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SAFETY AND HEALTH TOPIC SHEET NO. 31: TOOL TETHERING AND LANYARDS

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 What are tool tethers?

Tool tethers are safety devices used to secure tools and equipment while working at height. They prevent tools and equipment from falling, thereby reducing the likelihood of dropped objects causing injury to people below or damage to property. Tool tethers keep tools attached to the worker's harness or a fixed point, assisting with keeping them easily accessible and reducing the risk of dropping them.

1.2 Why are tool tethers required?

Safety: The primary purpose of tool tethers is to prevent tools from falling. Dropped tools can cause serious injuries to people below and/or damage to the surrounding environment. Tool tethers mitigate this risk by keeping tools securely attached to the worker or a structure.

Efficiency: Appropriate and correctly used tool tethers assist with keeping tools easily accessible, and drastically reduce the likelihood of dropping objects. This measure can save time and make the work process more efficient.

Compliance: In many industries, safety regulations and standards require the use of tool tethers when working at height. Compliance with these standards is not only a legal requirement in some regions, but also a best practice for maintaining a safe work environment.

2 TYPES OF TOOL TETHERS & EQUIPMENT

In general, tool tethers used in the rope access industry have been traditionally made from accessory cords between 3-8 mm in diameter, however, there are many manufactured varieties available which are designed and tested for their intended use.

2.1 **Lanyards**: Flexible straps or cords that connect tools to the worker's harness. They come in various lengths and materials, such as nylon, wire coiled and elasticated. They are designed to hold tools securely while enabling some freedom of movement.

2.2 **Retractable tool tethers**: These are devices that use a spring-loaded mechanism to retract the tool tether when it is not in use. This helps keep the tool tether organised and prevents it from becoming tangled. Retractable tool tethers are often used for smaller tools and equipment.

2.3 **Tool holsters and bags**: Designed to keep tools secure, easily accessible and should be used in conjunction with tool tethers.

3 CONSIDERATIONS WHEN SELECTING THE RIGHT TOOL TETHER

3.1 **Load rating:** Select a tool tether that is appropriate for the size and weight of the tool you are using. Ensure it is strong enough to hold the tool securely. If the tool is > 8Kg it is recommended that these are attached to an independent system, and not directly to your harness.

3.2 **Length**: Choose a tool tether length that enables sufficient mobility without excess slack. If the tool tether is too long, it can increase the risk of accidental damage, and if too short can restrict movement.

3.3 **Material**: Select a tool tether made from high-strength, durable materials that can withstand wear and tear.

4 ATTACHMENT POINTS

4.1 **Harness connection:** Secure the tool tether to a designated load rated attachment point on your harness, tool bag, work seat, or fixed point as appropriate.

4.2 **Tool connection**: Attach the tool tether securely to the tool using appropriate connectors or loops. Make sure the tool remains firmly attached throughout use.

4.3 **Connector:** Most manufactured/off the shelf tool tethers incorporate connectors which have been subject to the specific testing carried out by the manufacturer. If so, this will be indicated in the manufacturer's instructions for use, and only suitable connectors must be used.

4.4 **Connecting to equipment:** Unless specified by the equipment manufacturer, tools and equipment should not be suspended from the technician's rope access equipment, as this may affect the operation or behaviour of the equipment, e.g. equipment being used as a backup device should not be used to suspend tools and equipment, as this may affect the performance, safe use and operation of the backup device.

5 BEST PRACTISE

5.1 **Regular inspection**: Before use, inspect tool tethers for signs of wear, damage, or defects. Replace any tool tethers that show signs of deterioration, avoid twists and unintended knots as these will often hinder functionality.

5.2 **Proper attachment**: Attach tool tethers securely to both the tool and the harness or anchor point. Ensure that the attachment points are strong and reliable. Many manufacturers provide self-amalgamating tape to secure to the tool making a permanent attachment point, other tools have rings or dedicated attachments.

5.3 **Connecting to the tool**: A karabiner may not be the most suitable connector when using small tools such as a spanner, as the weight of the karabiner is often equal to the tool, which can be a hindrance if used as the connector, and therefore selection of the karabiner must also be assessed.

5.4 **Minimise tangling**: Keep tool tethers organised in your bag and avoid letting them dangle loosely, as this can lead to tangling and may interfere with your work.

5.5 **Training**: Ensure that all workers are trained in the tying of suitable knots. This can be controlled locally by ensuring suitable training is provided and is based on the type of tools, tethers and equipment available in the area of operations.

6 TOOL TETHER CASE STUDY 1

Case Study

A rope access technician was tightening bolts on the exterior of a building using a spanner secured by an accessory cord. The spanner became caught in a balcony handrail that the technician was climbing onto. As the technician pulled themself over the handrail, the force applied to the tool tether released the knot in the accessory cord, resulting in the spanner falling 35 metres into the exclusion zone below.

The exclusion zone was controlled by an operative on the ground who was fortunately, not hit by the spanner.

The incident was reported as a dropped object, as the spanner was being actively controlled by the tool tether to prevent it from falling into the exclusion zone. It was categorised as a dangerous occurrence due to the incident's potential to cause significant harm and the fact that it fortunately did not.

6.1 Why did this happen?

- In this instance, the technician had made the tool tether from an accessory cord, and the knot used to secure the spanner was incorrectly tied. A clove hitch with a very small tail end had been tied, and it had not been secured or dressed sufficiently to prevent it from pulling through under load.
- The technician had not maintained control of their tools or equipment whilst moving position from on-rope to the balcony.

6.2 What could have happened?

- The spanner could have struck the technician, a third party, or property below, resulting in damage, injury, or a fatality.
- Whilst there was an exclusion zone below the work area, the spanner having fallen from a height of 35 meters may have struck an object during the fall or bounced out of the exclusion zone, which could have resulted in damage, injury, or a fatality.

6.3 What should have happened?

- The spanner should have been secured by a suitable tool tether. If the tool tether was not manufactured specifically for its intended use, a procedure should be in place to ensure that the tool tether is constructed from suitable materials by a competent person, and subject to inspection to verify its suitability and conditions for its intended task.

  Note: While it is not mandatory in some regions to use manufactured tool tethers/lanyards, procedures should be in place to demonstrate their suitability, and construction and inspection procedures used to prevent dropped objects.

- When transferring onto the balcony, the technician should have maintained control over any tools and equipment being used. e.g. placing the spanner securely in a sealed pod bag.

7 TOOL TETHER CASE STUDY 2

Case Study

A rope access technician is using a mag drill (electric magnetic drill) on the underside of a steel beam. The mag drill weighs in excess of 18 Kg.

During the aid climb into position, the technician transported the mag drill in a tool bag which was suspended around the beam and they pulled the bag along behind them. The tool bag was sealed and the weight of the mag drill was supported by suspending the bag on the beam.

Before starting the work, the technician connected their spare cow's tail to the mag drill handle to prevent it being dropped when taking it out of the bag.

When the drilling was taking place, the technician maintained their position as high as possible suspended from the beam and kept their head and body to the side of the mag drill to avoid debris and being struck by the drill if it dropped from the steel beam.

During the drilling operation the power was cut to the mag drill, causing it to drop from the steel beam onto the technician's leg and continue falling the length of the cow's tail before stopping.

The impact of the mag drill onto the technician's leg caused a large cut and severe bruising, and the mag drill dropping onto the cow's tail caused bruising on the technician's hip from the force transferred into the harness, which resulted in a second technician needing to assist with a rescue and descending to safety.

After medical treatment was administered for the cut and bruising, the technician returned to work the following week (6 days later) and resumed normal duties.

7.1 Why did this happen?

- Whilst the technician had taken steps to prevent the mag drill being dropped, the implemented measures (connecting the mag drill to the cow's tail) did not take into account that the mag drill may drop onto the technician and the weight of the mag drill (> 8 Kg) required an independent connection rather than to the technician's harness.

- Power was cut to the mag drill by a third party and whilst this action was not intended, it was an assumed risk so could have been more effectively controlled.

7.2 What could have happened?

The mag drill could have caused damage to the harness, cow's tail and other Personal Protective Equipment (PPE), and resulted in a more serious injury to the technician.

7.3 What should have happened?

The mag drill should have been suspended on an independent line using a suitable tool tether, which would have:

- minimised the potential fall distance of the mag drill; and
- prevented damage to the harness, cow's tail and other PPE.

8 ACTION

Tool tethers are a fundamental aspect of rope access safety. They play a crucial role in preventing dropped tools and equipment, improving work efficiency, safety, and ensuring compliance with regulatory standards. By understanding the different types of tool tethers and adhering to best practise, workers can enhance their safety and that of others, and efficiency while working at height.

9 ADDITIONAL INFORMATION

- IRATA ICOP Annex M.1.3 'Where tools and equipment are carried by the rope access technician, appropriate steps should be taken to prevent them being dropped or falling on to people below'.
- IRATA ICOP Annex M.2.2 'In many cases, the greatest danger is 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'.
- ANSI/ISEA 121-2018 – American National Standard for Dropped Object Prevention Solutions
- Topic Sheet No. 015 – Tool Lanyards

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