

# ARB CLIMBER

Aerial Arboriculture, PPE, Climbing and Cutting Equipment



ISSUE

17

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# ARB CLIMBER 17

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#### FRONT COVER & THIS PAGE:

Aerial Rescue competitions are a great learning tool although nothing short of trauma experience will prepare you for the nightmare of a seriously injured colleague. Our cover shot, courtesy of Wesspur, shows a pick-off rescue in progress while this page shows the 'long re-anchor setup' as photographed by Joshua Dallen and described by Tom Schumacher in his article on page 52

# NEW DESCENDER

SKYLOTEC's new SIRIUS the device has a compact design that makes it fit perfectly in the hand. It also has a lever with a small arc of motion that saves time when working because quick and accurate movements are possible. Additionally, the lever closes automatically. As soon as it is released, it blocks the rope in the device. It can only be reopened by pressing a button. The automatically self-blocking lever reduces errors when getting into the work position. An unintended opening of the lever is not possible. Another benefit is that to insert and remove the rope, 'Sirius' does not need to be removed from the carabiner that connects the device to the harness. This increases safety for the user because the descender always remains attached to the harness, and rope insertion can be done intuitively and securely with a connected carabiner. A small eyelet in the lever makes it possible to operate the descender with an accessory cord in an emergency – which means simultaneous rescues can be executed. If one person falls or has a sudden medical issue, such as dizziness or a heart attack, an accessory cord can be attached in the lever eyelet of the other person. The user can then operate both his own as well as the descender of the victim and rappel both persons to safety on the ground.

STANDARD:	ANSI Z359.4:2013, DIN EN 12841-C:2006, DIN EN 341-2A:2011
DESCENT SPEED:	2,00 m/s
RATED LOAD:	250 kg/ 550 lb (2-person load)
TEMP:	60 °C – -30 °C
SIZE:	47x79x175mm 6.9x3.1x1.8"
WT:	500g / 1.12 lbs
MATERIAL:	Aluminium, Steel
COST:	£203/\$275/€203

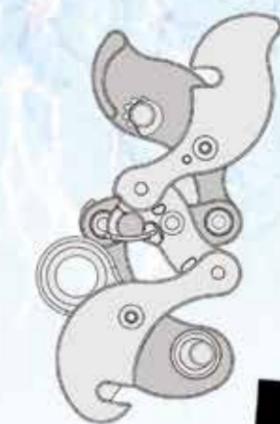
# NEW ASCENDER

The Skylotec *Get Up* combines progress capture cam and a hand ascender in one. The design is characterized by great ergonomics. Thanks to the two carabiner eyes, the Skylotec *Get Up* can be used faster and with less equipment. Operation can be left, right or ambidextrous. The ascender complies with the standards EN 567 and EN 12841. It can be used in combination with foot slings or cowtails as well as part of a pulley system as a progress capture cam. An innovative and alternative safety catch prevents accidental opening of the ascender, it also makes it easier to operate with one hand, even with thick gloves.

Suitable for ropes from 8 to 13 mm  
Dimensions 129 x 122 x 66 mm (L x W x D)  
Weight 120 g  
Cost: £90/€90

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Stationary / Moving Rope Device PATENT PENDING  
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## PRODUCTS ROPE STUFF

# C.A.M.P. KILO Hook

The CAMP Kilo gear carabiner features a proprietary design that makes it particularly robust, stable and easy to use.

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- Gear parking position at the top.
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- Stainless steel wire gate is shaped for smooth action and maintains a low profile to prevent entanglement and accidental opening.
- Torx TH20 allen wrench included.
- Working load limit: 20 kg.
- Safety release breaking load: 150 kg.
- Warning: the Kilo must never be used as a safety carabiner
- COST \$38 / €27



# C.A.M.P. GYRO

A compact and extremely versatile rigging system featuring our proprietary triple swivel design.

- The Gyro swivel rotates at all three connection points which allows for countless possibilities of connection between different elements that need freedom of movement.
- Just a few possibilities include: self-orienting multi-anchoring, multiple connections to a harness, preventing twisting in Y lanyards, cross-hauling operations, Tyrolean traverses, complex rescue procedures.
- The innovative design also prevents the accumulation of dirt and makes inspection easy.
- Main structure is carbon steel with a double corrosion preventive coating. Swivel balls and attachment points are stainless steel.
- Includes three removeable silicon anti-rotation inserts giving a 16mm diameter eye.
- Working load limit: 3 kN. Minimum breaking strength: 26 kN
- Weight 155g / 5.5oz
- COST: \$80 / €72



[www.camp.it](http://www.camp.it)

# LANYARD ORGANISER

The K1 Keeper by Neat Freak is a lanyard slack management system. Organizes and quickly stows excess lanyard line in one pull. The Keeper is suitable for dynamic and semi-static lines. This new tool invented by Chris Corley is perfect for managing your short, long, or double-sided lanyard in the canopy. Like so many tree climbing tools, this was created by a climber to solve the problems encountered in the field.

The K1 Keeper by Neat Freak is a lanyard slack management system.

- Manages lanyard line and doesn't inhibit preferred length.
- Organizes line in one easy pull.
- Reduces the amount of time spent organizing excess line.
- Secures safely and easily to most saddles.
- Suitable for dynamic and semi-static line.
- Manufactured using industrial grade Nylon 6.

NB – NOT PPE

Available worldwide e.g. Treekit UK for £119 [www.treekit.co.uk](http://www.treekit.co.uk) and Wesspur US for \$99 [www.wesspur.com](http://www.wesspur.com)



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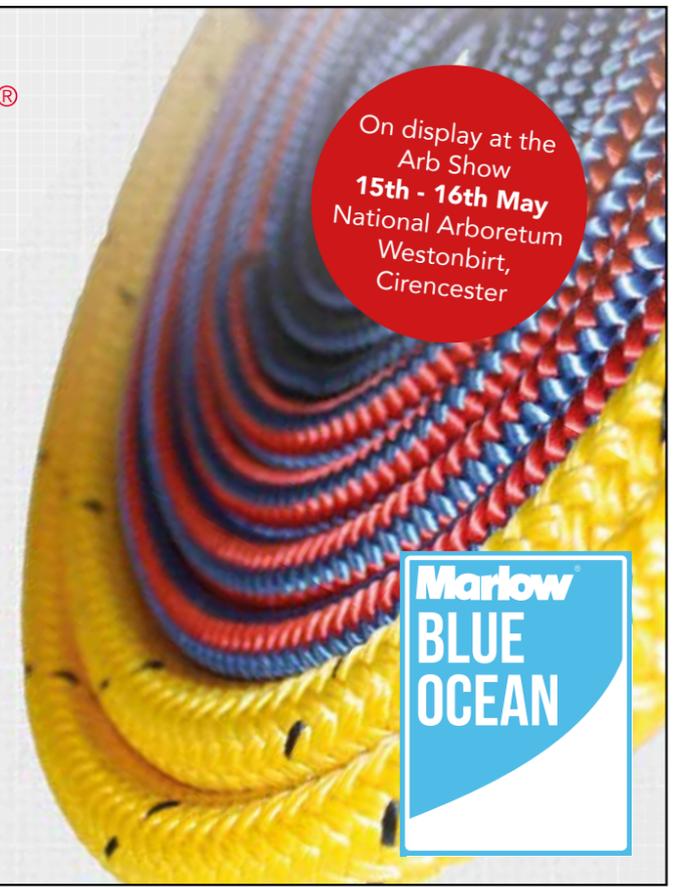
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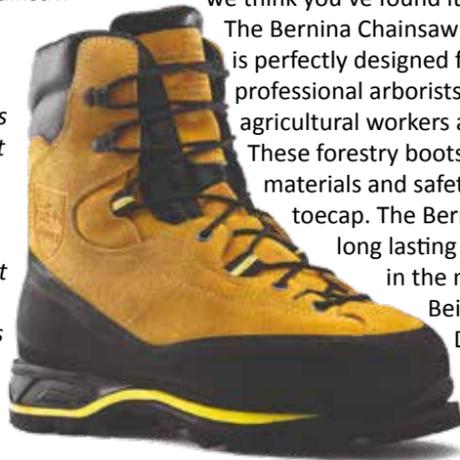
# Diemme Bernina chainsaw boots

*the pair on Diemme's Pro site (pic below unless that's a different colourway?).*



[ED: just coming into a northern Hemisphere Summer is probably not the best time to mention an Alpine style chainsaw boot but there hasn't been anything new in chainsaw protection to mention lately [ArbPro's excellent Evo update

If you work with chainsaws either on the ground or half way up a tree and want the ultimate boot, we think you've found it! The Bernina Chainsaw Boot is perfectly designed for professional arborists and agricultural workers alike for long days out in the trees. These forestry boots are renowned for their high-quality materials and safety features including the 200J steel toecap. The Bernina Chainsaw Boot is designed for long lasting wear and ensures maximum comfort in the most extreme weather conditions.



opposite is a climbing boot not chainsaw protective] so we went for a 'new-one-on-us' boot from Diemme which we didn't include in our comprehensive boots guides in issue 8 and 9. This one stands out as one of the brightest colours we could find although the BrandEcosse version we've shown above seems a lot more vivid than

Being situated in the foothills of the Dolomite mountains provides Diemme with an ideal testing ground for this superb pair of forestry boots. The Dolomites and Italian Alps are heavily wooded and until quite recently, were managed by the Italian

State Forestry Corps. So, not only are the locals enjoying these mountainous forest regions for pleasure, but they also work there as well. In answer to the many demands of Diemme fans wanting the same performance and quality in their forestry boots as their walking boots, the Bernina was born. If there is a single theme running through everything Diemme makes it's no compromise. And this can be seen throughout the Bernina boot. Leather is tough but very soft bovine suede, specified at 3mm thick. Cushioning around the ankle is padded calf leather whilst a full Sympatex® waterproof/breathable membrane keeps the foot dry in any conditions. Soling is an antistatic version of the classic Vibram Teton, widely used on our country boots but this time modified to allow the use of climbing irons and crampons. Safety wise the Bernina chainsaw boot sports a steel toecap rated at 200J, non-metallic penetration resistant midsole and aramid fibres providing chainsaw protection at Level 2 or 24m/s chainsaw speed. Bernina is approved to EN20345:2011 Safety Footwear standards with EN17249:2013 Chainsaw approval.

- 200J Steel Toecap.
- 1100N Penetration resistant, non-metallic midsole.
- Level 2 (24m/second) Chainsaw protection.
- Thick suede upper with scuff protecting rubber foxing.
- Sympatex® Waterproof/Breathable membrane.
- Antistatic Vibram® Teton outsole with impact absorbing phylon mid-ply.
- Super-strong lacing system with eyelets, web and sky hooks.
- Compatible with climbing irons and crampons.
- Cost: £249

[www.calzaturificiodiemme.it](http://www.calzaturificiodiemme.it)



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## Dear ARBclimber, how can I work safer but still look like James Dean?

Dear Reader, plastic surgery and maybe one of SwedePro's Chainsaw protective denim shirts with a white T-shirt underneath?.....Next.....

You'll be familiar with the orange version of safety shirts from all the main manufacturers similar to the image below but there is a more stylish option...

Swedepro's Denim protective shirt/jacket constructed with breathable yet sturdy denim material. Jacket boasts 180° Avertex™/Engtex® 6 layer protection that is sewn into collar, shoulders, sleeves and rib areas providing effective safety coverage. Jacket has a 7 button front. (Not shown in picture) Updated pattern offers more flexibility through shoulders, elbows, and wrists.

### FEATURES:

- 6 layers of Engtex fiber sewn where you need it the most, the torso, sleeves and shoulders
- Offers the most complete protection of any safety shirt
- Limited inventory
- Sewn in the USA
- Small-XXLarge available
- RRP/SRP is \$149 for Denim, \$99 for orange

<https://grandforest.shptron.com>



## PRODUCTS TOOLS

# ECHO's first battery top-handle chainsaw

### PRODUCT DETAILS

Rated Voltage	50.4v
Dry Weight	1.6kg / 3.5 lb
Run Time	Up to 18mins
Chain Oil Tank Capacity	0.12L / 4 US Fl Oz
Saw Chain Pitch	3/8, 1/4"
Guide Bar Gauge	0.050, 0.043"
Applicable Bar Length	20, 25cm / 8, 10"

Feast your eyes on the new DCS-2500T the first battery-powered top handle chainsaw from ECHO. Here is an electric saw to meet the needs of the arborist and tree care professionals who use top handle chainsaws daily for pruning and arboriculture. Don't let the light weight (dry weight 1.6kg) deceive you, this machine packs professional power with exceptional acceleration. In fact, the 50V Lithium-ion battery generates power and cutting performance equivalent to ECHO's best-selling CS-2511TES petrol chainsaw; and it does it with low vibration and without the noise and emissions, making it perfect for use in noise-sensitive areas. Well balanced and ergonomically designed for manoeuvrability and precision, the DCS-2500T is the latest addition to ECHO's 50V battery series and is part of their X Series of 'best in class' products. The superior, dependable tools are specifically designed for professionals who rely on their tools day in and day out. Often leading in terms of power and performance, X Series products are tested in the most extreme conditions, says the manufacturer, to ensure flawless operation. The DCS-2500T is certainly packed full of beneficial user-friendly features to complement its power and near noiseless operation. Users will find the patented Quick Draw harness ring a real boon for hooking and unhooking the chainsaw in one movement. There's a drop prevention lanyard hook for off ground safety and this is a truly easy to operate machine with an anti-slip handle grip and patented thumb rest adding to operator comfort. There's a side-access chain tensioner to allow quick chain adjustments. The driving force, the brushless

motor, will ensure long-lasting maintenance-free operation, while the casing has an IPX4 rating for water resistance so the chainsaw is showerproof for protection against the elements. The all-important oil adjustment is situated on the top of the saw so it's easily adjusted, while filling is equally simple with the flip lever cap opening. Last but not least is the internal air filter which prevents dust from entering the main board and motor. Qualified top handle arborists and tree surgeons looking for ultimate power with quiet, low vibration and emissions-free professional-grade performance will find ECHO's DCS-2500T just the ticket for everyday use.

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## WOMEN IN ARB...

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The Arbortec brand is focused on protecting the lifestyle of all those in the arb and forestry industries.

The launch of Arbortec's womens trousers will be great for the industry in showing support for women in arb. It is important that protective wear is more accessible to everyone in the industry.

Be sure to keep up to date with the latest from Arbortec on Facebook, Instagram and Youtube.



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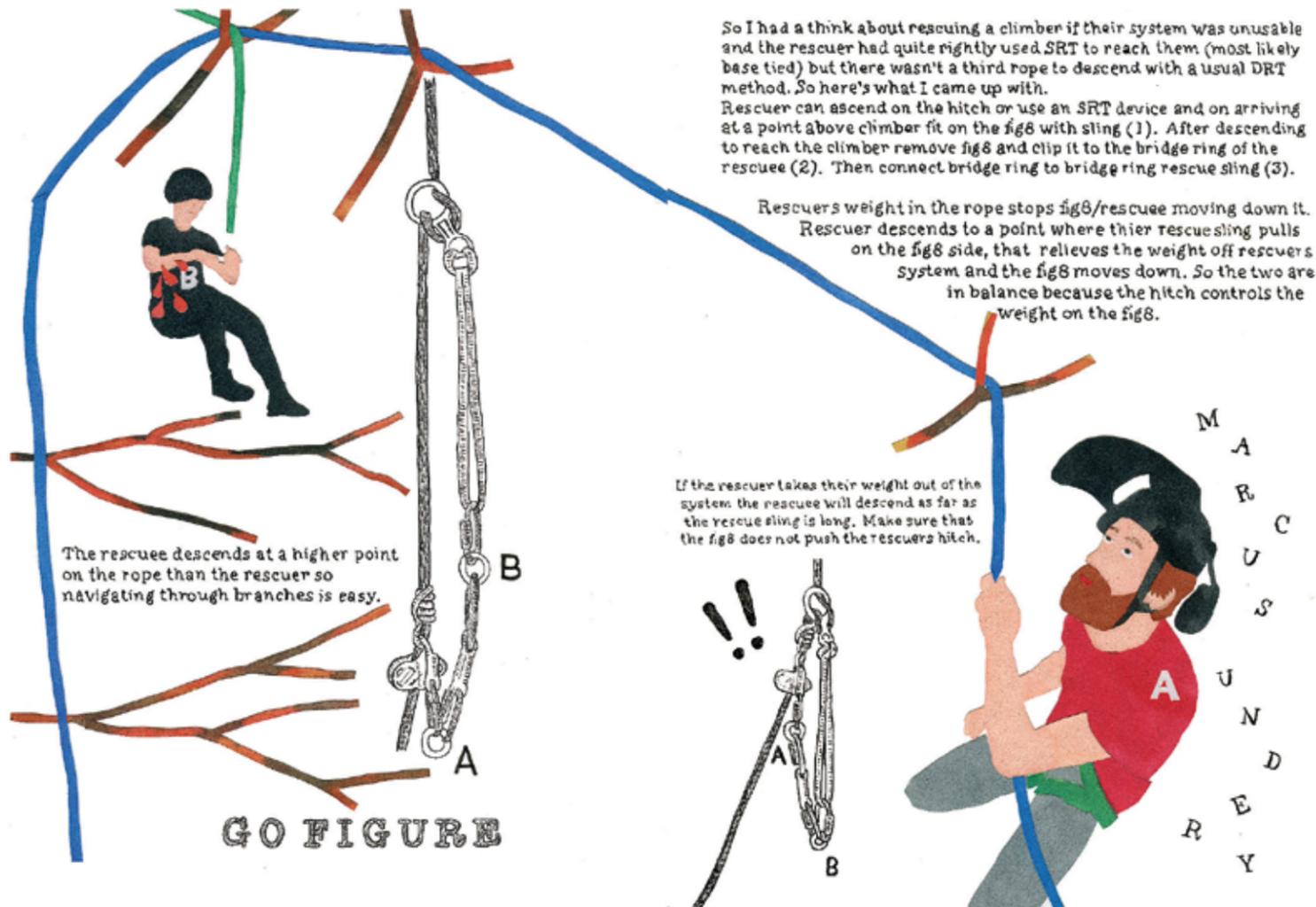
# SRT Techniques

## from around the world pt2



by **PAUL POYNTER**

Paul is originally from the UK. He has been climbing since 2005 and moved to Japan in 2011. He lives in Matsumoto (Japan's Northern Alps) and aside from his arb and climbing skills has an arts background which explains the sheer elegance of this Wooden Hand project.



Our favourite man in Japan Paul Poynter of ODSK has a sideline called the WOODEN HAND looking at training and technical stuff related to climbing and rope work. As part of that ongoing project he produced a hand-bound, real paper booklet pulling together hand-drawn SRT submissions from some of the world's best and lesser known names in arborism.

This issue and last issue features all 10 of those outstanding submissions to Paul's esoteric little booklet-without-a-name, we're calling it Project Blue Book. A big thanks to ODSK who funded and originally serialised the booklet into Japanese for their website but we felt that it deserved a much wider audience.

If you want to handle a little pocketful of quality and artistic prowess in its original paper format – which you can't beat – it is still available for around £8 from: Treekit and Treeworker (UK), Wesspur (USA), Treetools (New Zealand), Climbttools (Germany) and of course ODSK (Japan).

Our serialisation here includes some extra notes from Paul.



LEFT: 'Go-Figure' by Marcus Undery (UK)

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## TANGLES

There are some things that I have improved at since I started climbing professionally. One of the things I notice is how much less time I spend untangling strings and ropes now than I did back then. I still spend so much time untangling, but the activity is easier and I don't find it so frustrating. I have even come to enjoy the challenge of tangled string, being able to dissect a tangle, spot where the loops are caught and free them, letting the string flake true. So much of my job is about this one skill. Untangling is one of the most fundamental skills of our profession and it directly correlates to being able to freely access the tree, planning routes, climbing through the tree, and getting all your gear out and packing up in a timely manner. Planning the route is all about keeping the tangles at bay. Tangles represent the biggest obstacle to a clean climb. Keeping the rope paths clean and straight can be a puzzle. This is hard enough with one line but you start adding in rigging lines, tag lines, speed lines and the tangles can compound themselves.

Once, as a young apprentice climber, I was given the task of cabling an oak, no chainsaws required, simple enough task. It was the first time that I had used two tie-in points and it was the first time that I had dealt with a length of cable that long. I became so completely entangled with the tails of my rope and the cable that my movement ground to a complete halt and I required assistance in the form of another climber to untangle me. That experience traumatised me and gave me a look into the real life consequences of the tangle. One of the advantages of climbing SRT is the ease of which it is to avoid tangles. I really enjoy looking at a climb and making a decision on exactly how much rope I need in order to complete my climb. In a DdRT system you have to climb with whatever length of rope you have regardless of the size of tree. Using a 200 foot rope in a 30 foot tree is a nightmare. The laws of tangles makes sure that no matter what you do the tail of your moving rope system will become tangled in the branches below you, in the cut branches on the ground, or around that ornamental glass statue in the garden... or all three. Using stationary rope with a tail of the perfect length is such a pleasure after spending years trying to manage tangles in my tail on the other side of the tree or the ground.

Tangles are a fascinating study in chaos theory. The random complexities, the nature of rope, and the inevitable outcome. It is a basic rule that tangles cannot be fought with anger and frustration or they will simply tighten and become more and more entrenched. Tangles must be caressed and touched tenderly with patience, with an understanding that the very nature of string-that-tangles is the same quality that makes it such an awesome and powerful tool.

'Tangles' by Kevin Bingham (USA)

## 'Overlooked' by Taylor Hamel (USA)

For two reasons it is was a real honour that Taylor joined this booklet. The first being that he is someone that I looked up to and actively sought information from when I was starting my career as a climber. The second is because, while he does have knowledge and experience of SRT systems, he is predominately a DdRT climber and often promotes that technique. That being said, I felt that Taylor could give some wisdom and he came up with a novel take on this particular SRT discussion, that is, not to talk about it.

## OVERLOOKED



Something I see very often are folks who have made the transition to SRT without ever having moved beyond a Blake's hitch, and they are missing out on a very important skill set, in my opinion.

Over the last 16 years of climbing I've experimented with pert' near every possible technique and sub-technique. Exploring the details, splicing up my own tools, modifying gear, etc. Over that time I've kept the drive to continue learning and experimenting. However, I suppose you could say I've settled into a core handful of techniques that allow me to achieve all of my goals whilst minimising impact on my body.

These are (in no particular order):

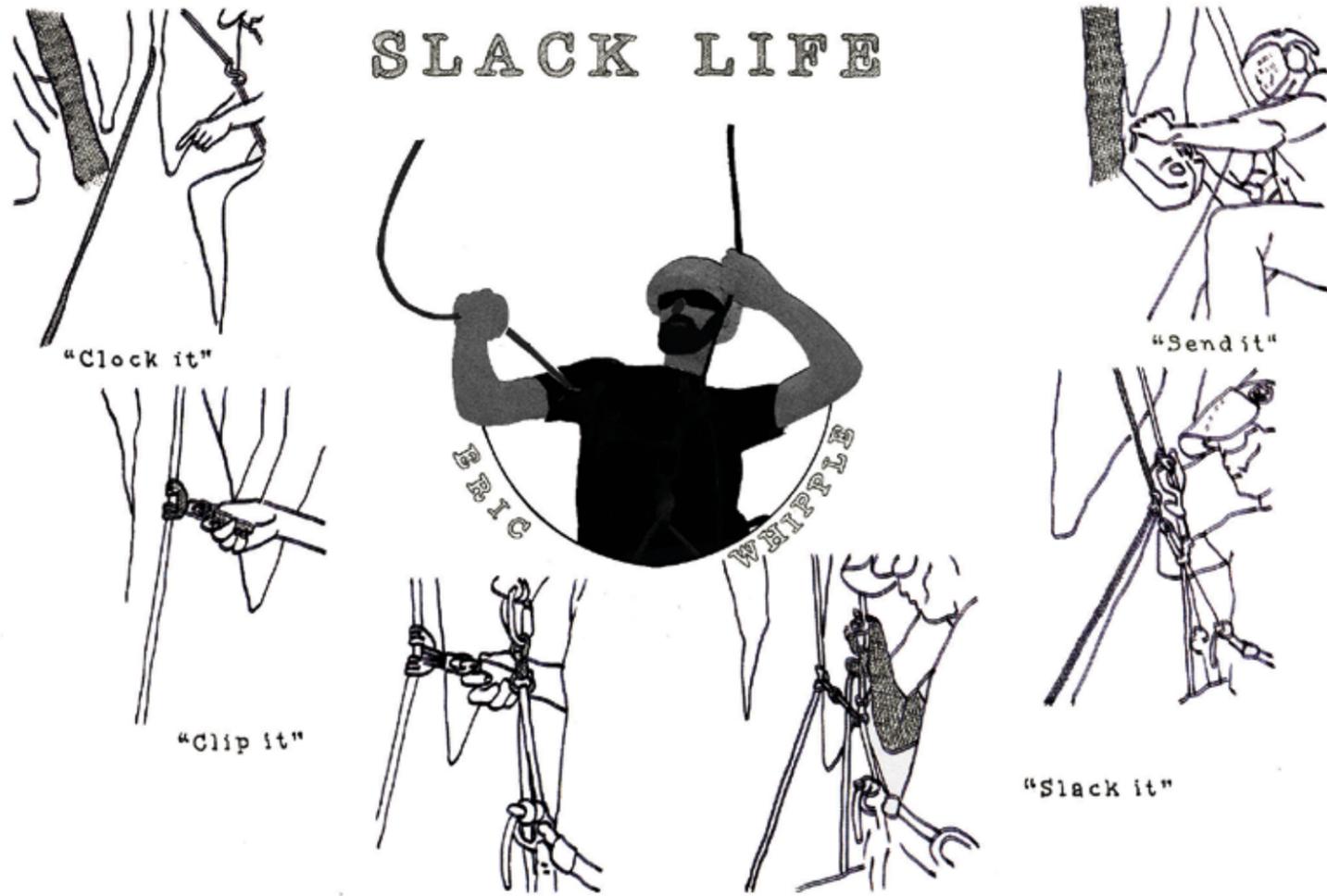
- Ascending SRT
- Inline anchor (DdRT system attached to a stationary rope). Convenient to work one side of the tree by stepping off with my preferred system on the way up. I will also use this technique to backup a particular anchor point by spreading the load over several others (whether choosing to work DdRT or SRT).
- DdRT movement through the canopy. I would say 90% of my canopy work is done DdRT, with SRT reserved mostly for the 'straight up-and-down' movements.
- V-rig, add-in prusik. Game changers that I think everyone should know how to use.
- Use a foot ascender as much as possible.





'Peaceful World ' by Paul Poynter (Japan via the UK)

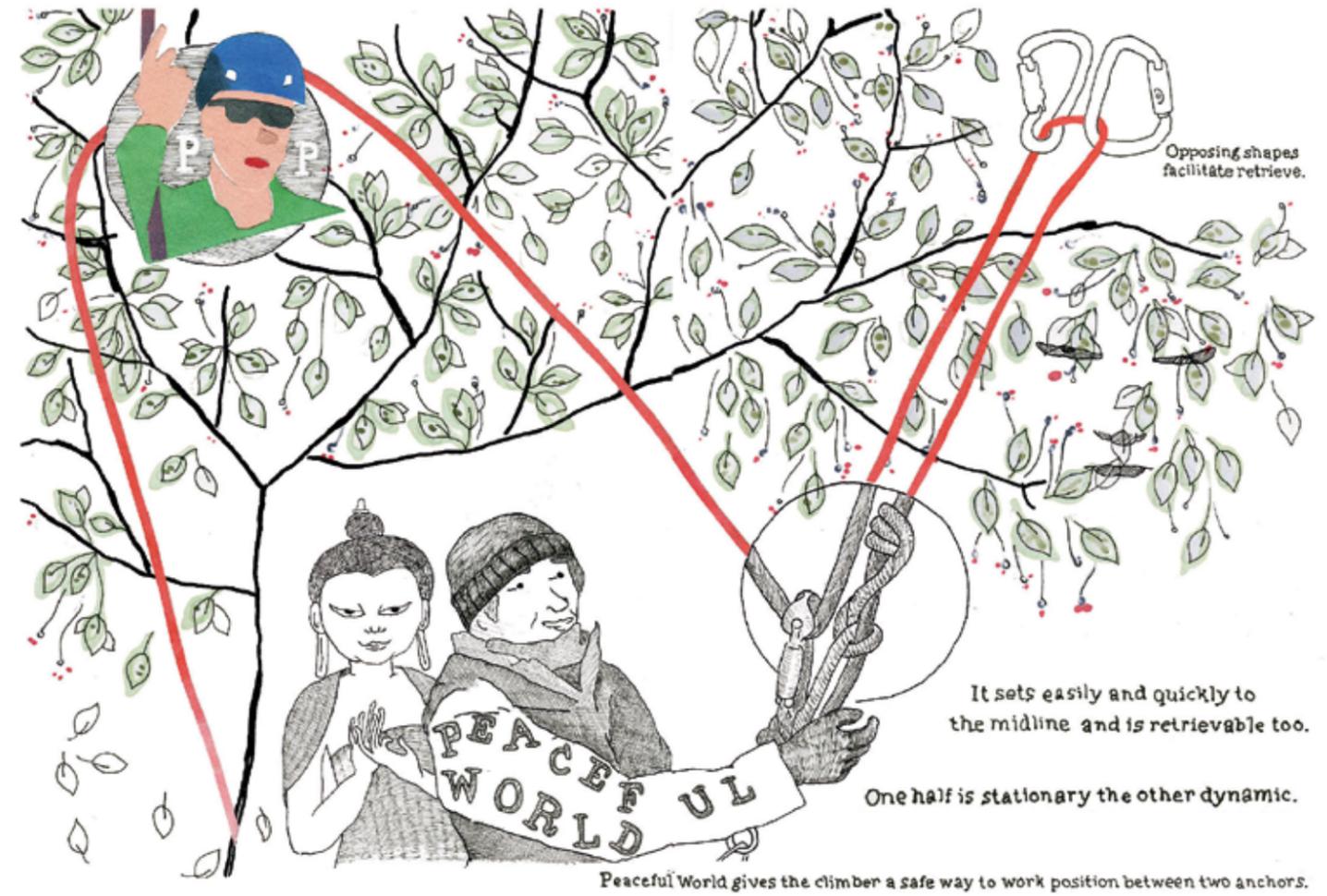
SLACK LIFE



'Slack Life' by Eric Whipple (USA)

'Slack Life' by Eric Whipple (USA)  
Climbing on a bottom anchor has many benefits and a few draw backs too. One thing that the climber has to take care of is the anchor leg side of the system. If you find yourself cutting close to it then Eric's Slack Life may suit you well. Can you work out what happens?.... It turns the SRT system into a DdRT one.

PEACEFUL WORLD by Paul Poynter





# RIG. REMOVE. REPEAT.



1/2" Orange



1/2" Green



9/16" Blue



9/16" Red



5/8" Yellow

**NEW!**



3/4" Green

## The Atlas™ Rigging Line

The burly Atlas has a completely redesigned double-braid construction that provides a huge increase in overall strength: over 32% stronger than the previous Atlas design. The nylon/polyester construction gives the Atlas unmatched strength-to-weight performance for a dynamic rigging line.

**Buy the Atlas Rigging Line at your local arbor dealer.**



**Made in U.S.A.**  
with U.S. and Globally  
Sourced Material

# UK & IRELAND TREE CLIMBING COMPETITION 2019

Better late than never!  
With this year's competition again lined up for Westonbirt Arboretum in the UK we'd better check out the results of the last one....

## 2019 Results

COMPETITOR	OVERALL RANKING	BELAYED SPEED CLIMB (60 max)	ASCENT EVENT (15 max)	THROW LINE (25 max)	WORK CLIMB (30 max)	PRELIMINARY TOTAL (60 max)	(200 max) SPEED TIME	B-SPEED TIME (sec)	ASCENT TIME (sec)
<b>Overall Preliminary Ranking – Women's</b>									
Josephine Hedger	1	42.50	15.00	24.00	13	74.00	168.50	37.12	17.75
Boel Hammarstrand	2	33.50	7.88	20.41	11	52.80	125.59	51.36	21.34
Kathryn Faulconbridge	3	24.50	2.59	18.84	13	14.50	73.43	61.95	22.91
Sophie Trenchard	4	22.50	0.00	12.08	0	12.50	47.08	85.79	26.67
Rachel Downs	5	18.00	0.00	6.58	0	12.50	37.08	70.36	31.17
Polly Burton	6	11.00	7.16	6.75	6	4.00	34.90	52.80	30.00
<b>Overall Preliminary Ranking – Top 25 Men's</b>									
Sam Hardingham	1	47.50	12.18	20.82	13	67.44	160.94	25.20	13.32
Michael Curwen	2	40.00	12.90	24.00	6	69.00	151.90	23.77	12.14
Callum Braithwaite	3	38.50	15.00	11.66	13	68.59	146.75	19.56	22.48
Tadhg Leahy	4	40.00	13.81	16.71	12	60.66	143.17	21.95	16.42
Ben Batt	5	42.00	10.11	17.84	5	60.77	135.71	29.35	16.30
Joel Ashton	6	24.50	12.41	18.07	12	60.37	127.35	24.74	14.07
Sam Watmore	7	37.00	10.74	13.30	0	66.31	127.35	28.09	20.83
Timothe Querilloz	8	25.50	11.21	15.74	6	57.53	115.97	27.15	16.40
Tremayne Finney-Green	9	27.00	8.44	17.82	0	58.97	112.24	32.68	17.31
Iain Cameron	10	25.00	2.87	21.41	8	50.05	107.32	43.83	15.73
Adam Holt	11	23.00	7.81	4.78	8	61.36	104.95	33.95	26.35
Adam Curtis	12	13.00	8.49	12.36	14	57.08	104.93	32.58	19.78
Auryn Jutting	13	31.50	4.40	11.57	7	48.73	103.19	40.77	20.57
Martyn Dudley	14	26.00	8.15	11.71	8	48.48	102.34	33.27	21.42
Simon Turner	15	28.00	7.30	9.55	17	39.29	101.13	34.97	23.59
Tom Culley	16	23.00	1.32	14.46	5	57.27	101.05	46.93	17.67
Robert Cardus	17	30.00	12.25	4.00	0	53.01	99.26	25.07	40.96
Joseph Hottinger	18	22.00	9.87	16.25	0	50.24	98.35	29.83	16.89
Josh Rooker	19	18.00	13.45	13.59	0	53.24	98.28	22.66	19.55
Ben Graff	20	32.00	7.91	10.43	8	39.53	97.87	33.74	22.71
Samuel Wild	21	26.50	6.08	12.09	10	41.70	96.37	37.40	20.05
Matthew Jordan	22	25.50	5.67	7.83	9	47.65	95.65	38.23	23.30
Gary Stoker	23	28.50	7.99	12.25	3	23.50	75.24	33.58	21.89
Adam Roberts	24	22.00	0.00	12.55	0	28.84	63.39	50.59	21.59
Ben Wade	25	17.50	8.98	4.14	0	29.00	59.62	31.61	26.00



In total 45 climbers registered for the 2019 UK & Ireland Tree Climbing Competition sponsored by Petzl. An increase of 29 on the previous year for the event which moved to Westonbirt, The National Arboretum after three years at the University of Exeter. There was a supportive, feel-good atmosphere throughout the event, which has received overwhelmingly positive feedback. A number of climbers were taking part in their first competitive climbing event.

A great deal of credit must go to the magnificent team of volunteers and the UKITCC committee, who all gave their time to create one of the most successful editions in recent memory. Thanks also to our hosts at Westonbirt, which proved to be an ideal venue not only for its incredible tree stock but the chance to engage with more members of the public.

It was a close contest throughout the weekend in both categories. Jo Hedger retained her title for the eleventh consecutive year, closely followed by Boel Hammarstrand in second and Katie Faulconbridge in third. A special mention also for Rebecca Barnes, who was awarded the Spirit of the Competition prize by the judges, for the extraordinary support she gave to her fellow climbers.

The Men's Masters' event culminated in a 3rd UK Championship for Michael Curwen, who held off hard fought competition from Callum Braithwaite in second and Irelands' Tadhg Leahy. Finally, a huge thanks to our sponsors Petzl UK, who provided fantastic support before, during and after the event, without which it would have been difficult to run such an enjoyable and well attended competition.

The 2020 UK & Ireland Tree Climbing Competition will hopefully still take place at Westonbirt on 5th and 6th September 2020.

Prizes provided by:

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# HANDLED ASCENDERS

term but this could equally describe my Great Grandad taking 3 days to get up a flight of stairs. Swiss-Rescue continued to produce a newer version of the Jumar and fountain-of-all- knowledge Doc Storrick has a double rope version but I'm not sure if this is a home-made conversion since it uses a single bolt through the middle of two handles (pic below right) but we couldn't find any contacts or details on Swiss Rescue/ Pewatec's website so we're guessing they're no longer produced. If they are still produced someone needs to have a word about their marketing, it sucks but it's clear that this model shares a lot of ancestry with Protekt's Proverti if you're interested. Next on the icon list was the 'Clog', another Denny Moorhouse invention and the first of the plate metal rather than cast and extruded models. He incorporated a wider hand



opening to better fit a gloved hand and an ergonomic plastic grip. I'm not entirely sure that the Jumar can have pre-dated the Clog by much since this too was born in the 60's and carried on until '85 when ClogWales was bought by Wild Country. Denny then continued the good fight with ISC and its own iconic modern ascenders. I used both Jumars and Clogs for a few years with the Jumar hand profile being considerably smaller than the Clog. Both Kong and Petzl launched into the fray in the 80's, Kong with some revolutionary ideas including their 'Cam Clean' chest and hand ascenders and Petzl with their market-leading handled Expedition ascender. I was, by then, an avid Petzl Stop user but I bypassed the Petzl Expedition in favour of CMI's Ultrascenders and then to SRTe's Explorer (now 3M/Sala and may be discontinued) both of which I used throughout the 90s and noughties. Both are ultra hard-wearing, heavy duty ascenders. Not that I'm overweight and likely to tax a standard ascender (at least not back then) but we often pushed the envelope beyond their design and certified loading so it was just more prudent to go with the highest strength options. I haven't yet changed from my trusty SRTe system but I do like the CAMP Turbo model pictured here and will probably make a last kit-switch to those for what's likely to be my last set of gear before I start trying to beat Great Grandad's stair-ascending record.

Main Image: CAMP TurboHand Pro with additional guide/eye reinforcement at the bottom and rope deviation roller at the top.  
Inset Right: The original Swiss Jumar but this very model is still on the Australian 3M/DBI Sala website rebadged as a Rollgliss 'rope-gripping handle'!  
Opposite Page: Top – The spacious CMI Expedition Twin. Below that is the modern version of a Jumar (doubled in this case) by Swiss Rescue but may already be discontinued.



Petzl Ascentree double handled, double cam ascender with custom-built frame as distinct from bolting two regular ascenders together.

Usually for the history of SRT development, it wasn't the cavers we have to thank for handled ascenders it's mountaineers; this time in the guise of the mythical Swiss Jumar. Ascender development actually stems from a handled version before being pared down to the hand, chest and foot variants. Jumar was years ahead of its time and is a design that wouldn't look out of place today (inset pic above). The original versions from the 60's were grey but after some failures resulting from weakness in the bottom eye and subsequently the frame when the eye was removed, this evolved into the much tougher, vivid yellow signature colour of the so-called Jumar 79 after its year of introduction. This became my first handled ascender and they served me well for a decade even while experimenting with others. Jumar cornered the market to such an extent that they did a 'Hoover' and turned themselves into a verb, to Jumar or Jumaring as a more precise description of using a mechanical device to climb a rope. 'Ascending' has become the modern generic



CREATIVE TECHNOLOGY

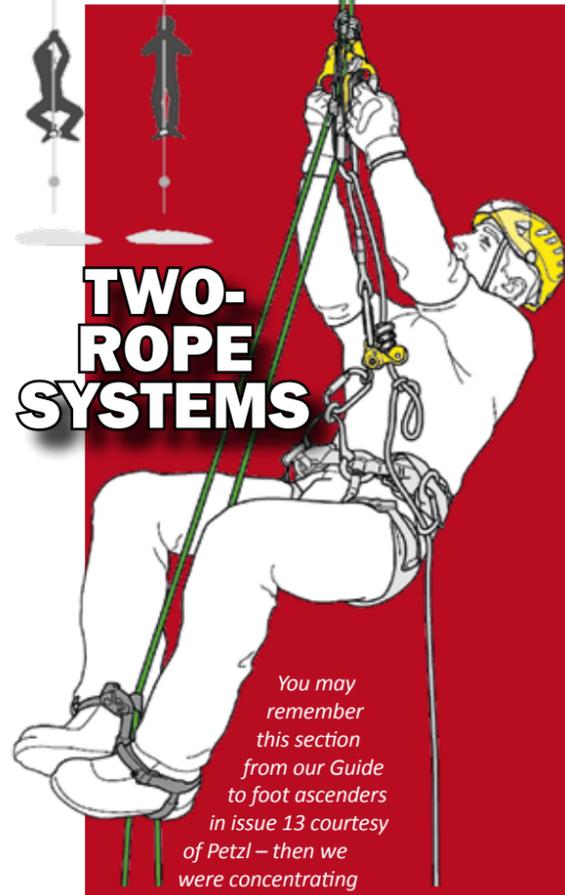
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TWO-ROPE SYSTEMS

You may remember this section from our Guide to foot ascenders in issue 13 courtesy of Petzl – then we were concentrating on the bottom bit,

this time we're concentrating on the top bit..... With the modern emphasis on safety using double ropes, this system uses con-joined hand ascenders (backed up with prusiks and attached to the ZigZag for easy direction reversal) and a pair of foot ascenders in a conventional sit-stand method which could become the norm or it may remain on the peripheries of systems actually being used. This system helps complicate the DRT/ DdRT and SRT/MRS discussion elsewhere in this issue (as it was in issue 13) because it could be that this climber is on a Doubled Rope or DdRT where the rope is simply looped over a branch or through a ring(s) on a cambium saver. Or it could be a Double Rope or DRT using two separately anchored ropes. Of course if you really want to get fussy this could be the same rope with two terminations tied in the middle and attached to the same or two separate anchors – does that make it Single Rope Technique because it's one rope and if it's DdRT isn't that defined as MRS or Moving Rope System in the new terminology? But this one is Stationary? In fact, if this is a doubled rope that isn't tied off and the foot ascenders are con-joined in the old inch-worm style, the rope will indeed be stationary. But if two separate foot ascenders are used, a DdRT rope NOT anchored at the top will actually move a little with each step with some small degree of mechanical advantage – so back to an MRS then? My head still hurts from the last time we mentioned all this.

IT'S ALL ABOUT TECHNIQUE

The traditional, and most basic ascending system, pioneered in mountaineering is often called a Jumar system later modified into the Texas Rig. The Texas Rig uses two handled ascenders (or two bootlaces if you're James Bond). One will be attached to a footloop via a length of rope or webbing a few feet long, the other will be attached direct to the sit section of your harness. [NB: there is an increasing trend towards backing up ascenders by pushing a prusik ahead of the cam]. There should also be a web or rope link between the footloop ascender and the harness as a backup safety in the event of failure or slippage on the harness ascender. In contrast, true Jumaring as used by mountaineers was seen by many to be an etrier (tape ladder) attached to each ascender – it might look cumbersome but it gives a great range of options.

If we put aside double rope ascenders discussed separately overleaf, most arborists currently use a single handled ascender together with a foot ascender (or floating knee system) and/or a chest ascender. Chest ascenders are the more common rope access and caving system while foot ascenders are more common in arb work. Many will use a hybrid auto-locking descender as a second ascender; it creates more drag than a regular ascender but allows rapid changeover from ascent to descent when manoeuvring around a canopy. Whichever system you use, there is one important scientific principal to consider – centre of gravity. If you sit on the floor with your feet out in front of you and you try to stand up what do you do first? On a Saturday night you might simply try to lunge your backside and upper body upwards while your feet are still out in front and wonder why you've smacked unceremoniously back down (everyone else will know why). On a work day, you would bring you feet inwards and as far under your backside as possible before attempting to stand. Foot ascenders can mitigate some degree of poor technique but on the whole, smoothness of progress and conservation of effort is best when you get your centre of gravity right over your feet and you have smooth upward progress of the ascenders WITHOUT pulling the handle out at an angle – keep them straight or they will catch and stall your progress. Everyone should first learn to ascend with a basic Jumar or Texas system because if you can do that efficiently every other ascending system is a piece of cake. On the other hand, if you only ever ascend on something like a full Mitchell 3-phase system with top ascender, chest roller, knee-cam, foot ascender and weird bits of elastic you might come a cropper if you ever need to do a James Bond and use your bootlaces to escape certain death. Don't say we didn't warn you.

OTHER HANDLED ASCENDER FEATURES

That obvious top eye has traditionally been used to clip a carabiner serving three purposes:

- 1) an added safety to stop the cam enclosure 'unfurling' allowing the cam to invert under high load but these days mitigated by other design features.
- 2) to clip a carabiner around the rope thus ensuring the ascender cannot detach completely.
- 3) as a hauling aid or to anchor for use in a haul system.

Otherwise, a sprung safety catch now stops the cam from opening wide enough to release the rope. The catch can also be disengaged and parked (CAM-PARK in our tables) by clipping open on the cam enclosure to make it easier to get on and off the rope. However, if it clicks to the disengaged position too easily during use you could be in for a carey drop. You rarely downclimb by releasing the safety catch and should instead press or 'thumb' the cam where sideways and/or downward pressure from your thumb or finger on the cam itself is enough to release the rope but it will then re-engage the second you removed your thumb. For this reason some cams have a more pronounced bottom edge while others have an opening or additional material to facilitate better thumb purchase. The pic above shows Black Diamond's Index with a cam that can be 'thumbed' from both sides; thumb



in the normal way and your index finger on the back face, hence the name.

Even more unusual is a supremely Russian answer to a problem you didn't even know existed- what to do when you want to downclimb but are using a right handed ascender as a left handed ascender.....add an extra curved hook thingy to allow you to push the cam off the rope with your trigger-finger. This picture also shows the traditional tie off for webbing by larks-footing the bottom eye(s) as mentioned below.

The CMI Twin (pic right) has a pip-pin keeping the cam from opening until you depress the end of the pin and remove it while the Kong Trender (pic below-right) has a carbine hook attached to a short wire to similarly stop the cam disengaging. On both these models, the pin/carbine hook are in addition to the normal cam safety catch that you see on other ascenders and the Kong even has a debris trap above the cams so these seem like quite extraordinary measures. I can't remember if these were on the very first versions and one wonders if there was unintentional cam opening on the first versions that prompted installation of these backups? Nevertheless, for arborists and the greater risk of debris from above opening or jamming the cam, these are reassuring extra measures.

The holes at the bottom are for a carabiner or maillon and usually connect to a footloop. There is often a second hole which can be used to attach a cowstail which would otherwise need to be clipped into the carabiner in a single-hole ascender. In the original Jumar designs webbing was wrapped around the frame rather than trusting to a single eye which, in early stamped models was also pretty thin and not so nicely finished as the modern stamping affords. Nevertheless there is no doubt that if you were connecting direct to webbing the strongest option would be the extruded frame models with their wide cross-section rather than the thin plate of a stamped frame. The old

SRTe Explorer (now SALA/Rollglis) had and still has, a reinforcing ring on one of its two bottom eyes. This not only strengthens the eye and prevents wear, it also makes the eye more textile-friendly for those connecting their foot loop or cow's-tail direct to the ascender without a maillon/carabiner. The extra material around the eye on the CAMP TurboHandPro shown in our titles is a stainless rope guide but has a secondary function as reinforcement of the eye; this model also has a roller to allow deviated rope-entry (left) when inverting the ascender as a haul cam. This picture also nicely illustrates the other main use for the bottom eye we were just discussing.



CHINESE & RUSSIAN MANUFACTURE

China is a perennial problem for us because so many prominent companies in the access and rescue sectors buy in Chinese products to rebadge as their own. We have only recently started including Chinese companies under their own names because some have transparent and comprehensive website and can be contacted for information most notably Anpen. But no sooner had we included Xinda products in a previous guide than they were seriously called out by trading standards in the US and Europe for having helmets that were virtually ALL mislabelled as meeting standards that they absolutely did not and it doesn't get any more dangerous than that. In this GUIDE we can be fairly sure that the companies have satisfied themselves of the quality and standards adherence but we remain a little bit sceptical because companies like Lixada, Magideal, GM, New Doar, SOB and Xinda are difficult to track down. We've cautiously included the Xinda model because it is well spec'd but don't take that as an endorsement. Even harder to track down are most Russian companies which often develop their own incredibly unique and interesting products but unfortunately also copy some European products far too closely.

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# HANDLES & ERGONOMICS

Given the amount of load you'll be applying to the handle it's important that this fits nicely in the hand even with a glove on; provides appropriate grip and remains comfortable when you apply load for a sustained period. The first thing you'll need to ascertain is whether your hand will actually fit comfortably in the gap provided. You will see a number of models with quite prominent finger indents rather than a uniformly round handle grip. Compare the Climbing Technology and ISC handles above right with the more conventional Black Diamond handle above Left. If they fit your hand then these will offer both comfort and enhanced purchase and efficiency, particularly noticeable when pushing up when you're tiring. The top protrusion is the most pronounced feature on many models and acts in a similar fashion to the hilt of a sword; it stops your hand sliding up the handle and has your index and middle fingers nestled either side as per the picture on the left. However, in true

Goldilocks tradition, if your hand is a little too large or too small these prominent ridges can be uncomfortable. Try the grip in your stockist – some may even give you the opportunity to apply some weight on rope which is worth doing and comparing. Just because a handle has no Loch Ness monster curves doesn't necessarily mean it's not as good. Many purists will swear by the cleaner lines of a smooth handle and in the case of the BD Index top-left, the black inner face is a more tactile material than simply a smooth plastic so they might argue that they provide just as much grip as the green ISC handle above, just in a different way.

Other quirks in handles comes from Beal/Edelweiss's HandsUp/A16 (left) which carries on where Kong's now discontinued ProCave (right) started with a 'shelf' to allow your second hand to be used on the same ascender hence there is no left hand version.

Black Diamond's now discontinued N-Force (top-right) had a pivotal attachment to the cam at the top and bottom of the handle. This was another innovation first used by Kong in the early eighties and then dispensed with so it's odd that BD felt it had enough merit to make a return but it does impart

a proportionally higher load on the rope so that means it will grip all kinds of rope well but equally may mean you have to be more careful about imparting a shock load as the forces will multiply at the cam-rope interface. This may explain why it is no longer made? Inadvertent force is something you have to beware of with all toothed cams but this could be something as seemingly benign as sitting back too hard on reset.

Grivel's A&D (right) has a built in brake bar rack allowing you to use a carabiner as the brake bar to create a descender making quite sure that your cam is in the locked-the-hell-out-of-the-way mode. This would certainly be the quickest changeover option but is clearly aimed at mountaineers rather than arb or industry. However, if you had to have a handled ascender, it's useful to have one that could do this.

Climbing Technology have their double ascender mentioned opposite but they also have the QuickRoll (below-right) which is their Quick Up ascender with an integrated pulley. (KROK have one too but we haven't included it, they're lucky we included the DoubleCam given how close both models are to both CT originals!) This is for immediate creation of a mechanical advantage system when added to a descender or a pulley. The pulley itself isn't rated for human loading in the same way as it takes up to a creditable 2kN loading. You really have to treat it as a separate entity that doesn't improve personal safety because it's doing a different job – like a vanity mirror in your vehicle's sun-visor – it doesn't get mentioned in the NCAP safety-in-a-crash ratings but it's handy for checking your hair.

Yet another one from Kong – they certainly don't sit around procrastinating do they – is the Futura which is one of the smallest designs on the market because it has an external handle unlike every other model in this guide which has an enclosed frame. This means the size of hand is not limited in any way but has also allowed Kong to give you a swap-out handle with different finger sizing for a better fit.

# DOUBLES

You could create your own double rope ascender quite easily by gerry-rigging two handled ascenders back-to-back with some strong cable-ties and a couple of carabiners. Since there is no specific standard for a double rope descender and your two single ascenders are still operating in their certified role this might, unusually, not contravene any standards or safety issues. With a carabiner or maillon linking the two at the bottom they cannot separate and a sturdy cable-tie or two can withstand any tendency to slide apart if one is loaded while the other isn't. Some companies have pretty much done just this but they have at least used bolts and rivets that are absolutely secure. So a commercially available double ascender can mean one of four things:

- double cams on an otherwise single handled ascender like the Miller/Komet and CMI models below left
- Double cams with two handles which are two con-joined ascenders like the six examples far right, four of which are side-by-side and intended ONLY to be used with
  - 2 ropes. The Petzl and Fusion use custom frames rather than a joining bracket.
  - Single cam on a double handle like the CMI Expedition and KROK on the right. These are unique and are really a fully grown version of what the Beal Hands Up and Kong Caver aimed with their extra shelf for your second hand.

It is more unusual for both CMI (left) and Komet (above left), in the new guise of Honeywell, to have opted for double cams on a single handed ascender. CMI's Twin has the ability to move both cams with one 'trigger' finger via a split ring which seems a little bit of an afterthought in terms of design but does nevertheless do the trick. Both of the Italian models have opted to have a debris shield on top

of the cams – this is to stop ingress of hard material or vegetation that might stop the cams from closing properly – a possibly catastrophic scenario. Odd that this isn't found on EVERY ascender since all have this same failure potential and particularly during tree climbing. The top eye mentioned earlier as a means of stopping cam inversion and for clipping the ascender to the rope so that it cannot completely detach is still present though unlikely to be necessary if you have two opposing cams engaged simultaneously. However this eye can also be used to anchor the ascender when used as part of a haul system or to haul it up or along a rope during reset. The Ascender standard EN567 applies to single rope so it's a little misleading in terms of the side-by-side models (top 4 pics above)intended to be used on two ropes at all times whereas the back-to-back models can still be used more easily as single rope ascenders. Petzl had this to say about the CE listed in theirs (and CT's) entry: *the Ascentree is not EN567 or 12841 as Petzl do not consider that ascenders used on a 'doubled rope' can fall within the current EN standards. These standards are written for devices used on a single rope, which is clearly not how they are used. To test on a single rope would not be representative and could give false data. Petzl have carried out their own testing in realistic scenarios and offer the product knowing that it has an appropriate level of performance for the techniques illustrated in the product instructions.*

## IN THE FOLLOWING TABLES:

### ORIGIN:

The country selling the product but this is not always the same as the country of manufacture. Where we know, there is an inset flag to show where it is made. You will be able to spot a number of rebadged items in these tables. As usual there are two or three key Chinese companies that make for several US and European companies.

**COST:** approximate, rounded up and inclusive of local taxes which are generally from 10% and more often 20% in Europe

**WEIGHT:** for a single ascender except the double versions obviously which still count as a single ascender

**DIMENSIONS:** Width x Height x Depth/thickness but this last one is not always given – the thickest part will generally be the cam enclosure but occasionally it may be the handle if it is moulded into something akin to a joystick handle on one of those stuffed toy grabbing cranes at an amusement arcade. Also note that this figure can vary from reality if they don't include protruding rivet heads etc.

**MATERIALS:** When we say 'Alloy' we mean Aluminium Alloy unless otherwise specified.

**STANDARDS:** for CE these fall into two categories EN567 is the main ascender standard to which all single rope models in this list meet and shown as 'CE'. This is the also standard that the rope diameter ranges meet – usually 8-13mm. There is also EN12841 type B for rope adjusters which also takes in a number of hybrid and descent/fall arrest devices and this requires a slightly larger diameter rope as the lower limit – usually around 10mm. Some of these ascenders meet that standard but a handled/toothed ascender really only has two jobs – ascending and pulling!

**ROPE DIAM RANGE:** It is best to always use the millimetre sizes in ALL of our MARKET GUIDES because the fractional inch equivalents are just too widely spaced. 1/2" for instance can be anywhere from 12 to 13mm. Fatter ropes make progress harder but too thin a rope can be positively dangerous as it can jam between the cam and enclosure. It's best to ignore the lowest and highest rope diameter claims. Remember that a rope will only get fatter with age so if it was a tight fit with a new rope it may become too large with use and stress the cam enclosure if heavily loaded. The rope range quoted for any models meeting CE is based on EN567; other uses meeting EN12841- B will require a rope that is at least 2mm larger in diameter.

**WLL:** is the weight of person actually climbing or the weight that can be pulled/hailed before either the rope begins to tear or the cam enclosure unfolds. This was a problem with early stamped models and is now mitigated by a small

button or 'crease' in the frame which stops the cam from flipping upwards under high load resulting in an unstoppable downward slide, this is why some systems like the Texas Rig, tie the second ascender to the first ascender via a harness tie-in. Incidentally, Skylotec/Anthon and the Russian KROK quote 15, 20 and 18kN (the KROK website figures are different to model images) as a breaking strength of the frame and 4kN as a Working Load Limit which presumably DOES NOT account for rope failure.

The **MBS** figure is largely irrelevant as it refers to the strength of the frame, or to be more exact the eyes at each end. If you were to use the frame as a carabiner or a link in a hauling system rather than as the means to exert the pull this might come into play as you try to stretch the frame end to end, otherwise, for operational use, don't worry about it because the failure mode if you overload the ascender will be the cam or the rope, probably the rope. For those that meet EN12841-B there is a minimum 100kg requirement so this might be the figure quoted for WLL here even though it may be capable of a higher working load.

**CAM-PARK:** This applies to virtually all handled ascenders and is the ability to hold the cam off the rope completely, generally by clipping the safety catch onto the opposite part of the frame.

**ANTI CAM-INVERT:** This is now a custom-incorporated button or pinch of frame material to stop the cam releasing out the top of the frame under high load. This was originally mitigated by clipping a carabiner through the top eye and is still used as such by many.

**TWIN ROPES ONLY:** The double ascenders that use two single rope ascenders connected side by side to facilitate twin rope working are imbalanced if you only use one rope and are designed specially to be used on two ropes simultaneously at all times. You can use just one rope but it's cumbersome and the ascender will tend to fall to the unweighted side when you take your hand off it.

**DOUBLE ROPES:** The ability to operate on two ropes simultaneously. Those ascenders without a black square in the TWIN-ONLY column will operate just as easily on one rope, they're just a little heavier and bulkier than usual.

**COLOURS:** different model colours are separated by a comma. A forward slash/indicates two (or more) colours on one model. Most companies make their left hand and right hand in two specific colours and for a while we thought the original Petzl colour scheme of Gold for right, Blue for left, might become an industry wide norm. But no, it's now a veritable rainbow of colours, usually with a different colour for each but some use the same colour and many offer just black for both left and right for the tactical and theatre markets. The left hand ascender colour is shown in burnt orange.

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images NOT to scale	MODEL	COMPANY	ORIGIN	COST	WEIGHT	DIMENSIONS Width x Height x Depth	MATERIALS SHELL CAM GRIP	CAM	STANDARDS	ROPE DIAM RANGE	WLL/ MBS	CAM -PARK	ANTI-CAM- INVERT	TWIN ROPES ONLY	DOUBLE ROPE	COLOURS RIGHT LEFT	NOTES	WWW.
	Explorer	3M/ DBI SALA/ ROLLGLIS		£95 \$113 A\$189	386g 13.6oz	212x88x30mm 8.3x3.5x1.2"	Extruded Stainless Steel Plastic		CE NFPA AS/NZ	10.5-13mm 3/8 - 1/2"	800kg* 1764 lbf	■	■			BLUE, GOLD GOLD, BLUE	NB :There was also a 16mm model in Red. Previously SRTE.and may be discontinued. *800kg is to cam-failure	3m.com.au
	Move Up 111/112	ALPIDEX		€30	240g 8.5oz	205x103x27mm 8x4.2x1.1"	Stamped Steel Plastic/Rubber		CE	8-13mm 5/16 - 1/2"	120kg 265 lbf	■	■			BLUE ORANGE		alpidex.com
	A11/A10 (A14)	ANPEN		£62 \$69 €56	136g (210g) 4.8oz (7.4oz)	205x93mm 8x3.7"	Stamped Steel Plastic/Rubber		CE	8-13mm 5/16 - 1/2"	5kN 1124 lbf	■	■			BLUE, BLACK ORANGE, BLACK	A14 = More substantial handle and plastic covered cam release	en.anpen.net
	A10 AB	ANPEN		£107 \$130 €120	540g 19.4oz	205x155mm 8x6.1"	Stamped Steel Plastic		CE	8-13mm 5/16 - 1/2"	5kN 1124 lbf	■	■		■	BLUE/ ORANGE		en.anpen.net
	Hands Up	BEAL		£48 \$70 €46	265g 9.3oz	235x110x35mm 9.25x4.3x1.4"	Stamped Steel Rubber		CE	8-13mm 5/16 - 1/2"	100kg 220 lb	■	■			GOLD	single ascender only, not a pair. Comfort grip on cam enclosure when gripped with second hand	pro.beal-planet.com
	Index	BLACK DIAMOND		£69 \$85 €65	200g 7oz	188x90x28mm 7.4x3.5x1.1"	Stamped Steel Plastic/Rubber	n/a	CE	8-13mm 5/16 - 1/2"	n/a	■				GREY GOLD		blackdiamondequipment.com
	Turbohand	CAMP		£52 \$90 €77	185g 6.5oz	185x95x22mm 7.3x3.7x0.9"	Stamped HardenedSteel Rubber		CE EAC	8-13mm 5/16 - 1/2"	120kg 265 lb	■	n			RED, BLACK GREY, BLACK		camp.it
	Turbohand- Pro	CAMP		£68 \$100 €70	198g 7oz	185x95x22mm 7.3x3.7x0.9"	Stamped HardenedSteel Rubber		CE EAC	8-13mm 5/16 - 1/2"	120kg 265 lb	■	n			RED, BLACK GREY, BLACK		camp.it
	QuickArbor H	CLIMBING TECHNOLOGY		£125 \$185 €165	500g 17.6oz	200x220mm 7.9x8.7"	Stamped Steel Plastic/Rubber		CE	10-13mm 3/8 - 1/2"	140kg 308 lb	■	■	■	■	ORANGE ORANGE	Cam cover protects from debris ingress. No depth given as the two ascenders are handled	climbingtechnology.com
	Quick'Up+	CLIMBING TECHNOLOGY		£55 \$72 €57	155g 5.5oz	190x90x33mm 7.5x3.5x1.3"	Stamped Steel Plastic/Rubber		CE	8-13mm 5/16 - 1/2"	140kg 308 lb	■	■			ORANGE GREY		climbingtechnology.com
	QuickRoll	CLIMBING TECHNOLOGY		£101 \$112 €106	255g 9oz	190x95x35mm 7.5x3.7x1.4"	Stamped Steel Plastic/Rubber		CE	8-13mm 5/16 - 1/2"	140kg 308 lb	■	■		■	ORANGE GREY		climbingtechnology.com
	Expedition	CMI		\$111 €99	273g 10oz	208x106x35mm 8.2x4.2x1.4"	Stamped HardenedSteel Plastic		NFPA*	9-16mm 3/8-5/8"	17.8kN 4000 lbf	■	■			BLACK BLACK	Hard-coated cam with lifetime warranty. *Also an NFPA version available +\$10	cmigearusa.com

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																RIGHT	LEFT		
	Expedition Double	CMI		\$142	369g 13oz	208x178x35mm 8x7x1.4"	Stamped HardenedSteel Plastic		-	9-16mm 3/8-5/8"	15.1kN 3400 lbf	■	■				BLACK	Hard-coated cam with lifetime warranty	cmigearusa.com
	Expedition Twin	CMI		\$220	432g 15oz	208x106x51mm 8.2x4.2x2"	Stamped HardenedSteel Plastic		-	9-16mm 3/8-5/8"	14.7kN 3300 lbf	■	■		■		BLACK	Hard-coated cam with lifetime warranty	cmigearusa.com
	Ultrasender	CMI		\$115	270g 9.5oz	188x76x29mm 7.4x3x1.12"	Extruded HardenedSteel Rubber		NFPA*	9-16mm 3/8-5/8"	20.4 kN 4600 lbf	■					RED or BLACK RED or BLACK	Hard-coated cam with lifetime warranty *NFPA version +\$10	cmigearusa.com
	Mini Ultrasender	CMI		\$79	170g 6oz	127x76x29mm 5x3x1.12"	Extruded HardenedSteel None		NFPA*	9-16mm 3/8-5/8"	20.4 kN 4600 lbf	■					RED or BLACK RED or BLACK	Hard-coated cam with lifetime warranty *NFPA version +\$10	cmigearusa.com
	Elevator	EDELRID		£54 \$85 €65	215g 7.6oz	190x89x29mm 7.5x3.5x1.3"	Stamped Steel Rubber		CE UIAA	8-13mm 5/16 -1/2"	140kg 308 lb	■	■				GREY GREEN		edelrid.de
	AS16	EDELWEISS		\$60 €48	240g 8.5oz	235x110x35mm 9.25x4.3x1.4"	Stamped HardenedSteel Plastic		CE	8-13mm 5/16 -1/2"	100kg 220 lb	■	■				BLACK	single ascender only, not a pair.	edelweiss-ropes.com
	Capitan/ (Capitan Industry)	FIXE		£32 €42	242g 8.5oz	200x90x35mm 7.9x3.5x1.4"	Stamped Steel Rubber		CE UIAA	8-12mm 5/16 -1/2"	20kN 2039 lbf	■	■				BLACK RED (SILVER GREY)	As far as we can tell, the industry has a slightly different cam and cam safety - less aggressive teeth perhaps?	fixeclimbing.com
	Beklim Double	FUSION		n/a	390g 13.7oz	195x165x25mm 7.7x6.5x1"	Stamped Steel Plastic		CE	8-13mm 5/16 -1/2"	100kg 220 lb	■	■	■	■		BLACK	May be discontinued by Fusion but still available via NH Industries Taiwan.	fusionclimb.com
	Beklim (Voltron)	FUSION		\$65	175g 6.2oz	195x92x25mm 7.6x3.6x1"	Stamped Steel Plastic		CE	8-13mm 5/16 -1/2"	100kg 220 lb	■	■				BLACK, CARBON FIBER BLACK, C- FIBER	NB: carbon Fibre pattern not actually made of carbon-fibre.	fusionclimb.com
	A1	GRIVEL		£47 €49	247g 8.7oz	203x98x35mm 8x3.9x1.4"	Stamped		CE UIAA	8.3-13mm 5/16 -1/2"	20kN 2039 lbf	■					GOLD BLACK		grivel.com
	A&D	GRIVEL		£59 \$80 €54	261g 9.2oz	203x98x35mm 8x3.9x1.4"	Stamped		CE UIAA	8.3-13mm 5/16 -1/2"		■					GOLD BLACK	Ropes from 7.3-13mm for descent	grivel.com
	Pulsar	HEIGHTEC		£51 \$84	240g 8.5oz	195x100x25mm 7.7x3.9x1"	Stamped HardenedSteel Nylon		CE	8-13mm 5/16 -1/2"	125kg 275 lb	■	■				GREEN BLACK		heightec.com

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	Single	HONEYWELL MILLER/KOMET		£99	225g 7.9oz	193x90x25mm 7.6x3.5x1"	Stamped HardenedSteel Plastic		CE NFPA	8-13mm 5/16 - 1/2"	100kg 220 lb 5kN 1124 lbf	■	■			RED BLUE		honeywellsafety.com
	Double	HONEYWELL MILLER/KOMET		n/a	550g 19.4oz	220x180x50mm 8.7x7x2"	Stamped HardenedSteel Plastic		CE UIAA	11-13mm 7/16 - 1/2"	100kg 220 lb	■	■	■		RED/BLUE		honeywellsafety.com
	RP220	ISC		£51 \$110	130g 4.6oz	218x82x32mm 8.6x3.2x1.3"	Extruded HardenedSteel Plastic		CE	9-13mm 3/8 - 1/2"	140kg 308 lb 2.5kN 562 lbf	■		■		GREY/ green GREY/red		iscwales.com
	RP221 Ultrasafe	ISC		£65 \$120 €95	183g 6.5oz	218x82x32mm 8.6x3.2x1.3"	Extruded HardenedSteel Plastic		CE	9-13mm 3/8 - 1/2"	140kg 308 lb 2.5kN 562 lbf	■	■	■		GREY/ green GREY/red	Ultrasafe version has cam arc restriction/Anti-cam-invert pin	iscwales.com
	Futura Hand/ Futura Hand Tactical	KONG		£70 \$90 €75	125g 4.4oz	140x88x24mm 5.5x3.5x1"	Extruded HardenedSteel Rubber		CE	8-13mm 5/16 - 1/2"	n/a	■	■			BLACK or BLACK/ylw BLACK or GREY/ylw	two different sized grips available	kong.it
	Lift/ Lift Tactical	KONG		£48 \$70 €50	225g 7.9oz	193x90x25mm 7.6x3.5x1"	Stamped HardenedSteel Plastic		CE NFPA	8-13mm 5/16 - 1/2"	100kg 220 lb 5kN 1124 lbf	■	■	■		CYAN,RED, BLK,GOLD GREY,BLK, BLUE	Multiple colour options	kong.it
	Trender	KONG		£157 \$215 €145	550g 19.4oz	220x180x50mm 8.7x7x2"	Stamped HardenedSteel Plastic		CE UIAA	11-13mm 7/16 - 1/2"	100kg 220 lb	■	■	■	■	BLACK/ GOLD	debris ingress protection plate	kong.it
	FA 70 003 00 FA 70 002 00	KRATOS SAFETY		€40	220g 7.8oz	206x95.5x35mm 8.1x3.8x1.4"	Stamped Steel Plastic		CE	10-12mm 3/8-1/2"	20kN 2039 lbf	■				GREEN BLACK	002=Black 003 = Green	kratossafety.com
	G-2	KROK		\$96* €78*	560g 19.75oz	228x195mm 9x7.7"	Stamped Steel Plastic		-	8-12mm 5/16 - 1/2"	4kN 899lbf 15kN 1686 lbf	■	■	■	■	BLUE/ BLACK	Steel version available 640g, 20kN	krok.biz
	Zhumar	KROK		\$40* €32*	240g 8.5oz	190x94x28mm 7.5x3.7x1.1"	Stamped Steel Plastic		-	8-12mm 5/16 - 1/2"	4kN 899lbf 15kN 1686 lbf	■	■			BLUE BLACK	also available without Safety catch. Powder coated. Steel frame version +40g	krok.biz
	Friendship-2	KROK		\$56* €46*	380g 13.4oz	190x150x36mm 7.5x5.9x1.4"	Stamped Steel Plastic		-	8-12mm 5/16 - 1/2"	4kN 899lbf 15kN 1686 lbf	■	■		■	BLUE	also available without Safety catch. Powder coated steel frame -540g, 20kN.	krok.biz
	Ascentree	PETZL		£132 \$220 €175	330g 11.6oz	190x175x51mm 7.5x6.9x2"	Stamped Stainless Steel Plastic/Rubber		CE*	8-13mm 5/16 - 1/2"	140kg 308 lb	■	■	■	■	GOLD	Not EN567	petzl.com

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	Ascension	PETZL		£45 \$90 €56	165g 5.8oz	190x90x26mm 7.5x3.5x1"	Stamped Stainless Steel Plastic/Rubber		CE EAC NFPA	8-13mm 5/16 - 1/2"	140kg 308 lb	■	BLACK/ylw YELLOW/blk BLACK	All -black version is £57	petzl.com
	Proverti CD211/2	PROTEKT		€36	280g 9.9oz	207x100x28mm 8.1x3.9x1.1"	Extruded Steel Plastic		CE UIAA	9-13mm 3/8-1/2"	n/a	■	SILVER RED	Older right hand were blue. Proverti is a wholly owned subsidiary of Protekt	protekt.pl
	Ultralight CD211/22	PROTEKT		€38	205g 7.2oz	190x93x24mm 7.5x3.7x1"	Stamped Steel Plastic		CE	8-13mm 5/16 - 1/2"	100kg 220 lb	■	SILVER ORANGE		protekt.pl
	RE Ascender	ROCK EMPIRE		€54	220g 7.8oz	203x98x35mm 8x3.9x1.4"	Stamped Steel Plastic		CE	8-12mm 5/16 - 1/2"	4kN 899lbf	■	LT GREY LT BLUE		rockempire.cz
	Lift	SINGING ROCK		£59 \$65 €54	190g 6.7oz	192x90x34mm 7.6x3.5x1.3"	Stamped Stainless Steel Plastic		CE	8-13mm 5/16 - 1/2"	120kg 265 lb 12kN 2698 lbf	■	BLACK BLACK		singingrock.com
	Lift Fix	SKYLOTEC (ANTHRON)		£62 \$70 €67	216g 7.6oz	203x91x34mm 8x3.6x1.3"	Stamped Steel Rubber 'cork' compound		CE NFPA	9-13mm 3/8-1/2"	4kN 899lbf 18kN 4047 lbf	■	GREY ORANGE	Skylotec Germany owns Anthron Slovenia	skylotec.com anthron.si
	RB17	SOB		\$34*	210g 2.4oz	200x90x26mm 7.9x3.5x1"	Stamped Steel Plastic		CE	8-13mm 5/16 - 1/2"	100kg 220 lb	■	GOLD BLACK	optimum rope=10-13mm [arborists reported cam-rope interface problems with the SOB foot ascender - beware!]	chinasob.com
	Clean Cam	SAR PRODUCTS		£60 (\$70)	216g 7.6oz	189x90x32mm 7.5x3.5x1.3"	Stamped Stainless Steel Soft Nylon		CE UIAA	8-13mm 5/16 - 1/2"	140kg 308 lb	■	BLACK or ORANGE BLACK	(Also rebadged in the USA by CYPHER)	sar-products.com
	Jumar	SWISS RESCUE/ PEWATEC		n/a	250g 8.8oz	183x85x28mm 7.3x3.3x1.1"	Extruded Steel Plastic		CE*	9-13mm 3/8-1/2"	n/a	■	GOLD GOLD	DISCONTINUED?	swiss-rescue.de
	Passport	TRANGO		\$60	210g 7.4oz	194x86x27mm 7.6x3.3x1"	Stamped Steel Plastic		n/a CE	8-13mm 5/16 - 1/2"	4kN 899lbf	■	BLUE GREY		trango.com
	71-257/8	TREERUNNER		€35	200g 7oz	190x90x25mm 7.5x3.7x1"	Stamped Steel Plastic		CE	8-13mm 5/16 - 1/2"	100kg 220 lb	■	RED GREY		grube.de
	H-SS02	XINDA (BINGFENG OUTDOOR)		\$65	210g 7.4oz	190x90x25mm 7.5x3.7x1"	Stamped Stainless Steel Rubber		CE UIAA	8-12mm 5/16 - 1/2"	150kg 3 lb	■	RED, GREY, BLACK, ORANGE, RED, BLUE, BLACK		xindaoutdoor.com

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# THE ART OF CABLING

by TC Mazar

**Title Pic:** Eye bolt hardware in static steel cabling systems provide the greatest strength-to-wood diameter ratings when considering the load capacity of the supplemental support system.

John Muir wrote, "I never saw a discontented tree. They grip the ground as though they liked it, and though fast rooted they travel about as far as we do. They go wandering forth in all directions with every wind, going and coming like ourselves, traveling with us around the sun two million miles a day, and through space heaven know how fast and far!"

A beautiful notion is presented here by Muir, and sheds an excellent light on the dynamic movement of trees as they bare the many elements of the universe. Even though trees grow strong and tall, or strong and short for that matter, they are certainly not without their biomechanical weaknesses from enduring each unique microclimate in which they are found: partially failed or even poorly formed branch unions, over-extended scaffold limbs, heaved root plates and shear-cracked stems.

Luckily, these weakened structural systems we find in trees can be supplemented by the artistic arborist in the form of supplemental support. And there is no shortage of tools and materials to deploy for the injured tree: static steel and dynamic synthetic cable, through-bolts, fids and scissors and chafe sleeves and rubber shock absorbers, wooden and steel props, gas and electric drills, steel rings and cable grips, and mechanical advantage systems for tensioning and tweaking. Like a doctor setting and mending a broken bone, the arborist climbs aloft in order to remedy the trees partially cracked or stressed ailments, pulling together and setting and drilling and pinning the weak pieces back together, so that the natural vigor of the tree can resume in the form of future active growth, eventually consuming the steel pins and supports long into the future of old life.

It should be noted that one of the first aspects in the consideration of installing a supplemental support system is studying both the tree itself, as well as the risk that it poses to the targets and environment around it. A qualified arborist should have a conversation with the tree owner or property manager about these risks, as well as about the limitations that a supplemental support system has. According to the ISA's Best Management Practices on Tree Support Systems: Cabling, Bracing, Guying and Propping, a steel system could have a service life from 20 to 40 years, whereas a synthetic system service life is much shorter due to degradation from the elements. Also, it should be noted that supplemental support systems do indeed have their limitations, and regular inspection of the supplemental support system is necessary on a periodic basis and it is the responsibility of the tree owner to schedule those inspections (ISA BMP, 4). Taking into consideration the level of risk that the tree owner is willing to accept, in combination with the extent of decay and/or structural damage the tree has endured will determine whether or not a supplemental support system is warranted. Trees are amazing and resilient biomechanical machines, and supplemental support is just another way in which the arborist can give trees a chance to endure long into the future.

An entire book can be compiled on choosing the proper system to install; which type of cable material and hardware, as well as how it is designed. Each unique system has its place somewhere in arboriculture. There are advantages and disadvantages to all of the different types of cables and hardware choices, as well as selecting the tools to install those systems. Because each and every tree is unique, it will be up to the arborist to select the proper material to use in the supplemental support system.



Arborist Matt Guarneri of Arbor-Craft works to attach a steel cable end to a dead-end grip in the crown of an Ash tree.

Static steel cable is strong and long lasting, but it also requires drilling into sound, strong wood, with the chance of potentially introducing decay depending on many factors, including species and environment. This process will require the use of a strong electric or gas powered drill, or lag spinners, as well as other hardware like a Chicago or havens grip to hold the cable while working, dead-end grips, properly sized thimbles, washers, nuts and tools for cutting excess bolts like a hacksaw or an electric saw with a metal cutting blade. On the other hand, when working with dynamic cable made from a synthetic hollow braid rope, the arborist will only be required to carry a few simple splicing tools, some chafe sleeve and perhaps a torch or lighter for burning the cut ends of the rope. The dynamic cable is much lighter and does not require the arborist to drill into the wood of the tree. Although, because a dynamic or soft cable is anchored around the branch of a tree rather than hardware drilled through it, there is the potential for a dynamic cable to girdle a branch or stem if not inspected frequently and adjusted as needed. Also, a soft cable has more visibility from the ground than the more sleeker steel cable. But, for what is lost is service life of the system is sometimes gained in the ease of installation with a dynamic system, so there are both positive and negative attributes to both cabling systems. It will be the arborist's responsibility to choose the proper system for the unique situation in which they are working. It goes without saying that managing the supplemental support system becomes just as important as managing the entire health of the tree.

Several methods of design for cabling systems are presented in the ISA's BMP on supplemental support systems. Of course, the limiting factor in how a cabling system is designed will depend on the tree itself; where specific branch unions are located and if there is decay or hard angles present where the arborist will potentially select anchor points. Some of the most common configurations are: direct, triangular, box and hub and spoke system (ISA BMP, 13). In the most basic system, the arborist will be supplementing support over one main branch union in which one cable will run directly between two stems. According to the ISA BMP, "Triangular systems connect branches in groups of three. This method is applied when maximum direct support is required," (BMP, 12). A box style configuration is used of course when connecting four stems together, placing each stem in the configuration at each corner of the 'box'. It's important to note that this configuration will allow more branch movement than those of direct or triangular configurations. Hub-and-spoke systems are deployed in the absence of a central stem. Due to the multiple cables and hardware, hub-and-spoke systems are challenging to install because there are multiple cables to tension and adjust independently (BMP, 12). It should also be noted that no matter which configuration the qualified arborist chooses, the cable should be placed two-thirds of the way between the branch union being supplemented and the outer extent of the tree crown. Again, this is a guiding note because of the dynamic nature of trees and their vastly varying forms, shapes, sizes and biomechanical differences such as decay pockets and uniquely angled branches.

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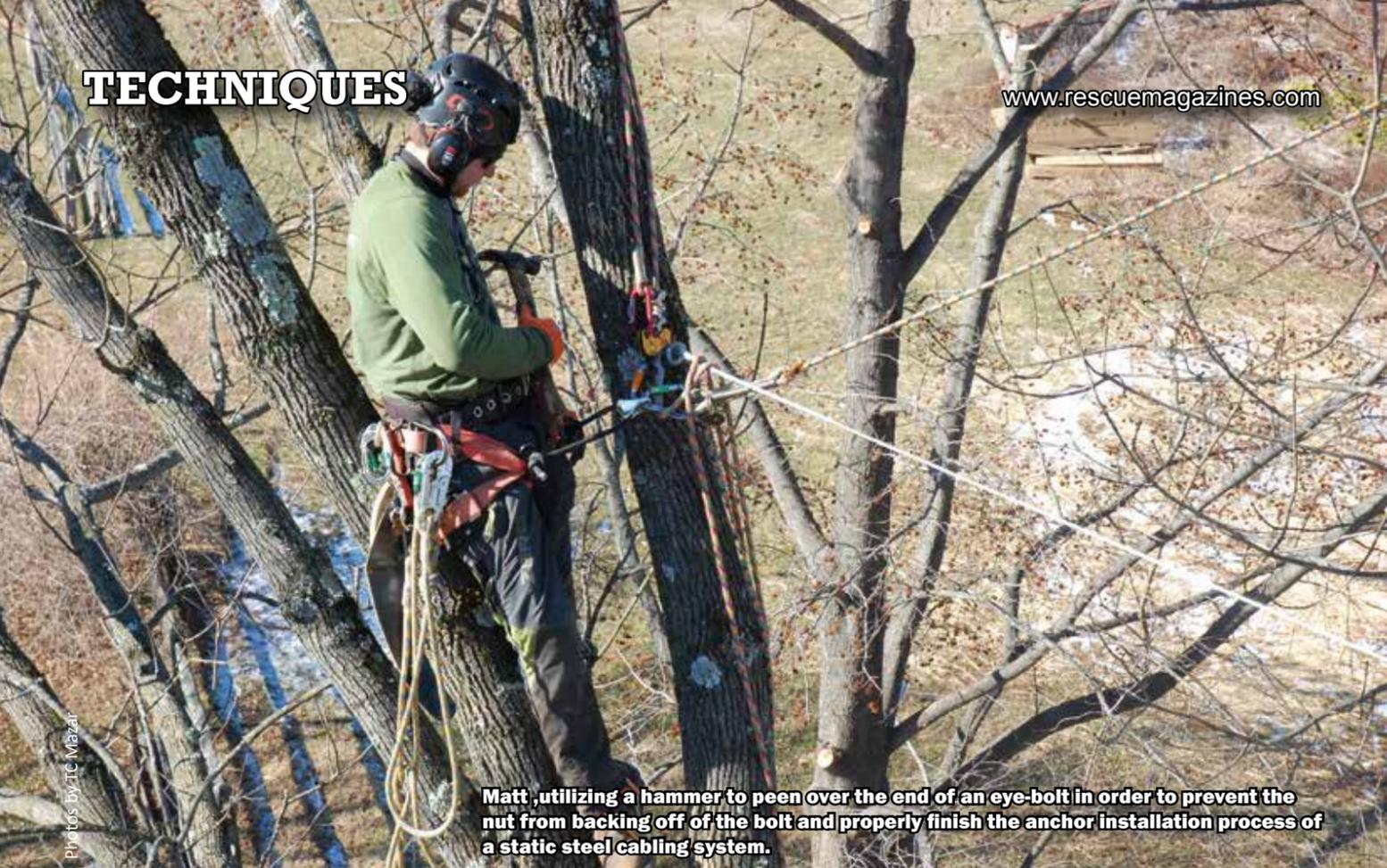


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# TECHNIQUES

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Matt, utilizing a hammer to peen over the end of an eye-bolt in order to prevent the nut from backing off of the bolt and properly finish the anchor installation process of a static steel cabling system.

Material selection will also be largely determined by the tree, especially the size and condition of the wood in which anchors are being placed, as well as by the anticipated load that the anchors and hardware will experience. In terms of anchors for static steel systems, the arborist has to choose between J-lags, eye-bolts and cable-stop terminations (rig-guy and wedge-grip style terminations). The most common anchoring hardware in production arboriculture with static steel systems will be j-lags and eye-bolts. The arborist is limited with J-lag anchor installation up to branches 10 inches in diameter and in instances where there is no decay present, according to the ISA BMP. Eye-bolt anchors, on the other hand, offer the greatest strength/diameter ratio, but require a bit extra in terms of tools and hardware for installation. For instance, J-lags only

require a hole drilled into the anchoring area of the branch and a lag spinner for setting the lag, whereas eye bolts will require drilling, a nut and washer to set the eye bolt in place to secure it to the branch, the proper wrench to tighten the nut, a saw to cut the excess bolt and a hammer to peen the threads of the bolt to prevent the nut from backing off. All steel systems, regardless of what type of anchoring hardware the arborist chooses, will require a thimble to protect either the cable itself (for hand-spliced common grade cable) in the anchoring hardware or the dead-end grip attaching the anchor hardware to the cable itself. Although there seems to be a lot of moving parts with the installation of a static system, the lifespan of these systems is long, and the visibility of the system in the crown is not as obtrusive as a dynamic, soft supplemental

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Matt uses bolt cutters aloft in order to trim off excess cable after attaching the cable to the anchor hardware.

support system. It should also be noted that "to avoid potential electrical shock and be in compliance with ANSI Z133 safety standards in the United States, cables should not be installed over or within 10 feet (3m) of energized electric wires," (BMP, 21). While on this topic, it should also be said that if installing a static steel system in a tree where a lighting protection system is present, the arborist should bond the cable system to the lighting protection system. According to the BMP, "the connection should be made by fastening a section of conductor between the cable and the tree lighting protection conductor. A specially designed bronze or stainless-steel connector clamp (multi-purpose clamp) should be used for this purpose," (22).

Hardware considerations for dynamic cable systems are a

little less complex than their static counterparts. The major consideration will be choosing the braided line itself and the proper load rating on that rope for the cabling situation the arborist is dealing with. Other pieces of gear necessary for these style of supplemental support systems will be properly sized chafe sleeve for the braided line to run through around the branch to protect the cambium of the tree, as well as a suitable fid for splicing the hollow braid rope and good pair of scissors for clean cuts of excess material once the cable is set in place. Some systems like the cobra-style cable systems will also come with other features such as rubber shock absorbers that will also need to be incorporated into the system as well. One major benefit of dynamic cabling systems is that if an arborist is working on older trees with major pockets of decay located



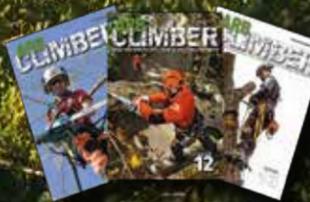
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**Matt attaches a dead-end grip to a piece of cable while installing a hub-and-spoke cable system.**

aloft at different anchoring points, the no-drill installation of a dynamic cable system can still add supplemental support without drilling into compensated wood.

Because every tree is unique and different, even down to the exact location of where the support system will be installed, as well as where the tree is situated in its environment, it will be up to the qualified arborist to choose the proper system, or combination of systems for that matter, for each unique situation aloft.

According to the ISA's BMP, a cabling system should be set taut, "that is, with the minimum tension required to eliminate visible cable slack," (BMP, 11). In order to fine-tune the finalized tension of a static or dynamic supplemental support system, many arborists employ the use of a simple mechanical advantage system, an exact design that can be left open to the arborist's own imagination and gear on hand. Popular choices range from any type of simple 3:1 system, otherwise known as a z-rig; or even a simple rope come-along with three-strand rope paired with some basic slings for anchoring. Depending on the situation and the forces needed to pull limb's together, winch style systems such as the Good Rigging Control System or fiddle block 5:1 mechanical advantage systems can also be utilized to meet necessary demands for pulling anchor points together and setting tension in the cable system.

Cablings trees also opens a world of creative possibilities into

which the arborist can experiment with different climbing systems and work positioning methods. Often, the work positioning demands for the arborist installing a cable system will be challenging and rather complicated based on where the system is being installed and how many limbs are being cabled together. Every situation from a basic, direct cable between two limbs to a hub and spoke system radiating from a central ring hub outward to multiple tree limbs can potentially require the arborist or arborists to be tied into several different anchor points so they can move freely and comfortably between two or more working positions. How the climbing arborist loads each of their anchor points or suspension points in the tree will also be a critical consideration as to how it will affect the supplemental support system they are installing because ultimately the load that they inflict on those anchors will affect the finalized tension in the cable system or specific part of the system. If we consider the dynamics of a basal-anchored climbing system and the larger loads that it can potentially inflict on the suspension point in the crown of the tree, this can either negatively or positively affect the ease of setting tension in a cable system or portion of a cable system. A climbing system that is anchored aloft such as a cinching style anchor system or one set through a cambium saver or ring-and-ring style device may be more suitable for the job at hand. In the absence of having an independent mechanical advantage system on hand in order to pre-set tension in the cabling system, the arborist can very well use their own climbing system or multiple climbing systems for that matter in order to

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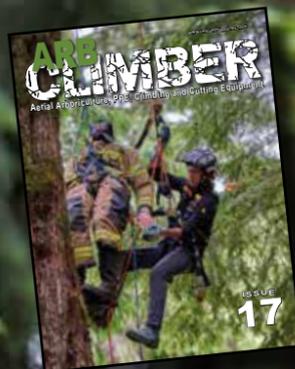
**Hub-and-spoke static cabling systems are utilized in trees that lack a central leader to anchor the cabling system to. Here, Matt uses two independent climbing systems to transfer from one work position to another while installing a hub-and-spoke cabling system.**

gain tension on each anchor point in order to set the proper tension in the supplemental support system. While lanyarding in to one anchor side in a simple direct cable operation, the arborist can simply use a moving rope system anchored across from them at the opposite cable anchor location to inject some mechanical advantage into the system and possibly get all the tension they need to finish the cable and set it properly. Also, an important consideration is that once the final system is installed, the cable or multiple cables themselves will become an obstacle for the arborist upon repelling out of the tree and retrieving their climbing system. If one leg of rope in a canopy-style cinched anchor system is draped over a cable or multiple cables, this can add friction into the system and be a nuisance upon retrieval of the system. Therefore, all of these factors and scenarios need to be thought through while working with the installation of a supplemental support system.

We definitely cannot overlook the need for a well-versed and experienced ground-support team either. The ground personnel working with the climbing arborist or arborists in installing a supplemental support system will be required to know the versatile tools and hardware of a cabling system, how to cut steel cable accurately and cleanly, choose the proper hardware to send aloft to the climber and be able to safely attach bulky and awkward tools that are not commonly used in day to day arboriculture operations. The concept of safety needs to be broadened to include different types of tools with different types of risk. The ground personnel can absolutely make or break the flow of a supplemental support installation operation, and the value of a ground crew will radiate brightly during these operations. They will be able to assist in the proper inspection of the tree as well as giving insight into the proper placement of the cabling system in the tree, confirming that it is located in the proper portion of the canopy from a more uniform perspective at a distance on the ground. Like many situations in arboriculture, cabling and bracing is an absolute team effort that will define what it means to perform as a cohesive unit in this specific mission of supplemental support.

The application of both art and science can be seen all throughout the wide field of arboriculture, but perhaps nowhere do these two spheres cross over more vibrantly than in the process of designing and installing a supplemental support system. This demanding process requires a vast knowledge of biomechanics and tree risk, a keen eye for inspection and planning, a huge vocabulary for communication and education, an athletic aptitude of climbing systems and technical rigging, leadership skills for the assembly a solid crew of other like minded arborists, a laser-like focus and calm for the ability to adapt and overcome to unforeseen situations on the run and while aloft, and a love for trees that will enable them to live and thrive long into the future. There is an old saying that goes something like, "wise is the person who plants a tree under whose shade they will never sit." But keen and industrious is the arborist who can install a supplemental support system in a tree under who's shade they have already sat, in the hopes that many future generations will also be able to enjoy that same cooling embrace.

'Skate block' Demo



pics courtesy of Wesspur

# AERIAL RESCUE CHALLENGE (ARC)

How competitions become essential training

by Thomas Schumacher

Aerial rescue is Dave Stice's passion. He has been practicing and training in the discipline for over 25 years. Several years ago Dave created Acensio Group, Wesspur's training arm. They offer courses in arboriculture, recreational climbing, rigging, aerial rescue, rope access and can also customize their offerings to individual client needs. Dave has been conceiving the idea of the Aerial Rescue Challenge for over a decade. Dave called upon his passion, experience and that of other industry leaders, with whom he's connected throughout his career, to put together an outstanding training experience for attendees. I attended, as a competitor. This is a description of my valued experience at ARC and an attempt to share some of what I learned. ARC 2019 was held in Alger, Washington on the first weekend after labor day. The upcoming 2020 event was planned to begin Friday, September 11 but in the current climate you would be wise to sign up for email updates at wesspur.com/arc in case rescheduling is required. The Aerial Rescue Challenge was advertised as a competition but it truly focused on training. It was accurately described as, "Aerial Rescue sharpened through the challenge of competition". The first day involved presentations by experts Ryan Murphy, Phil Kelley, Jeff Inman, Stephen Connally, John

Sheridan and William "Troll" McCook. The experts were specialized in fields of tree climbing, rope access, first aid and high angle rescue, however they all had some significant level of cross training between disciplines. More information on the Experts can be found on at wesspur.com/arc. Presentations focused on methods and theory needed to perform successfully in the upcoming rescue simulations. The rules of the competition required competitors to maintain backed-up systems while aloft. Maintaining backups is something that is required every day for rope access technicians but is only beginning to come into common practice on the cutting edge of tree climbing. The first challenge (pic above right) required competitors to complete a long re-anchor. The long re-anchor is not truly a rescue, rather, it is a controlled traverse more familiar to the rope access industry. Imagine a rope with two figure eights, each tied on a bight, sixty feet apart. Long tails of rope constitute each end. Each eight is anchored to the trunk of a separate tree. The trees, 1 and 2, are thirty feet apart, and the bights are anchored thirty feet up. If you are a visual learner like me, Youtube 'SPRAT long rebelay'. Due to using backup systems, a second rope was set up in the same fashion adjacent to the first.

After ascending to the anchor on tree 1, competitors were required to install a system for descent going down toward the low point of the rope between the two trees. Once set for descent, the ascent system was removed and re installed on the rope in the direction of the distant anchor in tree 2. By letting out on the descender competitors would drop away from tree 1 and by ascending they pulled themselves toward the anchor point in tree 2. Upon reaching tree 2, competitors removed their decent system from the rope and re installed it on the fall of rope coming down from tree 2. Once the descent system was in place on the fall, competitors could transfer out of the ascent system and descend to the base of tree two. As mentioned, competitors were required to remain backed up through the entirety of the challenge. Success in the challenge was judged based on time. Time began when the climber left the ground toward the anchor in tree 1, and stopped when they reached the ground at the base of tree 2. While preparing for the challenge, I decided to use systems that I was most comfortable with from tree climbing, rather than the ones that are more standard for rope access techs. I felt that even though the transfers could be made faster with the standard equipment, the time would be lost due to my incompetence.

A dropped piece of cordage may not seem like a big problem, but if I hadn't carried a backup system on my harness, I would have been stranded in the tree. Also, this could just as easily have been falling hardware (carabiner, micro pulley or rope wrench) more hazardous to ground personnel. More and more, I am appreciating the equipment tethering techniques employed by the rope access industry. In some ways I'm glad I dropped that hitch cord. It highlighted the inconvenience and preventable hazard of equipment dropped from height and forced me to overcome my resistance to trying something new. Now I can say I have some experience with a handled descender.

**PICKOFF** (AC17 front cover pic) Pickoff on ascent was the next challenge. In this scenario, the competitor had to access a stranded climber (patient) by climbing the patient's backup line while backing themselves up on the patient's primary line. Due to the patient, and their systems, obstructing competitors' ascent, it was necessary to leapfrog equipment past the patients systems. Ultimately competitors had to get above the patient to pick them off. By establishing a rated connection between competitor and patient, the competitor was able to use their own system for support of both them and the patient. It was necessary to lift the patient slightly to relieve the pressure from the ascenders



'Troll' demonstrates a pick-off. pic by Joshua Dallen

### ARBCLIMBER PICKOFF TIPS:

- **TALK TO YOUR CASUALTY.....FROM THE VERY START OF YOUR RESCUE EFFORT (from the ground) even if you are not sure they are conscious.**
- **TAKE A BREATH.** Before rushing blindly up the tree take 1 minute to consider whether there are any risks that caused the accident that could now affect you e.g. electricity cable, disturbed hornet nest, unstable branch ('hit-by' is a common cause of injury) or maybe even a running chainsaw. Also take this minute to double check what equipment you ACTUALLY have on you, don't just 'assume' because you had it at the start of your work day. In particular, do you have a first aid kit and a dedicated or make-shift rescue kit; pulley(s), sling(s), descender etc.
- **MAKE SAFE.** Immediately upon arrival at your casualty 1) Clip a sling from your descender connection to the casualty's harness (in rescue we use an adjustable sling like a mini anchor strap that you can shorten once they are transferred to you). This is because their own system may fail or an external influence could affect their safety (e.g. high winds) 2) Check breathing and stop any major haemorrhage with a trauma dressing and/or Combat Tourniquet – something EVERY arborist should carry on them at ALL times.
- **WAIT or RESCUE?** Is it better to treat in situ and wait for assistance from colleagues/rescue services or is the situation dire enough/simple enough to warrant a pick-off rescue? If you suspect a spinal injury DO NOT MOVE THEM. Await rescue assistance.
- **WEIGHT TRANSFER** from the casualty's own system to yours is the crux of a pick-off and may be easier said than done if you have a heavy worker on an ascent system. A descender can simply be activated until their weight comes onto your system and you can disconnect their equipment but an ascender needs to be de-weighted before you can release it. Pro rescuers carry a mini pulley system to achieve this and arborists may also have something like a Rock Exotica Aztek in their arsenal. But if not, improvise with a single pulley in a 2:1 configuration, two pulleys in a 3:1 (Z-rig) or try a simple counterbalance with a cord or sling running from your foot, up and through a carabiner and down to the casualty's harness. Push down with your leg to relieve the weight on the cam/hitch just enough to release their cam or hitch.

the patient was hanging so they could be removed allowing for decent. I found the pickoff on ascent to be very systematic. The task as a whole seemed hard to chew, but broken up into individual bite sized parts and it becomes easier to digest. It was just a matter of going through the steps. Each step on its own is rather simple. I did have trouble keeping track of all of the steps and their order, and required Troll to remind me at several points what to do next. Though I required some help, ultimately I was successful with the task and through practice I believe its a task I could master. Essentially the systematic steps for the pickoff on ascent that the experts presented to the competitors, was the rescue plan. Having a rescue plan outlining a clear order of operations to follow in case of emergency allows those involved to take care of some decision making before the emergency while they are thinking more clearly than they are able to in the heat of the moment. It can break a daunting, confusing and critical situation into more manageable series of choreographed steps making up a process. Thinking about it beforehand also gives us a chance to practice the steps and the process, so we can work toward mastery.

The rest of the challenges were sequenced in order to maintain the element of surprise, so competitors couldn't watch one another. They also involved human patients rather than rescue dummies which allowed for a more realistic experience. Competitors could verbally exchange information with the patients as part of their patient assessments. Megan Stoll and Jason Cecil did an outstanding job of acting out realistic scenes. Megan played a confused bird watcher, while Cecil played a one handed bandit.

The following paragraphs outline my experience rescuing Megan. Megan had apparently fallen out of her tree-stand while bird watching, and she was stranded in the tree. She expressed her worry that she was going to fall, as she was not securely attached to the tree. The rescue was relatively straightforward for me besides the head to toe assessment, as I was not practiced in performing patient assessments. I did, however, manage to effectively communicate with the paramedics on scene to find out how best to proceed with the assessment. More than anything the scenario emphasized the importance of communication. I will share some thoughts on our interaction that would have been helpful for me to consider prior to the rescue. Megan said that she had fallen out of her tree-stand while bird watching. She was suspiciously worried about whether I had come from the fish and game service, and she asked if I could see her gun anywhere on the ground saying she had dropped it. She also seemed quite sceptical about my ability to perform her rescue. Throughout the interaction it was clear that she was not thinking clearly. I became suspicious that she was actually a poacher, and not in fact a bird watcher. Of course this didn't matter for my purposes of trying to help Megan. In hindsight, I should have recognized different things from the interaction than I did. I should have realized that she didn't know who I was, my intentions or my qualifications. I should have

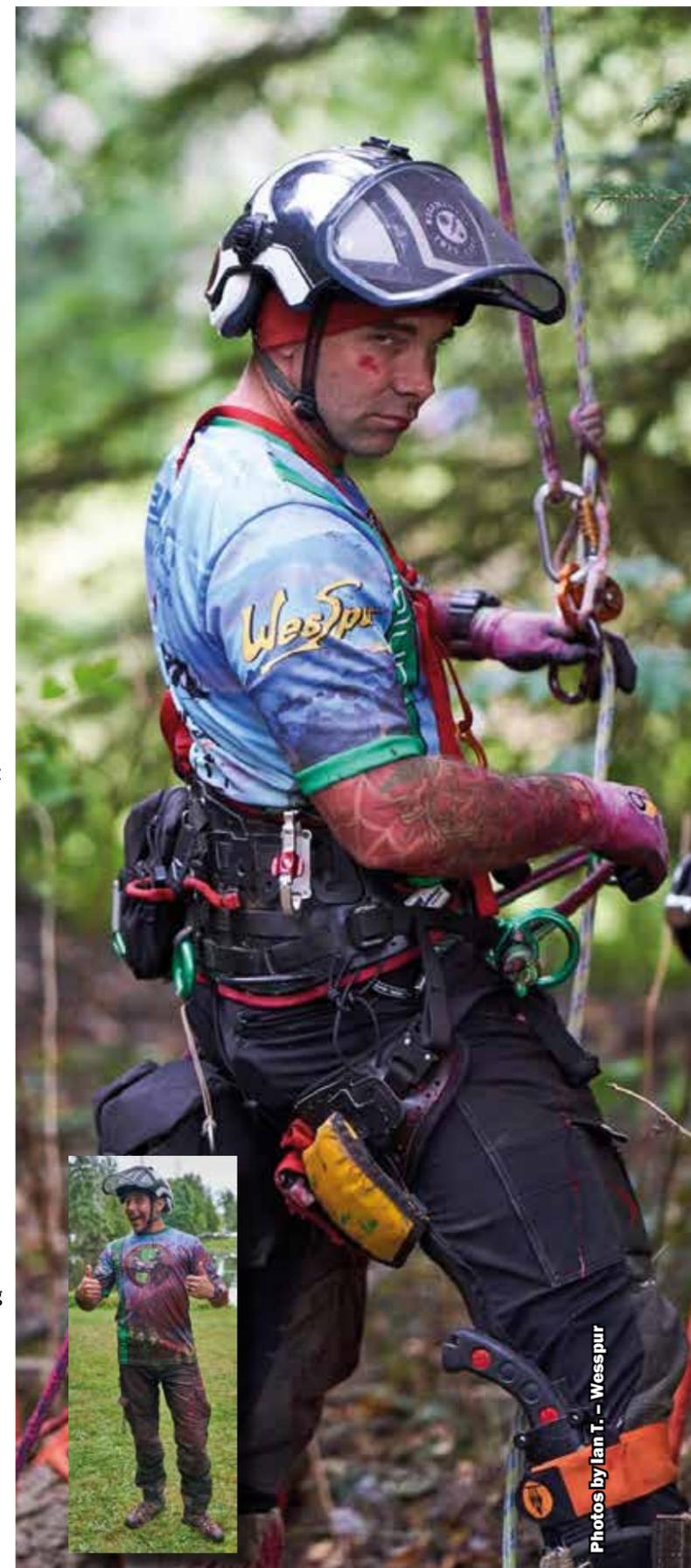


Photo by Michael Oxman - freedr.com

let her know who I was and that I was there to help. I could have mentioned something about my training in first aid, CPR and aerial rescue specifically involving trees. When she spoke about the gun she had dropped, even if I had done a thorough hazard assessment initially it might have been good to re-assess scene safety when there was reason to believe I missed something.

### SPAR RESCUE

The final (single) competitor challenge was a spar rescue. Cecil (pic right) was stranded at the top of a spar after cutting himself with a chainsaw while operating it with only one hand. Through the use of dish soap dyed with red food coloring and good acting, Cecil simulated the scenario very accurately. He had experience performing similar simulations in the military in order to prepare to better handle critical emergencies. Through an understanding of the human body's response to trauma, Cecil was able to act out a realistic response to a chainsaw wound to the arm. He simulated an arterial bleed, a likely result of contact with the business end of a chainsaw, by squirting the fake bright red blood from the wound. Unless a patient has a blocked airway or is not breathing, serious bleeding is of primary concern to the rescuer. [ED: in fact, if the bleed is serious enough it may trump airway as it does in the military] Therefore, competitors needed to access Cecil by spiking up the spar to apply a tourniquet as soon as was safely possible. Once the bleeding was under control, Cecil's situation became slightly less urgent. However, by that time, Cecil had been in the tree for a considerable duration. Suspension trauma was a concern, and he was also in shock after losing so much blood. Of course, it was still important to get Cecil down to the waiting paramedics in a timely fashion. I felt I did very well on this challenge, Cecil even commended me on how comfortable he was during decent. My short tether



Photos by Ian T. - Wesspur

length happened to be just right so that I was able to position myself behind Cecil, supporting his body with mine. Problem was, I could have become



a second victim. At least one other competitor became a second victim when he was caught with the patient's gaff. I failed to use proper PPE and work positioning to accomplish effective body substance isolation. I had required PPE for tree climbing, a helmet and eye protection, but in this case given the abundance of blood, I should have protected my hands with surgical gloves and face with surgical mask. In addition I should have taken care to avoid Cecil's falling blood when ascending. In reality, this exposure and lack of protection could have resulted in a pathogen having direct entry into my body.

Working with a human is different than working with a dummy, and they provide different opportunities for training. The use of human patients for the simulations at ARC is very unique. The typical competition aerial rescue involves a rescue dummy stranded in the tree playing the part of the patient as in the picture on this issue's front cover. As much as dummies are made to resemble humans, and training with them can be valuable, they are limited in their realism. Humans in rescue exercises can make for an especially realistic experience particularly when they skilfully act the role of a patient as Megan and Cecil did.

It was clear that Megan had fun playing the patient. She did a fantastic job staying in character and coming up with very clever responses to the rescuers' prompts. The verbal exchange allowed rescuers to gather the clues of the mystery as they would in a real emergency. Cecil created a scene that was so realistic that it affected rescuers in a way similar to that of a real emergency scene. It was truly a relief when he came out of character at the end of each rescue. Thanks to both of you for helping create very unique scenarios similar in their realism and excellence.

**MASTERS CHALLENGE**

Similar to typical tree climbing competitions, ARC featured a 'Masters Challenge' as the final event. Unlike the typical individual masters challenge, at ARC the masters was a team challenge. Twelve competitors were invited to participate as two teams of six. Each team of six would play the role of a high angle rescue team in an upcoming simulation. Each team knew a challenge awaited, but didn't know the details of the scenario until their time began.

Despite my many failures, I managed to score enough points through each preliminary challenge to qualify for the masters team challenge. After assembling the teams, each got some time to prepare before being thrown into action. My team was led by Mikolaj Miazio. In our limited time, he provided structure for our team by designating roles. Evan Sussman took charge of overseeing the patient assessment, handling and

first aid. Robert Bundy and Kyle Jacobs made up our climbing team. My position was belay assistant along with Dan Holiday the belay lead.

As each team arrived on scene, teams met first responders in need of assistance with the rescue of an unconscious climber stranded in a tree. The rescue teams needed to focus on accessing the patient and then assessing their condition. The rescue teams were not allowed to work in isolation, as the teams needed to work with the first responders to form and carry out a rescue plan. The patient couldn't be lowered straight down because of thick foliage below so a skate block was used to lower the patient down and away from the tree. Brandon Shields played the part of the patient in this scenario. Brandon did an excellent job of pretending to be unconscious. He endured a great amount of discomfort to remain in character as a limp body. By moving around some he was able to tolerate the simulations, but he was likely still experiencing the preliminary symptoms of suspension trauma by the time he was relieved. One of his primary complaints involved using a positioning lanyard over one shoulder to keep him upright. He became incredibly uncomfortable after a short time. In the future, using a lanyard or webbing sling in a way that supports both shoulders would likely be somewhat more tolerable. Dan and I set anchors at the base of trees, away from the tree the patient was stranded in, in preparation for use in the skate block system. It didn't take us very long to select anchor points and install lowering devices. The climb team consisting of Robert Bundy and Kyle Jacobs had many more tasks including, patient access, patient assessment, installing aerial rigging for the skate block and patient packaging. As a result, there was a time Dan and I didn't have a lot to do.

As a production arborist when there is nothing to do, my mind begins to race. I try to think about what I could be doing that I'm not. I think in some ways this is good, yet in other ways it's counterproductive. I sometimes find myself doing things because I could, not because I should. At times this tendency gives me tunnel vision. If I am constantly thinking about what I could be doing, I am not looking at the bigger picture of what the whole team should be doing.

I can't remember specifically what was said between Dan and me, and I'm not sure Dan consciously intended to have the effect on me that he did, but I was experiencing tunnel vision looking for things to be doing during our downtime. Dan seemed to recognize this in me. He was able to calm me down with a few words and calm demeanor getting me into a more effective head-space. In the future, I hope to be able to recognize when this is happening myself, so I can work to get myself back into, and maintain a calm, effective head-space. In the end our team performed most effectively and won the competition. In a complex scenario, with multiple teammates and tasks at hand, working cohesively as a team becomes critical. Cohesive teamwork requires effective leadership, especially when teammates are previously unknown to each other. Though our team won, I feel it comes with a caveat. We had significantly more time to prepare as a team. The opposition, consisting of Jose Villa, Joe Wurzel, Doug Tripp, Noel Rodriguez, Nick Markley and Cameron Lundin, had less than a



Photo by Michael Oxman - freedr.com

half hour to organize as a team before being thrust into action. Our team had well over an hour and our extra time was not wasted. Our team could not have been as successful as we were without the time we had to prepare, but also couldn't have been as successful if our time wouldn't have been managed as effectively as it was by Miko.

Through a very brief email interview, Miko shared his ideas with us.

"My first priority was to establish a structure and assign (but not impose) designated roles. After that I was trying to make sure people kind of stay in their lanes but in like an organic way. I wanted to empower people by just being there to guide them and coordinating the process. I also wanted us to be a cohesive unit which is why I asked we stay in formation because we were only as strong as our weakest link. The rest was just staying focused on the task and not getting fixated or carried away by one thing. -Mikolaj Miazio"

The competition was unique in its focus on patient centered rescue, with more emphasis, than has been typical in tree climbing competitions, put on patient care. The use of human patients in the simulations made for what seemed like a very real experience. The human patients and team event tested communication as much or more than climbing ability. The

event was also unique in bringing together previously largely independent industries of arboriculture, rope access and technical rescue. It is clear that we can learn many things from one another. It is true that some of what I learned seems to not be applicable or practical for my work with trees. However I do now have broader understanding and appreciation for rope access techniques beyond my arb bubble. In the future I expect the practical application of rope access techniques into tree work will continue to become more clear.

The last time I learned so much in one weekend was the first time I competed in a tree climbing competition. Both experiences pushed me far outside of my comfort zone in a safe environment. The training was quite hands on, great for me, as I often have trouble comprehending information without demonstration. The competition pushed and reinforced the training and provided more teachable moments and structure for constructive criticism.

Thanks to those who gave their time and energy to help write and edit this article. Thanks to the sponsors and all the dedicated volunteers who put their time into making ARC 2019 such a success, it would not have been what it was without you all. Special thanks to Dave, Cecil, Megan, Brandon and the instructors for helping teach me lessons I hope to be able to utilize and pass on.

# WEATHERING A NOR'EASTER

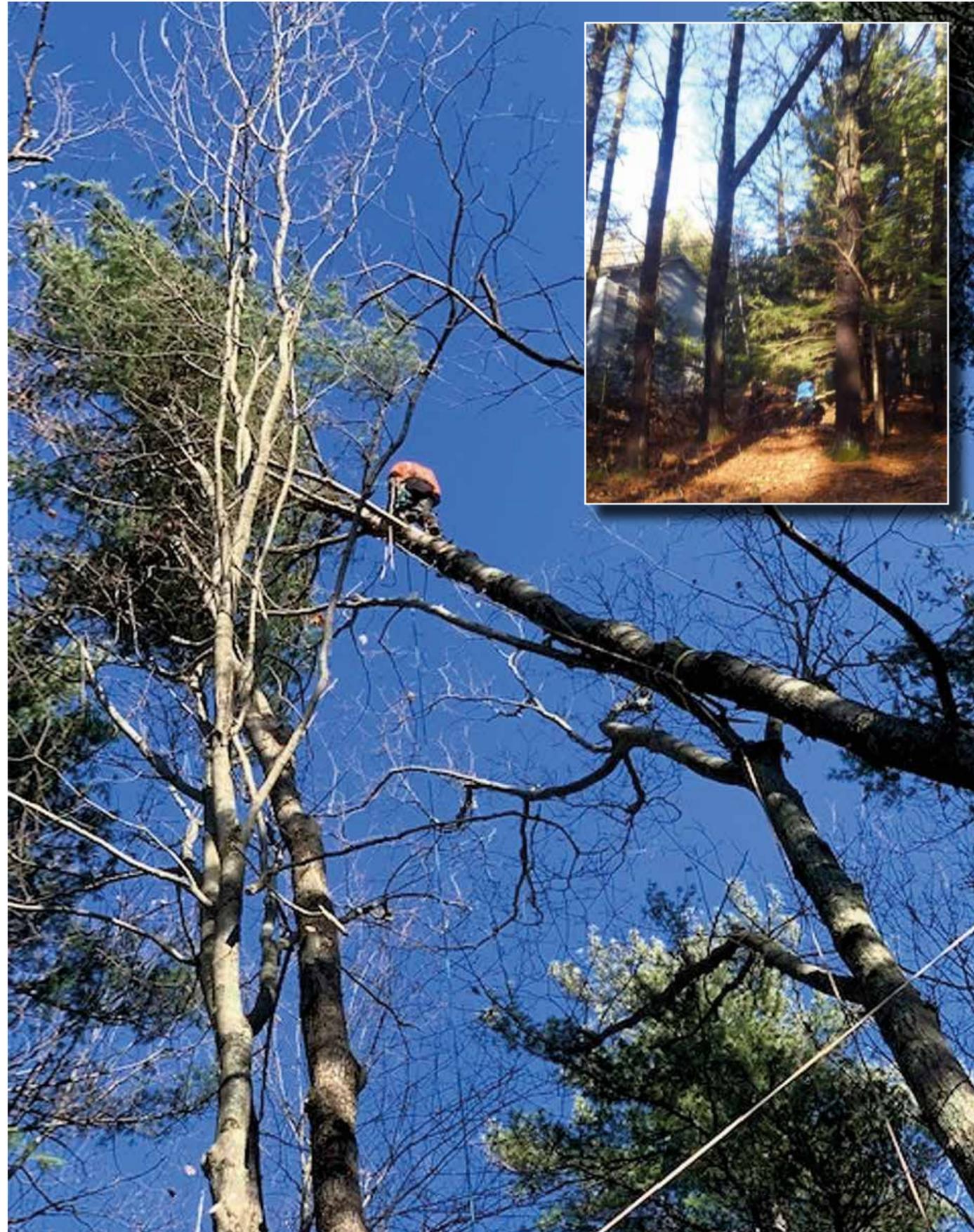
by **Chris Girard**

Chris Girard CTSP is an ISA Certified Arborist  
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**T**ree workers all along the eastern seaboard for years to come, will always remember the October 2019 nor'easter storm. Dubbed a "Bomb cyclone", it set records as the strongest October storm ever in the Boston area and plunged hundreds of thousands of people into the dark, toppling trees and wreaking havoc in numerous states all across New England. For those of you who may have heard the term nor'easter but don't know what it means, consider yourselves lucky. It is a storm (usually between the months of November and March) which travels northward up along the East Coast of North America and brings high winds that can reach hurricane forces of up to 90 mph, along with rain or snow that can cause flooding, blizzard and whiteout conditions. All in all, a really nasty piece of Mother Nature!

This October storm hadn't even finished churning its way up the states, before the phones started ringing with calls of trees down on houses, across driveways and hung up in other trees. Contrary to what most people think, professional tree workers do not always look forward to storm work (at least the ones that I know). We are not all storm chasers, looking to make a fast buck off of other's misfortune. In fact, we know that storm work brings some of the most hazardous conditions to work in, due to the wreckage that is left behind and what is involved in the cleanup process. *[ED: Sprung tension, counterbalanced root-plates, hangers and leaners are all potential arborist killers]*

I received a phone call from one of our long-time customers who lives near us in the Lakes Region of New Hampshire. His chalet style house sits at the base of Gunstock Mountain, which is a heavily wooded ski resort area, and regularly sees high winds, even when you don't have a nor'easter pounding the slopes overhead. A codominant Eastern White Pine tree (*Pinus strobus*), 26" DBH (diameter at breast height) had partially sheared off at about 25' up the stem and lodged itself in an adjacent Red Oak (*Quercus rubra*) and Sugar Maple (*Acer saccharum*). (see inset pic overleaf). It was still precariously attached (at around a 45-degree angle), without a lot of fibrous, structural strength holding it. My first thought was, "Boy, I don't want to have to climb and rig this tree out from itself." There were power, cable and telephone lines running perpendicular and parallel to the tree, so there was no way to just fell it into the woods and I know from past experience that the utility services in this area were not going to give us a line drop to do the work.



So, we started looking around and seeing if we could get a crane into the site. The problem though was that the tree was located down a very steep, wooded slope with numerous large second growth White Pines surrounding it and the only access in, was from a side road, which is not really wide enough for a crane to pass through. Also, the distance out from where a crane would have to setup, was too far and would have necessitated getting such a large crane, that it just wouldn't have been practical for this job.

I decided that our best course of action was going to be to mitigate the hazards as much as possible and come up with a viable work/rigging plan to safely get the hung-up portion of the tree down. I didn't want to just hope that the tree could be climbed safely, because hope alone is always a very poor Tree Risk Assessment tool to use. So, I began by doing a full evaluation of the tree using TCIA's Best Practices for RIGGING in Arboriculture manual. Then, after walking around the site completely and getting a good idea about the site conditions such as targets and hazards, I went back to the shop to start taking inventory of our climbing and rigging gear and coming up with a viable job plan/work order.

The job was scheduled for the following week and the weather promised to be fair and sunny. My crew was assembled, and my plan was sound and reliable (or so I hoped). On highly technical jobs like this, I don't always get a good night's sleep the night before the "action" is going to take place. Not because, I am nervous about having a catastrophic accident happen, but more about wondering if I have left out a crucial piece of gear or a part of the job plan that will affect us being able to safely do the work? So, I usually end up taking the tree down at least a dozen times in my head before and as I fall asleep, going over each step of the work plan. At least by doing this, I know that I have thought through everything in order to be as fully prepared as we can be for what we may encounter.

The next day arrived with beautiful fall weather as forecasted and everyone had their "game face on" for the work ahead. We arrived on sight and began by laying out two blue polyester tarps and organizing all the planned rigging gear. (pic op-right). Knowing that this was going to be one of our more rigging intensive jobs, we brought nearly every piece of gear that we owned,



plus some new stuff that we knew was going to be required. After that, I held a job safety meeting to go over the JSA (Job Safety Analysis) plan and what was expected of everyone. I can't begin to stress how important a JSA is on jobs like this, as everyone has to know what the other person's responsibility is going to be, before, during and after each step of the job. After that, we were ready to begin work.

My first step was going to be to climb up to the split co-dom and secure the fractured area with my trusty 2" heavy duty ratchet tie-down straps with double J hooks and 10,000 lb. breaking strength (yellow web). Unfortunately, I didn't like the looks of any of the trees adjacent to the damaged one, so I wasn't able to set a backup line up into any of them. I was also apprehensive about climbing up directly underneath the hanging section knowing that it could rip out, so I climbed of the back section of the tree, gingerly flipping my steel-core lanyard up every few steps and watching and listening to the "feel" of the tree. I also had one of my ground workers watching for any movement at all in the hung-up section, ready to notify me if something moved.

When I reached the co-dom split, I quickly threw my climb line (which consisted of my Zag-Wrench and 11mm Yale KernMaster line) above the critical section and then did the same with my lanyard and ascended slightly above to where I then had a comfortable work position. Just being above that split felt a whole lot better! I secured 3 load binder straps, again watching for any movement in the stems. (Pic Below)



After that, I began to climb higher to a spot where I installed the first DWT (Double Whip Tackle). Using a medium and large Hobbs Block (still the industry Gold Standard for arborist blocks in my opinion) along with a 5/8" Samson double-braid rigging line, (pic right)



snap the Pine that we were using as our gin pole, but again to secure and stabilize the tree as needed.

As we were tightening, I noticed the stem of our gin pole start to flex and move, so I immediately had the crew ease off on the tension. I decided right there to install a back guy at the second DWT to reinforce the point where

I ran this down to an X-Ring redirect at the base of the tree and over to our first lowering device, which was our GRCS (Good Rigging Control Device). The reason for the redirects at the base of the tree, was due to the fact that I did not want to have any of my ground workers have to be in close proximity to the base of the tree, knowing that there was a whale sized piece of wood hanging above their heads.

At this point, my objective was to secure and stabilize the tree to a point safe enough to where we could then begin the real work, which was to rig out the hanging co-dom. Moving up approx. another 20', I installed the second DWT to the stems, using another large Hobbs Block and the mammoth DMM Impact Block. Using a 3/4" Samson double braid rigging line, I again ran this down to a redirect at the base of the tree and the ground crew ran it over to our second lowering device which was my modified Hobbs Lowering Device (H2). (see photo 5) We then proceeded to tighten up both DWT systems and watch the tree carefully. My goal was not and try to lift the tree out of the other trees, as I knew that the weight and strain would

the strain from the bending moment was at its greatest. Calling up for a 1/2" double braid rigging line, I secured it to the stem and ran it to the base of a large Pine directly in back of the tree I was working in. The ground crew tightened the line using a Maasdam 3/4 ton rope puller. Once again taking up on the DWT's, I saw that we now were keeping the gin pole steady.

One thing that I would like to mention when using many different pieces of rigging gear and lines on a tree job such as this one, is to be sure that your equipment is compatible with each other. Many years ago, my friend and mentor Don Blair wrote about THE ABC'S OF RIGGING and a system's approach to designing your work plan in his wonderful book **Rigging for Removal**. In it, he describes how a system's approach to rigging means thinking of every component as part of an overall system. Don further states, that your rigging system, just like a chain, is only as good as its weakest link. I highly recommend this book to anyone who would like to learn further about the ABC'S OF RIGGING design systems.



The last thing that I needed to do in order to fully stabilize the tree was to install two side tension lines on the hung-up stem at the upper DWT. I had visions of removing the last contact point from the Pine in the adjacent trees and having the stem take a violent swing either left or right, taking out power lines, the side of the house or worst-case scenario my ground crew! So, in order to prevent this, I secured two 1/2" double braid rigging lines and had the ground workers use two Port-A-Wraps setup on adjacent side trees. (see pic below). They tensioned the side guy lines up using a Sterling Pocket Hauler kit (pic left). This mini fiddle block setup cots around \$250 and is a great mechanical advantage system that allows workers to increase their pulling strength to 5:1 and really is perfect when extra power is needed. [ED: Sterling's AZTEK Elite is their lighter and stronger option at 6250 lb MBS but costs a bit more at >\$400.]



At this point, we were finally ready to actually begin the removal portion of the job. So far, everything was going smoothly and according to plan. There wasn't any rushing around, for as the mantra in SAR (Search and Rescue) goes, "you have to go slow in order to go fast." I descended out of Pine and prepared to climb the Maple tree, to set up rigging and begin cutting. I ascended the Maple using another climbing system, which consisted of the Petzl Zigzag & Chicane combo along with an 11.7 mm Yale Blue Moon climbing line. I really like this setup, as it allows me to quickly move from an SRT/SRS climbing system to a DdRT/MRS system as needed. When I reached the top of the tree, I immediately realized that I had an unforeseen problem ahead of me. My initial work plan called for me to stay tied into the Maple that the Pine was lodged in and safely work out of it, but upon further inspection, I saw that the Pine shot up and out another 20'-25' beyond the top of the Maple tree. This had not been discernable from the ground and it meant that I was



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going to have to be tied in initially to the suspended Pine stem, (see pic on page 62) at least until I was able to rig it down to the contact points, at which time I would be able to transfer safely back into the friendly arms of the Maple tree.

Well, realizing that I did not have any other options, I transferred onto the Pine stem. Before doing that though, I set an ISC Rigging Block and ½" lowering line in the Maple to use as a redirect down to the base of the tree, where we had our fifth and final lowering device set up, which in this case was a large Port-A-Wrap. We would be negative rigging everything down until we were clear of the power lines and Maple tree, at which point that we could slowly lower the stem down using the GRCS and H2 off of the DWT's.

Back on the Pine stem, I looked around at the "attitude of the work" to decide what I was going to need for rigging gear. I first heard the term "attitude of the work" from another one of my mentors, Jerry Beranek back in 1996 in his classic book *The Fundamentals of General Tree Work*. This is "The Book" on tree work and is a must read for both beginner and experienced climbers alike. The work attitude refers to the angle at which the piece of wood that is being removed is orientated (vertical, horizontal, or leaning). From this, you can decide what gear and technique you will need to make the wood behave the way that you want it to, in order to safely accomplish the work. In the case of the Pine stem that I was working on, I needed to use the Fishing Pole Technique, loading the stem into compression to get it down to the contact points in the Maple. This was accomplished using a couple of my original X-Ring slings, which I received from the X Man himself, David Driver years ago to test out and since the first time that I've used them, they have been my go gear for redirects. These slings really have opened up a lot of rigging options for our industry and we owe David a debt of gratitude for introducing them to us. The top of the Pine was stuck fast up in the Maple and I knew that pieces of wood and brush were going to get hung up as well, as we lowered them. So, we used a tag line of each piece to yard them through the Maple after I had cut them. Removing the top and brush down to the remaining contact points was straight



forward and went as planned, without any movement on the Pine stem. When I had the tree brushed out down to the last three contact points, I transferred back into the Maple in order to cut the rest of the branch stubs holding the approx. 5,000lb. Pine stem. As I cut the first two points (which popped like 4th of July fireworks), I notice the stem shutter a little bit each time and knew that we were still supporting a lot of weight in the rigging lines.

I had the ground crew tighten up one last time on the DWT's and then proceeded to "trip" the last contact point. The instant I put the chainsaw into the underside of the Pine stub, it popped with another bang and I watched as the Pine dropped down further into the rigging about a foot or so and then settled completely. Breathing a sigh of relief, we now had the broken Pine stem completely in control and supported 100 percent by our rigging. We still had a few more pieces to rig down, but soon had the tree down to our highest DWT and I could descend out of the Maple tree and help the ground crew lower the remaining portion of the stem to the ground. (Pic left).

I went up one more time into the Pine tree that we were using as a gin pole and removed the load binder straps, as they were going to get in the way of us being able to lower out the Pine stem. Then with each one of the crew on the four separate lowering devices, I guided then as we gently eased off the rigging lines and lowered the piece smoothly to the ground, watching it tear out as we were lowering but still in complete control. By this time, it was 3:00 in the afternoon and we had just enough time to buck up the stem on the ground, clean up the rigging and call it a day. We would be back another day to remove our gin pile tree, which though still compromised from the co-dom tear out, I did not consider an immediate concern.

All in all, the job went smoothly and according to the JSA, with minor changes as the job progressed. My ground crew as usual did an incredible job and made my day a whole lot easier. I really enjoy jobs like this, because I look at it as a chance to expand my knowledge. I try to remember, that if I find I have a lack of knowledge in a particular area, it is not a hindrance, it's an opportunity to learn more and I try to use that opportunity to become a safer and more efficient arborist. So, for now, we'll just have to wait and see what Mother Nature throws our way and if I know New England weather, we probably won't have to wait long!

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PETZL

# SEQUOIA SRT

By Adam Jones

## SIT HARNESS

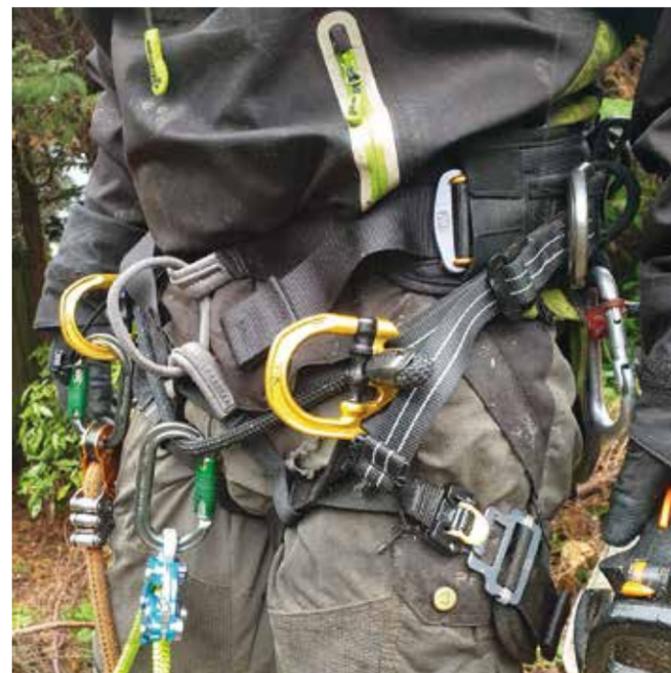


[ED: It may seem like we have an endless string of Petzl reviews but that's because we had a lot of kit to get through. We usually request specific items for review that we already figure are going to be pretty good but in Petzl's case they brought out quite a lot of new stuff for 2019 that we're only now getting to the end of! As usual we've stolen some of Petzl's images because there's no point reinventing the wheel and doing our own studio shots, see if you can discern their shots from ours ].

Climbing harnesses have come on a long way since Jeanne Immink conceived the idea back in the 19th century. The evolution of what we are familiar with today began in the 60's and 70's and Petzl produced its first vertical safety harness in 1977. Now with hundreds of thousands spent on research and development, we, as climbers are able to access highly refined products with technique-specific features.

Petzl released the *Sequoia SRT* in 2019, along with the latest version of the regular *Sequoia*, the fundamental differences of the SRT being a belay loop attached to the waist belt/leg loops with a resultant slight increase in product weight of about 100g/ 3.5oz. The regular version has a quite sophisticated double-release buckle on the waist while the *SRT* has a double back buckle on each end and therefore never entirely releases the waist which need to be stepped through for donning. Although it's called the *SRT* and costs slightly more than the standard version, you will have a wider range of options because it does both SRS/SRT/DRT and MRS/DdRT, arguably the better choice for the more diverse climber and those likely to evolve their techniques? Nice to see they're maintaining the SRT name in the face of the SRS usurper terminology!

The *Sequoia SRT* is designed for the tree care industry with a 'belay' loop on the front attached to the legloop risers. Ironically, in the rope access/rescue world this configuration is specifically NOT intended for SRT because it orientates regular access and rescue desenders by 90 degrees presenting them sideways to the user instead of face-on. Tree devices by contrast are mostly either swiveled or present correctly with a 90 degree offset. As always with the manoeuvring requirements of arborists, the *Sequoia* has scope to be finely adjusted while providing the capability to transport plenty of gear without compromising access to your key climbing hardware on the front or chainsaws and tools on the sides. Available in three sizes off the shelf, the end user can then tweak the set up to best match and balance their physique and comfort while also accommodating their preferred climbing technique and



settings. This includes adjusting bridge length and/or the addition of a second bridge, potentially of adjustable length. To don your *Sequoia SRT*, step through the waist belt and leg loops (which can be fully opened or slackened off) and lift into position. Adjustment begins with the waist strap, this is done bi-laterally (both sides), by pulling the waist strap tabs forward and together through the *Doubleback Plus* self-locking buckles. This adjustment will be required every time you don the harness which is something we've been used to in rescue for decades but not so much in our arb harnesses which more generally open completely and adjust on just one side. All other adjustments like leg loops and risers will be made only on initial set up then as and when required depending on how many donuts you're eating for lunch and whether that extra weight goes straight to your thighs. Once you've tightened the waist, frequently made easier with an alternate swing of the hips towards the direction of each buckle as you tighten it, secure the leg loops and you're ready to connect gear and get off the ground. How you do this will vary depending on your choice of system but what will be likely is the need to tweak the fitting a little more for optimum comfort. The bridge height adjustment is managed with double-back self-locking buckles, getting this set up well will ensure that your position when in suspension is



### SPECIFICATIONS

MODEL:	SEQUOIA SRT	SEQUOIA
WEIGHT:	1.48-1.8kg / 3.25-4lb	1.48-1.6kg / 3.25-3.5lb
WAIST SIZES:	0=65-80cm 1=70-93cm	2=83-120cm
	0=25.6-31.5" 1= 27.6-36.6"	2=32.7-47.2"
COST (inc tax):	£305 / \$470 / €374	£281 / \$439 / €345
WLL:	150kg / 330lb	
WEB:	www.petzl.com	

correctly orientated for both comfort and functionality. The leg loops can be adjusted, both at the rear for how high the loop sits on your thigh (these have a shock absorbing elasticated component), and the diameter in order to best fit the circumference of your thighs. Once this is set, it can be left in the required size with donning and doffing achieved by undoing the *Fast LT Plus* auto locking buckles. Pics below.

Ventral attachment to your working system can either be made via the belay loop, by the bridge(s) or by the side (pole) strop/ strap 'D' ring attachment points which are ideal for the Petzl *MicroFlip*. Multiple simultaneous attachment is becoming more relevant in certain regions/countries with the introduction a mandated second system for redundancy when working aloft. As with any harness which centres around a ventral attachment point, it is important to remember that this is not suitable for fall arrest and there is a greater risk of wearer inversion in particularly strenuous manoeuvres particularly with a heavy item like a chainsaw.



The bridge attachment points are an amazingly refined set up with the truly unique, multi-faceted side-D's doubling as an openable 'trap' for one or two bridges with their custom sewn and protected terminations. The D-rings are also attached to a second set of risers on the leg loops (the first set being to the belay loop). The black, cricket bats-looking gate (US Readers resort to Google) is opened via removal of an *Allen* key headed bolt. It is vital to check that these are correctly seated as part of your daily and/or pre-use check routine. Access to the bridge allows for accessories like a swivel to be added provided their eyes are large enough to pass the sewn termination through.

As always, the overall construction is very slick with highly refined and engineered components and webbing. It's part of why you pay a little more a Petzl *Sequoia*. The extra wide waist-belt is lined with medium density foam padding which holds its shape well and where comfort is well considered factor with the now common fold-lines allowing the thermo-moulded foam to bend with the shape of your leg and waist without bunching up. These attributes are fully appreciated after working aloft for a number of hours. The

# GEAR REVIEW

textile components of the harness are primarily polyester webbing and noticeably substantial – no flimsy car seatbelt webbing here. All of the buckles are steel and the hardpoint attachments are aluminium alloy. The latter are very nicely forged to provide intricate features in the case of the bridge D's already mentioned and reinforced strength on the side D-rings where weight is reduced without compromising strength by pushing material only to the high wear and high load surfaces – a modified 'H' cross section.

Inevitably there comes a point when you can't ignore the filth and strange smell any longer and you need to clean the harness thoroughly. Petzl advocate the use of mild detergent and a water temperature not exceeding 30°. We have long advocated that putting the harness into the washing machine is acceptable if it is placed inside a mesh bag and a low temperature and non-detergent soap is used AFTER the drum has completed a clean water cycle to clear out any residual chemicals. Local protocols may vary especially if survival rates for other climbers who try in someone's precious washing machine are low. Following washing, allow to air dry out of direct sun.

Surrounding the waist belt are multiple attachment points, with both ambiguous and designed purposes, and varying load limits. There are nine substantial cord gear loops of differing sizes, each with a 10kg capacity. Five waist-belt strap sewn openings for Caritools or similar – these have a 15kg load bearing capacity but this is obviously also dictated by whatever hook you connect in. There are also three sewn webbing loops, each good for 10kg. Finally there is a toggled, elasticated cord dead-centre of the back of the harness for your VERY important first aid kit which, as we often point out in **ARBCLIMBER** should include a combat trauma dressing and a CAT (tourniquet). This means that theoretically the potential to load up with 195kg of kit is possible! Back in the real world, the harness is actually rated to a maximum of 150kg, *including* the user and all kit because the harpoint attachment to your main rope(s) is the limiting factor during operational use, so don't load up with everything! Use the storage wisely and organise your gear well. If you do carry a significant amount of gear when working, then

the addition of shoulder straps which connect to the ventral attachment point and the two rear slots on the waist-belt will transfer the load from the waist-belt to the shoulders, improving comfort. There are also connection points for a stiffened seat, should



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you find the need for additional support when suspended for extended periods.

The biggest issue when using a new and unfamiliar harness is learning your way around it. It is always surprising how much muscle memory becomes an integral part of your working routine and retraining your body to adapt to the new layout can take time. It is important not to let this influence your initial opinion, the differences may

well prove to be significant improvements on what you thought you were happy with previously. It will be only a matter of time before your familiarity develops and you no longer fumble your way around the storage. I have the shoulder straps but rarely use them. I generally don't drag that much kit around with me when climbing and my acrobatics don't push into possible inversion which a chest harnesses can mitigate (but pure shoulder strap, bandolier-style tool-carriers exacerbate!).



As for the harness, and notwithstanding the need to re-educate myself away from my trusty Treemotion, it has been all good. I found the many gear loops provide excellent scope for dividing gear and/or keeping it safely out of the way until needed. This is not surprising given the degree of user-input that Petzl had at the outset of the redesign. They would have known exactly which key harness models they were going up against and what could be done better or at least as well as. The multiple and relatively highly load rated connection options permit good customisation when setting up for carrying your saw, should you find the intended attachment points don't quite meet your need. The belay loop is a great second connection point if you don't have a second bridge installed. The bridge has always been what sets arborist harnesses apart from access/rescue harnesses but here we have the best of both worlds with the ability to use the multitude of new descender and ascender systems as well as traditional bridge-'sliding'. Petzls adjustable bridge is very neat, it inspires confidence and is low-bulk compared to a knot termination. It still allows for significant variation in work position and separation of climbing systems if you're moving towards twin-rope working.

This was never going to be a 'bad' harness, just a question of subjectivity in relation to features and layout but it's good to know that we can recommend this latest version of the iconic Sequoia safe in the knowledge that it won't let you down in any of the vital criterion: durability, adjustability, versatility, functionality and comfortability. The one 'ility' we didn't include (or make up) is affordability, as that's more personal but at £310/\$470/€375 it compares very favourably with Treemotion Evo's £399/\$600/€530 and even Notch's Sentinel at £360/\$400/€420. What's not to like?



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# TWO-ROPE WORKING

By **Simon Ricmond**

[ED: this is an issue that strikes fear and loathing into the heart of many an arborist but it's not going away. This notice is from the Arb Association in the UK but is affecting most European countries where, initially at least, you'll need to take notice that two ropes are going to become the norm and much sooner than you think. North America is certainly looking at this too and may not mandate this in the same way as Europe. But it might! We had to contend with this two-ropes issue in rope rescue where we argued for decades that certain first response situations requiring you to reach the casualty very quickly did not lend themselves AT ALL to double rope working. This dispensation will almost certainly still apply for aerial rescues. In fact, I can tell you that if a colleague has an accident in a tree and the tree is safe to climb or access then just get to him or her the quickest way you can which will virtually never be via two ropes. Luckily, common sense looks like it will win out on emergency situations in the same way that you'll never see a Special Forces external building breach conducted on twin rope systems! In fact, if they've done their Ninja bit properly you should never see them at all!

Other than emergencies, arborism is a work situation so arborists are unlikely to be able to claim dispensation any more than the entire rope access industry which has been legislated to use two rope systems since the latter quarter of the last century. Arborists would argue that their roving requirements within a tree are more difficult to access than a simple top-to-bottom rope access job on a building or structure. But many, if not most arborists have been using double systems for years in some form; generally within specific problem areas of the canopy to improve speed, access and manoeuvrability rather than from start to finish of the job as a safety requirement. And it's a whole different matter to be TOLD you have to do it rather than electing to do it as a technical choice or personal preference! This involves extra equipment and extra time and therefore extra money, none of which is available in abundance to smaller arb companies in particular. However, commercial concerns won't save you from HSE/OSHA prosecution once these things become standard legislation. It's rarely prudent to argue with life-safety measures on the grounds of tradition but we feel your pain.]



Following the announcement in [Autumn/Fall 2019] that the HSE is now requiring full compliance with the Work at Height Regulations in relation to tree climbing operations, there has been much discussion and debate.

The relevant section of the Regulations is Schedule 5, which addresses requirements for personal fall protection systems. See [www.legislation.gov.uk/ukxi/2005/735/schedule/5](http://www.legislation.gov.uk/ukxi/2005/735/schedule/5). The HSE has observed that some aspects of these requirements have been largely ignored by many climbing arborists, and that current training and assessment standards do not adequately address these issues.

The HSE has provided details of reported fall from height accidents for a one-year period, which can be viewed on the AA's website: [www.trees.org.uk/2ropes-incidents](http://www.trees.org.uk/2ropes-incidents). The background to this wider issue can be viewed here: [www.trees.org.uk/2ropes](http://www.trees.org.uk/2ropes)

The Association has been in discussion with many other organisations, businesses and individuals over the past few months to ensure that, as a sector, we are taking a proportionate and practical position in response to this development in HSE policy.

One of the most urgent concerns of many people is that HSE is reminding us that as these Regulations are current (and have been in force since 2005), all operators should be compliant immediately. While the HSE does not intend to focus particularly on our industry in terms of its inspectors' activity, it has stated that in any investigation following an incident involving tree climbing, it would expect employers and the self-

employed to be compliant with the Regulations. This creates a period of insecurity for our sector, as we do not yet have detailed industry guidance in place to help practitioners accurately interpret the requirements in order to be compliant and to make informed practical decisions in planning and carrying out their daily work.

Working with our colleagues and other stakeholders we have developed a timetable for introducing the required guidance. Implementing changes to tree climbing guidance: use of two climbing lines.

## OBJECTIVE

**1 Devise and agree basic, principal guidelines for climbing using two lines – to be disseminated to training instructors and the wider industry.**

Completed by November 2019

**2 Revise and update the Industry Code of Practice for Arboriculture – Tree Work at Height (ICoP) – Principal guidelines for the 'Responsible person' and 'Competent person'.**

Completed by January 2020

**3 Revise existing draft of the forthcoming AA Technical Guide: Tree Climbing and Aerial Rescue (TG1) – Including detailed, practical guidance on the implementation of the use of two lines.**

Completed by March 2020 [ED: Prior to Covid 19! add a few months to what were projections even before the global C19 shutdown]

**4 Integration of TG1 guidance into national training content.**

Completed by Spring 2020 [Delayed by C19]

**5 Integration of TG1 guidance into national assessment standards.**

Completed by Spring 2020 [Delayed by C19]

The work on revision of the ICoP is progressing well and the HSE has agreed that the following hierarchical approach should form the basis of planning tree climbing work at height:

These principles will apply to all tree climbing operations and offer a planned approach, subject to any detailed decision making if points 1 or 2 are not possible. It is anticipated that situations where the use of a single fall protection system is compliant will be rare and of short duration. At this stage the emphasis is on all fall protection systems, regardless of whether they incorporate doubled/moving rope technique (MRT) or stationary rope technique (SRT) or a combination of the two.

## BASIC PRACTICAL GUIDANCE

At a 2019 meeting of Lantra Awards Aerial Tree Work Verifiers, a basic set of practical guidance was agreed which has been disseminated to registered instructors to provide initial direction for training that is being delivered currently. There will be further workshop sessions for instructors, but it is recognised that until the full and comprehensive guidance is published in the forthcoming AA Technical Guide, there remains a gap in detailed provision.

### Hierarchy of approach for use of two lines

**1** Two personal fall protection systems installed over independent load-bearing anchors must be the preferred method of working at all times.

**2** If point 1 is not achievable then two fall protection systems should be installed over a single load-bearing anchor point.

**3** If, as a result of a risk assessment, it is determined that it is not reasonably practicable, or would entail higher risk to persons,\* to achieve points 1 or 2, then one system installed over one load-bearing anchor may be used.

**NB.** If point 3 is to be adopted, all measures must be taken to ensure that the anchor point and personal fall protection system cannot fail.

\* Depending on the system employed. **Note:** An operator adopting point 3 on the principle of 'reasonably practicable' must be able to show that the effort or resource to adopt point 1 or 2 would be grossly disproportionate to the benefits of risk reduction that would be achieved. Thus, the decision-making process is not one of simply balancing the costs and benefits of measures but, rather, of always adopting the measures except where they are ruled out because they involve grossly disproportionate sacrifices.

## ACCESS

1. Rope Advance System  
Have 3 viable systems prior to leaving the ground (2 climbing lines, 1 lanyard). Install systems 1 & 2 (2 climbing lines) from ground. Test each system. Ascend to first anchor. Maintain 2 climbing systems at all times. Repeat to final anchor point.  
2. Throw Line  
Install 2 separate climbing systems and if possible do so on independent anchors. Test systems independently. Ascend.

## WORKING IN THE TREE

Select 2 separate load-bearing anchors where possible and install 2 separate climbing systems. Test systems independently. Work using 2 independent climbing systems.

## DESCENT

Both primary and secondary working systems should be long enough to descend to the ground.

## RESCUE

A single line system may be acceptable in a rescue situation.

## FAQs

**Q: What happens in aerial rescue situations when 2-rope makes rescue more difficult?**

**A:** It is acceptable to perform aerial rescue from one personal fall protection system.

**Q: Will there be a list of scenarios where 2 rope exemptions could apply? E.g. if you are able to rule it out categorically in risk assessment**

**A:** It is unlikely industry guidance will be able to provide specific scenarios, due to the variation of canopy structures within which arborists work. Guidance will be written to inform operators as to the factors they must consider prior to single line working.

**Q: I think HSE's interpretation of the law is wrong. Why can't we lobby them to change the law?**

*A: As part of the process of working with the HSE over the last six months, the AA have continually questioned their (HSE) interpretation and will continue to do so where relevant.*

**Q: To what extent will contractors be held accountable in the period until training and full detailed guidance has been made available?**

*A: HSE have stated that the Regulations apply now, and therefore employers and the self-employed should be complying with them.*

**Q: What face-to-face training and other resources will be available?**

*A: Resources are to include: Revised Industry Code of Practice (ICoP: Tree Work at Height); Technical Guide 1: Tree climbing and aerial rescue; Lantra Awards have adjusted their tree climbing training, which also includes their refresher provision; The AA intend to run update/information seminars or workshops later in 2020 [depending on the situation with C19].*

**Q: Will a draft of the updated guidance be made available to have a look at prior to it being finalised?**

*A: Yes, an industry consultation on the Technical Guide will be held once the draft is ready.*

**Q: Is the Arb Association going to support contractors / advise industry that work will take longer on 2 ropes and costs will be higher and there will be additional training costs to get everyone up to date?**

*A: It is acknowledged that this change may mean that work takes longer and this in turn may result in higher costs for compliant contractors. The AA will support the industry in promoting the higher professionalism that this brings.*

**Q: Will reasons for briefly not using 2 rope system be required to be written on risk assessment or will verbal risk assess be ok?**

*A: In accordance with current legislation, where the employer employs five or more employees, the significant findings of the risk assessment must be recorded. It would therefore be anticipated that common factor or generic risk assessment may identify the circumstances when a single personal fall protection may be used.*

**Q: Why is the Arb Association implementing this?**

*A: This change in practical guidance and support from the Arb Association has come as a direct result the HSE's insistence that the industry has not been fully compliant with the Work at Height (WaH) Regulations to date.*

**Q: Why, if we have always used a 1 rope system, is this now not considered safe?**

*A: The view of the HSE is that, given the number of falls from height in our sector (of climbing arborists), our current guidance and the standards we have been working to can be improved.*

*The HSE have also stated the use of a single personal fall protection system as the norm during tree climbing operations does not meet the requirements of the WaH Regulations.*

**Q: Will both ends of the same rope suffice or does it need to be 2 separate ropes?**

*A: This point does require further discussion with the HSE to determine the standard they would expect to see and whether such systems would be practical to adopt. It is likely that under certain circumstances the use of the same rope to create two separate load bearing anchor points will be acceptable. [ED: rule of thumb is for all parts of the system to have redundant safety - that means NOT having two ropes emanate from one anchor connection even though you could argue that there's ultimately only one anchor - the one tree that you're on!]*

**Q: I do not feel this is a safer system so can I always risk assess to not use it?**

*A: When using a work positioning system (moving rope techniques) and it is not reasonably practicable to include a backup as part of your system then a single system may be used.*

*When using a rope access system (stationary rope systems) and the use of a second line would entail higher risk then a single system may be used.*

**Q: Will both ropes have to reach the ground?**

*A: New technical guide has been drafted stating that at least one of the systems in use by the operator must be capable of providing an uninterrupted descent to the ground (i.e. without the need for a change of anchor) from any point within the canopy in the event of a self-rescue being required. During descent under normal climbing conditions, the climber will need to ensure that they remain connected to two systems for the duration of their descent.*

**Q: When will there be set definitions, that won't change, of such things as stationary rope work positioning, moving rope work positioning etc?**

*A: These definitions will be developed as part of the revision of the ICoP and the new Technical Guide.*

**Q: In a self-rescue situation can one rope be disconnected to allow one handed descent?**

*A: It is acceptable to resort to a single personal fall protection system in an aerial rescue.*

**Q: As a contractor when should we be putting this new system in place?**

*A: The principle of using two separate load bearing anchor points should be in place immediately.*

*We have been fielding queries on this topic for several weeks now and will keep this list and the Two-Rope Help and Advice web page updated to provide answers.*

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