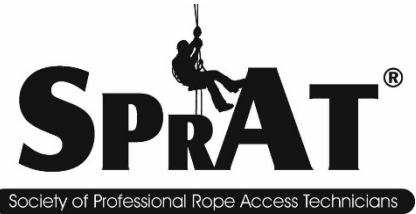


# SAFE PRACTICES FOR ROPE ACCESS WORK



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## 1. Purpose, Scope, Exceptions and Interpretations

### 1.1. Purpose

- 1.1.1. The purpose of this document is to provide information and guidance on acceptable practices and procedures to protect persons from the hazards associated with rope access work methods when working at height.
- 1.1.2. This document is written for all persons concerned with rope access work and especially for those primarily responsible for establishing and administering rope access work methods.
- 1.1.3. This document contains requirements recommended for use by enforcement authorities in establishing regulations or codes on rope access work methods.

### 1.2. Scope

- 1.2.1. This document sets forth accepted practices for rope access work performed using non-metallic synthetic ropes. This document does not apply to emergency response or emergency response training, except as provided in Section 15.

### 1.3. Exceptions

- 1.3.1. Regulatory agencies may have requirements that are different from this standard.

### 1.4. Interpretations

- 1.4.1. Request for interpretations of this standard shall be in writing and addressed to the Secretariat of this standard.

## 2. Defined Terms

- 2.1. **Access work plan:** A written statement prepared by the **employer** describing how a particular job (or types of jobs where these will be essentially identical) should be undertaken to ensure any risks to health and safety of the workers, or others who may be affected, are minimized or eliminated. The documentation prepared by the **employer** describing how a particular job or jobs **should** be undertaken may have different titles such as **access work plan, access permit, work plan and tailboard form**.
- 2.2. **Access zone:** The area in which people are at risk of falling such as **on-rope** or near a working edge. This area requires protective measures such as verbal warnings, signs, barriers, safety lines, or other devices designed to prevent or arrest a fall.
- 2.3. **Aid climbing:** A method of vertical or lateral movement in which the rope access technician moves from one **anchor** to another closely placed **anchor**.
- 2.4. **Anchor, anchorage:** A place, fixing or fixture that supports and to which the various ropes and rope systems are attached.
  - 2.4.1. **Anchor, main:** **Main anchors** are located at the top of and provide the primary support for the life-safety system.
  - 2.4.2. **Anchor, deviation:** **Deviation anchors** change the direction of the rope system. In common practice, the rope does not connect to a **deviation anchor**, but runs through a **carabiner** or connector. In general use a **deviation anchor** should not pull the rope system more than 20 degrees off of the vertical.
  - 2.4.3. **Anchor, rebelay:** A **rebelay** is a type of **anchor** located below the **main anchor** and used to direct the rope away from the fall line. The rope connects to a **rebelay anchor**.
  - 2.4.4. **Anchor, load sharing:** Several **anchors** connected together to make a single **anchor** that meets the strength required for rope access work.

- 2.5. **Approved equipment:** Equipment deemed appropriate for use with rope access techniques. **Approved equipment** shall meet the specifications set forth herein, or other specifications set forth in the **access work plan**, if more stringent.
- 2.6. **Ascender:** A type of **rope grab** that is used primarily for climbing a rope by gripping the rope when loaded in one direction and sliding freely in the opposite direction. **Ascender-type rope grabs** come in a variety of designs. Many of those designs are not appropriate to use as a connection to the **safety line** or for belaying a person.
- 2.7. **Belay:** A system operated by a rope access technician for the purpose of arresting the fall of another person.
- 2.8. **Carabiner:** A type of connector, formed as a complete loop with a spring-loaded entry gate.
- 2.9. **Carabiner, Locking:** A **carabiner** with a mechanism that reduces the possibility of a gate being opened inadvertently. A **locking carabiner** may include the standard screw-gate or other style **carabiner** in which a positive action is required to lock the gate.
  - 2.9.1. **Carabiner, two-stage locking:** A locking mechanism that requires at least two different consecutive manual actions to open the gate.
  - 2.9.2. **Carabiner, three-stage locking:** A locking mechanism that requires at least three different consecutive manual actions to open the gate.
  - 2.9.3. **Carabiner, self-locking:** A gate that locks automatically when it closes. May also be called auto-lock, quik-lok, or some variation of those terms.
- 2.10. **Descender:** A device that acts as a brake on a rope. **Descender** usually refers to a device attached to the operator and enables the operator to control the rate of descent down the rope. Many **descenders** may be attached to an **anchor** and used to control the rate of descent of a worker or equipment being lowered.
- 2.11. **Dynamic rope:** A rope that is specifically designed to absorb the energy of a fall by extending in length thereby minimizing the shock load to the worker, rope system, and **anchors**.
- 2.12. **Employer:** A corporation, partnership, proprietorship, government agency, or other organization that authorizes its employees to perform rope access work.
- 2.13. **Fall arrest:** Equipment, system, or structure that arrests the fall of a worker.
- 2.14. **Fall factor:** The maximum distance a person could fall, divided by the length of the rope attaching the person to the **anchorage** point.
- 2.15. **Fall prevention:** Equipment, system, or structure that prevents a fall from occurring.
- 2.16. **Hazard zone:** Any area where a person may be at risk as a result of the work being performed. The **hazard zone** is concerned with the risk that the public or other workers may be struck by a falling object. This includes the workers **on-rope** as well as anyone at ground level.
- 2.17. **Job safety analysis:** A component of the **access work plan** which identifies hazards, the hazard mitigation methods and outlines requirements to promptly rescue a rope access technician. The component of the **access work plan** which identifies hazards, the hazard mitigation methods and outlines requirements to promptly rescue a rope access technician may have different titles for different **employers**, but will contain the basic information. Names often used include **job safety analysis**, site specific safety plan, hazard analysis, tailboard form and risk assessment.
- 2.18. **Kernmantle rope:** A rope consisting of an internal load-bearing core enclosed within a separate braided sheath.
- 2.19. **Low stretch rope:** Rope that has an elongation of 6% to 10% at 10% of **minimum breaking strength**. See also **Static Rope**.
- 2.20. **Main or Working Line:** The primary rope used for descending, ascending or positioning.

- 2.21. **Minimum breaking strength:** Manufacturer's rating used by the **employer** to calculate safe working loads.
- 2.22. **On-rope:** The condition of being suspended from or attached to a rope.
- 2.23. **Proof load:** A test load applied to verify that an item of equipment will not exhibit permanent deformation under that load, at that particular time.
- 2.24. **Rescuer:** A person performing a rescue other than the rescue subject of the rescue.
- 2.25. **Rescue service:** Organization determined by the **employer** to be capable of safe and effective rescue of rope access technicians.
- 2.26. **Retrieval:** Procedure for rescuing rope access technicians without placing a **rescuer on-rope**.
- 2.27. **Retrieval system:** The equipment (including a **retrieval** line, harness, lifting device, and **anchor**) used for rescue of rope access technicians without placing a **rescuer on-rope**. The **safety line** may be used as the **retrieval** line in a **retrieval system**.
- 2.28. **Rope access:** A means of access by descending or ascending a **main line** while the worker is protected by a **safety line**. Rope access also includes the use of climbing and **aid climbing** techniques with fall protection. Rope access technicians use a variety of rope based skills and equipment to access buildings, other structures (on or offshore), geological features (such as cliff faces), or manmade features (such as dams). A rope is used as the primary means of support and a **safety rope** is used to attach the **fall arrest** system. Climbing and **aid climbing** techniques used by rope access technicians may use techniques other than a **safety line** for fall protection such as positioning lanyards, backup lanyards and bypass lanyards.
- 2.29. **Rope Access Program Administrator:** A person authorized by their **employer** to be responsible for managing the **employer's** rope access program, who is suitably knowledgeable, experienced, and qualified to manage the rope access program, including matters relating to safety, training, regulations, staffing, equipment selection and management, and other program responsibilities as designated by the **employer**.
- 2.30. **Rope access technician:** A person who has completed a rope access certification program and has the appropriate training and experience to perform the duties required according to the assigned level of responsibility. There are three levels of rope access technician.
- 2.30.1. **Level III Technician (Rope Access Supervisor):** A person with the training, skills, experience and certification necessary to assume responsibility for the entire rope access work site, including management and guidance of other rope access technicians on the work site, who is capable of designing, analyzing, evaluating and specifying rope access systems, and who has the knowledge and experience to direct rescue operations from rope access systems, as well as the skills necessary to perform advanced rescue from rope access systems.
- 2.30.2. **Level II Technician (Rope Access Lead Technician):** A person with the appropriate training, skills, experience, and certification to perform, under the direction of a **Rope Access Supervisor**, all rope access rigging, work and, at a minimum, has the skills necessary to perform standard rescue from rope access systems.
- 2.30.3. **Level I Technician (Rope Access Worker):** A person with the appropriate training, skills, and certification for performing, under the direct supervision of a **Rope Access Lead Technician** or **Rope Access Supervisor**, standard rope access operations and, at a minimum, has the skills necessary to perform limited rescue from rope access systems.
- 2.31. **Rope grab:** A device used to grasp a life **safety rope** for the purpose of supporting a load.
- 2.32. **Safe working load (SWL):** The designated maximum force that may be placed on an item of equipment as calculated by the **employer** from the **minimum breaking strength**.
- 2.33. **Safe zone:** Any area outside the **hazard zone** or the **access zone**.

- 2.34. **Safety, secondary, belay or backup line:** Rope used to protect against falls if the user slips or the primary support, **anchor** or positioning mechanism fails.
- 2.35. **Safety factor:** The minimum strength of the system divided by the maximum anticipated load expressed as a ratio.
- 2.36. **Shall:** The word “shall” is to be understood as denoting a mandatory requirement.
- 2.37. **Should:** The word “should” is to be understood as denoting a recommendation.
- 2.38. **Static rope:** Rope that has an elongation of 6% or less at 10% of **minimum breaking strength**. See also **Low Stretch Rope**.

### 3. Requirements for Safe Work Practices

- 3.1. A **Rope Access Program Administrator** shall be the main contact point for matters relating to the safety, training and regulatory aspects of rope access. The designated person shall be suitably knowledgeable and experienced in rope access techniques.
- 3.2. Rope access work practices shall include the ability for self-rescue or prompt rescue by other rope access technicians. All work plans shall include the necessary information for contacting the local emergency services.
- 3.3. An **access work plan shall** be completed before beginning rope access work. The **access work plan** shall include, but not be limited to, the following objectives.
  - 3.3.1. List the rope access systems to be used for the proposed work.
  - 3.3.2. List the members of the work team by name and identify their duties.
    - 3.3.2.1. The **Rope Access Program Administrator** shall assess the individual team member's suitability for the work to be performed.
  - 3.3.3. List the rope access equipment to be used for the work to be performed.
  - 3.3.4. List the hazards associated with the work to be performed and actions to be taken to mitigate the hazards.
  - 3.3.5. List appropriate personal protective equipment (PPE) to be used.
  - 3.3.6. List provisions for providing security to the **anchor** location.
  - 3.3.7. List public safety provisions.
  - 3.3.8. Describe the accident response plan and list the outside **rescue service** and the procedure for contacting
- 3.4. Before starting a particular job, the **employer** shall carefully assess the work to be undertaken and ensure that all the potential hazards are identified. A site survey is required to determine the means of access, risks to people other than the rope access technicians and the nature of the working environment.
  - 3.4.1. From this assessment, **employers** can then prepare a suitable **access work plan**, with necessary separate **access work plans** being prepared for each particular aspect of the job.
- 3.5. This statement should set out the general principles and working procedures for each particular situation which are to be followed by their rope access technicians and by independent contractors used.
  - 3.5.1. In many cases where types of jobs are similar, sections of the **access work plan** could be identical and might therefore be in the form of a general document.
- 3.6. Before starting work, the **Rope Access Supervisor** shall complete a **job safety analysis**. In particular, attention shall be given to the following aspects:
  - 3.6.1. Ability of the rope access technician to safely use materials, equipment or tools necessary for the work and whether the reaction from any equipment or tool may place the person at risk.

- 3.6.2. Whether the work may loosen material which could become a hazard to the rope access technician or other persons.
  - 3.6.3. Whether the time required for the work at any one location will be such that there may be unacceptable levels of risk.
  - 3.6.4. Whether it would be possible to quickly rescue rope access technicians from any position they could be expected to enter.
- 3.7. Rope access technicians permitting, planning, supervising, and carrying out the work should ensure that the following safety objectives are met:
- 3.7.1. The primary objective is to organize, plan, and manage rope access work so that there will be an adequate safety margin to minimize any risks.
  - 3.7.2. Where the work site contains additional hazards, then the training, ability, experience, competence, and size of the work team should be of a level that is suitable to deal with any emergency arising out of the work.
  - 3.7.3. In circumstances where wet synthetic ropes may become a tracking path for electrical discharges, suitable precautions should be taken.
  - 3.7.4. Except where work is laid out to allow horizontal traversing, work shall be planned such that rope access technicians can descend vertically, with the minimum amount of pendulum to minimize the risk of chafing the rope or overloading the rope or *anchors*.
  - 3.7.5. Work should start from properly protected safe areas or areas made safe by the installation of temporary barriers or scaffolding. Such areas should also have a safe means of access.
  - 3.7.6. *Anchors* should have *safety factors* that meet or exceed those required for the ropes.
    - 3.7.6.1. The attachment to the *anchorage* should at least equal the strength of the system attached to it.
    - 3.7.6.2. Re-direction of a rope from an *anchor* should not exceed 120 degrees unless the side loads produced at the redirection point are considered. Similarly, where the included angle at the attachment is high and produces a 'multiplier' effect, the extra forces produced should be considered.
  - 3.7.7. All rope access technicians should be properly supervised and self-supporting.
  - 3.7.8. Work teams should consist of at least the minimum number of members required to ensure that should anyone require help they can quickly perform a rescue.
    - 3.7.8.1. To meet the above requirement, a work team should consist of at least two members.
    - 3.7.8.2. One member of the work team should be qualified as a *Rope Access Supervisor* or *Rope Access Lead Technician*.
    - 3.7.8.3. The *Rope Access Supervisor* should ensure that the provisions for rescue are adequate.
    - 3.7.8.4. Sufficient personnel should be readily available to provide assistance in the event of an emergency.
- 3.8. The *Rope Access Supervisor* shall ensure that *anchors* have been evaluated in order to ensure that overall system safety is adequate.
- 3.8.1. Properly planned *anchorages* should be used.
    - 3.8.1.1. In some cases, *anchorages* must be installed prior to use. In such cases, a qualified person with experience in rope access anchoring systems should design an *anchor* point to be installed.
    - 3.8.1.2. In other cases, there will be a need to devise an *anchor* point from existing structures. Possible appropriate *anchor* points include but are not limited to steel members, I-beams, suitable trees of good size and mass, large boulders, heavy equipment and specially designed *anchor* points.

- 3.9. Each rope access technician shall use a **fall arrest** system meeting the fall protection regulations or standards of the jurisdiction or country of the work; such as ANSI/ASSE, CSA or EN/CE.
- 3.9.1. **Safety, secondary or backup line(s)** or other appropriate **belay** devices shall be used in addition to the **main line** unless the **employer** can demonstrate that the second line or other **belay** devices would create a greater hazard or otherwise would not be feasible.
- 3.9.1.1. In planning to meet these objectives, it should be noted that experience has shown significant safety benefits may be obtained if the system of work always includes the provision of at least one alternative means of support to prevent a person from falling. This means that should any one item fail within the suspension system, there will be an adequate back-up to prevent a catastrophic accident.
- 3.9.1.2. However, in some situations such additional measures may cause greater hazard than they mitigate. These situations should be thoroughly documented in the **access work plan**.
- 3.9.2. The **safety line** used for **fall arrest** should have its own separate **anchor** and should be separately fixed to the rope access technician's harness. This does not preclude both lines being attached to a single harness attachment point.

#### 4. Duties and Responsibilities of the Employer

- 4.1. The **employer** shall develop and implement a policy statement that provides general goals and guidance for a rope access program that emphasizes management's commitment to providing a safe workplace for personnel engaged in rope access work.
- 4.2. The **employer** shall provide the resources that are necessary for the development, implementation and operation of their rope access program.
- 4.3. The **employer** shall appoint a **Rope Access Program Administrator** who meets the requirements of this standard, and who has the authority to manage and direct the **employer's** rope access program.
- 4.4. The **employer** shall develop and maintain written rope access and rescue procedures for every location where its rope access technicians use rope access.
- 4.5. The **employer** shall ensure that rope access technicians are informed of foreseeable hazards that they may encounter during the performance of their duties.
- 4.6. The **employer** shall ensure that all rope access technicians have the knowledge and training necessary to safely perform the rope access work to which they are assigned.
- 4.7. The **employer** shall ensure that all rope access technicians assigned to supervise or otherwise manage other rope access technicians on the work site are capable in terms of knowledge, training and experience to provide such oversight.
- 4.8. Employee selection and capabilities
- 4.8.1. The **employer** shall verify prior rope access training and/or experience.
- 4.8.1.1. To assess whether a person is capable of performing this type of work requires detailed consideration of their previous experience. The **employer** should verify prior rope access training experience.
- 4.8.1.1.1. Other suitable experience could include mountaineering, caving and working at heights using other means of access. Experience with the fire service or military forces may also be relevant if a person has been regularly engaged in the use of methods that involve being exposed at heights.
- 4.8.1.2. Where practicable, references should be obtained to verify claimed experience and levels of competence.



- 4.8.1.3. The **employer** will be assisted in their verification and monitoring of a rope access technician's experience when their rope access technicians or applicants have a personal record log showing the training received and describing their work experience.
- 4.8.2. The **employer** shall determine that rope access technicians are sufficiently physically capable and free from any impairment that may prevent them from working safely. Rope access technicians should have a medical examination before employment in rope access work and at regular intervals.
- 4.8.3. The **employer** shall use certified **Level I Technicians (Rope Access Workers)** who have the appropriate training for the assigned tasks and/or **Level II Technicians (Rope Access Lead Technicians)** or a **Level III Technician (Rope Access Supervisor)** to conduct all work *on-rope*.
- 4.8.4. The **employer** shall use a **Level II Technician (Rope Access Lead Technician)** or a **Level III Technician (Rope Access Supervisor)** for system setup and system safety checks.
- 4.8.5. The **employer** shall provide for periodic re-assessment, recurrency training, and re-certification of the **employer's** rope access technicians.
  - 4.8.5.1. **Employers** must ensure that employees maintain their level of ability. Refresher training should be provided for rope access technicians who have not been continuously engaged in this work.
  - 4.8.5.2. Due to the aptitude and mental conditioning necessary for working at height, rope access technicians who have not been engaged in rope access work for six months or more should attend a suitable refresher course before being allowed to work in this manner. This may be either a refresher course or a full course at the appropriate level.
- 4.8.6. People chosen for the work should have a suitable attitude for working at height. To work safely at height requires those engaged in the work to have special characteristics.
  - 4.8.6.1. Prospective rope access technicians should have both aptitude and attitude that would not result in panic, cause them to make mistakes in a crisis, or work in a reckless or undisciplined manner. Aptitude and attitude may vary according to height and environment of work to be performed.
  - 4.8.6.2. Frequently those who work at height will be remote or out of sight from their **Rope Access Supervisor**. It is, therefore, especially important that the rope access technicians can be always relied upon to behave in a sensible and responsible manner.
  - 4.8.6.3. As part of their duties to maintain a safe place of work, the **employer** should control any tendency of rope access technicians to work in an undisciplined manner by recording this in their personal log books. An amending note canceling any adverse comments would not then be made until the **employer** is completely satisfied that there would be no recurrence.

## 5. Duties and Responsibilities of the Rope Access Program Administrator

- 5.1. A **Rope Access Program Administrator** is responsible for the development, implementation, monitoring, review, and revision of the **employer's** rope access program, and has overall responsibility for the program.
  - 5.1.1. The **Rope Access Program Administrator** will be responsible for setting up the **employer's** rope access program and developing or approving the **access work plan**.
  - 5.1.2. At minimum, the administrator should have the knowledge and experience of a **Level III Technician (Rope Access Supervisor)** if not a certified **Level III Technician**.
  - 5.1.3. The administrator should also be knowledgeable about and experienced in supervising fall protection programs and in particular fall protection systems for rope access work.
- 5.2. The **Rope Access Program Administrator** shall:

- 5.2.1. Recognize the limitations of the rope access technicians (in terms of training, qualifications, experience, and expertise) to perform rope access work, and ensure that no work is undertaken that exceeds those limitations.
- 5.2.2. Have a working knowledge of current applicable federal, state and local regulations that apply to rope access and working at height, directly or indirectly, and ensure implementation of all such requirements.
- 5.2.3. Establish and implement procedures for ensuring and verifying that all rope access technicians have the necessary training, skills, and experience for each rope access project to which they are assigned, according to their duties and responsibilities as outlined in this standard.
- 5.2.4. Establish and implement procedures for ensuring that all hazards to which rope access technicians may potentially be exposed on a rope access project are identified, and controlled or eliminated, prior to the commencement of the rope access project.
- 5.2.5. Ensure that all rope access projects are appropriately supervised.
  - 5.2.5.1. Appropriate supervision may not always require a **Rope Access Program Administrator** or **Rope Access Supervisor** to be on-site. Depending on the nature of the work and the qualifications of the rope access technicians, the on-site **Rope Access Supervisor** may not be required if it can be shown that the safety of the rope access technicians has not been decreased.
- 5.2.6. Ensure that the procurement, inspection, tracking, and replacement of equipment used for rope access projects is performed by a person (or persons) with the appropriate knowledge, training and experience to perform the assigned task as it relates to the **employer's** operations.
- 5.2.7. Ensure communication and coordination with clients and their safety representatives regarding rope access safety and rescue procedures.
- 5.2.8. Provide, or verify that rope access technicians are provided with all appropriate rope access, rescue and personal protective equipment for each rope access project.
- 5.2.9. Ensure that procedures are in place for establishing and marking work zones, and for keeping other persons and the public out of affected work areas.
- 5.2.10. Ensure that procedures are consistent with all applicable regulatory requirements and standards related to the work environment, and that such requirements are followed by all rope access technicians.
- 5.2.11. Establish and implement procedures for ensuring that all required planning and documentation, including work permits, **job safety analyses**, and rescue plans are completed prior to the commencement of rope access projects, and that all affected persons are appropriately briefed.
- 5.2.12. Verify that rope access technicians maintain all necessary training and certifications.
- 5.2.13. Ensure that rope access technician rope access and training hours are recorded properly.
- 5.2.14. Provide, or verify provision of, all rope access technician training required to meet the provisions of this standard and of the **employer's** rope access program.
- 5.2.15. Participate in the investigation of all incidents related to injuries or near misses involving rope access technicians during rope access work or training, either personally or through a qualified individual designated to investigate the incident(s), and taking necessary corrective action to eliminate the causes of such incidents.
- 5.2.16. Perform any other duties and responsibilities that are necessary for the development, implementation, and maintenance of a safe and effective rope access program, given the particular nature of the **employer's** operations and the environment in which rope access work is to be performed.

## 6. Duties and Responsibilities of the Level III Technician (Rope Access Supervisor)

- 6.1. A **Rope Access Supervisor** shall have overall responsibility for the rope access work site and the rope access technicians assigned to that work site.
- 6.2. To the extent that other qualified rope access technicians are assigned a duty or responsibility that is also designated as a duty or responsibility of the **Rope Access Supervisor**, the **Rope Access Supervisor** shall retain primary responsibility to ensure and/or verify that the assigned task is accomplished.
- 6.3. Where appropriate, the **Rope Access Supervisor** may also perform duties and responsibilities of the **Rope Access Lead Technician** and the **Rope Access Worker**, to the extent that it does not prevent the effective performance of the **Rope Access Supervisor's** duties and responsibilities required by this section.
- 6.4. The **Rope Access Supervisor** shall have the authority to stop the work immediately if it is unsafe to proceed.
- 6.5. The **Rope Access Supervisor** shall:
  - 6.5.1. Be responsible for the immediate supervision, implementation, and oversight of the rope access program at the work site.
  - 6.5.2. Have sufficient knowledge of current regulations that apply, directly or indirectly, to rope access and working at height, so as to ensure compliance by the rope access technicians being supervised.
  - 6.5.3. Direct the efforts of other rope access technicians to ensure safety and compliance with the rope access program.
  - 6.5.4. Communicate and coordinate with clients and their safety representatives, and other contractors on the work site where appropriate, regarding rope access safety and *rescue* procedures.
  - 6.5.5. Identify all hazards to which rope access technicians may potentially be exposed on a rope access project, specify the means by which such hazards are to be controlled or eliminated prior to the commencement of work, and ensure that such elimination or control has been accomplished.
  - 6.5.6. Specify the appropriate personal protective equipment (PPE) to be used by rope access technicians, ensure rope access technicians are properly trained in the use of such PPE in the rope access environment, and ensure rope access technicians use the PPE as required.
  - 6.5.7. Identify work zones, ensure that these zones are marked appropriately, and verify that adequate measures are taken to keep other personnel and the public out of any affected areas.
  - 6.5.8. Complete all required planning and documentation, including work permits, **job safety analyses**, and rescue plans as directed by the **Rope Access Program Administrator** prior to the commencement of rope access projects.
  - 6.5.9. Review all procedures prior to the commencement of work and as work site activities change to determine if additional practices, procedures, or training is needed in order to commence or continue work.
  - 6.5.10. Conduct job site safety meetings with all affected persons regarding applicable work permits, **job safety analyses**, **rescue** plans, or any other relevant information prior to commencement of the work.
  - 6.5.11. Specify the appropriate rope access equipment, systems and system components, and supervise their installation, use, and inspection.
  - 6.5.12. Verify that the necessary emergency services are available, including emergency medical services and ancillary **rescue services** (when applicable), and that the means to summon them are functioning.
  - 6.5.13. The **Rope Access Supervisor** is responsible for on-site **rescue** of **on-rope** persons. The **Rope Access Supervisor** shall:
    - 6.5.13.1. Ensure that a prompt **rescue** of **on-rope persons** can be accomplished.

- 6.5.13.2. Manage or perform any *rescue* that may be required during the work.
- 6.5.13.3. Specify appropriate *rescue* procedures.
- 6.5.13.4. Perform or manage initial emergency care within the scope of the *Rope Access Supervisor's* training.
- 6.5.14. Remove from service any rope access equipment or other equipment (such as tools) that are used during rope access work that is damaged or has potentially sustained damage (such as from a significant shock load), until such time that it can be established that such equipment is safe for use.
- 6.5.15. Ensure that all equipment on the work site is protected from damage and is maintained in a safe condition throughout the work.
- 6.5.16. Document and validate rope access technician rope access hours in the manner prescribed by the *Rope Access Program Administrator*.
- 6.5.17. Perform any other duties designated in the *employer's* rope access program or identified by the *Rope Access Program Administrator*. Such duties remain within that *Rope Access Supervisor's* training, skills, experience and qualifications for conducting safe rope access operations and maintaining a safe rope access work site.
- 6.6. Where it is determined that the use of ancillary *rescue* capability is required in the event *rescue* is needed during *rope access* operations, the *Rope Access Supervisor* shall coordinate with the provider of the ancillary *rescue* capability as required in the *rescue* section of this document.

## 7. Duties and Responsibilities of the Level II Technician (Rope Access Lead Technician)

- 7.1. A *Rope Access Lead Technician* shall have the appropriate training, experience, and qualifications to perform all *rope access* work, rigging and, at a minimum, standard *rescue* procedures under the direction of a *Rope Access Supervisor*.
- 7.2. A *Rope Access Lead Technician* may perform limited supervision over *Rope Access Workers* and other *Rope Access Lead Technicians* under the immediate direction of a *Rope Access Supervisor*. Such supervisory responsibilities may only be delegated to the *Rope Access Lead Technician* after:
  - 7.2.1. The *Rope Access Supervisor* determines that the *Rope Access Lead Technician* is capable of providing limited supervision given the circumstances of the rope access work being performed; and
  - 7.2.2. The *Rope Access Supervisor* determines that the *Rope Access Lead Technician* is prepared to handle all work variables and potential rescue requirements.
- 7.3. The *Rope Access Lead Technician* shall:
  - 7.3.1. Adjust, inspect, maintain, properly use, care for, and store all rope access equipment necessary to perform the rope access work.
  - 7.3.2. Utilize appropriate personal protective equipment as directed by the *Rope Access Supervisor* and the *employer's* rope access program.
  - 7.3.3. Recognize work site hazards, take corrective measures to eliminate or control those hazards, and notify the *Rope Access Supervisor* of all such hazards and the corrective measures taken.
  - 7.3.4. Be capable of identifying work zones such as the *access zone* and *hazard zone*.
  - 7.3.5. Understand and follow the requirements of all applicable work permits and *job safety analyses*.
  - 7.3.6. Have a working knowledge and understanding of the *employer's* rope access program and all applicable policy and procedures.
  - 7.3.7. Follow the *Rope Access Supervisor's* directions regarding the work to be performed.

- 7.3.8. Notify the **Rope Access Supervisor** if assigned a task or responsibility beyond the **Rope Access Lead Technician's** training, skills, qualifications, or experience.
- 7.3.9. Understand and communicate any written and verbal warnings.
- 7.3.10. Construct, inspect, and analyze safe rope access systems.
- 7.3.11. Perform standard rescue procedures used by the **employer** for the specific work environment.
- 7.3.12. Perform any other duties designated in the **employer's** rope access program or identified by the **Rope Access Program Administrator** or **Supervisor**. Such duties must remain within that **Rope Access Lead Technician's** training, skills, experience and qualifications for conducting safe rope access operations and maintaining a safe rope access work site.
- 7.3.13. The **Rope Access Lead Technician** shall have the authority to stop the work immediately if it is unsafe to proceed.

## 8. Duties and Responsibilities of the Level I Technician (Rope Access Worker)

- 8.1. The **Rope Access Worker** shall have the appropriate training and qualifications for conducting standard rope access operations under the direct supervision of a **Rope Access Supervisor** or **Rope Access Lead Technician** and, at a minimum, limited **rescue** from rope access systems.
- 8.2. The **Rope Access Worker shall:**
  - 8.2.1. Have a working understanding of the **employer's** rope access program and all applicable policy and procedures.
  - 8.2.2. Inspect, maintain, care for, and store personal rope access equipment.
  - 8.2.3. Inspect and verify the integrity of **anchor** systems and components.
  - 8.2.4. Recognize work site hazards and notify the **Rope Access Supervisor** of any such hazards.
  - 8.2.5. Be capable of identifying work zones such as the **access zone** and the **hazard zone**.
  - 8.2.6. Understand applicable work permits and **job safety analyses**.
  - 8.2.7. Understand and communicate any written or verbal warnings.
  - 8.2.8. Be familiar with **rescue** procedures and systems used by the **employer**, and assist in the performance of **rescue** from rope access systems.
  - 8.2.9. Utilize appropriate personal protective equipment as designated by the **Rope Access Supervisor**.
  - 8.2.10. Follow the **Rope Access Supervisor's** or, where appropriate pursuant to the requirements of this standard, the **Rope Access Lead Technician's** directions regarding the work to be performed.
  - 8.2.11. Notify the **Rope Access Supervisor** if assigned a task or responsibility beyond the **Rope Access Worker's** training, skills, qualifications, or experience.
  - 8.2.12. Perform any other duties designated in the **employer's** rope access program or identified by the **Rope Access Administrator** or **Rope Access Supervisor**. Such duties remain within that **Rope Access Worker's** training, skills, experience and qualifications, for conducting safe rope access operations and maintaining a safe rope access work site.
  - 8.2.13. The **Rope Access Worker** shall have the authority to stop the work immediately if it is unsafe to proceed.

## 9. Authorized Worker

- 9.1. Section Held for Authorized Worker

## 10. Rope Access Equipment

### 10.1. General:

- 10.1.1. Components used in any system shall be compatible.
- 10.1.2. Rope access devices shall be constructed so that inadvertent detachment or removal from the rope is not possible when the device is used in accordance with the manufacturer's instructions.
- 10.1.3. All equipment shall minimize damage to the rope under normal use.
- 10.1.4. Equipment shall be functional in the environment in which it is used.

### 10.2. Standards:

- 10.2.1. Rope access equipment should conform to standards relevant to the intended use. Seek guidance from the manufacturer of the equipment if there is any doubt about whether or not a particular standard is relevant to the intended use.
- 10.2.2. Rope access equipment should satisfy the legal requirements in effect at the location of the work.
- 10.2.3. If rope access is not directly regulated by an authority having jurisdiction at the location of the work, the rope access equipment should meet one or more of the relevant equipment standards established by an international, regional or national body such as those listed for each component.
  - 10.2.3.1. Testing methods for rope access equipment are beyond the scope of this document.
  - 10.2.3.2. Appropriate standards for each piece of equipment must be used to test for appropriate requirements such as a component's *minimum breaking strength*.
  - 10.2.3.3. There are many possible appropriate standards. Each one may differ in its test methodology, weight range of the worker, and pass/fail requirements.
  - 10.2.3.4. The most commonly used standards are listed for each piece of equipment.
  - 10.2.3.5. Typical strength requirements may be listed for each piece of equipment to be used as a reference.
  - 10.2.3.6. The most critical element is to ensure that the equipment being used is appropriate for the job at hand.

### 10.3. Certification:

- 10.3.1. All equipment shall be manufactured under an ISO 9001 or similar quality management program.

### 10.4. Care and Inspection of Equipment:

- 10.4.1. Equipment shall be inspected and maintained according to manufacturer's specifications.
- 10.4.2. The **Rope Access Program Administrator** shall establish and monitor an equipment inspection and maintenance program to ensure that:
  - 10.4.2.1. Equipment inspection history can be traced from purchase to retirement.
  - 10.4.2.2. Equipment is stored according to manufacturer's instructions.
  - 10.4.2.3. Equipment is retired in adherence to manufacturer's criteria.
- 10.4.3. Rope access technicians shall perform a functional and visual check before each use to confirm equipment serviceability.
- 10.4.4. Rope access technicians shall ensure that equipment is properly stored.
- 10.4.5. Records listing all equipment issued, referring to the original test or certificates of conformity should be kept.

10.4.5.1. In some cases it will be helpful if they also have relevant comments noting where the equipment was used, its storage conditions, and any incidents which could affect its life (e.g. unusual loadings, use in chemical or gritty atmosphere, exposure to salt-air, etc.).

10.4.5.2. The records should note when each piece of equipment was inspected, by whom and any remarks concerning its condition at that time.

#### 10.5. Backup System:

10.5.1. Requirements. The backup system shall:

10.5.1.1. Conform to 10.1 General.

10.5.1.2. Be maintained in a position as high as practical.

10.5.1.3. Be compatible with rope type and diameter.

10.5.2. Recommended selection criteria. The backup system should:

10.5.2.1. Have a rating for rescue loads.

10.5.3. The minimum strength of the backup system is based on the arrest force on the user.

10.5.3.1. Recent testing has shown that the maximum arrest force may not be adequate in determining a safe arrest force on the user.

10.5.3.2. The average arrest force should also be taken into account and may be more important to the user's safety than maximum arrest force.

10.5.3.3. ANSI/ASSE Z359.15 defines the maximum arrest force to not exceed 8 kN (1,800 lbf) and the average arrest force to not exceed 4 kN (900 lbf).

10.5.3.4. CE EN 12841 (Type A) only requires the maximum braking force (maximum arrest force), as measured during the braking period to not exceed 6 kN (1,350 lbf).

10.5.4. The length of the lanyard is not specified since other factors of the backup system will restrict the length.

10.5.4.1. Factors include the free fall distance, how the backup system is used, and how the backup system is tested (e.g. an appropriate standard).

10.5.4.2. The free fall distance refers to the distance fallen before the engagement of the backup device.

10.5.4.3. Free fall distance does not include the distance fallen during deceleration (e.g. sliding of the backup device or deployment of a shock absorber).

10.5.4.4. The distance fallen during deceleration should be covered in appropriate standards with specific information for each device located in the manufacturer's instructions.

10.5.4.5. In practice, clearance requirements must be determined from the total fall distance including free fall, deceleration of the backup device, rope stretch, and harness stretch.

10.5.5. Examples of appropriate standards in accordance with 10.2.3 include:

ANSI/ASSE Z359.15 (not tested for two-person load).

CSA Z259.2.5 (not tested for two-person load).

CE EN 353-2.

CE EN 12841, Type A.

#### 10.6. Harnesses:

10.6.1. Requirements. Harnesses shall:

10.6.1.1. Conform to 10.1 General.

10.6.1.2. Be of the full body type.

10.6.1.2.1. If a two-piece full body harness is used, it shall be certified as a full body harness.

10.6.2. Recommended selection criteria:

10.6.2.1. Most rope access harnesses will have three primary attachment points:

10.6.2.1.1. Sternal: Upper frontal attachment point typically used for connecting a backup device or backup device lanyard.

10.6.2.1.2. Ventral (Waist): Lower frontal attachment point typically used for connecting work positioning devices such as lanyards, *descenders*, and *ascenders*.

10.6.2.1.3. Dorsal: Backside attachment point located between the shoulder blades, typically used in *fall arrest*.

10.6.2.2. Leg loops should be of sufficient width and design to support the wearer in a comfortable and safe working position while allowing unhindered operation of other equipment and tools.

10.6.2.3. The harness should be compatible with a work seat.

10.6.3. Typically, the *minimum breaking strength* is 16 kN (3,600 lbf).

10.6.4. Examples of appropriate standards in accordance with 10.2.3 include:

ANSI/ASSE Z359.11.

CSA Z259.10.

CE EN 361.

ISO 10333-1.

NFPA 1983.

10.7. Connectors:

10.7.1. Requirements.

10.7.1.1. Connectors shall conform to 10.1 General.

10.7.1.2. *Carabiners* used to support human loads shall be of a locking type (e.g. screw-gate or auto-locking gate).

10.7.2. Recommended selection criteria (SECTION HELD):

10.7.3. Typically, the *minimum breaking strength* in the direction of loading is 22.2 kN (5,000 lbf).

10.7.4. Examples of appropriate standards in accordance with 10.2.3 include:

ANSI/ASSE Z359.12 (*self-locking* and self-closing types only).

CSA Z259.12.

CE EN 362 (screw links are Class Q).

ISO 10333-5 (*self-locking* and self-closing types only).

NFPA 1983.

10.8. *Descenders*:

10.8.1. Requirements. *Descenders* shall:

10.8.1.1. Conform to 10.1 General.

10.8.1.2. Allow for controlled descent and braking.

10.8.2. Recommended selection criteria. *Descenders* should:

10.8.2.1. Be appropriate for the length of the descent.



10.8.2.2. Enable the user to stop and work hands-free.

10.8.3. For long descents, consideration should be given to the effects of rope-weight and heat dissipation on **descender** performance.

10.8.4. Consideration should also be given to reducing cumulative twisting of the rope.

10.8.5. Examples of appropriate standards in accordance with 10.2.3 include:

CSA Z259.2.3.  
CE EN 12841, Type C.  
CE EN 341, Type A (rescue only).  
ISO 22159.  
NFPA 1983.

#### 10.9. **Ascenders:**

10.9.1. Requirements. **Ascenders** shall:

10.9.1.1. Conform to 10.1 General.

10.9.1.2. Require two or more deliberate actions by the user to be removed from the rope.

10.9.1.3. Not slip under normal use.

10.9.2. Recommended selection criteria. **Ascenders** should:

10.9.2.1. Be easily adjustable when moving up and down the **working line**.

10.9.2.2. Be suitable for specific use (e.g. mounted sternally).

10.9.2.3. Have attachment points for device lanyards and other devices.

10.9.3. Examples of appropriate standards in accordance with 10.2.3 include:

CE EN 12841, Type B.  
CE EN 567.  
NFPA 1983.

#### 10.10. Ropes:

10.10.1. Requirements. Ropes shall:

10.10.1.1. Conform to 10.1 General.

10.10.1.2. Be made from synthetic fibers.

10.10.1.2.1. Examples of synthetic fibers include nylon, polyester, and aramid fibers.

10.10.1.2.2. Consult with the manufacturer for the type and construction of ropes to be used in extreme environments.

10.10.2. Recommended Selection Criteria.

10.10.2.1. Life **safety ropes** should be selected which have an outer sheath that resists undue wear from edges and system components and tight enough to resist the ingress of dirt and grit.

10.10.2.2. Ropes should be **Static** or **Low Stretch**.

10.10.2.3. In special circumstances, **dynamic rope** may be appropriate to be used in place of static or **low stretch rope**. Dynamic **safety rope** should be of a kernmantle construction compliant with UIAA/CE (or comparable) standards for single climbing ropes.

10.10.3. Typically, 11 mm rope is used. The CI 1801 **minimum breaking strength** for 11 mm rope is 26.7 kN (6,000 lbf).

10.10.4. Examples of appropriate standards in accordance with 10.2.3 include:

CI 1801.  
ANSI Z359.15.  
CE EN 1891, Type A.  
NFPA 1983.

10.11. Lanyards:

10.11.1. Requirements.

10.11.1.1. Lanyards shall conform to 10.1 General.

10.11.1.2. If a lanyard is used as part of a backup system, the work positioning lanyard shall comply with 10.5 Backup System.

10.11.2. Recommended practices.

10.11.2.1. Lanyards (e.g. cows tails) should have sewn terminations or be terminated with an appropriate knot.

10.11.2.2. Lanyards should be as short as practical in order to minimize fall potential.

10.11.3. The same lanyard is often used for all work positioning lanyard cases.

10.11.3.1. For tied lanyards, data has shown that a barrel knot (sometimes referred to as a scaffold knot) is the preferred knot to use due to its energy absorbing properties. The knot may consist of either two or three wraps.

10.11.3.2. As part of the inspection process, knots should periodically be re-tied, dressed and set (e.g. hand-tightened).

10.11.4. For work positioning lanyards, typical *minimum breaking strength* is 17.5 kN (4,000 lbf).

10.11.4.1. If knots are used, the minimum strengths should be obtained after knots are tied.

10.11.4.2. Special care should be taken with high modulus fibers such as Spectra, Kevlar, Vectran and similar fibers with minimum elongation, which may fail when subjected to shock loading.

10.11.5. Examples of appropriate standards in accordance with 10.2.3 include:

CE EN354.  
CE EN358.  
CE EN89  
ISO 10333-2.

10.12. Helmets:

10.12.1. Requirements. Helmets shall:

10.12.1.1. Conform to 10.1 General.

10.12.1.2. Be suitable for the type of work being undertaken (e.g. electrical work).

10.12.1.3. Have a chinstrap or other retention system to prevent the helmet from coming off the head, whether the user is upright or inverted.

10.12.1.4. Properly fit the user.

10.12.2. Recommended selection criteria. Helmets should:

10.12.2.1. Allow unrestricted vision.

10.12.2.2. Have the ability to mount accessories such as a visor or headlamp.

10.12.3. Examples of appropriate standards in accordance with 10.2.3 include:

ANSI Z89.1, Type 1 or Type 2.  
CSA Z94.1.  
CE EN 397.  
CE EN 14052.  
CE EN 12492.

10.13. Pulleys.

10.13.1. Requirements. Pulleys shall:

10.13.1.1. Conform to 10.1 General.

10.13.2. Recommended selection criteria (SECTION HELD):

10.13.3. Examples of appropriate standards in accordance with 10.2.3 include:

CE EN 12278.  
NFPA 1983.

## 11. Access and Hazard Zones

### 11.1. Access Zone

11.1.1. An *access zone* shall be established.

11.1.2. *Anchorages* should normally be established outside the *access zone* so that the workers can don their harnesses and helmets and attach themselves to the *working line(s)* before entering into the *access zone*.

11.1.3. Appropriate fall protection measures shall be used by any personnel entering the *access Zone*.

11.1.3.1. Personnel in the *access zone* may require fall protection meeting the requirements of the jurisdiction or country of the work, such as ANSI/ASSE, CSA or EN/CE, during transition until the rope access *anchors* are established and personnel are *on-rope*.

### 11.2. Hazard Zone

11.2.1. A *hazard zone* shall be established and marked, blockaded or identified to warn rope access technicians and passers-by of hazards associated with the work being performed.

11.3. No one may enter the *hazard zone* unless they are wearing appropriate Personal Protective Equipment.

## 12. Communication Systems

12.1. An effective communications system shall be established prior to beginning work and should remain effective for all the time that work is actively taking place.

12.1.1. Hand or audible signals to be used for regular or emergency communications should be agreed upon and rehearsed before work begins.

12.2. Radio systems or hardline communications equipment should be used for communication purposes unless the area of work is such that all those involved are always visible to each other and within audible range.

## 13. Use of Suspended Work Platforms in Conjunction with Rope Access

13.1. A suspended temporary work platform should be utilized if the work is such that the rope access technician may become overtired or suffer restriction to their blood flow.

13.2. When such platforms are used in conjunction with rope access methods, the *anchorages* for the platform *should* be totally independent from *anchorages* used by rope access technicians as *main lines* or *safety lines*.

- 13.2.1. Alternatively, support could be provided for the rope access technician by a comfort seat or strap incorporated into the harness system. This should be fitted in a manner that it does not detract from the harness being the primary means of safety.

## 14. Tools and Work Equipment

- 14.1. All tools and equipment must be suitable for the work intended and compatible with rope access work. In particular, they shall not present a danger to the safe operation or integrity of the rope access system.
  - 14.1.1. Work using rope access techniques may be more exposed than most other work methods due to factors including the inability of the rope access technician to move from close proximity to the work itself and to any power source or tools being used. As a result, certain tools which can be used safely from the ground, platforms, or other work surfaces, could cause risks to the rope access technicians or their suspension equipment unless great care is taken.
- 14.2. Where the rope access technicians carry tools and equipment, appropriate steps shall be taken to prevent them being dropped or falling.
  - 14.2.1. Every effort must be made to prevent tools and equipment from being dropped. This effort may require lanyards or for small items, some other means for preventing items being dropped.
  - 14.2.2. Small tools may be securely attached to the worker's harness by lanyards, carried in a bucket or bag securely attached to the worker's harness or otherwise secured.
  - 14.2.3. **Safety factor** calculations always take into consideration the weight of tools and equipment.
- 14.3. All electrical equipment, plugs, sockets, couplers, leads, etc. should be suitable for the environment in which they will be used.
  - 14.3.1. In some cases, power leads might need to be adequately supported or secured at their upper suspension point to carry their own weight, or secured at intermediate points. Care should be taken to ensure that any such systems do not impair the rope access system or its backup.
- 14.4. Power tools weighing more than 10 kg should be fitted with a separate suspension system secured to an independent **anchorage**. **Anchorages** and suspension ropes used for equipment should be clearly identified to avoid confusion with those used to support persons.
- 14.5. Moving parts of tools should be kept clear of the operator, power leads, and the suspension equipment.
- 14.6. Appropriate grounding shall be provided for as necessary.
- 14.7. Any power tools that could cause injury to the users or access equipment shall be fitted with an automatic shut off switch that will interrupt the power and stop movement in the event of a mistake, accident, or emergency.

## 15. Rescue and Emergency Services

- 15.1. The **employer** shall have a rescue plan for every rope access work site or project. The plan shall provide for the prompt rescue and safe extrication of a sick, injured, or entangled rope access technician. The plan shall include the following provisions:
  - 15.1.1. The plan shall ensure that all persons conducting rope access work have been trained and are competent to perform self-rescue.
  - 15.1.2. The plan shall ensure that sufficient rope access technicians trained and competent in partner rescue are present and available to perform a rescue in a manner appropriate for the mechanism of injury or the patient's medical condition.
  - 15.1.3. The plan shall ensure that the **Rope Access Supervisor** is capable of managing a rescue incident and where appropriate, performing a rescue.

- 15.1.4. The plan shall include the information required to respond to the appropriate emergency services.
- 15.2. A rope access rescue plan recognizes that the best trained persons to perform the rescue of a sick, injured or entangled worker may be other rope access technicians. Fellow rope access technicians have the training and skills for work at height, have practiced rescue techniques *on-rope*, and are immediately on site. In most cases they can have the rope access technician at risk on the ground by the time the local emergency services arrive.
- 15.3. *Retrieval systems* or methods shall be available on-site whenever a rope access technician is *on-rope*, unless use of the *retrieval* equipment would increase the overall risk of the rope access work, or would not contribute to the rescue of the rope access technician.
- 15.4. *Retrieval* procedures using *retrieval systems* should be practiced at regular intervals and before the start of any work at situations that are unfamiliar to the work team.