IRATA Safety Notice

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IRATA Work and Safety Report 08/01

Summary of incidents reported on Form 021 2006/2007

This summary was based on reading the incident forms sent to IRATA. Some had no detail of remedial action and in other cases comment has been added to what was supplied. Some incidents were followed up, so more detail was available. Many incidents were excluded as they happened with little reference to rope access, for example slips, trips, tools slipping, sunburn, when off duty etc.
Even without detail, this should be useful to show that such incidents are largely preventable and may prompt changes to procedures.
In the UK, PPE regulations require employer to ensure users are provided with appropriate PPE, also that the user has been trained and understands how to use it. PUWER regulations require work equipment to be suitable, safe to use and only used by people with adequate training.
From some reports, it appears that basic site safety induction may have been lacking. Employers must not take things for granted just because someone is IRATA qualified; proper training and supervision is essential. It is essential that realistic on-rope training is given, and correct PPE used, especially if potentially dangerous tools are to be used safely. Users of permit systems should note that several failures of equipment belonging to third party contractors, or their errors have caused injuries or near misses.
Serious incidents are marked in bold. Note that there were many hand and eye injuries which could have been preventable with PPE

Type of Incident	**Detail [note this may only include detail of one or two incidents even if there were several incidents]**	**Control measures / remedial action / solutions**
8x Falling object Small < 8kg	Some objects landed outside exclusion zone; lanyard often removed. (ii)Falling rock dislodged by rope above.	Keep lanyard attached. [Also see below] possible use of two lanyards Ensure realistic size of exclusion zone. (ii) Site visit prior to work starting each day, check site conditions after bad weather; avoid descending below loose rock.
Falling object Large	4x incidents with item dropped by third party contractors working above. (ii) non authorised workers entering exclusion zone	Permit system; overhead exclusion zone + sentry, avoid being under any overhead work where something could fall, due to system failure [e.g. one incident involved failure in crane control].
12x Eye injury	Wind blown grit, grinding, vegetation flicked into eye	Some injured even when wearing visor. Goggles provide better protection
6 x damaged, cut or burned fingers	(i) Trainee fast abseil – burned fingers (ii) Cuts or damage when tools slipped	Appropriate gloves for protection and dexterity (ii) ensure all PPE supplied is worn at all times
Muscle strain	Trainee used as casualty in 30 min mock rescue 2 days lost time	Risk assessment for use of live casualty/ real rescue if problem arises. Avoid use of live casualties, use manikin or weight bag. Use seat for mock casualty.
Elbow strain Several	Trainees unable to complete training, another unable to complete assessment	Quite common, but usually L1 trainees – so probably poor technique. Do warm up exercises and stretching before practical work.

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incidents		
Manual handling	Several incidents - muscle strain	Further training in manual handling, avoid solo lifting over 25kg weight
Type of Incident	**Detail [note this may only include details of one or two incidents if there were several incidents]**	**Control measures / remedial action / solutions**
Uncontrolled descent	(i)Trainee fell 1.3m to floor – did not hold control rope, back-up did not engage (ii) Lost control landed in water [**could have been fatal if onto hard surface]**	Stretch in back-up line may mean no back-up device will prevent incidents from very low heights. Consider crash mats in training area. Keep back-up device high/ do not hold shunt string for small descents. Closer trainer supervision. (ii) No detail. System failure. Refresher training if has not worked recently; check team composition eg. only 1 new tech per level 3 to allow good supervision. Consider 11mm/11.5mm dia. rope when using shunt as back up. Shorter cow's tail to shunt. Risk assessment to select most appropriate PPE i.e. descender and back-up with more fail to safe features/ less prone to operator error.
Rope failed by abrasion	Descended on back-up line, after working line failed mid-height at edge.	Pre-work site inspection. Great care with rope protection required on non-vertical rock face. Awareness that one protector may not be adequate. Abrasion usually causes noticeable vibration in the rope, so may be necessary to ascend and add protection.
Rope abrasion	Rope over rough parapet wall, rope protector was not adequate. Several abrasion incidents.	Pre-work visit for risk assessment, rather than on site improvisation; e.g edge rollers or similar, as one protector may not be adequate for some edges. Good supervision. In some cases damage was detected by before use checking..
Rope damage	Ropes left rigged, damaged in wind /abrasion	Remove ropes when not being used if possible, or tension and add more rope protection to ropes and contact surfaces. Before use checking of in-situ ropes.
Bee stings	Disturbed bee nest	Site visit prior to work commencing, PPE; awareness, of potential for allergic reactions and anaphylaxis; check team members for history of allergies. COSHH could be relevant /pesticide to control nest [see HSE ref 3 below], also First Aid requirements
Allergic reaction	Detergent splashes caused rash	PPE – gloves, goggles. Applies equally to use of other chemicals; supply, read and follow precautions from COSHH/ MSDS [material safety data sheets] also

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		be aware of potential damage to equipment.
Burn	Overalls on fire from sparks, when steel cut with Stihl saw	Correct PPE flame retardant overalls & apron, body position when cutting, to avoid sparks; consider also effects on harness, rope & equipment etc in the surrounding area. Fire extinguisher on site.
2x welding injury	(i) Hot slag hit neck. (ii) Molten slag dropped into boot x2	Correct PPE [see ref 1 below] flame retardant overalls & apron, seal overalls to boots & to gloves to gauntlets to prevent entry, consider overalls on top of harness [must not impede use of equipment]; consider possibility & effect of spatter on equipment, such as ropes below, or in a bag suspended below.
Fatality	Heart attack, not work related	Work at height medical; if concerns raised pre-mobilisation, then consider pre-job fitness test. Rescue system to be available at all sites to deal with such contingencies. Liaise with appropriate authorities
Type of Incident	**Detail [note this may only include details of one or two incidents if there were several incidents]**	**Control measures / remedial action / solutions**
2 x Ultra/ HP water jetting	(i) 2 x Cut through boot – minor damage to foot. (ii) Lost time -staff were not wearing protective PPE provided	Training & supervision; tool box talk; obligation to wear PPE; protective over-boots/ kevlar boots/ metatarsal guards; suitable pressure, consider use of longer lance. Ensure communications in case emergency shut down required. See also below
Air hose detached	(i) Near miss. air /water hose separated from coupling (ii) tap on end of airline blew off hitting operative on head	Code of practice available [see ref 2 below]. Work to procedure, risk assessment, tool box talk; Pre-use inspection; ensure communications in case emergency shut off required on compressor; only certified hoses and fittings to be used, hose whip checks and “R” clips, or hose coupling safety locks or both should be fitted; hoses firmly secured close to operator
Near miss rock fall on cliff	Concern caused work to stop. When returned to work next day, a section of cliff had collapsed	Site visit prior to work commencing; experienced geotechnical engineer brought in to check site safety. See also below
Landslide	6 injured, escaping down steep slope avoiding landslide. Work was on a road side cutting approximately 20 metres above the road at an angle of 40º. The slope above the cutting slid down towards them, partially burying some operatives.	Assumption of safety made could be due to easy angle of slope. Better understanding of soil mechanics. Geotechnical engineer to be on site full time to assess potential for slippages on steep slopes occurring whilst people are working below. If it poses a potential risk of collapsing, all potentially loose material must be cleared in a top down manner. Client must be informed and accept this requirement. Safety must override budgets.

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Structural failure	Person climbed 6m pole. The base slipped on mountings & pole fell backwards	Pole bases to be checked by engineer & certified safe. Level 3 also to do visual inspection before use
Load slipped	Multi-pod overturned	Multiple guy lines to stabilise head of multi-pod and legs bolted to floor
Heat exhaustion	Felt weak, told to descend, Fainted after descending; 42ºC and 74 % humidity.	Predictable preventative measures: short duration shifts; water and electrolytes must be available [‘camel-back’ tube fed, on demand supply is best]; buddy checking.
2x Dangerous occurrence PPE	2 x incidents of operatives sleeping on site without PPE; permission to have a break had been given; extremely hot conditions and hard physical work.	Basic training and supervision; tool box talk, follow procedures: go off-site to a safe area if PPE is to be removed; frequent breaks in less oppressive atmosphere, air conditioned if available, with access to plenty of water / electrolyte drinks.

References:

1 Health and Safety Executive Information Document: HSE 668/25 - PPE for welding and allied processes: practical guidance on assessment and selection http://www.hse.gov.uk/fod/infodocs/668_25.pdf

2 Abrasive Blasting: Code of Practice 2004 Queensland, Australia. http://www.deir.qld.gov.au/workplace/law/codes/abrasiveblast/index.htm

3 Health and Safety Executive leaflet on points to be considered when asked to treat a bee nest. http://www.hse.gov.uk/pubns/indg276.pdf

4 OPITO Trainee Blaster/Painter Training Standard: http://www.opito.com/library/industry_training_standards/blaster_painter_training_standard.pdf

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IRATA Safety Bulletin, from the desk of IRATA Technical Co-ordinator

Observations on a rope access incident reported issued by the Australian Rope Access Association.

The intention of this document is to comment on only the facts as stated in the report.
The Association may wish to add to this Bulletin when further verifiable information is received.
GL= IRATA guidelines on the use of rope access method for industrial purposes
GR= general requirements for the certification of personnel engaged in industrial rope access methods

INCIDENT ANALYSIS	
Observations	**Recommended good practice by IRATA Guidelines & General Requirements**
5 level 1 technicians on site with no supervisor	GL 5.2 The work is properly managed and supervised by competent persons and the workers are regularly monitored to ensure they continue to work in a safe manner. Workers are thoroughly trained in accordance with IRATA requirements GL 7.1 Level 1:- a technician who is able to perform a limited range of rope access tasks under the supervision of a level 3. GL 12.3.1 One member of the work team must be qualified as an IRATA Level 3 supervisor
The communication system worked, but inadequate checking led to the accident.	GL 12 A risk assessment [JSA] and method statement describe job requirements. Pre-work briefing ['tool box talk'] includes adequate communication, exclusion zone below, special precautions such as deviations or rope protection etc.
Pre-work checking of equipment: - The rope should have been checked for damage prior to, or at very least as it was fed over the edge. Mid-rope knots pose extra problems in rescue situations and should be avoided if possible.	GL 12.3.2.2 At the beginning of each working day and at other times as appropriate (e.g. when the suspension equipment is relocated during the day), the supervisor should visually check that all the anchors and ropes (wire and textile) and structures and packings used to support them are satisfactory. .
No check that ropes reached the bottom. This was the single most crucial failing; if this had been done the incident would not have occurred.	GL 12.7 No mention of exclusion zone at the bottom, into an apparently public area. GL 12.3.1.3 A ground person could at least check the rope reached bottom, without excessive slack becoming snagged.
A crane lifting sling was used for the deviation. The dimensions were not given, but likely to be of high strength, though the strength of the steelwork anchor also needs to be considered	GL 12.3.3.8 Wide deviations including an angle of over 120 degrees cause a multiplication of the load on both deviation sling and anchor. GR mentions consequence of failure and possible double anchorage may be appropriate.

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The rope protector moving with the rope and getting jammed in the deviation karabiner was a major factor in the incident. Attaching a rope protector to the structure is usually better than to the rope. If it was tied to the structure it may have stayed in place on the sunshade. The sunshade edge was close enough to have the protector attached within hand reach from the parapet.	Rope protector attached by a knot to the rope, rather than to the structure.
No supervisor with visual check of whole system top to bottom. “The section from the sunshade to the second diverting karabiner was missed, hence the slack rope in the system”	GL 12.3.2.2 as above, when the suspension equipment is relocated during the day; the supervisor should visually check that all anchors and ropes are satisfactory.
When the rope was lowered, the operators rigging appear not to have looked over the parapet to see that the ropes were running over the unprotected edge on the sunshade. This suggests inexperience of basic rigging checks, or supervision. If the missing protector had been noticed, it could have alerted them to the problem below. If this incident had not happened, perhaps there could have been another incident with the rope being cut on the sunshade edge.	GL 12.3.3.3 Ropes should be rigged so as to avoid running over sharp edges, particularly of steelwork, stone, concrete or masonry, or hot surfaces. Where this cannot be done, the rope should be suitably protected. This should ensure that the radius of any bend is at least twice the diameter of the rope. Such precautions could include the use of packings, rollers or other types of rope protector. If the rope was to be lowered with a rope protector attached by a knot, the protector would no longer be protecting the rope as it went over edge of the sunshade. The report mentions that the protector could have been attached to the structure, so that a lowered rope could pass through.
Getting off mid-descent, allowing a rope to be lowered causes potential problems getting on again, as the previously unloaded rope stretches. It is possible for the tech to drop several metres, unless the rope can be tensioned as he gets on. This is difficult unless there is a suitable anchor on the ledge for the tech to attach to. If operator A had been attached to an anchor on the ledge as he loaded the rope with his body weight rather than just pulling by hand, the rope may have un-jammed safely	

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SAFETY INSPECTION NOTICE August 2008

Please note the news item below prepared by:
Work at height safety association http://www.wahsa.co.uk/content/view/24/3/

PERIODIC EXAMINATION OF FALL PROTECTION SYSTEMS FOR WORK AT HEIGHT

HORIZONTAL, Flexible Anchor Lines - EN795 Class 'C'

Periodic examination of work equipment is crucial to its continuing safe performance and to the safety of workers who use it. This is particularly important with equipment used as part of a Fall Protection System, but many system owners may be unknowingly putting users at risk by not following manufacturer's instructions when procuring inspection services.

Every component of a Fall Protection System must be supplied with manufacturer's instructions, which include instructions for periodic examination, and which should comply with the requirements of EN 365. This standard requires that instructions for periodic examination shall include:

"Where deemed necessary by the manufacturer, e.g. due to the complexity or innovation of the equipment, or where safety critical knowledge is needed in the dismantling, reassembly or assessment of the equipment (e.g. a retractable fall arrester), an instruction specifying that periodic examinations shall only be conducted by a person or organisation authorised by the manufacturer".

WAHSA, which represents many major horizontal flexible line manufacturers, is of the opinion that systems from different manufacturers have sufficient technical differences from each other to make it most unlikely that an examiner trained by one manufacturer would have the technical knowledge necessary to examine systems from other manufacturers. Even where an examiner has PREVIOUSLY been trained by a manufacturer, EN365 requires that they should be knowledgeable of CURRENT periodic examination requirements, recommendations and instructions issued by the manufacturer.

Using an examiner who is not aware of manufacturers' latest technical updates, product recalls etc could result in users being provided with unsafe systems.

When selecting examiners for this type of system, WAHSA advises that for each system to be examined the examiner should be CURRENTLY registered with the system manufacturer - to receive technical updates, current instructions, product updates etc, AND be certified to install spare parts where necessary.

28 August 2008

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SCAFFOLD / BARREL KNOT - DANGEROUS IF INCORRECTLY TIED

Two cases have been noted in IRATA assessments where a Barrel knot also known as a Scaffold knot has been incorrectly tied around a karabiner to terminate a cow's tail. **If incorrectly tied, it is dangerous because it will slip undone if loaded** and especially in a pre-tied knot it is very difficult to tell that it is not a standard Barrel / Scaffold knot by just looking at it.

The Lyon Equipment report (2001)* for HSE noted that the Barrel knot was the best knot to tie in the end of a cow's tail for energy absorption.

CORRECT version of a Scaffold / Barrel knot: See figure 1 – 3 below; Stages in tying.

	**Figure 1 -** This is tied by passing approximately 50cm of the tail end of the rope over the karabiner and tying half a double fisherman's knot around the section going back to the harness.	✓
	**Figure 2 -** The rope is tightened making a slip knot and loaded sufficiently to grip the karabiner tightly.	
	**Figure 3 -** **This is a slip knot which tightens when loaded.** In a pre-use check, the knot should be adjusted for length and loaded; the tail should also be tightened. If the knot is not adequately tightened the wraps may work loose and come undone. It is good practice to unfasten and re-tie cow's tail knots periodically to avoid them becoming over tightened.	✓

DANGEROUS version of knot: See figure 4 – 7 below; Stages in tying

This is very obviously wrong if the person tying it has any understanding of how the knot works. **This is not the intended slip knot and the important difference is that the tail will pull through if the cow's tail is loaded.** Without tightening it will come undone easily, but if the tail end has been pulled tight and the wraps hand tightened before loading, there may be sufficient friction not to loosen the karabiner unless body weight is used to load the cow's tail.

The knot may be tied incorrectly in two ways:

Figure 4 - Method 1
Half a double fisherman's knot is tied 10 -15 cm from the end of the rope, giving a Stopper knot.

Figure 5 - Method 1
The tail is passed over the karabiner and pushed back through the body of the knot to give the result in Fig 7 when tightened.

Figure 6 - Method 2
This is very unlikely to be done, especially if the cow's tail is attached to the harness first, but is included for completeness. It involves passing 10 - 15 cm of rope over the karabiner and then the long end of the rope is used to tie the half double fisherman's around the tail end.

Figure 7
This dangerous knot is a tightened version of Figs 4 - 6 and looks very like Fig 3 at first sight. **This is not a slip knot and the important difference is that the tail will pull through if the cow's tail is loaded.**

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Conclusion:
Hopefully these incorrectly tied knots [figures 4 - 7] should not appear, but if accidentally tied they are more likely to go undetected if the knot is pre-tied and only a visual check is made.

Supervisors should be vigilant and ensure buddy checks and loading are done before use.

References:

1) ICOP section 2.11.5 – The Use of Knots.
2) Industrial rope access – Investigation into items of personal protective equipment "
* Lyon Equipment 2001: http://www.hse.gov.uk/research/crr_htm/2001/crr01364.htm
"The tests show that the best material for cow's tails is knotted dynamic rope. Of the knots tested, the Barrel knot produced the lowest impact forces, followed by the figure-of-eight."

Grit Blasting Incident. There were several contributory factors

Incident Detail	Incident analysis/ control measures / possible solutions
A rope access technician was standing on an I-beam, blasting. He was attached with slings and cow's tails to an I-beam at shoulder level. These were not tight enough to hold him in position. He lost his balance and fell forward letting go of the dead man's handle. As he put his arm out to stop himself falling forwards, he blasted his forearm with the residual pressure in the system.	Pre-job training is necessary in the precautions and techniques to deal with the additional hazards of using high pressure tools when associated with rope access, over and above standard safety measures for blasting on the ground. Do not rely on own ability to maintain balance; feet should only be used to stabilise. To overcome reactive forces, subsidiary anchor lines should be used to tension the technician in position, in addition to being adequately braced. Tree surgeon type work-position devices with steel cored rope may help with body positioning**.** A hard line [steel cable] with minimal slack to a separate safety line and / or to the structure is necessary in case of damage to textile elements of the suspension system.
The suit had a damaged thumb ring, which allowed the sleeve to slide up the arm un-restricted. The blasting gauntlets had been modified by cutting a hole through the upper section to allow a karabiner to attach them to gear loops, as constant removal and replacing is necessary during climbing and blasting operations. The main blast damaged was at the modification point of the gauntlet. He had other gloves to wear when he was carrying out rope access manoeuvres.	PPE provided for rope access technicians is no different to PPE provided when blasting on the ground. The company are developing a new suit with helmet attachment to help overcome this problem. The thumb elastic loop was broken allowing the sleeve to ride up his arm away from the gauntlet. PPE should not be modified; in this case, this may have reduced the protection provided. It is common practice to tape sleeves to gloves and overalls to boots to prevent flesh being accidentally exposed.
The manpower and offshore Rep belonged to one company and the supervisor and equipment were provided by another company. References on the permits showed a mix of procedures being used. This caused some confusion on both the risk assessment side of the job and the general understanding of procedures from two different companies.	Joint operations involving more than one company's procedures should be clarified at the planning stage and a single joint procedure agreed prior to work commencing.

References:

Abrasive Blasting: Code of Practice 2004 Queensland, Australia. http://www.deir.qld.gov.au/workplace/law/codes/abrasiveblast/index.htm

OPITO Trainee Blaster/Painter Training Standard: http://www.opito.com/library/industry_training_standards/blaster_painter_training_standard.pdf

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Window cleaning incident – Falling person

An accident occurred during a window cleaning job, where ropes required moving from one drop to the next as soon as it was finished with. One operative had descended to the ground; another operative had descended a second set of ropes, which landed on a flat roof. At this point rather than gathering his ropes and feeding them off the flat roof down to ground level, he opted to disconnect from them and re-attach to an adjacent set (which he had not been cleared to use), which reached ground level.

He fell 3.5metres to the ground sustaining wrist injury, because the ropes were detached from their anchors and being held by the supervisor during the process of re-rigging to the next anchor set.

Conclusion: A potentially fatal incident, largely due to the failure of the operative to follow laid down procedure, as communicated by the supervisor, as to when ropes would be safe to use.

Incident analysis/ control measures / lessons to be learned

1 Work to agreed procedures which include: Pre work briefing [Tool box talk] covering, but not limited to:

2 Rope access technicians should not ascend or descend any anchor lines without confirmation from the supervisor that it is safe to do so, following pre-descent/pre-ascent checks.

3 Before any anchor lines are de-rigged, it is essential that all members of the team confirm that they are safe and aware that de-rigging is about to take place.

4 Adequate communications are necessary for safety e.g. radios, mobile phone etc

5 If the supervisor is supervising operatives from another company, there should be clarification and prior agreement of the work procedures.

6 **Not relevant in this case**, but could be in a situation with long ropes above a short drop to the ground. Getting off mid-descent, and getting on again, or getting on to new anchor lines at mid height presents a problem. Previously unloaded ropes will stretch suddenly, possibly allowing a technician to drop a distance proportional to the length of rope above. In order to be safe there should be suitable anchors at mid-height for the technician to attach to, while the rope above is tensioned to remove slack.

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Grit Blasting Incident. Initial notification

Incident Detail	Hazard	Control measures / possible solutions
Initial notification of a blasting incident where 'dead-man handle' function on the blasting equipment failed to operate but appropriate PPE had apparently not been used.		Pre-job training is necessary in the precautions and techniques to deal with the additional hazards of using high pressure tools when associated with rope access, over and above standard safety measures for blasting on the ground. See refs below
	Technician blasts himself, grit injection, severe abrasions, personal injury	Personnel must be trained and competent. Appropriate PPE must be available and worn & care taken that this does not impair operation of rope access equipment. Do not rely on own ability to maintain balance; feet should only be used to stabilise. To overcome reactive forces, subsidiary anchor lines should be used to tension the technician in position, in addition to being adequately braced. Tree surgeon type work-position devices with steel cored rope may help with body positioning. Dead man's lever to be tested as operational before blasting commences & standby personnel to perform emergency shut downs and test before use; Recovery system to be in place.
	Cutting through ropes causing fall, serious injury/fatality	Personnel should be attached to a back-up hard line [steel cable] out of range of the blasting nozzle, in case of damage to textile elements of the suspension system. The hard line should have minimal slack and be attached to a separate safety line and / or to the structure. Use of rope protectors may be necessary on other attachments. Standby personnel to perform emergency shut downs and test before use. Recovery system to be in place**.**
	Grit in eyes, excess noise, personal injury/disability	Appropriate PPE to be worn by standby personnel and those in the vicinity of operations.
Many e.g. confined entry or noisy work e.g. blasting etc	Communications failure/ difficulty	Pre–arranged hand signals used because a microphone is unsuitable when blasting. To contact the blaster the level 3 will cut off air supply [a common but effective technique] Recovery personnel to be in designated position at all times when personnel are working.
Change of platform status/ alert	Personnel unaware/ communication issue	In a general platform alert, personnel to vacate work site and go to muster station. Control room to be contacted by radio man. Pre–arranged signals to be arranged between personnel working in noisy environments before work begins.

References:
Abrasive Blasting: Code of Practice 2004 Queensland, Australia. http://www.deir.qld.gov.au/workplace/law/codes/abrasiveblast/index.htm

OPITO Trainee Blaster/Painter Training Standard: http://www.opito.com/library/industry_training_standards/blaster_painter_training_standard.pdf

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Incident where a cow's tail caught round a technician's knee as he stood up.

The photo illustrates a not unusual occurrence, which is usually without serious consequences. However this turned into a lost time incident, as it was necessary for the technician to be evacuated with a back strain.
A similar potentially dangerous practice applies to foot loops being dragged on the floor when a rope access technician gets off the ropes. Unless stowed away a fall could result if these loops or cow's tails catch on scaffolding or other obstruction when climbing stairs.

Trainers are advised to emphasise suitable stowage of cow's tails and foot loops when not in use to prevent this happening. There are a variety of ways to do this by tucking them into leg loops or shortening them. Level 3s and buddy checking of each other should encourage this safe practice.

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HOW TO AVOID DROPPING BACK-UP DEVICES

Recent occurrences have led to this advice being offered.

The back-up device is the only part of personal rope access equipment that needs to be removed from the harness or cow's tails during work.

With care dropping these devices is avoided by the following common methods:

Petzl Shunt: Before removing the shunt from the rope, remove the karabiner and carefully push the cam through the body to other side of the rope and replace the karabiner through the cam. [See photo 2]

In this position the base of the cam prevents the rope from being removed from the shunt, so the shunt cannot fall if the karabiner is reattached in this way. The shunt can only be removed from the rope by pulling down on the cam to fully open the rope channel.

After the shunt is reattached it grips the rope without being held, so the karabiner can be removed and replaced to load the cam normally.

Photo 1
Shunt loaded correctly

Photo 2
Shunt retained by karabiner to prevent dropping.

Warning: This is dangerous if accidently loaded in this way.

If the user is distracted part way through the above sequence it is possible to overlook this incorrect loading, especially if using a thick rope.
Always confirm correct loading by a tug on the cow's tail /lanyard.

ASAP B71 (copied from Petzl website: www.petzl.com)
When the ASAP MUST be secured to avoid dropping it

For some work situations, it is obligatory to secure tools and equipment to prevent them from being dropped. It is possible to attach the ASAP to the OK TRIACT with a keeper cord. **Warning:** using a keeper cord makes the device more difficult to handle and increases potential dangers and possible misuses.

Installing the keeper cord (fig. 1)

Tie one end of the keeper cord to the lower hole of the ASAP (identified as #7 in the *Nomenclature* section of the Instructions for Use). The knot of the keeper cord must be tied as close as possible to the device to keep the size of the loop to a minimum. Make a loop at the other end of the cord and connect it to the OK TRIACT karabiner. The loop must be tightened on the body of karabiner so that it stays in place close to the ASAP attachment holes. The cord must be short: once in place, it should be no longer than 11 cm. It's possible to use an elastic cord to make handling easier, as long as it's no longer than 11 cm when it's not stretched. When attaching the ASAP to the rope, run the keeper cord along the backside of the device (the side opposite the toothed wheel). Once the OK TRIACT karabiner is connected to the ASAP, the keeper cord must not be able to reach the toothed wheel.

Fig. 1

Warning danger (fig. 2)

- If the keeper cord is longer than 11 cm when tied to the device.
- If the keeper cord is on the wheel side of the ASAP.

There’s a risk that the keeper cord may get jammed in the toothed wheel, causing the ASAP to malfunction.

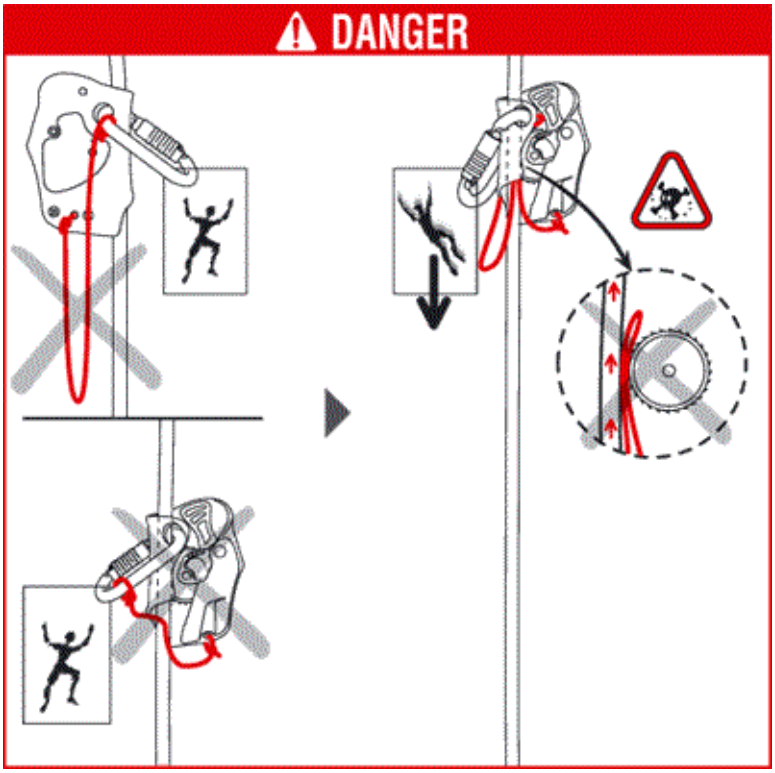

Fig. 2

WARNING: when using the ASAP, the OK TRIACT karabiner must be clipped through the 2 attachment holes and the rope must run inside the karabiner. IF NOT, DANGER OF DEATH (**fig. 3**).

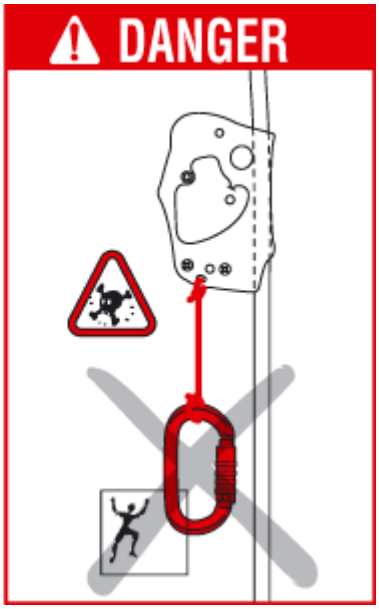

Fig. 3

Photo 3

Photo 3: Shows an alternative where the lanyard karabiner is placed in a small loop of cord in the lower hole to prevent dropping the ASAP as it is removed. Warning: this is obviously dangerous if the ASAP is loaded by this karabiner from this loop.

Information is non-exhaustive - refer to the Instructions for Use and other ASAP EXPERIENCE documents.

SCAFFOLD / BARREL KNOT - DANGEROUS IF INCORRECTLY TIED

Two cases have been noted in IRATA assessments where a Barrel knot [probably more correctly also known as a Strangle-Snare or Scaffold knot] has been incorrectly tied around a karabiner to terminate a cow's tail. If incorrectly tied, it is dangerous because **it will slip undone if loaded** and especially in a pre-tied knot it is very difficult to tell that it is not a standard Scaffold / Barrel / Strangle knot by just looking at it.

The Lyon Equipment report (2001)* for HSE noted that the Barrel knot was the best knot to tie in the end of a cow's tail for energy absorption.

CORRECT version of a Scaffold / Barrel knot: Figs 1 - 3 Stages in tying

Figure 1

This is tied by passing approximately 50cm of the tail end of the rope over the karabiner and tying half a double fisherman's knot around the section going back to the harness.

Figure 2

The rope is tightened making a slip knot and loaded sufficiently to grip the karabiner tightly.

Figure 3

This is a slip knot which tightens when loaded.

In a pre-use check, the knot should be adjusted for length and loaded; the tail should also be tightened. If the knot is not adequately tightened the wraps may work loose and come undone. It is good practice to unfasten and re-tie cow's tail knots periodically to avoid them becoming over tightened.

SCAFFOLD / BARREL KNOT - DANGEROUS IF INCORRECTLY TIED

DANGEROUS version of knot: See Figs 4 - 7 Stages in tying

This is very obviously wrong if the person tying it has any understanding of how the knot works. **This is not the intended slip knot and the important difference is that the tail will pull through if the cow's tail is loaded.** Without tightening it will come undone easily, but if the tail end has been pulled tight and the wraps hand tightened before loading, there may be sufficient friction not to loosen the karabiner unless body weight is used to load the cow's tail.

The knot may be tied in two ways:

Figure 4 - Method 1
Half a double fisherman's knot is tied 10 -15 cm from the end of the rope, giving a Stopper knot.

Figure 5 - Method 1
The tail is passed over the karabiner and pushed back through the body of the knot to give the result in Fig 7 when tightened.

Figure 6 - Method 2
This is very unlikely to be done, especially if the cow's tail is attached to the harness first, but is included for completeness. It involves passing 10 -15 cm of rope over the karabiner and then the long end of the rope is used to tie the half double fisherman's around the tail end.

Figure 7
This dangerous knot is a tightened version of Figs 4 - 6 and looks very like Fig 3 at first sight.
This is not a slip knot and the important
difference is that the tail will pull through if the cow's tail is loaded.

DANGEROUS

Conclusion:

Hopefully these incorrectly tied knots [figs 4 - 7] should not appear, but if accidentally tied they are more likely to go undetected if the knot is pre-tied and only a visual check is made.

Supervisors should be vigilant and ensure buddy checks and loading are done before use.

References:

1) Double fisherman's knot: http://en.wikipedia.org/wiki/Double_fisherman's_knot
2) " Industrial rope access – Investigation into items of personal protective equipment "
* Lyon Equipment 2001 : http://www.hse.gov.uk/research/crr_htm/2001/crr01364.htm
"The tests show that the best material for cow's tails is knotted dynamic rope. Of the knots tested, the Barrel knot produced the lowest impact forces, followed by the figure-of-eight."

ROCK STABILISATION INCIDENT – PERSON HIT BY FALLING ROCK

A rope access technician was in descent mode carrying out de-vegetation operations on a cliff, when a rock of about 6 kg was dislodged from above by his own ropes. This rock struck his helmet, causing him to be unconscious for approximately 30 seconds. He was brought quickly to the ground as in the rescue plan. The casualty was taken to hospital with suspected head and neck injuries. His helmet was unbroken apart from a large scuff and the internal cradle was intact. It appears that the cut to the head was caused by the inside of the helmet shell. The chin strap was securely fastened which probably avoided more serious injury. The neck injury was probably due to the impact of the rock on the helmet. Only relevant details are noted below.

Hazard	Control measures
Injury to operative working on a slope caused by collapse or slope failure	Cliff faces and slopes will be inspected by a suitably qualified and experienced engineer. A plan for the safe removal of vegetation and loose rock made on a day to day basis such that the work can be done safely. Operatives to be experienced in working on potentially unstable slopes. The site foreman will monitor the situation during the course of the works and will stop the works at any time he feels the slope is unsafe. Work only resumed after inspection by a suitably experienced engineer has confirmed it safe to do so. If necessary, temporary support such as rock bolts and cable strapping may be necessary before working on an unstable item
Injury caused by falling objects resulting from overhead working	Rock removal to be co-ordinated with other site operations to ensure there is no conflict. e.g one work team does not interfere with another and that they work sufficiently spaced apart. No operative to work below another. The access below a work zone will be isolated with high visibility barriers and warning signs. To pass below a work zone, persons must make the work party above aware that they wish to pass and can, only when the work party team leader has confirmed it is safe to do so. Operatives reaching the ground will exit by a safe route, which does not pass below another operative. Third parties and other ground-based operations will be coordinated with the roped access works to ensure there is no interference and that they are aware of works overhead. All tools will be kept on a lanyard or suspended on a separate rope system.
Injury to operatives doing rock removal works	The top edge of the slope may be covered with wide protective material to minimise the possibility of damage to ropes, or rope movement dislodging anything. Loose material will be removed working from the top down, to ensure that the face above them is safe and the possibility of dislodged rocks falling onto an operative is minimized before descending further. Rocks are removed using a hand held prise bar when waist height or below. See also relevant control measures above.

Injury to operatives doing de-vegetation works	Operatives to be experienced in the use of de-vegging tools and tool box talks given as necessary. Operatives to rig ropes to avoid damage from tools and inspect ropes each time before use for cuts. Chainsaws only to be used by trained and experienced personnel using full protective equipment. Appropriate PPE used includes gloves, ear defenders and eye protection.
Damage to ropes	Ropes protected from damage from abrasion, falling rock or cutting tools by rope protectors, retaining spare rope in bags attached to them, or positioning ropes to one side. See also relevant control measures above.

Conclusions / Remedial action / lessons to be learned

- Amend Method Statement and Risk Assessment to further emphasise operatives must keep checking above them and be aware of the possibility that any movement of their ropes could dislodge loose material.
- Toolbox talk to emphasise risks and procedures for dealing with loose rocks, this to be monitored for effectiveness
- Monitor condition of slopes above workforce at all stages of the contract to ensure loose material is not dislodged by either operative's ropes or lifting and lowering operations.
- The site team recommended that de-veg and rock removal should take place in one operation, rather than de-veg before rock removal
- The site team noted the importance of the casualty wearing a connected chest harness as this definitely assisted in handling the casualty.

Observation

- In some cases on loose slopes sacrificial netting/ mesh is fixed first, so that rock removal takes place through the netting to give greater protection to the workforce. Depending on the situation, rock netting may be laid on top of this.

30 August 2009

SNAGGED ROPE INCIDENT – FALLING PERSON

Two sets of anchor lines were rigged by a Level 3 rope access technician from the roof of a building and then thrown down to the lower of two balconies. From the lower balcony, the plan was for two technicians to pull the ropes coming down from the roof, to remove any slack rope above and feed the remainder to the bottom with rope protectors or deviations as necessary. From this lower balcony the Level 2 and Level 3 technicians would start their parallel descents. The Level 2 technician maintains he was suspended for a short time whilst getting ready to descend, before he suddenly dropped 12-15 metres with minor impacts en route, coming to a stop on his descender, just 2metres from the bottom. The Level 3 technician descended quickly and was able to release the casualty by standing on a structure near the bottom. The casualty was taken to hospital, but suffered no broken bones.

Incident analysis/ control measures

- The technicians had apparently done this descent many times previously without mishap. The Level 2 apparently pulled on his anchor lines and thought they were OK before committing himself to the abseil. The only explanation is that the ropes had accumulated at some point above the second balcony and snagged initially before releasing suddenly.
- Ideally anchor lines should be visually checked to ensure there is no build up of slack between the anchors and access point that could become snagged and release suddenly. In this case it is not possible to see the upper or lower balcony from the roof top area and from the lower balcony position it is not possible to see the upper balcony area.
- If someone had checked at the bottom, it should have been possible to see if both the anchor lines reached bottom and similar lengths were down.
- Checks were not carried out on the ropes as they passed the upper balcony level where it is likely they were snagged. A visual check from the top was impossible, but by positioning someone at the top and the other at either balcony or at the bottom, it should have been possible by each alternately shaking or pulling the ropes to determine if there was any slack between them.
- Adequate communications for this checking is necessary.
- The casualty was extremely fortunate that the slack in the system was not greater, other wise he would have hit the floor. The fall factor is estimated to have been about 0.5, though it is also possible there may have been some edge friction to contribute to energy absorption as well as rope elongation.

Conclusion / Lesson to learn:
A potentially fatal incident, due to failure of the rope access technicians to check that there was no build up of slack between the anchors and their access point that could become snagged and release suddenly.

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Not directly relevant in this case.

When attaching to anchor lines at mid-height or with a long length from the anchor point to the access point; rope elongation needs to be considered. Previously unloaded ropes will stretch suddenly, allowing a technician to drop a distance proportional to the length of rope above, with potential for impact injury. In order to be safe there should be suitable anchors at mid-height for the technician to attach to, while the rope above is tensioned to remove slack.

30 August 2009

Severed working line

Anchor lines were rigged 3m back from the edge, where they went over a metal rainwater gutter in a rope protector. The injured person had descended 3m and was painting a window when the working line failed. The shunt back-up device locked onto the safety line, but as he was working close above a glass roof, his fall was not arrested before his foot had made a heavy contact with the wired glass roof. He sustained a sprained ankle and broke several panes of glass.

It was found that the working line and rope protector had been cut through by a very sharp edge on a section of the metal guttering, probably exacerbated by sideways movement of the rope to reach the windows being painted. The estimated length of fall i.e. combined stretch of the safety line and device lanyard (cow's tail), slippage of the shunt and slack in the system was 2m.

Incident analysis/ control measures / lessons to be learned

- Although rope protection was in place and had proved to be sufficient over the previous days it was inadequate for that stretch of gutter. The risk assessment although referring to rope protection did not identify the metal gutter as a specific hazard. If the entire length of gutter had been assessed before work started, or before going over the edge, appropriate protection could have been put in place.
- Subsequently they established that by putting a length of hard plastic drain pipe cut vertically over the edge of such guttering, it would allow work to be carried out safely. Other types of protection such as rollers or rounded metal plates are available for sharp edges where textile protection is likely to be inadequate. Care is necessary to ensure protection will be effective with sideways movement of anchor lines.
- A loaded rope over a sharp edge can be cut relatively easily, especially with sideways movement. Technicians need to be particularly aware of all abrasion points when anchor lines are not free hanging and ensure adequate rope protection is in place.
- Working on ropes relatively near to the ground means that if the working line fails it is possible the backup device will not prevent impact with ground or other structure, because of elongation in the safety line. Whatever type of back-up device is used, some elongation cannot be prevented. The longer the safety line above the technician, the greater the fall distance due to elongation. A possible solution is to load the back-up device, but a loaded rope is easier to cut than slack one, so good protection is essential.

Anchor line protection information – though not directly relevant in this case

- At abrasion points in mid-height situations, attachment of the protector to the structure rather than to the anchor line is preferable, as anchor line elongation could result in poor protection or no protection at all. If exit is to be from the bottom, but retrieval of the anchor lines is to be from the top, then anchor line protector should be fastened to the safety line. If the working line and the safety line are some distance apart, an anchor line protector should be used for each anchor line. Where one anchor line protector is used for both anchor lines, it is normally attached to the safety line only, as it is less likely to stretch than the working line, thus minimising the chance of accidental abrasion
- Care is necessary to ensure the anchor line protector remains in the correct place when the anchor line is loaded, or that it is repositioned correctly when more than one person uses the anchor line. This may be particularly relevant if users are of different weights (masses). The consequences of a failure of the working line and the subsequent elongation of the safety line should be taken into account, which may prompt the use of several anchor line protectors.

Descender incident – near miss - failure to check catch on side plate.

During an IRATA training course, two Level 1s were practising a snatch rescue (for the third time) about three metres from ground, using a single set of ropes with a Petzl Stop descender and a Petzl Shunt as a back-up device.
As the rescuer lowered on the casualty's Stop to bring the casualty's weight on to the rescuer's Stop, the working line suddenly came out of the Stop with a loud noise, leaving both Level 1s suspended from the rescuer's Shunt. The unclosed Stop had held the rescuer's weight up to this point. The Level 1s were quickly removed to ground with no ill effects, apart from minor rope burns to the rescuer's hand. The Stop side plate was bent, so the Stop was discarded and all other equipment quarantined for close examination.

Incident analysis/ control measures/ lessons to learn

The rescuer had threaded the Stop correctly and locked it correctly, but had **not checked that the black spring catch on the side plate was correctly closed.**
The Shunt had been correctly positioned throughout the exercise and worked as intended. There was no discernable slippage or damage to the Shunt.

To protect against this type of incident occurring again, the following additional control measures are recommended:

1 All devices with such catches should have a visual and audible check to ensure that they have clicked shut. This should be part of a buddy/ trainer check.

2 In such a training environment it is crucial that adequate levels of supervision are maintained, particularly in situations using live casualties with inexperienced candidates. Appropriate supervision could have avoided this incident.

3 It is recommended that the following operational checks are standardised during IRATA training and expected at assessment and by supervisors in work situations.

Standard operational checks before descent

(Where possible this should be part of a buddy/ trainer check and is applicable to all descender/ backup device combinations).

1 '**Pre-use check' of equipment**: visual/ tactile/ functional (see manufacturer's instructions).

2 If at the top, attach an anchor lanyard (cow's tail) to an anchor during a 'function test'.

3 Attach the back-up device to the safety line and maintain it in a high position without manipulation until all checks described below have been completed.
   (a) Check the back-up device attachment karabiner is correctly closed;
   (b) Check for correct attachment and orientation of the back-up device on the safety line (i.e. not upside down), by pulling on the device lanyard (cow's tail).

4 Attach the descender

(a Descender karabiner is correctly closed, with the opening towards user & pointing down;

(b) Working line is threaded into the descender as illustrated on descender;

(c) The catch on descender side plate is fully closed, if one is present. Otherwise check instructions for correct installation of the device on harness or anchor.

5 **Function test /Descent test** (mini abseil)

Finally unlock the descender with a secure grip on the control rope and do a150-200mm descent with the back-up device in a high position, without being manipulated until the descent system is found to be O.K.

IRATA SAFETY BULLETIN SB13

SPARKING FROM A WIRE ANCHOR SLING

Issue No.	SB13
Issue Date	22.03.2010
Issuer	IRATA Health & Safety Cmtte
Status	Initial response to an operating members report

This bulletin is for the attention of those responsible for operational rope access work and health and safety advisors.

A member working on an oil platform issued a non conformity / improvement opportunity report, after it was noticed that sparks had come from a galvanised wire anchor sling. Since the possibility of causing a spark is obviously to be avoided in any potentially explosive atmosphere the work was stopped. In a safe area, the sparking was replicated by rubbing the wires on a piece of rusty steel.

The possible cause of sparking is too complex to explain in this safety bulletin, but the following precautionary action is recommended.

Where the use of intrinsically safe equipment is a necessity, consideration should be given to the deployment of anchor slings made from man-made fibres, noting that they are significantly less resistant to heat, abrasion or chemicals than wire rope or chain.

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IRATA SAFETY NOTICE SN14

MANRIDING INCIDENT – CONNECTOR FAILURE

Issue No.	SN14
Issue Date	26.10.2010
Issuer	IRATA Health & Safety Committee
Status	National Offshore Petroleum Safety Authority - Safety Alert 38

This document Safety Alert 38 from the National Offshore Petroleum Safety Authority is reproduced here, noting that although it was not a rope access incident it has value:

Key points:

- There was no back up.1
- There was no competent inspection and maintenance, which is particularly important when using triple-locking karabiners in dirty conditions.
- When selecting the type of gate locking system for connectors, users should balance the possibilities for human error against ease of inspection of a simple construction compared with a more complex mechanism which may be more likely to malfunction if not regularly maintained.

Manriding Incident – Carabiner Failure

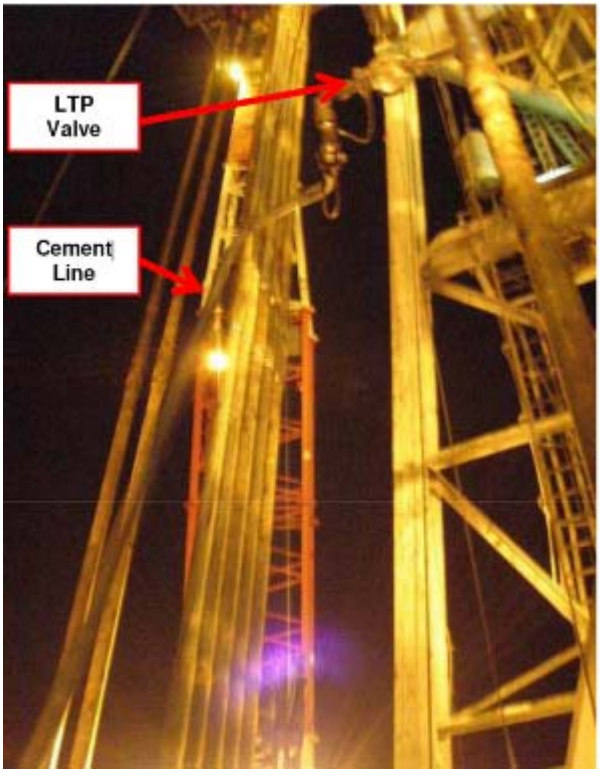
What happened?

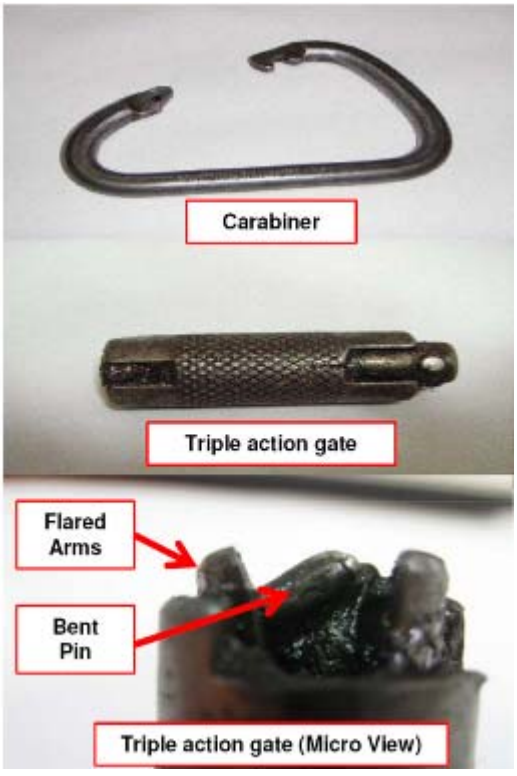
On a semi-submersible drilling rig, the drill crew had completed rigging up for a cement job. After pressure testing the cement line, a crew member was required to open the low-torque valve. The valve was located at a height of seven metres above the rig floor and could only be accessed by using a tugger and man-riding harness.

With the assistance of a roustabout, the person in the man-riding harness connected to the wire rope from the man-riding tugger using a carabiner. Another crew member then operated the tugger to raise the man-rider up to the height of the low-torque valve.

Operation of the valve involved some physical movement of the man in the riding harness. The man-rider then pushed away from the valve, grasped a cement hose with his right arm and signalled to the tugger operator to commence lowering. As lowering began, the carabiner locking gate broke free from the carabiner body. The man-rider became disengaged from the tugger wire rope and fell to the rig floor. Because he was holding the cement hose, this action slowed his descent. He landed feet first and rolled to absorb the fall.

Examination of the carabiner was carried out by a Materials and Corrosion Engineer. A considerable amount of dirt was found lodged around the latch pin and between the latch yokes. This contamination may have prevented full gate closure of the carabiner by stopping the gate sleeve from rotating to lock the latch. This would have left the tensioner spring as the only mechanism holding the gate closed.





Manriding Incident – Carabiner Failure

What went wrong?

1. The carabiner was thought to have failed because it was used with the gate in the unlocked position.
2. The most likely cause of the carabiner being unlocked was dirt inside the gate mechanism preventing it from closing fully.
3. The carabiner was not rigorously checked for security when it was operated.
4. The planned maintenance system did not identify the carabiner on the man-riding harness as an inspection item.

Key Lessons

Potential hazards associated with the use of the carabiner had not been identified. The routine planned maintenance instructions did not therefore identify the carabiner on the man-riding harness as an item for inspection. This lack of detail allowed the carabiner to be overlooked when inspections were carried out.

The height and position of the side entry sub on the cement stand that included the low torque valve was not designed or planned to minimise or eliminate the need for man-riding.

The man-riding procedures were not detailed enough to include rigorous inspection and checking of the carabiner for security when it was being operated by the user. This may have allowed the carabiner to be put into use with an unlocked gate. The operator has now replaced the carabiner on the man-riding harness with a 4-part shackle. This shackle is included in the lifting register as required in the man-riding procedure and is included in the loose lifting equipment inspection colour coding system.

Who is responsible?

(i) The operator of an offshore facility has a general duty of care under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* to ensure that all work and other activities are safe, and that the risk to the health of people is as low as reasonably practicable. Specifically, the operator must implement and maintain a safe system of work for any plant and equipment.

(ii) Any person who is in control of any part of a facility or particular work carried out at a facility has similar duties to the operator for that part of the facility or that particular activity.

(iii) Every person at a facility must at all times, take all reasonably practicable steps to ensure that by any act or omission, they do not create or increase a risk to the health or safety of either themselves or anyone else.

Contact

For further information, email alerts@nopsa.gov.au and quote Alert 38.

IRATA SAFETY NOTICE SN15

HOT-WORK INCIDENTS

Issue No.	SN15
Issue Date	26.10.2010
Issuer	IRATA Health & Safety Cmtte
Status	International Marine Contractors Association IMCA - Safety Flash 06/10

This document from the International Marine Contractors Association is reproduced here as it has value.

Note: some of the points in the investigation are covered by guidance in IRATA International Code of Practice [ICOP]. Annex M

- A common element in 'hot-work' incidents is inadequate training to use tools from ropes:

M.6 Blasting, spraying and jetting from anchor lines

- *M.6.1 Before work commences, training is necessary to cover the precautions and techniques required to deal with the additional hazards of using high-pressure tools when associated with rope access, over and above standard safety measures for using this equipment on the ground*.
- *M.6.4 Where the reaction from the high-pressure tools could unbalance the rope access technician and cause an accident, subsidiary anchor lines should be used to tension the rope access technician in position*.
- **Incident 1** see M.5 Hot work
- *M.5.1 Care should be taken by the rope access technician to protect against potential personal injury while carrying out hot work, e.g. by sealing the gap between overalls and boots or sleeves and gloves to prevent hot material such as weld or grit entering*.
- **Incident 4** see M.1.5 *Control measures should be implemented to minimize the potential for injury in the event of the rope access technician losing control of tools or equipment. Examples of control measures include self-actuating cut-off devices (so-called dead-man's handles) or rigging tools in such a way that, if control is lost, they swing away from the user*.
- M.5.2 *For certain types of hot work, rope access equipment such as anchor lines and harnesses may need special protection, e.g. anchor lines could be protected in the immediate hot-work area by attaching heat resistant anchor line protectors around them*.

Replacing the metal hard-link with a non-conductive polyamide sling seems to ignore the fact that the hard link was used to minimise the chance of heat damaging polyamide anchor lines in the first place, which is a more likely occurrence than for that reported.

Good practice should ensure that the air supply to the gouging torch are drained and blown through before use. For added security a heat resistant anchor line protector could be added to any hard link used to give protection against damage to the working lines as well as providing electrical insulation.

IMCA Safety Flash 06/10

September 2010

These flashes summarise key safety matters and incidents, allowing wider dissemination of lessons learnt from them. The information below has been provided in good faith by members and should be reviewed individually by recipients, who will determine its relevance to their own operations.

The effectiveness of the IMCA safety flash system depends on receiving reports from members in order to pass on information and avoid repeat incidents. Please consider adding the IMCA secretariat (imca@imca-int.com) to your internal distribution list for safety alerts and/or manually submitting information on specific incidents you consider may be relevant. All information will be anony mised or sanitised, as appropriate.

A number of other organisations issue safety flashes and similar documents which may be of interest to IMCA members. Where these are particularly relevant, these may be summarised or highlighted here. Links to known relevant websites are provided at www.imca-int.com/links Additional links should be submitted to webmaster@imca-int.com

1 Third Degree Burn Sustained During Rope Access Hot Work

A member has reported an incident in which a rope access technician (RAT) suffered third-degree burns whilst engaged in hot work. The injured person was engaged in rope accessed structural cutting activity using an oxy-acetylene torch on a 20 inch pump caisson. During the operation sparks and molten material were blown in the direction of the injured party, and a small piece of molten material was caught in the tongue and ankle protector of his left safety shoe, causing serious burns to the left foot. The injured person was able to stop work, swiftly remove his safety shoe and safely descend to deck level using the rope access gear. Following initial first aid, it was noted that the burn was more serious than could be treated onboard and arrangements were made for the injured person to receive further treatment in hospital ashore.

Figure 1 - Area in which rope access hot work was taking place

Figure 2 – Injured person's safety shoe showing burn damage

The investigation revealed the following:

The direct cause of the incident was failure to use the correct personal protective equipment (PPE). Spat protectors were not readily available, partly due to inadequate organisation. These offer flame retardant protection to part of the under leg, ankle and shoe.

The root cause of the incident was inadequate procedures and standards of work.

- **Procedures** - specific details of hazards and precautions were not implemented in procedures for rope access hot work activities;
- **Risk assessment** - a full risk assessment for rope access-based hot work was not available and the job specific risk assessment used did not reflect any job specific issues;
- **Permit to work (PTW)** - the permit to work showed partially generic pre-setting on hazards and precautions with references to standard rather than specific job safety analysis (JSA);
- **Job safety analysis** - a specific job safety analysis was not available at the time of the incident;
- **Toolbox talks (TBT)** - the quality of toolbox talks was not sufficient and needed to be improved.

Following the incident, the following actions were taken:

- Arrangements were made to make spat protectors available as soon as possible;
- Investigated the use of more substantial protective equipment for persons doing hot work;
- Arranged for all appropriate worksite safety documentation (e.g. PTW, JSA and TBT records) to be available with specific detailed job-related entries;
- Investigated further training for personnel engaged in hot work, particularly flame-cutting.

2 LTI – Severed Tendon

A member reports an incident in which a person suffered a severed tendon, resulting in several months off work. An electrical cable with a thick rubber sheath was being prepared for termination during a mobilisation. A pair of electrical side cutters was being used to cut back the rubber insulating material from the end of the cable being terminated. When cutting, the side cutters were also being pushed into the cable to aid the cut. After three successful cuts the side cutters slipped, stabbing the left hand that was holding the cable. The stab caused a puncture wound to the injured person's middle finger just above the first knuckle.

It was clear immediately following the incident that on clenching the left hand the injured person's finger did not move. On further investigation at the hospital, it was confirmed that the injured person had a severed tendon. Surgery was carried out to reconnect the tendon. It was anticipated that the injured person would be off work for 2 – 3 months.

Following investigation of the incident and its causes, our member noted the following:

- The injury was caused by the incorrect use of sharp hand tools. Although side cutters are often used when stripping back cable, their correct use is for cutting electrical cable or long thin items such as cable ties, at 90°. Side cutters are not specifically designed to cut in the way that scissors do, which is the way they were being used in this incident;
- The task was considered to be part of the basic skill set of an experienced engineer and was not subject to risk assessment or toolbox talks.
- The injured person was not wearing gloves when carrying out this task since gloves would have restricted manual dexterity;
- Cutting towards the body (left hand) meant that when the cutters slipped the hand was vulnerable to injury;
- A safe cable stripping tool had not been considered and such a tool was not available onboard the vessel;
- The use of side cutters had replaced the previous practice of using a Stanley knife for this task as a result of restrictions placed on the use of knives.

Our member drew the following lessons from this incident:

- Even tasks which are classed as part of the basic skill set of an individual should be reviewed occasionally to ensure good and safe practice and the use of the most appropriate tools;
- Tools should only be used for the purpose for which they are designed;
- If it is necessary to remove personal protective equipment (PPE) to carry out a task then that PPE is not appropriate to the task.

Our member made the following recommendations and corrective actions:

- Worksites were reviewed to ensure that the appropriate tools were being used;
- There was a review of the use of protective gloves at the worksite to ensure they were appropriate for the tasks being carried out;
- Personnel were reminded and encouraged to engage in personal last minute risk assessments and to pause before carrying out a task to ensure that they have all the correct tools and PPE and that it is safe to carry on and that nothing has changed.

3 Minor Chest Burns Suffered by Rope Access Technician

A member has reported an incident in which a rope access technician suffered minor spot burns on the chest during cutting operations. A 24 inch pipe approximately 4 metres above the deck was being cut by the rope access technician (RAT), who was suspended by rope access gear and also standing on a ladder. The first cut and the access hole for a shackle, using a standard cutting torch, went smoothly. The internal pipe was covered with a 4 centimetre thick rust layer. When the second cut was nearly completed, some melted particles of rust fell onto the tip of the cutting torch. One of the particles from the tip of the cutting torch was blown away and somehow entered into/below the RAT's protective clothing. The technician felt some very light pain on his chest and continued to work. After shift the technician felt some minor irritation on his chest and sought first aid. Three small burns on the middle of his chest were treated/covered by one plaster.

Investigation revealed the following:

- The direct cause of the incident was molten particles entering through an opening between the buttons of a fully closed leather protective jacket. This personal protective equipment (PPE) was not giving full body protection.

It was suggested the following long-term corrective actions:

- Protective jackets used for hot work should close using "velcro" closing straps rather than buttons;
- Consideration should be given to different kinds of protective clothing, including flexible fireproof hoods designed to cover shoulder, chest and neck area;
- It should be emphasised at toolbox talks and in preparation for hot work that molten particles can enter PPE through the smallest openings.

Figure 1- Protective clothing for rope access technicians showing small opening through which hot particle passed

4 Near Miss: Safety Device (Hard Link) Damaged During Hot Work

A member has reported an incident in which a rope access technician (RAT) damaged his safety equipment during hot work. The technician was gouging out the weld connection around 8 metres above deck. He was working next to his two climbing ropes and was also secured with a hard link. This hard link was connected to the D-link of the technician's harness and to a secure point above the technician.

At the moment the RAT opened the air flow to start gouging, water streamed out of the nozzle instead of air. This resulted in the technician instinctively pulling back the gouging torch. During this uncontrolled movement, the gouging torch connected with the stop descender - a steel part of the technician's climbing gear. Since the technician was connected using a hard metal link to a beam on the platform, the technician's metal climbing equipment made an electrical circuit to earth and current flowed from the gouging torch. As a result, three of the six strands of the hard link were burnt through.

The RAT descended safely to the walkway 8 meters below to check and replace the damaged equipment and subsequently was able to safely resume work. There were no injuries.

Following investigation, the following was suggested:

- Replace metal hard-link with a non-conductive nylon climber's sling;
- Ensure water is drained out of air supply before use with gouging torch.

Figure 1 - Typical metal 'hard-link' for rope access technicians

IRATA SAFETY NOTICE SN16

NEAR MISS: NO KNOTS IN END OF ROPE PROBLEM WITH ISSOW IN RISK ASSESSMENTS

Issue No.	SN16
Issue Date	28.01.2011
Issuer	IRATA Health & Safety Committee
Status	Modified member's Safety Bulletin

A member's Safety Bulletin has been simplified and is reproduced for valuable information.

It is unclear how the L1 at the top fitted into the rescue plan. Some relevant IRATA Code of Practice (ICOP) references are inserted in the text below.

1 INCIDENT

1.1 The rope access team consisted of Levels 3, 2 and 1; the L3 and L2 were to conduct outboard visual inspections with the L1 remaining topside as the third man.

1.2 Four sets of ropes were rigged, but upon commencement of the work it was clear that one set of ropes was of no use due to the wind blowing them out of reach. Given the now available working ropes, it was decided that both the L3 and the L2 would work on the same set of ropes to complete the work task. Whilst manoeuvring to the worksite the L2 had asked the L3 if he was to stay on his current set of ropes to which the L3 said "yes". This statement was misinterpreted by the L2 - *what was meant was that the L2 should remain on that set of ropes until the L3 had reached the worksite and then the L2 should transfer to the same set of ropes to which the L3 was attached.* (The L3 having already informed the L2 that they were to work off the same set of ropes, thought that the L2 was aware of the requirement to transfer from his current set of ropes as per the toolbox discussions). (*See ICOP 2.7.2*)

1.3 The L2 then descended on the set of ropes he was on and after 10m-15m his shunt became detached from the bottom of the backup rope. This rope was then out of reach so the shunt could not be reconnected. The L2 then noticed there was no knot in the end of his working rope and now had only 15cm of rope below his Stop descender which was too short to lock the descender.

1.4 The L3 manoeuvred to a position where the L2 could attach himself to the set of ropes he was attached to. This was achieved successfully and the Level 2 descended to the worksite. Both the L2 and the L3 then ascended safely back in-board.

2 ADDITIONAL INFORMATION

2.1 Company 'Safe Working Procedure for Rope Access Operations' states that all ropes should have knots tied at the ends. It is not possible to deploy ropes through gratings with knots in their lower end, so not having tied knots in before the ropes were deployed is not in itself an infringement of procedure. The ropes were correctly deployed through gratings with the appropriate rope protection attached. However, at the earliest opportunity the L3 should have pulled up the ends when in a safe position to do so and tied stopper knots in them. (*See ICOP 2.11.3.9*)

2.2 The site 'ISSOW' (Integrated Safe System of Work) did not identify the hazard of abseiling off the end of a rope which company 'Rope Access Risk Assessment' does.

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It was found that since the implementation of the electronic ISSOW system, our risk assessments have not generally been utilised within the planning stages of work onsite.

2.3 Our risk assessments for activities can be more detailed and all hazards and controls should either be captured within the ISSOW or appended, referred to and used as part of the permit and toolbox talks (*See ICOP 2.11.7.2*) as a safe system of work process. (*See ICOP 2.2*)

2.4 The decision made to work off the same set of ropes is also considered a poor judgement call and added to the confusion in communications. This should only occur in limited situations such as in an emergency. Neither Company nor IRATA documentation recommended this practice.

2.3 The rescue plan that had been discussed lacked sufficient detail and was not entirely understood by all team members. (*see ICOP 2.1.2, 2.2.2, 2.2.5 & 6, 2.11.6.3, 2 11.7.2)*

2.4 The L2 was not entirely sure of what was expected of him, but continued with the job without seeking confirmation or raising his concerns. A team 'Stop for Safety' philosophy should have been implemented when any doubt around the method of access, or a change within the workscope occurred. This would ensure all team members' roles and responsibilities within the team were clear and understood by all.

3 FACTORS CONTRIBUTING TO THE INCIDENT

- Poor Planning (*See ICOP 2.2.2, 2.2.4, 2.2.5*)
- Lack of Clear Communication (*See ICOP 2.11.10*)
- Complacency
- Failure to Follow Procedures
- Failure to apply Rope Access Training

4 ACTIONS TO TAKE/BEING TAKEN

The actions taken following this incident has been identified as:

4.1 Safety Bulletin issued regarding the incident to all sites for lessons learned – please display, roll-out and discuss this at your safety meetings.

4.2 Disciplinary process initiated in accordance with company 'Just Culture' policy.

4.3 Production of 'Safe System of Work' flowchart process outlining where company safety systems fit into clients - particularly risk assessments. (*See ICOP 2.2, 2.2.4*)

4.4 Workshop to identify improvements to Permit System to ensure contractor specialist risk assessments are captured and referred to in system.

In light of this incident, this company encourages others to take a proactive approach to look at how their ISSOW systems ensure the hazards/risk assessments of the specialist activities of their contractors are captured.

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IRATA SAFETY BULLETIN SB17

Abseil incident – operator error

Issue No.	SB17
Issue Date	31.01.2011
Issuer	IRATA Health & Safety Committee
Status	Report following an operating member's report

1 The incident

1.1 At the end of the working day, the injured person (IP), an IRATA Level 2 with four years experience, descended 2m without any problems to carry out work. On completing this work, he unlocked his Petzl I'D descender and the working line came out of the descender.

1.2 The Petzl Shunt back-up device did not engage on the safety line. It is thought that the IP failed to release the cord and towed it to the ground from a height of more than 7 m.

1.3 The fall resulted in a fracture of the heel and a compressed fracture to vertebrae, along with friction burns to the fingers. The IP was hospitalised for three days and was unable to work for several months

1.4 The company was in the process of changing to Petzl I'D descenders from Petzl Stop descenders. The IP had been issued with the I'D descender about a month before the incident. It should be noted that the safety catch is of a similar type on both descenders.

2 Incident analysis

2.1 It is likely that the side plate of the descender was not closed properly when installed on the rope in the first instance. The IP unweighted or otherwise manoeuvred the descender at the workside 2 m down, allowing the rope to come out of the descender when unlocked and beginning the second part of the descent.

There are a number of factors which may have influenced this:

- pre-decent check of equipment, including the catch on the side plate of the descender, not carried out properly;
- level of concentration;
- fatigue;
- operative training;
- level of supervision
- familiarity with equipment;
- environmental factors such as noise or light levels.

2.2 Secondary cause: back-up system did not operate to prevent the fall

There are a number of factors which may have influenced the secondary cause. See IRATA ICOP section 2.7.1 and 2.7.7, and below:

- method of use/ operation;
- most of the points listed under 2.1, factors which may have influenced failure of primary system;
- selection of equipment;
- type of back-up device;
- length and type of device lanyard (cow's tail) and point of attachment to the harness.

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3 Suggested additional control measures to protect against this type of incident occurring again

3.1 As part of a pre-descent check of the complete system, all descenders should have a visual and audible check to ensure that they are installed correctly on the rope and are functioning correctly.

3.2 All users of Shunts should be made aware during training of methods of use and possible misuse, including:

a) type and configuration of Shunt cord;

b) length/type of device lanyard (cow's tail) and attachment to harness;

c) chosen method of operation.

NOTE The chosen method of operation should not impede the functioning of the back-up device in case of any working line problem.

3.3 Failure to let go of the Shunt cord when necessary is foreseeable misuse. IRATA Code of Practice section 2.7.7 prompts users to assess likelihood of foreseeable misuse and put in suitable control measures.

3.4 Reference should be made to the manufacturer's website and equipment user information.

NOTE This information does not reflect the use of a Petzl Shunt as a back-up device in rope access. In May 2009, a Petzl specialist statement for the Shunt (on IRATA website) states that this use falls outside the general instructions issued. Petzl say "Responsibility for use of a product outside the recommendations of the manufacturer remains with the user and employer".

4 Further considerations

4.1 The Petzl website has a warning of potential for accidental opening of the side-plate on Stop or I'D decenders when the device is not fully loaded.

"It is possible for other elements of the user's system (e.g. rope, CROLL or maillon rapide) to be positioned in such a way as to push on the safety catch and open the side plate. Always take care to prevent elements of your system and other objects from coming into contact with the safety catch."

4.2 Alternate operation of the Shunt and descender probably would have prevented this incident occurring. This practice may be appropriate for regular work depending on the type of job, although some companies may regard it as impracticable for all situations.

4.3 An assessment should be carried out before each job to select the most appropriate equipment to be used; in this case a back-up device. (see ICOP 2.7.1 & 2.7.7).
The IRATA website has both a specialist statement on use of the Shunt in rope access from Petzl and a safety notice on Shunt Guidance from IRATA (see IRATA website 'Technical Information' and 'Safety Notices'). http://www.irata.org/safety_notices.htm

5 Summary of standard operational checks before descent

NOTE Where practicable, the operational checks before descent should be part of a buddy / supervisor check. Although specific to this incident, the following controls apply to the majority of rope access systems.

5.1 Carry out a 'pre-use check' of equipment: visual/ tactile/ functional (see manufacturer's instructions).

5.2 For the initial descent, where possible attach an anchor lanyard (cow's tail) to an anchor during a 'function test'/'mini abseil' see (5.5) below.

5.3 Attach the back-up device to the safety line and maintain it in a high 'hands off' position until all the checks described below have been completed:

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a) check the back-up device attachment karabiner is correctly closed;

b) check for correct attachment and orientation of the back-up device on the safety line (i.e. not upside down), by pulling on the device lanyard (cow's tail).

5.4 Attach the descender to the working line. Check that:

a) the descender karabiner is correctly closed, with the opening towards the user and pointing downwards;

b) the working line is threaded into the descender as illustrated on the descender and/ or as the information supplied by manufacturer;

c) the catch on descender side plate is fully closed, if one is present. Otherwise, check the instructions for the correct installation of the device to the harness or anchor.

5.5 Carry out a function test /descent test /mini abseil as follows:

a) With either the back-up device in a high 'hands off position' or an anchor lanyard attached, unlock the descender with a secure grip on the control rope and do a 150-200mm descent, until the descender is functioning correctly and a controlled descent can be made. If an anchor lanyard is used for protection it should then be removed.

b) At any time before recommencing a descent, particularly if the descender may have been unweighted at a worksite, carry out the 'function test /mini abseil' (i.e. do a 150-200mm descent with the back-up device in a high position).

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IRATA SAFETY BULLETIN SB18

Near miss – failure of anchor lines

Issue No.	SB18
Issue Date	18.02.2011
Issuer	IRATA Health & Safety Committee
Status	Report following operating members' reports

There have been several 'near miss' incidents which have involved failure of anchor lines.

Having two independent anchor points and separate working and safety lines which may be linked to share loading may not be adequate in extreme situations.

There may be several causes of situations where both ropes could fail. See examples below.

Hazard	**Control measures** (ICOP refs in bracket)
Melting on high temperature surfaces, or by hot tools	Avoid with rigging, or use heat and/ or flame resistant protection, or wire ropes in rigging.
Sharp edges or abrasion	Anchor line protectors (2.7.10), re- anchor (2.11.2.14 & 15, 2.11.3.13), deviation (2.7.9, 2.11.2.15, Fig 7) If using a wide Y-anchors use double anchor slings and connectors
Cutting by falling object e.g. confined access into a tank	Tie cover down to prevent closure, block up to prevent rope damage if hatch cover is closed suddenly.
Cutting by UHP water jetting, abrasive blasting, chain saw etc	Avoid with rigging / wide apart / wire rope (hard link) / use of suspended platform / technician lowered into position / Anchor line protectors (2.7.10)
Occasional deliberate on residential buildings	Rigging ropes quite wide apart so both not cut simultaneously. May also be appropriate for other hazards
Chemical	Avoid with rigging, or use chemically resistant protection. Wire ropes in rigging may be appropriate.

Example: A technician had a lucky escape, only suffering sprained ankles in the following incident.

Both ropes were rigged for a 6m descent on 16in dia. (400mm) insulated pipes, about 12in -18in (3-400mm) away from an exposed section of pipe at a temperature of 900-1000ºF /480-540ºC. Somehow the ropes slipped sideways onto the non-insulated section of pipe and within seconds of starting the descent the ropes melted and the technician fell about 3m, landing on his feet. The melting point of the ropes is about 500ºF /260ºC.

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IRATA SAFETY BULLETIN SB19

ANCHOR SLINGS SLIPPED ON ANCHOR

Issue No.	SB 19
Issue Date	10 June 2011
Issuer	IRATA Health & Safety Committee
Status	Report following an operating member's report

1 The incident

Two sets of working and safety lines were rigged to go up and over a six storey building, using four plastic coated steel strops, each with a single loop around a 500mm dia. poplar tree. One technician lowered himself over the top on the other side of the building, followed shortly afterwards by a second on the second set of ropes. As the extra weight transferred back to the steel strops they slipped up the tree. This resulted in one technician dropping 2–3 metres and landing on his back on the balcony wall below. The other technician also dropped, but only 1.5 metres and did not collide with any structure or suffer injury. The first technician was taken off his ropes, taken to hospital, X-rayed, given a thorough examination and discharged. He later went to the Doctor who signed him off work for a period.

2 Incident analysis

2.1 The primary cause was the configuration of the plastic coated wire strops slipping upwards on the relatively smooth tree trunk.

2.1.1 This safety bulletin will not consider the following:

The method statement said use the plant room on top of the building for the primary anchors and dead- weight anchors placed in the centre of the roof for deviation points. This configuration would also have eliminated a lot of rope stretch compared to the method used.

3 Control measures

3.1 Examples of ways to prevent ropes or anchor slings sliding:

a) Multi-wrapped webbing slings, rope, or wire strops have more friction /grip than those in a single loop.

b) 'Choked' webbing slings (i.e. where one side is threaded through the other) will increase friction around a structure, although this also causes a loss of strength in the sling.

c) Link to another opposing anchor to prevent sliding**.**

4 Lessons to be learned

4.1 Always anticipate the direction of loading from an anchor.

4.2 Where the load is offset from the perpendicular, suitable measures should be put in place to prevent ropes or anchor slings sliding in the direction of loading, particularly on smooth linear structures such as this tree, steel or concrete beams.

4.3 Consider management approval for significant changes to the method statement written following pre-work visit.

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Photo 1: Strop set up as a Primary Anchor. There were four of these together to anchor four ropes.

Photo 2: Indicating (approximately) where the ropes where originally rigged (at low level) and where they eventually came to a stop.

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IRATA SAFETY BULLETIN SB20

'Near Miss' Rope melted by heat from a lamp

Issue No.	SB20
Issue Date	26 July 2011
Issuer	IRATA Health & Safety Committee
Status	Report following operating members' reports

1. The incident

Working lines were rigged for cleaning purposes through a 600mm dia. access hole into a 30m high boiler which had several lower access holes. To illuminate the worksite, a 110 volt halogen lamp was positioned in the opening, but clear of all ropes. The surrounding area was taped off, but un-manned. A few hours later a team of rope access technicians working inside the boiler noticed a rope fall from above, followed shortly afterwards by the second rope. An investigation found that a carpet and rope protector were smouldering and burnt and had melted through both ropes. It appeared that the light had either fallen over, or been knocked over, ending up face down onto the ropes.

2. Incident analysis

2.1 The L3 supervisor insists the lamp was secured appropriately. An attempt to recreate the incident by pulling the hauling/ rescue ropes rapidly from below was unable to cause the lamp to end up face down on the protector.

2.2 In the absence of any other explanation it is possible that an unauthorised site person monitoring work, had interfered with the ropes securing the lamp resulting in the ropes melting.

2.3 During a re-construction with the 110v halogen lamp face down on the rope protector, the carpet protecting against the edge damage began to melt in 5-6 minutes. This smouldered before the velcro fastening on the rope protector melted and began to smoulder. The canvas then began to smoke and within 20 minutes of starting the test the ropes has melted.

3. Control measures

- Permit system which informs all site employees of work in progress and exclusion zone.
- Documented company procedure and pre-work briefing / tool box talk for all operatives involved in the work including precautions to protect working lines from any heat source.
- More secure anchor area exclusion zone (ICOP 2.11.9.3) where rigging and lighting is positioned, such as physical barriers, warning signs, and sentry or supervisor to prevent unauthorised access and monitor work progress.
- Alternative lighting which emits very little heat e.g. the company currently uses 38W 2D lights, secured so they do not foul the ropes and rigging in any way.
- Modified guards on lamps (the guards on the original lamp only extended approximately 10cm from the lighting element).
- Heat retardant padding and or kevlar heat resistant rope protectors for edge protection.
- Fire extinguishers to be on hand at each work area in case of fire.

4. See also Safety Bulletin 18 **Near Miss Failure of Anchor Lines** relating to situations where failure of both anchor lines is possible. http://www.irata.org/safety_notices.htm

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IRATA SAFETY BULLETIN SB21.1

Rescue training incidents

Issue No.	SB21 part 1
Issue Date	28 July 2011
Issuer	IRATA Health & Safety Committee
Status	Collation of several rescue training incidents

There have been several incidents during two-person rescue training resulting from uncontrolled descents. These have involved a variety of circumstances including all levels of technicians.

There is no one single solution to all the issues raised. The following information includes a variety of control measures which need to be considered with reference to the whole document. The application of the possible control measures should be viewed in the context of the training environment; this includes considering the techniques and equipment used during training, as well as the facilities available for any particular venue.

In each case, the 'casualty' was suspended below the 'rescuer'. The syllabus defines a variety of two-person descents during rescue, which are practised by often inexperienced trainees using unfamiliar techniques. Controls noted may or may not be transferable to the work site with competent technicians, where alternatives to two-person loading of equipment such as releasable anchors or remote lowering or hauling may be possible.

1. The incidents

1.1 Uncontrolled descent using Petzl I'D and Shunt. As he started to pick up speed, the 'rescuer' lost control of the I'D descender and failed to release the cord on his Shunt resulting in both 'rescuer' and' casualty' sustaining broken ankles on hitting the ground. The supervisor did not directly witness the incident.

Incident analysis

- Uncontrolled descent at low height / control line not held adequately / loss of control of descender.
- Shunt not released, which indicates an operator error.
- Trainer /supervisor not observing closely.

Possible additional control measures

- Closer supervision with intervention / bottom belay.
- Different use of equipment – alternate use of I'D and Shunt to prevent concurrent operator error of two devices.
- Selection of equipment – consider using a hands free back-up device instead of the Shunt.
- Use of impact absorbing mattresses below.

1.2 Uncontrolled descent using Petzl I'D and ISC Rocker. The 'rescuer' had his ropes on the opposite side than that taught. His back up device [Rocker] locked up on the ropes when he was around 2.5 m from the ground, with the casualty suspended below him. The rescuer locked his I'D descender in order to release his Rocker. When he recommenced descent, it seems that the 'rescuer' was controlling the handle of the I'D with his right hand instead of his left hand and then released his back-up device without holding the working line. They descended rapidly with the 'casualty' sustaining a broken leg. On reaching the ground, the 'rescuer' let go of the Rocker, which immediately engaged and had to be un-weighted to enable the 'casualty' to be released.

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Prior to the incident, the 'rescuer' told the trainer that he had suffered a right-sided shoulder injury but persuaded the trainer that this would not prevent him from performing the rescue.

Incident analysis

- Back-up device inadvertently locked up on safety line.
- Uncontrolled descent at low height / control line was not held and lost control of descender / awkward landing.
- Rocker back-up was disabled but engaged when released.
- Possible medical contra-indication.
- Trainer /supervisor not observing closely.

Possible additional control measures

- Closer supervision with intervention when instructed procedure not followed.
- Increased clearance height of rescue.
- Use of impact absorbing mattresses below.

1.3 Uncontrolled descent using Petzl Stop and Shunt. During an IRATA Level 2 assessment, the 'rescuer' had completed an aid climb rescue and when about to bring the 'casualty' to the ground had mistakenly placed the safety line instead of the working line through a braking karabiner. [The braking karabiner is required by the manufacturer to give extra friction when using a Petzl Stop descender for two people]. After unlocking the descender and pressing the handle, he had no control of the descent. The Shunt back-up device was at shoulder height; after falling approximately 5m they stopped just as the casualty's feet touched the ground. The 'rescuer' sustained a minor rope burn to his right hand and the 'casualty' was shaken, but had no injuries.

Incident analysis

- Uncontrolled descent / incorrect line was held & lost control of descender.
- Trainer / assessor did not observe incorrect rope in braking karabiner.
- Back-up device could not be placed above shoulder height and failure to do function test /mini-abseil before commencing main descent.
- Back-up engaged – rescuer let go of all equipment just in time.

Possible additional control measures

- Ensure function test /mini-abseil done before commencing main descent. See Safety Bulletin 12 and 17.
- Closer supervision with intervention when instructed procedure not followed.
- Different use of equipment – alternate use of Stop and Shunt to prevent concurrent operator error of two devices.
- Selection of equipment – consider using a hands free back-up device instead of Shunt.
- Use of impact absorbing mattresses below.

1.4 Uncontrolled descent using Petzl Stop and Shunt. During an IRATA Level 2 assessment, the 'rescuer' had completed an aid climb rescue and was asked to rig a 'pull through' to allow him to bring the 'casualty' to the ground and retrieve the ropes from the bottom. He mistakenly rigged the ropes such that the working line did not reach the ground. The 'rescuer' pressed the handle on his Stop descender without holding the working line and descended out of control, off the end of the short working line, resulting in a fall of approximately 3 m, before being held by the Shunt just 600mm from the ground. The casualty grabbed the ropes with his hand as he was falling, resulting in a serious rope burn to one hand.

Incident analysis

- A pull-through exercise is inappropriate during rescue as rope retrieval is unimportant.
- Uncontrolled descent, control line not held.

- Failure to check ropes reached the ground / without knots in end of rope.
- Back-up device could not be placed above shoulder height in start position / failure to do function test /mini-abseil before commencing main descent.
- Back-up engaged – rescuer let go of all equipment just in time.
- Lack of intervention once error noticed by the assessor, fine detail obscured by rescuer.

Possible additional control measures

- Ensure function test /mini abseil done before commencing main descent. See Safety Bulletin 12 & 17.
- Closer supervision with intervention when instructed procedure not followed.
- Different use of equipment – alternate use of Stop and Shunt to prevent concurrent operator error of two devices.
- Selection of equipment – consider using a hands free back-up device instead of Shunt.
- Use of impact absorbing mattresses below.

1.5 Uncontrolled descent when passing a knot. During an IRATA Level 3 assessment, the ‘rescuer’ was bringing his ‘casualty’ past a knot. The knot was isolated using a re-anchor / re-belay attached to a Shunt. As this re-anchor Shunt took the load, the Shunt slipped, so the ‘rescuer’ placed an ascender below the Shunt to stop this, but couldn't remove the ascender afterwards. He then used a pulley system above the knot to raise himself and the casualty. As he started to lower the two of them, he lost control and they fell 400-500 mm. The ‘casualty’ suffered a back strain and the assessment was discontinued. The rescuer's Shunt and the re-anchor Shunt had both been shock loaded. It was later discovered that the back-up Shunt had been deformed due to the shock load.

Incident analysis

- Untrained technique used after initial Shunt slippage.
- Lost control after lifting without a mechanism to guarantee a gradual lower.
- No system to limit slipping distance.
- Numerous other manoeuvres possible to deal with this situation.

Possible additional control measures

- Intervention once problem occurred /need to approve method of dealing with problem before allowing to continue.

IRATA SAFETY BULLETIN SB21.2

Discussion on rescue training incidents

Issue No.	SB21 part 2
Issue Date	28 July 2011
Issuer	IRATA Health & Safety Committee
Status	Collation of several rescue training incidents

2. Selection of back-up devices used for two-person use

2.1 The function of a back-up device is to prevent a fall or injury in the unlikely event of any kind of problem with the working line system. [i.e. not just main line failure].

2.1.2 IRATA ICOP section 2.7.1 and 2.7.7 says before each job users should select the most appropriate equipment, assess likelihood of foreseeable misuse and put in suitable control measures. This applies particularly if equipment is to be used differently from its intended purpose, or from the tests included within the standard to which it has been tested. Common sense suggests the overriding factor is that equipment should be fit for purpose.

2.1.3 Devices used as back-ups may conform to different 'industrial' standards. For example;

- EN 353-2 [fall arrest standard] e.g. ISC Rocker, Petzl ASAP, Komet Stick & Run
- EN12841 type A [Rope access systems - rope adjustment devices

2.1.4 ICOP 2.7.7.2 says: "When back-up devices are dynamically tested in accordance with standards, the tests represent a (vertical) free-fall. In certain circumstances, an uncontrolled descent may not be a free fall and the back-up device may not activate…..back-up devices should be selected which are known to perform in such a way that an uncontrolled descent at all angles likely to be encountered during use would be prevented or minimized".

2.1.5 ICOP 2.7.1.3.4 also says: "just because a piece of equipment does not claim conformity to a particular standard, it does not necessarily mean that it is unfit for use".

2.2 Petzl Shunt [EN 567 Rope clamps – 'mountaineering' standard for recreational use]

2.2.1 Normally reference should be made to the manufacturer's website and equipment user information. However, the information provided with a Shunt does not reflect use as a back-up device in rope access.

2.2.2 The IRATA website www.irata.org contains Shunt Guidance (January 2008 and August 2009) from IRATA in 'Safety Notices' section and a specialist statement Petzl statement on use of the Shunt in 'Technical Information' section. http://www.irata.org/irata_technicians.htm

2.2.3 Tests at an assessor workshop showed that in extreme conditions, in this case a 200 kg steel mass dropped onto a 1 m device lanyard (cow's tail) attached to a Shunt placed immediately below the anchor knot [fall factor one], the shunt slipped 5 m to the ground without slowing. When repeated with a mid-rope knot, the Shunt detached from the rope. A static load of 200 kg is near the limit of the Shunt's resistance to slipping. The Shunt will usually slip at slightly higher values with larger diameter rope.

2.2.4 Subsequent less severe tests with dummies [more comparable to a body and less severe than a steel mass] of lower mass, e.g. 150 kg with a lower fall factor have shown that a Shunt can hold after variable slippage. [See http://www.youtube.com/watch?v=Jv-YCRb6xbI] However the amount of slippage will vary depending on the actual mass and

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height fallen for any particular incident. An uncertain outcome with a dynamic two-person load poses questions about the suitability of the Shunt as suitable back-up device for rescue loads.

2.2.5 In May 2009, Petzl issued a specialist statement on "*continued use of the shunt in professional rope access*" stating that this (back-up for rope access) use falls outside the general instructions issued. [25.05.09 http://www.irata.org/irata_technicians.htm]. Petzl say: "use of a Shunt as a back-up device for more than one person requires careful consideration" and "Responsibility for use remains with the user and employer". "We remind you that in this application the Shunt is not covered by EN 353-2 and EN 12841 standards"

2.2.6 IRATA Shunt guidance 2008 [http://www.irata.org/safety_notices.htm] says: "WARNING: If there were working line failure during a two-person rescue, a shunt is likely to slip many metres if used in a regular way [i.e. slack back-up lanyard [cow's tail] /approx fall factor 1]".

"It is good practice at all times to minimise slack in the back-up lanyard, but especially during a two-person rescue". Keep the potential fall distance to an absolute minimum by having minimal slack in the back-up lanyard".

2.2.7 IRATA Safety Bulletin 17 says: - All users of Shunts should be made aware during training of methods of use and possible misuse, including:

a) diameter and configuration of Shunt cord e.g. length, with / without knots in the end;

b) length/type of device lanyard (cow's tail) and attachment to harness;

c) chosen method of operation and use with / without gloves.

NOTE The chosen method of operation should not impede the functioning of the back-up device in case of any working line problem.

2.2.8 Failure to let go of the Shunt cord when necessary is foreseeable misuse, Ref ICOP 2.7.7.5 and is a separate issue from use of the Shunt for rescue loads. This potential problem applies to both single person use and two person use in rescue.

2.2.9 Tests on single person descents at an IRATA meeting at Petzl HQ to simulate working line failure, incorporating an additional dynamic safety line managed by a third party, were done with very experienced volunteers to see if the Shunt cord would be released. In 25% of cases, the fall was held by the safety line, as the Shunt had not been released, even though the fall was expected. It was suggested that diameter and configuration of Shunt cord, use of gloves and how the cord was held with particular descenders may have influenced the result. To be effective in an incident, [if the Shunt cord is held when the handle on the descender is being operated] the method of holding the cord must be so light that release will be an involuntary action.

2.3 Other back-up devices

2.3.1 Devices such as the Petzl ASAP which conform to an industrial standard such as EN 12841 Type A are widely used in many European countries as required by their legislation. Use of the ASAP for two-person rescue falls outside EN 12841, but Petzl approve two-person rescue use providing it is used with an Absorbica energy absorbing lanyard http://www.petzl.com/en/node/10072).

2.3.2 Detractors of the ASAP point to a variety of factors such as the complex mechanism suggesting it will be prone to problems with work such as spray painting or blasting, difficulty of working with the very short attachment lanyard. However, European operator members claim to have few problems with these back-up devices in such use.

3. Control measures in rescue training [in no particular order].

3.1 Height of rescue

3.1.1 Very low height [less than 1.5 m for descender] – Use for initial training to get correct sequence, even though back-up is likely to be ineffective at this height. For example, it could be from standing height to laying the casualty on the ground.

3.1.2 Low height [around 2 m for descender] A benefit is that it is easy to observe. When operating close to the ground or other structure, users need to be aware of the 'clearance'

required (refer to manufacturer's information) and to minimize any potential impact by the variety of ways which maintain any back-up device in a high position.

3.1.3 Intermediate height [over 4.5 m] Not as easy to observe without a suitable platform, but if casualty transfer is done here [with pre-descent checks] there is adequate 'clearance distance' and greater distance for devices or operator to stop the descent. There is a chance of more serious injury as height increases, but could still be a problem if a problem occurs later at a low height. There is the option to stop the exercise at 2 m and separate the rescuer and the casualty.

3.1.4 Calculation for rescue clearance with ASAP and Absorbica, i.e. full deployment of energy absorber (1.4 m), clearance from sternal attachment to their feet (1.5 m), clearance below their feet to avoid hitting obstruction (1 m). 1.4 m + 1.5 m + 1 m = 3.9 m minimum clearance required for one person. During a rescue, the 'casualty' normally will hang below the rescuer, so an extra 0.7 m allowed for failure of short connecting anchor lanyard (cow's tail), giving a total of 4.6 m.

3.2 Trainer /assessor supervision

3.2.1 Techniques demonstrated need to be explicit and early intervention made if trainees do not follow procedure. Assessment is more difficult, as the assessor does not want to intervene too early.

3.2.2 Suitable management of sequence of training exercises / appropriate trainer to trainee ratio to be able to observe and intervene.

3.2.3 Trainer and other trainees buddy check and function check, particularly before descent, also throughout the rescue by 'casualty'. Also, possible 'bottom belaying' in each rescue.

3.2.4 Trainer checking to ensure device lanyard (cow's tail) to Shunt [if Shunt used] is within rescuer's reach to avoid accidental locking onto safety line.

3.2.5 Trainer checking to ensure minimal slack in device lanyard (cow's tail) if Shunt used.

3.2.6 'Bottom belaying' as an additional control to prevent uncontrolled descents, and avoid confusion between ropes, though less useful when working line goes through a braking karabiner and is held high.

3.2.7 The casualty's backup device left on and managed by the casualty throughout the exercise.

3.2.8 A blocking knot at 2 m on working line may be effective, but is questionable because of rope stretch and potentially high impact forces and needs 'bottom belaying' to release.

3.3 Alternative techniques

3.3.1 Alternate operation of the descender and Shunt in a rescue exercise is an option and is widely used during single person descent training. Without good working line control, descent may not be smooth and will result in a higher fall factor for the back-up device each time it is lowered.

3.3.2 Rescue using two descenders with various options:

- both descenders attached to the 'casualty';
- both descenders attached to the 'rescuer';
- one descender / back-up on each person and operated alternately 300/400 mm increments – suited for short descents and avoids two-person loading of equipment. During the above option to use a back-up on a third rope, back-up device/s left above one or both descenders.

3.4 Additional fall protection systems

3.4.1 Additional safety line controlled by third party. Ideally, 'top rope', but less satisfactory if extra safety line goes over a pulley, because of rope stretch with two-person load at low height.

3.4.2 Consider use of controlled rate descender [centrifugal brake type] rated for two-person loads.

3.4.3 Additional fall arrest systems may be inappropriate, unless they are approved by the manufacturer with a two-person load and limited clearance height.

3.5 Other options

3.5.1 Impact absorbing flooring /mattresses to minimise injury if all else has failed.

3.5.2 Use of different coloured working and safety lines to help avoid confusion between ropes.

3.5.3 Greater use of a dummy/ manikin will minimise number of people at risk, but inconvenient to position initially.

3.5.4 Use of support seat is recommended for 'casualty', though care is necessary to ensure correct loading when transferring load to rescuer and loading of stitching on central loop of sit harness.

3.5.5 Where possible, avoid two-person loading of equipment, e.g. by lifting or lowering the casualty.

4. Summary of standard operational checks before descent

NOTE *Where practicable, the operational checks before descent should be part of a buddy / supervisor check. Although specific to this incident, the following controls apply to the majority of rope access systems.*

4.1 Carry out a 'pre-use check' of equipment: visual/ tactile/ functional (see manufacturer's instructions).

4.2 For the initial descent, where possible attach an anchor lanyard (cow's tail) to an anchor during a 'function test'/'mini-abseil' see (4.5) below.

4.3 Attach the back-up device to the safety line and maintain it in a high 'hands off' position until all the checks described below have been completed.

a) check the back-up device attachment karabiner is correctly closed;

b) check for correct attachment and orientation of the back-up device on the safety line by pulling down on the device lanyard.

4.4 Attach the descender to the working line. Check that:

a) the descender karabiner is correctly closed, with the opening towards the user and pointing downwards;

b) the working line is threaded into the descender as illustrated on the descender and/ or as the information supplied by manufacturer;

c) the catch on descender side plate is fully closed, if one is present. Otherwise, check the instructions for the correct installation of the device to the harness or anchor.

4.5 Carry out a function test /descent test /mini-abseil as follows:

a) with either the back-up device in a high 'hands off' position or an anchor lanyard (cow's tail) attached, unlock the descender with a secure grip on the control rope and do a 150-200 mm descent, until the descender is functioning correctly and a controlled descent can be made. If an anchor lanyard (cow's tail) is used for protection, it should then be removed;

b) at any time before recommencing a descent, particularly if the descender may have been unweighted at a worksite, carry out the 'function test /mini abseil' (i.e. do a 150-200 mm descent with the back-up device in a high position).

IRATA SAFETY BULLETIN SB22

Catastrophic failure of ropes rigged over an edge

Issue No.	SB22
Issue Date	28 July 2011

NOTE The advice on protection against edges in this document equally applies to protection against abrasive edges and hot surfaces.

1 Essential safety measures

It is essential that, wherever possible, contact of anchor lines with edges is totally avoided. It is critical that, where risk assessment identifies the risk of contact of anchor lines with an edge, the following hierarchy is followed:

a) Anchor lines must be rigged in such a manner so as to prevent them from coming into contact with any edge. When rigging or deviating anchor lines to prevent contact with edges, reference should be made to the IRATA ICOP**, 2.11.2.14 to 2.11.2.15.

b) Whenever edge avoidance by rigging or deviation is not possible, risk control measures must be validated by a comprehensive on-site risk assessment.

c) Where edge avoidance by rigging or deviation is not possible suitable edge protection in conjunction with rope (anchor line) protectors must be used. Reference should be made to the IRATA ICOP, 2.7.10, 2.11.3.2 and 2.11.3.5 to 2.11.3.8.

d) Consideration should be given during the entire rope access operation to the possibility of changes of position of the anchor lines and what effect this might have on the safety of the operatives, e.g. a lateral movement of the anchor lines outside the intended range that could result in contact with an edge.

2 Information on rigging

2.1 General

The following information gives an overview of some rigging considerations.

2.2 Y hangs

A Y hang may be used to allow anchor lines to be rigged directly above the drop, thus avoiding edges. See IRATA ICOP, 2.11.2.10 and Figures 4 and 5.

2.3 Re-anchors

A re-anchor (re-belay) may be used to prevent exposure to contact with an edge.

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2.4 Deviations

If the anchors and their anchor points are not in a suitable location for rigging the anchor lines directly above the planned position for descent and/or ascent, anchor lines may be deviated using a side anchor to prevent contact with the edge. It is vital to assess what the effect of deviation failure (stored energy) would have if anchor lines should contact any edge as a result of that failure. Consideration should be given to using a number of side anchors to ensure the position of the anchor lines is maintained during the entire rope access operation.

3 Edge protection

3.1 General

Where it is not possible to use any of the methods described in clause 2 and, where the risk assessment identifies that there is **ANY** possibility of anchor lines coming into contact with an edge, the edge should be covered with suitable protective material. The following gives some examples of ways in which anchor lines can be protected against edges.

4.2 Protective edge roller or plate

An edge roller or plate is an option for protecting the anchor lines from cutting (or abrading) on an edge. It is usually placed over the edge and secured to the structure and the anchor lines are run over the bearing wheel or plate. As an alternative, 50 mm diameter scaffold tubes positioned to protect from any edges may provide adequate protection.

4.3 Protective edge matting

This method utilizes a mat or other thick, tough material, which is placed over the edge and secured to the structure.

4.4 Double-layer canvas rope protector

A double-layer rope protector only provides limited protection to the anchor lines from edges when anchor line movement is perpendicular to the edge. When anchor line movement is transverse along an edge, the protection afforded by a canvas rope protector can be negligible, and catastrophic failure can occur in a very short period of time to the main working line and to the safety line during any subsequent fall, if both anchor lines are rigged over the same edge.

5 Further reading

The following documents provide useful information:

Health and Safety Executive (HSE) Contract Research Report CRR 364/2001 Industrial Rope Access – Investigation into items of personal protective equipment.
See section 5 for information on rope protectors. This document is freely downloadable from:
http://www.hse.gov.uk/research/crr_pdf/2001/crr01364.pdf

NOTE The data collected in the above report is only valid for perpendicular movement against an edge.

** Industrial Rope Access Trade Association (IRATA) *International code of practice* (ICOP) First edition, January 2010 (currently under revision at July 2011)

Revised 8 August 2011

WARNING: Ultra-violet light degradation and abrasion in personal fall protection equipment made from textiles

There is irrefutable evidence that ultra-violet light (UV) weakens many man-made fibres. IRATA members and rope access technicians are recommended to check with equipment suppliers that equipment made from textiles, e.g. polyamide, polyester, polyethylene, polypropylene, aramid, is protected from the adverse effects of UV. UV is emitted by sunlight, fluorescent light and all types of electric-arc welding. The normal way to provide protection is by the inclusion of UV inhibitors at the fibre production stage but there are other possibilities, such as the type and colour of any dye used or the use of a protective covering.

It is difficult to inspect for UV degradation but tell-tale indicators are fading of colours and any powdering of the surface of the materials. However, these indicators also apply to degradation by chemicals. Any textile equipment showing these signs should be taken out of service.

Users of textile equipment should also carefully and regularly inspect their equipment for signs of abrasion. This applies to both external abrasion and internal abrasion. External abrasion is easy to spot but sometimes it is difficult to determine the extent of its detrimental effect. Internal abrasion is more difficult to spot but can often be substantial, particularly if grit has penetrated the outer surface. All levels of abrasion lower the strength of textile equipment: as a rule of thumb, the greater the abrasion the greater the loss of strength.

The effects of UV degradation and abrasion combined weaken the materials even further.

Although European Standards for personal fall protection equipment incorporate safety factors, they do not address explicitly the potential for degradation by UV and abrasion during use of the product, relying instead on its strength when new. There has been a strong attempt by the United Kingdom to include tests in at least one European Standard, to ensure that the materials used in the construction of webbing and ropes have adequate protection. However, this campaign has failed. It is, therefore, left to specifiers, purchasers and users of equipment to determine the appropriateness of the materials used.

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IRATA SAFETY BULLETIN SB23

SAFETY ALERT Pre Use Checking of Equipment

Issue No.	SB23
Issue Date	29.06.2012
Issuer	IRATA Health & Safety Committee

Importance of pre use function checks has been illustrated by incidents involving:

1 Incorrect threading by the manufacturer of a buckle connecting the upper section and chest ascender to lower section of a full body harness by the manufacturer. This was undetected until noticed by a technician when on the ropes.
Action: Check buckles are threaded as described in manufacturer's instructions, even before first use.

2 Quick release buckle mechanisms can become damaged or contaminated, but without close inspection they may appear to be functioning correctly. Such damage can lead to the buckle becoming detached (although this does not occur under load).
Action: Clean and lubricate according to manufacturer's instructions. Check the function and not just the apparent function/ listen to the noise. E.g. has the buckle actually locked?

3 Twistlock karabiner not closing fully.
Action: If the gate mechanism has become damaged or contaminated, this could allow the gate to close, but not to lock. Check twistlock karabiners are locked properly and not just closed.

4 Excessive wear on the harness webbing attaching the D-ring.
Action: Pay attention to areas of high wear. Be aware that damage which builds up slowly may not be as obvious.

Excessive wear on webbing loop of a sit harness

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IRATA SAFETY BULLETIN SB24

OUT OF CONTROL ABSEILS

Issue Date	November 2012
Issuer	IRATA Health & Safety Committee
Status	A Report following an IRATA member company report B Incident notified by a UK HSE inspector (Non IRATA company)

A1 UK Incident (IRATA Member Company)

On the afternoon of his first day at work an IRATA level 1 whose first language is not English, went out of control from a mid rope point for approx 10m, resulting in a fractured pelvis.
He was using a Stop descender and Shunt back-up device [with towing cord removed], but his level 1 training out of UK a month previously listed training with Petzl I'D and Singing Rock Locker.
He was checked prior to descent by a level 3 at the top, and abseiled parallel to a level 2 technician who spoke the same language and who was showing him how to do the drilling etc.

A2 Incident analysis

2.1 Use of different equipment from that trained.
2.2 Was use of Shunt without a towing cord relevant - potentially more likely to grab the shunt body which is a known foreseeable misuse for any use of the shunt, as noted in manufacturer's instructions & Shunt statement?
2.3 IP's first language is not English, so possibly some misunderstanding because of language?

A3 Control measures

3.1 Risk assessment and method statement to address language issues. Provide workers with comprehensible and relevant information about risks, procedures they need to follow and to ensure they understand and can work safely.
3.2 Adequate training /familiarisation /competence check for equipment issued, particularly if different from that previously trained.
3.3 Close supervision for newly qualified technicians and reminder of pre-descent function check [mini abseil] without holding back-up device.
3.4 Use of descender for novices with anti-panic function i.e. squeezing handle causes it to lock.
3.5 Consider attaching two technicians together where they are abseiling close together.
3.6 Use of friction karabiner below descender to give greater control, minimising initial problem.
3.7 Use of 'blocking knot' tied in working line, or 'bottom belay' by technician on ground.

B1 UK Incident (NON IRATA COMPANY)

An IRATA level 1 window cleaner had stopped at a height of approx 4m from the bottom of an 80m drop; the descent was jerky as it was wet. On continuing he went out of control and landed awkwardly across a barrier, resulting in spinal injury.
He was using a Stop descender and Shunt back-up device.

B2 Incident analysis

The elongation on 80m of the safety line would be in excess of 4m, so the braking action on of any type of back-up device would have been ineffective once out of control.

B3 Control measures

3.1 Risk assessment and method statement to recognise rope elongation and clearance distance problems on the lower section of any, but particularly long abseils.
3.2 Minimise rope elongation/ stretch, e.g. If possible re-anchor working and safety lines, pre-tension safety line, use double descender, or a second descender as an alternative to a back-up device.
3.3 Use of a descender with anti-panic function i.e. squeezing handle causes it to lock.
3.4 Use of friction karabiner below descender to give greater control on wet rope.

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IRATA SAFETY BULLETIN SB 25

Near Miss: Rope failure caused by unauthorised lift

Issue No.	SB 25
Issue Date	September 2013
Issuer	IRATA Health & Safety Committee
Status	Report following operating members' reports

1. The incident

A team was performing a potential dropped objects inspection on the forward side of a derrick, from the top of the derrick to midway down using double rope access techniques. A level 1 technician was positioned on his ropes under the crown waiting for his colleague to pass him a tool. At this point the level 1, while still waiting for the tool, felt his main working rope being tensioned towards the bow of the ship, causing him to be pulled away from the derrick in the opposite directions of his two anchors. The tension rope caused his descending device to fail catastrophically (the broken descender device was found more than 50m away from the base of the derrick) and the main rope, that his descending device was on, then snapped at the source of the tension below, causing the technician to swing back in towards the derrick on his back up line. The Level 3 immediately contacted the drill floor, via radio, calling for all activities on the drill floor to be stopped.

The level 1 secured himself to the derrick structure and a second set of ropes were deployed by the level 3 who abseiled down to the level 1, once satisfied that the level 1could abseil down without any assistance, the level 3 gave another descending device to the level 1, the level 3 then abseiled down to the next safe level and was soon followed by the level 1, on the new set of rigged ropes, to the same level. All work at height was stopped until further notice. During the incident the snapping rope "whipped" up hitting the top of the level 1's left leg and knee causing abrasions and severe bruising.

Upon investigation of the incident it was found that a member of the drill crew had requested a basket to be lifted by the deck crew but no one had gained authorisation to do this lift. The port forward crane was used to carry out this lift. As the crane moved to carry out the unauthorised lift, the level 1's rope ends became entangled in the crane boom causing the tension in the lines which led to the incident.

2. Incident analysis

2.1 The deck crew ignored the rope access teams' barriers and signs and operated the crane without any authorisation from their supervisor. The deck foremen was aware of the rope access activities but he wasn't consulted about the crane lift over to the drill floor. A sentry in the exclusion zone could have helped prevent this incident. (See ICOP Ref 2.11.8)

2.2 The driller should have been contacted before anyone entered the drill floor; this rule was disregarded by the deck crew carrying out the unauthorised lift.

2.3 Wind direction assisted with the snagging of the ropes.

2.4 There wouldn't have been any conflict with the crane, even if it did cross the barriers as the rope access work was only supposed to be carried out from the top of the derrick down to the monkey board level (inside the wind wall onto a walkway). The level 3 and team did not recognise the potential hazard of rigging the ropes over the wind wall to deck level.

2.5 The rope access company's procedures requires rope ends to be kept in bags if there is a risk of them coming into contact with cranes, tugger winches, etc. There was no control of rope ends, by the rope access team, in accordance with company procedures.

3. Control measures implemented

- Create a standing Instruction for simultaneous operations, to guarantee that all lifting ops must be authorised by the deck foreman, that considers crane use while working in derricks
- The addition of regular training in company procedures will be implemented.

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IRATA SAFETY BULLETIN SB 26

‘Near Miss’: Rope melted by cyclic pipework

Issue No.	SB 26
Issue Date	September 2013
Issuer	IRATA Health & Safety Committee
Status	Report following operating members’ reports

1. The incident

A rope access technician carrying out work at height positioned himself and his equipment to a new location while still at height. When the equipment was set up at his new work site, he leaned back to check that the equipment was aligned correctly. By leaning back the path of his ropes changed and his ropes came into contact with unidentified cyclic pipework which had increased in temperature from ambient temperature (about 25 degrees) to greater than 250 degrees.

The supervising Level 3, watching the operator, saw that the outer sheath of the working line had become damaged and the inner core seriously compromised whilst in contact with the cyclic pipework. The level 3 immediately called the technician and advised him to return to his original position and to secure himself to the structure. The level 3 rigged and lowered a replacement set of ropes to the technician and the technician descended safely to the ground, unharmed. All work was ceased immediately.

2. Incident analysis

2.1 Rope access team was working in an area with unidentified cyclic pipework.
2.2 Rope access team was unfamiliar with cyclic pipe work and its location/function.
2.3 Area Authority issuing the permit to work did not identify the potential hazard of cyclic pipework to the performing authority and the rope access team prior to the task commencing.
2.4 Onsite, vigilant supervision by the level 3 allowed for the technician to be advised of the incident thus preventing further damage to the technician’s ropes and possible injury to the technician.

3. Control measures

- The sites permit to work system was updated to highlight location of cyclic lines to all operatives.
- Any work sites which are in areas of known cyclic pipework are now discussed in detail with the Area Operators and team prior to issuing the permit to work.
- All works in and around cyclic lines are now considered as working at maximum temperature and as such all risk assessments and controls made to that effect.
- All Ropes will be deviated away and protected from cyclic lines.
  (See ICOP reference 2.7.10.1, 2.11.3.1 & Annex P)
- All new operatives will be mentored highlighting dangers of cyclic lines
- Toolbox Talks now revised to include cyclic lines and prompt operators to safeguard ropes from hidden dangers.

4. See also Safety Bulletin 20 ‘**Near Miss’ Rope melted by heat from a lamp** relating to situations where failure of both anchor lines caused by a heat source is possible.
http://www.irata.org/safety_notices.php

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IRATA SAFETY BULLETIN SB 28
DROPPED OBJECTS

Issue No.	SB 28
Issue Date	07/03/2014
Issuer	IRATA Health & Safety Committee

1. Summary

A number of incidents have been reported to IRATA relating to dropped objects;

- *"Technician lowered a bucket with a bucket of paint in it, the bucket of paint fell out but didn't hit anything."*
- *"A radio located in a radio-harness slipped out and fell 25ft to the ground."*
- *"While carrying out ultrasonic inspection, the ultrasonic set fell 30m into the sea."*
- *"An operator de-rigging on the bridge deck dislodged a piece of ballast that ricocheted to hit a suspended operator below on the left knee causing a small bruise"*
- *"The tool bag of a technician fell to the ground when he missed clipping the karabiner to the gear loop on his harness."*

2. Recommendations

Take your time to prepare your worksite and equipment properly before commencing any task! Only use certified bags when lifting or lowering equipment in bags! Most of these incidents could be avoided by following the recommendations in the IRATA ICOP;

1.4.1.1 The essential elements of a safe system of work include:

f) proper control of working methods, including:

(i) provision for emergencies;

(ii) the protection of third parties;

(iii) the use of work equipment;

(iv) exclusion zones.

2.2.4 Risk assessment

"…b) [consider] any hazard placing the public or other workers at risk, in particular, persons working on the ground on to which debris or tools could be dropped;…"

2.2.6 Procedures and personnel to be in place before work begins

j) protection of third parties, e.g. exclusion zones; barriers; warning signs.

2.11.8.1.1 Exclusion zones may need to be set up to protect people from falling or to protect people against falling objects from above the area of rope access operations, or anyone below.

2.11.8.2.1 Where required, precautions appropriate to the situation should be provided to prevent equipment or materials falling in such a way that other people might be endangered.

Annex M.2.2 In many cases, the greatest danger is of dropping the tools on to people below. Therefore, to guard against this, small tools such as hammers, trowels and drills should be securely attached to the rope access technician's harness, e.g. by appropriate cords or lanyards, or to an independently suspended line. Alternatively, small items could be carried in a suitable container, e.g. a bucket or bag, securely attached to the rope access technician's harness."

Annex K.1.2 Pre-use equipment check

K.1.2 Before approaching the point of descent or ascent, or commencing to descend or ascend, checks should be made to ensure:

f) tools or other items are secured so they cannot fall."

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IRATA SAFETY BULLETIN SB 29

Unauthorised persons tampering with rope access equipment

Issue No.	SB 29
Issue Date	07/03/2014
Issuer	IRATA Health & Safety Committee

1. Summary

"While performing a rigging and rope systems check, one of our techs found one of our lifelines to be cut. This rope was clearly cut intentionally by someone else. It looked as if it has been cut to possibly be used as a haul or tag line. There is probably a 50-75 ft. section of the rope missing. It was not in the way of anyone or another ongoing job. The rope was intact yesterday when it was last used. These ropes have to be left up overnight due to the lengthy rigging process versus the little amount of actual time we are able to spend in the field."

It goes without saying that rope access equipment represents the safety of human life therefore we must look after our equipment and be aware who is potentially tampering with it. Understandably we can only use reasonable precautions to ensure that no other work parties will cross our barriers and enter our work site to tamper with rope access equipment. It is not unheard of for third parties to interfere and / or damage rigged rope access equipment while technicians are on breaks or off shift. From the example above we can see the importance of pre use equipment inspections and of suitable exclusion zones with clear signage.

2. Recommendations

Although it is nearly impossible to stop third parties from entering, tampering or damaging rope access equipment whilst off shift or on breaks, by following the IRATA ICOP recommendations below it may help to deter these actions from happening;

2.10.1.4 It is essential that all load-bearing equipment is given a visual and tactile inspection by the user before each use to ensure that it is in a safe condition…"

2.11.8.3 Anchor area exclusion zone

2.11.8.3.1 An anchor area exclusion zone (also known as a rope access controlled area) should be cordoned off at anchor level with suitable barriers and warning signs. The anchor area exclusion zone should usually be large enough to include anchor points and to provide safe access to the working edge.

2.11.8.3.2 Only members of the rope access team should be allowed in the anchor area exclusion zone, unless under close supervision."

2.11.8.2.3 Exclusion zones…People should be discouraged or prevented from entering the exclusion zone or interfering with the rigging by posting suitable notices, providing warning signs, erecting appropriate barriers or installing alarms….

2.11.7.5 At the beginning of each working day and at other times as appropriate, e.g. when the anchor lines are relocated during the day, the rope access safety supervisor should carry out a pre-use check to ensure that all the anchors and anchor lines (wire and textile), and the structure or natural feature to which they are attached, are satisfactory. This pre-use check should include any points on the anchor lines where abrasion or other damage, e.g. caused by hot surfaces, could occur. The rope access safety supervisor should also take responsibility for checking anchor lines for length and that, where appropriate, termination stopper knots are in place and secure.

Another consideration could be the use of bag tags with a unique security seal threaded through the eyelets of the rope bag to prevent unauthorised tampering with rope access equipment. It may be necessary to have an additional person as sentry or guard to prevent unauthorised tampering with suspension equipment.

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IRATA SAFETY BULLETIN SB 30
HAZARD IDENTIFICATION

Issue No.	SB 30
Issue Date	07/03/214
Issuer	IRATA Health & Safety Committee

1. Summary

An incident has been reported to IRATA relating to a work party not correctly identifying all the hazards associated with their task at the planning or job implementation phase;

"Operators were not informed by the client or had not noticed low voltage electrical bird protection on the structure themselves. Operator touched the bird protection & received electrical shock to their left hand.

All work ceased until electrical bird protection powered off & isolated. Operators briefed to be aware of these types of protection in the future."

2. Recommendations

As referenced in the IRATA ICOP, proper hazard identification during the risk assessment process, whilst planning for the job, may have helped identify this hazard correctly and allowed for the necessary steps to be taken to isolate the low voltage electrical bird proofing. It could be beneficial to talk to building managers and/or area authorities and use open questioning techniques during discussions as they may have more knowledge of hazards onsite and in conclusion may help provide for a more comprehensive risk assessment.

2.2.4 Risk assessment

2.2.4.1 Once it has been decided that rope access is a suitable method to carry out the intended task, employers should review carefully the procedures to be followed for carrying out the work. They should identify any hazards and examine how they can be removed or, if this is not possible, how the risk can be reduced to an acceptable level. This is determined by carrying out a risk assessment, which is also known as a job safety analysis (JSA). For more information on risk assessment, see **Part 3, Annex A**.

2.2.4.3 Hazard identification should comprise identification of anything with the potential to cause harm, for example:

a) power cables, which could pose a high risk of electric shock; …

2.2.4.5 The hazard identification and risk assessment should be site specific. They should be documented and should cover all aspects of the work to be undertaken. The document(s) should be available to personnel working on-site and should be regularly reviewed formally by them during the course of the work, to take account of changing circumstances, e.g. weather conditions and other work being carried out. Operations such as oil platforms, refineries, power stations and railways have a formal written permit-to-work system to address hazards, by requiring certain precautions to be taken. Examples are: electrical isolations; restriction of other work; communication requirements; specified personal protective equipment

2.11.7 Pre-work checking

2.11.7.1 If a permit to work is required, this should already have been obtained and checked. Permits to work are an effective method of isolating a hazard before work starts and to ensure that it remains isolated while work is in progress and until everyone is clear of the danger area.

See IRATA Safety Bulletin number 26 which highlights how important it is to identify all the hazards associated with a task during the planning and risk assessment phase of the project.

NOTE Permit to work systems are not fool proof and technicians must be aware of other site operations

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IRATA SAFETY BULLETIN SB 31

PROCEDURES NOT FOLLOWED.

Issue No.	SB 31
Issue Date	07/03/2014
Issuer	IRATA Health & Safety Committee

1. Summary

Incidents have been reported to IRATA where technicians have not followed the clients or employing companies' procedures;

- *"A worksite visit was being carried out and it was noticed that one of the Abseil team was not wearing a life jacket whilst working overboard. The job was stopped and work party came back in board. Discussions followed with team leader and manager. L3 and team brought in for investigation."*

- *"A team needed to lift a 900mm C-Beam (3kg) from roof deck to the 8th floor of the derrick. When lifting commenced, the beam jerked due to the ropes rebound and slipped out, falling down 3m. No barriers or signs were put up during the task. Nobody got hurt when the beam fell. The site manager immediately stopped all ongoing task on the derrick and barricaded the location. Investigation carried out found improper rigging methods were used."*

- *"The technician was abseiling down the rock face, carrying a hedge cutter on his harness to pass it to a competent person to use. The hedge trimmer was hooked on to the IPs harness and hanging at his side. During transportation it bounced on a rock and swung round making impact with his left hand. The technician was fairly inexperienced (level 1 with only 5 months experience), the hedge cutter was being carried incorrectly allowing the hedge trimmer to bounce of the off the rock.*

The hedge trimmer should either have been lowered on a rope, raised to the operator on a rope or hang from a lanyard below the operative carrying it down the slope in accordance with the IRATA Code of Practice."

2. Recommendations

The IRATA ICOP makes clear reference to the requirement for suitable procedures to be in place to help protect personnel and property (**A.1.2**). Employers and technicians should ensure they fully understand the contents of procedures prior to commencing any task (**A.2.1.4.2**). Detailed information relevant to the task should be available prior to the task commencing (**B.2**) and toolbox talks should be used to confirm that technicians understand what is required of them from the safety method statement (**annex B**) and if they identify that they do not have the correct equipment or PPE (**B.2.2.e**) or are not suitably qualified (**2.2.5.1**) to carry out the task then the work should not go ahead until all the correct resources have been found.

Exclusion zones with adequate signage should be set up prior to tasks commencing (**1.4.2.6 & 2.11.8**) and prior to any work commencing proper pre site planning (**1.4.2.1**) should be carried out including hazard identification during the risk assessment phase (**annex A**) and any safety method statements (procedures) should be strictly adhered to during the task and may not be deviated from.

If technicians are unable to comply with any requirement of the procedure or do not understand the procedure then they should not commence the task without reporting the issue to their supervisor or employer. They must not recommence the task until they clearly understand what is required or until the issue has been adequately addressed.

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IRATA SAFETY BULLETIN SB 32
STRAIN INJURIES

Issue No.	SB 32
Issue Date	07/03/2014
Issuer	IRATA Health & Safety Committee

1. Summary of incident reports

A few incidents have been reported to IRATA relating to technicians suffering strain injuries;

"While bristle blasting the underside of the pipework, the technician felt a pulling sensation in their left shoulder when applying pressure. Technician came down and reported to medic."

No rescue required.

"Technician was climbing after lunch, between pipes and experienced pain in his shoulder. He was safe and sitting on pipes and alerted his team mates. A rescue was initiated where the supervisor climbed to him, prior to attaching a 3:1 system to the technician and hauling him to safety. The technician was stripped of his harness and walked away escorted to the medic."

The shoulder was found to be dislocated causing significant pain.

"While performing rigging work, technician felt pain in his groin after repositioning and evacuated to surface. After resting, the pain was still present so technician reported to rig medic who evacuated him to hospital for inspection/diagnosis. Technician had passed a full medical examination and had been working without problems since then."

No rescue was required.

All the scenarios above describe qualified rope access technicians who had passed medicals to work in the environment they were operating in, however these medicals do not take into account their current physical strength and fitness as they are usually carried out on a two yearly cycle.

2. Conclusions

According to the IRATA ICOP, rope access technicians should be physically fit to carry out rope access activities at height.

*"**1.4.2.2 Training and competence***

Rope access technicians should be:

b) sufficiently physically fit and free from any disability that might prevent them from working safely at height;"

The trigger mechanism for these incidents appears to be related to poor body positioning, overexertion or lack of access and egress consideration.

3. Recommendations

- Rope access work can be strenuous and it is strongly recommended to carry out suitable warm up exercises prior to commencing any rope access activities, especially after prolonged periods of rest.
- Use rope access equipment for its intended purpose and ensure the most ergonomic body position in relation to the task and worksite.
- If any discomfort is being experienced, whilst carrying out the task, stop the job and reposition prior to commencing the task. If the task cannot be carried out safely it should not be carried out at all.
- Technicians should take the time to be mindful of their comfort whilst fitting their appropriately sized rope access harness as per the manufacturer's instructions and use suitable clothing to maintain a comfortable temperature while working.

***"2.3.1.6** Rope access technicians should be given the opportunity not to work at height if they do not feel fit enough to do so. (IRATA ICOP)".*

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Fall from Height During Operations

Issue No.	SB33 Fall From Height During Operations
Issue Date	12/11/14
Issuer	IRATA Health & Safety Committee

1. The Incident

At around 10h30 on 11 October 2014 a Rope Access Technician Level 1 (IP1) fell from a building roof level to the 2nd floor level of the seven-storey building. All team members and eyewitnesses who were on the scene of the incident were interviewed.

The incident took place after the team had completed their first section of work, during the time that the ropes were being shifted to the next section, but prior to the completion of the rigging. The Level 3 Supervisor (L3S) was responsible for the rigging and was at the ground level on the north elevation busy with rigging and being assisted by a Ground Support Technician (GST1). GST1 was responsible for establishing the exclusion zone and for radio communication with Rope Access Technician Level 2 (RATL2) who was team leader on the rooftop and all communication was done in their mother tongue, to avoid confusion. RATL2 was responsible for communication on the roof and for all rigging assistance and safety measures on location.

At approximately 10h25, RATL2 received information from L3S that the rigging of three sets out of five (1, 2 & 5) are complete and that the team should get ready to start their work on the south elevation. Once the information was received, RATL2 instructed two technicians to start attaching to their ropes in location 1 and 2. At this point one of these technicians requested additional rope protectors from RATL2, who then left to another part of the roof to collect the items.

During the absence of RATL2 two technicians, IP1 and Rope Access Technician 1 (RAT1) proceeded to attach themselves to their individual sets of rope (3 & 4) and positioning themselves on the parapet wall without receiving instruction to do so from the team leader or supervisor. At approximately 10h30, IP1 proceeded to lower himself off the parapet wall and onto his working ropes, but as he let go of the parapet wall committing his entire weight to the ropes the ropes started slipping. IP1 fell two floors where he hit a ledge of approximately 1 meter wide. He rolled off the ledge and proceeded falling the further three floors to the landscaped area on level 2 of the building.

At this point security responded to the sound of the impact and rushed to assist IP1. They released him from his ropes and removed his harness. IP1 was then assisted to go inside the building where he was made comfortable inside the security room on the floor and the security phoned the ambulance service. At the same time on the roof RAT1 informed RATL2 of the incident and RATL2 immediately let L3S know by radio. All technicians went to level 2 to assist IP1, but were prevented access to him by building security until the ambulance arrived and took him to hospital at 11h20.

Detail of injury noted as bruises, bone fracture and ligament damage.

Parts of injury damage noted as left little finger, right foot and right hip.
Cause of accident noted as human error/procedure not correct/carelessness.
Injury agent noted as concrete slab and loose stone landscaped area.

2. Incident Analysis

Corrective action request taken to prevent re-occurrence or eliminate hazard:
An immediate investigation was carried out by the QHSE Manager of the Operating Member Company (OMC) assisted by OMC Safety Officer and in collaboration with the building Associate Director Public Safety, Building Facility Project Manager, Site HSE Manager and site security. All site personnel were interviewed on site excluding L3S who was taken by the police and interviewed at a later stage after his release, on the same day. IP1 was interviewed in the hospital while awaiting the results of his CT scans and x-rays.

A close door emergency meeting was called by OMC Head of Division and attended by division management, operations management, assistant managers involved and site management and supervision. During the meeting all documentation was examined, all procedures where discussed and analysed and corrective actions where determined.

Root cause:

- Human error
- Poor communication

3. Control Measures Implemented

When rigging activities are carried out that are not in line of site of the technician from where he will access the system then no one will be allowed to transfer onto the ropes until the Level 3 supervisor has checked the rigging and is back on the roof or access level to give personal approval for technicians to access the system.

When rigging activities are carried out that are not in the line of site of the technician from where he will access the system then all access ropes are to be positioned on the roof or access level and not lowered over the building edge until the Level 3 Supervisor has checked the rigging and returned to the access level and gives all technicians the approval to access the ropes.

A green tag system will be implemented where the Level 3 supervisor responsible for the rigging will have to do a green tag on a daily basis for each set of ropes. The tag will contain the following information – supervisor name, date and signature.

Immediate meetings were held with all OMC Supervisors explaining the incident and discussing root cause with preventative measures.

Scheduled meetings are being held with all OMC personnel over the course of the next week to discuss the incident, root cause and the preventative measures emphasising the fact that safety is everyone's personal responsibility first.

Method statement templates are amended to provide a place for signatures by assistant managers and supervisors (every supervisor who gets to the site – even as a replacement for another need to sign a new method statement document with the site assistant manager) of OMC to assure procedures are explained, understood and handed over.

Fall From Height During IRATA Level 1 Revalidation Training

Issue No.	SB34 Fall From Height During IRATA Level 1 Revalidation Training
Issue Date	12 November 2014
Issuer	IRATA Health & Safety Committee

1. The Incident

Incident occurred on 16 July 2014 at 10.30am at an indoor training area operated by a Trainer Member Company (TMC).

The affected person was a Level 1 candidate (IP1) on the first day of a two-day IRATA Level 1 revalidation course. IP1 had over 6 years experience at IRATA Level 1 with 400 hours in his logbook.

There were three TMC staff on site at the time of incident:
L3T1 = IRATA Level 3T trainer on duty;
L3T2 = TMC director, teaching theory in classroom;
OM= TMC Office Manager, in office.

There were seven trainees on site at the time of incident:

Four Level 1 candidates including IP1 in training area with L3T1;

One L3 candidate and two L2 candidates in classroom with L3T2;

The other three L1s had been with the TMC since Monday. Two were experienced technicians revalidating and one was new to the industry. All were progressing well with training allowing L3T1 to initially focus his attention on IP1.

After assembling equipment, L3T1 took IP1 through some initial manoeuvres: ascent and descent with ascenders; then up with ascenders and change to descender and descend; this was carried out twice.

With IP1s prior experience and performance on these initial exercises L3T1 was happy to move onto more complex manoeuvres, starting with a rope-to-rope transfer. IP1 completed the first half of the exercise successfully, changing from ascent to descent, connecting to the new ropes with chest ascender and knot, and lowering across. L3T1 advised IP1 of the remaining steps to complete the exercise and turned his attention to the other L1 candidates. A short time later IP1 fell the short distance (approximately 2m) to the floor clutching ropes, burning his right hand and landing hard on his left leg, hurting his ankle. IP1s handled ascender and foot loop were still on the rope, but he had no connections to the ropes. IP1 said he thought he had put his descender on the rope before removing his chest ascender, but it was evident he had not. Likewise his back-up device was not connected, he had untied the knot and had not connected to his handled ascender.

NB: the initial report in the TMC accident book suggests the back-up did not engage due to insufficient height. Further discussion with L3T1 and IP1 suggests the back-up had in fact been disconnected.

2. Incident analysis

Although IP1 considered the accident his own fault, it could have been prevented through closer supervision. Supervision was at the TMCs normal level (4:1), and is lower than IRATA's maximum candidate/trainer ratio of 6:1. IP1s experience and initial performance were not indicative of him requiring special attention or a higher level of supervision.

Whilst the potential for such accidents is always present when training it is not possible to watch everyone 100% of the time, but a quick check to confirm at least one good connection had been made would have been sufficient to prevent the fall.

The incident required IP1 to make **all** of a series of mistakes:

- Not re-attaching his descender,
- Not re-connecting his back-up,
- Not disconnecting from the knot,
- Not making a connection to his handled ascender,
- Not checking all of the previous before disconnecting his chest ascender.

The avoidance of any one of these mistakes would have prevented the accident.

Equipment selection was not considered to be a factor here.

This is the first time any of the TMCs trainers have witnessed such an incident in many years experience and it is considered to be very unusual. IRATA's accident statistics confirm that such occurrences are very rare.

The TMC report that the only unusual factor present was that IP1 was attempting to revalidate in 3 days and perhaps therefore felt pressure to 'catch-up' with the other L1 candidates who had been present since Monday.

3. Control measures implemented

IP1 was advised by the TMC to have at least a day's rest. As this would leave him unable to complete the course the same week it was agreed to reschedule on the 4 August, for a full four days (which became mandatory in the intervening period with the release of the Training Assessment and Certification Scheme on 01 August) of training. The TMC noted that in light of this incident it would seem prudent to insist all candidates attend the 5-day course; coincidentally IRATA introduced this as a requirement in the same period.

The TMC held a toolbox talk with all trainers to discuss how the accident could have been prevented. The incident affirmed the worth of keeping an attachment to the handled ascender, which although not mandatory the TMC teach as good practice.

4. Postscript

IP1 re-attended training without further incident, and was successfully assessed and re-certified at IRATA L1 for 3 years.

5. Further Reading

Further reading for candidates attending training courses can be found in IRATAs Training, Assessment and Certification Scheme (TACS) in section 4. - Guidance for candidates.

Further reading for trainers and trainer member companies can be found in TACS section 7. -Requirements and guidance for trainers and trainer member companies.

A link to TACS can be found here -
http://irata.associationhouse.org.uk/default.php?cmd=215&doc_id=4193

Dropped Objects

Issue No.	SB35 Dropped Objects
Issue Date	12 November 2014
Issuer	IRATA Health & Safety Committee

1. Summary

Member companies continue to submit incident reports regarding dropped objects from height, see selection below. The H&S Committee would like to re-enforce the message from SB 28, highlight again, the need to treat this issue with the respect it deserves, considering the severity of consequences a dropped object can pose.

Incident 1: *Karabiner was carried open on the side of the harness, resulting in a drop of the karabiner. Nothing was hit, karabiner remained within barrier area.*

Incident 2: the *attachment point of a Makita hand drill broke (without a clear reason, no shock load), resulting in a fall of the Makita from 60m. Only the battery drill was damaged, remaining within the barricaded area.*

2. Conclusions

The responsible rope access team employing tools and equipment at height must ensure the suitability and fitness for service of the equipment. The example involving a dropped battery drill in particular shows the importance and value of exclusion zones.

3. Recommendations

- Conduct thorough pre-use checks of items/tools/equipment used at height regarding its structural integrity and suitability for use in a tethered configuration.
- For further information on exclusion zones reference ICOP 1.4.2.6 & 2.11.8 - Exclusion zones.
- For further information on tool attachment methods reference ICOP Annex M - Use of tools and other work equipment.
- Consider having larger, heavy or cumbersome tools and equipment attached to a separate hauling/lowering system ***ICOP 2.11.8.2.2*** *Methods of providing precautions include securing all tools to either the rope access technician or to separate lines. Normally, items weighing over eight kilograms should be attached to a separate line, while those below this weight may be secured to the worker (For more information on the use of tools and other work equipment, see* ***Part 3, Annex M****.)*

- The above precautions and requirement for inspection and suitability also apply when using retractable lanyard style equipment/tool attachment devices.
- Rope access equipment itself can become a dropped object if not handled carefully and/or malfunctioning**.**
- A pre-use check consisting of a visual, tactile and function check should be carried out before each use. Operators should continue to monitor the safety of the system during use.
- Consider the use of catch nets, bags with large openings etc. when removing fragile and brittle objects or substances to prevent them from falling. In some cases overhead protection of sensitive equipment below or the coverage of thoroughfares might become essential.

  Information refer to ICOP 2.7.14 – clothing and protective eg.

Trade Specific Tasks and Risk Assessment

Issue No.	SB36 Trade Specific Tasks and Risk Assessment
Issue Date	12 November 2014
Issuer	IRATA Health & Safety Committee

1. Summary

Incident 1: *Beam used to hoist a banner got stuck. When released, it hit an employee in the face. Technician had a bleeding nose.*

Incident 2: *While welding a length of chain onto a cross member, the technician used a gloved hand to initially place the chain. During the welding process a piece of welding slag lodged on a recess of the glove, burnt through the glove which resulted in a first aid treatable burn to the finger. The burn was treated with a tropical burn cream and the technician returned to work. The technician should have used a clamp to hold the chain in place while welding, instead of a gloved hand.*

Incident 3: *Due to welding above our worksite, weld spatters rained on our equipment resulting in a waste bag catching fire.*

2. Conclusions

While the above examples are related to trades specific tasks – rigging and welding - safe-work principles apply to all working at heights and rope access situations. These cases highlight the need to take care with unfamiliar tasks and the arising risks and hazards requiring pre-execution identification to prepare safe operation. The responsible IRATA site safety supervisor, although experienced in his trade of rope access, must consult with the specialist trades person, engineer, inspector etc. and all team members at large to appropriately plan and execute the task as outlined in the scope, utilising the correct techniques, tools and PPE.

3. Recommendations

- Refer to ICOP Annex A - *Risk Assessment* for guidelines and principles of the risk assessment process, which can and should be applied to all work situations.
- Refer to ICOP Annex M - *M.5 Hot work* and *M.4 Bulky, awkward or heavy equipment* in particular, regarding the above examples.

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- Refer to ICOP 2.11.9 - *Communication***.** Rigging and lifting activities on ropes, for example, shall follow the same principle as operations on ground level. Where spotters are necessary to closely monitor a load in motion, ensure the technician is adequately trained and briefed on the task and the commands used during the operation. Ensure alternative communication is available to the team in case one method fails during operation (e.g. failure of radio communication, excess noise inhibit clear conversations etc).
- When planning activities, consider the bigger picture, not only those hazards affecting the immediate vicinity and the technicians performing the work but anticipate the whole area where affected works may possibly reach. Welding splatters may drain away from the immediate job location setting waste on fire however, this could have severe consequences if the resulting fire is cutting off/inhibiting your escape and retrieval routes.
- There may be occasions where PPE worn to access and egress a work place may differ to the PPE required to carry out a given task (e.g. gloves), for further information refer to ICOP 2.7.14 – clothing and protective equipment.

Rope Caught by Moving Elevator

Issue No.	SB37 Rope Caught by Moving Elevator
Issue Date	12 November 2014
Issuer	IRATA Health & Safety Committee

1. The Incident

On 30 July 2014, a high-potential near miss incident took place on board a semi-submersible drilling platform (could have resulted in a fatality)

During derrick inspection activities whilst using rope access, both ropes of a team member where destroyed caused by accidental activation of the derrick elevator. All moving derrick equipment had been isolated electrically before start of the activities correctly and in accordance with the project's risk assessment (except for the elevator).

The person involved promptly acted upon noticing that the elevator started to move, which enabled him to stand on a nearby support beam and secure himself to the cable tray directly next to him.

2. Circumstances

Arrangements were made that no persons outside the rope access crew itself (team of 12) could use/activate the elevator from the bottom position (intermediate stops halfway up the derrick and at the crown). The rig floor and surrounding area had also been barrier off.

A team of 2 RA technicians from the team of 12 were working together on the derrick's corner leg adjacent to the elevator support tracks, but around the corner.

After completion of their inspection descent, one team member climbed back up on the ropes towards the crown to guide torque tools suspended from a light winch along the same route upwards.

Before ascending the ropes were released from the railing to which they were tied down (to prevent them being blown sideways).

Even though agreements were made to ask permission via radio before using the elevator, a RA tech belonging to a second team (next to the one asking the permission) accidentally pressed the elevator call button on the control panel.

A safety alert was raised among company personnel and shared with the client.

3. Lessons Learned

- *Task Risk Assessment for use of the elevator (and when changing procedures) with a RA team nearby should have been carried out with the whole team and formally recorded on paper;*
- *All moving machinery should be isolated when carrying out RA work (even when arrangements are made to keep third parties away from control points);*
- *Make proper arrangements to prevent ropes getting moved by wind / caught by moving parts (rigging, rope bags, etc.);*
- *(Radio) Communication procedures should be clearly agreed with the entire team (transfer & verbally confirm all information);*
- *To have a clear description of / policy on a Level 3's role in projects with large team sizes.*

4. Conclusions

The Operating Member Company (OMC) has implemented additional control measures including: training of employees regarding communication; updating guidance on project risk assessments; adding 'Confirm isolation of all moving machinery' to pre-shift meeting checklist.

Furthermore the OMC has cooperated with several clients to issue a standing order to an entire fleet of one drilling contractor which prohibits the use of rope access in active derricks and to confirm complete isolation of moving machinery (also elevators) in derricks. The OMC is also communicating this message across to other drilling contractors & clients.

5. Recommendations for further reading from the ICOP

- Refer to **Annex A - Risk Assessment** for guidelines and principles of the risk assessment process, which can and should be applied to all work situations, see also ***2.2.4.5*** *The hazard identification and risk assessment should be site specific. They should be documented and should cover all aspects of the work to be undertaken. The document(s) should be available to personnel working on-site and should be regularly reviewed formally by them during the course of the work, to take account of changing circumstances, e.g. weather conditions and other work being carried out. Operations such as oil platforms, refineries, power stations and railways have a formal written permit-to-work system to address hazards, by requiring certain precautions to be taken. Examples are: electrical isolations; restriction of other work; communication requirements; specified personal protective equipment.*

- Refer to **1.4** - **Principles and controls** for the essential elements of a safe system of work including ***1.4.2.5.6*** *An efficient communication system should be established between all rope access technicians in the team and, where necessary, third parties, e.g. the control room, if offshore.*
- Refer to **Annex P – Recommended actions for the protection of anchor lines**, see also **2.11.3 – Use of anchor lines** which contains ***2.11.3.1.6*** *The effects of wind on the free end of anchor lines should be taken into account. Care should be taken to ensure that the tail end of anchor lines cannot snag on dangerous objects, such as working machinery, power lines or a moving vehicle. This could lead to the need for additional monitoring.*
- Refer to **2.11.7 - Pre work checking.**
- Refer to **2.11.8 - Exclusion zones.**
- Refer to **2.11.9 - Communication** which contains ***2.11.9.1*** *An efficient communication system should be established between all rope access technicians and, where necessary, to third parties (e.g. sentries or the control room, if offshore). This should be agreed and set up before work starts and should remain effective for the whole of the time that people are at work.*

IRATA SAFETY BULLETIN
SB38 Entanglement

Entangled tool lanyard during drilling operations

Issue No.	SB38
Issue Date	5 February 2015
Issuer	IRATA Health & Safety Committee
Status	Report following operating members' reports

1. The incident

The incident occurred in a shipyard on board a drilling vessel. A team consisting of four members was on their task to drill m18 hole for the support at the starboard side of the derrick at level 7. The team comprised:

- Employee #1 is on top of the drilling area to lube the drilling bit;
- Employee #2 is on rope doing the drilling from the bottom towards the upper level;
- Employee #3 is holding the safety line for the magnetic drill;
- Employee #4 is stand by at the edge of the platform to hand over equipment.

Employee #1 is holding the cutting oil attached to a lanyard, which is connected to his cow's tail, while Employee #2 is doing the drilling. Employee #1 repeatedly lubricated the drilling bit by pouring the oil directly from the container and keeping a distance around 10mm. At one point the lanyard of the cutting oil container made contact with the drill bit which caused Employee #1 left little finger to become caught and crushed in between the lanyard and the drilling bit.

2. Incident analysis

Root cause:

- Human error – lack of concentration / attention;
- 'Moving parts' hazard was not identified and highlighted.

3. Control measures implemented

Safety meetings to be held with all crew to raise awareness of concentration and attention during all operation.

Safety meetings to be held with all crews to raise awareness of hazard identifying involved in all tasks.

4. Recommendations for further control measures

- Conduct thorough pre-use checks of items/tools/equipment used at height regarding its suitability for use in a tethered configuration;
- Where appropriate choose auto feed lubrication systems over manual feed;
- Use extended nozzles so that an increased distance between lubricator and machine is maintained;
- Use elasticated or retractable tool tethers/lanyards to reduce unnecessary slack coming into contact with moving machinery thus reducing the entanglement risk.

5. Recommendations for further reading

- For further information on identifying hazards and measuring risk reference ICOP Annex A – Risk assessment;
- For further information on safe execution of sequence of procedure reference ICOP Annex B – Safety method statements;
- For further information on using work equipment from anchor lines reference ICOP Annex M - Use of tools and other work equipment.

Fall from Height

Issue No.	SB39
Issue Date	14 April 2015
Issuer	IRATA Health & Safety Committee
Status	Report following operating members' reports

1. The incident

On 04 February 2015, in a shipyard on board a vessel, rope access work was in progress. Working space was barricaded with red/white tape, according to the procedures. NDT specialist, technician 1 (Tech 1) was performing work to the top structure (davit) of a lifeboat. He was nearly finished.

The rope access supervisor (Tech 2) for the task was preparing the rigging with beam clamps in order to inspect the next welding spot. To gain proper access to the welding spot and to properly perform a rescue if necessary, walkway grating (see Figure 4, point B) was removed by Tech 2 and Tech 3 and placed out of the way.
During this action, Tech 2 had secured himself with a lanyard to the top of the handrail (see Figure 4, point C).

Tech 3 was secured with ropes from the rigging attached to beam clamps (see Figure 3, point A and Figure 4, point D).

Tech 2 was facing point C (Figure 4). Tech 2 asks Tech 3 to hand him a set of ropes for the new rigging. Tech 1 had finished the inspection on top of the lifeboat and was climbing down.

Tech 2 noticed that Tech 1 had his leg near the lifeboat control panel. His intention was to warn Tech 1 to be aware of the control panel. In order to warn Tech 1, Tech 2 turned himself 90 degrees to the right in order to face Tech 1. Now Tech 2 is facing the hole in the grating. At the same time Tech 2 intended to take a different position on the grating, in the direction of Tech 1. Taking a different position, Tech 2, removed with his left hand lanyard from point C (see Figure 4), made a step with his left foot and intended to secure himself to point E (see Figure 4) with the lanyard in his right hand.

While doing these multiple maneuvers, for a split second Tech 2 was unsecured and stepped into the hole of the grating. As a result, Tech 2 fell through the opening in the walkway grating and into the water from 14 meters high. Tech 2 fell with his feet downwards into the water. When coming back to the surface the lifejacket started to inflate.

At the same time, Tech 3 communicated with the Control Room that there was a man overboard. Tech 1 was shouting man overboard. Lifeboat 2 was launched into the water.

Tech 2 was swimming to a pontoon nearby to get out of the water and kept communicating with vessel crew.

The crew inside the lifeboat pulls Tech 2 out of the water and immediately removed all gear and clothes and put him in a thermos-blanket.

The vessel crew handed over Tech 2 to firefighters of the shipyard and was taken to HSE office in order to check any injuries and to warm up. It was reported that Tech 2 suffered no injuries.

2. Incident analysis by the Operating Member Company (OMC)

Root cause:

- Human error – lack of concentration / attention

Conclusion by OMC

Investigation has led to the fact that all OMCs procedure was followed and that all paperwork and permits were in accordance with procedure from client and site.
Multiple maneuvers were performed in a short time, which led to this human error from a very experienced rope access technician.

In case a lifeline / safety-line was in place, the necessity for unhooking when changing of position was not necessary and highly likely would have prevented this accident.
OMC has already been in contact several times with Tech 2, to check the physical and mental conditions. As far as we can judge, all is well. Tech 2 will not be disciplinary penalized. He is more than willing to support OMC by supporting us in this investigation and in presentations to all involved.

3. Control measures implemented by the OMC

Although procedures were followed, this accident could happen. We have carefully read our procedures and taken in count all the facts, which led to this accident. This resulted in the following point of improvement:

□□□□□ will adjust the toolbox form with an additional line stating what to do with unstable or open surfaces and/or grating.

□□□□□ will adjust the tick box form with an additional line stating; Tensioned line in place? YES or NO

□□□□□ will adjust the RA-OPS (Rope Access procedure) with an additional paragraph explaining the procedure what to do with unstable or open surfaces and/or grating. In detail will be explained that in case of open surfaces, lifelines / safety-lines will be placed along the open surfaces. Lifeline / safety-line will be fastened to proper anchor points. In case a lifeline / safety-line will be in place, the necessity for unhooking yourself when changing of position in case necessary, is limited.

4. Recommendations

A number of fundamental principles failed to be applied essentially being:

1. The technician was not attached whilst working at height;
2. The removal of walk way grating creating the unprotected edge was done without proper planning, protection or notice;
3. The worksite was potentially congested and not planned in an agreed sequence;
4. Communication was inadequate;
5. The fall protection system either personal and/or collective did not fully suit the work scope.

Human error and momentary lapse of concentration appears to be the immediate if not root cause. It is essential that the rope access teams are aware of the hazards associated with the task to be carried out including hazards created by the team itself namely falls from height. A suitable exclusion zone is required to protect not only third parties from the rope access task being carried out but also from the rope access team themselves so that the team are not exposed to the hazard when moving around at height and concentrating on other tasks in hand.
The use of barrier tape to prevent third party access was totally inadequate bearing in mind the removal of walkway grating and creating an exposed edge. This may have contributed to the overall

approach to the jobsite as with signed & hard barriers in place would have meant access and egress require a more controlled action and a sense of the exposure beyond them considerably higher. There are various ways to control falls from height when working near to exposed areas including but not limited to the following:

- Barricading off the affected area from third party access using signed and hard barriers (in this case barrier tape had been an implemented control measure and was not the immediate cause);
- Implement a Work Restraint system so that it is impossible to reach the affected area;
- The use of a barrier system around an opening as an automatic default action if any grating in a walkway is to be removed;
- Only remove walkway grating when absolutely necessary i.e. when accessing the work area to carry out the task and then installing the walkway grating as soon as the task is complete and technicians have egressed the work area therefore minimizing the exposure time to the hazard;
- If selecting fall arrest as a method of access whilst moving around the affected area then 100% attachment at all times must apply and an appropriate system selected to reflect this.

For further guidance and information on applying a safe system of work please refer to the IRATA International Code of Practice (ICOP) -
http://irata.associationhouse.org.uk/default.php?cmd=215&doc_id=4336

IRATA SAFETY BULLETIN
SB39 Fall from Height

Figure 1 - position on the vessel

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Figure 2 - Working space barricaded with red/white barrier tape

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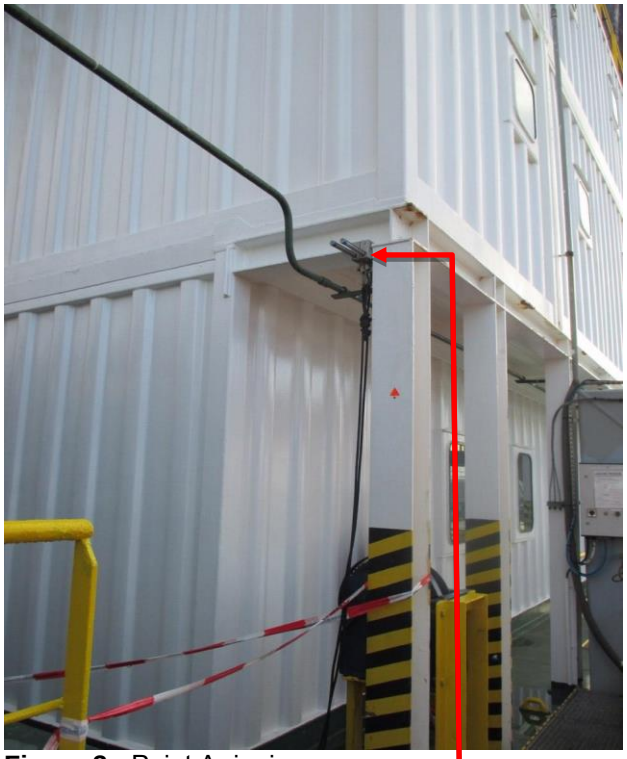

Figure 3 - Point A rigging

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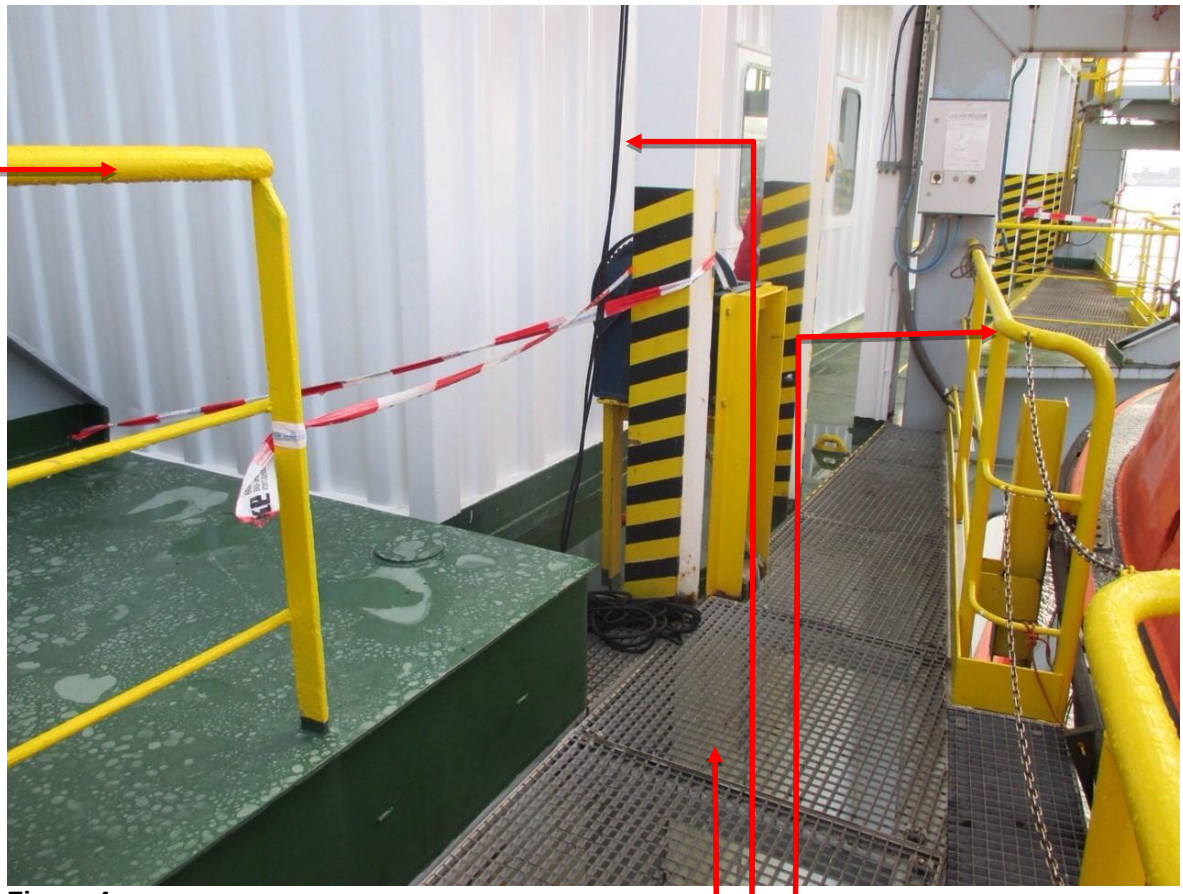

Figure 4 -:
Point B= Tech 2 & 3 removed grating panel
Point C= Tech 2 secured with lanyard
Point D= Tech 3 secured with ropes to harness
Point E= Tech 2 intended to attach to new point with right hand

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Dropped Objects

Issue No.	SB40
Issue Date	04 August 2015
Issuer	IRATA Health & Safety Committee
Status	Report following Operating member's reports

1. Summary

Member companies continue to submit incident reports regarding dropped objects from height, see selection below as reported by the Operating Member Companies (OMC). The H&S Committee would like to re-enforce the message from SB 28 and SB 35, highlight again, the need to treat this issue with the respect it deserves, considering the severity of consequences a dropped object can pose.

Incident 1: "*Technician tried to place rope clamp on their rope, the rope clamp slipped out of their hand and fell to the ground."*

Incident 2: "*Technician handed an unsecured crowbar to another technician. The crowbar fell from height and landed on a balcony below. No damage was reported."*

Incident 3: "*While performing window cleaning by utilizing rope access, the wiper fell down on the ground, inside the barricaded area."*

Incident 4: "*Technician used a karabiner to attach a 4 in 1 gas multi meter to him; he clipped through the ring of the multi meter and attached it to his harness. Whilst working, the ring of the multi meter where the karabiner clipped through had broken resulting in the multi meter falling from height."*

2. Incident analysis

The responsible rope access team employing tools and equipment at height must ensure the suitability and fitness for service of the equipment.

3. Health and safety committee - Recommendations for further control measures

- Conduct thorough pre-use checks of items/tools/equipment used at height regarding its structural integrity and suitability for use in a tethered configuration.
- Consider also using proprietary tool tethers to secure hand tools to prevent dropping, depending on the weight of the tool can be secured to the technician, having larger heavy or cumbersome tools and equipment attached to a separate hauling/lowering system.
- Rope access equipment itself can become a dropped object if not handled carefully.
- A pre-use check consisting of a visual, tactile and function check should be carried out before each use. Operators should continue to monitor the safety of the system during use.

- Consider the use of catch nets, bags with large openings etc. when removing fragile and brittle objects or substances to prevent them from falling. In some cases overhead protection of sensitive equipment below or the coverage of thoroughfares might become essential.

4. Health and safety committee - Recommendations for further reading

- For further information on identifying hazards and measuring risk reference **ICOP 2.2.4 & Annex A – Risk assessment;**
- For further information on safe execution of sequence of procedure reference **ICOP Annex B – Safety method statements;**
- For further information on securing tools see **ICOP 2.11.8.2.2;**
- For further information on exclusion zones reference **ICOP 1.4.2.6 & 2.11.8 - Exclusion zones.**
- For further information on tool attachment methods reference **ICOP Annex M - Use of tools and other work equipment.**

Adverse Inclement Weather

Issue No.	SB41
Issue Date	04 August 2015
Issuer	IRATA Health & Safety Committee
Status	Report following Operating member's reports

1. The incident as reported by the Operating Member Company (OMC)

"While carrying out cleaning works on a tall skyscraper the wind suddenly picked up and blew the technicians whom were window cleaning into the building, resulting in minor injuries to the hand and abrasion to the nose. "

"A traditional rescue was not possible due to the high winds and a window was removed and the technicians retrieved safely through the window."

2. Incident analysis as reported by the OMC

"All necessary precautions were taken prior to the incident such as briefings, toolbox talk checks and wind readings with the addition to a senior level 3 on site and radio communication. All safe systems of work were implemented fully and correctly."

"The weather suddenly and dramatically picked up resulting in a couple of technicians being blown into the building and receiving minor injuries."

Root cause: *"High-unexpected wind."*

3. Control measures implemented by the OMC

"Additional wind readings are now taken and recorded throughout the day. During the day when weather is generally poor or adverse the work is done at a different time. The incident was briefed out to the rest of the company and the risk assessment was changed to implement further measures to prevent such incidents occurring in future, such as if there is any doubt that the wind or weather is forecast to be poor the site technicians will consult with a senior IRATA Manager to see if it is safe to work. The site technicians are instructed to be extra vigilant for weather changes and to stop work if there is any doubt of inclement weather either before starting or during the shift."

4. Health and Safety Committee - Recommendations for further control measures

It is important to gain a local weather forecast prior to starting a rope access task, having regular updates and understanding how the weather behaves in the given area when comparing to that forecast e.g. sudden turbulence. Local knowledge may prove useful information also when assessing this.

Adverse weather should be considered when carrying out a risk assessment for a given task where the hazard exists, this assessment should be ongoing as well as initial and take in to account the changing environmental conditions such as wind speed and temperatures.

ICOP 4.2.7.3 provides information on the UK Work at height regulations (WAHR) where under the WAHR; work at height has to be properly planned, appropriately supervised and carried out in a safe manner. This includes the need to plan for emergencies and rescue. In addition, employers are required to ensure that work at height is only carried out when the weather conditions do not jeopardize the health and safety of persons involved in the work (see Regulation 4).

When considering emergency rescue and evacuation consider rigging for rescue and including a pre- installed lowering / lifting device (e.g. certain descender devices have the capacity to lift and lower in certain configurations, always consult the manufactures product instructions for the given device to ensure suitability) to each anchor line so that technicians working in areas where such a hazard exists can be lowered or lifted remotely, safely and efficiently.

5. Health and Safety Committee - Recommendations for further reading

- For further information on identifying hazards and measuring risk reference **ICOP 2.2.4 & Annex A – Risk assessment;**
- For further information on safe execution of sequence of procedure reference **ICOP Annex B – Safety method statements;**
- Information on **Emergency procedures** reference **ICOP 1.4.2.7 & 2.11.11**
- Keep a look out on www.irata.org for revised IRATA ICOP Annex O, this annex is currently being reviewed by the ICOP development and review panel (provisionally retitled Protecting against environmental conditions) and will include guidance and information on the effects of working in windy environments. Expected release December 2015.