Working at Heights

PURPOSE

All work at heights must be completed in a safe manner. CF recognizes that training, planning and the proper equipment are fundamental in completing work at heights safely. CF will ensure workers have adequate training on the equipment and devices used while working at heights, and that the work has been assessed for hazards and controls have been put in place.

SCOPE

The following requirements will be implemented when working from heights. Fall Protection requirements may vary between jurisdictions and work location. Consult the supervisor.

CF is committed to completing work at heights safely and will ensure that when working at heights the requirements set forth by the applicable legislative requirements are met or exceeded.
Fall Protection is the means or measures taken to ensure work is completed safely while working at height. This can include but not be limited to the use of guardrails, ladders, fall arrest systems, travel restraint, scaffolding or working on elevating work platforms.

A means of fall protection must be used when a worker may fall:

- A vertical fall of 3m (10') or more may occur;
    - Note: In some jurisdictions and client workplaces rules are observed with a 6' height requirement. Consult with the H&S department for further information and instruction.
- A fall from a lesser height involves an unusual risk of injury, e.g. working above a tank, exposed re-bar or operating machinery, etc.;
- Operating elevating platforms

General Information

- Travel Restraint Equipment must be CSA approved. Travel Restraint Equipment, and Shock-Absorbing Lanyards and Lifelines must be attached to a secure part of the project.
- Scaffolding shall be erected by qualified workers and shall be erected as designed by the manufacturer.
- Where use of scaffolding is not possible, Fall Arrest Equipment will be used. Fall Arrest Equipment shall be CSA approved and shall be used in accordance with manufacturer instructions. Only one worker per lanyard and safety line is permitted.
- Materials and tools being stored must be 3m (10') back from the edge except for tools being used and working quantities of materials. Proper lift ropes and containers are to be used for hoisting tools and equipment.
- Signs and barricades shall be used to notify and inform workers and the public of overhead work. If it is not possible to barricade as above, a watchman will be posted.
- 100% fall protection is required on elevating work platforms. A bull body harness and lanyard will be used while on an elevating work platform. The system used will be arranged so that the worker is not capable of striking the ground in the event of a fall.
- Instruction and implementation of these procedures shall be enforced by site supervision.
- Some typical fall hazards are:
    - Openings in elevated floors;
    - Erecting structural steel and equipment at heights;

- Working above water or other liquid;
- Working close to the edge of an elevated floor or roof, or etc.

RESPONSIBILITIES

Supervisors

It shall be the responsibility of the Supervisor to ensure that:

- The Fall Arrest Rescue Plan is current and specific to actual operation. Long duration projects must review the plan annually at a minimum;
- A Fall Protection Plan is implemented that meets the policy criteria;
- All workers that require a Fall Protection Plan are instructed in proper execution of the plan; and
- A copy of training documentation will be filed at the project

Sub-Contractors

It shall be the responsibility of Sub-Contractors to ensure that:

- Ensure all workers under his/her authority receive Fall Protection instruction;
- Ensure training documentation is forwarded as requested;
- Ensure that the required Safety Equipment is available;
- Ensure that required Safety Equipment is regularly inspected and maintained; and
- Provide an inventory of Fall Protection Equipment available, if required and ensure all workers under his/her authority adhere to the project Fall Protection Plan.

Workers

Workers are responsible to:

- Receive instruction, and adhere to the Fall Protection Plan/Procedure and report to the Supervisor any non-compliance of the Fall Protection Plan/Procedure; and
- Report falls resulting in the worker's fall being arrested
- Ensure the fall arrest system in use prevents them from hitting the ground or surface below

Fall Protection and Working Alone

CF requires a minimum of 2 people to be present at all times when the use of a Travel Restraint or Fall Arrest System is required (buddy system).

Guardrails

Whenever possible, danger areas shall be protected by properly constructed guardrails.

- Guardrails shall be constructed around any open-sided floor, working platform, runway, walkway, or other surface to which a worker has access.
- Guardrails must be between 0.96 - 1.1m (38"-42") high or as per the local jurisdictional requirements.
- Guardrails shall have an intermediate rail and toe boards.
- Railings must be attached to the inside of posts.
- Posts must be spaced less than 2.4m (8') apart.

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- When Guardrails are temporarily removed to facilitate work, workers exposed to a fall hazard must be protected by other Fall Protection Systems. The Guardrails must be replaced when the unguarded area is left unattended and after the work is completed (if still required)
- Guardrails shall be designed to withstand all loads likely to be applied in any direction.
- Where it is not possible to install guardrails in a danger area, a Travel Restraint or Fall Arrest Protection Plan shall be used. Cable/Fence Guardrails must meet the requirements of the local jurisdiction.

Elevating Working Platforms (EWP) & Logs

Workers using elevating working platforms will be trained in its safe and proper use by the manufacturer or other approved designate (i.e. rental company, safety association etc.). The EWP operator will provide verification of training for the class of equipment used.

Guidelines

- EWP shall be equipped with a top rail, mid-rail and a toe board.
- EWP shall be used only on smooth level surfaces. EWP's used on uneven surfaces must be rated accordingly and used as per the manufacturer instructions.
- EWP are to raise workers and light tools, not materials beyond its rated capacity.
- Workers on EWP's must be protected from falling. Protection will include a full body harness and the appropriate lanyard to prevent the worker from striking the ground in the event of a fall. Double lanyard system may be required in some applications. Consult with your H&S department for jurisdictional requirements.
- Workers wearing a bull body harness on a EWP will tie-off to the engineered anchor point identified by the manufacturer. If there is no approved anchor point consult with the H&S department.
- No person is permitted to use cheater planks and/or ladders on the EWP.
- Workers using EWPs shall conduct a daily inspection. See Elevated Work Platform Inspection H&S_FORM_048 and Scissor Lift Inspection H&S_FORM_049.

EWP

Elevating Work Platforms must be designed and manufactured as per CAN3/CSA standards.

EWP Signal Person

A Signal Person will be utilized in the following circumstances:

1. When the EWP will be operated in close proximity to existing structures, piping, storage areas, facilities, power lines (*See Procedure For Work Near Overhead Power lines – CF H&S Program), etc.

2. When the EWP will be operated inside a building or structure and there is potential to be operated in the vicinity of hazards including other workers, uneven surfaces or overhead hazards

EWP Rescue Person

A Rescue Person may be required due to the location or work activity. Consult with the H&S Department for further information.

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The Rescue Person must be provided means of communication to notify Project Management and Designated Project First Aider in the event that assistance is required.

A Rescue Person will be instructed in their responsibilities and emergency procedures prior to any work being performed utilizing a EWP. The Rescue Person will remain in close proximity and maintain visual and/or audible contact with workers while a EWP is in use.

Note: The Rescue Person may be identified through the site Fall Arrest Rescue Plan. Consult with the H&S Department for further information.

Ladders

All work involving the use of ladders will be in compliance with the standards set forth in CF safe work practices for ladder use.

Scaffolds

All work involving the use of scaffolding (including suspended scaffolds) will be in compliance with the standards set forth in CF safe work practices for scaffolds.

Personal Fall Protection Equipment

- A worker must use an approved Full Body Harness for Fall Arrest and Travel Restraint (CAN/CSA-Z259.10 – 06 or equivalent standard).
- Shock-Absorbing Lanyards must meet CSA Standard (CAN/CSA-Z259.11 – 05 or equivalent standard) and, in combination with a Lifeline System, shall not allow a worker to fall more than 1.2m (4’).
- A personal Fall Arrest System with a Shock Absorber shall be so arranged that if the worker falls, he/she will not hit the surface below.
- Where there is potential to sever, abrade, or burn a Safety Lanyard, the Lanyard must be made of an approved wire rope. A Shock Absorber must be used with such approved wire rope. Nomex/Kevlar Safety Harness may be required for workers in environments where falling is not the only hazard. Spark and slag from welding, cutting, burning, gouging, and smelting operations can quickly ruin standard nylon and polyester webbing normally used in the construction.
- When working around an energized conductor, a Non-Conductive Lanyard shall be used. If, in addition there is potential to sever, abrade, or burn the Lanyard, then two Non-Conductive Lanyards shall be used, or another effective means of Fall Protection.
- Snap hooks must be self-locking.
- Carabiners must have an ultimate load capacity of 5000lbs and this must be clearly shown along with a means of identifying the manufacturer on the device. A Carabiner must be secured to prevent inadvertent opening.
- A Lifeline, or Lanyard used without a Lifeline, must be secured to an anchor. A professional engineer must certify an Anchor Plate with multiple attachments in writing. An Anchor for a Vertical Lifeline or for a Lanyard used without a Lifeline must have an ultimate load capacity of at least 5000lbs in any direction required to resist a fall.
- All engineered drawings must be available onsite

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Fall Protection Equipment Inspection

All workers who wear Fall Arrest Equipment shall visually inspect their equipment on a daily basis prior to use to ensure there are no tears, rips, burns, abrasions, or other factors that would affect the performance of the fall arrest equipment.

The fall protection equipment inspection report will be completed to document the inspection history. See H&S_FORM_050.

Note – Horizontal Life Lines (HLL) are a component of the fall protection system and must be inspected by a competent person as required by the manufacturer, jurisdiction, or site requirements.

Training

All personnel required to use Fall Protection Equipment must be trained in a "Working at Heights" approved training program in Ontario.

Training should include the following components:

- A review of current legislation pertaining to fall protection and any workplace specific rules
- The types of fall protection that can be used to control a fall hazard
- Identification of fall hazards;
- Assessment and selection of appropriate equipment and anchors that the worker may use;
- Instructions for the correct use of connection hardware
- Information about the effect of a fall on the human body, including:
  - Maximum arresting force
  - The purpose of shock and energy absorbers;
  - Swing fall and
  - Free Fall
- Pre-use inspection requirements
- Potential emergency response procedures to be used based on the fall protection system in place
- Practice in:
  - Inspection, fitting, adjusting, and connection fall protection systems and components

In addition to the training described a worker must be made aware of the fall hazards particular to that work site and the steps being taken to eliminate or control those hazards.

Personnel expected to conduct a site rescue will be trained in the procedures and techniques to conduct such a rescue.

Hazard Identification & Assessment – Fall Protection Plan

Where workers are required to wear personal fall arrest systems the work will be reviewed for potential hazards and the appropriate controls identified. This plan will incorporate the use of JSA's, FLRA's, rescue planning, fall clearance calculations or other plans as required.

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The procedures for working at heights with the use of a fall arrest system will be must be available at the work site and reviewed with workers before work with a risk of falling begins.

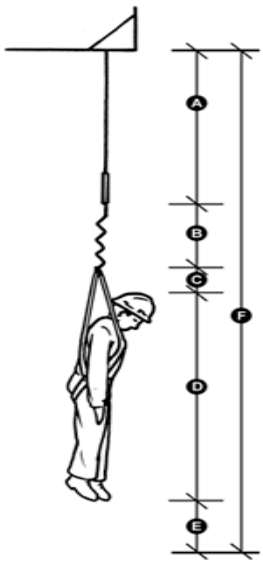
Calculating Fall Clearance

Calculating the fall clearance will help determine if the selected fall arrest system will prevent the worker from striking the ground or objects below:

The minimum fall clearance required using a shock absorbing lanyard is calculated by using the information below.

Note: This calculation reflects the fall clearance required from the anchor point. The use of vertical life lines will need to consider additional distance for potential stretch of the lifeline in relation to the components of the selected system.

A	Length of lanyard	=
B	Extension of shock absorber	=
C	D-ring slippage	= 1.5 ft
D	Height of worker to D-ring	
E	Safety Factor	= 3 ft.
F	Fall Clearance required (F = A+B+C+D+E)	=



Rescue Planning

Where workers are required to wear fall arrest equipment the supervisor will ensure that a rescue plan is in place prior to the use of such equipment.

The rescue plan is to consider the types of fall arrest used, application and potential emergency situations.

Additional rescue planning may be necessary for unique situations and will be developed as part of the fall protection plan.

Items that can be considered as part of rescue planning:

- The use of elevating work platforms to reach workers at height

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- Equipment must be available
- Rescue personnel must be trained and competent in the use of the equipment
- Having Ladders on site that are capable of reaching a suspended worker
- Equipping workers with leg loop extensions for their Full Body Harnesses, e.g., Suspension Relief Straps
- Using rescue devices that includes an integral hand winch that allows the suspended worker to be raised upwards or lowered to safe ground. Use of this device does not require the suspended worker to be conscious. (ie Rollgliss)
- Equipping workers in certain situations with self-rescue devices such as the “Rollgliss” device that allows the suspended worker to remove themselves from their Lanyard and descend to safe ground using one of these devices.

WAH Rescue Plan

The WAH Rescue Plan H&S_FORM_051 can be used to determine the rescue plan and rescue team members when fall arrest equipment is in use. Additional planning may be required for scenarios not covered by the WAH Rescue Plan.

Definitions

Fall Arrest System is a system that will stop a worker’s fall before the worker hits the surface below.
Fall Protection System includes the following when used to protect a worker from a fall hazard:

- Guardrails;
- Full body safety harness with shock-absorbing lanyard & anchor point;
- A Travel Restrain System
- A Safety Net;
- A Control Zone;
- A Safety Monitor with a Control Zone;
- An Elevated Work Platform;
- A barrier constructed 2m back from an opening

A Travel Restraint System is a mechanism that restricts the movement of a worker on a work surface.

Personal Fall Protection System is an individual worker’s Fall Protection System, composed of a Shock Absorbing

Lanyard, Full Body Safety Harness and Lifeline, and any other connecting equipment that is used to secure the worker to an individual anchor or to a lifeline system.

Unusual Risk of Injury from a fall means there are added danger from landing on operating machinery, in water, or into a vessel; as well as the usual danger of impact with a hard surface.

Control Zone means the area between an unguarded edge of a building or other opening and a barricade, which is set back 2m (6ft) from the edge or opening.

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Danger Areas includes elevator shafts, floor openings, scaffolding, slab edge, roof tops, and other tops, and areas where a fall of 3m (10') or more is possible.

EWP Signal Person
A person who has full view of the intended path of travel and provides audible or hand signals to the Equipment Operator to assist in safe operation of the Equipment. A signal Person must be a competent person and is to be instructed in the hazards that may be encountered and the necessary controls including limits of approach to prevent injury or damage.

EWP Operator is a competent person who maintains valid proof of training for the classifications of mobile equipment to be operated.

EWP Rescue Person is a person trained in operating the equipment from the ground controls to safety lower the work platform to the ground when the controls in the work platform are not functioning correctly or where unforeseen conditions prevent the crew in the work platform to lower the work platform safely to the ground.

Tower Crane Rescue Planning Purpose
Where tower cranes are being erected, used, altered, maintained, inspected, thoroughly examined or dismantled, the evacuation and rescue of persons from height, although required infrequently, must be planned for. This section's primary purpose is to provide guidance on the planning of the rescue of persons from height on tower cranes.

Circumstances Requiring Rescue from a Tower Crane

The following table summarizes the activities during which persons may require rescue from a tower crane, the persons who may require rescue and the types of emergency that may precipitate the need for rescue:

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Activity	*Person requiring rescue*					*Type of emergency*			
	Erector	Operator	Maintenance Persons	Competent Person	Visitors	Suspension from fall arrest system	Equipment failure	Medical emergency/ injury	Partial collapse of tower crane structure
Erection	✓					✓	✓	✓	✓
Use		✓					✓	✓	✓
Alteration	✓					✓	✓	✓	✓
Maintenance			✓			✓	✓	✓	✓
Thorough Examination				✓		✓	✓	✓	✓
Dismantling	✓					✓	✓	✓	✓
Other					✓	✓	✓	✓	✓

The table above indicates that the circumstances requiring rescue from height, fall into two categories:

- During erection, alteration and dismantling of the crane when the people who may require rescue are members of the crane erection team.
- During use, maintenance and thorough examination of the crane when those that may require rescue are the operator, visitors to the crane (e.g. safety advisors, inspectors, managers, etc.), maintenance persons and 'competent persons' carrying out thorough examinations.

Planning for Rescue from Height

Before carrying out rescue from height, as with all activities in the workplace, employers must ensure that a safe system of work is in place. A Working at Height Rescue Plan is vital to establish a safe system of work. Refer to WAH Rescue Plan H&S_FORM_051.

Recovery from suspension during erection, alteration and dismantling

CFs tower cranes will use a self-contained rescue system's, taken up the crane by the erection team and kept there whenever fall arrest systems are in use. In the event of a person falling and being suspended in the fall arrest system, rescuers will attach a rescue device to the crane structure and clip one end of the rescue rope to the casualty's harness D-ring using the telescoping pole provided. The casualty can then be raised back up to the crane structure or lowered to the ground (after the casualty's harness lanyard has been disconnected).

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During use, maintenance and thorough examination of the crane

The basic principles of rescue from height, while the crane is in use are similar to those outlined above. There are likely to be several different scenarios that need to be considered in the planning process. Issues to be considered in rescuing persons from the operator's cab include:

- cab location, e.g. hung or within the tower;
- access/egress, e.g. from the rear, top or trap door in the floor.

Before moving a casualty, a first aid assessment should be undertaken. The assessment will indicate whether there is an immediate need for recovery, or stabilization of the casualty while awaiting the rescue team or emergency services.

Once the person being rescued has been recovered from the cab they are generally moved to part of the crane structure, such as the counter jib, from which they can be lowered to ground level. This is generally carried out using either a proprietary rescue system or a man riding basket and it is sometimes possible to utilize a davit arm and/or tag line(s) to keep the casualty clear of the tower crane structure. The casualty may either be placed in a rescue stretcher or in a rescue harness, depending upon the injury and its severity.

The rescue equipment should be available on site at all times when persons are on the crane, as should be adequately trained rescuers.

Consideration should be given to how rescue equipment will be carried or hauled, or any additional risks that may be created if it is to be carried.

Selection and Training of Rescue Persons

It is essential that all rescue from height on tower cranes is carried out by adequately trained (competent) persons who should be available on site at all times when rescue may be required. All rescuers must have valid first aid certification.

Rescuers should be assessed using practical exercise(s), as well as theory session(s). It is desirable to undertake simulated rescue training to confirm that the training has been assimilated.

Refresher training should be carried out as required by training program. This should include a review of the rescue plan, as well as the equipment being used and its location. Equipment should be inspected at the end of any exercise and the findings recorded.

It is important that Rescuers are not exposed to additional risk during any simulated rescue carried out during training. It is generally preferable to utilize a mannequin of representative height and weight during a rescue exercise, although it can sometimes be beneficial to use a "live" casualty (person) for maximum authenticity. If a "live" casualty is being used a lifeline must be used to provide fall protection back-up.

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It _is also important that persons operating or carrying out work on erected tower cranes have an appreciation of the rescue process. This will ensure that if they have to be rescued they will know what to expect and, if conscious, may be able to cooperate with the rescue team.

Inspection and Maintenance of Rescue Equipment

All equipment used for the rescue of persons from height on tower cranes must have a pre- use check before each use. Damaged equipment should be taken out of service immediately.

Rescue equipment is only to be used in rescue situations or in training. Rescue equipment is not to be used to lift equipment, tools, etc.

In addition to pre-use checks, equipment should be subjected to periodic detailed inspection (and/or thorough examination) by a competent person in accordance with a pre- determined regime specified by the equipment manufacturer.

NOTE: The inspection regime may specify the need for 'interim inspection'. WAH requires equipment to undergo a thorough examination.

Furthermore, rescue equipment should be inspected after use and, if damaged, taken out of service immediately.

Equipment should be kept clean and dry and should be properly stored, in a secure place. Wet equipment should be thoroughly dried before storage. Equipment should not be altered or repaired, unless this has been authorized by the manufacturer.

The frequency of detailed inspection should be reviewed by a competent person to take account of storage conditions and any damage found at pre-use and detailed inspections.

See the Fall Arrest Rescue Procedures section below.