# SECTION 18–ASSEMBLY & THEATER SAFETY

*(Assembly occupancy is defined by NFPA 101, 2000 as any occupancy used for a gathering of 50 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses; or used as a special amusement building, regardless of occupant load.)*

## 18.1 Assembly Guidelines

## 18.2 Theater Safety Guidelines

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# 18.1 ASSEMBLY GUIDELINES

## A. Objective

To provide safety rules and procedures to follow for assembly events (gathering of 50 or more people).

## B. Scope

This procedure covers all assembly areas at Harper College where there is a gathering over 50 people, including but not limited to: Performing Arts Center, J143, Wojcik Conference Center, M building Gym, and lecture halls.

## C. References

Department of Labor, Occupational Health and Safety Administration 29 Code of Federal Regulations 1910, Illinois Department of Labor 820 ILCS 225 Health and Safety Act., National Fire Protection Association (NFPA) Life Safety Code 101, 2000.

## D. Training

The Facilities Manager; the Manager, Environmental Health & Safety and/or a designated training representative shall conduct training on this procedure and other procedures referred to in this manual.

## E. Ticket Sales

Attendance for an event can be controlled through ticket sales, so overcrowding does not become an issue. Standing room shall not be permitted. The number of fixed seats in a space is the maximum occupancy. For seating arrangements with mobile seating, the arrangement and number of seats shall comply with the NFPA Life Safety Code 101, 2000. The Manager, Environmental Health & Safety, can assist with interpretation of the Code.

The Facility Administrator and/or Harper Police determine the need for security measures. The number of people involved and the nature of the event are the primary determining factors. In some cases, security may be required for the use of certain buildings or areas.

## F. Crowd Control & Front-of-House Responsibilities

For the fixed seating occupancies over 300 (J143 & the Performing Arts Center (PAC)), the house/facility manager and all front-of-house personnel must assist the audience to evacuate the building safely in case of an emergency. A fire safety and evacuation plan must be prepared and personnel should be trained and drilled in the duties they are to perform under the plan. In addition, front-of-house personnel must be knowledgeable in the proper use of portable fire extinguishers.

In assembly occupancies of 1000 or more (M bldg. Gym), there shall be trained crowd managers at a ratio of 1 crowd manager for every 250 occupants (unless reduced by the Palatine Fire Dept.) due to the nature of the event or existence of sprinklers. These crowd managers shall receive training in crowd management techniques.

## G. Exits (Means of Egress)

The means of egress is the continuous and unobstructed path of travel from any point in a place of assembly to an exit or public way (e.g., sidewalk, street, etc.). All parts of the means of egress must be available for immediate, emergency use.

- Aisles and corridors must be unobstructed and kept free of flammable or combustible materials. Event organizers must inspect the means of egress immediately prior to any event and remove any obstructions immediately.
- Exit doors must be unlocked.
- Care must be taken to ensure that the exit discharge is also unobstructed (e.g., not blocked by dumpsters or vehicles, no materials stored against the exit door, all snow removed, etc.).
- All exit signs must be clearly illuminated and unobstructed at all times.
- The width of a means of egress cannot be blocked or reduced.
- Draperies or similar decorative hangings cannot obstruct the view or the access to an exit.
- Mirrors cannot be placed near an exit in any manner that may confuse those trying to exit.

Exits cannot be used for any other purpose other than a means of egress. Spaces within a stairway enclosure are not to be used for storage of any materials.

## H. Flame-Retardant/ Open Flame/ Pyrotechnics

**The use of open flame devices (including but not limited to candles) or pyrotechnic devices must be approved by the Palatine Fire Department.**

Combustible scenery of cloth, film or vegetation (dry) and similar materials shall meet the requirements of NFPA 701. Foamed plastics shall be permitted to be used only by specific approval of the Palatine Fire Department.

### Procedures for Food Service Operations:

Portable cooking equipment that is not flue-connected shall be permitted only as follows:

1. Equipment fueled by small heat sources that can be readily extinguished by water, such as candles or alcohol-burning equipment, including solid alcohol, shall be permitted to be used, provided that precautions that are taken to prevent ignition of any combustible materials satisfy the Palatine Fire Dept.
1. Candles shall be permitted to be used on tables used for food service where securely supported on substantial noncombustible bases located to avoid danger of ignition of combustible materials and only where approved by the Palatine Fire Dept.
2. Candle flames shall be protected.
3. “Flaming sward” or other equipment involving open flames and flamed dishes, such as cherries jubilee or crepe suzette, shall be permitted to be used, provided that precautions subject to the Palatine Fire Dept. are taken.
4. Listed and approved LP-gas commercial food service appliances shall be permitted to be used where in accordance with NFPA 58.

## I. Exhibits

Exhibit booths shall be constructed of the following:

1. Noncombustible or limited-combustible materials
2. Wood exceeding ¼ inch (0.6 cm) nominal thickness or wood not exceeding ¼ inch (0.6 cm) nominal thickness that is pressure-treated, fire retardant wood meeting the requirements of NFPA 703.

# 18.2 THEATER GUIDELINES

## A. Objective

To provide safety rules and procedures to follow while working on productions from the planning stages to strike.

## B. Scope

It is applicable to all members of the college community including, but not limited to directors, performers, crew, stage managers, and front-of-house personnel. Any questions or comments regarding this manual should be directed to the Manager of Environmental Health & Safety in Facilities Management.

## C. References

Department of Labor, Occupational Health and Safety Administration 29 Code of Federal Regulations 1910, Illinois Department of Labor 820 ILCS 225 Health and Safety Act. National Fire Protection Association (NFPA) Life Safety Code 101, 2000.

## D. Training

The Theater Manager, Technical Director, the Manager of Environmental Health & Safety or a designated training representative shall conduct training on this procedure and other procedures referred to in this manual.

## E. Procedure

- A pre-production meeting shall be conducted. This meeting will cover set design, type of production, review any requests for the use of special effects or pyrotechnics and review of this Section 18: Assembly & Theater Safety of the Environmental Health & Safety Procedure Manual (EH&S Manual).

- All Incidents shall be reported to the Theater Manager or Technical Director. See *Section 5: Incident/ Injury Management* of the EH&S Manual.

    - Life-threatening injuries (examples are severe burns, hemorrhaging, severe head injury, open (compound) fracture).
        - **Call Harper Police at 6330**
        - Notify the Theater Manager or Technical Director
    - Other Injuries (Non-life threatening)
        - Notify the Theater Manager or Technical Director
        - Notify Harper Police at 6330 and proceed to Health and Psychological Services.
    - The Theater Manager or Technical Director shall complete a Supervisor's Incident/Injury Report. This report should be copied to Health and Psychological Services and the Manager of Environmental Health & Safety for both injured employees and students. For employee injuries also copy Human Resources.

# SET DESIGN & CONSTRUCTION

## A. Props and Decoration

All requirements of Section 18.1 Assembly Guidelines shall be followed. In addition, wood and decorative materials may be used only if they are noncombustible or flame resistant or have been rendered so with commercially available products and meet requirements of NFPA 701. The quantity and arrangement shall be reviewed by the Manager of Environmental Health & Safety. The use of open flame devices and/or pyrotechnics must be approved by the Palatine Fire Department. Use of smoke machines, strobes, and/or gunshot sounds should be approved by the Technical Director and a notice included in the program. Contact the Technical Director or the Manager of Environmental Health & Safety if you have any questions about the approved use of decorative materials.

## B. Structural Issues for Set Design

The Technical Director must approve any set design that includes steps, ladders, traps or other specialty devices.

## C. Rigging

All theaters that have fly space where rigging is used.

Some rigging guidelines include:

- Anything attached to a fly bar must have a safety cable attached as well.
- Check that everything attached to a light, including barn doors, gel cases and safety cables, is secure before it is raised.
- Make sure the rope or cord is strong enough for what you are lifting and that the rope or cord is not frayed or damaged in any way.
- Warn people on the stage or grid before moving any rigged scenery or other objects.
- Maintain visual contact with a moving piece at all times.

The Technical Director performs inspections of rigging and overhead lighting prior to the opening of each show. The production crew, before each use, should also inspect rigging.

## D. Personal Protective Equipment (PPE)

Personal protective equipment includes all types of equipment used to increase individual safety while performing potentially hazardous tasks. This may include eye and face protection, head protection, foot protection, hand protection, respiratory protection, or any equipment used to protect against injury or illness. The Manager of Environmental Health & Safety can help in assessing the need and making selections of personal protective equipment.

- **Safety Glasses:** Safety glasses look very much like normal glasses but are designed and manufactured to certain standards to protect against flying particles. Safety glasses have lenses that are impact resistant and frames that are far stronger than regular street wear. Safety glasses must have side shields and should be worn whenever there is the possibility of flying particles, dust, wood chips, or paint to enter the eye. Always wear safety glasses when using any power tool.

- **Goggles:** Like standard safety glasses, goggles are impact resistant. Goggles provide a secure shield around the entire eye area to protect against hazards coming from many directions. Safety goggles may have regular or indirect ventilation.
  (Goggles with indirect ventilation may be required if you are exposed to splash hazards, e.g., solvents, paints or thinners).

- **Gloves:** Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals. It is important to select the most appropriate glove for a particular application and

to determine how long it can be worn, and whether it can be reused. Nitrile gloves should be worn when handling large amounts of solvents or paint thinners. Leather work gloves may be used in material handling and when using power tools to avoid severe cuts, lacerations, and abrasions.

- **Shoes:** Shoes should have a hard sole when working around sharp objects such as nails, wire, tacks, screws or large staples that could be stepped on causing a foot injury. Open-toed shoes should not be worn during any phase of set construction.

For more information on personal protective equipment, see *Section 6* of the *Environmental Health & Safety Procedure Manual (EH&S Manual).*

## E. Power and Hand Tools

Crewmembers should use a power tool only after receiving proper training. The Head of Set Construction or Technical Director should review the operation of the equipment, making sure to point out safety features and guards. Crewmembers should be familiar with the owner's manual for the tool, and should know both the use and the limitations of a power tool.

Some guidelines for using tools include:

- Inspect tools before use to check for any defects such as frayed wires, or damaged hand tools.
- Remove defective tools from service and have them repaired or replaced.
- Only use power tools that are grounded with a 3-pronged plug or that are double insulated.
- Never carry a power tool by its cord.
- Unplug power tools before loading them, changing blades or bits, making adjustments, or cleaning them, and follow the manufacturer's instructions.
- Never use power tools on wet surfaces or in wet weather.
- Discontinue use of defective or unsafe equipment as soon as the defect becomes known.
- Dull tools are unsafe and can damage work. Maintain your tools and always use sharp cutting blades.
- Never alter or remove any machine or blade guards.
- Report all incidents to the Head of Set Construction or the Technical Director.

## F. Ladders

Portable ladders should be inspected at frequent, regular intervals and maintained in good condition free from oil, grease, or other slippery materials. Defective ladders should be removed from service until repaired. Those that cannot be repaired should be destroyed.

Ladders should always be placed on stable bases and, whenever possible should be secured near the top and at the bottom. Boxes, barrels, or other unstable surfaces should never be used to extend the reach of a ladder.

See *Section 19: Portable Ladder Safety* of the *Environmental Health & Safety Procedure Manual* for all College ladder users. It includes a ladder inspection checklist, which is helpful before each ladder use.

## G. Chemical Hazards - Hazard Communication

The key to safe chemical usage is to be aware of information on the physical and health hazards of chemicals, safe handling precautions, and emergency and first aid procedures.

Each chemical container bears a manufacturer label with the chemical name(s), hazard warnings, and the manufacturer's name and address. Labels must not be removed or defaced. If the product is transferred from one container to another, the new container must be labeled with the product name, the names of all hazardous chemicals and/or the five most predominant chemical

constituents, the Chemical Abstract Service (CAS) number for each chemical, and appropriate hazard warnings.

Each group must obtain and maintain a Safety Data Sheet (SDS) for each hazardous material used. See *Section 7: Hazard Communication* of the *EH&S Manual* for more information on interpretation of SDS information. These SDSs must be accessible to individuals working with the products during all work hours. If an SDS is not received with a product, the group must obtain the SDS within a reasonable amount of time.

Vapors from flammable liquids ignite readily when mixed in certain proportions with air in the presence of an ignition source and could result in an explosion. Flammable and combustible liquids vaporize and form flammable mixtures with air when in open containers, when leaks occur, or when heated.

Use nonflammable materials like water base paint whenever possible. Water-base or latex paints are less hazardous and allow for easier clean up and disposal than oil-based paints. Buy as you need it, quantities should be limited to the amount necessary for the work in progress. Control all ignition sources in areas where flammable liquids are used.

- No smoking or open flames should be present during the use of flammable liquids.
- Spray paint cans are under extreme pressure and could rupture when exposed to fire.
- Never puncture aerosol cans or expose them to high heat or other stresses.
- Read and follow the manufacturer's label and precautions on aerosol cans.
- Paints and thinners should not be mixed with general trash or poured down the drain.

Contact the Manger of Regulatory Compliance if you have flammable liquids to be disposed. Please refer to *Section 7: Hazard Communication Program* of *EH&S Manual* for more information.

## H. Chemical Spills

In the event of a chemical spill, the individual(s) who caused the spill is responsible for prompt and proper clean up.

Harper College does not have a spill response team. Improper cleanup of a spill may result in injury, illness, fire, a release to the environment, or property damage.

Contact Harper Police at 6330 if:

- There is a fire or medical attention is needed
- The quantity of material spilled is more than one gallon
- You are uncomfortable in your ability to clean up the spill
- There is a release to the environment (i.e., soil, waterways, sewer, etc.)

Planning for spills is essential. Before beginning work with chemicals, be sure that the appropriate types and amounts of spill clean-up materials and personal protective equipment are immediately available.

Review Safety Data Sheets or other references for recommended spill clean-up methods and materials, and the need for personal protective equipment (e.g., gloves, aprons, etc.)

General guidelines for cleaning up spills:

- Immediately alert others in the area, and evacuate the area, if necessary
- Contaminated clothing must be removed immediately and the skin flushed with water for no less than fifteen minutes. Clothing must be laundered before reuse.
- If a volatile, flammable material is spilled, immediately warn others in the area, control sources of ignition and ventilate the area

## I. Housekeeping

Work areas can become congested while set building and rehearsals take place. Clutter makes it difficult to move around and can be a fire hazard. To prevent accumulation of materials, trash should be removed daily.

- Place trash in proper receptacles, preferable in metal containers
- Clean up after each work session
- Avoid accumulating scrap lumber and materials
- Purchase materials as needed to avoid the need for additional storage
- Store tools in the proper areas when not in use

Housekeeping is the sole responsibility of the people working with the production. This includes the dressing rooms, scene shop, and audience seating areas. Facilities Management maintains other venues, although students are still responsible for keeping areas clean and clear of congestion.

## J. Storage of Materials

The proper storage of materials in theater spaces is extremely important to the efficiency of the production and the safety of the cast, crew and audience.

The National Fire Protection Code mandates certain storage requirements, such as:

- Flammable and combustible liquids must be stored in approved flammable storage cabinets
- If the building has sprinklers, materials must be a minimum of 18 inches below sprinkler head Materials in any building must be a minimum of 24 inches below the ceiling
- Materials must never obstruct an exit from the building
- Stored materials must be a minimum of 3 feet in all directions from unit heaters, duct furnaces and flues
- Smoking is prohibited in all places of assembly and in spaces where combustible materials are stored or handled
- Materials may not be stored under seating risers or steps

## K. Lifting and Material Handling

Back pain and injuries related to lifting and material handling are some of the most frequent types of injuries. While some factors that contribute to the potential for injury cannot be controlled, others can be reduced or minimized. Stage pieces are often awkward, heavy, or unusually shaped, which impedes proper lifting techniques.

Some general lifting techniques include:

- Perform stretching exercises and warm-ups prior to lifting; warming up your back muscles can help reduce the stress of an initial lift.
- Use the right personal protective equipment; some work gloves offer non-slip grips to handle a load easier.
- Wear non-slip shoes to avoid a fall while carrying a load.
- Take time to size up the load – Is it too large or heavy for one person to lift? Will you be able to get through doorways and corridors as you are carrying it? Can it be broken down into several trips?
- Plan your route ahead of time; make sure there is a clear path to avoid tripping hazards. Be able to see where you are going and avoid sharp turns or difficult courses.

### Proper Lifting Techniques:

1. **Stand Close to the Load:** Carrying an object as close to your body as possible will keep the strain on your back at a minimum and will also help keep your center of gravity over your feet to maintain balance.
2. **Bend your Knees:** Your leg muscles are much more equipped to handle heavy loads than your back muscles. Bending your knees will allow you to lift with your legs and reduce the load on your lower back.
3. **Grip the Load Securely:** Get a secure handle on the object before you lift to avoid slipping. If a load does start to fall away from you, let it go. You can do enormous damage to your back if you attempt to catch a heavy object in an awkward position.
4. **Lower the Load in Reverse:** All the effort put into a proper lift will be erased if the load is lowered by bending at the waist and putting pressure on the back.

**Note:** Back belts provide no protection from back injuries. Harper does not recommend the use of back belts for such purposes.

# LIGHTING & SOUND

## A. Electrical Safety

Electricity is intrinsic in modern life. However, many students have never worked with electricity directly before working on stage. To work near electricity safely, it is necessary to understand what hazards are present, and how these hazards can be controlled.

How Shocks Occur

Electric shock occurs when the body becomes a part of an electric circuit. The current enters the body at one point and leaves at another. Electric shock normally occurs in one of three ways, when an individual, while in contact with the ground, comes in contact with:

1. Both wires of the electric circuit
2. One wire of an energized circuit and the ground
3. A metallic part that has become “hot” by contact with an energized conductor

The metal parts of electric tools may become energized if there is a break in the insulation of the tool or machine wiring. A ground wire will cause the unwanted current to pass directly to the ground, thereby greatly reducing the amount of current passing through the body of the person in contact with the tool.

Severity of Shocks

The severity of the shock received when a person becomes a part of an electric circuit depends on three primary factors:

- the amount of current flowing through the body (measured in amperes),
- the path of the current through the body, and
- the length of time the body is in the circuit

Effects can range from a barely perceptible tingle to immediate cardiac arrest, depending upon the type of circuit, its voltage, resistance, current, etc. A severe shock can cause considerably more damage to the body than is visible. For example, a person may suffer internal hemorrhages and destruction of tissues, nerves, and muscles. In addition, shock is often only the beginning in a chain of events. The final injury may well be from a fall, cuts, burns, or broken bones.

Preventing Electrical Hazards

- **Repairs:** Students should **not** attempt electrical repairs without proper training. Equipment that malfunctions or causes shocks should be removed from service and repaired by a qualified individual.

- **Extension Cords:** Extension cords are only designed for temporary use. Use of thin, light duty extension cords can increase the risk of fire and shock. Make sure extension cords have adequate current capacity for the equipment being used. Do not pull an electrical cord out of a socket by the cord. This breaks interior wires and can cause a short and, possibly, a fire. Inspect for frayed or split cords or plugs before use.
- **Electrical Cords:** Electrical cords can also be a tripping hazard. It is a good practice to route cords away from traffic areas to prevent trips and falls.
    - Avoid stretching or pinching cords between objects. This can break interior wires, causing overheating which can result in a fire. Do not cover electrical cords with rugs or run under or through door hinges; this can also result in a fire.
- **Circuit Protection Devices:** Circuit protection devices are designed to automatically limit or shut off the flow of electricity in the event of a ground-fault, overload, or short circuit in the wiring system. A ground-fault circuit interrupter, or GFCI, should be used in high risk areas such as wet locations or outdoor sites. Portable GFCIs are available from any hardware store or safety supply catalog.
- **Training:** Training is essential in working with lighting circuitry, dimmers and instruments. Students should be trained before being authorized to work the control areas. Keep food and beverages out of the light control areas to prevent possible shocks and damage to the circuitry.

### B. Overhead Lighting

Lighting dimmers have limits to the lamp loads they can handle. Overloading dimmers can cause a fire hazard. There are standard size 2.4-kilowatt (2400W maximum) dimmers used in the theater spaces.

The spaces also use standard lamps listed as follows:

- Fresnels:
    - BTL 500W
    - BTR 250W
- Ellipsoidals:
    - FEL 1000W
    - EHD 500W
    - EHG 750W
- Source 4:
    - HPL 575W

The wattage of the bulbs **MAY NOT** exceed that of the dimmers they are plugged into.

All lighting that is hung over seating or public area shall be secured with chains.

# CAST & CREW

### A. Cosmetics

Products approved for makeup use have been tested extensively for toxic hazards. Only these products should be used for stage productions. Old containers of makeup could contain bacteria and should be thrown away. A good practice is to wash your face and hands before and after applying cosmetics. If you are using makeup from a “communal” make-up kit, use a clean brush or your hands to apply. Shared makeup should not be applied directly to your face.

The Center for Safety in the Arts offers these guidelines for shared makeup users:
**1) Crème Sticks:** Slice these out with dental spatulas on to individual papers such as butter trays. Label and reuse them individually for touch-ups.
**2) Lipsticks:** These too can be sliced and labeled. For a long running show, individual lipsticks should be provided.

**3) Pancakes and Powders:** Powdered products provide a less viable environment for infection, but try to individualize usage. Supply powders in the smallest containers available.
**4) Mascara:** Use individual applicators/containers if possible.
**5) Eyeliners and Eye Makeup:** Use individual products if possible.
**6) Brushes:** Use disposable brushes.
**7) Sponges:** Use disposable sponges whenever possible. Reusable ones can be disinfected. Give out individual sponges at the beginning of a show, and maintain separate use.
**8) Miscellaneous:** Any type of facial hair, skullcaps, sequins, or other face product should be disinfected before used by a new performer. Use an approved bactericide for disinfection. These types of products should be carefully stored in labeled individual plastic bags between performances.

Makeup artists should make a practice of washing their hands between actors. Sponges and brushes should be washed after use on each individual.

When removing spirit gum or latex, avoid prolonged skin contact with solvents. Moisturizers can be used to replace lost skin oils and to help guard against dermatitis.

### B. Fatigue

Fatigue is a serious safety concern that should be considered during all stage productions. With performance dates approaching, most crewmembers can become severely overworked.

Follow these simple guidelines to avoid fatigue:

- Get proper rest. The average person requires 8-9 hours of sleep per night.
- Limit drugs that might contribute to fatigue (tranquilizers and cold/allergy medications)
- Reduce caffeine, nicotine and alcohol, which can also contribute to fatigue.
- Take frequent breaks while working. Repetitive or long work sessions can reduce one's ability to concentrate on the work at hand.
- Plan ahead. Having your building materials and equipment ahead of time can increase efficiency and reduce the work time required.
- Know when to quit. Recognize signs of fatigue – loss of concentration, slow reaction times, memory loss – and take a break.

### C. Heat Stress

Theater spaces are often without air-conditioning and, even if they are air-conditioned, stage lighting can produce an incredibly hot glow. Add to that, the stress and/or excitement of performing and cast members are prime candidates for heat stress. Working in hot conditions may pose special hazards to safety and health.

Drink plenty of liquids during a performance to replace the fluids lost from sweating – as much as one quart per hour may be necessary. Water and/or sports drinks are recommended. Caffeinated beverages such as cola, iced tea and coffee should be avoided.

## STRIKE

### A. Set Deconstruction & Material Disposal

All items must be returned to storage or otherwise disposed of immediately following the final performance, e.g.:

- lighting instruments
- cables and control equipment
- properties
- sound equipment
- scenery and platforms

- costumes
- seating

Note: Set deconstruction should take place in a careful and organized manner.

## B. Housekeeping

The facility must be left in good condition after the strike

## C. Chemical Waste Disposal

Most commonly used organic solvents (e.g., acetone, methanol, toluene, mineral spirits, and turpentine) and paints are considered hazardous waste and cannot be disposed of with regular trash or poured down the drain. See Section 15: *Environmental Management* for additional information. If you have hazardous waste to be disposed of, contact the Manager of Environmental Health & Safety for recommendations and instructions.