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I. Purpose
The Villanova Theater Safety Policy’s purpose is to protect the health and safety of all faculty, students, employees and visitors who can reasonably be expected to be exposed to chemical or physical hazards normally found in a theater.

II. Scope
Information found in the policy is applicable to all members of the theater community including directors, performers, production staff, outside contractors, and front-of-house personnel.

III. Definitions

**Authorized Person**: A person who by virtue of knowledge and safety training possess the skill required to perform a specific task and has been approved by the Technical Director to perform said task. This category may include but is not limited to, employees, workers and students.

**Chemical Hazard**: A type of occupational hazard caused by an exposure to commercial chemical products in the workplace. Exposure to such products can cause acute or long term detrimental health effects.

**Competent Person**: A person trained to identify existing and predictable fall hazards in the surroundings or working conditions, which are hazardous or dangerous to employees. A person who has the authorization to take prompt corrective action to eliminate such hazards.

**Cosmetics**: Substances or products used to enhance or alter the appearance of the body. Many cosmetics are designed for application to the face and hair. They are generally mixtures of chemical compounds.

**Electrical Hazard**: An electrical hazard is a dangerous condition in which a worker can or does make electrical contact with energized equipment or a conductor. From that contact, the person may sustain an injury from shock, and there is a potential for the worker to receive an arc flash burn, thermal burn or blast injury. Working on or near electrical hazards is dangerous and can be fatal. Any work on or near energized equipment must be done only when measures are in place to provide protection from electric shock and burn.

**Heat Stress**: A condition that occurs when there is an increase in a workers core body temperature above healthy levels. As the core temperature rises, the body is less able to perform normal functions.
Means of Egress: A continuous and unobstructed path of egress travel from any point in a building or structure to a public way.

Near Miss: An unplanned event that did not result in injury, illness, or damage – but had the potential to do so. Only a fortunate break in the chain of events prevented an injury, fatality or damage. An ideal near miss event reporting system includes both mandatory (for incidents with high loss potential) and voluntary, non-punitive reporting by observers. The events that caused the near miss are subjected to analysis to identify the defect in the system that resulted in the incident.

Personal Fall Arrest System: A system used to arrest (catch) a person in a fall from a working level of six feet or more, to the next level. It consists of anchorage location, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or any combination of these items.

Personal Protective Equipment: Objects or garments worn to minimize exposure to hazards that cause workplace injuries or illnesses.

Qualified Person: An individual, who by possession of a recognized degree, certificate, or professional standing or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems relating to fall protection.

Scaffold: A temporary metal or wooden framework that is used to support workers and materials during the erection, repair or dismantling of lighting, props or sets.

Self-Retracting Lanyard: A specific kind of lanyard used with a safety harness. It utilizes inertia to activate a breaking mechanism that activates when the fall distance exceeds four and half feet per second.

Strike: The deconstruction, removal, and sometimes demolition of any and all scenic elements, lighting equipment, props, and/or costumes used in a theatre production after its final performance.

IV. Policy Statement
The goal of this Policy is to prevent injuries or illnesses to Theater personnel and guests by strict adherence to the safety practices listed herein.

V. Procedures
A. Pyrotechnics, Fire Codes and Work Practices
   1. The use of open flames and pyrotechnics in the Vasey Theater is strictly prohibited.
2. Students may not work alone. Any engagement in activities that require the use of ladders or fall protection must be carefully supervised by a Competent Person. The Theater Department is responsible for enforcing this policy.

3. The Theater Department will develop a system of random inspections to ensure compliance with housekeeping and safe work practice policies.

B. Emergency Procedures

Dial 9-4444. Your call will be answered by a communications officer in the Department of Public Safety. Public Safety personnel will respond and determine the need for additional assistance.

1. Chemical Exposure
   a. If you spill a chemical such as paint thinners or fabric dyes on your skin:
      o Rinse the area with water for at least 15 minutes.
      o Remove any soiled clothing and jewelry while you are rinsing.
   b. If you get a chemical in your eyes:
      o Rinse with water, rinsing from the nose outward to avoid contaminating the unaffected eye.
   c. If you inhale a chemical or are overcome by fumes:
      o Leave the room and move to fresh air. For any emergency including injury, illness, fire or an explosion, dial 9-4444 from any University phone or call 610-519-4444 by cell phone.
      o Keep door of room open to vent.
      o Do not re-enter a contaminated area.
      o If symptoms do not subside, seek medical attention.

C. Set Design & Construction

1. Props and Decoration
   Decorative materials include curtains, draperies, streamers, fabrics, cotton batting, straw, hay, vines, leaves, stalks, trees and moss. Decorative materials may be used only if they are noncombustible or flame resistant or have been rendered so with commercially available products.

2. Structural Issues for Set Design
   Any set design which includes steps, ladders, traps or other specialty devices must be approved by the Villanova University Theater Department Technical Director. When
possible, sets for Vasey Theater should be constructed in a location outside the theater and assembled later in the theater.

When possible, the Theater Department will hang cable lights before they assemble the set in Vasey Theater to minimize the use of ladders, the only time students should be using ladders. Authorized Persons must use the fall arrest system and follow the associated safety procedures while hanging lighting.

3. Vasey Theater Catwalks
Vasey catwalk platforms are intended for the express purpose of theatrical scenery, light, and sound equipment access, follow-spot usage, theatrical rigging, and building maintenance and repairs. Authorized personnel include, but is not limited to, Villanova Theatre Department (VTD) theatre technicians (i.e.-set and prop shop assistants and work-study, VTD production and running crew staff), as authorized by VTD’s Technical Director or prop supervisor. VTD actors are prohibited from using Vasey catwalk platforms for all theatrical presentations.

4. Personal Protective Equipment
Personal protective equipment includes all types of equipment used to increase individual safety while performing potentially hazardous tasks. This includes eye and face protection, head protection, foot protection, hand protection and respiratory protection (please note that EHS (9-7838) can help in assessing the need and making selections of personal protective equipment.)

**Safety Glasses:** Always wear safety glasses when using either hand or power tools.
**Goggles:** The EHS department recommends using goggles rather than safety glasses when using chemicals that can be corrosive to the eyes. Consult the Safety Data Sheet (SDS), chemical label, or EHS for assistance.
**Gloves:** A leather type work glove should be worn when working with your hands during set construction and strike. DO NOT wear gloves, loose fitting clothing or jewelry when working with power tools.
**Work Safe Clothing:** Anyone working in Scenery, Lighting, or Props & Paints Departments should wear work-safe clothing at all times during work calls. This includes:
- Wear some type of closed-toe shoes, such as work boots, hiking boots, or even sneakers (no dress shoes, high heels, sandals, character or ballet shoes, or any other open-toed footwear; absolutely no bare feet.)
Vasey Theater Safety Policy

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- Wear safe-sensible clothing such as jeans or other close-fitting pants and tops (no skirts, sweatpants, leggings, or any loose-fitting clothing).
- Any and all loose accessories – i.e., ties, scarves, bracelets & earrings, or even strings on hooded sweatshirts – should be removed entirely or tucked away securely.
- Long hair should be tied back or kept under a hat.

5. Power and Hand Tools
   Authorized Persons may use a power tool only after receiving proper training on its operation. The Technical Director will review the operation of the equipment, making sure to point out safety features and guards. Crew members are expected to know both the use and the limitations of a power tool before using it. General guidelines for using tools include:
   - Inspect tools before use to check for any defects such as frayed wires, or damage. Remove defective tools from service.
   - Only use power tools that have been approved by the Technical Director.
   - 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 while standing on wet surfaces or in wet weather.
   - 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.
   - Ground Fault Circuit Interrupters (GFCIs) must be used in conjunction with portable tools, particularly in outdoor or wet environments. Portable GFCI’s are available.
   - For additional information, refer to EH&S Policy S24 Hand & Power Tool Use.

6. Ladders
   Portable ladders must be inspected before use and maintained in good condition free from oil, grease, or other slippery materials. Defective ladders must be removed from service. Ladders must always be placed on stable bases and, whenever possible, secured near the top and at the bottom. Boxes, barrels, or other unstable surfaces must never be used to extend the reach of a ladder. Never climb higher than the next to top rung of a ladder. The use of wooden ladders is prohibited.

Spotters must be used when setting up and working on ladders. Authorized Persons ascending or descending a ladder must maintain three point contact. In those instances
when it is impossible to maintain three point contact while working from a ladder or a scaffold, personal fall arrest equipment must be utilized.

- Using a ladder is a two person activity. No exceptions.
- When going 4’ or above you must utilize the fall protection system.
- Before going up a ladder, make sure all feet are firmly seated on the ground.
- Anytime you are carrying something (e.g., crescent wrench) it must be attached to you.
- Make sure any loose items not attached to you are taken off before going up.
- When moving a ladder or scaffolding be aware of your surroundings and what is above you.
- The top of a ladder is not be used for standing. It is not a step.

7. Scaffolding:
Each person working from a scaffold more than 4 feet above a lower level shall be protected from falls by guardrails while erecting or deconstruction of scenic elements, lighting and props. When working more than 10 feet above a lower level, personal fall protection is required. Scaffolding used in the theater shall be designed and built by a Qualified Person. Footings and anchorages of scaffolds must be sound, rigid and capable of carrying the maximum intended load. Planking must be capable of supporting at least 4 times the maximum intended load. The following general requirements apply.

- Where a guardrail is the primary fall protection the top rail must have a minimum height of 42 inches and be equipped with 4 inch high toe board. Scaffolding must be maintained in a safe condition.
- Scaffolding must not be altered or moved horizontally while in use.
- Scaffolding may not be loaded in excess of the working load for which it is intended.
- Material, such as lights, must be hoisted onto the scaffold by a tag line.
- An access ladder or equivalent safe access must be provided.
- Tools, materials and other debris must not be allowed to accumulate on the scaffold.
- A Competent Person, as defined by OSHA must supervise the assembly and disassembly of all scaffolds.
- See EH&S Policy S45, Scaffolding, for additional information.

8. Chemical Hazards
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. The Technical Director must obtain and maintain a Safety Data Sheet (SDS) for each hazardous material used. 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 Technical Director must obtain an SDS before the product is used in the workplace. A number of SDSs are available through MSDSonline located on Villanova’s EHS web page.

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

- Use nonflammable materials like water-based paint whenever possible. Water-based 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.
- 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 EHS at 9-8989 if you have flammable liquids to be disposed.

9. Chemical Spills
In the event of a chemical spill, the individual(s) who caused the spill is responsible for prompt and proper clean up. Contact Public Safety at 9-4444 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.
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. General guidelines for responding to 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.
- Collect all spill clean-up debris in labeled bags. Contact the EHS department to arrange disposal. DO NOT throw the debris out with the regular trash.

10. **Housekeeping**

All work areas should be kept as clean as possible while working. Every attempt should be made to prevent congestion within working areas. Always:

- Materials should be stored out of the way and as neatly as possible.
- Replace tools in their proper storage locations when finished with them.
- Throw away all trash.
- Clean up work areas after every work call.

**Electrical Cords:**

Electrical cords can 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 and fires.
- Do not cover electrical cords with rugs; this can also result in a fire.

11. **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 PA Uniform Fire Code mandates certain storage requirements, such as:

- Flammable and combustible liquids must be stored in approved flammable storage cabinets.
- Materials must never obstruct an exit from the building.
o Stored materials must be a minimum of three feet in all directions from unit heaters, ducts, furnaces and flues.

o Materials may not be stored under seating risers or steps.

D. Lighting and Sound
1. Electrical Safety
   To work near electricity safely, it is necessary to understand what hazards it presents, and how these hazards can be controlled.

   Preventing Electrical Hazards:
   * Repairs: Equipment that malfunctions or causes shocks must be removed from service.
   * 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. Inspect for frayed or split cords or plugs before each use.
   * 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.
   * Training: Training is essential in working with lighting circuitry, dimmers and instruments. Personnel should be trained before being authorized to work the control areas. Keep food and beverages out of the light control areas.

E. A safety orientation program will be developed and instituted that explains the various potential hazards that may be encountered when operating a theater and their controls. Topics will include power tool use, ladders, fall protection, chemicals, electrical safety, emergency evacuations, and personal protective equipment.

F. Cast & Crew
1. 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” makeup 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:
a. **Crème sticks**: Slice these out with dental spatulas on to individual papers such as butter trays. Label and reuse them individually for touch-ups.

b. **Lipsticks**: These too can be sliced and labeled. For a long running show, individual lipsticks should be provided.

c. **Pancakes and powders**: Powdered products provide a less viable environment for infection, but try to individualize usage. Supply powders in the smallest containers available.

d. **Mascara**: Use individual applicators/containers.

e. **Eyeliners and Eye makeup**: Use individual products.

f. **Brushes**: Use disposable brushes.

g. **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.

h. **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.

2. **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 and stop work.
3. Heat Stress
   Stage lighting can produce an intense heat. 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.

G. Performance
1. Curtain Speech
   Each performance must be preceded by a curtain speech to outline the location of all fire exits.

2. Crowd Control
   Attendance for all events must be controlled. Observe occupancy limit when selling tickets.

3. 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.
   - 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 from the building 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. Strike
   1. Set Deconstruction & Material Disposal
      All items must be returned to storage or otherwise disposed of immediately following the final
      performance:
      o lighting instruments, cables and control equipment
      o properties
      o sound equipment
      o scenery and platforms
      o costumes
      o seating
      Strike should take place in a careful, organized manner.

2. Housekeeping
   The facility must be left in good condition after the strike. All trash must be properly discarded.

3. 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. If you have hazardous waste to be disposed of, contact Environmental Health & Safety at 9-8989 for recommendations.

I. Villanova Scene Shop and Theater
At Villanova University our number one priority is safety. The scene shop is inherently a dangerous workspace. We will take every precaution to ensure every individual's well-being. Many techniques and materials used in the theatre contain inherent risks to individuals. If those risks cannot be adequately minimized and controlled through proper training, equipment, and use of appropriate precautions, we will not use those items. For example, due to the lack of proper ventilation, working with steel and foam is discouraged. If at any time you feel a situation is unsafe, by lack of proper safety equipment, lack of staffing, or any other reason, please see the Technical Director. If you observe someone in an unsafe situation, please remedy the situation.

First Aid Locations
   • (2) Front of House, (2) Backstage, (1) Paint Room, (1) each Dressing Room, (1) Prop Room

Injury/Accident Report – utilize forms found on EHS and Human resources websites.
   • Please file with Business Manager.
Scene Shop Safety Rules
  o You are not allowed to work in the shop under the influence of drugs and alcohol.
  o No mobile phones are to be used while working.
  o Proper attire is required. Always wear closed toe and hard soled shoes. Do not wear baggy clothing, dresses, flip flops or sandals.
  o Wear Safety Glasses while working.
  o Wear a Dust Mask when appropriate.
  o Wear hearing protection.
  o Always turn off power tools when not in use.
  o Keep your work area clean and organized. Put away tools not in use.
  o Always unplug a tool before changing a bit or blade.

Lifting
  o Always bend at the knees.
  o Always communicate with your lifting partner.
  o When moving tall objects grip with one hand high and one hand low.
  o Make sure the path is clear.
  o Be aware of the surroundings. What is behind, what is above?

VI. Policy Evaluation
The Vasey Theater Safety Policy will be jointly evaluated periodically by the Theater Technical Director and the Department of Environmental Health and Safety to determine its effectiveness. The following criteria will be used to evaluate its performance:

1. Accident reports.
2. Number of accidents and /or “near misses”.
4. Periodic on-site audits.
5. Employee feedback and interviews.

VII. Related Information
References:
OSHA Regulations – http://osha.gov
29 CFR 1926 Subpart M – Fall Protection
Villanova University Scaffolding Policy S45
VIII. History – Issued 4-1-16, Revised 4-26-16, 5-27-16, and 5-2018.

IX. Responsible University Division Department
Production Manager
Theater Department
800 Lancaster Avenue
Villanova, PA 19085
610-519-8043

X. Responsible Administrative Oversight
Department Chair
Theater Department
800 Lancaster Avenue
Villanova, PA 19085
610-519-7174
Appendix A

The Miller Training Guide to Fall Prevention and Protection

<table>
<thead>
<tr>
<th>INSPECTION AND MAINTENANCE</th>
<th>To maintain their service life and ensure performance capabilities, fall protection systems must be inspected before and after each use. Regular inspection by a competent person for wear, damage or corrosion should be a part of your safety program. Inspect your equipment daily and replace it if any of the defective conditions explained in this guidebook are found. For harness inspection, perform the following procedures for all straps.</th>
</tr>
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</table>

**Body Belt/Harness Inspection**

1. **Belts and Harnesses**

   **Belts:** Beginning at one end, holding the body side of the belt toward you, grasp the belt with your hands 6 to 8 inches apart. Bend the belt in an inverted "U." The resulting surface tension makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the belt. Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage.

   **Harnesses:** Starting at the top of the harness (hold harness by back Dee-ring), grasp one strap and run your hand along the entire length. While running your hand along the strap, bend the webbing over your index fingers. The resulting surface tension makes damaged fibers or cuts easier to see. Follow this procedure for all shoulder straps, back straps, leg straps and the chest strap. Watch for frayed edges, broken fibers, pulled stitches, cuts or chemical damage.

   a. **Check Dee-Rings:** Check Dee-rings and their metal or plastic wear pads (if any) for distortion, cracks, breaks, and rough or sharp edges. The Dee-ring bar should be at a 90° angle with the long axis of the belt and should pivot freely.

   b. **Attachments of Buckles:** Attachment of buckles and Dee-rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles or Dee-rings. Rivets should be tight and unmovable with fingers. Body side rivet base and outside rivet burr should be flat against the material. Bent rivets will fail under stress.
Appendix A

The Miller Training Guide to Fall Prevention and Protection

e. Inspect for Frayed or Broken Strands: Broken webbing strands generally appear as tufts in the webbing surface. Any broken, cut or burned stitches will be readily seen. See page 1-20 for detailed chart on visual inspection for chemical, heat and corrosive damage.

   d. The Tongue or Billet: The tongue or billet of a belt or strap receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted or broken grommets. Belts and straps should not have additional, punched holes.

2. Tongue Buckle

Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. The roller should turn freely on frame. Check the roller for distortion or sharp edges.

3. Friction and Mating Buckles

Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar. Look for burrs and cracks.

Lanyard Inspection

When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so that the entire circumference is checked. Spliced ends require particular attention. Hardware, i.e. snaps, Dee-ring and thimbles, should be examined under procedures detailed below.

1. Hardware

   a. Snaps: Visually inspect the hook and eye for distortions, cracks, corrosion or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper lock is not depressed.

   b. Thimbles: The thimble must be firmly seated in the eye of the splice. The splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion or cracks.
Appendix B

Will Your Safety Harness Kill You?

Workers and emergency response personnel must be trained to recognize the risks of suspension trauma.

I was surprisingly comfortable with my legs dangling relaxed beneath me, and my arms outstretched in a posture that must have resembled a crucifixion. I had no feeling of stress and mused as to why this was considered dangerous. I felt I could stay in this position for a long time. Three minutes later, maybe less, I wondered why I suddenly felt so hot. The next thing I knew, they were reviving me from unconsciousness. I had just experienced what could be deadly for your workers who use safety harnesses. Fortunately for me, my suspension trauma occurred in the safe environment of the research ward of University of Texas Medical Branch Hospital at Galveston, Texas, where I was the first subject in a NASA experiment studying orthostatic intolerance in astronauts. Your workers won’t be so lucky.

Harness-Induced Death

Wide ranges of situations require safety harnesses of various types. Workers requiring fall protection, workers entering many confined spaces, mountain climbers, deer hunters in elevated stands, and cave explores all try to protect themselves through the use of safety harnesses, belts, and seats. What is little known however, is that these harnesses can also kill. Harnesses can become deadly whenever a worker is suspended for durations over five minutes in an upright posture, with the legs relaxed straight beneath the body. This can occur in many different situations in industry. A carpenter working alone is caught in mid-fall by his safety harness, only to die 15 minutes later from suspension trauma. An electrical worker is lowered into a shaft after testing for toxic gases. He is lowered on a cable and is positioned at the right level to repair a junction box. After five minutes he is unconscious – but his buddies tending the line don’t realize it, and 15 minutes later a dead body is hauled out. The cause of this problem is called “suspension trauma.” Fall protection researchers have recognized this phenomenon for decades. Despite this, data has not been collected on the extent of the problem – most users of fall protection equipment, rescue personnel, and safety and health professionals remain unaware of the hazard.

March 2003 Occupational Health & Safety
Bill Weems and Phil Bishop
Suspension Trauma
Suspension trauma death is caused by orthostatic incompetence (also called orthostatic intolerance). Orthostatic incompetence can occur any time a person is required to stand quietly for prolonged periods and may be worsened by heat and dehydration. It is most commonly encountered in military parades where soldiers must stand at attention for prolonged periods. Supervisors can prevent it by training soldiers to keep their knees slightly bent so the leg muscles are engaged in maintaining posture. What happens in orthostatic incompetence is that the legs are immobile with a worker in an upright posture. Gravity pulls blood into the lower legs, which have a very large storage capacity. Enough blood eventually accumulates so that return blood flow to the right chamber of the heart is reduced. The heart can only pump the blood available, so the heart’s output begins to fall. The heart speeds up to maintain sufficient blood flow to the brain, but if the blood supply to the heart is restricted enough, beating faster is effective, and the body abruptly slows the heart. In most instances this solves the problem by causing the worker to faint, which typically results in slumping to the ground where the legs, the heart, and the brain are on the same level. Blood is now returned to the heart and the worker typically recovers quickly. In a harness, however, the worker can’t fall into a horizontal posture, so the reduced heart rate causes the brain’s blood supply to fall below the critical level. Orthostatic incompetence doesn’t occur to us very often because it requires that the legs remain relaxed, straight, and below heart level. If the leg muscles are contracting in order to maintain balance and support the body, the muscles press against the leg veins. This compression, together with well-placed one-way valves, helps pump blood back to the heart. If the upper-legs are horizontal, as when we sit quietly, the vertical pumping distance is greatly reduced, so there are no problems.

In suspension trauma, several unfortunate things occur that aggravate the problem. First, the worker is suspended in an upright posture with legs dangling. Second, the safety harness straps exert pressure on leg veins, compressing them and reducing blood flow back to the heart. Third, the harness keeps the worker in an upright position, regardless of loss of consciousness, which is what kills workers.
Appendix B

After a Fall:

1. Workers should be trained to try to move their legs in the harness and try to push against any footholds.
2. Workers hanging in a harness should be trained to try to get their legs as high as possible and their heads as close to horizontal as possible (this is nearly impossible with many commercial harnesses in use today.)
3. If the worker is suspended upright, emergency measures must be taken to remove the worker from suspension or move the fallen worker into a horizontal posture, or at least to a sitting position.
4. All personnel should be trained that suspension in an upright condition for longer than five minutes can be fatal.