MEMORIAL UNIVERSITY

Department of Health and Safety

Fall Protection

1.0 Introduction

Where it is not possible or practicable to provide adequate work platforms or staging, Memorial will ensure that fall protection systems are used by all workers and contractors working at elevations greater than 3.05 meters (10 feet) above grade or floor level. Fall arrest systems are required for anyone who:

- Works at a height at or exceeding 3.05 meters (10 feet);
- Works over operating machinery;
- Works over water or another liquid or a hazardous substance;
- May fall through an opening on a work surface.

2.0 Purpose

Fall Protection Procedures are intended to instruct departments on: (1) Fall Protection requirements and; (2) the Department's responsibility to train faculty, staff, and student members exposed to the risk of falls. The Department of Health & Safety will provide assistance and consultation in performing fall hazard analysis, recommending fall protection system options, and coordinating personnel training on fall arrest equipment.

3.0 Procedure

All workers who are exposed to potential fall hazards must be trained in the proper use of fall protection equipment before using any fall protection products. Workers must be able to identify potential fall hazards, determine which equipment to use in specific work situations, and demonstrate proper anchoring procedures.

3.1 Supervisors that coordinate work in areas where employees may be exposed to potential fall hazards must be trained and have the ability to determine the best means to protect employees from the hazard. Methods of protection include the installation of guardrails, use of restraint and positioning systems, warning line systems or controlled access zones, and development of a fall protection plan. Fall protection plans must be submitted to the Department of Health & Safety for review and approval prior to the work. A hazard analysis as described in the "Recognition, Evaluation, and Control of Hazards" procedure will suffice for this plan.

3.2 The University shall, whenever feasible, eliminate the need for work at elevations that present fall hazards and/or shall implement engineering solutions to create safe work environments for employees and contractors.

3.3 Fall protection strategies (e.g., enclosures, barriers, and guardrail systems, protective coverings, travel restraint systems, or fall arrests systems) shall be adopted by supervisors, employees, and contractors wherever there is a fall- from-height risk greater than 3.05 meters (10 feet) that cannot be mitigated.

3.4 Employees will be trained on the selection, use, care, inspection, and proper storage of fall protection components and systems and shall be instructed about those circumstances (e.g., falls exceeding 3.05 meters (10 feet) requiring this equipment.

3.5 Contractors will provide written fall protection strategies to the University Project Coordinator whenever the work site presents fall-from-height hazards.

3.6 All fall arrest system components and travel restraint system components shall be CSA-approved.
(Details on the requirements for these components and systems shall be referenced in Fall-Arrest Systems Practical elements by Andrew C. Sulowski. CSA publication – 2000).

3.7 Fall arrest system components and travel restraint system components shall be inspected by a competent worker before and after each use. Defective components shall be taken out of service immediately.

3.8 Temporary anchorage points for travel restraint and fall arrest shall be selected with professional engineering assistance. Permanent anchors shall be installed according to the Building Code and shall be conspicuously labeled for the purpose and with load capacity information.

3.9 A written rescue plan for fallen workers shall be provided by the workplace supervisor and contractors in advance of all work requiring a fall arrest system. Rescue training shall be provided. The entire fall arrest system is only as good as the weakest link. Falls must be anticipated and rescue methods must be devised to help a fallen worker suspended by the fall-arrest system used. Possibilities for rescue include self-rescue, rescue by co-workers, and rescue by a professional rescue team. Rescue training is necessary for workers using fall arrest systems.

4.0 Definitions

4.1 Anchorage: a secure point of attachment for lifelines, lanyards, or deceleration devices point that is independent of the means of supporting or suspending the employee.

4.2 Fall arrest system: an assembly of components joined together so that when the assembly is connected to a fixed support, it is capable of arresting a worker's fall; consists of a full-body harness with a back-mounted "D"ring, a shock absorbing lanyard, a lifeline, connecting hardware, and anchorage point(s). A potential for injury will exist if the worker falls.

4.3 Fall restricting system: a type of fall arrest system that has been designed to limit a worker's fall to a specific distance.

4.4 Guardrail system: an assembly of components joined together to provide a barrier to prevent a worker from falling from the edge of a surface.

4.5 Kilonewton (kN): a unit of force, approximately equivalent to 225 pounds of force.

4.6 Safety net: a net that is located and supported in such a way that it assists the fall of a worker who may fall into it, without endangering the worker.

4.7 Swing-fall: the hazard of swinging into an obstruction after falling.

4.8 Travel restraint: an assembly of components capable of restricting a worker's movement on a work surface and preventing the worker from reaching a location.

5.0 Ten Essential Principles for Users of Fall Arrest Systems (FAS)

1. Inspect your equipment before every use.
2. Don and adjust your harness properly.
3. Use your shock absorber or your shock-absorbing lanyard whenever possible.
4. Connect all components of your FAS using only compatible connecting hardware.
5. Attach your FAS only to a suitable anchorage.
6. Keep your fall distance to a minimum.
7. Consider the conditions of your workplace when choosing your equipment.
8. Care for your equipment as you would care for yourself.
9. Know the rescue procedure and equipment in case you should fall.
10. Be properly trained to use any fall protection equipment.

6.0 Strategies to Eliminate the Risk of Falls from Heights

- Remove the reason for work at heights
- Move the task to floor or ground level
- Ensure that the elevated workplace is capable of supporting your weight
- Install permanent safe access to the elevated workplace
- Install walkways and guardrails
- Build safe work platforms or use a lift cage
- Enclose the elevated workplace
- Install permanent rigid covers over openings and/or erect barriers or guardrails
- Select anchorage points carefully for fall restraint and fall arrest systems

7.0 Anchor Points for Personal Fall Arrest Equipment

7.1 Secure anchor points are the most critical component when employees must use fall arrest equipment. Memorial's buildings may have existing structures (e.g., steel beams or anchored roof cupolas that may meet the criteria for a secure anchor point). Other work locations and assignments may require the installation

of a temporary or permanent anchor. As a minimum, the following criteria must be considered for each type of anchor point:

7.2 Criteria for an Existing Structure

- Structure must be sound and capable of withstanding a 5000 lb. static load.
- Structure/anchor must be easily accessible to avoid fall hazards during hook up.
- Prior to tying off to perform the work, a means of rescue in the event of a fall must be immediately available.
- Direct tying off around sharp edged structures can reduce breaking strength by 70%; therefore, chafing pads or abrasion resistant straps must be used around sharp edged structures to prevent cutting action against safety lanyards or lifelines.
- Choose structures for anchor points that will prevent swing fall hazards. Potentially dangerous "pendulum" like swing falls can result when a worker moves horizontally away from a fixed anchor point and falls. The arc of the swing produces as much energy as a vertical free fall and the hazard of swinging into an obstruction becomes a major factor:
  - Raising the height of the anchor point can reduce the angle of the arc and the force of the swing.
- Permanent anchor systems that meet a 2 to 1 safety factor of at least 3,600 lb. must be CERTIFIED. The design and installation must be done by a QUALIFIED PERSON. If the permanent anchor system is not certified, it must meet a 5,000 lb. static load or greater.
- Roof anchors must be immediately removed from service and disposed of if subjected to fall arrest forces.

7.3 Reusable Temporary Roof Anchors

In addition to all the criteria listed for existing structures, the following points must be considered:

- Reusable temporary roof anchors must be installed and used following the manufacturer's installation guidelines.
- Roof anchors must be compatible with employee's fall arrest equipment.
- Roof anchors must be removed from service at the completion of the job and inspected prior to reuse following the manufacturer's inspection guidelines.
- Roof anchors must be immediately removed from service and disposed of if subjected to fall arrest forces.

Legislative reference:
Occupational Health & Safety Regulations: Part X Fall Protection 138 – 146.
CSA Standard CAN/CSA – Z259.10-06 (R2011) Full Body Harnesses.

CSA Standard CAN/CSA – Z259.2.1-98 (R2011) Fall Arresters, Vertical Lifelines and Rails.
CSA Standard CAN/CSA – Z259.2.2-98 (R2009) Self-Retracting Devices for Personal Fall-Arrest Systems.
CSA Standard CAN/CSA – Z259.11-05 (R2010) Energy Absorbers and Lanyards.
CSA Standard CAN/CSA – Z259.2.3-99 (R2010) Descent Control Devices.