

# Topic Sheet No. 8

## Knots in the end of ropes



*A topic sheet prepared by © IRATA International (2017)*

## SAFETY AND HEALTH TOPIC SHEET NO. 8: KNOTS IN THE END OF ROPES

*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 training<sup>1</sup> teaches the importance of tying a 'stopper knot' to prevent a technician from descending off the end of a rope inadvertently. This is a very simple hazard to mitigate. However, it can be easily overlooked.

### 2 WHAT CAN GO WRONG ...

- 2.1 The most obvious consequence of not tying a 'stopper knot' in the end of a rope (or using a mechanical stopping aid) is that a technician will descend off the end of their working or back-up rope, with an increased risk of serious injury or fatality. Accordingly, steps should be taken to remove this hazard.

#### Case study

Four sets of ropes were rigged through gratings. This prevented 'stopper knots' being tied as part of the initial rigging, with the result that they would need to be tied later. Not all the rigged ropes were suitable for the task to be undertaken, so the L3 advised the L2 of a new method of work. These were not made clear and were misunderstood by the L2. Whilst not contributory to the incident, it complicated the situation. The L3 and L2 both accessed the ropes to carry out the task. The L2 descended their ropes to a point where the back-up device came off the end of the back-up rope. Fortunately, the technician noticed and stopped their descent just short of the end of the working rope. There was insufficient rope remaining to lock off the descender, so the L2 maintained position until the L3 re-positioned their ropes to allow for a rescue.

### 3 WHY THINGS CAN GO WRONG ...

- 3.1 Procedures were in place and there was a planned method of work. However, there was a human failure. Human failures occur for a number of reasons, e.g. 'errors' (a deviation from an accepted standard, leading to an undesirable outcome) or 'violations' (a deliberate deviation). The technicians did not do what their training had taught them. There were contributory factors, e.g. ineffective communication and uncertainty, but this lapse of memory nearly cost one of them their life.
- 3.2 If you are relying solely on the action of an individual to carry out a task, which if not done could result in a fatality or serious injury, then you should take steps to ensure that the task cannot be overlooked.

<sup>1</sup> TACS, 6.4.3.2.2 (f)

# Topic Sheet No. 8

## Knots in the end of ropes

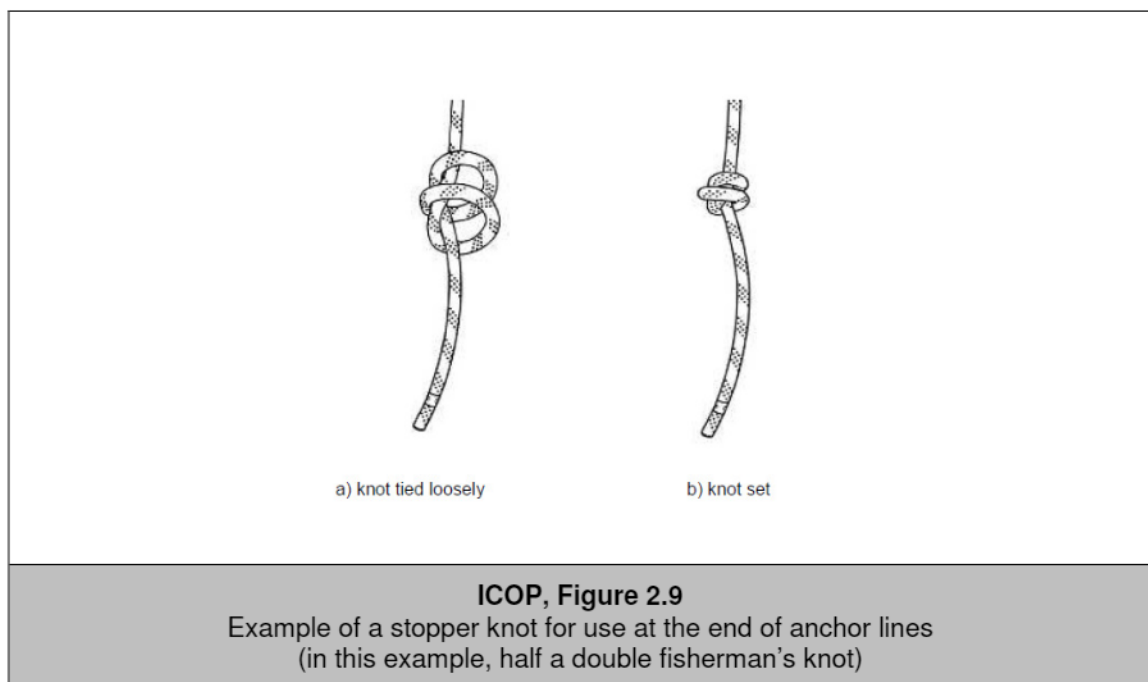


### 4 WHAT YOU CAN DO ...

- 4.1 Error control and reduction can be enhanced by ensuring that there are opportunities to increase the chance of detecting and correcting slips and lapses, e.g.:
- Pre-start task assessment briefings, highlighting the planned method of work (and, in particular, any changes agreed).
  - Toolbox talks on the high-risk elements of the task. This is a way of engaging all those involved. Whilst mandatory elements may result in over-familiarity, simply discussing an action out loud should provide a 'memory jogger'.
  - Refresher training, building upon the core training provided by IRATA; which stresses the importance of tying stopper knots in the end of ropes.
  - Ensuring that the risk assessment process is inclusive risk assessment, with the technicians helping to plan the work.
  - The simple use of memory aids, e.g. tying a piece of cord or string on the first rope to be accessed as a physical reminder that something needs to be done.

### 5 HOW YOU CAN DO IT ...

- 5.1 An example of a 'stopper knot' is shown in Figure 2.9 of the ICOP (below<sup>2</sup>). It can be tied at the bottom of the working and back-up ropes and when 'set' (tightened by hand) should have a tail of at least 300mm.



<sup>2</sup> See ICOP, Clause 2.11.3.1.11 and Figure 2.9

# Topic Sheet No. 8

## Knots in the end of ropes



### 6 ACTION

- 6.1 When carrying out risk assessment, and rigging, consideration should also be given to exiting the rope at the bottom. Is the rope long enough? Should there be knots or aids to stop operatives inadvertently hitting the ground when descending?
- 6.2 Review your management system for the use of knots in the end of ropes.

### 7 RECORD FORM

- 7.1 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.

### 8 REFERENCES

- 8.1 Further information can be found in:
  - (a) IRATA International code of practice for industrial rope access (Third edition, September 2016)<sup>3</sup>:
    - o Part 1, Clause 1.4.2.5.5
    - o Part 2, Clause 2.11.3.1.11
    - o Part 2, Clause 2.11.7.5
- 8.2 For a list of current (and past) 'safety communications' by IRATA, see [www.irata.org](http://www.irata.org)

---

<sup>3</sup> [www.irata.org/default.php?cmd=215&doc\\_id=4336](http://www.irata.org/default.php?cmd=215&doc_id=4336)

# Topic Sheet No. 8

## Knots in the end of ropes



### IRATA SAFETY AND HEALTH TOPIC SHEET – RECORD FORM

<b>Site:</b>							
<b>Date:</b>							
<b>Topic(s) for discussion:</b>				Topic Sheet No. 8: Knots in the ends of ropes			
<b>Reason for talk:</b>							
<b>Start time:</b>				<b>Finish time:</b>			
<b>Attended by</b> <i>Please sign to verify understanding of briefing</i>							
<b>Print name:</b>				<b>Signature:</b>			
<i>Continue overleaf (where necessary)</i>							
<b>Matters raised by employees:</b>				<b>Action taken as a result:</b>			
<i>Continue overleaf (where necessary)</i>							
<b>Briefing leader</b> <i>I confirm I have delivered this briefing and have questioned those attending on the topic discussed.</i>							
<b>Print name:</b>				<b>Signature:</b>			
				<b>Date:</b>			
<b>Comments:</b>							