***UC Theater Fall Protection Program***

**Fall Protection Program Introduction**

The *{LIST CAMPUS & THEATER VENUE HERE}* Fall Protection Program is a key component of this Unit’s Injury & Illness Prevention Program and supports the overall UC Policy on Management of Health, Safety and the Environment.

The Fall Protection Program is based on the most current version of ANSI/ASSE Z359.2 - Minimum Requirements for a Comprehensive Managed Fall Protection Program. This document will detail all known fall hazards within the facility along with equipment and procedures to work around these hazards safely. Details will include equipment usage, authorized personnel and rescue procedures.

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**University of California Policy on Management of Health, Safety and the Environment**

Adopted 2005

The University of California is committed to achieving excellence in providing a healthy and safe working environment, and to supporting environmentally sound practices in the conduct of University activities. It is University policy to comply with all applicable health, safety, and environmental protection laws, regulations and requirements.

To meet this standard of excellence, the University implements management initiatives and best practices to systematically integrate health, safety, and environmental considerations and sustainable use of natural resources into all activities. All University activities are to be conducted in a manner that ensures the protection of students, faculty, staff, visitors, the public, property, and the environment.

The University’s goal is to prevent all workplace injuries and illnesses, environmental incidents, and property losses or damage. Achieving this goal is the responsibility of every member of the University community. Supervisors have particular responsibility for the activities of those people who report to them.

**Definitions (ANSI Z359.0)**

**Authorized Person.** A person assigned by the employer to perform duties at a location where the person will be exposed to a fall hazard. An authorized person is required to receive training and to periodically demonstrate the ability to safely use the appropriate fall protection equipment.

**Certified Anchorage.** An anchorage for fall arrest, positioning, restraint, or rescue systems that a qualified person certifies to be capable of supporting the potential fall forces that could be encountered during a fall or that meet the criteria for a certified anchorage prescribed in this standard.

**Competent Person.** An individual designated by the employer to be responsible for the immediate supervision, implementation, and monitoring of the employer’s managed fall protection program, who, through training and knowledge, is capable of identifying, evaluating, and addressing existing and potential fall hazards, and who has the employer’s authority to take prompt corrective action with regard to such hazards.

**Fall Protection.** Any equipment, device or system that prevents an accidental fall from elevation or that mitigates the effect of such a fall.

**Free Fall Distance.** The vertical distance traveled during a fall, measured from the onset of a fall from a walking working surface to the point at which the fall protection system begins to arrest the fall.

**Lanyard.** A component consisting of a flexible rope, wire rope, or strap, which typically has a connector at each end for connecting to the body support and to a fall arrester, energy absorber, anchorage connector, or anchorage.

**Maximum Arrest Force.** The peak force measured by the test instrumentation during arrest of the test weight in the dynamic tests set forth in these standards.

**Non-Certified Fall Arrest Anchorage.** A fall arrest anchorage that a competent person can judge to be capable of supporting the predetermined anchorage forces as prescribed in these standards. Non-certified anchorages typically consist of unquestionably strong elements of a structure.

**Program Administrator.** A person authorized by their employer to be responsible for managing the employer’s fall protection program.

**Qualified Person.** A person with a recognized degree or professional certificate and with extensive knowledge, training, and experience in the fall protection and rescue field who is capable of designing, analyzing, evaluating and specifying fall protection and rescue systems to the extent required by these standards.

**Rescue.** The process of removing a person from danger, harm, or confinement to a safe location.

**Self-Retracting Device (SRD).** A device that contains a drum wound line that automatically locks at the onset of a fall to arrest the user, but that automatically pays out from and retracts onto the drum during normal movement of the person to whom the line is attached. After onset of a fall, the device automatically locks the drum and arrests the fall. Self-retracting devices include self-retracting lanyards (SRL’s) and self-retracting lanyards with integral rescue capability (SRL-R’s).

**Shall.** The word “shall” is to be understood as denoting a mandatory requirement.

**Should.** The word “should” denotes a recommendation.

**Swing Fall.** A pendulum-like motion that occurs during and/or after a vertical fall. A swing fall results when an authorized person begins a fall from a position that is located horizontally away from a fixed anchorage.

**Total Fall Distance.** The total vertical distance a person falls, measured from the onset of a fall to the point where the person comes to rest after the fall is stopped.

**Webbing.** A narrow woven fabric with selvedge edges and continuous filament yarns made from light and heat resistant fibers.

**Roles and Responsibilities**

* Program Administrator
* The program administrator shall be responsible for development, implementation, monitoring, and evaluation of the managed fall protection program. These responsibilities shall include, but are not limited to, identification of new fall hazards, creating new and auditing existing procedures to protect workers from fall hazards, scheduling and overseeing inspections and training as appropriate, and ensuring the program meets current and local codes and regulations pertaining to fall protection.
* Competent Persons
* The competent person shall be responsible for the immediate supervision, implementation, and monitoring of the managed fall protection program. These responsibilities include overseeing the safe use of the fall protection equipment in accordance with this program and current and local codes and regulations. They shall setup and supervise improvised anchorages, carry out scheduled inspections as needed, evaluate authorized users, and carry out rescue procedures as laid out in this program.
* Authorized Persons
* Authorized Persons shall be responsible for the proper use, inspection, maintenance and care of fall protection equipment in accordance with this program and their training. Authorized persons shall notify the competent person of any fall protection equipment defects or damage. They may connect and disconnect to and from anchorages as laid out by this program or as directed by a competent person, but may not setup or choose the anchorage themselves.

See Appendix 1 for a listing of the Program Administrator, Competent Person(s) and Authorized Persons.

**Training requirements**

Documented training must be competed by any worker prior to using an active fall protection system. At a minimum, training shall be done in accordance with the timetable below.

* Program Administrator: Competent Person training shall serve this purpose
* Competent Persons: Every 2 years
* Authorized Persons: Annually

**General Rescue Guidelines**

In the event of a fall arrest, the following steps shall be followed. Rescue details related to specific fall hazard locations and operations s are covered under the Fall Hazard Procedures section.

* Call 911
* Assess work area of further danger
* Attempt to establish verbal communication with the fallen worker
* If the fallen worker is conscious and able, instruct them to perform self-rescue
* Leg straps are available on each harness and can be used to relieve harness pressure to provide more time for self or assisted rescue. Workers should be trained to “pump” their legs frequently to activate their leg muscles. Instruct them to do so while preparing for self or assisted rescue.
* If the worker is still at the level of the work area, they may pull themselves back onto the work platform
* If the worker is adjacent to a ladder, they may regain footing on the ladder and ascend/descend to the nearest work platform. (Note: extra caution should be taken as the fall arrest mechanism will have been deployed and may not protect against a second fall)
* If the fallen worker is not conscious, or is not able to perform self-rescue, the competent person shall perform assisted rescue based on the procedures laid out in the Fall Hazard Procedures section.
* Once the worker is safely on the ground or back on the work platform, wait for paramedics to evaluate the worker before attempting to move them.
* All fall protection equipment involved in the fall shall be removed from service immediately. Anchorages and SRL’s shall be tagged out of service until replaced or recertified by a qualified person. All incidents shall be reported and investigated in accordance with UC Injury & Illness Prevention Program policies.

**Identify, Evaluate and Control Fall Hazards**

Use the Fall Hazard Survey Report to identify, evaluate and determine appropriate control measures for facility fall hazards.

* Eliminate the Fall Hazard
* If possible eliminate or engineer out the fall hazard such that no hazard exists at all. Examples of this include lowering equipment down to floor level for maintenance or repair.
* Prevent Exposure to the Fall Hazard
* If the hazard cannot be eliminated, prevent employees from being exposed to the hazard if possible. Examples of this include guardrails and access controls.
* Protect from the Fall Hazard
* If the employee must be exposed to the hazard and there is no passive fall protection system suitable for the exposure, use an active fall protection system and equipment to protect the employee in the event of a fall. This includes the use of harnesses, lanyards, SRLs, and other fall protection equipment.

**Cal-OSHA General Industry Requirements**

Cal OSHA specifies the following in their General Industry Orders:

*3210. Guardrails at Elevated Locations*

*(a) Buildings. Guardrails shall be provided on all open sides of unenclosed elevated work locations, such as roof openings, open and glazed sides of landings, balconies or porches, platforms, runways, ramps or* ***working levels more than 30 inches above the floor****, ground, or other working areas of building as defined in Section 3207 of the general Industry Safety Orders. Where overheard clearance prohibits installation of a 42-inch guardrail, a lower rail or rail shall be installed. The riling shall be provided with a toe board where the platform, runway, or ramp is 6 feet or more above places where employees normally work or pass and the lack of a toe board could create a hazard from falling tools, material, or equipment.*

*Exception:*

*9. Theatre galleries, balconies, or other such elevated seating locations, where a 42-inches railing would obstruct the sight lines, may be protected by a guardrails or other barrier of not less than 34 inches in height provided that a horizontal concave safely ledge not less than 6 inches in depth and not less than 36 inches in effective width is installed beyond he railing at the balcony floor level. The safety ledge shall be designed to carry a live load of 100 pounds per square foot.*

*11.Elevated locations used infrequently by employees if the employees using them are protected by a fall restraint/fall arrest system used in accordance with the requirements in Article 24 of the Construction Safety Orders.*

*13. On the auditorium side of a stage, raised platforms and other raised floor areas such as runways, ramps and side stages used for entertainment or presentation. At vertical openings in the performance area of stages.*

*(b) Other Elevated Locations. The unprotected sides of elevated work location that are not building or building structures where an employee is* ***exposed to a fall of 4 feet or more*** *shall be provided with guardrails. Where overhead clearance prohibited installation of a 42-inches guardrail, a lower rail or rails shall be installed. The railing shall be provided with a toe board where the platform, runway, or ramp is 6 feet or more above places where employees normally work or pass and the lack of a toe board could create a hazard from falling tools, material, or equipment.*

**User Equipment**

* All fall protection equipment shall be manufactured and used in accordance with ANSI Z359 standards and applicable Cal-OSHA regulations. Fall protection anchorages and user equipment shall be used only for fall protection.
* All fall protection systems shall limit free to 6’, reduce arresting force to below 1800 pounds, and limit any swing fall hazards.
* All harnesses, beam straps, lanyards, and any other user equipment shall be inspected prior to use and in accordance to the manufacturer’s instructions. Damaged or worn equipment shall be brought to the attention of the designated Competent Person.

**Total Fall Distance**

The total fall distance shall be considered prior to the use of a fall arrest system to ensure the worker will not hit the ground or any obstruction that might cause them harm during the fall. Fall distance calculations will include consideration of the following factors:

* Length of any anchorage connectors
* Total free fall distance (should not exceed 6’)
* Deployment of the shock absorber and deceleration distance (normally should not exceed 3.5’)
* Height of the worker (assume approximately 6’)
* Safety factor (minimum 3’ and includes harness D-ring slide considerations)
* Always round up to the nearest foot.
* SRL’s eliminate the free fall distance and therefore will have less total fall distance

**Inspection**

* All Authorized persons shall perform an undocumented inspection of any fall protection equipment before use.
* A Competent Person shall inspect fall protection equipment and non-certified anchorages annually in accordance with the manufacturer’s instructions. The inspection shall be documented.
* A Qualified Person may provide direction to a Competent Person on the frequency and type of anchorage system inspections.

**Fall Hazards – Guidelines and Procedures**

**STAGE RIGHT AND STAGE LEFT LOWER AND UPPER AND UPPER TORM LIGHTING POSITIONS**

**Fall Protection type:** Active Fall Arrest

**Capacity:** One person per D-ring

**Description:** When torm doors are open and no railing is present a fall hazard is created. In some cases, a fall hazard can exist even if a railing is present such as when the work to be completed is above or beyond the railing when the technical needs of the performance hall require it. When a fall hazard is present, fall arrest and anchorages and equipment shall be used.

**Anchorage:** Each door is equipped with a single D-ring mounted overhead. This is a certified anchorage.

**Connectors:** Each D-ring shall have one 11’ SRL connected to it.

**Assisted Rescue Procedures:** If the worker is high enough that they can easily be pulled back onto the work platform, the competent person shall do so. The rescuer shall be in fall arrest equipment and tied off to the auxiliary d-rings mounted on the staircase edge using a SRL. If it is not safe to pull the worker back onto the work platform a competent person shall setup the 85ft retrieval SRL in the attic and use it for rescue based on the following procedures.

For stage right, a fixed beam anchor shall be mounted to the structural beams overhead the work area in the attic. For stage left a tie off adaptor shall wrap the structural beam overhead the work area in the attic. The retrieval SRL shall be mounted to this anchor and lowered to the fallen worker via the gap between the concrete and slab and the precast panels. The cable shall run through a protective sleeve to protect the cable and the building elements from damage. The cable shall be attached to the worker’s chest D-ring using the extension pole if necessary. The worker shall be raised until 11’ SRL can be disconnected, and then shall be lowered to the floor. The worker shall be lowered into a sitting position with most tension released from the SRL line. The worker shall remain connected to the SRL until the paramedics ask it be disconnected.

**Authorized Users:** All workers listed in Appendix A and B are authorized to use these anchorages.

**LOADING GALLERY**

**Fall Protection type:** Active Fall Arrest

**Capacity:** One Person

**Description:** When loading weight on the arbors for line sets 6-12, it is sometimes necessary to lift or lower heavy weights below the work platform. In these instances, one of the safety railing sections must be removed and a fall hazard is present. Fall arrest anchorages and equipment shall be sued.

**Anchorage:** There is one D-ring overhead. This is a certified anchorage.

**Connectors:** One 130’ SRL with retrieval mechanism shall be connected to this D-ring.

**Assisted Rescue Procedure:** A competent person shall use the retrieval mechanism of the SRL to lower the worker to the next level below. The worker shall be lowered into a sitting position with most tension released from the SRL line. The worker shall remain connected to the SRL until the paramedics ask it be disconnected.

**Authorized Users:** All workers listed in Appendix A and B are authorized to use these anchorages.

**GRID HATCH, UP STAGE LEFT**

**Fall Protection type:** Active Fall Arrest

**Capacity:** One person per D-ring, 2 people total.

**Description:** This hatch is often used to hoist equipment from the stage level to the grid. When the grid hatch is open any workers working within 6ft. of the open hatch shall be using fall arrest equipment.

**Anchorage:** There are 4 D-rings in this position, each rated for 1 connector each. Up to 2 **persons** may be connected in the area at a time, leaving one spare D-ring for additional rescue gear (130’ SRL with retrieval) and one to allow the rescuer to be connected while performing rescue. This is a certified anchorage.

**Connectors:** One SRL may be connected to each D-Ring. If there is only one worker connected in the area the 130’ SRL with retrieval mechanism shall be used or kept available for rescue. If more than one person is connected in the work area, the 130’ retrieval SRL shall be unused so that it may be available for rescue.

**Assisted Rescue Procedure:** A competent person shall mount the retrieval SRL (if the victim is not already attached to it) to one of the spare D-rings. The hook shall be lowered and connected to the victim’s chest D-ring, if necessary with the use of the extension pole. The retrieval mechanism of the SRL shall be used to lower the worker to the next level below. The worker shall be lowered into a sitting position with most tension released from the SRL line. The worker shall remain connected to the SRL until the paramedics ask it be disconnected.

**Authorized Users:** All workers listed in Appendix A and B are authorized to use these anchorages.

**BALCONY RAIL LIGHTING POSITION**

**Fall Protection type:** Active Fall Arrest

**Capacity:** One Person

**Description:** The balcony rail lighting position is on the first balcony main front edge. It is composed of the center 40ft. of the balcony edge on which a rail for hanging lighting equipment is mounted. Work in this area often requires the worker extend their body over the railing presenting a fall hazard. When such a hazard exists the worker shall use fall arrest equipment.

**Anchorage:** There are 3 mounting points (point #5,6 and 7 on image A) designed for the Tough Built PRO-II Davit system in the attic above the Balcony Rail. There is one PRO-ll Davit arm available to be placed in the mounting point, which is designated for the specific area of the balcony rail being worked on. Image A details which mounting point locations can be used for each work area as well as the davit offset settings or each location. Point 6 may be used to access the center 20 ft. of the balcony rail. Point 5 and 7 may be used to access the area from the corresponding edge to the center of the rail. For some work areas more than one mounting point is permissible as is shown in the drawing. This is a certified anchorage.

**Connectors:** One 130’ SRL with retrieval mechanism shall be sued with this anchorage. The SRL shall be mounted to the davit arm in accordance with the manufacturer’s instructions.

**Assisted Rescue Procedure:** A competent person shall use the retrieval mechanism of the SRL to lower the worker to the next level below. The worker shall be lowered into a sitting position with most tension released from the SRL line. The worker shall remain connected to the SRL until the paramedics ask it be disconnected.

**Authorized Users:** All workers listed in Appendix A and B are authorized to use these anchorages.

**LIGHTING CATWALK ACCESS LADDERS**

**Fall Protection type:** Active Fall Arrest

**Capacity:** One Person

**Description:** If the worker has both hands free and is able to climb the ladder with three points of contract, no fall protection is required. If the worker does not have both hands free and/or cannot maintain three points of contact while climbing the ladder, fall arrest equipment shall be used. This is often the case when carrying equipment up or down the ladder. At any time a worker may elect to use the fall arrest equipment even when this program does not require it.

**Anchorage:** There are two davit arms mounting points and one UCL Advanced Safety Systems davit arm for this work area. Each mounting base is located at the top of the house left ladders, which descend to the lighting catwalks. The davit arm shall be placed in the mounting bracket associated with the ladder being climbed. This is a certified anchorage.

**Connectors:** One SRL of sufficient length to reach the level below shall b attached via carabineer to the D-ring at the front of the Davit.

**Assisted Rescue Procedure:** In the event of a fall arrest the worker will still be within the ladder’s railings or on the catwalk platform below. Help the worker up or down the ladder to the next work platform ( up is preferred if the worker is able as this provides better access for the paramedics).

**Authorized Users:** All workers listed in Appendix A and B are authorized to use these anchorages.

**ORCHESTRA PITS**

**Fall Protection type:** Passive fall prevention, warning lines ad temporary railings

**Descriptions:** When the orchestra pits are lowered 4’ or more stage level a fall hazard is present.

**Warning Lines:** If this fall hazard is present during a work shift or while the building is not occupied warning lines may be used. If the pits are lowered 4’ or more below stage level five warning lines shall be used. One shall be connected to each end of the smoke pocket and pulled taught. Two shall be placed in both SR and SL cheek areas to restrict access through the six apron doors. If the pits are lowered 4’ or more below the level of the house four additional warning lines shall be used. Each line shall restrict access to each of the four aisles, which provide personnel access to the pits. All warning lines shall have caution signs hung on them in a visible manner. All warning lines shall be 6 feet or more from the leading edge of the fall hazard.

**Temporary railings:** lf the pits are lowered below house level during a rehearsal or performing a temporary railing shall be used on the audience side of the fall hazard. An opening in the railing is permissible to provide access to the pits from the house if a legal stair unit is in place. If the pits are lowered during a rehearsal or performance to a point where there is a possibility of falling below the pits more than 4’ a temporary railing shall be used in all affected areas.

**Pits in motion:** It is often necessary for workers to be on the lifts while they move up and down. During the time fall hazards are often temporarily create while the height of each lift is adjusted. As no warning lines or railings are possible, workers shall stay close to the center of each pit and be made aware of the possible fall hazard before it is created.