

Safe Working Procedures

[PAT/SWP001 ~ 01/04/08]



CONTENTS

- 1.0 SCOPE
- 2.0 PROJECT PLANNING
- 3.0 SELECTION OF PERSONNEL AND TRAINING
- 4.0 SUPERVISION
- 5.0 COMPOSITION OF TEAMS
- 6.0 NON PAT Rope Access Services PERSONNEL
- 7.0 GATEMEN/SENTRIES/STANDBY/FIREWATCH
- 8.0 ROPE ACCESS EQUIPMENT
- 9.0 IDENTIFICATION AND INSPECTION OF ROPE ACCESS EQUIPMENT
- 10.0 ROPE ACCESS ANCHORS
- 11.0 ROPE SYSTEMS
- 12.0 ASCENDING AND DESCENDING
- 13.0 BACKUP
- 14.0 CLIMBING, AID CLIMBING AND TRANSVERSING
- 15.0 WORK POSITIONING AND FALL ARREST
- 16.0 SUSPENSION TRAUMA
- 17.0 ROPE ACCESS OPERATIONS – GENERAL ARRANGEMENTS
- 18.0 HAZARDOUS OPERATIONS
- 19.0 PROTECTIVE CLOTHING AND EQUIPMENT
- 20.0 RESPONSIBILITIES
- 21.0 REFERENCES AND RECORDS
- 22.0 APPENDICES

1.0 SCOPE

This procedure establishes the company's recommendations and guidance on the use of rope access methods. It interprets and corresponds to BS 7985:2002 "Code of Practice for the Use of Rope Access Methods for Industrial Purposes" and IRATA Guidelines. The procedure is applicable to situations where rope access methods are used in an industrial situation as the primary means of support, access or egress or as protection against a fall.

PAT Rope Access Services personnel are the only persons qualified to assess work-site conditions and comment on the suitability and safety for the use of rope access techniques. The decision of the PAT Rope Access Services Team Leader is final in all matters affecting the safety of rope access operations and the people affected by the work.

These procedures are principally designed to meet UK law and requirements. Variations may need to apply in the company's work in other countries and this should be addressed when required during project planning. Any adjustments must remain within IRATA Guidelines since PAT Rope Access Services (Offshore) Ltd is an IRATA member and obliged to follow its rules.

2.0 PROJECT PLANNING

Rope access techniques allow personnel to gain speedy access to difficult locations. The techniques can also allow access to locations that would have traditionally been associated with high or prohibitive costs or providing a method of approach. The economic advantage of rope access methods can be reduced in circumstances where prolonged and repeated work is required in one location; heavy or complex tools are needed or large quantities of materials require to be handled.

Work should be planned and organised to create an adequate margin of safety. Proposed work should be considered to make sure that it is appropriate for rope access and that a satisfactory standard of quality, workmanship and efficiency can be attained.

Attention should be paid to:

- How easily and safely personnel will be able to gain access to and egress from the worksite.
- How easily and safely personnel can be rescued from the worksite.
- How easily and safely personnel will be able to use tools and materials at the worksite.
- Whether reaction force from any tools, materials, plant etc could introduce unacceptable risks.
- Whether personnel at the worksite will be in danger from other operations (e.g. above).
- Whether personnel at the worksite could be in danger from falling objects or materials.
- Whether personnel at the worksite could be in danger from stored energy (e.g. parts moving suddenly when dismantling, rock becoming unstable on slopes etc).
- Whether personnel at the worksite could be at risk of unacceptable exposure times (e.g. weather, materials, noise, vibration).

The Team Leader must always assess the job risks prior to work commencing. Control measures must be introduced to reduce any foreseeable unacceptable hazards to a tolerable level. Formal methods of risk analysis may be advisable in some cases and in the UK are obligatory. The company has procedures to control formal risk assessment. The assessment should also take into consideration the feasibility of rescue methods [see WP0053 – Standard Rescue Methods and Procedures] and the need for additional methods, planning and possible practical trial rescue methods.

All operations require good job pre-planning to PAT Rope Access Services standards. Ideally the information for this is best gathered by conducting a site visit/survey but alternative sources (particularly for remote and overseas sites) include client information, photographs, drawings information from field technicians and experience of similar work. If some aspects are not fully defined, adequate excess equipment must be supplied and the Team Leader briefed to finalise details on site as appropriate.

Where appropriate, a method statement should be prepared describing each stage of the operation, the sequence of tasks, and the general approach that is to be taken. The method statement should also describe the safety requirements and principles for the project.

PAT Rope Access Services Project Engineers planning and coordinating operations shall do so in accordance with the relevant process control procedures contained in the company's management system. Team Leaders or Supervisors shall be briefed prior to commencement of the work and mobilisation to the site. Relevant information (e.g. briefing notes, risk assessments, method statements, scope of work, workpack, job specific procedures, drawings, requirements for communications and progress updates, administration etc) shall be provided to the Team Leader during the briefing and explained. The detail of the briefing and the information provided must be sufficient to give the Team Leader a clear and unambiguous understanding of what is required and allow this to be communicated by the Team Leader to the remainder of the team. The detail should also be sufficient to allow the Team Leader to communicate meaningfully with the client representative on site.

3.0 SELECTION of PERSONNEL and TRAINING

Personnel must be capable of competent and productive work at height and hold or develop appropriate attitude, skills, knowledge and experience relevant to rope access techniques. Personnel should be of a reliable, sensible, responsible character with good safety awareness. Rope access techniques require physical fitness and freedom from any disability that could prevent safe working. Suitable background and experience could include caving, mountaineering, military service, work at height, fire service etc.

Personnel must be selected using an interview process with an assessment or verification of their rope access skills carried out.

All PAT Rope Access Services personnel will receive formal tuition appropriate to their needs in accordance with PAT Rope Access Services's documented processes and the IRATA "General Requirements for Certification of Personnel Engaged in Industrial Rope Access Methods". Competency is regularly assessed and further training provided through periodic re-assessment of rope access skills. This currently occurs every three years. Alternative training and certification arrangements equivalent to IRATA General Requirements may be adopted provided they are at least equivalent.

Personnel who have not been engaged in rope access work for a period of 6 months or more are required to undertake a refresher course.

In general PAT Rope Access Services (Offshore) Limited Rope Access Personnel may be categorised as Trainee, Experienced or Senior technicians. Details are as follows:

Level 1: Trainee Technician

Trainee Technicians receive formal tuition in accordance with IRATA Level 1. The following criteria are assessed before Level 1 competency is awarded:

General:

- Knowledge of equipment strengths and safety factors and the back-up philosophy.
- Edge preparations, anchors, knots and rope protection.
- Care and examination of ropes, harnesses, hardware and other equipment.
- Static/dynamic loads, fall factors and belays.

Ascending/Descending:

- Correct use of ascenders, descenders and back-up.
- Simple ascent and descent and obstacle passing.
- Mid-rope transfer from descent to ascent and vice-versa.
- Rope transfer and re-belay techniques.

Additional Skills:

- Knotting.
- Artificial techniques and traversing.
- Safe use and understanding of aid equipment.
- Basic recovery methods.
- Legislation, guidelines and equipment standards.
- Worksite organisation.

After achieving the necessary level of competence, trainee technicians are required to work through an induction period during which time they are supervised by more experienced technicians. In order to ensure satisfactory progress the trainee is also subject to continuous assessment and instruction by experienced technicians on the job.

Level 2: Experienced Technician

Having successfully completed a minimum period of 12 months and at least 1000 logged hours of work experience that includes a wide variety of work situations and techniques; the Technician may be formally trained and assessed in accordance with IRATA Level 2. In addition to further development of the requirements covered at Level 1, competence is also required to be demonstrated through:

General:

- Equipment certification.
- Health and Safety Laws.
- Report writing.
- Worksite organisation.

Rope Work:

- Rigging of various rope and anchor systems.
- Pitch Head, Traverse and Tramway systems.
- Rescue systems.
- Lead climbing and traversing.

Having demonstrated competence at Level 2 the Technician shall be deemed to be self sufficient in Rope Access Techniques.

Level 3: Senior Technicians

Having successfully completed one year and 1000 hours of work experience involving a comprehensive variety of work situations and techniques at Level 2; the Technician can undertake further formal training and assessment in accordance with IRATA Level 3. In addition to all the material covered by Levels 1 and 2, the Senior Technician shall demonstrate competency in the following:

- All relevant legislation.
- Permit Systems (where applicable).
- Complicated rescue procedures.
- Equipment and personnel requirements.
- Hazard Analyses.
- Team briefing/organisation.
- Client liaison.

4.0 SUPERVISION

Activities at the worksite require to be supervised. The level of supervision should be appropriate to the work situation, number of personnel, tasks etc. The supervisor's role is to ensure that all the work is conducted safely and efficiently. The PAT Rope Access Services Team Leader is normally the person responsible for supervision at the work site.

On arrival at the work-site, Team Leaders must report to the designated Client Representative and ensure that the team complete all formalities such as registration with Site Managers, Offshore Installation Managers, Safety Officers, etc., as required. It is imperative that initial contact with the Client's Representative(s) conveys an image of professionalism on behalf of both PAT Rope Access Services and the Team Members. It is also important to maintain this level of professionalism throughout the duration of the work.

The Team Leader must apply for any necessary work permits in a timely manner. By doing so the Team shall be able to assess and prepare for the following day's workscope and commence work without delay. Hot work permits may be required in refineries and similar locations. All Work Permit conditions must be strictly adhered to. Specific attention must be given to those conditions relating to the use of specialised equipment such as electrical, pneumatic, welding or burning equipment. Vigilance must be maintained throughout.

Modified or additional specific risk assessments may have to be conducted for certain occasions and/or site conditions. These shall be conducted in accordance with PAT Rope Access Services (Offshore) Limited's Procedure Number SP0169 Risk Assessment and Toolbox Talks.

5.0 COMPOSITION OF TEAMS

Rope access operations shall be conducted by a minimum of two personnel. In all but the most unusual circumstances a minimum team of three personnel is usually required for work over water, remote working locations or situations where rescue and retrieval methods might be difficult.

In all cases the person responsible for supervising rope access operations shall be of IRATA Level 3 status or equivalent. Frequently this role is combined with that of the Team Leader or supervisor.

Inexperienced personnel within the team shall not exceed a ratio 1:1 with respect to experienced personnel. They shall be supervised under the Buddy System and restricted to duties commensurate with their experience. These exclude duties as a sole standby man who may be required to implement a recovery system with which he is not fully conversant.

6.0 NON PAT Rope Access Services PERSONNEL

Personnel with no rope access training or experience who are not employed by PAT Rope Access Services may be escorted to the work site if strictly necessary. A system should be arranged to enable this to be done safely (e.g. using staging devices, top ropes etc). The individual should be physically and mentally capable for the operation.

Appropriate authorisation is needed by PAT Rope Access Services management prior to the involvement with non-PAT Rope Access Services personnel. Special insurance implications and inter-company hold harmless agreements are often required for such activities.

7.0 GATEMEN/SENTRIES/STANDBY/FIREWATCH

It may sometimes be necessary to integrate non-PAT Rope Access Services personnel as part of, or in addition to, the rope access team. Usually the duties of such personnel are as Sentries, Standby or Gateman. The main responsibility of these personnel is to report normally via radio to a control point in the event of an incident or emergency. When these circumstances present themselves the Operations shall be conducted in accordance with the requirements of PAT Rope Access Services's Briefing Notes for Gatemen and Client Rep. Working alongside PAT Rope Access Services (Offshore) Limited Personnel (WP0039).

8.0 ROPE ACCESS EQUIPMENT

Rope

Two types of rope are in use by PAT Rope Access Services:

- Low Stretch Rope -10.5mm diameter, pre-stressed, nylon kernmantle "caving" rope for use in most descent/ascent work in accordance with BS EN 1891:1998, Type A.
- Dynamic Rope -11mm, 10.5mm or 9mm diameter nylon kernmantle rope for use in climbing traversing situations where there is a possibility of shock loading the system in accordance with BS EN 892:1997.

The nylon used in rope manufacture is highly resistant to chemical attack but ropes should not be allowed to come into contact with harmful substances. When not in use, they must not be left lying around and should be stored in containers or bags.

Harnesses

PAT Rope Access Services use a selection of types of sit harness and chest harnesses. Chest loops are also provided. Personnel should select an appropriate harness applicable to work methods that, when adjusted, supports them in a comfortable working position.

Cow's Tails (Lanyards)

Cow's tails are used to connect working and safety ropes to harnesses. They are of 11mm dynamic rope and have energy absorbing qualities.

Ascenders and Descenders

Petzl Jumars and Crolls are used as ascending devices. The Petzl "Stop" is the commonly used descending device. Alternatives such as a "rack" are sometimes more appropriate and training should be given for alternatives if necessary.

Karabiners & Maillons

Large and small screwgate karabiners are in use together with "D" shaped maillons. These items are all steel. Karabiners and Maillons must only be used with their screwgates fully closed. Steel screwgate karabiners or maillons must be used.

Anchor Slings

PAT Rope Access Services normally use 10mm diameter 1.0 metre steel wire anchor slings with soft-eyes at each end. Occasionally other types of anchor sling are used dependent on job specific requirements. Anchors used should be a minimum of 15kN. Slings made from textile webbing should have sewn joints or a specific tape knot and a rated strength of 22kN.

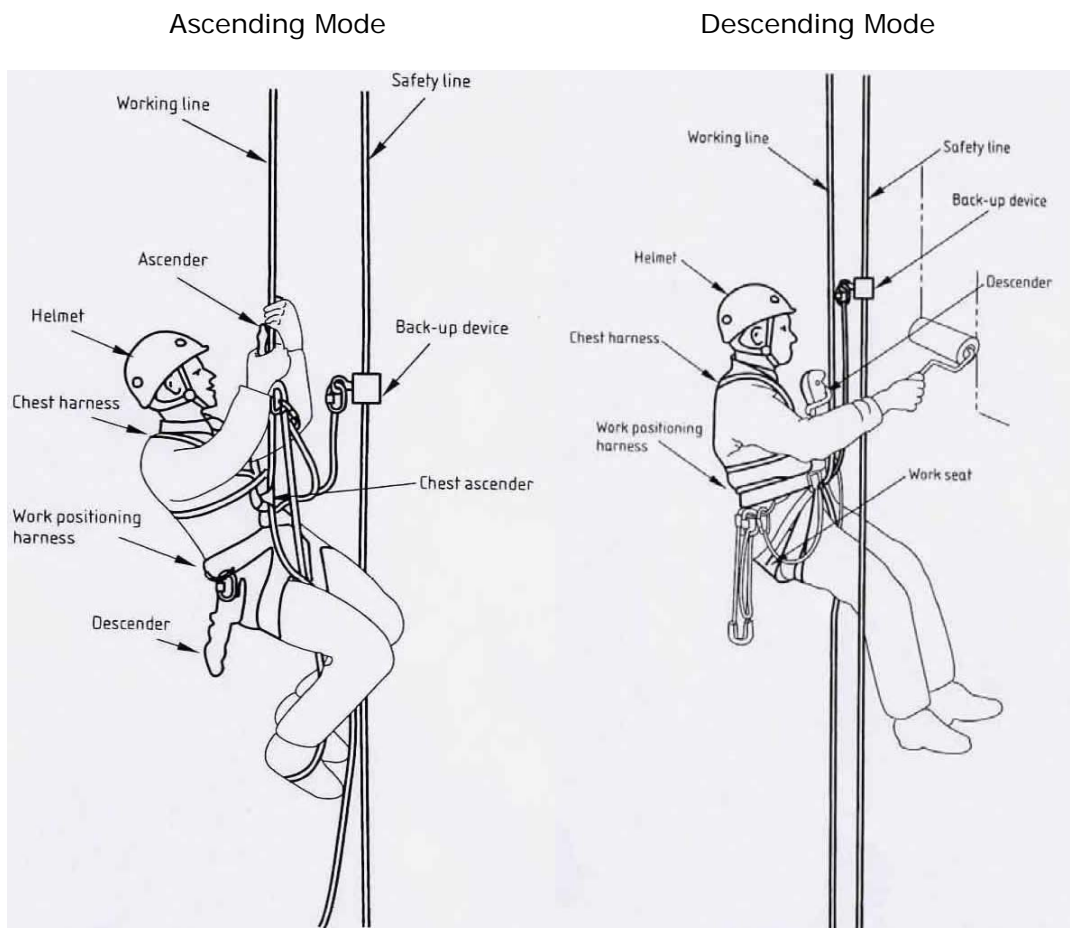
Backup Devices

The Petzl "Shunt" is used for backup.

PAT Rope Access Services Stage & PAT Rope Access Services Span

These are lightweight specifically developed temporary work platforms designed for use in conjunction with rope access techniques.

Typical Rope Access Equipment Set-up



9.0 IDENTIFICATION AND INSPECTION OF ROPE ACCESS EQUIPMENT

All critical items of PAT Rope Access Services rope access equipment are marked with a unique number that is traceable to inspection, certification and purchase records. A colour code is also used to indicate the inspection/certification period for equipment. Equipment that does not bear the current certification colour code must not be used.

All lifting equipment and rope access equipment owned by PAT Rope Access Services is certified, marked and identified in accordance with PAT Rope Access Services's procedures. The items are examined in accordance with the Lifting Operations and Lifting Equipment Regulations SI 2307, 1998 (LOLER). Specific items of rope access equipment are designated as Critical to Life Support and are identified as such on form MF0178 – Designated Critical Items of Access Equipment.

Equipment is inspected in several ways:

When In Use

Personnel are expected to inspect their personal equipment daily, paying particular attention to susceptible soft items such as the sit and chest harness and slings. All rope anchors and associated equipment must be checked regularly during the job for any signs of wear, contamination or damage. Daily checks are recommended. Any item suspected of being defective should not be used. Such items should be identified and segregated in accordance with PAT Rope Access Services's procedure for Control of Unserviceable Equipment in the Field (MP0013).

On return to PAT Rope Access Services's base; prior to shipping; formal bi-annual recertification

All Equipment is inspected in accordance with PAT Rope Access Services's documented management processes for:

MP0011 Equipment Inspection and Maintenance.

MP0014 Handling, Storage, Preservation and Transport of Equipment.

MP0008 Certification, Identification and Marking of Critical Access and NDT Equipment.

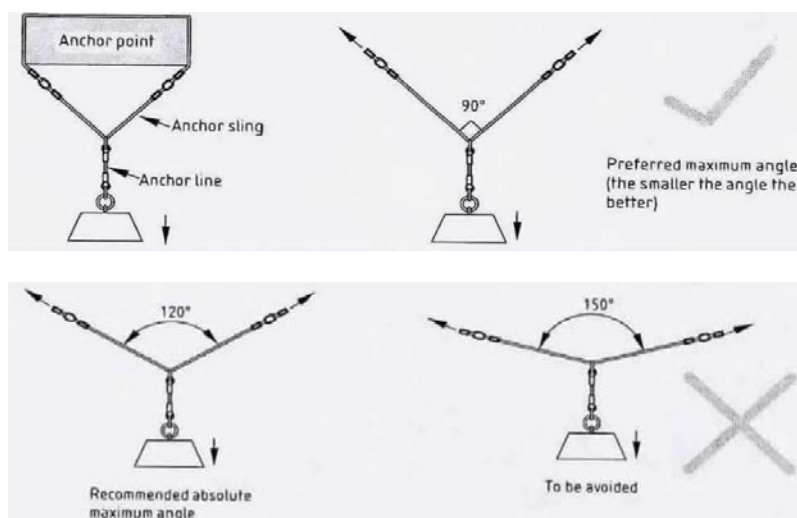
10.0 ROPE ACCESS ANCHORS

Anchors used for rope access systems should be of unquestionable strength and reliability. The following are samples of suitable primary anchor points.

- Large I beams or pipes. Heavy steel, or large wooden, beams in good condition and other substantial structural elements.
- Beam clamps or special brackets etc. that may be designed for specific applications and conform to the appropriate safety codes.
- Two separate 12mm diameter or thicker wire cables 'looped' round lift housings or other unquestionably substantial structures. The cables must be pulled tight by hand and each terminated with 6 bulldog clips of the appropriate size. Such anchors may be used for several personnel.
- Hilti Saferings or equivalent safety eyebolt system.
- 10mm diameter wire cable & rawlbolt or similar self-wedging bolt systems with Petzl type hangers. At least 3 for 2 ropes are used when in tension.
- Weights or water bags - with or without counterweighted roof rigs - all complying to BS 5974:1990. For deadweight systems account needs to be taken of any cantilever or friction effects (e.g. ice under the weight), and the possibility of any additional loading such as a rescue situation.
- Rock bolts, very large and secure trees, rock features etc., when working on cliff faces.
- Vehicles with handbrake applied, locked, keys removed and in possession of the team leader.
- Any item or feature whose weight or holding strength the Team Leader judges to be 100% reliable and unquestionably several times greater than that of the working rope(s) attached to it.

Rawlbolts and saferings must be placed well apart so that there is no possibility of the foundation material (concrete etc.) failing in the anchor area. Bolts used should comply with the requirements of BS EN 795:1996 and should be installed in accordance with the manufacturers instructions to maintain this compliance. New or unknown bolt installations should be tested to the requirements of BS EN 795:1996 and BS 7985:2002. The requirement is to confirm the soundness of each fixing by applying an axial pull-out test load of 6kN. The anchors should sustain the force for a minimum of 15 seconds. The test can be done using "Hydrajaws" or similar equipment and the test results should be noted including particulars sufficient to identify the anchors.

Bolts linked together to obtain the required anchor strength should be equally loaded. The angle formed by linking the anchors should be as low as possible and should generally not be more than 90°. The greater the angle beyond this, the weaker the connection will be. If circumstances require the need for an angle greater than 90°, the increased forces at the anchors and in the components of the system need to be taken into account.



Adequate precautions must be taken to ensure safe anchorage. These include avoiding or protecting sharp edges and preventing any angle or side loads which may multiply the load in the rope and components e.g. Tyrolean Traverse effects.

All anchor components should have a breaking strength equal to or greater than that of the working rope. Whenever feasible, personnel should have separate anchors but, where more than one person is using a common anchor point, the breaking strength of the anchor shall be equal to or greater than the combined strength of the working ropes attached to it. Aid slings, clips, handrails, etc., must not be used as main anchors. Anchor slings may be looped together or joined with a suitable connector such as a karabiner, which is at least equal in SWL or breaking strength to the sling.

SEPARATE ANCHORS MUST BE USED FOR MAIN AND BACKUP ROPES AND THEY MUST NOT BE ATTACHED TO GEAR BEING USED FOR LIFTING HEAVY OBJECTS OR SUPPORTING PAT Rope Access Services-STAGE OR PAT Rope Access Services-SPAN.

Each descending person must have each of their two ropes attached to separate anchor points. This is normally done using 10mm diameter wire slings together with large steel screwgate karabiners. It is acceptable to anchor the ropes to the same point if this point is clearly structurally sound and has a breaking strength unquestionably in excess of the strength of the working rope(s) attached. The consequence of any part of the anchor system failing must be considered carefully in order to avoid the risk of a pendulum swing or imposing a shock load onto the low stretch rope. Team Leaders must also ensure that there is no possibility of the anchor sling or similar attachment, slipping off.

All team members must be advised when anchors are de-rigged.

11.0 ROPE SYSTEMS

Two ropes are used, one working rope and one safety or back-up rope. The working rope is used to support personnel and the safety rope provides backup in the event of failure of the working rope. Generally, each rope should be attached to the anchor using a figure of eight (or nine) knot and a large steel screwgate karabiner. Wherever possible ropes must be rigged to avoid contact with sharp edges or hot surfaces. Rope protectors, edge rollers etc. are available and should be used if appropriate.

Abseil ropes should normally be just long enough to adequately cover the work area. Excess rope may allow wind or wave action to entangle it in projections, restricting the retrieval of the rope and complicating any emergency procedures. Excess rope should be coiled and hung up rather than left to lie on the ground.

Attachments between the ropes and the harness are via energy absorbing cowstails (lanyards) and connectors such as karabiners and maillons. Proprietary ascending and descending devices (Croll, Jumar and Stop) are used for ascent and descent on the working rope. Connection to the safety rope is made using the Shunt.

Free ends of ropes should be KNOTTED to prevent descent off the end of ropes into free space. To prevent impact with any potential "landing" site (e.g. in a careless, emergency or uncontrolled descent) a stopper knot, such as an "alpine butterfly" should be placed in the safety rope. The knot should be 2 to 5m above the landing after adding an allowance for stretch at 5% of the rope length. The Shunt should not be removed from the safety rope to pass the knot; it should be passed either by untying and retying; or placement of additional equipment to pass the knot so that the protection remains in place. Unless additional risk is created, further knots at intervals of approximately 30m can be included in the safety rope on longer abseils (e.g. over 100m).

12.0 ASCENDING AND DESCENDING

For ascending, personnel shall be attached to the working rope by the Croll and use the Jumar in conjunction with a foot-loop. This equipment allows ascent of the working line. For abseil descent, a "fail safe" fall arrester (descender), such as the Petzl Stop, must be used. This gives personnel suitable control over the speed of descent. Occasionally an alternative device such as a "Rack" could be more appropriate dependent on job-specific circumstances. Ascending and descending devices must be carried at all times.

13.0 BACKUP

Personnel must be attached to the back-up safety rope at all times with a device such as the Petzl Shunt. In the event of a failure of the working rope, or loss of control this device will lock on to the safety rope with out causing catastrophic damage and will limit and absorb shock loads. The Shunt must always be positioned on the safety rope so that any load will be taken in such a way that a fall is prevented or minimised.

14.0 CLIMBING, AID CLIMBING & TRAVERSING

Dynamic rope must be used for climbing and traversing situations where there is a possibility of shock loading the system. One 11mm or 10.5mm "single" rope or two 9mm "half" ropes must be used and they should be inspected prior to use for damage or deterioration. The ends of the ropes should be tied securely to the harness using a figure-of-eight knot.

The rope(s) should be run through a belay device attached to a suitably positioned anchor. Sufficient spare rope must be available to allow personnel to be lowered to a rescue point. For traversing, a back rope will also be required. Rescue and recovery must be pre-planned and considered prior to commencement and the rescue system ready to implement. All rescue techniques shall be conducted in accordance with PAT Rope Access Services's documented Standard Rescue Methods and Procedures (WPO053).

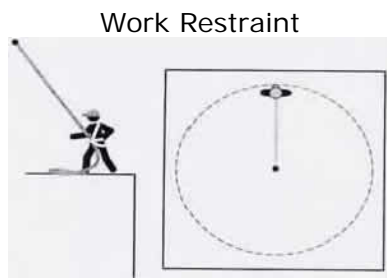
PAT Rope Access Services clips, small slings and similar restricted strength equipment may be used as "runners". These can be attached to the structure being accessed and ropes clipped into them as the climb or traverse progresses. A maximum of three of these restricted strength items may be used before an anchor wire, or similarly strong piece of equipment, shall be used as a "runner".

15.0 WORK POSITIONING AND FALL ARREST

Normal rope access operations involve personnel being partly or entirely supported (positioned) by the rope access equipment. This is work positioning. In addition to providing support the rope access equipment used is designed to be strong enough to arrest a free fall of limited distance and force.

Different arrangements and equipment are needed if the planned method of work is such that there will be a significant free fall if physical contact with the working surface is lost. This represents a fall arrest situation. For these circumstances, the work equipment system must include a specific type of harness arrangement and energy absorbing devices.

PAT Rope Access Services rope access operations should be planned so that they represent the work positioning scenario. This can be achieved using top-ropes, back-ropes, running belays etc. It should be possible to avoid the risk of a significant free fall in most situations. However, where this is not possible alternative fall arrest arrangements and equipment can be made available.



16.0 SUSPENSION TRAUMA

Suspension trauma is a condition to which a person suspended in a harness can be susceptible in certain circumstances. Symptoms include pallor, cold sweats, nausea, ringing ears, blurred vision, dizziness and feeling faint. Severe cases can involve loss of consciousness and death. The condition mainly affects people who are suspended in harnesses without moving, such as an unconscious casualty.

Movement of the limbs, particularly the legs, helps blood circulation back to the heart against the force of gravity. If the legs are completely immobile the absence of these muscle pumps can cause excess blood to collect in veins. Pressure from harness straps is also thought to contribute to this process. The resulting imbalance in the circulatory system can result in a reduction of blood flow to the brain and/or critical organs, which creates the symptoms described.

Frequent physical activity and the "sit" position created by the use of a sit harness in rope access operations help to guard against suspension trauma, as entirely immobile vertical suspension does not occur. However it is not unusual for rope access personnel to encounter numbing/loss of circulation to the legs/waist area. This can occur while carrying out types of work, which involve lengthy periods with little need or choice for movement. If these symptoms are encountered they can normally be relieved by movement (pumping) of the legs and body to return circulation to normal. A comfort chair should be used to relieve the pressure of harness straps. A foot-loop can also be used to allow periodic transfer of weight to the legs. When a bosun's chair (comfort chair) is used, the operative must be attached directly to the ropes, not via the chair. A comfort chair must not be used as a critical part of the rope access system.

As rope access work is performed in teams it is unlikely that an unconscious casualty will go unobserved and pre-planned rescue systems assist in the recovery of personnel without undue delay.

PAT Rope Access Services personnel should remain aware and vigilant to the potential for suspension trauma.

Some research has indicated that movement of a person suspected of suffering suspension trauma into a horizontal position can cause a sudden flow of blood to the heart resulting in potentially fatal anomalies.

17.0 ROPE ACCESS OPERATIONS – GENERAL ARRANGEMENTS

All personnel are legally responsible for their own safety and that of others. They must remain alert and follow safe working practices at all times.

Where a risk assessment has been conducted the Team Leader must familiarise the team with its contents and conclusions. This is done using briefings and "Toolbox Talks" prior to commencement of operations and as appropriate as the work progresses. The Team Leader shall refer to the briefing notes contained within the Specific Job Pack for relevant topics to be addressed.

The proposed work site and projected workscope shall be reviewed by the Team Leader prior to commencing work. Any potential difficulties or problems must be considered and solutions agreed by the Team Leader in consultation with the remainder of the Team. Particular attention shall be paid to aspects such as 'pendulums', heavy loads, falling objects and related concurrent operations. PAT Rope Access Services personnel should develop a general awareness of other activities and process close to the work site, such as scaffolding or diving.

Personnel should check any special equipment before going to the work location. NDT equipment can require special provisions. It must only be operated by qualified personnel and they will make the necessary arrangements under the supervision of the Team Leader.

Tools and work equipment should be suitable for the work and compatible with rope access operations. They should not present a danger to the integrity of the rope access system. Rope access systems can be modified to guard against the risk of tools cutting ropes by the incorporation of wire slings. Methods and techniques for this are addressed in specific risk assessments where required. Any item suspected of being defective should not be used. Such items should be identified and segregated in accordance with PAT Rope Access Services's procedures for Control of Unserviceable Equipment in the Field (MPO013).

All tools and equipment must remain isolated until ready for use. All hand tools and loose equipment up to about 8kg must be fitted with lanyards to prevent them being dropped. Larger items should be suspended on separate tag lines of adequate strength and short enough to minimise impact loads. Items should never be lowered from directly above during ongoing Operations and heavy equipment must be securely attached to a separate lowering system of lifting equipment. Stop descenders may be used for this purpose up to a maximum of 100kg (220lbs). Power leads, hoses and supply lines should be kept free and separate from rope access systems to avoid the possibility of entanglement.

Effective communications methods should be established among the team and with any necessary third parties and/or installation control points. Communication methods should be tested prior to work commencing. Radio systems are well suited, but hand or voice signals can also be used (e.g. as back-up) provided they are not liable to be misunderstood. Work areas, including the anchor area, should be cordoned off and defined with warning signs before hand. When working close to or over water, a rescue boat should be on standby in close proximity to the work site or other adequate rescue arrangements should be provided.

Precautions must be taken to protect others who could be affected by the work. In particular measures should be taken to prevent people from entering the danger area below the work site in case of dropped objects or materials. This can be achieved by establishing an exclusion zone. The size of the exclusion zone should be appropriate to the distance that objects could travel if dropped from above

AS A FUNDAMENTAL PRINCIPLE, there must be a backup for each item when personnel are supported by a rope. This means being on two independently anchored rope systems attached separately to anchors, via the safety and the climbing/descending equipment, to the sit harness which itself is backed up by the leg loop and chest harness. Rope access personnel should be able to attach their personal equipment to access ropes in a safe area prior to commencing access operations. Personnel should normally ascend or descend vertically with pendulum type swinging avoided or minimised. Rope deviations and re-belays and running belays can be used as appropriate to assist in work positioning.

In all cases, a recovery technique must be thought out beforehand for the retrieval of incapacitated personnel. Appropriate provisions for the agreed rescue system must be made before the job commences including any necessary rescue equipment. The rescue method must be defined in advance by the Team Leader with the remainder of the team being fully briefed. Rescue may be by direct lifting using winch or pulley system from above; lowering to another suitable level or sideways pull to an access point. All rescue techniques shall be conducted in accordance with training and PAT Rope Access Services's documented Standard Rescue Methods and Procedures (WP0053).

Equipment should be checked carefully each time before work commences and during the course of the job. Anchors should be checked at least daily. Individuals should carefully examine their own equipment and the Team Leader should be satisfied that personnel have set-up their equipment correctly. Any individual modifications (eg cowstail length etc) are to be inspected by the Team Leader.

Sentries should be appointed as necessary to guard anchor areas if there is a risk of interference. Emergency communications must be tested to ensure they are operational. Weather conditions must be judged by the Team Leader. Wind speed and sea-state are often limiting factors, but visibility and ambient temperature are also important issues. Operations should not proceed unless the Team Leader is satisfied that weather associated risks are acceptable. Conditions should continue to be monitored and during work.

Setting wind speed limits is not practical as the effect of wind on the safety of rope access operations depends on many factors (eg type and location of work, amount of shelter, temperature, nature of materials being handled etc). It is likely that work in situations where direct exposure to wind speeds exceeding 25 knots (46 kph, 30mph, 13m/sec, Beaufort Force 6) could be impractical, but the Team Leader is responsible for judging safe limits and taking appropriate decisions based on specific work site conditions.

Special attention must be paid to splash-zone work. In inclement weather, the sea state must be observed for at least ten minutes and the Team Leader must satisfy himself that there is no possibility of operatives being hurt by wave action. Rest periods and exposure times should be appropriate to site conditions and tiredness avoided. Working hours will normally be up to twelve per day, however, additional working hours may be necessary and PAT Rope Access Services personnel are expected to be conscientious in working to complete jobs. Fatigue has a major effect on safety and extended working hours, especially over a prolonged period of time, should be avoided. Personnel must ensure that they get adequate sleep whilst off-shift.

PAT Rope Access Services PERSONNEL HAVE FULL AND FINAL AUTHORITY IN DECISIONS REGARDING THE SAFETY FOR ROPE ACCESS OPERATIONS TO PROCEED OR CONTINUE.

Good housekeeping practice is central to all Safety Policies and attitudes. PAT Rope Access Services personnel are expected to be exemplary in this aspect, both with PAT Rope Access Services property and that belonging to others. Equipment, tools and materials should be tidied at the end of each shift and thoroughly cleaned and restored at the end of the job.

18.0 HAZARDOUS OPERATIONS

A considerable amount of the company's rope access work involves significant hazards thus the Team Leader must always assess the job risks prior to work commencing. Control measures must be introduced to reduce any foreseeable unacceptable hazards to a tolerable level. Formal methods of risk analysis may be advisable in some cases and in the UK are obligatory. The company has procedures to control formal risk assessment. This is begun using generic risk assessments to build a specific risk assessment appropriate to the work. The specific assessment must be continued at the worksite by the Team Leader to identify and control the foreseeable significant hazards. The measures identified to reduce the risks to an acceptable level must be implemented and all team members informed of them (e.g. using toolbox talks).

Work involving the use of, or contact with asbestos is not permitted. Work over water requires the use of a life jacket or buoyancy aid and arrangements for recovery of individuals should they enter the water should be in place. Survival, dry or wet suits may be required for splash-zone work.

For welding, cutting, grinding, blasting and similar operations, susceptible rope and harness equipment must be protected against the risk of cutting. This can be achieved by using suitable shielding material and/or the use of steel wire at the risk area to remove vulnerable rope from danger. PAT Rope Access Services-Stage or Span should be installed wherever practicable for these operation and the controls identified in risk assessments followed.

Work in confined spaces is hazardous. Special precautions are necessary and control measures have to be in place. The hazards and controls should be identified through a risk assessment process.

Compressed air and electricity are potentially dangerous. Power tools should be checked before use and properly maintained to ensure trouble free operation. Cable and hose connections should be secure (e.g. safety leashes and clips). Electric tools should normally be of 110-volt type. Other electrical equipment may require to be intrinsically safe or explosion proof.

Heavy and swinging loads are a major danger. Personnel must stay alert and keep their fingers and other limbs clear of potential crushing areas whenever this situation exists. Personnel should not attach themselves to heavy loads.

Work during the hours of darkness is permitted provided that adequate lighting is available and rescue arrangements are viable. Judgement of this is the responsibility of the Team Leader. Such operations should be in accordance with specific risk assessments for the type of work.

19.0 PROTECTIVE CLOTHING & EQUIPMENT

Individuals' own personal work clothing must be in good condition and warm enough for the prevailing conditions. Safety must not be prejudiced by cold or other such adverse conditions. Normal easily washable undergarments such as fibre pile are recommended. Clothes shall be close-fitting for ease of working and to avoid catching in equipment.

Appropriate personal protective equipment (PPE) is provided. This includes coveralls, helmets, gloves, boots and weatherproof garments. Thermal under-garments are issued and the layering principle should generally be used in preference to over-jackets to allow warmth to be maintained without interfering with rope access equipment.

Any specific Personal Protective Equipment requirements should be highlighted during project planning and the risk assessment. Job specific requirements are frequently associated with hazardous chemicals or surface preparation techniques (e.g. blasting). The type and specification of the appropriate personal protective equipment shall be chosen by the Project Engineer in consultation with Client's Representative(s), Team Leader and relevant Authorities. Any relevant training for specific PPE should be arranged (e.g. breathing apparatus). COSHH assessments and Materials Safety Datasheets normally stipulate any specific PPE needs.

Helmets must be worn at all times when outside designated safe areas. The Ecrin ST Climbing Helmet is the preferred helmet for Rope Access Workscopes. A chin-strap must always be used.

Waterproof outer-wear should be used for specific workscopes such as water jetting operations as well as working during periods of inclement weather. Gloves shall be worn as often as practicable. Hide-Tuf gloves shall normally be issued, alternative appropriate ones shall be issued when required. These include welder's gauntlets for welding, burning and grit blasting operations. Safety glasses should be worn and foam backed goggles must be worn for specific operations requiring eye protection. Face visors, head and face covers, dust masks and, when needed, air supply equipment shall be issued and used as appropriate.

When breathing apparatus is required the operations shall be conducted in accordance with PAT Rope Access Services's guidance and risk assessment.

20.0 RESPONSIBILITIES

The Quality Assurance Manager, or his designee shall be responsible for the day-to-day administration of this procedure and for the effectiveness and efficiency of this procedure.

All staff shall be responsible for the successful implementation and maintenance of this procedure.

21.0 REFERENCES & RECORDS

IRATA

General Requirements for Certification of Personnel Engaged in Industrial Rope Access Methods.

BS 7985:2002

Code of Practice for the use of Rope Access methods for Industrial Purposes.

SI 2307:1998

Lifting Operations and Lifting Equipment Regulations (LOLER).

SPRAT

Safe Practices for Rope Access Work.

BS EN 795:1996

Protection Against Falls from a Height. Anchor Devices. Requirements and Testing.

BS EN 1891

Personal Protective Equipment for the Prevention of Falls from a Height. Low Stretch Kernmantel Ropes.

BS EN 892:1997

Mountaineering Equipment. Dynamic Mountaineering Ropes. Safety Requirements and Test Methods.

WP0039

Briefing Notes for Gatemen and Client Rep. Working alongside PAT Rope Access Services (Offshore) Limited Personnel.

3/81

Department of Energy Guideline Safety Letter.

SP0169

Risk Assessment and Toolbox Talks.

WP0053

Standard Rescue Methods and Procedures.

MP0011

Equipment Inspection and Maintenance.

MP0013

Control of Unserviceable Equipment in the Field.

MP0008

Certification, Identification and Marking of Critical Access and NDT Equipment

MF0178

Designated Critical Items of Access Equipment.

22.0 APPENDICES

Appendix 1

Strengths & Codes of Typical PAT Rope Access Services Equipment (SF0268).