



SAFETY NOTICE – RESCUE

FORCES PLACED ON EQUIPMENT DURING ROPING OPERATIONS

Background:

Rope rescue operations present the need for operators to often undertake procedures at height. These procedures may either be self-rescue (eg; passing a knot etc) or vertical rescue (eg; extracting a victim from a fixed line). Emphasis is often placed on the overall 'load' pulling on equipment and anchors, but with little reference to the 'forces' that are transferred through equipment and ropes during procedures.

Key points:

1. 'Force' refers to the energy being transferred from the operator's movements, into equipment, anchors and ropes.
2. Operator movements during activities (eg; passing a fixed knot) lead to the generation of forces that may be significantly **magnified, or even reduced**, due to operators '**bouncing**' as they perform procedures (see Fig 1).
3. These forces often combined with movement against abrasive or sharp surfaces **greatly increases the risk of damage to particularly ropes**, as well as anchors and roping equipment such as harnesses.
4. Testing was done over a 40m pitch, using industry approved techniques, whilst connected to a computer. The test operator remained at one point on the rope, around 5m below the anchor, and performed a variety of simple work operations. **Average forces generated were; 0.75 kN, with values ranging from 0.45 kN to 1.00 kN** (see Fig 1 below).

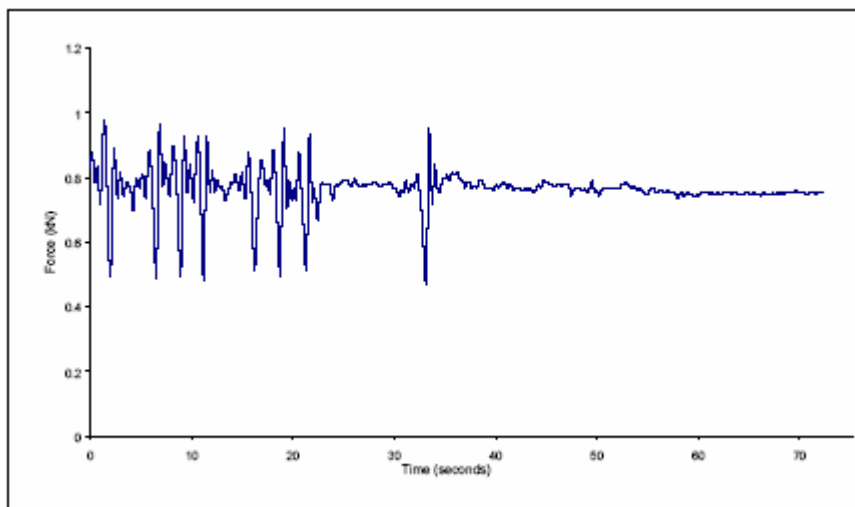


Figure 1: Forces generated whilst working at a single point on rope (Source: HSE)



Further detailed information can be obtained from Health & Safety Executive UK

5. Considering the equipment often carried by rope rescue operators, it is possible to increase peak forces in excess of 200% of the gross weight of the operative through moving abruptly or braking.
6. **Rescue procedures (where loads may be doubled) should always be carried out as smoothly as possible.** The **further down the rope from the anchor**, the more rope available to stretch & absorb 'peaks' & 'troughs', resulting in reduced force fluctuation.

Regulations/further information – the following documents should also be consulted;

- **Lyon Equipment Limited (2001) Industrial rope access – Investigation into items of personal protective equipment.** Health & Safety Executive: Sudbury, UK.
- AS 1891 – Industrial fall arrest systems & devices
- AS 1891.1 – Safety belts & Harnesses
- AS 1891.2 – Horizontal Lifeline & rail systems
- AS 1891.3 – Fall arrest devices
- AS 1891.4 – Selection use & maintenance
- AS4142.3 1993 – Man Made Fibre Ropes for Static Life Rescue Line.
- NSW Occupational Health & Safety Act & Regulation

Conclusion:

Due to activities at height being a large part of rope rescue, it is essential that the above information is considered in organisational SOPs. This information will ensure that operators stay abreast of current 'best practice' and ensure safety and quality for all victims & rescuers.

Recommendations:

1. That this information be discussed among safety committees with a view to inclusion in SOPs.
2. That if adopted, formal testing be conducted of new procedures as they are developed.
3. That all rope rescue operators receive training in this information.

Outdoor Access is able to assist with advice and training. For further information please contact us – info@outdooraccess.com.au

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