

# Single Rope Access: Safety Notes

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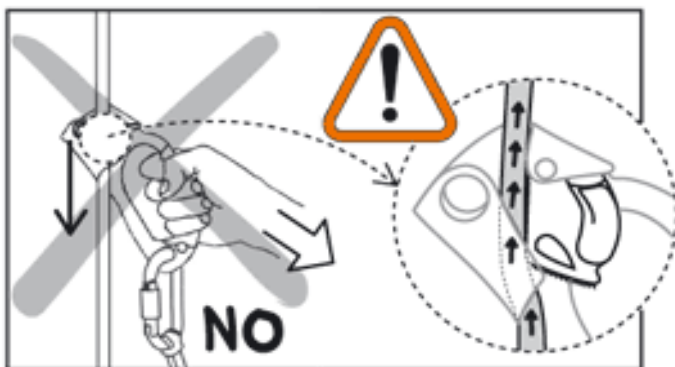
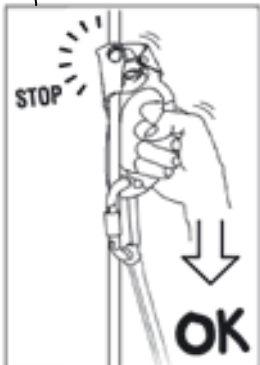
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## Direction of Loading

Ascenders (hand and chest) are designed to be loaded in a direction parallel to the rope; if loaded at an angle to the rope, the cam may not correctly engage the rope and slippage can occur.

SRT systems are most safely and effectively used for the initial ascent into a tree. Use of an SRT set up to branch walk is potentially dangerous.



## Unloaded Ascenders

Ascenders can only be considered as a secure attachment point to the access line when loaded

Climbing into a position that deviates from the vertical and introduces slack in the line above the ascender is dangerous. In this situation it is possible for the ascender to become unloaded.

In the unloaded position any interference with the ascender gate (i.e. from branches / equipment on the climbers harness) has the potential to open the ascender gate.



## Dynamic Falls

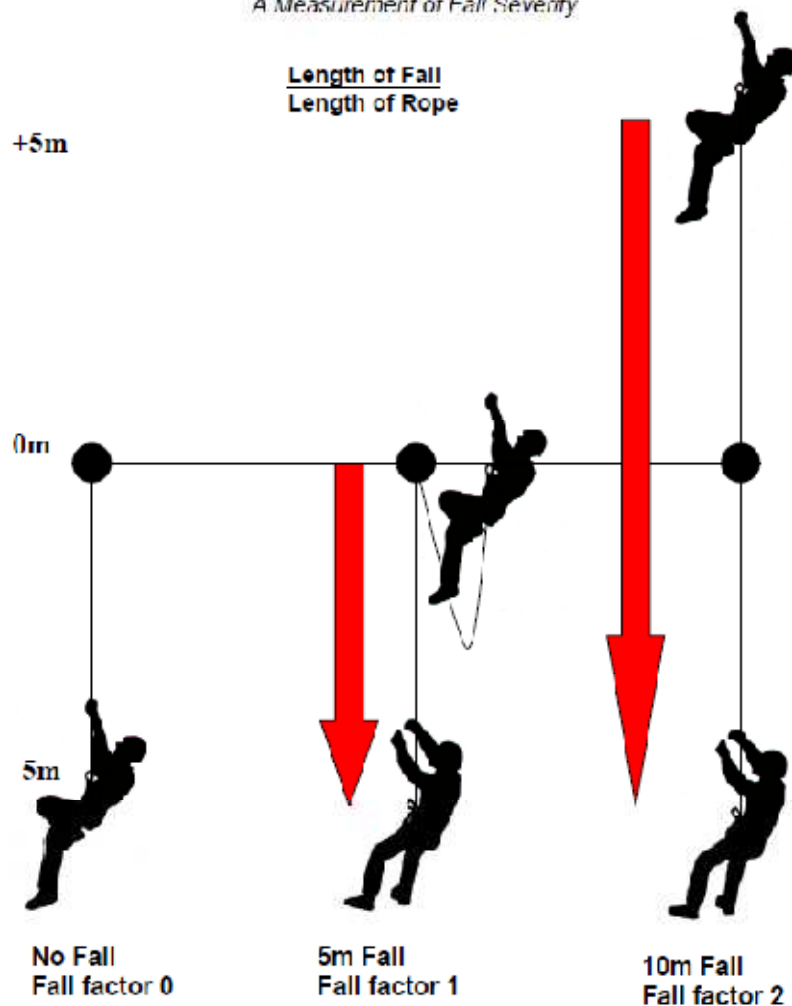
Dynamic falls onto toothed device may severely damage and possibly sever the access line.

The normal best practice when climbing with standard arborist techniques is to ensure that the slack in the climbing rope fall does not fall below the climber's knees<sup>1</sup>.

No fall factor (even short distances) is acceptable when using toothed devices as a primary attachment point<sup>2</sup>.

## Fall Factors

*A Measurement of Fall Severity*



<sup>1</sup>VTIO Draft Climbing Guidelines 05th June 2010, 3.4: Safe Tree Climbing Techniques.

<sup>2</sup>Industrial Rope Access Industry Association (IRATA) best practice recommendations are that climbing in a manner that may result in fall (of any distance) onto a toothed devices is not acceptable.

## Rescue from Ascenders

Using a ground based belay system is the best practice for safe and efficient rescue<sup>3</sup>. If a ground based belay system is not available an aerial rescue will be required to retrieve the casualty.

When rescuing a casualty from a loaded ascender there are additional techniques required that are not used in a standard aerial rescue of a casualty from a friction hitch.

In the conventional aerial rescue the casualty is retrieved from their friction hitch (essentially a combined ascender / descender). The casualties hitch is operated to lower them on their own line or in the case of a short / damaged rope to lower the casualty's weight onto the rescuers line.

When an ascender is loaded with the weight of the casualty it cannot be opened by the rescuer (even by applying considerable force).

In order to lower the casualty to the ground it is necessary to detach them from their ascender.

### Scenario 1: Casualty Suspended on Chest Ascender

#### Step 1: Attaching to Casualty's D-Ring

The rescuer attaches to the casualties to harness using the same method as a standard aerial rescue for a casualty with short / damaged rope<sup>4</sup>. The attachment between the rescuers D-ring and casualties D-ring is made with karabiners and a prusik loop or webbing sling.

#### Step 2: Attaching to Casualty's Chest Ascender Karabiner / Mallion

The rescue prusik is linked into the casualty's karabiner / mallion that is attached to the top of the chest ascender (rather than their D-ring).

For an unconscious casualty, the chest harness will keep their upper body supported. There is no need to use an additional flip line / lanyard to raise the upper body as with the standard aerial rescue technique<sup>5</sup>.

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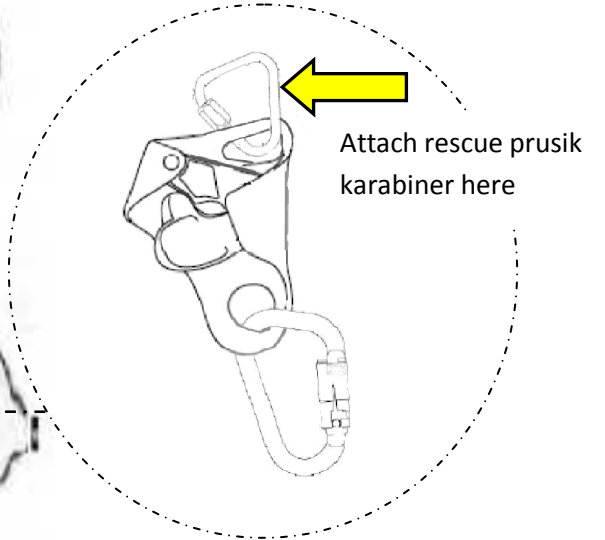
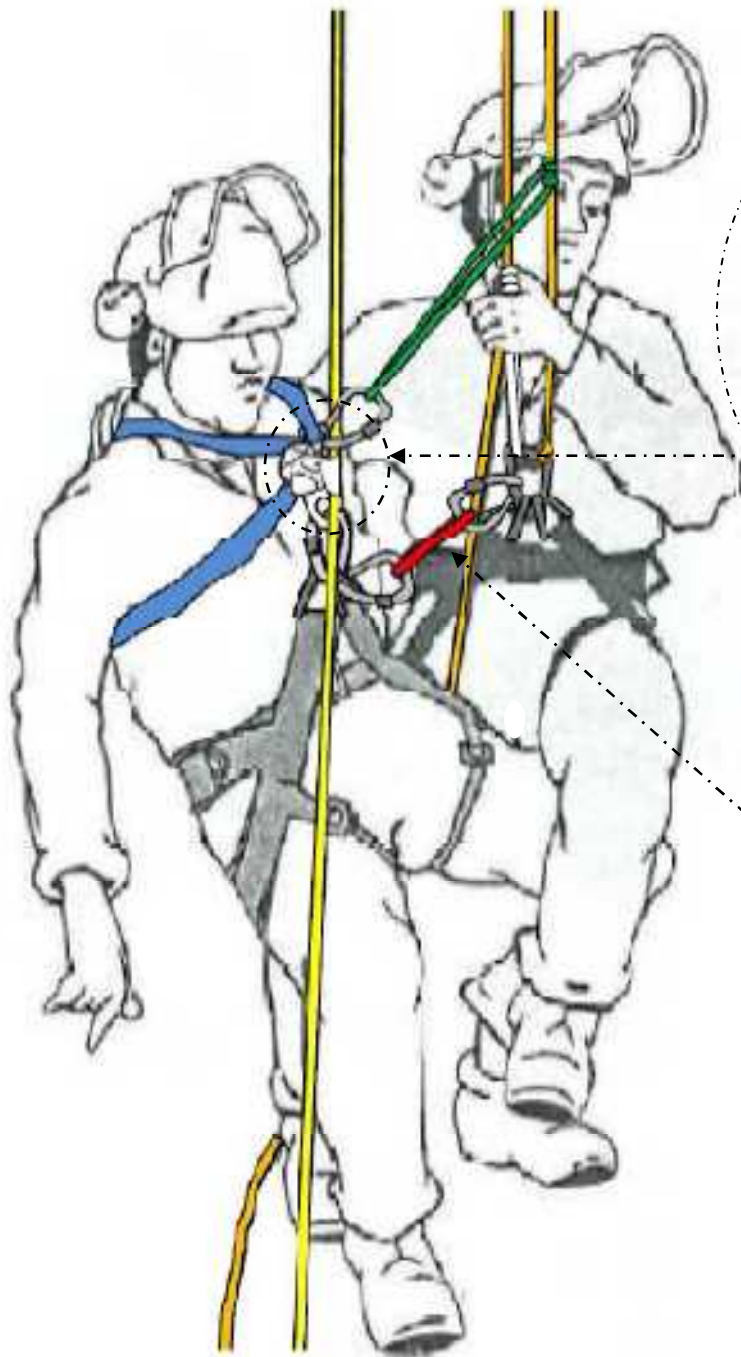
<sup>3</sup> VTIO SRT Single Rope Techniques, Appendix 1: July 2010, Scott Sharpe  
Canopy Access Ltd, BCAP Handbook: June 2005, James Aldred and John Pike

<sup>4</sup> RTF3702A - Undertake Aerial Rescue: Casualty with rope too short to reach ground and/or damaged rope.

<sup>5</sup> If an unconscious casualty is not wearing a standard chest harness it may be necessary to support their upper body with a supplementary flip line / lanyard to relieve the pressure on the back of their neck. See VTIO SRT Single Rope Techniques: *Micro-Frog* pg.11. July 2010, Joe Harris and Scott Sharpe

Scenario 1: Casualty on Chest Ascender

Step 2: Rescue prusik (green) is attached to the casualty's karabiner / mallion linked into the top eye of the chest ascender



Step 1: Attachment (red) between the rescuer's D-ring and casualty's D-ring as per standard aerial rescue

## Scenario 2: Casualty Suspend on Hand Ascender

### Casualty on Hand Ascender and Lanyard

If the casualty is suspended on a hand ascender and lanyard and not wearing a chest harness<sup>6</sup>, then an additional flip line / lanyard is required to raise the upper body of an unconscious casualty.

The rescue prusik is attached to the casualties D-ring, as with the standard aerial rescue technique.

### Use of Pulley System to Unload Ascender

When an ascender is loaded with the weight of the casualty it cannot be opened by the rescuer

Before the casualty's rope can be removed for the ascender the rescuer must lift the casualty's weight to unload the ascender.

#### Step 1: Attach Prusik Loop on Casualty's Line

The rescuer ties a prusik loop<sup>7</sup> around the casualty's rope, at approximately arms length up the rope.

The rescuer attaches a karabiner<sup>8</sup> to the prusik and runs their foot loop<sup>9</sup> through the karabiner and attaches to the top eye of the chest ascender (in Scenario 2: Casualty Suspended on Hand Ascender attachment is into D-ring).

#### Step 2: Pulley System Used to Raise Casualty

The rescuer then stands up straight in the foot loop, using his body weight to raise the casualty. It may also be necessary to lift the casualty by the waist band of their sit harness whilst standing in the foot loop.

Once the casualty's weight is raised enough to unload their ascender, remove the rope from the ascender and close the gate (to prevent ropes from being accidentally re-captured during the descent).

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<sup>6</sup> "Sit-Stand" Method *The Tree Climber's Companion* 2nd edition 2004 Jeff Jepson pg.46

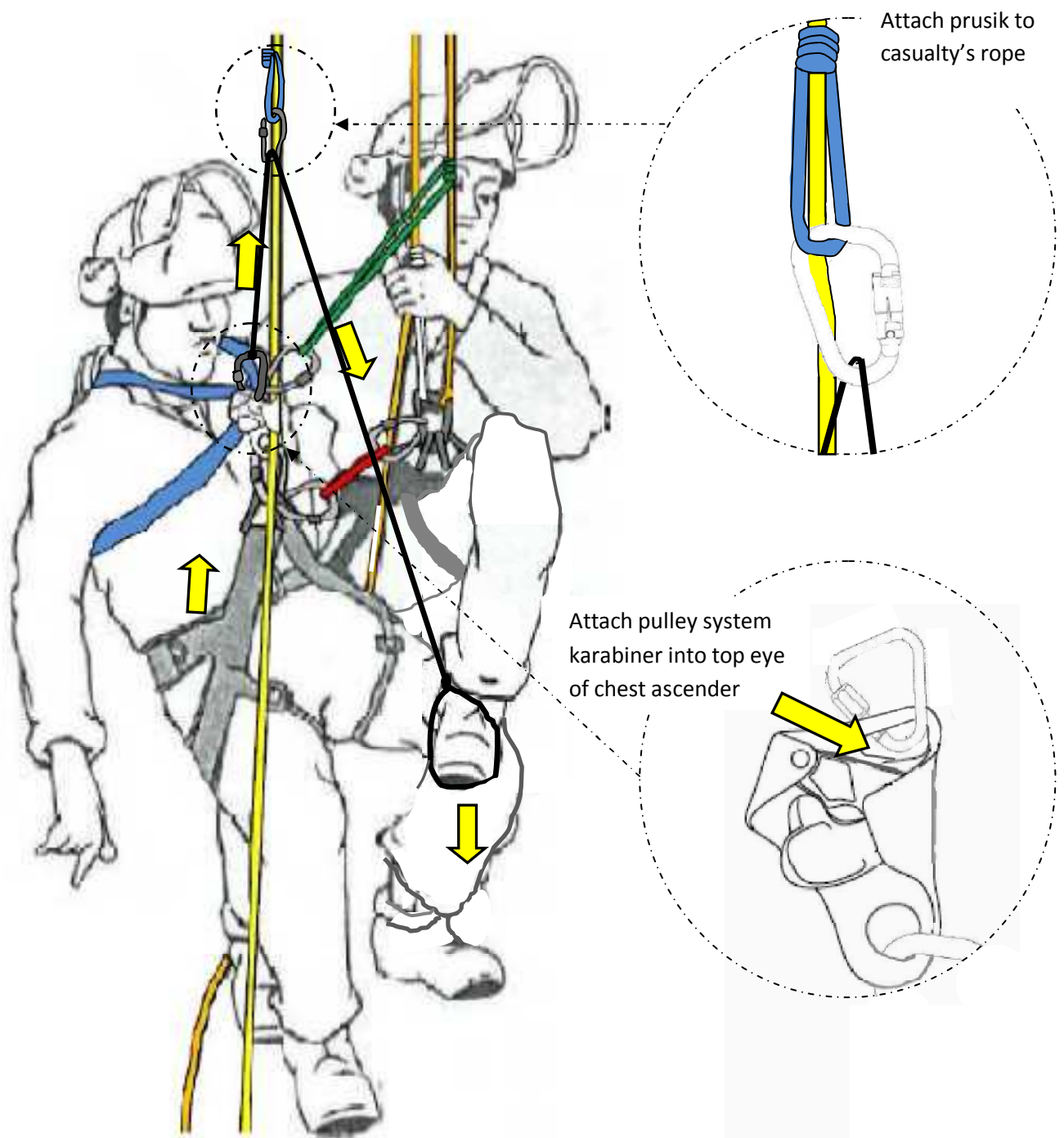
<sup>7</sup> The rescuer can use a hand ascender in place of a prussic.

<sup>8</sup> A micro-pulley can be in this system and is helpful in reducing the physical effort required to lift the casualty but not considered to essential to undertake this rescue.

<sup>9</sup> The foot loop must be made of cord / rope without knots (that will not jam on the karabiner/micro-pulley). Webbing foot loops can be used but are not combatable with micro-pullies and generate much greater friction on the karabiner, increasing the physical effort required to lift the casualty.

The rescuer 'sinches' (squeezes) both sides of the foot loop together as they lower the casualty's weight. This prevents jerky / sudden movement of the casualty's body and protects the rescuer from damaging their leg.

### Use of Pulley System to Unload Ascender



## References and Further Information

Industrial Rope Access Trade Association (IRATA) [www.irata.org](http://www.irata.org)

Australian Rope Access Association (ARAA) [www.araa.net.au](http://www.araa.net.au)

AS NZL 4488-1997 Industrial rope access systems

*Basic Canopy Access Proficiency* Hand Book: Canopy Access Ltd (CAL), June 2005, James Aldred, John Pike (1<sup>st</sup> edition).

*The Single Rope Techniques*, Tree Care Industry September 2002, Tom Dunlap

*Safe and Efficient Tree Ascent: Rope Techniques (DdRT)*. ISA Arborist News, Climbers Corner, June 2007, Mark Adams

*Single Rope Techniques* VTIO, July 2010, Joe Harris, Scott Sharpe, Grant Cody

## Pictures Acknowledgements

Pictures adapted by Grant Harris from the following sources:

Peztl [www.petzl.com](http://www.petzl.com)

CAL Canopy Access Ltd [www.canopyaccess.co.uk](http://www.canopyaccess.co.uk)

Arboricultural Association UK: Aerial Rescue Guidance Notes [www.trees.org.uk](http://www.trees.org.uk)

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