementary block located between the head and loft blocks, designed for the specific purpose of changing the direction of lift line travel.

Must: Denotes a mandatory requirement.

Near miss: Defined by OSHA as a potential hazard or incident in which no property was damaged and no personal injury was sustained, but where, given a slight shift in time or position, damage or injury easily could have occurred.

NEC: National Electric Code.

NFR: Non-Flame Retardant. Any fabric that is not Inherently Flame Retardant and has not been treated with chemical fire retardant.

Operating line: The line that an operator pulls to move position or hold a counterbalanced load. Also known as a purchase Line.

Orchestra lift: An elevator used to raise or lower the floor of an orchestra pit, or to transport instruments or equipment to another level. Also known as Pit Lifts. Found in Maltz.

Out-of-balance condition: A condition where the weight of the batten load differs from the weight of its associated counterweight equipment by more than 50 lbs.

Pickle: A small controller with an Up contact and a Down contact, usually on a rocker switch, which can operate one motor at a time.

Pick: A point rigged to lift (pick up) bundles of electric cables offstage.

Pin rail: A rigidly mounted railing, and its associated supports, with holes designed to accept belaying pins, used to tie off rope and sandbag rigging lines. It transfers unbalanced system loads to the building structure. Found in Eldred and Thwing Ballroom (disused).

Pipe weight/tare weight: The part of a load representing the weight of the empty batten; pipe weight should be left on the arbor when the load and its counterweight is removed, in some venues the pipe weight is marked with painted bricks.

Pit: A recessed area in front of the stage used primarily by musicians. May be covered and used as an extended area of stage or apron.

PIT: Powered Industrial Truck. Equipment used for transporting materials from one place to another. Forklifts, and powered Pallet Jacks.

Point load: A concentrated load applied at a single location.

Presented works: Productions or events have been developed elsewhere by external companies and are brought into a “host” venue.

Produced works: Productions developed by creative teams “In house” from new or existing works.

Production rigger: The person designated by the production supervisor to ensure the proper installation of the rigging system and hoists.

Proscenium: The wall between the stage and the audience containing the proscenium arch or opening.

Purchase line: The operating line in a counterweight fly system.

Qualified person: A person who by possession of a recognized degree or certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

Reeve: To pass a rope over the sheaves in a block or a system of blocks. Reverse bend: A condition where a rope is reeved in opposing directions, over two or more sheaves, within two days of the rope strands.

Rigging: The installation, use and removal of equipment to move, suspend or secure objects.

Rope and sandbag system: A type of counterweight system that uses natural or synthetic rope, instead of wire rope, for the lift lines, and uses sandbags as the counterweight method.

Rope lock: A positioning device located on the locking rail that holds an operating line of a balanced counterweight set and prevents unintended movement.

“Run it”: Used during focus. To move the barrel of an ellipsoidal light to its most extreme point so that a designer can call the desired level of focus.

SAFD: Society of American Fight Directors. The leading training, certification, and governing body for stage combat in the United States.

Safety disconnect switch: Used to open and close a circuit as a disconnecting means for service entrance or to facilitate lock-out/tag-out procedures for motors and other critical power systems equipment.

Safety factor: The ratio of breaking strength to the safe working load. The safety factor is determined by information on manufacturers specifications and users evaluations of the loading situation.

Safe Working Load: The maximum load that can be safely supported by a component after the safety factor has been applied.

Sandbag: Fabric bag filled with sand and used with rope rigging to counterbalance a load.

Scrim drop: A drop made from transparent fabric to obscure any action behind it.

Shall: A term to indicate that an action is mandatory.

“Sharp to shutter”: Used during focus. To set the barrel to sharp edge. Often the first step before shutter cuts, color, or gobos are added.

Shinbuster: Shin height lighting on booms, commonly found in dance.

Shock load: The extreme surge in force associated with sudden impact.

Should: A term used to indicate that an action is recommended under most conditions but is not mandatory.

Single reeve (single purchase): A system of rigging employing weights, blocks and lines to hold or move similar weight, using a 1:1 mechanical advantage for counterweight and batten load.

Sling: A length of chain, wire rope, natural or synthetic fiber rope, or webbing with attachment points at both ends.

Snub: To lock a line, generally with a pin, post, or by lashing it with another line to a structural, stationary object.

Socapex: “Soca” A Socapex brand multi pin connector carrying multiple circuits, used for joining lighting multi-cables “Mult”. Regional variations and pronunciations include Sock-O, and SOka.

Softgoods: Any non-wardrobe, cloth-based element of the stage or scenery. Typically masking, curtains, borders, legs, cycs, scrims etc.

Spanset: A lifting sling with either a polyester fiber core or a steel core covered by a double wall tubular webbing. Steel cores are preferred due to higher fire resistance. If polyester or nylon cores are used they must be backed up with a steel safety. Also known as round slings

“Spin the bottle”: Used during focus. To rotate the oval shape of the PAR’s beam, either by using a focus ring or by rotating the lamp.

Spotline: A single line, used in conjunction with one or more spot blocks to support a load such as a chandelier. A loft block or point is placed in position and a line dropped where needed. Often used as cable picks.

Spreader plate: Plate that is installed between counterweight arbor rods to keep the rods from spreading during rapid travel or impact, preventing counterweights from falling out of the arbor.

Stagepin: *NEMA designation, 5T-20***,** has round 1/4" pins, and is very durable. A very common dedicated stage connector. Rated at 20 amps. The center pin is "ground", the outside pin nearest the ground is the "neutral", and the other is the "hot".

Standard: A document that provides rules or guidelines to achieve a desired, consistent outcome.

Static load: The constant force associated with a stationary object.

Stinger: A length of steel cable used to extend a motor or chain so it can reach the overhead suspension point.

Strike: The deconstruction of scenery, removal of lighting and any show specific preparations following the end of a production run. Resetting to zero.

Sunday: The tying of a snub line. “Make sure you Sunday that lineset”

Teaser border: This is the first border behind the main curtain regardless of the presence or absence of other curtains. Thus, if there were a grand border behind the main curtain, such could be designated as Teaser, Teaser Border or Grand Teaser.

Tension block: A block designed to remove slack from an operating line, preventing it from twisting in its travel, and from rubbing against wire ropes, structural framing, and adjoining equipment.

Thimble: A grooved fitting around which a rope/wire rope is bent to form an eye. It supports and protects the rope to prevent kinking and wear.

Three Phase (4 wire): Electrical power using three hot lines and one common or neutral wire. The potential between any hot line and neutral is 120 VAC and between any two hot lines is 208 VAC or 480 and the circuits differ in phase by 120 degrees.

Three-pin twist lock: *NEMA designation L5-20.* It has three curved blades which are locked into the receptacle by rotating it 1/8 turn after insertion. Rated at 20 amps. The ground is the blade that has a tab bent towards center; The slightly larger blade with silver screw is "neutral", and the small blade with the copper screw is "hot".

Tie line: #4 (3.2mm) black Venetian blind cord. Tie line has many purposes but should not be used for rigging. Also known as *Trick Line.*

Trap(s): A removable section of stage floor, allows access to the area underneath.

Traveler: Usually a two-piece bi-parting curtain operating on a horizontal track.

Trim: 1) To set the height of a piece of scenery for use during a performance. **2)** To adjust a scenic unit to hang level.

Trim chains: Chain lengths attached to the batten end of lift lines in a counterweight set. Pipe battens are trimmed to level by adjusting these chains (sometimes in conjunction with turnbuckles).

Trip: To raise the bottom of a piece of flown scenery or backdrop with lines attached to the bottom in such a way that it occupies a vertical height approximately half its height, forming a U.

Two-fer: A Y-cord with one input and two outputs, plugs two devices into one outlet.

Up rigger: A rigger who carries out rigging work at height.

USITT: The United States Institute for Theatre Technology.

West coast: To store soft goods without folding them neatly first. Goods may be stuffed directly into a hamper, or more typically bundled bottom to top and coiled into a hamper, or even bundled bottom to top and secured to a batten for storage.

Working load limit (WLL): The maximum rated capacity of a component or system during normal operating conditions, as determined by the component manufacturer, or as determined by a qualified person for a specific application.

Zip cord: Number 18- or 16-gauge SPT type electric wire. NOT suitable for stage work.

Relevant Codes and Technical Standards:

ANSI

- ANSI E1.15 – Entertainment Technology – Recommended Practices and Guidelines for the Assembly and Use of Theatrical Boom and Base Assemblies
- ANSI E1.2 – Entertainment Technology – Design, Manufacture and Use of Aluminum Trusses and Towers
- ANSI E1.21 – Entertainment Technology – Temporary Structures Used for Technical Production of Outdoors Entertainment Events
- ANSI E1.22 – Entertainment Technology – Fire Safety Curtain Systems
- ANSI E1.23 - Entertainment Technology – Design, Execution and Maintenance of Theatrical Atmospheric Effects
- ANSI E1.26 – Entertainment Technology – Recommended Testing Methods and Values for Shock Absorption of Floors Used in Live Performance Venues
- ANSI E1.28 – Guidance on planning followspot positions in places of public assembly
- ANSI E1.32 – Guide for the Inspection of Entertainment Industry Incandescent Lamp Luminaires
- ANSI E1.34 – Entertainment Technology – Measuring and Specifying the Slipperiness of Floors Used in Live Performance Venues
- ANSI E1.39 – Entertainment Technology – Selection and Use of Personal Fall Arrest Systems on Portable Structures Used in the Entertainment Industry
- ANSI E1.40 – Recommendations for the Planning of Theatrical Dust Effects
- ANSI E1.4-1 – Entertainment Technology – Manual Counterweight Rigging Systems
- ANSI E1.4-2 - Entertainment Technology – Statically Suspended Rigging Systems.
- ANSI E1.4-3 - Entertainment Technology – Manually Operated Hoist Rigging Systems
- ANSI E1.42 – Entertainment Technology- Safety Standard for entertainment Lifts
- ANSI E1.43 – Entertainment Technology – Performer Flying Systems
- ANSI E1.46 – Standard for the Prevention of Falls from Theatrical Stages and Raised Performance Platforms
- ANSI E1.47 – Entertainment Technology – Recommended Guidelines for Entertainment Rigging System Inspections
- ANSI E1.53 – Overhead mounting of luminaries, lighting accessories, and other portable devices: specification and practice
- ANSI E1.55 – Standard for Theatrical Makeup Mirror Lighting
- ANSI E1.56 – Entertainment Technology – Rigging Support Points
- ANSI E1.57 - Recommendations to prevent falls on or off movable parade floats, movable stages, and similar moving platforms
- ANSI E1.58 – Electrical Safety Standard for Portable and Studio Equipment Used Outdoors
- ANSI E1.60 - Guidelines for the Use of Raked Stages in Live Performance Environments
- ANSI E1.6-1 – Entertainment Technology – Powered Hoist Systems

- ANSI E1.6-2 - Entertainment Technology – Design, Inspection and Maintenance of Electric Chain Hoists for the Entertainment Industry
- ANSI E1.6-4 – Design, Inspection and Maintenance of Portable Fixed Speed Electric Chain Hoist Control Systems in the Entertainment Industry
- ANSI E1.62 - Minimum specifications for mass-produced portable platforms, ramps, stairs, and choral risers for live performance events
- ANSI E1.66 – Safety Standard for Followspot Positions Erected for Short-term Use in Entertainment Venues
- ANSI ES1.18 – Event Safety – Rigging
- ANSI ES 1.19 – Event Safety – Safety Requirements for Special Event Structures
- ANSI ES1.4 - Event Safety – Event Fire Safety Requirements
- ANSI ES 1.40 – Event Safety – Event Security
- ANSI ES1.7 - Event Safety – Weather Preparedness
- ANSI E1.72 – Powered Floor Machinery (wagons, turntables, trap covers, slip stages, etc)
- ANSI ES1.9 - Event Safety – Crowd Management
- ANSI Z535.1-5 – Nonskid surfaces and gate signage
- ANSI Z358.1 – Eyewash Stations
- ANSI 830.9 - Slings

OSHA

- 1910.1030 – Blood Borne Pathogens
- 1910.106 – Flammable liquid storage
- 1910.107 – Spray booths
- 1910.119 – Process Safety Management
- 1910.1200 – Hazard Communications Act
- 1910.134 – Chemical Protection and Personal Protective Equipment
- 1910.146 – Confined Spaces
- 1910.23 (e) (8) – orchestra nets
- 1910.331-335 – Electrical Safety Work Practices
- 1926.250 – Storage
- 1926.251 – Rigging Equipment for Material Handling
- 1926.500 – Guardrails
- 1926.501 – Gates and Barriers/Fall Protection

NEC/NFPA

- NFPA 30 –Flammable and Combustible Liquid Code
- NFPA 33 – Spray Applications
- NFPA 70 Chapter 3
  - 305 Temporary Wiring
- NFPA 70 Chapter 5
  - 518-1 places of assembly
  - 518-3 Assembly Occupancy
- NFPA 101 – Life Safety Code

Power Tools (Saws, Drills, Sanders, etc.)

- OSHA regulations often require guarding for moving parts, proper grounding, and specific safety features like emergency shut offs. Regular inspections and maintenance as per OSHA standards.

Electrical Equipment

- Compliance with the National Electrical Code for electrical safety. Regular electrical safety inspections are mandated in many jurisdictions.

Welding Equipment

- Adherence to OSHA standards for welding, cutting, and brazing (29 CFR 1910.252). Proper ventilation and use of PPE are legally required.

Lifting Equipment (Hoists, Lifts)

- OSHA standard 29 CFR 1910.179 applies to overhead and gantry cranes, and similar standards exist for other lifting devices. Regular load testing and inspection are required.

Paint Booths

- Must meet Environmental Protection Agency regulations for emissions. National Fire Protection Association (NFPA) standards for fire safety and ventilation.

Respiratory Protective Devices

- OSHA standard 29 CFR 1910.134 for respiratory protection, especially when working with toxic materials.

PPE

- Must meet standards set by OSHA and ANSI (American National Standards Institute).

Inspection Checklists

The following pages include inspection checklists for various areas including:
-General Rigging Inspections
-General Safety and Front of House Inspections
-Shop and Workroom Inspections

Inspect each component for pass or fail. If a component fails, indicate why in the notes section.

Facility Name:				***Inspected by:***					***Date:***		
Description	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**	**Lineset #**
Spreader Plate											
Lead Line											
Hand Line											
Purchase Line											
Locking Rail											
Rope Lock											
Head Block											
Loft Block											
Floor Block											
Mule Blocks											
Tension Sheave											
Arbor											
Arbor Termination											
Batten											
Term. at Batten											
Cables											
Pin Rail											
Limit Switches											
Smooth and Quiet											

Note:

1) **Deficiency -**
2) **Corrective Action –**
3) **Date Corrective Action completed -**

General/Front of House Preshow Inspection Checklist

Location:_____ **Date:**_____

Inspected by:_____

It is recommended that in addition to preshow checks, this list is used to inspect front of house spaces on a quarterly basis. Mark any potential hazards accordingly and make comments when warranted. Check each category as compliant and safe, non-compliant/hazardous or not applicable.

	Fire Prevention, Egress	Yes	No	N/A	Corrective Action/Date Completed
1	Emergency phone numbers posted near phones?				
2	Fire doors unlocked and kept closed				
3	Emergency exit doors are visible and free of obstructions on both side of door				
4	Exits are properly marked				
5	Fire extinguishers are mounted, accessible, charged and serviced in the last 12 months				
6	Extinguishers, alarm pulls, sprinkler risers and heads are free of obstructions				
7	Intercom or emergency communications equipment is operational				
8	Occupancy limits are posted near the main exist of large rooms and assembly areas				
9	Evacuation maps are posted				
10	First aid kits are fully stocked				
11	Flammable and combustible materials are stored away from heat sources				
12	Space heaters are absent				
13	Aisle widths in venues without permanent seating are maintained in accordance with fire department requirements				
	ELECTRICAL	**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
14	Cords and plugs are in good condition; no exposed wires				
15	Extension cords are only used temporarily				
16	No daisy chaining of extension cords or power strips				
17	Outlets and switches have covers				
18	Breakers and fuses are identified				

19	GFCI plugs in use in wet areas				
20	Electrical panels are free of obstructions and have 30” clearance to each side and 36” in front				
WALKWAYS		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
21	Building entrances, aisles, and work areas are free of trip and fall hazards				
22	Entrance mats are in place and used during wet weather				
23	Walkways are free of tripping hazards and clear of materials, cords, paper, and equipment.				
24	Carpets and rugs are secure and in good condition				
25	Floors are clean and dry				
26	Stairways, ramps and corridors are illuminated				
27	Stairways, ramps and corridors are free of stored items				
28	Stair treads are in good condition				
29	Ramps have non-slip surfaces				
30	Handrails and guardrails are present where required and in good condition				
31	Aisle lights function properly				
FOOD SERVICE AND STORAGE		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
32	Food and beverage service permits are properly displayed				
33	Food, beverages, and service equipment are stored away from cleaning products				
34	Refrigerators are set no higher than 45 degrees				
35	Freezers are set below 32 degrees				
36	Signs are posted in restrooms reminding service personnel to wash hands				
GENERAL STORAGE		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
37	Storage shelves are not overloaded				
38	Shelves and cabinets are secured from tipping				
39	Drawers closed when not in use				
40	Materials are stored to minimize climbing, reaching and bending				
41	No storage is within 18” of sprinkler heads (24” from ceiling when no sprinklers)				

HOUSEKEEPING		Yes	No	N/A	Corrective Action/Date Completed
42	Tables, desks and chairs are in good condition				
43	Restrooms are clean				
44	Lighting is adequate and free of burn outs				
45	Safety Data Sheets are Available				
46	Spill kits are available				
OTHER/MISC		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
47					
48					
49					
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55					
56					
57					

CASE WESTERN RESERVE UNIVERSITY

Shop and Workroom Inspection Checklist

Location:_____ **Date:**_____

Inspected by:_____

It is recommended that inspections occur quarterly. Mark any potential hazards accordingly and make comments when warranted. Check each category as compliant and safe, non-compliant/hazardous or not applicable.

	Fire Prevention, Egress	Yes	No	N/A	Corrective Action/Date Completed
1	Emergency phone numbers posted near phones?				
2	Exit doors are visible and free of obstructions on both side of door				
3	Exits are properly marked				
4	Fire extinguishers are mounted, accessible, charged and serviced in the last 12 months				
5	Extinguishers, alarm pulls, sprinkler risers and heads are free of obstructions				
6	Intercom or emergency communications equipment is operational				
7	Evacuation maps are posted				
8	Eyewash/Shower stations are accessible, operational and maintained				
9	First aid kits are fully stocked				
10	Flammable and combustible materials are stored away from heat sources				
11	Dust collection system is routinely inspected and emptied				
12	Space heaters are absent				
	TOOLS AND MACHINES	**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
13	All machine guards are in place				
14	Grinding wheel guards in place and adjusted properly (work rest 1/8", tongue guard ¼")				
15	Only type 1 and 2 ladders in use (no light duty ladders)				
16	Tools and equipment are in good condition				
	HAZARDOUS MATERIAL	**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
17	Safety Data Sheets are accessible				
18	Secondary storage containers are labeled				

19	Flammable and combustible materials are stored in NFPA-approved containers/cabinets				
20	Spill response kits are available				
21	No noticeable spills are leaks present				
22	Waste containers are closed and labeled				
23	Work area with chemicals are free of open food and beverage				
24	Ventilation systems are in use and maintained				
25	NFPA hazard labels are posted where hazardous materials are stored				
PERSONAL PROTECTIVE EQUIPMENT (PPE)		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
26	Personnel are wearing appropriate PPE				
27	Eye protection is available				
28	Hearing protection is available				
29	Signs warning workers to wear PPE are posted				
ELECTRICAL HAZARDS		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
30	Cords and plugs are in good condition; no exposed wires				
31	Extension cords are only used temporarily				
32	No daisy chaining of extension cords or power strips				
33	Outlet and switch covers are present				
34	Electrical panels are free of obstructions and have 30” clearance to each side and 36” in front				
35	GFCI plugs in use in wet areas				
36	Outlet and switch covers are present				
37	Breakers and fuses are identified				
WELDING		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
38	Compressed gas cylinders are secured, upright with chains or straps				
39	Welding curtains are available and used				
40	Welding rod holders are empty and stored when not in use				
41	Gas is turned off when not in use				

GENERAL/HOUSEKEEPING		Yes	No	N/A	Corrective Action/Date Completed
42	Tables, desks and chairs are in good condition				
43	Step stools and ladders are available for reaching overhead storage				
44	Shops are neat, clean, orderly				
45	Aisles and work areas are free of trip and fall hazards				
46	Floors are clean, dry and free of slippery material				
47	Shops and workrooms are free of apparent hazards and safety concerns				
WALKWAYS, STAIRS, RAMPS		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
48	Entrance mats are in place and used during wet weather				
49	Carpets and rugs are secure and in good condition				
50	Stairways, ramps and corridors are illuminated				
51	Stairways, ramps and corridors are free of stored items				
52	Stair treads are in good condition				
53	Ramps have non-slip surfaces				
54	Handrails and guardrails are present where required and in good condition				
LOADING DOCK		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
55	There is a warning stripe or barrier at edge of dock area				
56	Chocks/dock locks present				
57	Handrails present on access stairs				
MATERIAL HANDLING		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
58	Mobile Elevated Work Platforms are secured to prevent unauthorized use				
59	Personnel authorized to use MEWPS have received training				
60	MEWPS are inspected prior to use and annually				
STORAGE		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**
61	Storage shelves are not overloaded				
62	Shelving units and cabinets are secured from tipping				
63	Drawers are closed when not in use				

64	Materials are stored to minimize climbing, reaching, bending				
65	No storage within 18” of sprinkler heads (24” from ceiling when no sprinklers)				
66	Nothing is stored in mechanical or electrical rooms				
67	Nothing is suspended from fire suppression pipes				
68	Items stored vertically are secured to prevent movement (ladders, pipes, lumber etc)				
69	Excess or idle power cables, ropes and hoses are coiled or hung on walls				
OTHER/MISC		**Yes**	**No**	**N/A**	**Corrective Action/Date Completed**