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SAFETY AND HEALTH TOPIC SHEET NO. 21: FRAGILE, FRIABLE AND SOFT SURFACES

A safety and health 'topic sheet' aimed at raising awareness of hazards in the rope access industry. The series may be of use as a toolbox talk.

1 INTRODUCTION

1.1 IRATA technicians work in many locations and on various sorts of potentially fragile, friable and/or soft surfaces. The most common material is probably glass, e.g. working in atriums or against large windows. With the evolution in use of rope access, it is not uncommon to find technicians working on large scale fabric structures[1], e.g. the O2 Arena, or on slate roofs.

1.2 Each of these different surfaces presents unique rope access-related hazards. Accordingly, a project-specific hazard identification and risk assessment must be undertaken. A generic assessment for working on or around fragile surfaces is never sufficient.

2 WHAT CAN GO WRONG …

2.1 The risks associated with a number of surface types follow. This list should not be considered exhaustive.

Surface Type	Associated risks
Glass	Very slippery when wet Fragile Sharp edges, particularly when broken Can become brittle with age The surface is reflective It can break in different ways, depending on the type of glass Breakages can be sudden and violent.
Slate roof	Very slippery when wet Brittle Fragile Sharp edges, particularly when broken Can be dislodged easily
Fabric	Very slippery when wet Can become brittle with age Can have unpredictable strength The surface is reflective Movement can be unusual, i.e. they can act like a large trampoline
Polycarbonate	Very slippery when wet Fragile Sharp edges, particularly when broken Tends to snap in sections (rather than crack) and then fail
Fibre cement board/ Asbestos containing sheets	Fragile Brittle Sharp edges, particularly when broken Asbestos dangers Become brittle with age
Cont./…	

[1] More commonly known as 'tensile fabric structures' (and manufactured typically from PTFE, ETFE or PVC)

Cont./…	
Roofing tiles	Brittle and/or fragile Sharp edges, particularly when broken Easily dislodged Can be slippery when wet
Stored material in silos, e.g. stone, gravel, etc.	Risk of collapse Entrapment

2.2 Working at height on or near fragile surfaces requires consideration of the fall protection hierarchy:

(a) Avoid;

(b) Prevent, e.g. by the use of a barrier;

(c) Mitigate, i.e. minimise the distance and/or consequence of any fall.

2.3 Collective protective measures take precedence over personal protective measures, e.g. fall arrest.

2.4 There needs to be a rescue plan. There is a need also to consider what might happen if there was a fall through a surface. For example, were there a fall through a glass atrium roof the ropes must not be damaged or cut; but were the same fall to occur through a large fabric panel then damaged or cut ropes are not really an issue.

2.5 It may be possible to use wire slings to prevent the glass damaging or cutting the ropes in event of failure. However, the high potential for severe injury when falling through glass means that any rescue procedure will need to be robust and effective, as lowering and/or hauling through broken glass is particularly difficult.

2.6 Technicians working on fabric surfaces may be using ropes (anchor lines) or suspended on tension lines. Large fabrics tend to be curved in shape and, in the event of fabric tearing, it is very important to know where the casualty or casualties might end up. If, for example, you have six operatives working on tension lines on a large fabric arch and the fabric tears or fails, you potentially have six casualties hanging in the bottom of large loops; a considerable distance below where they were.

Case study: Fabric roof

Technicians had been installing a large fabric roof over a sporting venue. To prevent falls from the structure they were working from tensioned lines; anchored up and over the fabric arch.

The span was large and not steep so the technicians could easily walk around the fabric surface to carry out the tasks.

There had been no issue with any of the access until a rain shower, when the fabric became very slippery. The tension lines prevented the operatives from falling off the structure, but did not prevent the higher technician slipping over and sliding down the structure, taking the operative lower down with him, until the slide was arrested at the anchors.

Neither operative was injured but this could have been much more serious had there been tools in use, or a longer slip.

Name some simple measures which could have prevented this from happening …

Case study: glass atrium
Rope access technicians had been installing window film on an old glass atrium. They were using crawling boards and tension lines, with the system incorporating steel slings within the back-up in the event that a technician should fall through the glass. Preventing a fall must always be the preferred method of work, but this is not always possible. In this case, the technicians where close to the glass and required a certain amount of movement to lean across to clean and install the film. A technician leant on the glass to install the film. The glass was old and brittle and gave way. The technician fell through the hole and was suspended on his rope and the back-up sling. The technician was not injured; and operatives placed a board across the span allowing the casualty to climb back up using his etrier.
Consider what might have happened if the casualty was injured, the rope had been cut and/or the casualty could not self-rescue …

3 WHY THINGS CAN GO WRONG …

3.1 There are a number of reasons for why things go wrong:

- The lack of a suitable and sufficient risk assessment and/or a poor method of working;
- Technicians may work with a false sense of security, thinking the surface that they are on or against provides more support than it does;
- The rescue plan may be ineffective in event of a failure;
- Technicians may not be aware of the properties of the surface, e.g. how it moves and reacts and what may cause a failure;
- Technicians may not be aware that a surface **is** considered fragile (and they might not have been informed as such).

4 WHAT YOU CAN DO …

4.1 You should:

- Follow the hierarchy of fall protection;
- Make sure you know what you are working on and how it reacts to loads;
- Make sure that you have an effective rescue plan in place;
- Rig for the worst case scenario – think about what might go wrong!

5 ADDITIONAL CONSIDERATIONS …

5.1 When working on fragile surfaces it is very important to consider what is underneath them, i.e. what you might land on in the event of failure as well as what might land on others.

5.2 Working on toughened or laminated glass presents its own risks and hazards. Falling onto laminated glass can be likened to jumping onto a swimming pool cover that may or may not be

well secured around its edges. If well secured, you still have to get back off it; and if not well secured you've pulled it in from its sides; and both you and the pane are at the mercy of gravity!

6 ACTION

6.1 Review your management system's procedures for work on or near fragile surfaces

7 REFERENCES

7.1 Further information can be found in:

(a) IRATA International code of practice for industrial rope access (Third edition, September 2016)[2]:
- Part 2, 4.2.7, Work at Height Regulations

7.2 For a list of current (and past) 'safety communications' by IRATA, see www.irata.org

8 RECORD FORM

8.1 An example *Safety and Health Topic Sheet: Record Form* is given below. Members may have their own procedure(s) for recording briefings to technicians and others.

9 FURTHER READING

Fragile roofs: safe working practices, HSE (2012)[3]

Health and safety in roof work, HSG33, HSE (2020)[4]

Advisory Committee for Roofsafety (ACR)[5]

2 https://irata.org/downloads/2055
3 http://www.hse.gov.uk/pubns/geis5.pdf
4 http://www.hse.gov.uk/pubns/priced/hsg33.pdf
5 https://www.the-acr.org/

IRATA SAFETY AND HEALTH TOPIC SHEET – RECORD FORM			
Site:			
Date:			
Topic(s) for discussion:		Topic Sheet No. 21: Fragile, friable and soft surfaces	
Reason for talk:			
Start time:		**Finish time:**	
Attended by *Please sign to verify understanding of briefing*			
Print name:		**Signature:**	
Continue overleaf (where necessary)			
Matters raised by employees:		**Action taken as a result:**	
Continue overleaf (where necessary)			
Briefing leader *I confirm I have delivered this briefing and have questioned those attending on the topic discussed.*			
Print name:		**Signature:**	**Date:**
Comments:			