Version History List

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Connor Turley – CEO – 18th March 2013

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Appendix 1

Altius' Lead Climbing Technique

1.0 Foreword

1.1 Altius Technical Services (Altius) carries out a broad range of repair, construction and maintenance services in conjunction with specialist access skills and capabilities. One of the key access methods used by Altius is industrial rope access. In addition to the aforementioned Altius offers rope access, working at height & rescue training for all levels of competence. This training procedures manual, supported by other documents, legislation, codes of practice (which are referenced within the main text), forms part of Altius' Safe Working Procedures (ASWP) and provides technical guidance on safe working practices in the workplace & during training

1.2 The objective of implementing this procedure is to plan, manage and carry out training using rope access methods. To ensure a safe system of working is maintained at all times with no incidents leading to injury, damage to property, or harm to the environment. This procedure sets the minimum standards for personnel, procedures and equipment when conducting industrial rope access training activities. All rope access training carried out by personnel, partners and sub-contractors shall be carried out in accordance with this procedure

1.3 This manual is a key auditable item by the Industrial Rope Access Trade Association (IRATA), and has been formatted in a manner that it can be read alongside the latest IRATA checklist for Operator companies during each audit. Each checklist item number is highlighted (in blue color) next to the corresponding statement that relates to the latest IRATA requirements as listed on the audit checklist. All items conform to the IRATA International Code of Practice (ICoP) and other industry related documents and standards.

2.0 Scope

2.1 This manual details the procedures and quality controls in place to ensure the safe, efficient and compliant delivery of IRATA rope access training by Altius.

3.0 General Principles

The main aim is to plan, organise and manage any training such that there will be a more than an adequate margin of safety to diminish any risks to personnel, any third parties, equipment and property. To this end, it is fundamental to Altius' safe working procedures that appropriate risk assessments, method statements and health and safety plans are in place before any training takes place.

It must be ensured that:

- Competent / certified instructors are chosen to carry out the training
- Candidates have a suitable attitude/aptitude for working at height
- Candidates are trained and qualified as per current IRATA ICOP and General Requirements;

- Appropriate PPE is worn at all times;
- Access equipment used for training is fit for purpose

4.0 QUALITY CONTROLS AND MANAGEMENT

4.1 Document Control

4.1.1 The Altius Rope Access Manager is responsible for the implementation, operation and updating of this manual. This updating is carried out under the approval of the company CEO in accordance with the Altius Document System (ADS). Together the Technical Director and CEO ensure that this manual maintains its currency and validity to Altius' Training pertaining to Rope Access, industry recommendations, IRATA notices, as well as local and international legislations. *(A1)*

4.2 Management Responsibilities

4.2.1 Altius' management is responsible for the provision of a safe and healthy workplace for its employees and therefore must ensure that employees are properly trained, know and understand Altius' work methods and procedures. Management will support personnel in their administration of safety activities at the workplace. Personnel will report all incidents to Altius Management. All incidents will be reported in accordance with the incident management systems.

4.2.2 Altius' Rope Access Training activities are managed and directed centrally by the Altius Training Department under the lead of the Training Manager. Technical assistance and input is added from the Altius Technical Director. Other designated technical experts in their fields have direct input at the work planning stage. Together the Technical Director and Training Manager are the responsible company representatives who will originate all training projects as a team and who will pass working instructions to the designated IRATA Level 3 Trainers. Trainers shall then execute the work on behalf of the company to the highest quality whilst maintaining compliance with current IRATA regulations.

4.2.3 See current Altius Rope Access Organisation chart as per ADS002 11.0. (A2)

4.2.4 The Altius Technical Director is responsible for ensuring that all accidents & incidents are submitted to IRATA. All rope hours will also be submitted to IRATA at the end of each quarter in a timely manner. (A3, A4, A5)

4.2.5 As per IRATA requirements for member companies, a company employee with the appropriate knowledge, experience, training and authority to manage and monitor the companies rope access systems on a day to day basis to the extent required by current IRATA requirements. Therefore, the Altius Technical Director is the company nominated person for all matters relating to rope access and is the company designated correspondence contact between Altius and IRATA. Should the designated company nominated person change, then Altius shall notify IRATA immediately. (A6)

4.2.6 It is the duty of the Technical Director to carry out at least 1 internal audit per year whilst checking that this manual remains updated with the latest Trainer checklist issued by IRATA. Audits are also carried out on Altius operations and should include each item of the audit checklist. Internal audits are submitted to IRATA once in each calendar year. (A7)

4.2.7 The Training Director is responsible for implementing the rope access training procedures and compliance with IRATA requirements and the management of training staff.

4.2.8 The Technical Director shall be the point of contact on all matters relating to operational safety and any local regulatory issues concerning rope access.

4.3 Supervisory Responsibilities

4.3.1 Supervisory Personnel must be Level 3 authorized trainers and they are responsible for instruction and training employees under their supervision. They must comply with all legal requirements and Altius' procedures as well as those of the client. They must correct all unsafe conditions and hazards immediately. They must ensure that only authorized, suitably trained employees operate and use machinery and equipment. They must report immediately all accidents and/or incidents and near misses and complete the incident report documentation and aid in any investigation if required.

4.3.2 Supervisors are responsible for conducting and documenting daily toolbox/tailgate safety talks detailing the work scope and the associated hazards and the controls for those hazards. When newly certified rope access technicians are part of the work team, the Supervisor will ensure that the entire team understands any and all additional control measures required when working with inexperienced personnel. All control measures will be documented in the tool-box talk.

4.3.3 Supervisors must ensure that all rope access equipment in use during training is certified and a copy of all the certification is onsite. If the integrity of any item of equipment is in doubt the supervisor is authorized to remove it from service and request a replacement from stores.

4.3.4 Supervisory personnel must instill and reinforce the Altius safety culture in employees by setting a good example of safety and work ethic. They must report to the Training Manager any employees who fail to comply with governmental safety regulations, client work and safety procedures and/or Altius' safety requirements. Supervisors are encouraged to assist in the setting of safety procedures.

5.0 HUMAN RESOURCE MANAGEMENT AND TRAINING

5.0.1 All appropriate personnel records (E.g. Training certificates, IRATA certificates and Current valid First aid certificates) are kept up to date by the Altius Human Resources Department, under the direction of the Office Manager, and are filed in the personnel database. Email reminders are utilised when technicians' certifications reach near expiry dates. IRATA

certificates can be verified by using the IRATA Online System (IOS) and printed copies of technicians' certificates shall be included in the job work pack file for easy reference. (B1)

5.0.2 Personnel employed for rope access training operations by Altius shall be:

- Physically fit and free of any of the contra-indications for working at height and in strenuous environments as listed in section 6.6 of the current IRATA General Requirements for Certification of Personnel Engaged in Industrial Rope Access Methods. A medical certificate may be appropriate although self-certification is deemed as an acceptable minimum standard.
- Of a responsible and mature nature;
- Hold a current, valid IRATA certificate; The Company therefore, as a minimum, adheres only to the IRATA scheme of training as described in the General Requirements for certification of personnel engaged in rope access. Under no circumstance shall Altius utilise technicians whose certificates have expired for any rope access operations.
- Screened as to their appropriateness for such work via means such as references or by a competency assessment. Competency assessments can be carried out in-house or at external test centres, subject to requests from Altius clients. In summary, the Altius company policy is that rope access and related work is always carried out by personnel who are competent and who are appropriately supervised.

5.1 First Aid Certification

5.1.1 All IRATA Level 3's must have valid first aid certification. If it becomes apparent that an IRATA Level 3 does not have a valid first aid certificate then he/she will be unable to take employment as a trainer with Altius until valid first aid certification is presented. (B2)

5.2 IRATA Qualified Trainers and Training Assistants

5.2.1 Only IRATA qualified, independently assessed personnel will be used to conduct IRATA training courses. This will be verified by personnel producing their IRATA qualifications and via the IRATA IOS. IRATA Level 1 or 2 assistants will not at any time be left in sole control of trainees on the training structure, the IRATA Level 3 will be in control of training sessions at all times. (B3)

5.2.2 Training Assistants who are not L3 shall never be left in sole control of a training course.

5.3 IRATA Level 3 Trainer Competence

5.3.1 Trainers are approved and authorized by the Technical Director and Altius operates an employee database detailing skills and aptitude, from this, approved trainers can be selected.

5.3.2 Potential IRATA trainers will be established as IRATA L3 and will be asked to prove their competence by means of qualification, references from other training companies or competence checks noted in log books. (B4)

5.4 IRATA trainer qualification and experience

5.4.1 All lead trainers must have obtained the IRATA Level 3T (or new I badge) certification, in exceptional circumstances Level 3 technicians may lead an IRATA course after having undergone a "Train the Trainer" course and then been approved by the Technical Director. Where a potential trainer has little or no experience then an IRATA level 3 T will operate alongside the potential trainer until such time that they have demonstrated their competence as a trainer at all IRATA levels. (B5)

5.5 Supply of IRATA publications to trainees

5.5.1 During IRATA courses it is the responsibility of the Trainer to ensure that all candidates are informed of the IRATA system. They must distribute the most current versions of the IRATA International Code of Practice, General Requirements and regional legislation. They must also ensure candidates have provided required waivers, suitable medical documentation and Altius' registration form ADS005. (B6)

5.6 Trainers Manual and Procedures

5.6.1 Altius will provide IRATA trainers a manual to follow during the training course. This will contain responsibilities, maintenance of procedures, facilities, equipment, inspection records, content and delivery of training. All training courses must be delivered in compliance with ADS004 (B7)

5.6.2 Trainers are encouraged to suggest changes and improvements to the training procedure as new industry developments present themselves

5.7 Sub Contract Trainers

5.7.1 Any and all sub-contract IRATA trainers will have to be approved by the Technical Director and will have the same access to class materials and instructors notes as employees. They must follow the procedures as laid out in both the Altius Training Manual and the Altius Trainers Manual.

5.7.2 Sub contract trainers must attend an Altius site induction and a training structure familiarisation session prior to undertaking any training for Altius. (B8)

5.8 Applicant's Information Pack

5.8.1 Candidates wishing to be trained by Altius will be sent an information pack prior to training, this pack will contain information about IRATA 1,2 and 3, supervision, revalidation, work experience requirement between levels, logged hours, independent assessment and fitness requirements. (B9)

5.9 Trainee Induction

5.9.1 All candidates arriving on site for IRATA training will be inducted, detailing instructions to be followed in the event of an emergency. Risk assessments and Tool Box talks will be carried out prior to commencement of training, candidates will be involved in this so as to give them an idea of what risk assessments entail. (B10)

5.10 Course Hand-outs

5.10.1 The syllabus & techniques used in training is in accordance with the IRATA General Requirements & ICoP for all levels. Course hand-outs will be in the form of the Altius Rope Access Training manual, the IRATA General Requirements & ICOP in either paper or eBook form. (B11)

5.11 National and Local Legislation

5.11.1 National and Local legislation will be covered on all IRATA courses and will be appropriate to meet the requirements of the syllabus concerned. (B12)

5.12 Risk assessment for training locations

5.12.1 Any location used for training will be the subject of a specific risk assessment. Trainers are required to complete and check compliance to the IRATA form 006R for venue audit and include risk assessments of training venues. Trainers will discuss the hazards and controls with candidates before commencement of any training. (B13)

5.13 Trainer File

5.13.1 The trainer file will be up to date with all current IRATA documents; these will be made available for the trainer. The Technical Director is required to ensure the Trainers have access to and use all the most recent training files and documentation. The Trainers are required to ensure that all relevant documentation is available to the candidates during each course. (B14)

5.14 Statement of physical fitness

All candidates must as a minimum complete & sign a statement of physical fitness and contra indications confirming that they are fit enough to undertake rope access training (ADS005). Altius' trainer has the authority to exclude any trainee if they have a concern for health, fitness or attitude. Records will be kept on file along with all other trainee documentation. (B15)

6.0 EQUIPMENT AND TRAINING FACILITIES

6.1 Purchase of rope access equipment

6.1.1 Access equipment is purchased by Altius from approved sources and vendors only. Purchases are managed and documented by the Technical Department under the supervision of the Technical Director. Copies of Certificates of Conformity are kept by the Technical Department.

6.1.2 On arrival at Altius' premises all items are initially checked against the written purchase order as well as the delivery note, once this has been carried out and any discrepancies resolved the items are given a unique ID number to allow traceability in line with IRATA requirements. All certification is maintained by the Technical Department. (C1)

6.2 Selection and purchase of equipment

6.2.1 Altius' Technical Director has knowledge of technical specifications of rope access and working at height equipment and therefore is the only person at Altius who can select, following a risk assessment, the equipment required for training. (C2)

6.3 Equipment Storage

6.3.1 Rope access equipment is held in a secure store away from potential interference and contamination. Rope Access equipment must be stored unpacked in an environment that is a cool, dry, dark place, chemically neutral, away from excessive heat or heat sources, high humidity, sharp edges, corrosives, and other possible causes of damage. At this store area equipment shall be systematically stored and kept appropriately. When equipment is in transit, care will be taken to ensure that the above factors are considered where appropriate and practicable to do so. (C3)

6.4 Equipment Inspection, Care and Maintenance

6.4.1 Individual items of access equipment are uniquely marked and identification and traceability strictly monitored. When an item does not contain a manufacturer's individual serial number then rope access equipment is marked at non-stress raising areas only using the following methods: (C4)

- Ascenders – stamped/engraved
- Harnesses – permanent marker/engraved
- Karabiners – stamped/engraved
- Ropes – permanent marker/heat shrunk tape
- Descender – stamped/engraved
- Back up devices-Engraved
- Wire slings – stamped
- Any other items may be stamped, engraved, or indelibly marked as appropriate

6.4.2 Inspection and maintenance of all rope access equipment is carried out as per manufacturer's recommendations and in line with the general advice given in section 2.10 of the IRATA ICoP.

6.4.3 It is vital that ropes are cared for appropriately. There is no room for complacency with the care and maintenance of any rope access equipment but especially so with ropes.

6.5 Summary of General Rules for Rope Care

6.5.1 The following points relate to the potential misuse of rope:

- Knots, sharp bends, abrasion and over loading such as when rigging a Tyrolean traverse can reduce a rope's strength by up to 50%.
- Nylon can lose up to 15% of its strength when wet. Wet ropes will abrade more easily.
- Low stretch (semi static) rope must never be used as a climbing protection rope or to catch falls.
- Never stand on walk on drag jump on or sit on a rope. Dirt particles may be ground into the sheath and eventually into the core.
- Never store ropes wet and tightly coiled, with knots or kinks, or leave it under tension for a prolonged period.
- Never let nylon run across nylon. The non-moving part is liable to become weld-abraded.
- Never throw a large amount of rope over the edge of a drop or pitch when rigging. The weight of the resultant mid-air stop will strain the core filaments.
- Never load a kinked rope; serious damage to the core fibres can result.
- If the integrity of a particular rope is in doubt – **CONDEMN IT**. Ropes are consumables, lives of personnel are not.

6.5.2 All Rope Access equipment will be subject to a minimum six monthly thorough examinations and inspection. Equipment will be thoroughly examined and inspected by a company appointed person and the results of the inspection will be logged. This may be done as part of the routine issue of equipment from the stores. Load testing of certain equipment may be carried out if appropriate to ensure conformity. Any damaged or suspect equipment that is rejected during the inspection will be formally scrapped and corrective action taken where necessary. The pass/fail methodology used in these inspections will be based upon the relevant criteria define by the manufacturer of the item being inspected. (C6)

6.6 Certificates of conformity and equipment user instructions

6.6.1 New equipment must either be accompanied by a certificate of test and examination or a certificate of loading and conformity confirming the manufacturer's performance figures and stating safe working loads and proof loads where applicable. Certificates along with user instructions will be kept on file. (C5)

6.7 Inspection schedule and records

6.7.1 Altius will inspect all rope access equipment at least every 6 months, with the due inspection periods currently scheduled for January & July of each calendar year.

6.7.2 Altius equipment inspections are carried out by a company designated competent person. Records of equipment inspections as documented in IRATA ICoP section 2.9 are kept by the Technical Director and entered into the Rope Access Equipment inspection database. (C7, C8)

6.9.3 The Trainers must inspect and check that all access equipment is certified and a copy of all certification is on site before commencing training operations. This check also acts as a current certificate of visual examination carried out by a competent person.

6.8 Quarantine areas

6.8.1 Any worn or damaged items must be quarantined immediately until further integrity examination and judgement has been made. Quarantined equipment must be kept isolated from regular equipment that is fit for use. Quarantine areas in stores must be clearly marked. Equipment in Quarantine must be clearly marked “not for use”. Damaged equipment items may be kept as evidence and may be kept and utilized for inspections as part of the IRATA level 3 training syllabus. (C9)

6.9 Equipment Safe to Use

6.9.1 If the integrity of any item of equipment is in doubt Altius encourages and authorizes all employees to remove the items from service and contact Altius managerial staff to arrange suitable replacements. Employees must never try to repair equipment by themselves and at all times shall only use equipment that has a valid inspection certificate and is safe to use. (C10)

6.10 Altius Equipment Selection Criteria

6.10.1 Full body harness. Permitted types: Industrial harnesses conforming to NFPA 1983: 2006, EN 361: 2002, ANSI/ASSE Z359.1- 2007, CAN/CSA-Z259.10.06. Full body harnesses are marked to provide traceability to the supplier’s original certification. Harnesses must have a work positioning attachment at the waist point as per EN 813 or an equivalent standard and must meet strength requirements for local legislation. All harnesses will be kept for a maximum of 5 years from first use (10 years from manufacture) and then removed from service and disposed of. (C11)

6.10.2 Cow’s tails for connecting the harness to the safety line must be able to withstand the dynamic forces that may occur and must be as strong as the safety line and comply with EN 892. They must be of a width of 10.5mm to 11mm and a maximum tied length not to exceed 1m including connectors. Where a lanyard or shock absorber is used it shall meet the requirements of ANSI Z359.13 – 2009, BS EN 355 – 2002, CAN/CSA Z259.11-05 (R2010). (C12, C13)

6.10.3 Descenders must give the user suitable control over the speed of descent, must not cause

undue shock loads to the working rope when braking and be such that, if the user loses control, they will stop, or allow only a slow rate of descent in the hands-off position. In addition, they must not cause significant abrasion, plucking or stripping of the sheath when suddenly clamped onto the working rope. They shall be of a type that cannot be accidentally detached from the working rope or become detached under any circumstances while carrying a person's weight. If a connector is used to attach it to the user, only an appropriate locking connector shall be used. For long descents, preferred descenders must be those with good heat dissipating properties to prevent burning of the hands and melting of the working rope, and those that reduce cumulative twisting of the rope to a minimum. The European standard for rope adjustment devices for use in rope access, EN 12841 type c, which includes descenders, may be used. NFPA 1983: 2006 also details descenders. (C14)

6.10.4 Back up devices are devices by which the operator is attached to the safety rope. In the event of a failure of the working rope or loss of control by the operator, they are intended to lock on to the safety rope without causing damage to the rope and also to absorb and limit the shock load that may occur. Ideally, back-up devices will always be positioned on the safety rope so that in the event of a failure in the working rope system, the load will be taken immediately on the back-up device without a fall occurring. There is an advantage in using back-up devices that can be released by the operator without de-weighting first. However, correct functioning of this type of back-up device critically relies on the loading being applied via the cam and not the body (i.e. grabbing the body of the device may cause it to slide down the rope and prevent it from functioning properly). It is recommended that back-up devices are of a type that will not slip below a static load of 2.5 kN European standard EN 12841 type A for rope adjustment devices for use in rope access, which includes back-up devices. ANSI Z359.1-2007 also details back up devices. Ideally, these devices should require minimal operator manipulation. They will be marked with a reference number. Altius currently uses a number of devices:

6.10.5 The ASAP Mobile Fall arrest back up device is often used to travel to and from the work site, this device complies with EN 353. An Energy Absorber with appropriate connector must be used with the ASAP and the Petzl L57 Energy Absorber is the only one authorized for use by Altius.

6.10.6 The Safetec ‘Duck-R’ (Duck) is also used. This device, which complies with EN1284, is used mainly to protect technical manoeuvres when a second back up is required, e.g. passing knots, deviations or re-belays or when the use of the ASAP is not advised, e.g. during shallow rope to rope transfers.

6.10.7 Two Ducks must be placed on the back up ropes during rescues to effectively arrest a fall should the main rope fail, cows tails must be shortened to 600cms when involved in rescue. Ducks can also be used where travel distances to and from the work are short. Ducks are also used at the work site to provide additional back up where required and to install a hard link between the technician and the rope system when carrying out work which may compromise the main rope support system (Anchor Line and Safety Line), e.g. hot work, cutting and grinding activities. When Ducks are used they must be towed independently of the descender. (C15)

6.10.8 Ascenders shall be of the type that cannot be accidentally removed from the working line. Toothed ascenders such as the Petzl Ascension are used by Altius. Such devices are classified as rope clamps by the manufacturer and comply with EN 567. (C16)

6.10.9 Connectors will be screw gate, double action twist lock, or ball lock for all rope access activities and conform to EN 362 with a minimum breaking load of no less that 22.5kn. Altius defines double action as a minimum of two unlocking actions BEFORE the gate opening movement.

6.10.10 Textile slings will be stitched and conform to EN 566 with a minimum breaking strength of 22kn. Wire rope slings will have closed ferrules to ensure there are no wires protruding and will conform to EN 795. Textile & wire rope slings will be subject to six monthly thorough examination and interim examinations in line with standard rope access category three PPE.

6.10.11 Normal descent ropes shall be kernmantle construction, low stretch (semi-static) ropes with a minimum nominal diameter of 10.5 mm. Ropes must have a minimum failure load of 2200 kg / 4,850lbs and be capable of holding a fall factor 1 with a 100 kg / 220lbs weight. Such ropes are not suitable for sustaining major dynamic loads and in such cases dynamic ropes shall be used. Ropes are to be marked with their length and a reference number at both ends. Dynamic ropes used by the company have a kernmantle construction with a minimum nominal diameter of 10.5 mm. Such dynamic ropes are suitable for sustaining any foreseeable dynamic loads (when used in line with this procedure) and are specified by the company for use as cow's tails (device lanyards). Ropes are to be marked with their length and a reference number at both ends. Low stretch ropes used will normally conform to one or a combination of the following standards; EN 1891: 1998 and/or NFPA 1983:2006, UIAA 107: 2004. Dynamic ropes will normally conform to EN 892: 2004 and or UIAA 101: 2004. Other types of rope with specific design features that provide appropriate strength and performance will be deployed for specific operational situations. Ropes will be kept for a maximum of 5 years from first use and 10 years from manufacture. (C17)

6.11 Personal Protective Equipment

6.11.1 Personal Issue:

- All personnel are issued with standard PPE suitable for carrying out rope access training. PPE comprises protective footwear, appropriate clothing and a safety helmet. All PPE issued is in accordance with defined national or international standards.

- Rope Access safety helmets shall comply with industrial standards EN 12492: 2000, ANSI Z89.1- 2003, CSA Z94.1-05 as appropriate for the region will be used. Helmets must have sufficient side impact protection and strong chinstraps. Chinstraps on helmets shall prevent the helmet from coming off the head. This is typically achieved by the incorporation of "Y" shaped straps in the casing of the helmet. Helmets must always be used with the chinstrap fastened. (C18)

7.0 Hazard Identification and Risk Assessment

7.1 Risk assessments are conducted for each type of training course and may be general in nature to cover routine tasks. The Trainers should conduct further risk assessments on site, if required, using the Risk Assessment form.

7.2 The Altius method for controlling all rope access work and related activities is based on, but not limited to, the following strategy: (C19)

- Once the work has been identified as suitable for Rope Access, all hazards arising from personnel, equipment, materials, or the environment will be identified.

- As per Altius' Risk assessment procedure, all activities require the completion of a risk assessment.

- A safe system of work will be developed utilising the following hierarchy:

    - Elimination – get rid of the hazard altogether
    - Substitution – exchange one risk for something less likely or severe
    - Physical Controls - separation/isolation, eliminate contact with the hazard
    - Administrative controls - safe systems of work, rules in place to ensure safe use/contact with hazard
    - Information, instruction, training & supervision – warn people of hazard and tell/show/train them how to deal with it
    - Personal Protective Equipment – equip techs appropriately to reduce severity hazard

- Risk reduction/elimination measures will be implemented through:

    - Dissemination of relevant information to all concerned,
    - Instruction
    - Training

- Once a risk assessment has been completed and control measures implemented the remaining risk must be reviewed and evaluated. If the risk is still considered too high then the job must be cancelled until such time as a method of reducing the risk to an acceptable level is identified and implemented.

8.0 Rescue during training

8.1 Specific rescue equipment will be at the training site and available to the instructor at all times. The location of the rescue equipment will be specified prior to course commencement, a

rescue plan must be put in place prior to course commencement and rescue techniques may be practiced if required by the risk assessment.

8.2 Rescue techniques to be used are the responsibility of the course instructor. (C20)

9.0 Anchors and Limits of Pendulums

9.0.1 Great care must be taken when selecting anchors. Trainers shall only select anchors that can be classified as primary structural elements such as structural beams and appropriate natural features. Suitable artificial means (bolts, dead weight systems, etc.) may also be used. All anchors must be 100% reliable and the strength of all anchors (except intermediate deviation anchors, which may be weaker) shall be at least as great as that of the terminated ropes attached to them. This strength of installation shall be not less than 6kN. Altius commonly uses wire slings that have a minimum static strength of 15kN. If man-made fibre slings are used then the minimum static strength must be 22kN. This is to compensate for the reduction in safe working capacity if fabric slings are "choked" around structures. Appropriate consideration must be given to anchor line protectors and suitable precautions taken into account for edge protection. Badly placed tape slings will fail considerably below their stated tensile strength and due to their susceptibility to damage sustained through abrasion on impact, as such they should be deployed with great care. (C21)

9.0.2 When tying knots in working lines, consideration must be given to the appropriateness and efficiency of each knot. The effect of knotting varies with rope strength, condition, and method of use. Knot efficiency or the remaining relative strength of a rope after a knot has been placed in it, is a much-debated topic. The figure of 50% strength loss should be regarded as the worst possible scenario.

9.0.3 If ropes are redirected from the anchor point, the redirection anchors shall be of sufficient strength with a minimum of a 10 to 1 safety factor (10 degrees minimum 3kN, 20 degrees minimum 5kN). Deviations shall be limited as much as possible with due regard to the consequences of a potential uncontrolled pendulum. (C22)

9.0.4 Great care must be exercised when Tyrolean Traverses or Tramways are deployed because of the excessive loads that may be applied to the anchor points.

9.0.5 When descending or ascending, minimal pendulum should be allowed to prevent abrasion to the ropes or excessive loading to both ropes and anchors. The consequences of an uncontrolled pendulum must be borne in mind therefore redirection angles should be kept to below 10 degrees from primary anchor

9.1 Double Protection

9.1.1 All personnel using rope access for work positioning must use two independently anchored ropes. The principle of double protection consists of an access (sub) system and a backup (sub) system. This facilitates the provision of a 'live' or working rope and a back-up or safety rope and acts as a safe rope access system. Anchors must be linked to provide added security. This also applies to the attachment of personnel to the live and back-up ropes whereby descenders or ascenders and back up equipment must be attached separately to the harness. (C23, C24)

10.0 Work seats

10.1 Consideration of the deployment of support seats shall be undertaken when personnel may have to stay in one position for a significant time. When a support seat is included in the suspension system, the harness must be the primary means of attachment to the positioning and backup systems. (C25)

11.0 Exclusion Zones & 3rd Parties

11.1 As part of the risk assessment, measures to protect third parties shall be identified and implemented, and anchor areas should be protected as required. Exclusion zones must be set up to protect people from falling objects within the training area. Exclusion zones maybe necessary to protect the anchor areas and must be enforced if used. All persons within the training area must wear a helmet when instructed to do so. (C26, C27)

12.0 Pre-Use and Buddy Checks

12.1 During training the de-rigging of rope access equipment is not normally carried out. As such ropes and anchor areas must be thoroughly checked each time before use to ensure that no tampering has occurred and that integrity and safe working can be maintained.

12.2 Prior to training on the ropes personal and buddy checks shall be carried out on all trainers and trainees to ensure that all equipment are of sound integrity, correctly fitting and secure. (C28)

13.0 Communications

13.1 Effective communication is an important part of the management of health and safety and all staff are responsible for ensuring good communications are maintained at all times.

13.2 Clear communication between all concerned parties involved in the training course shall be a priority. This may be by means of pre-arranged word or hand signals etc. All methods of direct communication must be understood before any work begins. (C29)

14.0 Lead Climbing

14.1 Rope access is primarily concerned with movement up or down suspended ropes and working from them, and is considered to be primarily a technique for work positioning. However techniques and equipment used for this purpose are sometimes extended to encompass traversing, aid climbing, lead climbing and other forms of access. When lead climbing is carried out, only appropriately trained personnel shall be used and only after a specific risk assessment has been undertaken. Lead climbing procedure shall be as contained in Appendix 1 of this Operating manual. (C30)

15.0 Fall Arrest

15.1 When using a fall arrest system (i.e. a personal fall protection system for work at height by which a fall is intended to be arrested to prevent the collision of the user with the ground or structure) the equipment must include a full body harness, an energy absorber and appropriate connectors that meet the requirements of recognised standards. Use of a fall arrest system shall be as contained in the company Rope Access Training Manual.

16.0 Training Dummies / Masses

16.1 A dummy or mass with the potential to weigh at least 70kg will be provided for hauling and rescue exercises, manual handling precautions will apply. Where a live casualty is to be used then this will be included in the risk assessment prior to training. (C31)

17.0 GENERAL LEGISLATION HEALTH, SAFETY AND WELFARE

17.1 Classroom Available

17.1.1 A classroom facility will always be available for indoor discussion / theory sessions. (C32)

17.2 Welfare facilities

17.2.1 Normal welfare facilities will be available including a WC, Tea, coffee, water. (C33)

17.3 Training centre test records

17.3.1 Ground anchors & training centre structure will have inspection and testing records available at the training centre. (C34)

17.4 Safety & Load Signage on Structure

17.4.1 The training structures must display signage specific to their loading capacity (number of persons). (C35)

17.4.2 All safety signage will be present where required and clear demarcation of the training area established. (C36)

17.5 Structure suitable to cover all manoeuvres

17.5.1 The assessment and training area will be of a suitable construction so as to enable the Trainer to conduct the complete IRATA syllabus, including ascending, descending, re-belays, deviations, passing knots, rope to rope transfers, rescues, hauling systems, climbing with cows tails(aid climbing) and rigging of horizontal & diagonal tensioned ropes in positions that may be used for rescue. Suitable anchors will be available to allow 3 dimensional rescue / rigging exercises.
(C37, 39, 41, 42)

17.6 Edge obstruction

17.6.1 A suitable edge obstruction where the ropes pass 90 degrees between the anchors and ground will be available. (C38)

17.7 Lattice frame

17.7.1 A lattice frame will be available for demonstration of climbing with twin tail shock absorbing fall arrest lanyards. (C40)

17.8 Insurance

17.8.1 Altius' liability insurance includes cover for Rope Access & Working at Height Training. The current insurance policy is displayed in the training area. (D1)

17.9 First aid

17.9.1 The IRATA Trainer, Technical Director & CEO are all trained emergency first aiders with current certification, first aid provision will be provided at the training area and at other locations onsite. (D2)

17.10 Legislation and Guidance

17.10.1 The Technical Director will keep copies of all relevant national and international Health and Safety Guidance's, approved code of practices and all other relevant industry documentation. Any Altius employee can view these files at any time although copies are kept as controlled documents and will not be freely issued. (D3)

17.11 Permits to work

17.11.1 Altius does not operate a permit to work system at their premises, however in the event that Altius were to train personnel at an alternative companies premise then Altius would then adhere to the alternative companies permit system if applicable.

18.0 Altius Referenced forms/manuals

- Altius Safe Job Plan
- Altius Job Hazard Analysis
- Altius Daily Log / Report
- Altius Toolbox Talk
- Altius Training manual

Appendix 1

ALTIUS' RECOMMENDED LEAD CLIMBING TECHNIQUE

Definition of Lead Climbing: A method of progression, not in suspension, in which the operative is supported by the structure and is protected by a safety line, which is passed through intermediate anchors. The safety line is passed through an independently anchored fall protection device, which is operated by another person, and by which a fall can be arrested with a limited force.

Altius Recommended Technique:

- Lead climbing is carried out using two single rope dynamics, conforming to EN 892.
- This technique may be applied to both vertical and horizontal scenarios.
- The lead climber ties the ropes into the Sternal attachment of his full body harness.
- One of his ropes is then inserted into a climbing protection unit, or belay device, commonly this will be a descender such as the Petzl ID or Rig.
- The other rope is attached to a back-up device.
- Both of these systems are then attached via slings and connectors to the structure. The ropes are then controlled through the belay devices by the second man, or belayer.
- The belayer shall ensure that there is not too much slack in the system as this will increase fall distance.

- The rope should not be kept too tight as this may impair the upward movement of the lead climber and possibly upset his balance.

- The lead climber then proceeds to climb the structure placing intermediate anchors, or running belays, as he goes.

- Careful consideration is given to fall factors and running belays shall be positioned at regular intervals, particularly in the lower sections of the climb. Fall factors greater than 0.3 are avoided by regular running belay placement.

- All running belays are full strength anchors

- Good communications between climber and belayer are maintained throughout the climb using standard international climbing calls and include:

    - "Slack" - give me some slack

    - "Take in" - pull the rope in tight

    - "That's me" - the rope is tight enough

    - "On belay" or "Safe" - the climber has secured himself to the structure and the belayer can remove the belay device

- Prior to the second person leaving ground, communication calls include:

    - Lead - "climb when you're ready"

    - Second - "climbing"

    - Lead - "OK" - second should not leave ground until this final confirmation which is only given after the lead climber has double-checked his system.