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1 Introduction

The Environmental Health & Safety Standard Operating Procedure for Fall Protection was developed by the Department of Environmental Health & Safety in accordance with the University's Policy Statement on Health and Safety and to ensure compliance with the Ontario Occupational Health & Safety Act and Regulations.

The purpose of this Standard Operating Procedure (SOP) is to ensure that employees performing work which requires Fall Protection, are protected from any associated hazard and are aware of safe operating practices.

2 Applicable Legislation

- Occupational Health and Safety Act, Industrial Establishments O. Reg. 851
- Occupational Health and Safety Act, Construction Projects O. Reg. 231/91
- Occupational Health and Safety Act, OH&S Awareness and Training O. Reg. 297/13
- CAN/CSA-Z259.10-12, "Full Body Harness"
- CAN/CSA-Z259.1-5 (R2015), "Body Belts and Saddles for Work Positioning and Travel Restraint"
- CAN/CSA-Z259.11-05 (R2015), "Energy Absorbers and Lanyards"
- CAN/CSA-Z259.2.1-98 (R2011), "Fall Arresters, Vertical Lifelines, and Rails"

3 Definitions

<u>Anchorage Point</u> – a secure point of attachment for lifelines, lanyards, or deceleration devices that is independent of all means of supporting or suspending the worker.

<u>Buddy System</u> – a system of organizing individuals into work groups so that each individual within the group is designated to be observed, by at least one other person in the work group.

<u>Authorized Employees</u> – Individuals who have been trained and certified as being competent to work safely on a specific task involving the use of scaffolds, suspended scaffolds or powered elevated platforms.

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Competent Person (OHSA) – means a person who:

- (a) Is qualified because of knowledge, training and experience to organize the work and its performance,
- (b) Is familiar with this Act and the regulations that apply to the work, and
- (c) Has knowledge of any potential or actual danger to health or safety in the workplace.

<u>Fall Protection</u> – Any system that serves to protect a worker from falling, or minimizes travel distance in the event of a fall.

Fall Arrest System (FAS) – Any fall protection system that permits a limited free fall.

<u>Fall Restricting System</u> – Type of fall arrest system that has been designed to limit a worker's fall to a specified distance.

<u>Travel Restraint System</u> – Any fall protection system that limits travel in a manner such that free fall is not possible.

<u>Guardrail System</u> – An assembly that provides a barrier to prevent a worker from falling from an edge of a surface.

<u>Safety Nets</u> – (A safety net system must be designed by a professional engineer). The system is installed below a work surface to protect any location where a fall hazard exists. The use of safety nets is not allowed unless approved by the Department of Environmental Health & Safety.

4 Responsibilities

This section outlines the responsibilities within the University for the implementation of this SOP.

4.1 The Department of Environmental Health & Safety

- Develop fall protection procedures and review it as required;
- Coordinate with Departments to ensure that training is made available to all employees on campus that are required to use fall protection;
- Approve trainers that carry out the training sessions;
- Provide technical support to departments and employees when questions or concerns arise about working at heights; and
- Conduct periodic audits to ensure that all equipment inspections are being completed appropriately.

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4.2 Department Heads and Directors

- Provide the resources and instruction necessary to support and maintain an effective fall protection program within their jurisdiction;
- Ensure that the requirements outlined in this SOP and other relevant policies are complied with; and
- Ensure that contractors and subcontractors hired by the department demonstrate, with documentation, their ability to manage projects in compliance with Queen's University policies and procedures and the Ontario Health and Safety Act (OHSA) related regulations prior to being awarded contracts for work on Queen's University property.

4.3 Managers and Supervisors

- Ensure that the requirements outlined in this SOP and other relevant policies are complied with;
- Be trained and authorized to recognize and supervise work that involves the use of fall protection equipment;
- Whenever feasible, eliminate the need for work at elevations that present fall hazards by utilizing engineering solutions in the design and retrofit of new and existing facilities;
- Identify situations where fall protection is required;
- Determine the appropriate fall protection system and components to be used in a particular situation;
- Ensure that all fall arrest system and travel restraint system components are CSA approved;
- Ensure that employees are provided with any required fall protection equipment, are trained in the equipment and deemed to be competent in the safe use, care and maintenance of the equipment, and provide every precaution necessary to ensure the employees safety;
- In charge of the rescue plan, the supervisor must understand the plan and oversee scheduled practice, research and develop the site-specific plan, and provide employees with all necessary equipment and training to carry out the rescue plan;
- Ensure that employees use all appropriate travel restraint, fall restricting and fall arrest system components and procedures when performing their work;
- Ensure that fall arrest and travel restraint systems are inspected by a competent person, with a written record of such inspection being retained, before and after each use and that defective components are taken out of service immediately;

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- Communicate the rescue plan to employees and post a written copy in a visible location in advance of all work requiring the use of fall protection equipment that will not exceed 30 minutes in any case;
- Provide the training record for each employee to an inspector upon request; and
- Ensure that contractors and subcontractors working under their supervision demonstrate, with documentation, their ability to manage projects in compliance with Queen's University policies and procedures and the OHSA related regulations prior to being awarded contracts for work on Queen's University property.

4.4 Employees

- Complete working at heights training to be deemed a competent authorized worker in the safe use, care and maintenance of fall protection equipment;
- Participate in the development of the rescue plan for all work involving the use of fall arrest equipment;
- Read and practice the rescue plan according to the directives of their supervisor.
- Follow the procedures outline in this SOP and use fall protection in a manner that is consistent with their training;
- Inspect the workplace and all of the components of fall arrest and travel restraint equipment before and after each use and report defective components to their immediate supervisor;
- Maintain fall protection equipment in good condition;
- Report all incidents involving personal injury or property damage to their immediate supervisor;
- Don and adjust the harness properly and only connect components with compatible connecting hardware;
- Only connect fall protection equipment to approved anchorage points;
- Keep the potential fall distance to a minimum and use a shock absorber or shock absorbing lanyard whenever possible;
- Never work alone and implement the buddy system when using fall protection; and
- Review the rescue plan and emergency procedures for all equipment being used before starting work involving the use of fall protection.

4.5 Contractors and sub-contractors

• Ensure that their fall protection program meets or exceeds all of the conditions outlined in the Queen's University fall protection SOP;

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- Ensure that all related requirements under the OHSA are strictly enforced while working on Queen's University property;
- Ensure that regular inspections and safety audits are conducted on all project sites; and
- Ensure that only competent workers are assigned to the project.

5 Training Program

All supervisors, employees and students involved in work that requires the use of fall protection equipment shall be trained and authorized as being competent in the use and care of such equipment. The working at heights training program must be approved by the Chief Prevention Officer (CPO) from the Ministry of Labour and delivered by a CPO approved training provider before employees can work at heights.

6 Hazard Identification and Controls

Fall protection is required when a worker can fall 10 feet (3 meters) or more from a floor such as a balcony, a bridge, a roof, a platform of a scaffold or other work platform, or into an opening in a work surface, into the path of/or into operating equipment or into a hazardous substance, object, water or any liquid. Fall protection is also required when a worker can fall 4 feet (1.2 meters) or more from a work area being used as a path for a wheelbarrow or other equipment.

The type of fall protection that should be used is determined by the type of work area and the hazard involved. The following hazard controls are addressed in the preferred hierarchy. Whenever possible the work should be brought down to ground level to reduce the risk.

Guardrails:

The use of guardrails is the best alternative to fall protection devices that must be worn by workers when accessing roofs (See Roof Access SOP-Safety-18). Other forms of fall protection should only be used where the installation and use of guardrails is impractical.

Guardrails must be built to the structural specifications outlined in the building code. There are three main components: (a) top rail – the upper most horizontal rail, positioned 91-107 cm above the floor level, (b) mid rail – horizontal rail halfway between the top rail and toe board level, and (c) toe board – 12.5 cm, high enclosure at floor level required where tools and other objects may fall onto those

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below. Guardrails should be installed in any location that presents a fall hazard where routine access is required.

Travel Restraint, Fall Restricting and Fall Arrest Systems:

Travel restraint, fall restricting and fall arrest systems are typically used where the installation of guardrails or other physical barriers for fall prevention is impractical. Important points regarding these two systems follow:

- Equipment must be inspected prior to use, and on an ongoing basis throughout the day;
- All equipment must be inspected yearly or more frequently by competent person and a record of the inspection shall be kept of site;
- Training with the type and model of equipment to be used is essential for the proper use of personal fall protection equipment;
- Placement of temporary anchors must be done by highly experienced and knowledgeable individuals;
- Any piece of equipment that has sustained a fall or is otherwise damaged shall not be reused unless recertified/reconditioned by the manufacturer. Equipment that cannot be recertified is to be destroyed in a manner that eliminates potential reuse such as cutting it up;
- All components used shall be designed and rated appropriately for their intended use;
- Employees must be familiar with and guard against the degradation of the system by the work activity;
- Body belts are not permitted, only body harnesses are allowed;
- Precautions must be taken to guard against abrasion of ropes;
- Activities such as hot work and the use of harsh acids/alkali require the use of wire rope lanyards and lifelines;
- Wire rope should not be used where there is the risk of electric shock;
- All gate style connectors such as snap hooks and carabiners shall be locking. Self-locking styles are preferred; and
- The capacity of gated connectors must be marked on the item.

Travel Restraint Systems

- Travel restraint systems must be designed such that a free fall is not possible;
- Travel restraint system shall be capable of withstanding the maximum arrest forces generated through fall arrest; and
- Travel restraint belts are not to be used on aerial platform lifts such as scissor lifts and boom lifts (See Elevated Work Platforms SOP-Safety-19). If the employee is thrown from the lift,

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there is a risk of severe internal injury because travel restraint systems are not designed to sustain or distribute that amount of force.

Fall Restricting Systems

- A full body harness shall be used as the body holding device. A work belt shall not be used for this purpose; and
- In the event of a fall, the system shall permit a free fall of less than 0.6m.

Fall Arrest Systems

- A full body harness shall be used as a body holding device. A work belt shall not be used for this purpose;
- When working on an elevated work platform, a fall protection harness shall be worn and connected to anchor points provided in the lift basket;
- In the event of a fall, the system shall permit a free fall of less than 1.5 m, and transfer a maximum force of no more than 8 kN to the wearer. Total fall distance shall be restricted such that an impact on lower level or object below is not possible;
- The fall arrest system shall have capacity to absorb twice the energy and twice the load to which it is likely to be subjected;
- Vertical lifelines shall accommodate one user only; and
- Lanyards should be positioned as high and directly overhead as possible to minimize pendulum effect and free fall distance.

7 Inspections

All fall protection components must be inspected by the employee before and after each use. Examples of inspection checklists for harnesses (Appendix A), lanyards (Appendix B) and components (Appendix C) have been included at the end of this SOP. Annual inspections must also be performed on all components by a competent professional.

Horizontal lifelines must be designed by a Professional Engineer and certified after installation.

The inspection process is a critical step in preventing accidents that are caused from faulty or worn out equipment. When safety-related concerns have been discovered through the inspections, or at any other time, the supervisor shall be notified and the equipment taken out of service immediately.

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8 Rescue Plan

To ensure that a fallen employee is rescued in a timely manner, a rescue plan shall be created by the supervisor when an authorized employee is required to use fall arrest equipment. In the event of a fall, every minute that the employee is suspended increases the chances of injury, a rescue plan must be put into action immediately. Each job site will have its own set of unique conditions that need to be addressed in a rescue plan. There is no "one size fits all" method and a new plan must be written for each job accordingly. These procedures must be reviewed and rehearsed annually.

Attached to this policy is an example of a rescue plan (Appendix D).

9 Records Retention

Equipment inspection and training records for work involving the use of fall protection shall be maintained by the department and kept for a period of three years after the use of such equipment.

Revision History:

Version 1.0: January 2018 – Initial Release Version 1.1: May 2021 – Reviewed

Appendix A - Harness Inspection Sheet

Date of Inspection: Inspected by:				
Component	Aspect Examined	Harness 1 ID#	Harness 2 ID #	Harness 3 ID #
	Cut or tears or mildew	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Excessive stretching	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Heat deformation, and damage from corrosives or chemicals	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Webbing	Localized discolouration	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Localized hardening	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Deterioration due to UV or other factors	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Grommets not bent, corroded, loose or missing	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Buckles	Distortion or other physical damage	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Cracks	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Adjustors	Corrosion	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Aujusters	Examine for excess movement at its attachment point	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Cracks	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Distortion or other damage	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
D-Rings	Loss of cross-section due to wear	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Corrosion	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A

Component	Aspect Examined	Harness 1 ID#	Harness 2 ID #	Harness 3 ID #
	Broken, cut or worn threads	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Damage or weakening of threads	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Sewing	Damage due to heat, corrosives or chemicals	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Deterioration due to UV or other factors	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Unauthorized repairs	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Serial number legible	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Labelling	Product label inspection legible	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Product description legible	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Comments:				

Appendix B - Lanyard Inspection Sheet

Date of Inspection: ______ Inspected by: _____

Component	Aspect Examined	Lanyard 1 ID#	Lanyard 2 ID #	Lanyard 3 ID #
	Cut, pulled or worn stitches	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Cuts, nicks, tears	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Damage due to heat, corrosives or chemicals	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Webbing	Deterioration due to UV or other factors	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Unauthorized repairs	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Missing or popped flag	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Excessiveness or brittleness	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Cracks	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Corrosion	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
HOOKS	Examine for excess movement at its attachment point	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Distortion	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Comments:				

Appendix C - Component Inspection Sheet

Date of Inspection: Inspected by:				
Component	Aspect Examined	Lifeline 1 ID#	Lifeline 2 ID #	Lifeline 3 ID #
	Cut, pulled or worn stiches	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Unusual strand size or shape variation	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Discolouration	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
LIFELINE	Broken or loose strands inside the rope (untwist the rope and check inside)	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Accumulated powder or dirt inside the rope	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Loose thimbles	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Decreased elasticity (a rope will lose elasticity, especially if subjected to a load)	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
Component	Aspect Examined	Carabiner 1 ID #	Carabiner 2	Carabiner 3 ID #
CARABINER	Cracks	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Corrosion	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Locking	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A

Component	Aspect Examined	Snap Hook 1 ID#	Snap Hook 2 ID #	Snap Hook 3 ID #
SNAP HOOK	Cracks	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Corrosion	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A
	Locking	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A	□ Ok □ Faulty □ N/A

Comments:

Appendix D – Sample Rescue Plan

A rescue plan needs to be job and site specific. Every new use of fall protection equipment must have a rescue plan in place to ensure that in the event of a fall the worker will be rescued in a timely manner. The rescue of suspended workers must happen as quickly as possible, within 5 minutes, and no longer than 30 minutes. Review and rehearsal of rescue procedures must occur annually.

Location Information					
Site Address:					
Site Access Directions:					
Personnel Information					
Designated trained person in charge of rescue:					
Oualified on-site first aid personnel:					
Number of Workers on-site:					
Task Specific Information					
Scope of Work:					
Max height that needs to be reached in the event of a fall:					
Total potential fall distance:					
Emergency Informati	on				
You will need to know the following information when contacting emergency services.					
How high off the ground is the person suspended?					
How long have they be	en suspended?				
Are they conscious?					
Emergency Contact Numbers					
Queen's ERC	(613) 533-6733	Kingston Fire & Rescue	(613) 548-4001		
Fire	911	Kingston General	(613) 548-3232		
		Hospital			
Ambulance	911	Hotel Dieu Hospital	(613) 544-3310		
Police	911	Kingston Police	(613) 549-4660		
Workers Backup Communications Systems		Radio channel & call sign:			
		Cellphone:			
Additional Documentation Needed					
□ Procedures to lock-out and secure activated safety devices and unsafe working conditions					
\Box Rescue or emergency control procedures for any mechanical hoisting systems or					
elevating devices being used					

<u>Sample Emergency Rescue Plan instructions are on the back of this page which recommend the</u> steps that need to be taken in the event of a conscious or unconscious worker needing a rescue.

Sample Emergency Rescue Plan Instructions:

Conscious Worker

- 1. Send someone to notify the supervisor/constructor immediately.
- 2. Talk to the worker and keep them calm.
- 3. If accessible and safe to do so, place a ladder or position an Elevating Work Platform under the worker to allow them to climb down safely.
- 4. If qualified to do so, perform first aid until help arrives.
- 5. If it is unsafe for you to easily rescue the worker call 911.
- 6. Never risk your own safety to rescue a worker, wait for the Fire Department.
- 7. Send someone to guide Emergency Services to the scene.
- 8. Stay with the worker until the supervisor or Emergency Services arrives on the scene.
- 9. Turn the scene over to the supervisor once they have arrived.
- 10. Restrict access to the accident scene (other than Emergency personnel/MOL).
- 11. Rope/tape off the accident area to preserve the scene for the accident investigation (other than Emergency personnel/MOL).
- 12. Notify the Safety Representative or JHSC and union.

Unconscious Worker

- 1. Call 911 immediately.
- 2. Send someone to notify the supervisor/constructor immediately.
- 3. If they become conscious, keep the worker calm and follow the procedures listed above for a conscious worker.
- 4. If accessible and safe to do so, position an Elevating Work Platform under the worker to support and remove them from their fall arrest equipment.
- 5. If qualified to do so, perform first aid until help arrives.
- 6. If it is unsafe for you to properly rescue a worker wait for the Emergency Services to arrive.
- 7. Never risk your own safety to rescue a worker, wait for the Fire Department.
- 8. Send someone to guide Emergency Services to the scene.
- 9. Stay with the worker until the supervisor or Emergency Services arrives on the scene.
- 10. Turn the scene over to the supervisor once they have arrived.
- 11. Restrict access to the accident scene (other than Emergency personnel/MOL).
- 12. Rope/tape off the accident area to preserve the scene for the accident investigation team (other than Emergency personnel/MOL).
- 13. Notify the Safety Representative of JHSC and union.