

SAFE PRACTICES FOR ROPE ACCESS WORK



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SAFE PRACTICES FOR ROPE ACCESS WORK

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- 1 **SCOPE, PURPOSE, APPLICATION, EXCEPTIONS, AND INTERPRETATIONS**
 - 1.1 Scope

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.
 - 1.2 Purpose

The purpose of this document is to provide information and guidance on acceptable practices and procedures to protect employees from the hazards associated with rope access work methods when working at height. 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. This document contains requirements recommended for use by enforcement authorities in establishing regulations or codes on rope access work methods.
 - 1.3 Exceptions

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

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

2 DEFINITIONS

- 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.
- 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 climber 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.
- 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.
- 2.7 **Belay:** An active system operated by another employee for the purpose of arresting the fall of a rope access worker.
- 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.
- 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.
- 2.10 ***Descender:** A device that acts as a brake on a rope.

- 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.
- 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 the rope access worker.
- 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 workers.
- 2.26 **Retrieval:** Procedure for rescuing rope access workers 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 workers 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.
- 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

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 workers. All work plans shall include the necessary information for contacting the local emergency services.
 - 3.3 *A Rope Access Work Plan shall be completed before beginning rope access work. The Rope 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.
 - 3.3.3 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 work, the Rope Access Supervisor shall complete a Job Safety Analysis. In particular, attention shall be given to the following aspects.
 - 3.4.1 Ability of the suspended person 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.
 - 3.4.2 Whether the work may loosen material which could become a hazard to the worker or others.
 - 3.4.3 Whether the time required for the work at any one location will be such that there may be unacceptable levels of risk.
 - 3.4.4 Whether it would be possible to quickly rescue workers that are using rope access techniques from any position they could be expected to enter.
 - 3.5 *The Rope Access Supervisor shall ensure that anchors have been evaluated in order to ensure that overall system safety is adequate.
 - 3.6 Each rope access worker 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.
 - 3.6.1 *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.
 - 3.6.2 The safety line used for fall arrest should have its own separate anchor and should be separately fixed to the worker's harness. This does not preclude both lines being attached to a single harness attachment point.

4 DUTIES AND RESPONSIBILITY 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 employees use rope access.
- 4.5 The employer shall ensure that employees are informed of foreseeable hazards that they may encounter during the performance of their duties.
- 4.6 The employer shall ensure that all employees 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 personnel assigned to supervise or otherwise manage other personnel 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.
- 4.8.2 Employer shall determine that personnel are sufficiently physically capable and free from any impairment that may prevent them from working safely. Employees 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.

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.

5.2 The Rope Access Program Administrator shall:

5.2.1 Recognize the limitations of its personnel (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 employees 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 employees 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.

5.2.6 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 Rope Access 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 personnel 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 personnel 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 employees.

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 personnel are appropriately briefed.

5.2.12 Verify that rope access personnel maintain all necessary training and certifications.

5.2.13 Ensure that employee rope access and training hours are recorded properly.

5.2.14 Provide, or verify provision of, all employee 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 employees 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 personnel assigned to that work site.

6.2 To the extent that other qualified personnel 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 employees being supervised.

6.5.3 Direct the efforts of other 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 employees 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 employees, ensure employees are properly trained in the use of such PPE in the rope access environment, and ensure employees 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 personnel 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 personnel. The supervisor shall:
 - 6.5.13.1 Ensure that a prompt rescue of rope access personnel 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 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 employee 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 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 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 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 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 the Safe Practices Document, 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 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

Section Held For Authorized Worker

10 ROPE ACCESS EQUIPMENT

10.1 Components used in any system shall be compatible.

10.2 Any equipment chosen to support a person at height should be such that it cannot be accidentally removed, dislodged or become unfastened from the rope while a person is suspended from it.

10.3 *Harnesses

Harness performance and construction should comply with relevant, nationally recognized standards such as NFPA, UIAA, ANSI, ASTM.

10.4 *Carabiners

Carabiners and similar connectors with screw-gates or self-locking methods of closure are the only types that can provide the required level of security for this type of work. If used to clip onto steel cable, shackles or eye bolts, they should be constructed of steel or other suitably hard metals. Those that are to clip to any anchorage (e.g., hanger, eye bolts, or shackles) should be of such a design and size that they can rotate freely in them without hindrance and without loosening the anchorage. Minimum strength: 22 kN (5,000 lbs).

10.5 *Descenders

Descenders should give the user suitable control over the speed of descent and should not cause undue shock loads to the rope when braking. In addition they should not cause abrasion, plucking or stripping of the sheath under normal or expected use. They should be of a type that cannot become accidentally detached from the rope.

10.6 *Rope Grabs

Rope grabs should be of a type that will not slip at a static load below 2.25 kN (506 lbf). Rope grabs should be of a type that cannot be accidentally detached from the rope. Ascenders should be chosen so as to minimize the risk of damage to the rope when in use.

10.7 Ropes

10.7.1 *Ropes made from nylon or polyester will normally be the most suitable for

rope access work. Ropes of other man-made materials might, however, be useful in specific situations. In such cases, great caution should be exercised in verifying their suitability for the work.

10.7.2 *Static or Low Stretch Ropes shall normally be used for ascending and descending on rope. Static or Low Stretch Ropes shall be of a kernmantle construction compliant with Cordage Institute 1801 Low Stretch and Static Kernmantle Life Safety Rope, and have a minimum breaking strength sufficient to supply the users' desired calculated system safety factor. In no case shall the safety factor for a rope access system be less than 5:1.

10.7.3 Where a fall in excess of a factor .25 fall might occur, dynamic rope should normally 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.

10.8 Webbing.

Webbing used shall have a minimum breaking strength of at least 17.5 kN (4,000 lbs) when new. High modulus fibers such as Spectra, Kevlar, Vectran and similar fibers with minimum elongation may break when subjected to shock loading and shall not be used where a shock load may be applied.

10.9 *Certification.

It is recommended that only equipment that has a current certificate of the safe working load or minimum breaking strength, or other certification as to reliability, should be used. A check should be made that all certificates are backed by either sample testing to failure, or proof testing on individual

items, and a proven quality assurance program, in accordance with an appropriate standard. Equipment should be only used in the manner indicated by the manufacturer.

10.10 *Care and Inspection of Equipment

10.10.1 Employer shall demonstrate that all equipment is used, inspected and maintained in accordance with manufacturer's instructions. Provisions shall be made for the retirement of equipment as necessary.

10.10.2 Employer shall establish and monitor a procedure to ensure all items of equipment are inspected before each use.

10.10.3 Employer shall ensure that equipment is protected from damage during the course of its use.

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.

11.2 Hazard Zone

11.2.1 A Hazard Zone shall be established and marked, blockaded or identified to warn rope access personnel and passers-by of hazards associated with the work

being performed.

11.2.2 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.

12.2 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 anchors used by Rope Access technicians as main lines or safety lines.

13.3 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.
- 14.2 *Where the workers carry tools and equipment, appropriate steps shall be taken to prevent them being dropped or falling.
- 14.3 *All electrical equipment, plugs, sockets, couplers, leads, etc. should be suitable for the environment in which they will be used.
- 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 worker. 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 personnel 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 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 Retrieval systems or methods shall be available on-site whenever a rope access worker 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 worker.
- 15.3 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.

APPENDIX

- A2.1 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.
- A2.4.2 In general use a deviation anchor should not pull the rope system more than 15 degrees off of the vertical.
- A2.6 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 worker.
- A2.9 A locking carabiner may include the standard screw-gate or other style carabiner in which a positive action is required to lock the gate.
- A.2.9.3 May also be called auto-lock, quik-lok or some variation of those terms.
- A2.10 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.
- A2.16 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.
- A2.17 The component of the Access Work Plan which identifies hazards, the hazard mitigation methods and outlines requirements to promptly rescue the rope access worker 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.
- A2.27 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. Rope access may also include the use of aid climbing techniques.
- A2.28 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.
- A3.3 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 employees and the nature of the working environment. From this assessment, employers can then prepare a suitable work plan, with necessary separate work plans being prepared for each particular aspect of the job. This statement should set out the general principles and working procedures for each particular situation which are to be followed by their employees and by independent contractors used. In many cases where types of jobs are similar, sections of the rope access work plan could be identical and might therefore be in the form of a general document.

A3.3.2 The Rope Access Administrator shall assess the individual team member's suitability for the work to be performed.

A3.4 Personnel permitting, planning, supervising and carrying out the work should ensure that the safety objectives given in the following paragraphs are met.

- 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.
- 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.
- In circumstances where wet synthetic ropes may become a tracking path for electrical discharges, suitable precautions should be taken.
- Except where work is laid out to allow horizontal traversing, work shall be planned such that workers can descend vertically, with the minimum amount of pendulum to minimize the risk of chafing the rope or overloading the rope or anchors.
- 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.
- Anchors should have safety factors that meet or exceed those required for the ropes. The attachment to the anchorage should at least equal the strength of the system attached to it. 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.

- All rope access workers should be properly supervised and self-supporting. 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. To meet the above requirement, a work team should consist of at least two members. One member of the work team should be qualified as a Rope Access Supervisor or Lead Technician. The Rope Access Supervisor should ensure that the provisions for rescue are adequate. Sufficient personnel should be readily available to provide assistance in the event of an emergency.

A3.5 Properly planned anchorages should be used. 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. 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.

A3.6.1 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. However, in some situations such additional measures may cause greater hazard than they mitigate. These situations should be thoroughly documented in the Rope Access Work Plan.

A4.8 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. Prospective employees 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.

- 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 workers can be always relied upon to behave in a sensible and responsible manner.
- 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.
- 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. Where practicable, references should be obtained to verify claimed experience and levels of competence.

- The employer will be assisted in their verification and monitoring of a worker's experience when their workers or applicants have a personal record log showing the training received and describing their work experience.
- As part of their duties to maintain a safe place of work, the employer should control any tendency of employees 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.
- Employers must ensure that employees maintain their level of ability. Refresher training should be provided for workers who have not been continuously engaged in this work. Due to the aptitude and mental conditioning necessary for working at height, workers 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.

A5.1 The Rope Access Program Administrator will be responsible for setting up the employer's Rope Access Program and developing or approving the Rope Access Work Plan. 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. The administrator should also be knowledgeable about and experienced in supervising fall protection programs and in particular fall protection systems for rope access work.

A5.2.5 Appropriate supervision may not always require an administrator or supervisor to be on-site. Depending on the nature of the work and the qualifications of the workers, the on-site supervisor may not be required if it can be shown that the safety of the workers has not been decreased.

A10.3 Where the harness is to be used as the primary support, webbing on the 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.

A10.4 Strengths listed are for single person loads. Higher strengths may be required to achieve similar safety factors for two person or rescue loads.

A10.5 For long descents, consideration should be given to the effect of rope-weight on descender performance. Consideration should also be given to reducing cumulative twisting of the rope.

A10.6 Rope grabs may be used to ascend a rope or to attach the operator to a safety line. In the event of a failure of the main line or loss of control by the operator, rope grabs are intended to grip the safety rope without causing damage to the rope and also help absorb any shock load which may occur.

A10.7.1 Ropes made from high modulus

polyethylene, high tenacity polypropylene and “Kevlar” are types of ropes which may be considered in exceptional circumstances when the appropriate descent devices have been developed. These might be useful where there is severe chemical pollution or where the self weight of the ropes could be a problem. However, H.M. polyethylene and H.T. polypropylene have much lower melting temperatures than nylon or polyester and may be affected by frictional heat from the descenders. Dangerous softening of polypropylene occurs at temperatures as low as 27 degrees C (80 degrees F). Kevlar has a very high melting point but poor resistance to abrasion, UV light (including sunlight) and repeated bending.

A10.7.2 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. In most cases, this rope will be low stretch rope.

An example of calculating system safety factors is as follows: a 68 kg (150-pound) worker, to achieve a 5:1 safety factor, must work on a system where the weakest link of the system is calculated to be capable of sustaining at least 340 kg (750 pounds).

A10.9 Part of the permitting process for rope access work is the evaluation and determination of which standards apply to equipment being used for the type of work being done. Conventional “fall protection” equipment rated to ANSI A10.14 or Z359.1 may not be sufficient for rope access work due to different construction and performance requirements. Most equipment will meet a CE, ASTM, Cordage Institute or NFPA

standard. The most critical element is to ensure that the equipment being used is appropriate for the job at hand.

- A10.10 Records listing all equipment issued, referring to the original test or certificates of conformity should be kept. 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.). The records shall note when each piece of equipment was inspected, by whom and any remarks concerning its condition at that time.
- A11.1.3 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.
- A12.1 Hand or audible signals to be used for regular or emergency communications should be agreed upon and rehearsed before work begins.
- A14.1 Work using rope access techniques may be more exposed than most other work methods due to factors including the inability of the worker 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 worker or their suspension equipment unless great care is taken.

- A14.2 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. 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. Safety factor calculations always take into consideration the weight of tools and equipment.
- A14.3 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.
- A15.1 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 workers. Fellow workers 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 worker at risk on the ground by the time the local emergency services arrive.

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