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ARB CLIMBER

Aerial Arboriculture, PPE, Climbing and Cutting Equipment



ISSUE

22

A NEW WAY TO HYDRATE

DELUXE WORK SUSPENDERS WITH HYDRATION PACK

These durably constructed suspenders feature a detachable water bladder and tube for convenient hydration any time. The comfortable design evenly places the weight of your saddle or belt on your shoulders, and the suspenders are lined with ProCool™ Mesh Technology that allows air circulation for a cooling effect. The detachable water bladder holds up to 1.5L of water, and the chest strap buckle features a built-in emergency whistle.

For device tending, a small carabiner can be attached to the loop on the chest strap.

Suspenders can be used with or without the detachable water bladder. Nickel-plated snaps and sliders allow for convenient attachment and adjustment.

Not for fall arrest.



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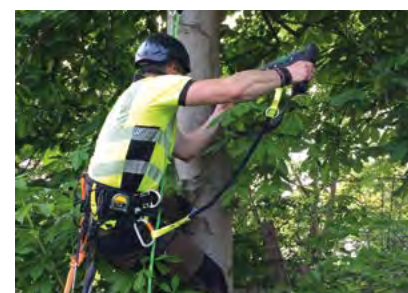
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ARB CLIMBER

issue

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FRONT COVER:

Issue 22's cover shows one of the UK's leading climbers, Jo Hedger wearing and wielding Husqvarna gear. see page 2 for more details.





A SURGEON'S ONLY AS
GOOD AS THEIR SCALPEL.

ON THE COVER

Husqvarna® Pro Battery Chainsaws

When you're working above the ground, there are no simple operations. Which is why you need tools that you can trust.

And Husqvarna is here to deliver.

This issue's front cover features professional battery-powered game-changers from Husqvarna: with over 60 years of chainsaw innovation, Husqvarna has taken another innovative step to meet the needs of tree care pros by offering two battery-powered chainsaws with power equivalent to 40cc gas-powered saws.

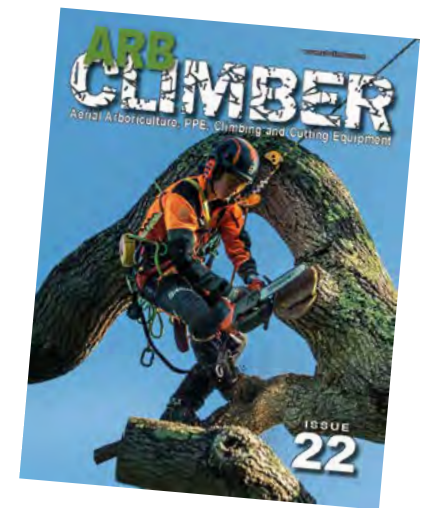
With power, precision, excellent maneuverability and zero emissions, Husqvarna's battery chainsaws raise the bar when it comes to professional battery chainsaw performance.

The T540i XP® is Husqvarna's most powerful top-handle battery chainsaw, equivalent to a 40cc professional gas saw when fitted with a BLi200X battery. This model is the ideal tree climbing saw. Designed for arborists who want a smooth, high-performance chainsaw, the T540i XP® features excellent ergonomics, high chain speed, and low weight.

The Husqvarna 540i XP® is a powerful and efficient rear-handle battery-powered chainsaw, also equivalent to a 40cc professional gas saw when fitted with a BLi300 battery. It's ideal for ground work and the removal of small and mid-sized trees, designed for tree care pros who need a lightweight, high-performance rear-handle chainsaw.

Both models come equipped with X-Precision cutting equipment and deliver all the benefits of battery power — push button start, less fatigue, less vibration, and less maintenance — without compromising cutting performance.

So keep cutting. And climb higher.
With Husqvarna Pro Battery Chainsaws.





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PRODUCTS – ROPE STUFF


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TEXORA SLINGS


ARBCLIMBER REVIEW

Some time ago, our mates at Treekit, one of our local arb stockists, gave us a handful of dead snakes and said, 'ere, try these'. As it turned out they weren't snakes and the initial screams subsided into embarrassment and wonderment. Endless round slings have been around for decades, a standard piece of kit for riggers, crane ops and agricultural lifting the world over. In fact, endless round slings are so versatile that trying to cover the range of possible uses is futile. It's probably better not to delve too deeply as some of the applications to which they are being used may fall outside of the manufacturers' recommendations. The reason for this is that they are just so good and so versatile, with a massive strength to weight ratio and a huge range of sizes. We've used them in rescue since their invention. Back in the 80's the concept of a web 'sheath' with an endless loop of bundled nylon fibres inside baffled us and we just assumed it was some kind of sorcery. Since then, bundled-fibre (or endless) slings have found a home on most arb work sites but their sheer bulk usually relegates them to the 'big-rigging' cache of gear. Smaller more intricate, everyday rigging did not require such mammoth gear, and was often simply too large and fat to suit the situation or even the equipment. It was far too easy to 3-way load a standard carabiner for instance although not as badly as wide, stitched webbing slings because at least the bundle-slings compact down to a smaller diameter. Then, from the city of Jelgava in Latvia, *Texora Compact Round Slings* arrived. On the face of it, a simple evolution from large, fat endless slings to a much smaller, thinner endless sling – why didn't we have them from the start? Too focused on crane rigging I guess and for our own use in rescue we probably just assumed that the sorcery didn't stretch to shrinking them. They were initially easily distinguished in their blue, yellow, red and black colour scheme and stood out from the rest of our kit until they also brought out an all-black version, then... not so much. Far from being just another rigging sling this reinvention of an existing invaluable rigging tool into a miniaturised version was genius and should give *Texora* slings a place in every climbing arborist's inventory.

Available in a range of lengths (0.5/0.8/1/1.2/1.5/1.8 & 2metre) and costing between£12 and £27 or \$€33, the key to the *Texora* sling's success is its reduced diameter, while maintaining an incredibly high load bearing ability. Rated to 100kN, the ratio between the working capacity in relation to the physical size is huge. This means that any element of doubt that loads may become too great in the small to medium rigging range can be all but eliminated. Where we once opted for the 20mm-25mm tape slings, with a working load limit of 2.2kN, there is now the option of bumping that straight up to a whopping 100kn with little appreciable increase in the physical size of the kit. This means that you



can negate some hardware and 'soft-rig' hardware like impact blocks and rigging plates and maintain the same load capacity as the hardware. You can also simply rig sections of wood with either a larks foot (choke hitch) or combination of larks foot and half hitch with longer Texora slings, ready for rigging out (pic right). If, like us you employ slings at the working end of your rigging lines for many jobs, you may find that these may become your go-to option. They provide straight-forward anchorage of virtually anything from bollards and winches to climbing ropes. Protected by an outside sleeve of



polyester with an elastic weft, [ED: I had to look that one up] the polyester core is afforded great protection and is intended to be used either as a choke hitch (larks foot) or overlapped. Exceeding the required standards (EN 354 : 2010; EN 795 B : 2012; TS 16415:2013; ANSI/ASSE Z359.18:2017) the capacity should be more that adequate for a vast range of applications, within limits. In fact, *Texora* state that a *Texora* sling is tested, and capable in isolation of providing suitable adequate support for four persons in suspension simultaneously. Obviously to be compliant, users would have to build in redundancy and second systems as a requirement of most local/national safety standards, and then of course you would have to justify why you felt the need to dangle the whole crew up a tree in the first place; team bonding? The fact that all of the key arb stockists sell these is testament to their worth. They are an absolute asset, whether on the ground or in the canopy. Have a variety of lengths available and you'll have an option for pretty much any rigging scenario.

www.texora.eu






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PRODUCTS – ROPE STUFF



SINGING ROCK
ARBO
MASTER

Czech height-safety specialist Singing Rock have introduced a new arborist harness. The ArboMaster is a fully adjustable work positioning harness with a unique bridge system and front attachment points. It has

been specially invented for professional arborists allowing freedom of movement in the tree top.

The wide, super-comfortable waist belt is comprised of three layers of webbing with wide leg loops made of two layers providing maximum comfort and durability.



The replaceable bridge connect to the leg loops via 15kN D-rings allowing a variety of work positions and connection points. The double rope bridge allows for two independent attachment points (EN 813) with knots on each end allowing length adjustment and replacement. Other features include:

- moveable alloy ring on the bridge as an EN813 attachment point
- replaceable adjusting webbing for red leg-loop D rings
- side-D rings fold in when not in use
- SPEED buckles allow fast and easy adjustment of the waist belt and the leg loops plus rear elastics for adjusting the position of the leg loops
- 4x gear loops – capacity of 5 kg
- 1x rear loop for hanging chainsaw, etc. with a load capacity of 35 kg
- 2x red textile loops with a load capacity of 5 kg for attaching a hand saw
- 2x small steel rings -capacity 10 kg- for attaching a chainsaw on left & right side
- small textile loops to create your own gear loops- load capacity 5 kg
- chest harness attachment loops
- slots for the PORTER tool holder to carry your industrial tools
- wide rubber band on the rear for attaching a first aid kit to the harness
- neoprene pocket on the leg loop for small items
- Weight: 1680g/59.3 oz (S/M/L), 1760g/62 oz (XL)
- Max. rated load 120 kg
- CE1019 EN358 EN813
- Approx Cost: £380/\$340/€310

www.singingrock.com

www.rescue-ropes.com

www.arbclimber.com

NEW
DESCENDER
from EDELRID

The MEGAWATT is an intuitive and reliable descender with a wide range of potential uses when working with ropes and in rescue scenarios. It fulfills four important work safety standards (EN 12841-C, EN 341-2A, EN 15151-1/8, and ANSI/ASSE Z359.4). During the descender's development,



focus was placed on intuitive handling, compact dimensions, and a low weight (495 g). It is a versatile heavy-duty descender with a lever made of a two-component material with rubber inserts for maximum grip and with special lever geometry to allow a large transmission ratio and an extremely wide working range. At the same time, its anti-panic feature reduces the risk of an accident in the event of loss of control. Users can descend by either pushing or pulling the lever. On arrival at the desired work site, the MEGAWATT enables easy positioning. The integrated autolock function locks the device so there is no need to park the lever or tie off the descender. The short lowering lever also reduces the risk of snagging. It is suitable for left and right-handed users alike (regardless of active or passive operation) and enables optimal handling even in difficult working positions. The opening mechanism has a safety lock enabling you to leave the MEGAWATT clipped onto the harness when inserting the 10-11.8mm rope. The MEGAWATT is compact and lightweight compared to other rescue-capable work devices. Approx cost: £/€180

www.edelrid.com

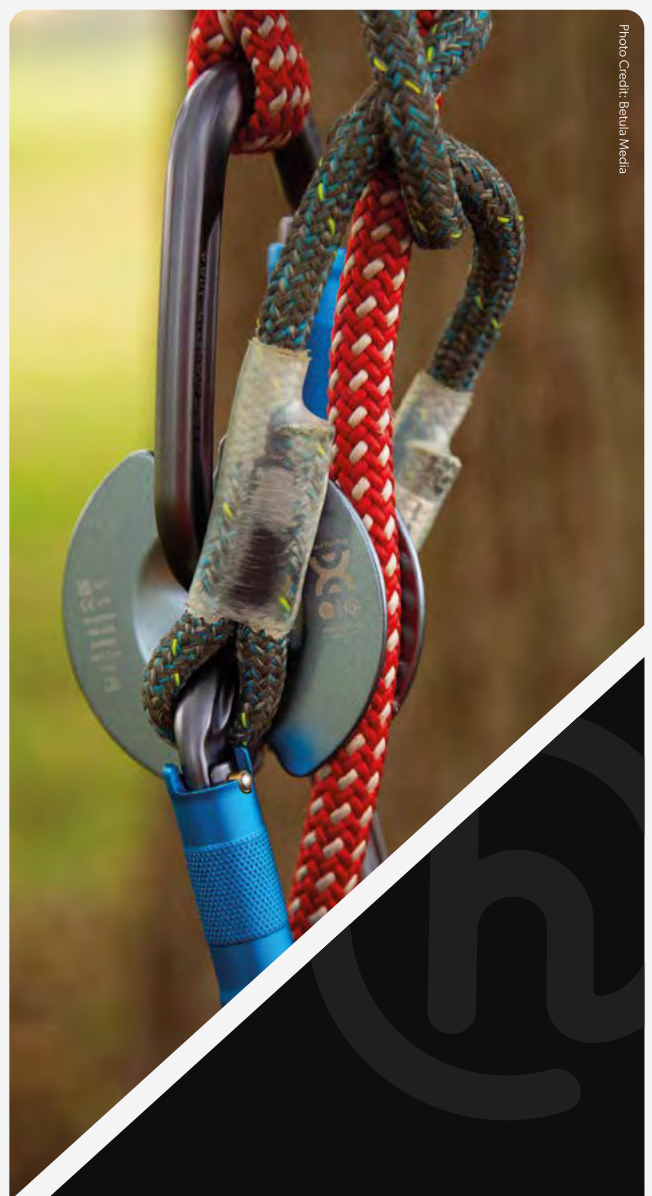


Photo Credit: Betula Media

Pulley One

Optimised for 11.5mm Rope
Clip-in, Clip-out Easily
MBS 36kN

Patent Pending No. 2205034.8
British Registered Design No. 6171217
Europe Registered Design No. 009084551

A Design Collaboration between
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MORE IS POSSIBLE
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PRODUCTS – ROPE CUFF



LIGHTWEIGHT PULLEYS

PulleyOne P36 is a new and innovative 'clip-in clip-out' pulley range from At Height Ltd and Jammy Design.

Each pulley is 36kN MBS and individually serial numbered. The P36 range is CE approved to EN12278:07 and optimised for use with 11.5mm rope.

Super lightweight at 140g each

Can be easily colour-customised

Pulleys can be used in multiples in-line or in-parallel to create compact mechanical advantage systems, or singly as redirects.

Spec:

Weight 140g
Dimensions 70mm x 75mm x 18mm
MBS 36kN
Material Aluminium
Finish Anodised
Connector Oval / Offset / Sling
Standard EN12278:07
Cost: \$85

P36B (Bearing version)
Premium Ball Bearing
Strength 36kN
Rope Ø ≤11.5mm

www.atheightuk.com

PRODUCTS – TREE CARE

PiCUS ROOT PLATE MOVEMENT DETECTION



The wind reaction measurement of the TreeMotion Sensor records the swaying movement of trees under real conditions and allows conclusions to be drawn about the anchoring of the roots in the ground. In addition to the properties of the tree, all factors influencing the environment on the wind are taken into account. This allows the stability to be assessed in the actual wind exposure.

A basic sensor measures the inclination of the root plate directly at the base of the trunk. A control sensor measures the inclination at a height of 2 to 3 meters so that the real wind reaction of the tree can be distinguished from sources of interference. The PiCUS TreeMotion Sensor can independently record the measurement for hours, days or weeks. The data evaluation takes place comfortably in the office.

Prerequisites for a successful measurement are gusts of more than 45km/h (30mph) and a measurement time of at least 2 hours. A good application of the TreeMotion Sensor is the comparative analysis of groups of trees. Several trees are equipped with sensors at the same time before an expected storm. For example, all trees in an avenue can be tested very quickly with little effort.

PiCUS TreeMotion range of functions:

Sensors: 10 sensors included (also available as a mini kit with 2 sensors to get you started)
Accuracy: Inclination measurement accurate to 0.03°
Unobtrusiveness: Reduced risk of vandalism thanks to small sensors (61 mm x 41 mm x 20 mm)
Running time: 2 weeks + integrated Charging station with which 10 sensors can be charged wirelessly

The scope of delivery of the PiCUS TreeMotion Online also includes a radio unit with an external solar panel and software.

www.iml-electronic.com

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**APIII
SYSTEM**



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AVAILABLE AT YOUR LOCAL **STIHL APPROVED DEALER**

The MSA 220 TC-O is STIHL's most powerful cordless arborist chainsaw to date. It's the first STIHL chainsaw that has an LED display and integrated oil sensor, which provides key information during operation. With equivalent cutting performance to the petrol MS 201 TC-M and long-service life, arborist professionals can take on the tough tree maintenance and removal jobs.

The new ADVANCE ProCOM headset and ear defenders on the X-CLIMB helmet allow you to communicate with workers on the ground seamlessly, with simple networking over vast distances for up to 16 people, plus much more.

**SMART, EFFICIENT, COMFORTABLE COMMUNICATION:
STIHL ADVANCE PROCOM.**

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by Adam Jones

DMM XS

Extra Small IMPACT BLOCK

The evolution of a living species can take millennia. For technology and equipment it can be much more expedient, driven by the quest for safer and more efficient ways to function. In this respect, we have advanced more in the last 50 years, than we have in the last 50,000 years and for arborists, more in the past 5 years than the previous 50. As with most technological advances the old ways still exist and in the absence of technology you can still get the job done but no where near as fast and no where near as safely.

Tree rigging in particular has seen a huge amount of innovation, some of it seeming to be development for development's sake and very much the domain of the wealthy as appeared to be the case when DMM introduced their silky smooth, artistically inspired impact blocks. Traditionally, we think of DMM as a company that leads and the others play catch up and that is true to some extent with ISC's latest 200-range clearly looking to emulate the smooth curves of DMM. However, it's worth remembering that it was ISC who first introduced impact blocks decades before the DMM models so it's very much tit for tat....eventually. This time, with the XS, a mini version of their other impact blocks, it's DMM's turn to follow once again since CMI first spotted the need for a mini version of the hitherto pretty big, heavy and expensive space-age impact blocks and introduced their RP126 a few years back.

Of course, pulleys have been around in some form or other for maybe 4,000 years but high strength rigging or impact blocks are more recent. We were using Denny Moorhouse's impact blocks over 30 years ago, and in fact didn't originally realise their true purpose and instead cursed their neolithic-looking design and vast bulk and weight. Once you realise their potential you also realise why the *Incredible Hulk* doesn't win beauty contests; sheer grunt simply had to have an excess of mass and bulk. But a reduction in bulk didn't necessarily mean a reduction in performance – look at Sumo Wrestling. Anyone

10



Above three 'competitors' of the DMM XS (MBS 100kN) are the ISC RP248 Compact (MBS100kN), CMI's original RP162 mini block (MBS 97kN) and Notch's 1/2" model MBS100kN



familiar with the evolution of this Japanese sport will know that back in the 90's, the huge bulk of traditional wrestlers started being beaten by a new generation of lighter, sleeker wrestlers able to concentrate their strength where (and when) needed. That's pretty much what DMM's hot forged artistry has done with their rigging tools and the high-performing Impact Blocks in particular. This new XS is a natural progression although it has to be said that the smooth lines of their largest model don't have the same room to spread in the much smaller surface area of the XS.

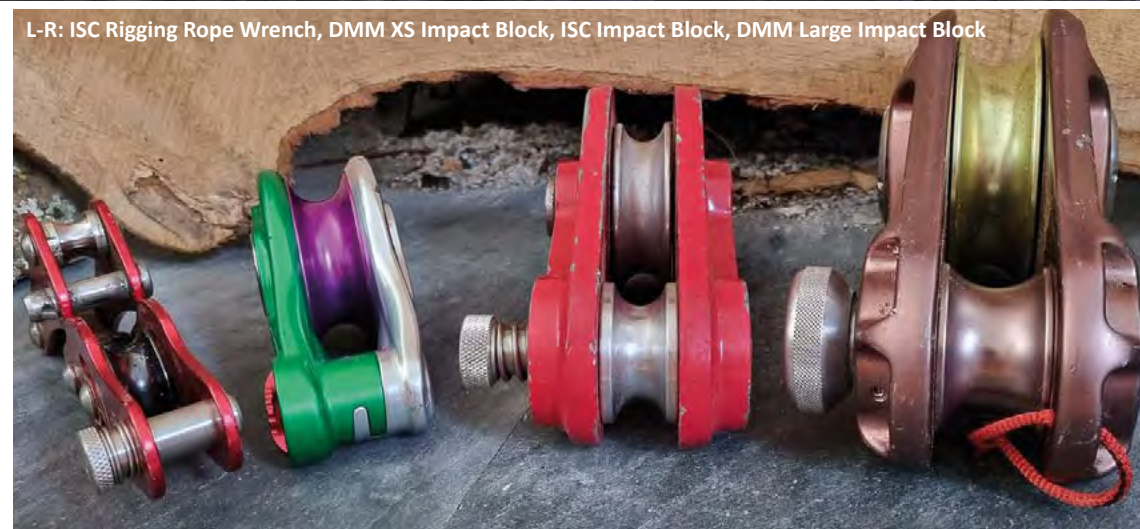
Often, when removing parts or all of a tree, we have space restrictions that require us to manage things and prevent uncontrolled drops. If the wood section has to be stopped quickly or "snubbed off," shock loading occurs, and the forces that are generated can be very great. When butt-hitching, snatching or blocking wood (which is also known as negative rigging), the anchor point of the rigging is below the rigged piece and we will intentionally impart what equates to a factor 1.5 or even factor 2 drop.

Early techniques used chunky 3 strand ropes and bow shackles, with steel snatch blocks designed for cable winches also used. These were far from infallible and certainly not what would be accepted today. Thankfully when you go to your tree gear supplier now, you will have a selection of bespoke, high strength snatch blocks to choose from.

DMM have come through this process maintaining a position as the pack leader despite strong competition. With the XS they've gone for a smaller, compact, cold forged alloy tool with some unique features. Available in three colour schemes; Green, silver and purple, or pink, or black.

As with the previous models, the cheeks are opened via a locking screw at the top and then rotate around the main sheave axle, to accept anchorage (around

L-R: ISC Rigging Rope Wrench, DMM XS Impact Block, ISC Impact Block, DMM Large Impact Block



the top pin) and/or running line around the larger sheave. The XS has a 'double security' (DMM's words) interlocking bollard, which is locked close by a threaded axle. This is operated by hand using the recessed 'finger wheel' bolt-head instead of the usual knurled knob that you see in the blocks above. This is located at the side of the anchor bollard with the inner thread protected by a rubber 'O' ring, which provides additional friction to reduce the chance of the thread working loose during operations. Although the colour of this finger wheel differs, the yellow safety warning in the centre is consistent across the range.

The cheeks, or side plates have smooth fairlead flairs, designed to ensure unhindered rope passage something also enhanced by the integration of the sheave's profile into the body of the side plates. The large 51mm/2" diameter sheave is quite wide, accepting up to 16mm/5/8" diameter working rope. The sheave itself is seated on large, heavy duty bearings which complement the robust capabilities. The central axle is hollow, cited as 'all new', because it more funnel-like than the larger DMM impact blocks. This hollow axle is designed to accommodate additional rigging slings or ropes up to 10mm, allowing the user to build more complex 3D systems when required. The top anchorage bollard is designed to accommodate a maximum sling/anchorage of up to 20mm/3/4", which could be 48kN to 50kN MBS.

These relatively large gauge materials compliment the impressive 20kN working strength of the XS Impact Block, with a five to one safety factor of its 100kN MBS (minimum breaking strength). In very simple, highly unscientific terms, this means that you can drop a load which peaks at about two tonnes of applied force onto this block. In real world calculations this will be a lump of tree weighing no more than around 130kg/286lb, can you guesstimate that by eye? There are so many variables to consider, weather/wind, rope condition, height/length of working lowering rope (available stretch) and of course the condition and ability of your ground crew and whether they manage the stopping of the dropped load dynamically or as a dead-stop.

It's all somewhat academic, as most climbers will look at the bit that they're rigging and say, 'it'll be alright, I reckon...'. I'm not disregarding experiential learning, prior study, availability of weight/load tables and pocket fobs, but I would suggest that 95% of lumps cut from trees have been subjected to no

more than mental calculations and guesstimates based on experience, and not much applied physics. The crux of this is that the XS Impact Block is tough and will probably be more than adequate for most smaller size rigging jobs. Winning jobs can also be a consideration, with the XS as an integrated

component making redirects and mechanical advantage possible. It must be noted that this can only be done if you are using synthetic winch lines, UHMPE etc. Steel cables will trash any alloy sheave.

The XS weighs in at just 0.7kg/1.5lb, so is clearly a step down in size from DMM's other models but not quite as small as CMI's smallest Impact blocks with their comparable load capacity. Unlike CMI's block, the DMM XS does come with a cord loop for attaching it to your harness or rig, making carrying it around easier, a simple feature also seen on DMM's bigger Impact Blocks. The Large and Small Impact Blocks have projecting knurled head, easy to operate with gloved hands while the XS requires a finger and thumb grip. This can prove fiddly, when wearing gloves or in cold conditions and personal experience as well as anecdotal accounts can lead to choosing more easily opened/closed small blocks in cold and wet conditions. However, this is about the only negative feedback that we can offer. In better weather, the low profile of the locking mechanism is a bonus over the normal projecting bollard locks.

In reality the XS is really an 'S' because the original 'small' DMM impact block should have been a 'Medium' because- 'small' it ain't! And what are they gonna call the next one that's even smaller-it'll get messy. The XS is small, lightish and tough, a great resource as a stand-alone impact block but small enough to be a component in a system. If you don't already have a small impact block, what are you waiting for?



BACK TO BACK

Anchorage/ Friction Savers

For
Climbing Ropes

www.rescuemagazines.com

Thanks to our colleagues at *Arboristes Mag* in France for producing this outstanding examination of what are also called Cambium- Savers. French-speakers can check out their website at www.arboristes-mag.com

www.arbclimber.com

ANCHORAGE/FRICTION SAVERS



DID YOU KNOW ?

The first false fork with rings was created by two arborists (François Dussenne and Frédéric Mathias) who cut a mountaineering fig8 descender in two, connecting the two rings with a strap, a small ring and a large one: the false fork had just been born! The objective was not to protect the tree but to facilitate the sliding of the rope to bring a little more comfort to the climber.

CANOPY/TOP ANCHOR

The original false crotch or fork anchorage was simply a sling with a carabiner, later replaced by small alloy rings to reduce bulk, cost and allow 360 degree obstruction-free rope travel.

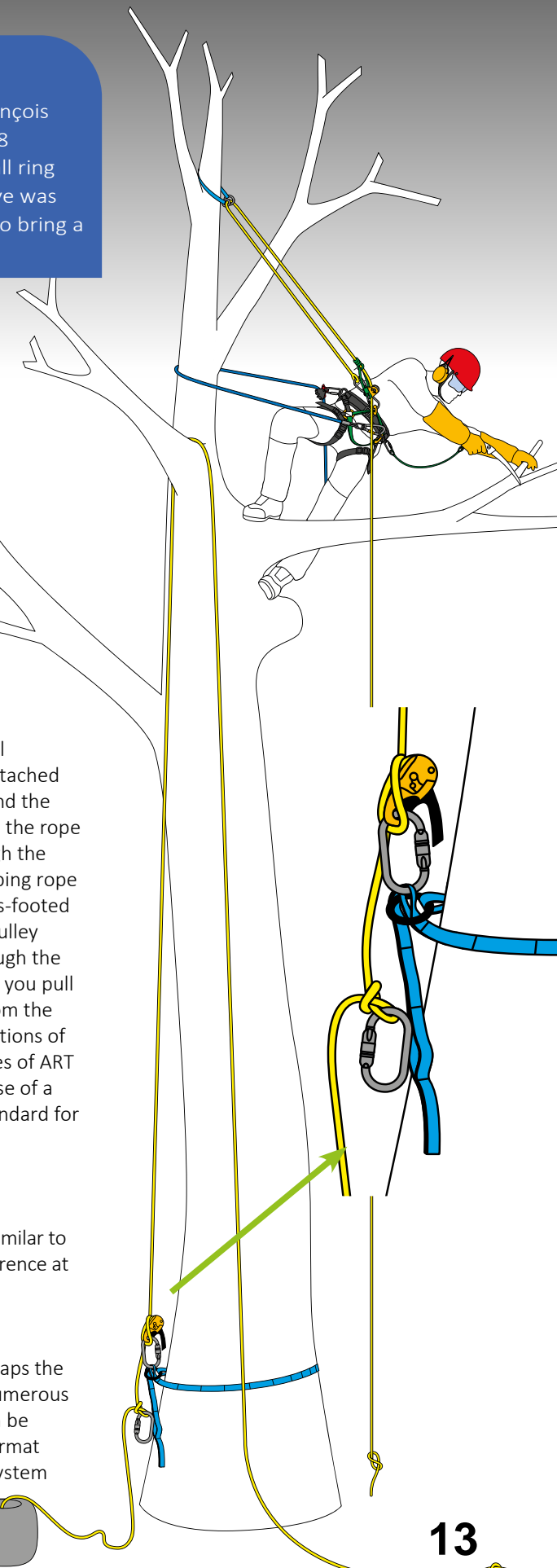
The web or rope sling was looped over a branch union and the working rope(s) passed through the rings instead of directly over the tree fork/branch union. This prevented damage to the tree's bark/cambium and decreased friction, saving abrasive wear on the rope and limiting dirt and debris being forced into the weave. 30 years later a sling with rings is still the most used anchor but it evolved by using one small and one large ring so that retrieval of the rope and sling was improved and it is most often called a 'friction saver' though 'cambium saver' is also still a common term. Such anchors can be the main anchor or a redirection anchor.

More recently, *Treemagineers* came up with the 'pulley-saver' which is a small pulley on a prusik and a separate retrieval eyelet also on a prusik. Both are attached to your anchor-rope near the sewn eye termination. The rope is passed around the anchor fork and back to the prusik-attached pulley which is 'dangled' through the rope eye. Your second rope is a climbing rope with soft eye which is passed through the eyelet first then through the pulley above it. Pulling on both ends of the climbing rope cinches the system up. When it comes to retrieval, a small ball or cone is larks-footed to your climbing rope's soft eye and then pulled up and passes through the pulley effectively releasing it from the anchor rope (though it may still 'dangle' through the eye). The ball is too large to pass through the eyelet beneath the pulley so, as you pull the climbing rope it now pulls the anchor rope too and hopefully unwraps from the crotch and falls to the ground – look out below! Aside from various configurations of sewn eyes and stitched webbing we now have custom hardware from the likes of ART and Petzl so there is something for everyone. As a reminder, in Europe, the use of a false crotch/fork is now compulsory for the main anchor according to the standard for rope anchors EN 795 B.

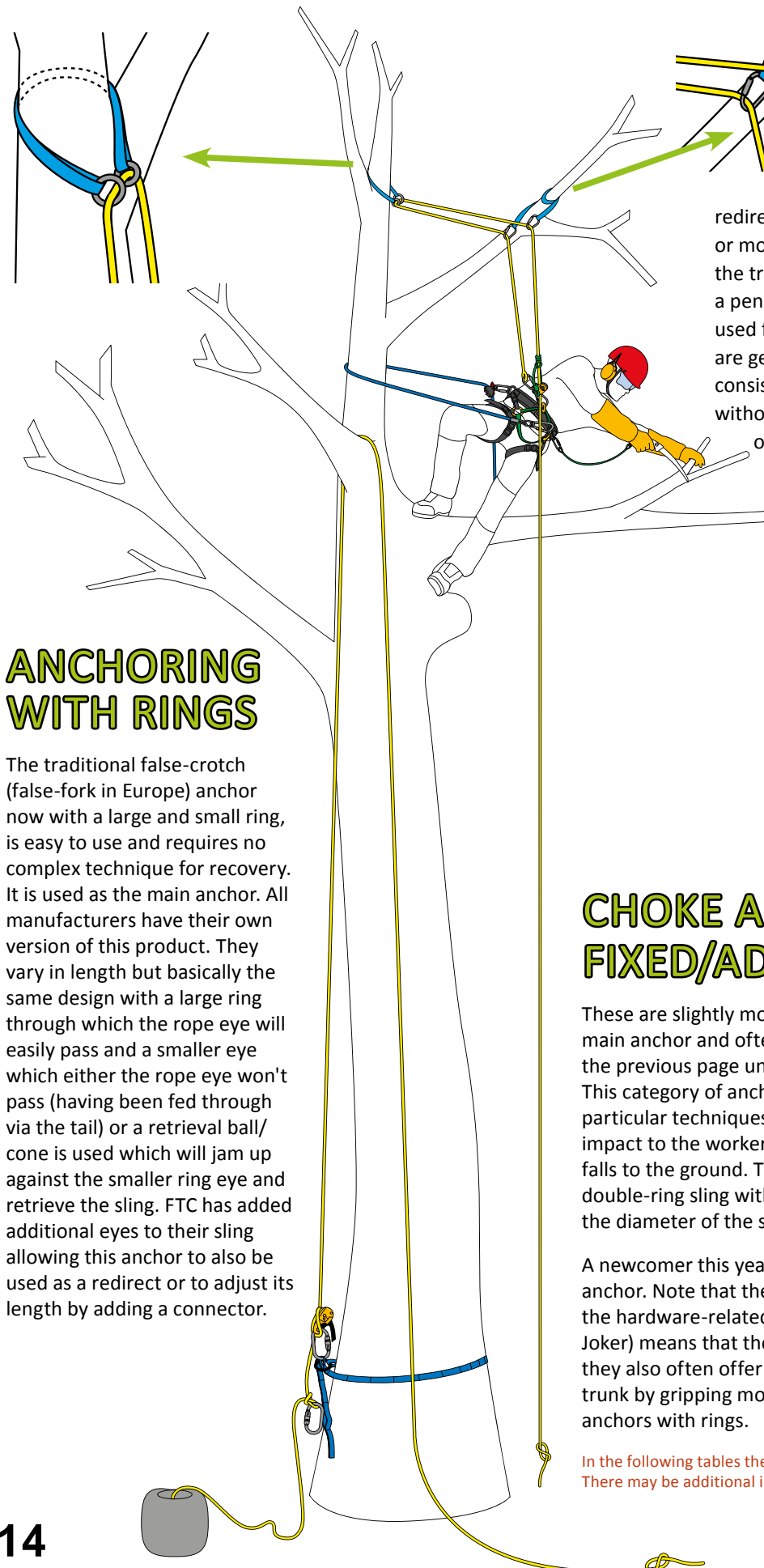
BASAL ANCHOR

Not to be confused with the large diameter rope slings for heavy-duty rigging. Similar to redirectional anchors, they differ mainly in their length since a trunk's circumference at the base can be many feet/metres. There are three key types of product:

- 1) Rope with an eye, (larger rigging versions are often called Whoopi slings),
- 2) buckle-adjustable webbing slings
- 3) the multi- eyelet sling or what used to be called a 'Daisy Chain'. This is perhaps the most versatile and is a length of webbing segmented by stitching to create numerous load-bearing eyes into which a carabiner can be clipped or the sling's end can be passed through to create a choke. The *ART Snake* and *FTC Joker* follow this format with the addition of a ring allowing many anchoring configurations and this system is a particular favourite of SRT practitioners.



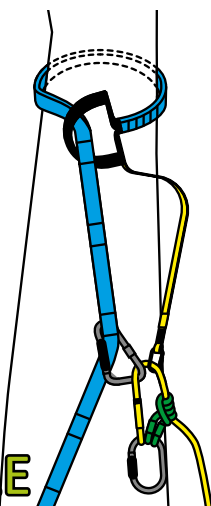
BACKtoBACK



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ANCHOR REDIRECTS

Used in addition to the main anchors, the redirection anchor makes it possible to reduce or modify a rope angle during progression in the tree to lessen drag and reduce the risk of a pendulum should the climber slip. It can be used for both DRT and SRT techniques. Products are generally the simpler, classic designs, mostly consisting of a double-eyed strap/rope with or without rings many choosing to use carabiners or maillons. Basic double-eye straps or rope can also be used as a simple main anchor and indeed have a multitude of other uses including prusik, load-release hitch etc.



CHOKE ANCHOR FIXED/ADJUSTABLE

These are slightly more complex designs, mainly used as the main anchor and often associated with a pulley as detailed on the previous page under 'Pulley-Savers' or bespoke hardware. This category of anchor requires the implementation of particular techniques for recovery to avoid a possibly damaging impact to the worker, rope or the device itself as the system falls to the ground. The *Teufelberger FimblClimb* is similar to the double-ring sling with the added ability to adjust precisely to the diameter of the support spar/trunk/branch.

A newcomer this year, the Eject from Petzl is a resolutely new anchor. Note that the complex designs and manufacture of the hardware-related products (excluding FimblClimb and Joker) means that these are the highest priced models. But they also often offer the possibility of being used on a smooth trunk by gripping more securely, which is not the case with anchors with rings.

In the following tables the **US price** is a currency conversion as a guide only. There may be additional import duty and local taxes.

rock exotica®
GEAR FOR THE Z AXIS

akimbo

For Stationary Rope / Moving Rope Systems — Made in USA

The AKIMBO is a versatile, mid-line attachable friction device that allows climbers to ascend and descend stationary or moving rope systems without needing tools or changing equipment.

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*Only use ropes approved by Rock Exotica. Consult user manual or website for details.

Patented

CE

DOUBLE-RING
(SIMPLE)

CAMBIUM SAVING
ANCHORS

Other Models not tested:

CT90/120/250 €45/55/65
Kong TreeFork 90 €52
Stein 90/120 €40/48
TreehogHD 100/120/150 €42/48/54

TREESBEE



HERBOL



SYNCHRO



BRAND		PETZL	CAMP	COURANT
RINGS	Material	Aluminium now Steel	Anodised Aluminium Alloy	Anodised Aluminium Alloy
	Internal ø	1 x 25 mm 1 x 50 mm	1 x 34 mm 1 x 45 mm	1 x 28 mm 1 x 45 mm
STRAP/ROPE	Material	Polyester webbing	Polyester webbing	Polyester webbing
	Width / ø	26 mm	29 mm	28 mm
LENGTH(S)		90 cm / 110 cm	90 cm / 120 cm	90 cm / 110 cm / 130 cm
WEIGHT		280g /300g 420g / 440g	240g / 310g	226g / 242g / 274g
MBS		2 300 daN	2 400 daN	2 200 daN
MAXPERSON LOADING		1	1	1
STANDARD		CE EN 795B	CE EN 795B	CE EN 795B
MAXWORKINGLIFE		10 years	10 years	10 years
COLOUR				
STORAGE/BAG		no	no	no
SUPPLIED ACCESSORIES		✗	plastic retrieval ball ø 30 mm	✗
APPROX RETAIL COST INC TAX		£55/57 \$63/65 €58/60	£40/£42 \$54/60 €50/55	£50/51/54 \$60/61/65 €55/56/60
ADVANTAGES		<ul style="list-style-type: none">• Colour-contrast web-ends makes identification much easier• Rings now steel and very robust (no price change)	<ul style="list-style-type: none">• Long length	<ul style="list-style-type: none">• Long length• Colour-contrast rings and web-ends makes identification much easier
DISADVANTAGES		<ul style="list-style-type: none">• Light alloy rings easily scratched/gouged• Steel ring version is heavier	<ul style="list-style-type: none">• Quite stiff webbing	<ul style="list-style-type: none">• Light alloy rings easily scratched/gouged

JINGLE II



JOKER LIGHT RING



SIRIUS MULTISAVER



CAMBIUM SAVER








SINGING ROCK	FTC	TEUFELBERGER	EDELRID
Aluminium (also available in steel)	Tubular Stainless Steel	Anodised Aluminium	Anodised Aluminium
1 x 28 mm 1 x 46 mm	1 x 28 mm 1 x 40 mm	1 x 25 mm 2 x 33 mm	1 x 28 mm 1 x 40 mm
Nylon webbing	Polyester webbing with sewn eyes	Polyester rope	Nylon/polyester/aramid webbing
25 mm	19 mm	ø 12 mm	25 mm
100 cm / 120 cm / 150 cm	110 cm	70 cm / 200 cm / 250 cm	90 cm / 120 cm / 150 cm
201g / 221g / 250g	210g	200g / 460g / 500g	175g / 204g / 224g
2 500 daN	1 990 daN	1 800 daN	2 500 daN
1	2	1	1
CE EN 795B	CE EN 795B / TS 16415	CE EN 795B	CE EN 795B
10 years	10 years	5 years	10 years
no	Fabric pouch	no	no
✗	Wooden retrieval ball ø 30 mm	Plastic retrieval cone ø 22 mm Prusik adjuster for Sirius Ring	Plastic retrieval cone ø 30 mm
£31/33/35 \$38/41/43 €35/37/39	£63 \$75 €69	£93/95/97 \$113/117/120 €104/107/110	€42/47/52 \$57/62/68 €52/57/62
<ul style="list-style-type: none">• Excellent price• Colour-contrast web-ends makes identification much easier	<ul style="list-style-type: none">• Versatile• Multiple carabiner attachment points (stitched eyes)• Lighter than other steel ring products because they are hollow• Robust, hard-wearing sings• Able to support 2-person load	<ul style="list-style-type: none">• Versatile allowing many anchor configurations	<ul style="list-style-type: none">• Long length• Colour-contrast rings and web-ends makes identification much easier
<ul style="list-style-type: none">• Large ring can get jammed more easily during retrieval• Steel ring version is heavy	<ul style="list-style-type: none">• No colour-contrast rings/web-ends	<ul style="list-style-type: none">• Long rope length can impede retrieval and more cumbersome to carry (needs a bag/pouch)• More complex to use than classic two-ring straps• Short life-span• No colour-contrast rings/rope-ends	<ul style="list-style-type: none">• Light alloy rings easily scratched/gouged









ADJUSTABLE
(CHOKING/
CINCHING)

CAMBIUM SAVING
ANCHORS

Other Models not tested:

Teufelberger FimblSaver125/200 €109/116
Edelrid Adjustable125 €80
Stein SkyAnchor 200/250 €98/102

PULLEYS AVER 2.0		ROPEGUIDE 2010 COCOON 5	ROPEGUIDE 2010 LINK 2
			
TEUFELBERGER		ART	ART
SYSTEM ADJUSTMENT		Friction Hitch	Mechanical Grip/Cam
CHOKE CREATED BY....		Large Sewn Loop	Alloy Hollow Ring Ø 50 mm
WORKING ROPE VIA...		Pulley	Pulley
RETRIEVAL VIA....		Friction Hitch + Thimble	Trapeze shaped link
STRAP/ROPE	Material	Polyester / aramid / dyneema rope	Nylon double rope
	Width / Ø	Ø 12 mm	2 x Ø 8 mm / L. 18 mm
LENGTH(S)		125 cm / 250 cm / 400 cm	150 cm / 300 cm
WEIGHT		480 g / 620 g / 760 g	520 g / 700 g
MBS		2 410 daN	2 400 daN
MAX PERSON LOADING		1	1
STANDARD		CE EN 795B	CE EN 795B
MAX WORKING LIFE		5 years	10 years (metal) / 5 years (textile)
COLOUR			
STORAGE/BAG		no	no
SUPPLIED ACCESSORIES		Plastic retrieval cone Ø 20 mm	Plastic retrieval ball Ø 22 mm
APPROX RETAIL COST INC TAX		£207/209/211 \$245/248/250 €225/228/230	£255/269 \$326/345 €300/317
ADVANTAGES		<ul style="list-style-type: none">Long lengthAdjustableVery efficient pulley	<ul style="list-style-type: none">AdjustableVery efficient pulley
DISADVANTAGES		<ul style="list-style-type: none">Can get hung up on coarse bark (sequoia, cedar etc) during cinching and retrievalShort lifespan	<ul style="list-style-type: none">Needs to be rigged for controlled drop retrieval so as not to damage on impactShort lifespan


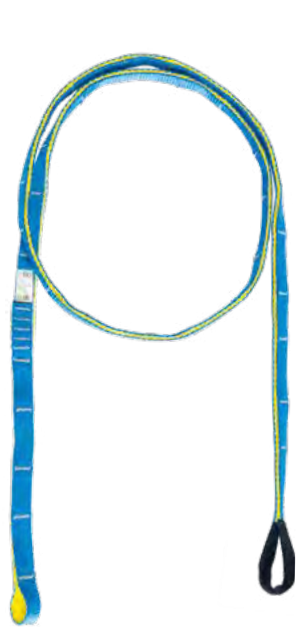
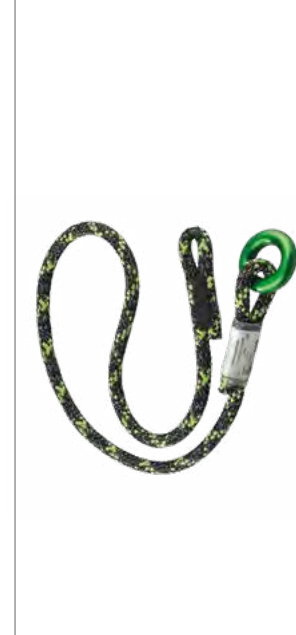
EJECT	TWINLINE	JOKER 'CHOKER'	FIMBLCLIMB
			
PETZL	ART	FTC	TEUFELBERGER
Mechanical Grip/Cam	Mechanical Grip/Cam	Strap Loops	Friction Hitch
Locking Pulley	Large Sewn Loop (Rope Not Included) Or Ring (included)	Large Sewn Loop	Sewn Loop + Thimble
Pulley	Pulley	Pulley or carabiner (not included)	Sewn Loop + Thimble
Pulley	Trapeze shaped link	Maillon Rapide	Sewn Loop + Thimble
Polyester/Nylon single rope	Your choice of rope	Polyester webbing	Poyester rope
L. 20 mm	Ø 10,5 à 11 mm	L. 19 mm	Ø 12,7 mm
150 cm / 250 cm	Your choice of rope	110 cm	125 cm / 225 cm
490 g	560 g	230 g	300 g / 400 g
2 500 daN	2 000 daN	3 000 daN	2 800 daN
2	2	2	1
CE EN 795B / TS 16415	CE EN 795B / TS 16415	CE EN 795B / TS 16415	CE EN 795B
10 years	10 years (metal) / 5 years (textile)	10 years	5 years
			
no	no	Fabric pouch	no
Plastic retrieval ball Ø 21 mm	Plastic retrieval ball Ø 22 mm Small carabiner	Metal retrieval ball Ø 17 mm	Plastic retrieval ball Ø 20 mm
£210 \$278 €256	£354 \$420 €386	£70 \$85 €78	£94 \$115 €106
<ul style="list-style-type: none">Long lengthAdjustableVery efficient pulleyAble to support 2 persons	<ul style="list-style-type: none">Long lengthVersatileAble to support 2 persons	<ul style="list-style-type: none">VersatileMain anchor and redirectLength adjustable (by adding Joker Light 110 cm)Can be used with carabiner or pulleyLightweightAble to support 2 persons	<ul style="list-style-type: none">Long lengthSimple yet adjustableLight
<ul style="list-style-type: none">Needs to be rigged for controlled drop retrieval so as not to damage on impact	<ul style="list-style-type: none">Relatively complex to useExpensiveShort lifespan	<ul style="list-style-type: none">Can get hung up on coarse bark (sequoia, cedar, pine etc) during cinching and retrieval	<ul style="list-style-type: none">Short lifespan


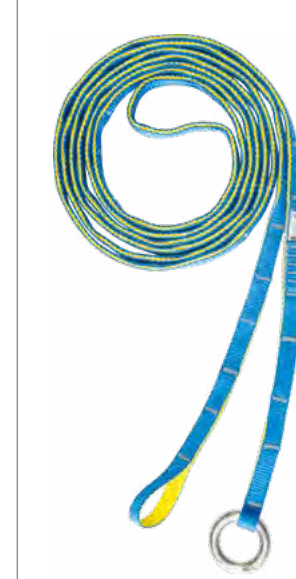


CHOKING/CINCHING

CAMBIUM SAVING
ANCHORS/
BASAL ANCHORS

Other Models not tested:

Edelrid Adjustable125 €80
Teufelberger MultiAnchor4m/6 €98/100

SNAKE TAIL		JOKER LIGHT	SIRIUS MULTISLING
			
BRAND	ART	FTC	TEUFELBERGER
TERMINATION(S)	1 Ring Ø int. 25 mm 1 Sewn Loop + Multi-Eyes	2 Sewn Loops + Multi-Eyes (inc 1 reinforced)	1 Ring Ø int. 26 mm 1 Sewn Loop
WEB/ROPE	Material	Double Polyester / Dyneema Rope	Polyester Webbing
	Width / Ø	2 x Ø 8 mm / L. 18 mm	L. 19 mm
LENGTH(S)	115 cm	110 cm / 200 cm	100 cm / 130 cm
WEIGHT	170 g	105 g / 190 g	140 g / 160 g
MBS	2 500 daN	2 320 daN	2 225 daN
MAX PERSON LOADING	1	2	1
STANDARD	CE EN 795B	CE EN 795B / TS 16415	CE EN 795B
MAX WORKING LIFE	10 years (metal) / 5 years (textile)	10 years	5 years
COLOUR	■ ■	■ ■	■ ■
STORAGE/BAG	no	Fabric pouch	no
SUPPLIED ACCESSORIES	✗	✗	✗
APPROX RETAIL COST INC TAX	£92 \$119 €109	£32/42 \$38/60 €36/55	£43/45 \$53/55 €48/50
ADVANTAGES	<ul style="list-style-type: none">VersatileMain anchor and redirect	<ul style="list-style-type: none">Versatile-many attachment eyesMain anchor and redirectTo extend length add a Joker-LightIn addition to the Joker-Light, ideal for anchoring on main trunkAble to support 2-person weight	<ul style="list-style-type: none">LightVersatile
DISADVANTAGES	<ul style="list-style-type: none">Non-retrievable as isNot as hard wearing as some web modelsShort lifespan	<ul style="list-style-type: none">Non-retrievable as isDespite simplicity of design, quite complex to position correctly	<ul style="list-style-type: none">Short lifespan

SNAKE ANCHOR	JOKER LIGHT 5m	VARIO	ADJUSTABLE STRAP
			
ART	FTC	PETZL	ANTEC
1 Hollow/Tube Ring Ø int. 25 mm 1 Sewn Loop + Multi-Eyes	1 Hollow Stainless Steel Ring Ø int. 40 mm. 1 Sewn Loop	2 D-Rings Ø 45 mm & 65 mm Forged Steel	1 Sewn Loop 1 Ring
Double Polyester/Dyneema Rope	Polyester Webbing	Adjustable Length Polyester Webbing	Adjustable Length Polyester Webbing
2 x Ø 8 mm / L. 18 mm	L. 19 mm	L. 44 mm	L. 50 mm
250 cm / 500 cm	500 cm	30 to 200 cm / 200 to 400 cm	150 cm / 300 cm / 600 cm
350 g / 660 g	540 g	810 g / 950 g	300 g / 500 g / 760 g
2 000 daN	1 990 daN	2 500 daN	2 200 daN
1	2	1	1
CE EN 795B	CE EN 795B / TS 16415	CE EN 795B	CE EN 795B
10 years (metal) / 5 years (textile)	10 years	10 years	10 years
■ ■	■ ■	■	■
no	Fabric pouch	no	no
✗	✗	✗	✗
£113/160 \$129/181 €118/166	£104 \$109 €100	£44 \$55 €50	£55/63/67 \$67/77/82 €62/71/75
<ul style="list-style-type: none">Long lengthsMany attachment eyes	<ul style="list-style-type: none">LightVery longMany attachment eyesAble to support 2-person weight	<ul style="list-style-type: none">Very longParticularly robustInfinitely adjustableLocking choke position	<ul style="list-style-type: none">3 LengthsHigh visibilityOne of the first basal anchor slings on the marketLocking choke position
<ul style="list-style-type: none">Stitched eyes not as resilient as JokerShort lifespan	<ul style="list-style-type: none">Long fixed length so a lot of spare material on narrow trunks	<ul style="list-style-type: none">Heavy	<ul style="list-style-type: none">Robust but somewhat cumbersome for tree work

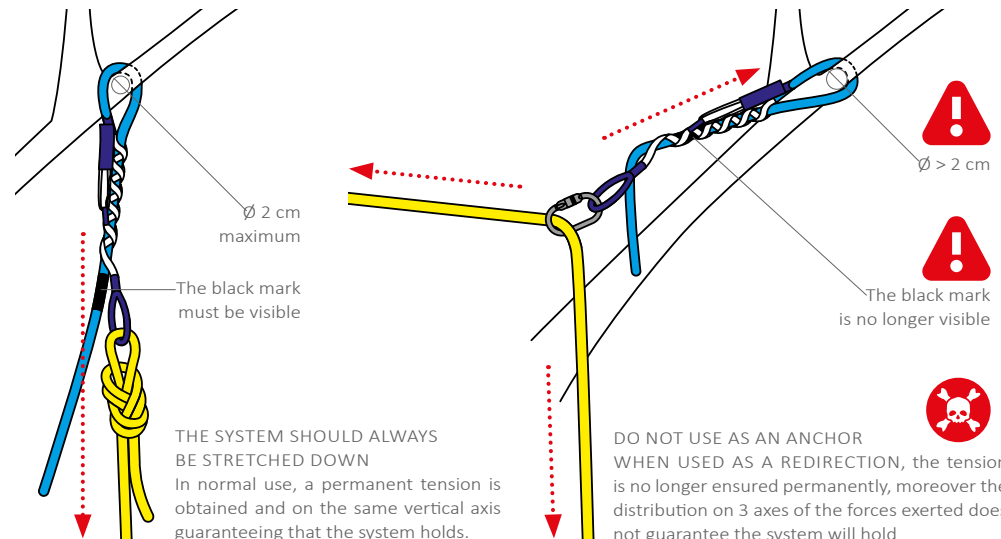
Arborists have always "tweaked" equipment and techniques, it is most certainly thanks to this that our profession has a multitude of products and techniques specifically engineered to arborists. However, having drawn so much in recent years from mountain climbing, caving and rescue equipment, it is always worth checking out new equipment that might be useful for tree work.

THE BEAL ESCAPER

In 2020 we saw a new tool appear, the Beal Escaper. The Escaper is an EN795B standard releasable anchoring system, intended for sports and rope access (no mention of work in trees) and costing around \$££50. To minimise bulk it has a relatively short length of anchor rope and because it is intended to be attached to climbing bolts/anchors, the maximum anchor diameter recommended by the manufacturer is 2cm/<1" and a black mark on the rope must remain visible below the web grab-knot or 'dogs' once the anchor has been set up. In a tree, whether for an anchor or even a redirection (a use proposed by some arborists), 2 cm is logically not a safe minimum diameter let alone a maximum. **[ED: It's important to remember that a redirect anchor can have a much higher load imparted on it than a main anchor due to the more obtuse rope angles and shorter rope lengths between contact points available to absorb energy].** This maximum diameter is preset by the manufacturer to keep a safe length of tail below the 'grab-knot', the larger the diameter that the end loop has to pass around, the shorter that safety tail becomes. The simplest option for arborists, since bulk and weight are less of a problem than for rock climbers, is to have a longer starting anchor rope length. The user manual is the one and only valid official document defining the framework of use so it is simple to conclude that the *Escaper* is not suitable for arboreal use in its current form/length but a longer length could easily be made? We nevertheless tested the product in situ in trees as an anchor on diameters beyond the maximum authorized (none of the testers would accept 2cm as an anchor). The release and recovery

of the rope and this anchor system is achieved by a succession of pulls and releases of the climbing rope, similar to ringing church bells. The webbing through which you thread the climbing rope grips it like a prusik when you pull down but slackens when you let go with a bungee cord 'resetting' it several inches further up the anchor rope. You maintain this spring action until the tail of the rope disappears into the web-grab and out of the end thus opening the anchor loop to then fall to the ground. It is recommended to tie a simple overhand knot ahead of the black mark just to be sure there's no accidental release and then on the final occasion you use it (or the last person down) untie it so that it will release as intended.

Because tree work involves a succession of load and release actions rather than a straight climb or descent from point A to point B it seems quite possible to gradually release the Escaper during movement and this would be especially dangerous if your anchor loop is larger to go around branches thus shortening the available tail of anchor rope. The Escaper was designed to be used with a constant downward tension. However, if used as a redirect in a tree, there is a bouncing action and lateral tensions that could accelerate release albeit that a redirect release/failure though dangerous is not necessarily catastrophic since the main anchor provides the ultimate fail-safe to falling to the ground (if you're high enough in the canopy!). Moreover, in this mode, the assembly is being used outside the manufacturer's recommendations. The *Escaper* cannot be used as a rescue anchor in terms of 2-person loading. It is good to see and try out new equipment, however in the case of the *Escaper*, the usual arb-working methods make this seem a risky option unless the anchor rope length can be increased. Currently the all-important limitations set by the manufacturer, which must be adhered to, can be mitigated for failure but it is up to you to decide. Above all, Climb safe.



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Strong - Supple - Predictable

BlueWater's 11mm NFPA-G rated low elongation line features:

- < 48 carrier sheath
- < Designed to run well in all devices
- < Whopping 9,447 lbf. published tensile strength
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Diameter:	11mm
Tensile Strength:	9,447 lbf. (42 kN)
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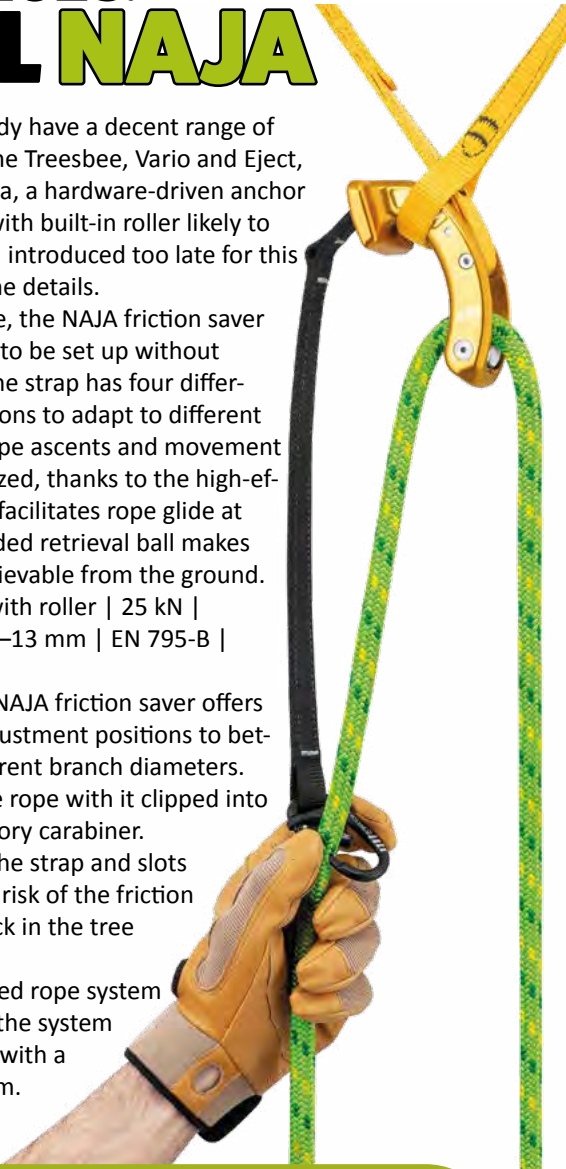
NEW for 2023: PETZL NAJA

www.rescuemagazines.com

As if they didn't already have a decent range of Friction savers with the Treesbee, Vario and Eject, Petzl now has the Naja, a hardware-driven anchor and retrieval device with built-in roller likely to cost around €150 and introduced too late for this article but here are the details.

Designed for tree care, the NAJA friction saver allows the work rope to be set up without damaging the tree. The strap has four different adjustment positions to adapt to different branch diameters. Rope ascents and movement in the tree are optimized, thanks to the high-efficiency pulley which facilitates rope glide at the anchor. The included retrieval ball makes the system easily retrievable from the ground.

- cambium saver with roller | 25 kN | for ropes of Ø 11–13 mm | EN 795-B | EN12278
- The strap of the NAJA friction saver offers four different adjustment positions to better adapt to different branch diameters.
- Easy to install the rope with it clipped into the MINO accessory carabiner.
- The slimness of the strap and slots helps reduce the risk of the friction saver getting stuck in the tree during retrieval.
- Use with a doubled rope system is preferred, but the system can also be used with a single rope system.



CONCLUSION

From the false crotch/fork with rings to the cinching/choke false fork, this first category is the essential to have in our bags, its choice will be made according to your practice, in small trees where the climbing time is short a false fork with rings or even a sling with carabiners may be all that is needed to get the job done efficiently. Conversely, during long working hours, the comfort and ease of movement afforded by a pulley or pulley-based hardware like the ART Ropeline/Twinline or Petzl Eject can be immense. As for the rest of our equipment, each according to his practice must find what suits him/her best. The rest of the anchoring range are "optional" elements that can be dispensed with, but this can be to the detriment of comfort, safety and traces left by friction on the bark... after all, in the language of Shakespeare, what we in France call a 'false fork' is literally called a "cambium (bark) saver" and for good reason.

S|M|C // **APEX**
A NEW REVOLUTION OF PULLEY



Cold-forged swivel eye is textile friendly & accommodates up to three carabiners

Swinging sideplate allows for midline rope attachment

Triple-action lock combines security with industry leading ergonomics

Symmetrical body streamlines rigging with prusiks

To create our new Apex Swivel Pulley, we combined 54 years of design and manufacturing knowledge with an uncompromising program of innovation, prototyping and user feedback.

The result is unmatched security and deceptively simple operation. This robust, American-made pulley will give you the confidence to complete your operation, no matter how complex the challenge.

**MADE IN
USA**

HAND BUILT IN THE NORTHWEST

SPECIFICATIONS APEX 1.5 Single Swivel Pulley

Model #:	NFPA165120
Material:	Aluminum, Stainless Steel
Finish:	Anodized, Blue/Grey
Dimensions:	5.8" x 2.9"
Weight:	10.8oz (306g)
MBS:	38kN
WLL:	9.4kN
Rope size:	up to 13mm
Sheave Major Diameter:	2.0"
Sheave Tread Diameter:	1.5"
*NFPA-G Certified	

Treetopia 2022

Mare Island, California

by Michael (Ox) Oxman

Treetopia 2022 was a magical tree industry event and festival in California presented by A Plus Tree Inc and Treestuff. Treestuff need no introduction but A-Plus Tree, Inc is a west coast based, progressive and forward-thinking tree care company with much love and respect to give. They are improving with workforce development – and taking care of the people of this great industry and the next generation.

The 2-day tree festival was held on a 10 acre naval officer's garden in a Mare Island shipyard near the San Francisco Bay at Vallejo, California. It jumped off with an unexpected opening ceremony—A welcome speech, a beautifully sung national anthem, and an inspiring six-chainsaw salute. Treetopia was a fantastic blend of education, arbor-style games, obstacle courses, equipment demos, a ton of prizes and lots of family entertainment. There were three bands, including a nine-piece Mariachi band, steel drum Caribbean band, and a New Orleans style brass band that led the parade to the afterparty at a local brewery.

WHY TREETOPIA?

All tree industry events have a regional flavor and Treetopia was no exception with the intention to create a West Coast. In the words of Cyrus DeVere, A Plus Tree's CEO, "For us it's a pay-it-forward and a giving initiative. We are privileged and humbled to be able to partner with TreeStuff.com and provide such a platform." Over 700 people attended the festival, set in a tree climbing obstacle course among huge trees, in a parklike neighborhood of abandoned vintage officers housing barracks. Attendees were largely members of the tree care industry, suppliers, vendors, and their families.



GAMES

The ropes course tested the agility of climbers of all ages, young and old. Teams combined scores in competition during the games, awarding \$25,000 in prizes. A game testing accuracy of dismounting from a rope assessed people's ability to land in a 5' wide target circle, showing control in descent down the rope. The Claw game used 4 ropes suspending a climber in a harness from 4 trees. Lengthening the various lines moves the climber across the drop zone while picking up boxes containing prizes with their feet, carrying them back to the starting point.

A tug-of-war between a tractor and humans pulling on the rope resulted in it requiring 18 people to stop the tractor. There was a sunset head-to-head foot locking contest, with former world champion tree climber, Mark Chisholm winning the top prize.

EQUIPMENT DEMONSTRATIONS

The Tractor Maze driving game tested skills in equipment operation. The rubber – tired tractor is driven thru an outdoor race course, carrying a bucket of water in the Branch Manager bucket of their loader. Several of these games have real life scenarios.

The benefit of this hands-on festival had real life

utility driving the tractor, using the crane simulator, fitting of harnesses, chaps & boots to allow good purchasing decisions. Vermeer and RDO Equipment set up a head-to-head course so folks can hop on and test out their CTX 100's. They also demo'd their new AX 17 whole tree chipper.

The crane simulator provided by NJ Crane Experts allowed the participants to sit in a chair operated by a motion access base. Hydraulic pumps move the seat while the simulation reacts to the trainee's adjusting crane controls, and they move the joystick while observing the image of simulated tree branches being hoisted or lowered on the video screen. The joystick



can be manipulated to maneuver around imaginary obstacles that may be encountered in on-the-job tree care operations. According to NJ Crane Expert Hans Tielmann, who developed the simulator, one of the biggest benefits comes from the ability to safely simulate working in close proximity to energized power lines. The crane simulator allows operators to get in the seat & try out various lifting & rigging scenarios without any risk. A knuckleboom crane with grapple chainsaw head, owned by Erick Palacios was used to demonstrate the precision needed to simplify operations that can save money for tree service operators. A comparison of crane use with various rigging systems helps arborists decide what gear is needed, and sometimes the larger pieces of equipment can make good economic sense, as well as being much safer.

RECREATIONAL TREE CLIMB

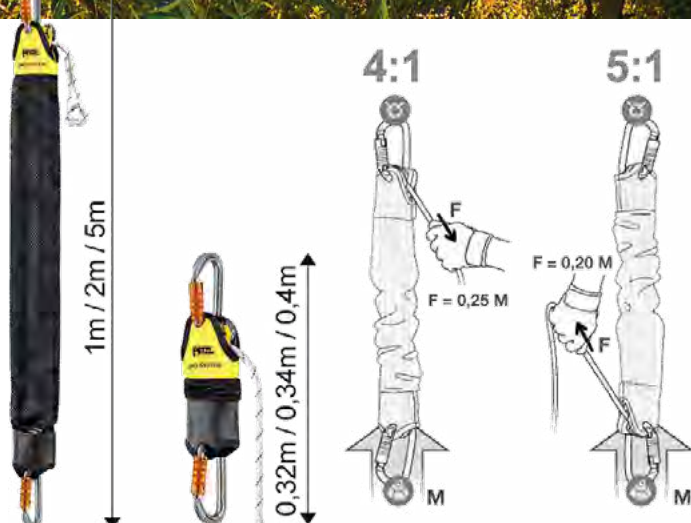
An open recreational climb with about a dozen climbers took advantage of an old spreading Eucalyptus tree in the Euc Zone. On the last night of the conference a group ascended in the dark on a special rec climb of the Eucalyptus tree. Headlamps helped accommodate risks from unseen objects in the treetop. There was enhanced radio communication with the lead climbers relaying inspection results determining the strength of branch structure. Visibility was less than during the daytime, so precautions were taken with extra planning. Redundancies by several climbers provided duplication of security measures.

CLASSES

There were 28 classes with subject matter presented by expert arborist instructors, with a variety of classes from climbing

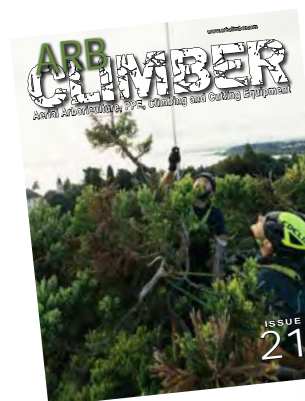
workshops, bore cutting secrets of tree felling, and PHC demos to aerial rescue training. Recertifying professionals could receive Continuing Education Units (CEU's) and everyone else can expand on their skills and expertise. One attendee wrote to the Treetopia staff and said, "It was a life-changing experience. Because of the women-led climbing workshop by instructor Megan Bujnowski, my daughter now wants to be a climber when she grows up!"

Trainers with businesses dedicated to workforce education gave a professional sheen to the teaching portion of the weekend. There was a focus on racial and gender equity from a diverse contingent of experienced arborists from many backgrounds. Women involved with training arborists gave the perspective that comes from overcoming stereotypes that have been pervasive in our industry. Spanish speaking instructors and vendors catered to many bilingual arborists. Arborists are recognizing the historic suppression of underserved minorities thru programs at Treetopia. Videos & powerpoint presentations on big screen tv's provided detailed information at the classes. Equipment, tools and services available for arborist resources were displayed. Some items, new at the time of the event, were introduced to this audience by commercial vendors. The DMM Keanu was used by instructor Taylor Hamel to hoist a log and cause it to travel sideways along a highline to redirect it's position before lowering it to a landing.



The Petzl Jag is an enclosed 5/1 block & tackle, small and light enough carried on the harness for rigging configurations that must be hoisted with progress capture capability.

The Edelrid TreeRex sit harness and Bungee chest harness were on display, this was the harness system featured in the cover of Issue 21 of **ARBCLIMBER** magazine and otherwise not widely known in the US so it was good to see some of this kit 'in the flesh'.



Throughout practical demos, manufacturer's representatives stressed the fact that mechanical devices need to be inspected every time we use them. Bigger gadgets have greater leverage that can put excess pressure on suspension components. Devices with life support functions are massive and able to resist strong forces in tension. Some of the rope friction devices being used were the good 'ol Blakes hitch, Rope Wrench with various tethers, ART's Spider Jack, several types of Rope Runner, Rock Exotica's Akimbo, and Petzl's Zigzag with Chicane mechanical tether.

OUTCOMES

Our methods of communication get the message out about the need to improve our skills. A laid-back attitude results in learning more at Treetopia than some other events that are focused on competition. If we think of rigging options we can make it happen with our creativity and experience. Ryan Michael Swederski liked the networking at Treetopia among people he met on the internet, who finally had a chance to introduce themselves in person. Ryan is a crane



safety and climbing instructor with Swederski's Independent Consulting LLC. Ryan enjoyed meeting potential clients and new opportunities to compare their own skillset with the moves they aspire to incorporate into daily routine. Ryan says, "If you are willing to invest in your own career, do it with knowledge". Several vendors said they had unexpected turn-out and incredible engagement with quality leads. It was just as fun for them to be there as it was for the those who attended.

CONCLUSION

At the end of the event, Treetopians walked away filled with a sense of excitement and belonging. A-Plus Tree and TreeStuff nailed the festival vibe and demonstrated how bringing in the family aspect adds another layer of community. Tree industry events are expanding and widening in scope to include more than what we're used to.

After Treetopia, instructor Krista Strating went on a tour of the Giant Sequoias, and then went to the competition of the North America Tree Climbing Championship (NATCC), where she won the women's title. How fantastic it is that instructor Taylor Hamel was able to go home after Treetopia & host the NATCC in his hometown of the Twin Cities in Minnesota!

Now that pandemic restrictions against group gatherings are easing, the number & frequency of tree climbing events is ramping up. The fact that these two back-to-back events happened in 2022 is a sign that the hunger for more arboriculture information has arrived. Thanks so much for helping arborists grow with the times!

To see a 13 minute video of Treetopia22 go to: <https://youtu.be/1mFMvQ9incY>

Michael Oxman began climbing on Manila rope, right out of high school in 1970. He lectures at conferences, produces videos & is a content creator on social media platforms.

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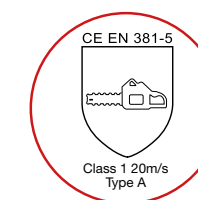
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DECAY DETECTION TESTING

by Charlotte Ina Sterland



INTRODUCTION

Surface fungal growth on a tree can indicate serious decay, but from the outside it's hard to tell how much decay there is, how deep it goes and whether it has any effect on the structure and strength of the tree. For trees that are to be retained we need a less destructive way to look inside. Unlike assessments which can be done quite superficially, either by visual inspection or by looking at bark strength, it's possible to get a really good picture of the wood health inside the tree using the right equipment. While these tools are primarily seen deployed at or near ground level, there is much that climbing arborists and inspectors can achieve with these tools. Tomographs and drill-resistance systems are currently two of the standard pieces of equipment for non-destructive examination of the structure and health of tree.

Tomographs send sonic pulses into a tree, calculating the speed of the waves in different parts of the tree. Where there is decay, pulses travel around the defect. Sensors are placed around the trunk circumference at a height thought to contain decay and by using enough sensor points around the tree, a cross-



sectional diagram can be created showing the load-carrying (stronger) wood.

Frank Rinn is credited with most of the initial development of tree decay systems and founded Rinntech to sell the 'Resistograph' drilling device, which electronically measures the resistance of wood to a drill as it enters the tree. IML Electronics' 'Resi' is the other major player in drill-resistance testing. Where the wood is sound and dense, there is more resistance to drill-entry. If wood is less sound or decayed there is less resistance to drill-entry. Depending on the model, where there is a hole due to decay and no resistance at all, the drill will automatically retract. By determining how much the drill's movement is resisted, a line chart of the density of wood in the trunk is drawn up which can be used to map out quite quickly where large decay areas exist.

This article is not intended as a 'how-to' guide, simply a look at key tomograph and drill-resistance models and compare what they offer arborists, both in ease of use, cost, and variety of results obtained. Opposite is the *Rinntech Arbotom* tomograph system with sensors placed partway up the trunk together with a visual representation of how that is mapped. On the right is *IML's Resi* and above is *Rinntech's Resistograph* systems using a drill bit to test resistance of the wood; lesser resistance being indicative of poorer quality wood.

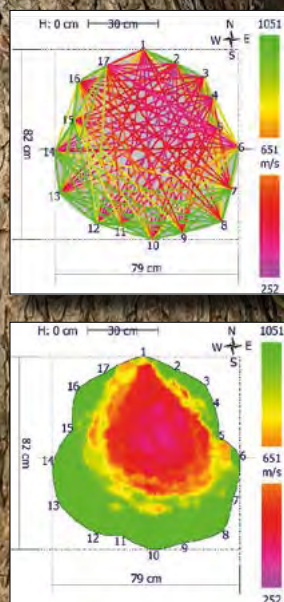
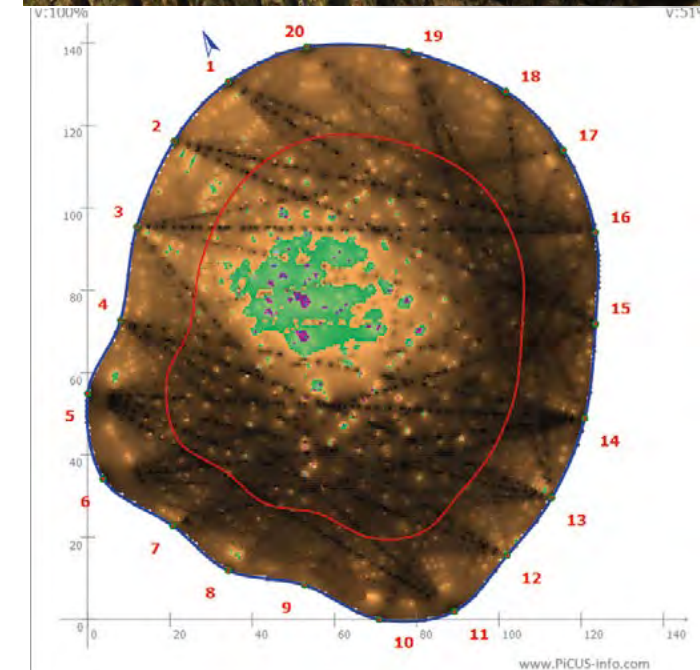
SONIC TOMOGRAPH SYSTEMS

PRODUCING CROSS-SECTIONAL DIAGRAMS

The Picus 3 tomograph, by German company IML Electronic, is the most up-to-date tomograph sold by IML. The system includes an all-in-one carry case and GPS location features for logging the tree's whereabouts.

A tomogram can be created in about 15 minutes from start to finish: Nails are placed around the tree circumference at the level where fungi is suspected. Using Callipers, the distance between all the nails is calculated, so that a chart of the tree circumference can be drawn up by Picus. After this, numbered sensors are attached to the nails, (maximum 12 for the 12 model). Using a specially programmed electrical hammer, five sharp taps are made on each of the sensors, one by one. The tap sends a sound signal through the tree to all the sensors,

and the time taken for the tap sound to arrive at the sensors gives the speed of the sound in the wood, which can determine the thickness of the wood (using the distance chart we created with the callipers before). When this has been done using all the sensors, (in both directions round the tree), the tomograph can sketch up a visual representation of the tree's interior.



Rinntech Arbotom tomograph



IML's ResiPD400 drill-resistance system



The 6-sensor model is better for slightly smaller trees, since this has enough sensors to map out the tree quite accurately, while the 12-sensor model can be stretched around the whole trunk of a larger tree. The 6-sensor model can be used for larger trees but the sensors must be placed twice; first for one half of the trunk, then removed and placed around the other half. With Bluetooth connectivity, the Picus 3 can be connected easily to a laptop for displaying results, otherwise an SD card is used for internal data storage, so that the device may be used completely stand-alone without laptop. From the resultant image (in this case an oak tree) we can decide whether we want to use a Resi drill to look at parts of the tree in more detail. Picus 3 has been used by professionals working not only on tree analysis but also for other timber structures like playgrounds/ adventure parks, historic buildings and even Nelson's flagship, HMS Victory to identify potential areas of weakness that can then be exposed and repaired/replaced.

DESIGN AND FEATURES

The Picus 3 can easily be taken up the tree and has a clip-on holder and packs away into a small bag, custom-made for climbing arborists. Not surprisingly, it's a little faster to use with two people rather than one but one person can easily set the whole system up. Picus is fairly practical to transport to the tree but it is much easier to operate a laptop from a car boot/trunk or the back of a pick-up. At £16,560 for the 6 sensor model and £20,930 for the 12 sensor

model, the Picus 3 system is fairly expensive, but there is no limit to expansion of the system and even the smallest kits can be used on larger trees (albeit more time-consuming) and it comes with ten software licenses for use on your various platforms.

ARBOTOM (Title picture and pic right)

Having developed the principles of tomography, Frank Rinn went on to produce the Arbotom system using sonic waves to determine where decay exists in the tree. Rinn developed tiny sonic sensors for looking inside trees. 'Before this,' he says, 'ultrasonic waves were being used, but required removing the bark of the tree; therefore harming the tree unnecessarily.' With a focus on examining urban as well as rural trees, the Arbotom uses tomography to determine where the tree cannot take as much load, or where intervention might be required to maintain it. The Arbotom can be used with 6 to 8 sensors for smaller trees, or with as many as 24 sensors for bigger stems. The 24 sensor system allows for use with buildings, to determine rot in beams, which is sometimes completely hidden. Bridges, towers and important stucco are also tested using the Arbotom technology. Older buildings constructed with beams throughout are often tested and large diagrams constructed indicating places of decay. Similar detail can be achieved with enough sensors and scans up the trunk of the tree. Rinntech also offer 'Arboradix' equipment; for defining the extent of a root system and used in addition to the Arbotom, for when information about the roots below ground is sought; perhaps under a road or similar.

DESIGN AND FEATURES

Cables can be ordered at different lengths, and sensor pins are also available at different lengths, if a tree with very thick bark is to be measured. Also with Bluetooth capability, the software for the Arbotom allows for allometric data analysis (further analysis based on initial tomograph results). The screen controller is quite small for the Arbotom, and can easily be taken up a tree in a backpack. A number of interesting softwares items are available for comparison of the initial tomogram data with other trees. Rinntech are constantly updating the tomograph technology, from sensors, to software and for the most up-to-date product options available, it's best to contact their distributor in your locality. In the UK for instance an Arbotom usually costs around £8,000-



£14,000. Again, not a cheap acquisition but it certainly adds a technological offering to your business. [ED: Accurate data gathering and assessment are essential for all of these systems so if this is outside of your skillset you may need to work with a qualified dendrologist or tree inspector, preferably one that doesn't climb, making your skills indispensable].

DRILL-RESISTENCE SYSTEMS

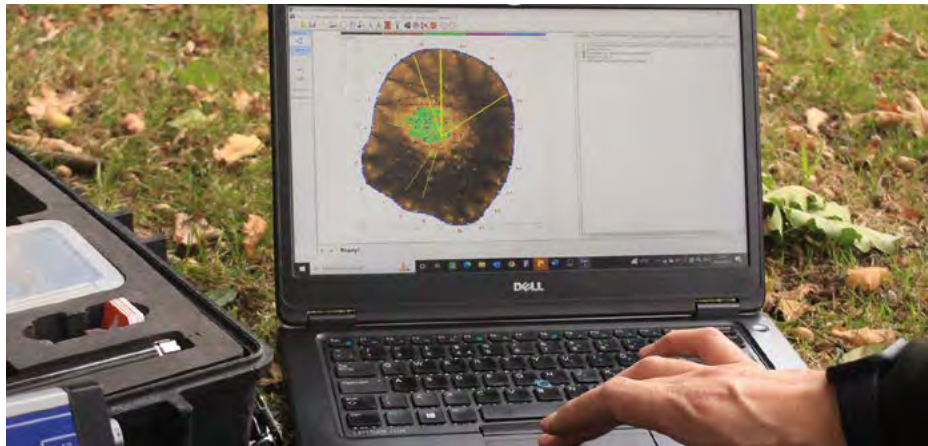
Designed to assess and monitor tree decay, the Resistograph and Resi systems are used to profile weaknesses in a tree's wood by creating a density profile of the wood. Measuring the resistance a tree provides to a drill on entering the tree allows a visual spectrum representing the length of the drill bit, to be created and examined.

RINNTECH RESISTOGRAPH (pic above)

Frank Rinn wrote his physics thesis proposing the resistograph in 1986, and developed a resistograph model soon after. The Resistograph® R650 is the latest model Rinntech are selling, offered in 4 versions:

- **R650-pr** for conifer (and other soft) timber as well as utility poles
- **R650-ea**, for tree and timber inspection
- **R650-ed**, for high density tropical species
- **R650-sc** for scientific applications.

Supplied ready for around 1000 drillings (120 per charge), the resistograph drill is shorter and lighter than previous versions and drills slightly faster and





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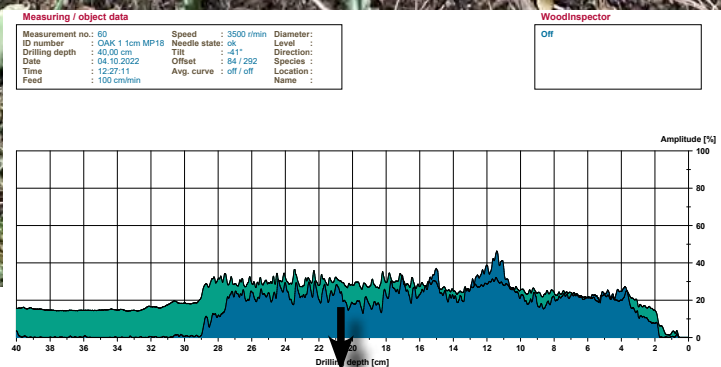


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Microdrills should not be applied between buttresses or into visually rotten wood and you should instead seek a more regular and solid surface which will give a better visual contrast between sound and unsound areas of wood.



Two comparable drill results in our test oak tree, one (blue) which runs into an area of decay (arrowed where the graph drops) and the other (green) which does not.

with adaptive speed response but still with high precision and resolution. With a drilling depth of 50cm/20" the unit has thermally and electrically insulated casing but still weighs only 4kg so it can be used one-handed. The device also features LiMn (lithium manganese based) batteries, which are suitable for ten times the charging life of lithium-ion batteries. With a vast internal memory, the *Resistograph* also has *Bluetooth* connectivity.

As found using *Rinn's* models, *Resistographs* can also be used to establish weather patterns in the years of growth of conifer trees. Early wood (grown earlier in the season) and late wood (grown later in the season) show different drill resistances. These can be matched with corresponding weather conditions in the year of growth. Calibration is also required when compensating for friction, encountered when drilling into denser wood, and software is available from *Rinntech* for this.

RESI MICRODRILL (pics above)

The *Resi PD* is IML's most up-to-date micro-drill system and is available from 20cm/8" to 100cm/39" drilling depths. The *Resi* is suitable for both drill-resistance and feed-resistance measurements. A drill speed of 200cm/78"per minute makes this a fast model with a range accessories. These include mini portable *Bluetooth* printer onto graph paper, which is available in reels. There is also a more ergonomic handle which can replace the existing handle, is adjustable and has a shoulder strap which can be used if taking it up the tree. A screen protector is also a nice addition. Older *Resi* drills used to have a

VERDICT

With their accurate testing capability, drill-resistance systems and tomographs are both great investments for tree inspection companies and arborists, and have many wider applications for other forms of timber inspection. While they are definitely expensive; they are a sure way to give reliable feedback about the state of wood in trees, offering information which other industry standard tests do not. Suppliers like Sorbus International in the UK and Dr Julius Dunster for Rinntech in the US provide training services for the use of decay detection equipment and it is essential that arborists providing such services to customers are competent and up to date on their training.

DECAY DETECTION TESTING

Sonic Tomograph	MANUFACTURER	MODEL	NOTES & SYSTEM CONTENTS	Approximate KIT PRICE
	IML ELECTRONICS www.iml-electronic.de www.sorbus-intl.co.uk urbanforestinnovations.com	Picus 3 6-Sensor 12-Sensor	Up to 99 measuring points with a PC, 24 without. Transport case. Control unit. 6-Sensor chain(x2) Radio hammer with display for PST 3. Hammer cable. 4x belt clips. USB cable. 2x 25mm lashing/tension straps 4.5m. Charger. Tape measure Hammer & cable. Nail/screw bin. Number set 1 to 24. USB&software. PiCUS Climbers bag. PRHD cable. Manual	£17/21K \$13-18.2K €12.1/17.1K
	RINNTech www.rinntech.de www.writtleforest.co.uk www.rinntech.com	Arbotom 8-Sensor 12-Sensor 16-Sensor 24-Sensor	Pro, Precision and 3D kits available. Pro-kit= 12 impulse sensors/cables, 60mm sensor pins. 12V rechargeable battery pack. Accessory kit. USB and Bluetooth connection to notebook computer. ARBOTOM® 2-D software for Microsoft Windows. Stable transport case. Half-day training. One-year support contract. Manual	£6/8/12/15K \$7/9/13/16K €6/8/12/15K
Drill-Resistance				
	IML www.iml.de www.sorbus-intl.co.uk www.iml-na.com	Resi Microdrill PD200. PD300 PD400.PD500 PD600.PD750 PD1000	PD400 (400mm) most popular for Arborists. Aluminium case including the PD device with drilling needle fitted, fast battery charger, 2 x 5,0Ah 18V Li-ion batteries, integrated 45° adapter, USB cable Bluetooth compatible, Pliers, 10 x spare drilling needles in quiver, Tool Kit with spare chuck & User Manual	£3/5K \$4/6.5K €3/5.3K
	Rinntech www.rinntech.de www.writtleforest.co.uk www.rinntech.com	Resistograph R650 PRO R650 EXP R650 ED R650 SCI	650-SC, Scientific & 650EA Tree Pro. EA kit= Resolution 1/50mm. 2 battery packs/charger Wireless thermo printer/20 paper rolls. USB cable. Tool set. 10 Needles(drills bits). 10 hardened needles. Carrying case/strap DECOM™ Expert software for data processing and visualisation.	£6/7/9/10K \$7/8/10/11K €6/7/9/10K

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RiGGiNG

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by **Paul Poynter & ODSK – Japan** *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), works with the leading arb stockist ODSK and uses his considerable artistic talents to produce work as the **Wooden Hand** project*

.....the rope that you never knew that you wanted.....

Class II refers to the material type, not the ropes construction.

Class II ropes are made in whole or part from any of the following high modulus fibers: Dyneema®, Vectran®, Technora®, and Zylon®.

Technora and Vectran were originally developed for telecommunications and are also sometimes used for winching operations.

Both these fibers are abrasive and have a tendency to wear themselves out to the point of weakening the rope.

Dyneema is a soft rope so you can safely use it for repeated rigging cycles without it wearing out.

Dyneema itself has a low melting point but when used with a protective cover in a double braid construction it becomes a super strength and incredibly light weight option for a variety of uses.

If you use a Teufelberger Tree Motion harness you will already be using a class II rope (the green bridge). its strength to weight ratio is unbelievable. Constructed into a double braid with a polyester cover protects the

lightweight, high strength Dyneema core from any heat damage. They use this same construction in their ArborWINCH rope shown below.

I became personally interested in class II ropes after following rigging stories on the tree buzz forum way back in 2005. At that time people were discussing ways to improve efficiency and how to choose and implement the correct tools for specific problems. A lot of the conversation was based around using lowering devices with a marine winch (Harken).

Today marine based rope technology is stratospheric in its development and tinkering but even twenty years ago there were a lot of different types of rope available.

ADVANTAGES

Class II rope offers various advantages:

- heaps of efficiency when winching. It stretches less so the load is pulled almost immediately.
- less weight and stretch means that highlines and speediness need less initial input tension.
- lightweight means less work for you when carrying into difficult (slopes) and far away work sites.
- very low stretch (1.5%)
- polyester cover protects the dyneema core from heat.
- easily spliced.

Those of you that have been rigging for a while with a harken winch may have tried a variety of class I ropes by now.

www.rescuemagazines.com



Above: Materials used in specialist military and rescue ropes are now used extensively in tree work (Teufelberger above), albeit at far higher prices than traditional polyester and nylon. Technora and Dyneema may be mixed to provide an incredibly strong core which is further protected by a Technora/Polyester sheath.

Below: Samson's 100% Dyneema Amsteel is typical of modern wire-rope-replacement cords. They are ultra-high strength with similar strength-to-diameter of wire rope but around 6 times lighter and much easier to handle. They are ideal for winch-use but as single/hollow braids are not well suited to cams or capstans with cleats/cams.



DO YOU HAVE A FAVORITE ROPE?

Your choices will probably fall into one (or all) of the following categories.

- Price
- MBS
- Knotability
- Hard wearing cover / coating
- Good balance of static and dynamic nature (around 4% stretch at 20% MBS / 5:1 SWL)

But like me, I am sure that you have found most class I ropes to be fairly similar in nature. They tend to stretch and knot in similar fashion, and all are used like work horses for static and dynamic rigging. Much of a muchness in the pool of polyester double braid ropes, all high quality from the respected and well known companies. This is a great situation for to be in, far better than there being a risk of spending hard-earned money on a less capable product.

For any 'dynamic rigging' I will certainly use a class I rope and for anything else I choose class II. It is initially startling to buy a class II rope because the price difference makes you sweat, ¥1287 (\$10) compared to ¥708 (\$5.50) in the above example. But please study the data a little, you can see that while the rope

www.arbclimber.com

MATERIAL	MODULUS (tenacity (g/Denier))	STRENGTH (tenacity (g/Denier))	ELONGATION (% at break)
Dyneema SK99 (HMPE)	1800	48	3.6
Dyneema SK76 (HMPE)	1267	40	3.5
Dyneema DM20 (HMPE)	1042	35	3.6
Zylon Type HM (PBO)	1948	42	2.5
Zylon Type AS (PBO)	1302	42	3.5
Zyex (PEEK)	-	6.5	30
Teflon (PTFE)	13	2	8.5
Technora (Para-Aramid)	590	27	4.5
Twaron (Para-Aramid)	600	23	3.6
Vectran (LCP)	600	25.9	3.8

is more expensive you should not compare a 14mm class II to a 14mm class I as the MBS is vastly different.

So, we can compare a 10mm to a 14mm and still have more strength in the thinner rope, 5600kg / 5000kg. A 10mm class II is lighter than a 10mm class I and vastly lighter than a 14mm class I, 64g/m compared to 140g/m.

Low elongation is the reason to use a class II rope, it is like wire, stretching only 1.5% compared to most class II at 4%. This figure may not sound like a lot but it is noticeable even when pulling the rope by hand.

Finally, the price. Comparing a 10mm class II to a 14mm class I results in a price increase that I am sure you will find palatable when weighed against the benefits in efficiency, which of course have a direct consequence to efficiency at work and base line profit. For static rigging, highline and winching jobs a class II rope will simply earn more money than a class I.

I would like to add one more thing, which is my opinion, but valid I hope. We ordinarily work to a rope's Safe Working Load (SWL) and at this particular point a class I rope stretches 4%, so must recoil the same amount. Often find situations where the recoil is a cause for concern because it must always be managed by a human hand. The power of recoil is so strong it can break bones. Comparing it to a class II, when releasing

a winch for example, the recoil is noticeably absent and makes this particular aspect of rigging smoother, and in my opinion, safer. Most everything except Rock Exotica's Unicender (top-right), (eg. RopeRunner, Akimbo, Bone, Zigzag etc.) have a 'pulley' or 'bobbin' at the bottom of

the device which implies that the arborist pulls up the rope

to remove slack. It is called a 'slack tending pulley' for good reason and can be traced back to use beneath split tail systems. Typically a split tail hitch will be pulled and then slack removed by pushing it upwards, giving a positive affirmation of completion. A two-handed operation may seem sluggish, but when used on an SRS line the feet are engaged in the pulling operation. Slack is removed, not by lifting the

RIGGING

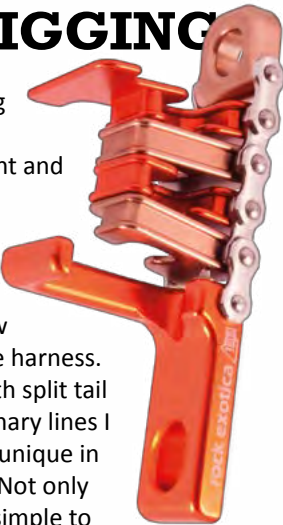
rope but by sliding the device up it becoming fast, light and ergonomic.

Modern devices within MRS and SRS, all sit low down, close to the harness. Experimenting with split tail systems on stationary lines I found something unique in the Unicender. Not only is it the most simple to

install, but also pairs into a dual system with ease

so that a device may trail along a second line and it tolerates a huge variety of rope types and diameters.

Having no pulley allows different climbing techniques and makes one wonder what else is worth discovering from the US, UK and Japanese rope work historical lineage.



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TRANSPORTING WOOD

Using cross-referenced rigging techniques

by **Chris Girard**

Chris Girard sits on various Rope Industry Standards committees, is an ISA Certified Arborist, a Society of Professional Rope Access Technicians (SPRAT) Level 1 Technician and owner of Girard Tree Service, a 15-year TCIA member company based in Gilmanton, New Hampshire, USA.

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Main Pic : English reeve and Photo 1 (Inset) Norwegian reeve. Both systems are similar, as described within the article. Note that a haul-back line is not shown in the main pic but would connect to the rigging plate as arrowed. All photos by Chris Girard



Sometimes you arrive at a potential job site where you know the client wants all the wood removed, and you ask yourself, "How are we going to be able to make this work?"

Occasionally, my company gets work for a logging and site-excavation company that does not have climbers on staff and needs unique tree work performed. I received such a call this past May to bid on a job involving a new septic-system installation behind a house on Lake Sunapee, here in New Hampshire.

THE WORK SITE

In New Hampshire, we have extremely strict regulations for tree work to be performed within 250 feet of a lake, river or stream. This is because, in the past, loggers, tree workers and land owners would clear so many trees and so much vegetation along the shoreline that it would lead to erosion issues, deteriorate water quality and detract from the beauty of the natural landscapes the Granite State is famous for. This particular site fell right in the middle of the protected area, and a DES (Department of Environmental Services) Shoreland Permit was going to be required. While waiting for the "wheels of government" to turn for issuance of a permit, I was able to make a few site visits and produce a viable work order and plan.

The problem with the location of the new septic system was that it was going to be installed halfway up a bluff and gulley, where the slopes are heavily wooded and very steep. The pitch varied from 45 degrees to 70 degrees. Our job was to take down approximately 25 hardwood and soft-wood trees ranging in size from 6 to 24 inches in diameter at breast height (DBH). The majority of trees were northern red oak (*Quercus rubra*), eastern hemlock (*Tsuga canadensis*) and our state tree, the (American) white birch (*Betula papyrifera*). The brush material and as many logs as possible were going to have to be transported up the slope to an existing paved landing, where the new septic would be installed.

There was a narrow, steep, winding road adjacent to the bluff and landing. This led down and around to the carport and house on the lake. Unfortunately, limited lower-driveway access did not allow for removing and processing the material from below. As stated, everything was going to have to be transported up the slope. Due to the steepness of the grade, using a skidder, tractor or mini-skid steer was not an option either. Hauling everything up by hand was simply out of the question. Time to come up with an unconventional rigging plan.

Bringing in a crane is always my first choice on a job as large as this one, but with the terrain, that was not an option. The steep, narrow, switchback road where the landing was located was just too small and had high-tension wires overhead, which precluded extension of the crane boom had we been able to get one into that area.

So, what could we do? Having been a logging and mountaineering enthusiast for a number of years, I knew there were techniques and methods to deal with problematic sites like this one. It was just a matter of which one to use. My friend Norm Hall, an ISA Certified Arborist and master rigger, authored an excellent article that appeared in the December 2018 TCI Magazine, describing how he successfully used caving and mountaineering rescue techniques to transport wood from a site remarkably

similar to the one we had on this job. This is a must-read article for every tree worker if they are going to be doing this type of high-lead work. (<http://digimag.tcia.org/publication/?m=54984&i=547743&p=38&ver=html5>).

In terms of forestry work, around the turn of the last century, Oscar Wirkkala, a Finnish American logger and inventor who lived and worked in the Pacific Northwest, produced the high-lead method of logging that utilized a skyline



Photo 2: Norwegian reeve system used on the author's job, transporting a "turn" of wood up to the landing.

(or "spar") and was ideally suited for the steep, rugged terrain of the West Coast. This revolutionized the industry. Being an ingenious man, he developed and patented many other important pieces of equipment for the logging industry that were used extensively during the first half of the 20th century. One such piece that we still use daily is the choker hook.

Many of the loggers who worked with Wirkkala were former sailors back in the day of wind, sail and tall-masted ships, when a vessel's mast (aka "spar") was used to transport both men and gear

from ship to shore, and vice versa. This experience allowed these workers to quickly adapt to this new method of high-lead logging. For more about these logging and sailing rigging techniques, as well as the terminology used in each industry, I would recommend A Logger's Lexicon, An Illustrated Guide for Logging Terms and Technology, by John T. Labbe, and the late, great master rigger Brion Toss' The Complete Rigger's Apprentice.

THE WORK PLAN

In dealing with our particularly steep work site, I decided to use a high-lead (highline/trackline) system. It would combine techniques of logging, sailing, mountaineering and industrial rope access that would help make this job go smoothly and efficiently. One of the wonderful things about our industry is that we adapt and share different tools, techniques and methods with other high-angle industries. Even though mountaineering does not fall under a work-related industry, much of the gear and what they do can be related to tree work. This, to me, makes it especially important that we also look to them for ideas that may prove to be useful in keeping us safe and productive in our line of work. I call this form of sharing "cross-referenced rigging," and I encourage others to take advantage of it.

Recently, I have noticed a trend with those in the tree care industry who are using high-lead/highline systems. Workers are choosing either the "English reeve" or the "Norwegian reeve" systems. The term "reeve" refers to the passing of a rope through a pulley or block. The difference between the two systems is subtle but worth noting when you are choosing one or the other for your work plan.

In a simplified version, the English reeve consists of a tensioned highline, one or two moving carriages, a control line below that passes through two pulleys attached to the carriages and a final pulley below, connected to the control line and the load to be moved. The lowest pulley allows the raising and lowering of the load and adds a 2:1 MA (mechanical advantage) to the system.



Photo 3: Backguy line, tensioned using a Maasdam rope come-along and a Sampson Tree-Master 1/2-inch (12-mm), three-strand line.



Photo 4: Highline tensioned using Hobbs H2 lowering device and also acting as side guy line, counteracting the opposite pulling force.

The control line – after it passes through the second upper pulley – is terminated along with the highline to what is known in the logging/tree care industry as a “back spar” or “tail hold” (anchor) tree. (See photos 1a and 1b) Other rigging (both hardware and software) gear, such as carabiners, screw links, screw-pin shackles, rigging plates and prusiks, also may be built into the system as needed. In tree-worker/lay terms, the reeve system allows us to easily transport loads – up and down – from point A to point B.

The English Reeve is the Cadillac of hauling systems. It acts as a horizontal- and vertical-moving elevator. Due to the addition of the second pulley below the carriage(s), you spread out the distance between the two legs of rope supporting the pulley and load below. This eliminates the torquing and twisting action in the control line that can occur with other systems. However, the English reeve is more gear intensive than other haul systems, and can lead to additional job costs if equipment must be purchased.

As stated earlier, there are subtle differences between the two systems. The Norwegian reeve also consists of a tensioned highline, but only has one moving carriage and one pulley attached below it. A control line runs through the pulley and down to another pulley attached to the load to be moved. The control line then runs (aka “reeves”) back up and is terminated to the rigging hardware, which is connected to both the pulley and carriage. (See photo 2) This also provides a 2:1 MA. The beauty of the Norwegian reeve is its simplicity in the amount of gear needed and its ease of setup.

One thing to be aware of (which I do not really consider a disadvantage) is that, due to the control line being terminated at the pulley below the carriage and the two legs of the rope being so close together, sometimes the control line will torque and twist while the load is being raised/lowered. Often it will correct itself, and this really does not affect the strength or function of the reeve system. If, however, you are a rigger such as myself, who always tries to get a “fairlead” (the direction a rope runs, in a straight

line, through the hardware to avoid chafing), then you could choose to use a swivelling pulley attached to the load to eliminate this “problem.”

CONDUCTING THE WORK

I settled on using the Norwegian reeve system for this project. Whereas in the past my crew has used various reeve systems, we decided on the Norwegian reeve because it fits with what we use for gear and for its ease of setup. The first thing was to choose the location for the highline. We had plenty of trees to pick from, but I wanted to stay in the center of the landing as much as possible in order to stage the logs and chip the brush. Unfortunately, that left us with a hemlock tree approximately 10- to 12-inch DBH – not as large as I would have liked – as our “front spar.” I knew this tree was going to see tremendous forces on it and would need guying support from both the back and side, due to the way we would be loading it. The highline consisted of a fairly new Sampson 1/2-inch Arbor-Plex line. Though not the ideal rope for this application (I would have liked to have had a more semi-static or static rope), I did have a lot of it and knew we were spanning close to a 125-foot distance. I also knew to keep all the loads within the safe specifications for this particular 12-strand line. The highline was reeved through a redirect pulley installed on the front spar, but not tensioned just yet. Once the highline and pulley were in place, I tied a back guy line adjacent to the highline and lightly tensioned it using a Maasdam rope come-along and a length of Sampson 1/2-inch, three-strand Tree-Master line. (See photo 3)

Because our pulling force was going to be perpendicular to our front, guyed-back hemlock tree, I also wanted to set up a side guy line that was as close to 180 degrees opposite our pulling force as we could achieve. This would cancel out the bending moments (levering action) that the vector forces would exert on the front spar when everything was tensioned and pulling evenly. In setting up a front or back spar (anchor pole) in this manner, it allows you to use a much smaller stem, if necessary, which we had to do with

this particular location. We would use our trusty Hobbs H2 lowering/lifting device to tension (but not over tension) the highline, coming from the redirect in the hemlock. This would not only secure the highline, but also function as our side guy line, counteracting the opposite pulling force. (See photo 4)

Before we tied off the highline to the back spar, we needed to install our Norwegian reeve carriage system. (See photo 2) We kept the setup simple and used gear we already had with us. This consisted of a Petzl Tandom carriage pulley. Its distinctive design allows it to move horizontally without the worry of flopping over that you get with rescue pulleys and blocks. Connected to that was a steel, locking carabiner and a DMM Pinto Pulley. A Sampson 1/2-inch Stable-Braid rigging line ran through the Pinto, then down through a 2-inch CMI Service Line Pulley (which was connected to our loads) and back up to the steel carabiner, where it was terminated with a long bowline knot.

Also attached to the steel carabiner was our “haulback” line, which was nothing more than a “retired” Yale Blue Moon 11.7 mm climbing rope. On the carriage end of this line, we attached a 1/2-inch screw-pin shackle, which was then connected to the steel carabiner. This added a smooth interface without having to tie directly onto the long axis (spine) of the carabiner. As the haul-back line was also going to function as a “snubbing line,” – temporarily holding back the load as it was raised – we needed to make sure no part of the gear would be loaded onto the gate of the carabiner. The snubbing/haulback line was tethered off at the base of the back spar with a Port-A-Wrap rigging device and managed by one of my ground workers during hauling operations. (See photo 5)

Our back spar was going to be a large red oak with sufficient diameter 35 feet up, where the termination knot would be. There was no need to guy it back. (See photo 6) Another option to use, in the event you do need to give the tree extra support or lessen the forces on it (as Norm Hall mentions in his article), is to run your highline through a rigging friction

saver up in the tree, then down to a Port-A-Wrap at the base of the tree. This serves multiple purposes:

- (1) The resultant vector force between the two legs of rope will be at an angle instead of horizontal, which will lessen the bending moment on the spar
- (2) the tension in the highline can easily be controlled from the ground
- (3) in the event the back spar is not a removal tree, the friction saver can be removed from the ground without having to climb back up and untie a knot

After we secured our highline with a half-hitch and running-bowline termination knot, we tightened the rope using the redirected Hobbs H2. [Note: A tensionless hitch (aka the “no knot”) would have been a better termination knot to use on the back spar, as it would have eliminated any excessive bending of the fibers in the highline, thus ensuring we used the rope to its optimal strength.] We kept the highline semi-taut but not super-tight. This would help reduce the vector forces. When tightening the high-line, you need to be thinking about your rope properties, such as the percent of break strength and elastic elongation. Obviously, knowing what type of rope you are using is critical. All the necessary information can be found in the rope manufacturer’s spec sheets, which are available online. Again, though, these things should be thought out and discussed beforehand in the JSA (job safety analysis) and the work order. Now is a suitable time to speak about highline tension. Too many tree workers new to highlines think they can just throw some ropes and pulleys up there and the system will work. This could not be further from the truth. You need to know the basic physics behind the system, the WLL (working load limit) of your gear and much more. You also need to be aware of force-multiplication and highline-tension formulas.

In physics, a force multiplier, such as a lever or wedge, increases the amount of force you can place on an object. In tree work, we think of force multipliers in terms of rope angles between anchor points and rigging points. The important thing to remember is that, as the angle between the legs increases, the resultant



Photo 5: Haulback line acting as a “snubbing line” was tethered off at the base of the back spar with a Port-A-Wrap and operated by a ground worker during hauling operations.



Photo 6: Large red oak “back spar” along steep gully, shown at left of carport. Note highline termination approximately 35 feet up on stem.

Diagram 1: Using the force-multiplication chart will help you to determine your safe working load (SWL) in your highline/track-line system. Graphic courtesy of ropebook.com.

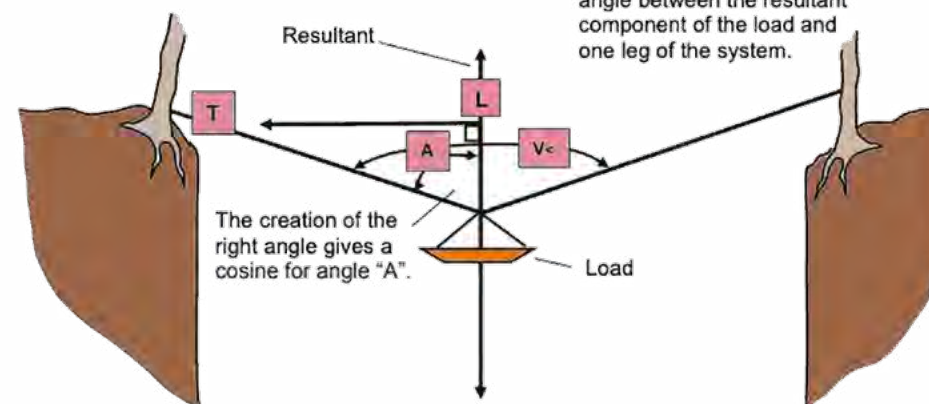
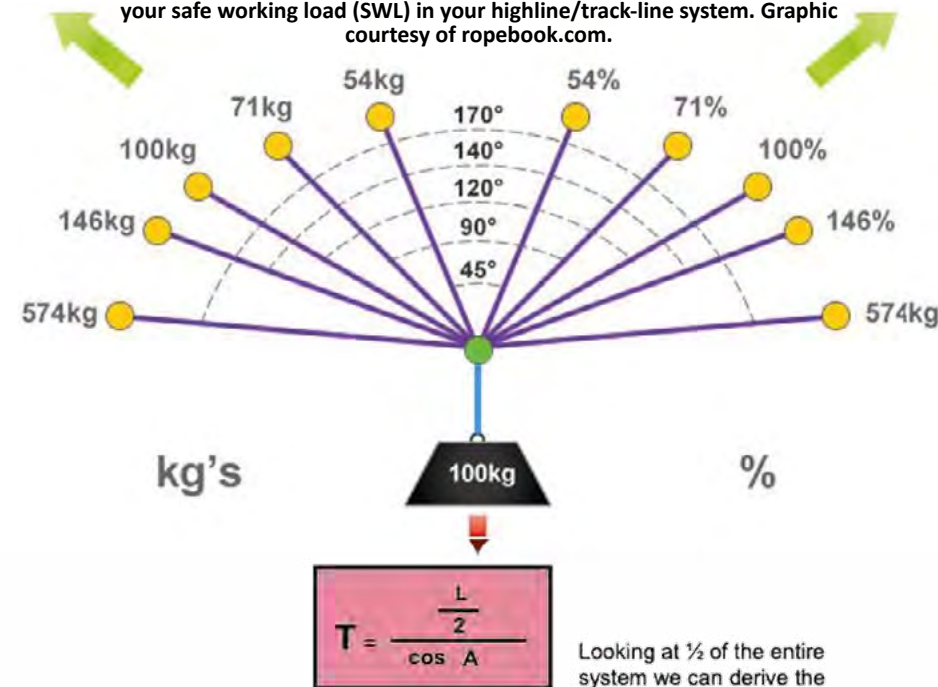


Diagram 2: Using the highline-tension formula will help you to determine your safe working load (SWL) in your highline/trackline system. Second Option Based on cable yarding calculations from the Cable Yarding Handbook, Work Safe BC.

force on each leg also increases. If a 175-degree angle in the highline could be achieved (though highly unlikely), then a 100-pound haul load would have close to 1,150 pounds being felt by each anchor on the front and back spars. Definitely something worth thinking about! Unfortunately, space for this article does not allow me to go into detail on how to calculate highline tension and force multiplication, or how it applies in tree care situations. If readers are interested in tree-work applied physics, I can plan to make that a future article. It was time to begin hauling. We wanted to get all the brush and as many logs as possible up the slope, but we needed

to do so in a safe manner. Most of my calculations were done beforehand. Knowing that ½-inch Arbor-Plex has a breaking strength of 6,000 pounds and a WLL of 1,200 pounds (5:1 safety factor, which is standard in rigging work), as well as estimating our approximate sag-angle in our highline, I was able to use the force-multiplication chart and the high-tension formula to determine our safe working load (SWL).

I calculated we could take loads in the 200- to 500-pound range without exceeding our safety parameters. Then, using the Green Log Weight chart and looking up red oak (which was the



Photo 7: Author's custom-welded tree-mount frame and Portable Winch. Also shown is the control line used to raise/lower and haul the Norwegian reeve system, brush and logs up to the landing.



Photo 8: Toyota being used to pull Norwegian reeve control line in lieu of Portable Winch. Being able to pull downhill sped up the hauling operation, as well as lessened the strain on the whole highline/trackline system.

heaviest type of wood on this site), I found we could still haul millable-sized pieces of wood, albeit of a diameter not as large as I would have preferred.

Our hauling instrument to begin with was going to be our gas-powered Portable Winch. It has a 2.1-hp Honda 4-stroke engine and a 2,200-pound pull capacity at 60 fpm (feet per minute) with the smaller-sized bollard that comes mounted on it. When you switch out to the larger bollard (which we did), your load rating drops to 1,500 pounds, but your speed increases to 90 fpm. Still, plenty of pull capacity for what we needed. Since the bollard works as

a spinning capstan drum, you are only limited by the length of your pull rope. I have a custom-welded, tree-mount frame for the winch that allows us to place it on small- and large-diameter trees. It also swivels, which allows torque-free movement and prevents damage to the motor. (See photo 7)

After yarding up a few "turns" (the material brought out of the woods by a single pull), we were quite pleased with the way the entire system was functioning. Since we were not going to haul beyond our working capacity, I decided to speed up the turns by switching from the Portable Winch to pulling with my Toyota truck in 4WD low. (See photo 8) This, too, worked exceptionally well and sped up the whole operation.

CONCLUSION

By the end of the afternoon, all the brush from that day's work had been brought up and chipped, and we had a nice-sized log deck right at the top of the landing, which we did not have to move, thanks in part to the forethought and placement of the highline. (See photo 9) Much to my disappointment, though, that night I received a message from the logging contractor saying the State of New Hampshire had shut down the work site due to something being wrong with the permit. We had to go back and de-rig the entire Norwegian reeve system. Now I am still waiting for the "wheels of justice" and DES to allow us to go back and finish the job.

Overall, I highly recommend a highhead/highline haul system anytime you have a bluff and gulley site that requires unconventional rigging. I also want to give a big shout-out to my crew, Brandon Eldridge, Drake Simpson and Sam Wagner. Without them, I could not have accomplished this job.



Photo 9: Norwegian reeve system and turn of brush on its way up to be chipped at the landing. All logs shown in the log deck were hauled successfully using the system described in the article.

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ARBCLIMBER ISSUE 22

www.arbclimber.com

This GUIDE does not cover general forestry/ground work helmets (generally ANSI type 1 and/or EN397) unless they also function as a climbing helmet (ANSI type2/EN12492) and in fact, as we'll see, this whole genre is tricky to reconcile even between European standards let alone between European and North American standards. For instance there are ANSI type 1 and EN397 helmets that have top-only impact tests but may also test for side impact and/or lateral deformation. All-around impact tests and/or lateral deformation are the minimum guarantee of protection we want to see for climbers as an addition to just top impact. EN397 and ANSI Type 1 by themselves are not enough to get in this GUIDE because working at height is NOT the same as Climbing, HOWEVER, there are two helmets in this GUIDE that don't meet our criterion, at least not on paper, but others in their range do and they specifically state these models as being suitable for climbers/climbing arborists so we have highlighted these with a red mark in the EN12492/Lateral tests column. Depending on the type of worksite, OSHA defines working at height as 4, 6 or 8 feet off the ground – that could be a 4-rung stepladder!

The technical specifics of visors and ear defenders are not included here as they would each need their own GUIDE. We had a full GUIDE to Climbing Helmets in our sister magazine WILDERNESSAR issue 11 which is available free in digital/pdf format so for competition and recreational climbers and arb inspectors this would be an appropriate GUIDE to check out. In this GUIDE for climbing arborists using chainsaws, handsaws and other power equipment however, we are specifically looking at helmets that meet climbing standards and can provide eye and hearing protection often sold under the banner of 'Combination' helmets. That means various types of visors to protect from wood chips and dust and protection of the ears from the potentially damaging sound of a petrol/gas chainsaw but these days is just as likely to incorporate a communications system. Pretty much all such work helmets can be used as stand-alone climbing helmets simply by removing the click-on ear defenders and visor mounts or the visor may stow within the helmet shell. Ear defenders can be swung back onto the helmet shell when not needed as the arborist in this image obviously feels is the case in using a battery powered saw, although, it has to be said, that even electric saws have a sustained level of noise all the while you're pressing the trigger. We'll get to the details of fixtures and fittings later, we first

PETZL STRATO
Hi-Viz



MARKET GUIDE

need to discuss the various structural and design differences between helmets. In tree work we can differentiate three work types:

- 1) GROUND-CREW/CHIPPER (ANSI type1/EN397)
- 2) WORK At HEIGHT eg. Cherry picker (ANSI type1/EN397)
- 3) CLIMBING (on-rope) (ANSI Type 1-2/EN12492)
 - 3a) Recreational Climbing/Competitions/Inspections
 - 3b) Climbing and use of a saw/chainsaw
 - 3c) Climbing & working around electricity (ANSI/EN397 + side-impact and/or Lateral Deformations tests)

Some helmets are specifically designed and marketed towards arborists while others are modified sport or industrial helmets that are coincidentally useful for arborists. Some elements of climbing-specific standards do not take into account the need for arborists to work around electricity, especially for post-storm work so there are many overtly industrial climbing helmets without vents here that meet dielectric standards but are not actively aimed at arborists – CT's Aries for example

as compared to their Aries Tree and X Arbor. The key difference between a climbing and a ground-work helmet is that climbers need all around impact protection (rather than just on the top) and a stronger chin strap to ensure the helmet stays on your head.

'Working At Height' is NOT the same as 'Climbing'



STIHL
Advance X-Climb

Competition climbers don't need the associated safety accessories although a headtorch and flip-up goggle visor can be useful. All three of these groups can use the non-accessorised climbing helmets in WSAR magazine #11's GUIDE.



KASK
Superplasma
(by STEIN)

US & EUROPEAN STANDARDS

Unfortunately, as with most products, there is no fully international safety standard. Europe and North America have competing and slightly different standards and requirements that requires most manufacturers to produce a different version for each regional market – ANSI in the US and EN in Europe and most Pacific countries. There is much greater emphasis in the US on working around electricity because of

the way the utilities are structured and the sheer number of damaging storms. ANSI z89.1 Type1&2 helmets have the higher strength chin strap and are class 1 for top-only impact or class 2 for all-around impact. **This GUIDE only includes ANSI Class 1/EN397 helmets if they are also tested for lateral impact and/or deformation (LD).** LD is an addition to EN397 that tests the resistance to 'squeezing' of the sides of the helmet but not as relevant as side, rear and front impact tests. ANSI also specifies electrical conductivity as Class C, G or E which we'll come to shortly.

ANSI does not delineate the chin strap strength for ground and climbing as the European standards do. Consequently North American arborists could choose either the mountaineering (EN12492) or industrial (EN397)-standard helmets because their shells are virtually identical. This is also true in Europe given that arborists may need an unvented EN397 helmet that doesn't conduct electricity and negates the vent aspect of EN12492. There are three key differences between EN397 and EN12492 helmets which are otherwise identical: EN397 requires less vent area, a chin strap that releases at a much lower load (15- 25daN) and clearance between the shell and the cradle that doesn't allow for any lining in direct contact with the shell. It uses a 5kg test load from 1metre above which must exert no more than 5kN of force to the head whereas climbing helmets use a 5kg mass falling 2metres but exerting no more than 10kN to the head and of course, they include impact loading to the side, front and rear of the shell. Vent size must be less than 4.5cm² of total shell area for EN397 whereas for climbing it

needs to be well ventilated in excess of 4cm² of area. However, that does mean there is crossover if a shell has between 4 and 4.5cm² of vent area – that would meet both standards.

ELECTRICAL CONDUCTIVITY

ANSI specifies three electrical conductivity classes: Class G, (General) hard hats are rated for 2,200 volts. Class E (Electrical) hard hats are rated for 20,000 volts and Class C (Conductive) hard hats offer little or no electrical protection. Electricity protective helmets are NOT vented or are minimally vented and this directly contradicts the main climbing helmet standard in Europe EN12492 which requires a certain area of vents for airflow. ANSI class E precludes vents and G has smaller vents than for C-type helmets. Utility arborists and anyone tasked with a job near power cables will need a helmet that will NOT conduct electricity to your head. In practice this means no vents and more clearance between the shell and your head. Many climbers will think that ventilation is a must-have to keep the head cooler in hot weather and during heavy work and this is a requirement of the EN12492 climbing standard. But an electrical arc will kill you quicker so if storm and/or utility work is on your radar you may well need both options. For US ANSI standards this is covered by class G and E helmets where class E rated for 20,000 volts is for high tension pylon style cables (E & HT in our tables) and the General 2,200v rating will see you though all domestic-feed power lines. In Europe this is covered primarily by EN50365 but this is only for lower voltage systems up to 1000v Ac or 1500Vdc and can be as low as the 440vAC that we have listed as LT so is less stringent than ANSI class

G. Many EN50365 helmets also comply with ANSI G so are actually higher rated than their EN50365 adherence implies. Some helmets like CAMP's Ares and Petzl's Vertex have closable vents and can meet EN50365 though some only meet this electrical-protection standard if used on the ground like JSP's Evo5. The similarly equipped Petzl Stratos fails on non-conductivity because there is not enough clearance between the head and the shell.

CHIN STRAPS

And then there's chin strap strength which in climbing helmets requires it to keep the helmet in place during a fall and when resisting an impact. Industrial helmets in Europe, which often include 'arborist' models, requires the chin strap to separate or break at less than 25daN because, oddly, it is felt that there is a greater risk of being strangled if the helmet gets hung up on an obstruction during work. You would think that those at the greatest risk of hang-up would be arborists and yet they are specifically mandated towards EN12492 helmets with high-strength chin straps and NOT EN397's breakaway straps. This is because the helmet needs to stay on AFTER an impact/fall because the climber may well still be exposed at height and can't afford to have the helmet detach completely. It would be interesting to know how often a fall that results in being hung up by the helmet strap such that you are strangled to death has occurred versus being hit on the head because

your helmet has come off after an impact from the first piece of falling debris or branch? A number of manufacturers like Petzl and Uvex provide both types of chin strap which can be swapped in and out but this might still result in falling foul of local protocols if you had the wrong one on. While it's impossible to meet both standards at the same time, the helmet as a 'package' is able to meet both EN397 and EN12492 and these helmets are often called 'hybrids', not to be confused with 'hybrid' as a type of helmet construction. Many more helmets, especially outside of Europe, will meet the impact resistance (including sharp-object penetration) requirements of EN12492 but not necessarily the chin strap requirement. It's a strange dilemma since we're not at all convinced of the validity of a lower strength breakaway chin strap for climbers. Heightec's Duon and JSP's EVO series (pic right) have gone some way to solving this dilemma by using a chin-strap buckle that adjusts between weak and strong. The enhanced EN14052 standard that requires better top, side and frontal impact tests for industrial helmets effectively mimics EN12492 impact testing but has the lower strength EN397 chinstrap so climbing helmets will rarely be fully EN14052 compliant and vice versa. This standard is far from widely adopted so only relatively few including Kask, and Team Wendy have it.



HELMET CONSTRUCTION

in the fourth quarter of the last century, sport climbers were progressing from very round, glass-fibre, water melon-style helmets with a foam lining and a chin strap to plastic ovals with a spider-web cradle and a chin strap. Meanwhile, arborists were just about progressing from a plastic building site helmet to a plastic building site helmet with a chin strap. Some of us wore certified climbing helmets with accessories but it wasn't until this century that arborists really began to see the need for a 'proper' climbing helmet that was firm and comfortable in all orientations that a climber might find him/herself in, able to withstand impacts from multiple directions (ANSI Class 2) not just from the top (as ANSI Class 1 requires) and also able to take all the safety trimmings necessary for chainsaw use. By 2010 virtually all climbing helmet manufacturers producing high quality mountaineering helmets were also producing a more 'industrial' version able to be fitted with visors and ear defenders for both the rope access and arborist markets. Europe mostly embraced the climbing helmet model with arborist helmets from the likes of Petzl, Kask, Edelrid, Kong, CT and C.A.M.P. while North America continued to develop the

site-helmet theme incorporating a peak (primarily driven by the ANSI helmet standard requiring a peak) from companies like Klein Tools, Americana, 3M, PMI, Studson and imports from Pacific and JSP. This has led to many Arb stockists in North America majoring on European models which, in turn, has caused some European manufacturers to ensure that their helmets either meet both ANSI and EN standards like Petzl or they have two versions, one meeting EN and one meeting ANSI standards, like Kask. Also this century we saw perhaps the biggest driver in arborist helmet evolution, the Protos Helmets by Austrian Forestry giant Pfanner. The Protos was the first to fully integrate eye and ear protection into the one shell but and is renowned for its vast range of colours, designs and customizations. The version below for instance is a Ukraine Special edition with money from every sale donated by Pfanner and the stockist (in this case Honey Brothers in the UK) to Ukraine charities having to cope with devastation caused to civilians and civilian infrastructure by the 2022 invasion by Russia.



Back to past history and after an initial flirtation with motorcycle helmets for climbing it became clear that helmet linings had to be improved. The answer initially was to keep the glass fibre shell and increase the clearance between the head and the shell. Building site helmets had something of an answer with their adjustable plastic head band and concentric plastic 'spokes' joined at the crown but more comfort was needed and this included improving ventilation or airflow to the head which was otherwise encased in a hot and sweaty goldfish bowl. Enter the age of substantial sized air vents and a webbing cradle initially riveted around the shell and with an inch or two of clearance between the top of your head and the inner shell. In the event of a lump of wood hitting the top, the shell can deform to absorb some impact before the shell reached your crown. This allowed superior materials to creep into helmet production – lighter, stronger and more resilient to wear than glass-fibre, mostly plastics, thermoplastics and polymer mixes. The next couple of decades saw various combinations of hard-shell plastics that deformed to absorb impact and cradles that tried their best to keep your crown clear of the shell. Some shells began to re-incorporate fibres into the plastics to improve durability, not quite back to the traditional glass-fibre days and certainly a feature of the more



North America vs European

Only one of these three helmets is available to European climbers – spot the differences? Above right and Our title picture shows the Husqvarna Elevation arborist helmet with vents while left and on our front cover is the Spire Vent. Above right is the US-Only Spire with no vents. The Spire Vent adheres to EN12492 while the Spire and Elevator adhere to ANSI z89.1 Type 1 Class C and E respectively but with extra

Lateral Deformation tests for both.

You'll find this same North American/European differentiation with many of the key brands Stihl, Petzl, Kask, MSA etc. and while some are fully compliant across both sets of standards most are only partially compliant. If you take electricity out of the equation the choice of European climbing helmets is huge in comparison to their US-counterparts and US stockists obviously agree since they all sell far more EN-compliant helmets to arborists than they do ANSI.

robust shells. Meanwhile, some cradles were replaced by a full 'cap' or dome of polystyrene instead of webbing straps to improve comfort, all the while making the helmet lower in profile than the original pimple-on-your-head like the *Joe Brown* and original *Edelrid Ultralight*. Carbon fibre came and went and still appears every now and then but perhaps the most obvious modern change has been more extensive use of EPS (Expanded Polystyrene) and latterly the slightly denser EPP (Expanded Polypropylene) leading to three new classes of helmet in addition to the existing hard-shells. Good luck differentiating some of the 'hybrids' from some of the 'in-Molds'. See WSAR for a full explanation of the 5 helmet types. For arborists we only really have to worry about Hard-Shell and Hard Shell Hybrids. Again difficult to tell apart. They both have a full dome of material – mostly ABS and ABS/Polycarbonate (as dictated by EN397) but basic Hard Shell has a web cradle with internal clearance (often with a small insert of polystyrene in the crown while the hybrid has a much more expansive 'lining' of expanded foam/polystyrene. Hard shell is the traditional design with a web cradle and/or small EPS crown insert in a full ABS or polycarbonate shell. A few that are more suited to rescue but are sold by some arb stockists like *Pacific* use a kevlar reinforced composite so are renown for being tough but are fairly heavy and not cheap. What looks like polystyrene is now carefully crafted as EPS and EPP and is used as a shell liner in addition to a mesh in place of the traditional web cradle. EPP and EPS are very light, they insulate and are soft allowing thicker cross-sections to absorb impact well. It can be shaped to fit pretty much anything you like allowing intricate designs to improve air flow, follow the shell contours, cut around ears and extend down at the nape all while allowing enough deformation/compression to absorb impact and protect your head. The initial problem with these materials is durability – as an outer shell it's a weak material when it comes to resisting having chunks knocked or scraped out of it, which is one reason you don't see many as arborist helmets.

MIPS & KORROYD

Of special mention in helmet construction is the MIPS enhanced head protection we see most often in ski-helmets that code-share as climbing helmets. **MIPS** stands for **Multi-directional Impact Protection System** and is basically a licensed element to helmet linings from the Swedish inventors that limits rotational impact because the special liner allows the head to rotate within the shell. Companies basically buy in the *MIPS* expertise in helmet safety and incorporate it into their helmet designs like the *Centurion Nexus MIPS* on the left (yellow section). It's a bit like clothing manufacturers adding *GoreTex* as a key and prestigious feature. One of the newest helmets on the market is the US *Studson* helmet which purports to have merged the best of sport helmets with industrial to produce a sleek and well featured model. It uses a similar system to *MIPS* called *Brainshield* made by *Shield-X*. The *Studson* also uses another safety addition which is the *Koroyd* honeycomb liner most notably used by *Pfanner* in their *Protos* (pic right) and by New Zealand's *Zero Height Safety* in their *Pinnacle* series. *Koroyd* crumples on impact to absorb far more energy than a solid liner or web cradle.



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VISORS

It used to be that a helmet visor was a dark wire mesh that occluded vision by about 30% but didn't 'occlude' dust at all – just the larger particulates and chips most likely to damage your eyes.

Back in the 80's when some colleagues were mocking my use of SRT systems for tree work I also got some stick for having a clear plastic visor instead of the standard mesh; this was probably acetate back then rather than the much harder-wearing polycarbonate visors we mostly see today. The advantages as I saw it were that the clear visor kept out water and dust and gave me much, much better visibility especially since mine didn't have a frame – it was a bit like the hospital covid masks. The downside was that it scratched easily and with no reinforcing frame you had to look after it a bit more and it fogged up in certain weather. This latter problem is why the modern goggle-style visor have found favour over full 'square' visors- you're not breathing your heated, foetid fumes on it all day long and even if you were, most have anti-fog and anti-scratch treatments to prolong their usable life in the tree. Goggle-visors have therefore become the standard eyewear protection in most modern arborist helmets, practically to the exclusion of full face 'square' visors which are largely the domain of ground crew and those tending the chipper. Many of the goggles supplied directly by the helmet manufacturer have unique sizing and fittings for that helmet – *Climbing Technology* for instance has a different visor for their *X-Arbor* than to their *Aries Tree*. However, the vast majority of helmets in this GUIDE have the 30mm Uni or Euro slot that will take industry standard ear-defenders and visor mounts so you can supplement the goggles to some of these with an additional full/half size visor or mesh visor. Some of the images show the helmet with a visor that doesn't necessarily come from that helmet manufacturer and has to be purchased separately. Refer to the UNI-SLOT column to ensure that the helmet can be retro-fitted with various other general-market visors and ear defenders. High quality, anti-fog/anti-scratch goggle-visors can be as much as, if not more expensive than the helmet itself at between £/\$20 and £/\$100+. You can also get full visors with an integral curved chin or as a quadrant-shaped attachment (for clear and mesh) to help stop debris blowing up under the visor. Those that stow inside the shell are obviously better protected but some like Petzl do also offer visor guards for externally stowed visors to protect from damage.

EAR DEFENDERS

Sometimes called ear-muffs, this is another area where the climbers helmet may vary from ground-crew/chipper team helmets because the chipper is a lot noisier than a tree-chainsaw and especially a battery saw. It's not quite as simple as using the greater noise insulation of a 31SNR ear defender over a climbing standard 26SNR (SNR=Single Number Rating and is equivalent to the percentage noise that is absorbed and therefore not making it through to your delicate ear holes) because a climber may need to have at least some background hearing to be aware of any hazard warnings. Although the same could be said for ground-crew since they're more likely to get a branch on the head. That's why an **alarm whistle** is a useful item to carry and only use in the event



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of a hazard to life because it will cut through any ear defender's noise baffle. The ear defender market is dominated by *MSA*, *Sordin*, *Sperian* and *3M Peltor* and these can have an independent head band so that you can use them under *any* helmet or, more usually they will be directly mounted to the helmet as a detachable element often in conjunction with the visor mount. Whether it's a visor or ear defenders, you need to ensure that it fits the helmet properly because so-called universal slots and fixings only need to be a half a millimetre out and there will be play in the mount. A uni-slot (in Europe a standard *Euro-slot* is 30mm wide) allows visor and ear defender mounts to simply push in and click into place. Some, like *Petzl* have their own system called *Easy-Clip* which means that *Petzl* accessories will only fit *Petzl* helmets although the helmets themselves will take other *Euro-slot* accessories and some like *Husqvarna* are even more confusing because they have accessories that will fit some in their helmet range but not others at least not without an adaptor but that pretty cheap at just a few quid/bucks. There are also helmet designs that don't suit certain accessories – peaks will block visors and side brims/flares similarly stop ear defenders from fitting to your ear properly. As with visors you'll pay for the better quality and hearing protection is also something worth preserving expect an average of £40/\$55 rising to £/\$100+ for high end models.

INTEGRAL HELMET FEATURES

VENTS This is one of the two key features that differentiates a climbing arborist's helmet from an industrial helmet or ground-worker's helmet. Aside from utility climbers working around electricity, climbers mostly want vents to help cool the head when working hard. But it would be nice to have the option so helmets like *Petzl's* Vent models, *CAMP's* Ares and *Pfanner's* Protos have the useful provision of a sliding vent that can be closed. Others have separated vent covers that you can push into place to provide a closed shell. Industrial helmets tend not to be vented at all in order to adhere to additional electrical conductivity and molten metal ingress requirements. Vents may be comprised of a few large openings like *Petzl's* Vertex. or many smaller ones. Some have mesh covering the vents (shown as ● in our tables) so that air gets through but not much else because the disadvantage of larger openings is the possibility of twigs and stones getting in. In some models this risk is countered by offsetting the internal lining to partially occlude the opening. Helmets with only minimal vents are indicated by ● in the tables.



Some helmets have a small rubber D or ring on the chin strap which is for carrying your helmet on your harness or the outside of a pack. We always simply clipped around the chinstrap or yoke section but this method ensures you don't inadvertently stress and damage the buckle or any stitching.



PACIFIC E6 Dominator



TEAM WENDY EXFIL SAR



MSA GALLET F2XR



FUTURE SAFETY MH4 Tactical

SIZE ADJUSTMENT

There are three main options for adjusting the fit of a helmet: Headband, Chin Strap and what we'll call the Yoke Union. The first two are self-explanatory but the yoke union is where the chin strap meets the Y-shaped helmet attachments and there is often a plastic buckle here that can adjust the chin strap forward and backwards in relation to the shell. The headband is generally padded for comfort and sweat retention and often detachable and washable. It needs to fit snugly around your head and, together with the chin-strap, ensures the helmet won't fall off or tip forwards/backwards when you look up or down. Originally, tightening was achieved with a simple belt-style pin and hole adjustment later modified to much safer and lower profile plastic lugs on one end of the headband pushing

MULTI-ROLE HELMETS

Arborists are an active bunch and often have fingers in other pies so how about something a little different? Arborist climbing helmets pretty much ARE multi-role helmets as exemplified by the *Pfanner Protos* but in this case we mean **certified for a range of other uses**. For those undertaking tree work as part of a wider remit that encompasses either rescue, forestry, ATV driving, firefighting or shooting people, there are multi-role helmets where one model fulfils a number of different activities. At present that means it's bigger, heavier and more expensive but that will change. *Future Safety's* *Manta mk4* and *Gallet's* *F2XR* are excellent examples with climbing, urban/industry rope rescue, firefighting, quad-bikes, skiing and water rescue etc. catered for in one helmet. The *MSA/Gallet F2XR* and *PAB's* *MP1/2* actually incorporate an integral headtorch, in the *F2RX's* case, a dual-beam 250 lumen and rear indicator lighting so they are heavy but useful. *Team Wendy's* *Exfil SAR* and the *MH4* version of *Future Safety's* *Manta4* have the, as yet, unique versatility of rails. *MSA* also has the *Gallet TC801* helmet that meets EN12394 or EN397 but is currently military-only. These allow use of military accessories but for rescue, cameras, night vision, laser-pointers as well as more regular headlamps using a slot-in adapter are all things becoming more prevalent in rescue in the modern era, we may see rails catch on more in civilian rope activities rather than just military or law enforcement but it's a rare beast at the moment.

into a set of holes in the other end, what we have called Slide Adjust and indicated by a ■ in the tables. We did see *Velcro* for a time but that quickly evolved back to a more substantial lug and hole or zip-tie/cable-tie style ridges of plastic. This gave rise to the idea of using a knob, cog or dial to drive the two sections over each other and lock into place wherever you stopped the ratcheting. These ratchet adjusters were originally seen only on fire-rescue and industrial helmets and it was decades before they started to appear on climbing helmets. This may have been because they were perceived to be too heavy or because the knob was deemed a hindrance or even a hazard to the back of the head in the event of a fall. Either way, ratchet adjust cogs/wheels have now well and truly evolved into the design of virtually all climbing helmets in this GUIDE and shown in our tables as ■. If you work in cold climates you will need to ensure that the headband sizing and internal clearance is sufficient to allow wearing a balaclava or fleece head-covering and that this is close-fitting with no extraneous buttons and lumps that can affect impact forces. Unlike sport climbing helmets, 'female-specific' versions of arborist helmets are much rarer – this is usually perceived as being pink/magenta or having a cut-out for a pony-tail or having a smaller head-size though there are plenty of males to which all three of these options might apply. This issue's cover shows our own local celebrity climber Jo Hedger wearing Husqvarna's helmet with enough size adjustment to be well-fitting and their Kask manufactured models do have a 'pony-tail' cut-out.

CONCLUSIONS

Ultimately, ALL of the helmets in this GUIDE are suitable as an arborist climbing helmet but aside from weight, cost and comfort (which is subjective) the key decision is on standards and whether you need to work near electricity. Don't forget that **'Working At Height' is NOT the same as 'Climbing'**. Fitting plumbing or electrical cables on the upper floors of a high rise construction is working at height but is quite unlike hanging off a rope. For climbing, arborists should be choosing a helmet tested for impact and/or deformation to the top, sides and front/back of the shell and preferably with the higher strength chin strap >50daN, which will stay on in the event of a big fall or impact – this being more important and more likely than the industrial/ground-helmet 'concern' of being hung up such that you might be strangled. Some offer both options in the same helmet such as *Petzl*, *Heightec* & *JSP* and we will see more of this because, for electrical work, will need to juggle with EN397's conflicting chin-strap strength requirement and internal head clearance and lack of vent openings. **Climbers must take note of their helmet's specific standards because some look exactly like climbing helmets but only meet top-impact (ANSI class1/EN397) standards** like the *Stihl's X-Ergo*, *Klein Tools*, *Defender Safety's H1CH* and the *Milwaukee's Bolt* which are therefore not included in this GUIDE. The *CAMP Ares Air Pro* and *Kong Spin* which might otherwise seem to be the perfect climber's helmets only meet EN397 but are specifically marketed as climbers helmets so we have included them with a red flag in the EN12492/Lateral column. For pure climbing it is likely that we will see more military rail- style models creeping into arborism if only because some arborists will think it looks cool but it does also open up the accessories options quite a bit – night-vision anybody? The lighter 'foam' hybrids and in-mold climbing helmets that

you can find in WILDERNESS SAR#11's HELMET GUIDE only get one mention here (*Kong's Leef*) because they are far less robust than the hard shell and hard shell hybrid helmets but they do still have a place for tree climbing, competitions and inspections as we saw on the cover of ARBCLIMBER#21 with the *Edelrid Salathe* which would otherwise not be considered a typical arborist helmet. *Kong's Leef* however, takes ear defenders and visors and is easily the lightest in this GUIDE.

There is also again no overt Chinese representation here as they continue to be difficult to extract details from and to blatantly copy identifiable models but they can and do produce quality models including companies like Portwest so we will see more Chinese own-branding in future.

IN THE FOLLOWING TABLES:.....

The figures in this Guide are verified by the manufacturer but you often see different spec on some supplier websites and for rebadged models. No idea why!

ORIGIN: The main flag refers to the manufacturer's home country, this may not be where the helmet is made. If we know, we show an inset flag.

COST: Recommended Retail Price. Often sold for less so a rough guide only – varies due to exchange rates (unusual Euro-Dollar parity in 2022), taxes etc. and we usually round the price up. In the UK, helmets have no VAT when purchased for personal use. The price in black is for a bare helmet. The price in orange is for a basic combo or kit as supplied by that specific manufacturer so it varies with visor and ear defender type

WEIGHT: for the bare helmet MINUS any accessories. As a rough guide, add 3/450g for ear defenders, 160-250g for a mesh visor, 250g+ for a full clear visor &100g+ for goggle visors. **STANDARDS:** ■ = full compliance, ● = partial compliance – the type of chin-strap and lateral deformation tests will generally be the cause of partial compliance – eg. the shell will be to EN397 to allow for electrical protection with additional lateral deformation tests and a chinstrap to EN12492.

✂EN50396 ELECTRICAL INSULATION (in addition to indications under ANSI – C,G & E) where EN50396 =<1000vAC, **LT** = Low Tension domestic/<440vAC and **HT**=High Tension/>1500vDC. A ■ indicates **LT** <440vAC as a max voltage but is also an addition to EN397 so may not have the ■ denoting EN50396 **CSA / AUSNZ/ EAC:** Specific **Canadian**, Australian/New Zealand And **Russian/East European** industrial standards but **CSA** mainly follows ANSI while AS/NZ mainly follows EN standards.

ANSIZ89.1: North American industrial standard – Type 2 has all around impact protection but many Type 1 have additional lateral impact and/or deformation testing to better suit climbers needs as indicated in the **EN12492/+Lateral column**. ANSI is defined by 3 classes of electrical conductivity **C, G & E**. **BS/EN14052:** an enhancement of EN357 for impact tests with top, side, front and rear impact tests but seems to be largely ignored by most manufacturers.

(BS)EN397 Industrial-oriented standard – shells may be the same general structure as an EN12492 shell but vents may be less or absent altogether and the chin strap must be able to detach/break at **15-25daN** (effectively <25kg of force) to avoid the risk of strangulation in a hang-up. Associated requirements for electrical resistance precludes the use of sizeable vents. **(BS)EN12492/+Lateral:** Climbing Specific helmets with Lateral (side/front/rear) impact or deformation (LD) testing

and vents greater than 4cm² of the shell area. Chin strap retention should be **greater than 50 daN (50kg)** loading for 2minutes. **+LD** = additional Lateral Deformation (not impact) tests supplementing EN357 and ANSI type1 top impact tests indicated by an orange circle ●

MATERIALS: PP=Polypropylene (for the outer shell and some components). EPS=Expanded Polystyrene (especially for the shell liner. EPP=Expanded Polypropylene (especially for the crown insert). ABS= Acrylonitrile Butadiene Styrene (thermoplastic polymer) for the outer shell.

TEMPERATURE

UNI-SLOTS/RAILS: Goggles/visors and ear protection are as supplied by the specific company – ANY helmet with a black square in the UNI-SLOTS column can have visor/goggle/ear defenders fitted from any other manufacturer. 30mm slots in Europe ('Euro-Slots')& similar 1" in North America but double check for a firm fit. **RAILS** are military style (Picatinny) attachment points for lighting, cameras, night-vision etc.

EYE PRO[TECTION]: **INT**=Internal or Integrated and means the goggle-visor and/or 'square' visor stow INSIDE the shell rather than outside.

GOGGLE/VISOR: Simply indicates the colour of polycarbonate goggles and/or visors available from this manufacturer – Clear, Smoked/tinted or mirror.

VENTS VENT COVERS: Many of these helmets have obvious air holes (vents) in the shells shown as a black square ■ but some have less than others, particularly the more industrial oriented helmets. Those with minimal vents are shown with a black circle ● Closable vents are shown as a green square ■ and if these are separate push-in covers there will be an asterisk and a note to that affect. Those that have a mesh cover to restrict the ingress of twigs and debris are shown as ■ square.

ID/LOGO REFLECT: Customised decals are available from some manufacturers while other helmets may have a specific ID badge area which might simply be a clean, flat rectangular area or may be a plastic housing allowing an ID to be slid in. If it is a standard feature it will be shown as ■ if it is an option it will be a black outline square. **Reflective decals** are standard on one or two indicated by ■ but most provide them as an option shown as an orange outline square □.

NAPEGUARD UV: A shroud that comes down from the rear of the helmet shell and down to your shoulders. This helps stop wood chippings, dust and water from going down your neck. Almost always an option rather than standard. **UV** is a UV indicator on the helmet.

Most helmets will be retired due to sheer abuse and unsightliness with no real regard for its performance capabilities years after its purchase, which may be significantly reduced. One thing you can keep a eye on is UV exposure which is a silent helmet killer also largely ignored by most. We are now seeing red UV indicators embedded into the rear like this *Stihl Advance X-Climb* to tell you exactly when it's seen its fair share of damaging UV rays (it changes colour, in this case it bleaches white).

LAMP CLIPS BRKT where **BRKT** refers to *either an elastic retainer or a solid bracket* at the front or rear of the helmet. **COLOURS** different colour options are shown as the main colour with trim or secondary colours shown in the box outline.

VERTICAL FREEDOM



Grippy and robust tree climbing rope
JACAMAR 12.5 MM





























Discover your vertical freedom with the JACAMAR. It is an easy-to-grip tree care rope that thanks to its compact diameter of 12.5 mm, runs particularly smoothly through all standard rappelling and ascent devices. The perfectly aligned double-braid construction combining a wear-resistant 24-strand polyester sheath and a 16-strand polyamide braided core offers outstanding splicing properties. The JACAMAR is also ahead of the curve when it comes to sustainability thanks to its 100% recycled polyester sheath, which saves resources. The product is also available with a WEblink termination.

www.edelrid.com



images NOT to scale	VISORS AND EAR DEFENDERS ARE SHOWN AS AN EXAMPLE OF WHAT CAN BE FITTED TO THE HELMET, NOT NECESSARILY WHAT YOUR STOCKIST SUPPLIES	MODEL Variant/ AKA	COMPANY	ORIGIN	COST BARE HELMET COMBO inc Tax £ NO VAT	WEIGHT (BARE HELMET)	SIZES	CONSTRUCTION SHELL INNER STRAPS/HEADBAND		STANDARDS										EYE PRO			Goggle Visor	EAR	FEATURES				CRADLE		CHIN		COLOURS	NOTES	WEBSITE																																																																																																																																																																																																																																																																																																																																																																														
										TEMP RANGE °C °F	EN50365 LT HT	ANSI 289.1 CGE	CSA AUS/NZ EAC	EN14052 / UKCA	EN397 (Industrial)	EN12492 +Lateral	GOGGLES INT	FULL VISOR INT	MESH VISOR INT	CLEAR	SMOKED	MIRROR	UNI SLOTS/RAILS	VENTS CLOSABLE	ID/LOGO REFLECT	NAPE GUARD UV	LAMP CLIPS BRKT	SLIDE COG ADJUST	REPLACE PADDING	<25daN Release	>50daN Release																																																																																																																																																																																																																																																																																																																																																																																		
		Ares 0747 Ares MIPS 3258	C.A.M.P.		£70 \$110 €76 N/A	475g 16.8oz 500g 17.6oz	54-62cm 21.3-24.4"	HARD SHELL ABS/Polycarbonate HD EPS Nylon		-20 -4 +50 122																																																																																																																																																																																																																																																																																																																																																																																																							<

NOTES: N/A = info Not Available/not given COST: Approx. Inc local tax/VAT VENTS: ■ = closable ● = mesh covers ○ = minimal openings EAR: ○ = Will fit most accessories but check ■ □ = OPTION VARIANT data shown in blue or outline if it differs from the base model

images NOT to scale	VISORS AND EAR DEFENDERS ARE SHOWN AS AN EXAMPLE OF WHAT CAN BE FITTED TO THE HELMET, NOT NECESSARILY WHAT YOUR STOCK SUPPLIES	MODEL Variant/ AKA	COMPANY	ORIGIN	COST BARE HELMET COMBO inc Tax £ NO VAT	WEIGHT (BARE HELMET)	SIZES	CONSTRUCTION SHELL INNER STRAPS/HEADBAND		STANDARDS										EYE PRO			Goggle Visor	EAR	FEATURES				CRADLE		CHIN		COLOURS	NOTES	WEBSITE
										TEMP RANGE °C °F	ANSI 289.1	CSA AUS/NZ EAC	EN14052 / UKCA	EN397 (Industrial)	EN12492 / Lateral	GOGGLES INT	FULL VISOR INT	MESH VISOR INT	CLEAR	SMOKED	MIRROR	UNI SLOTS/RAILS	VENTS CLOSABLE	ID/LOGO REFLECT	NAPE GUARD UV	LAMP CLIPS BRKT	SLIDE COG ADJUST	REPLACE PADDING	<25daN Release	>50daN Release					
		Elevation	HUSQVARNA		£121 \$170	450g 15.9oz	51-62cm 20-24.4"	HARD SHELL HYBRID ABS EPS Nylon/Nylon		-30 -22 +50 122	- - - -	- - - -	- - - -	- - - -	● - - -	■ - - -	- - - -	- - - -	4 - - -	■ ■ ■ ■	- ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	adaptor needed for Husqvarna ear defenders on Elevation.	husqvarna.com				
		Spire	HUSQVARNA		£121 \$160 €90	470g 16.6oz	52-63cm 20.7-24.8"	HARD SHELL HYBRID Polypropylene EPS Nylon/Nylon		-30 -22 +50 122	- - - -	- - - -	- - - -	- - - -	● - - -	■ - - -	- - - -	- - - -	■ ■ ■ ■	■ ■ ■ ■	- ■ ■ ■	- - - -	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	adaptor needed for Husqvarna ear defenders on Spire. Spire Vent=EN model in Grey Spire=unvented ANSI model in Orange	husqvarna.com				
		Spire Vent	HUSQVARNA		£135 £180 €126	470g 16.6oz	52-63cm 20.7-24.8"	HARD SHELL HYBRID Polypropylene EPS Nylon/Nylon		-30 -22 +50 122	- - - -	- - - -	- - - -	- - - -	■ - - -	■ - - -	- - - -	- - - -	4 - - -	■ ■ ■ ■	■ ■ ■ ■	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	- ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	adaptor needed for Husqvarna ear defenders on Spire Vent. Spire Vent=EN model in Grey Spire=ANSI model in Orange	husqvarna.com				
		EVO 5	JSP		£79	480g 16.9oz	53-64cm 21-25"	HARD SHELL ABS EPP Polyester/HDPE		-40 -40	- - - -	■ - - -	■ - - -	- - - -	● ● ● ●	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	*chin strap 'switches' from high to low strength to meet both standards.*Only meets 50365 when used on the ground. Optional Evospec goggles store internally but not the same as the Vista models.	jspsafety.com				
		EVO (ASCEND) Vista Shield Vista Lens	JSP		\$136	415g 14.6oz	53-64cm 21-25"	HARD SHELL ABS EPP Polyester/HDPE		-40 -40	- - - -	■ - - -	- - - -	● ● ● ●	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	Branded as 'Ascend in USA'. CR2 versions have hi-viz reflective as standard add \$12. *chin strap has a 'switch' to change from hi to low strength to meet both standards.	jspsafety.com				
		EVO Lite Skyworker AJS260	JSP		£32	382g 13.5oz	53-64cm 21-25"	HARD SHELL ABS EPP Polyester/HDPE		-40 -40	■ ■ - -	■ - - -	- - - -	● ● ● ●	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	*meets some EN397 impact requirements. NB: EvoLite Forestry is not a climbing helmet	jspsafety.com				
		HP Plus WHE00020/21	KASK		£85 \$105 €98	480g 16.9oz	51-62cm 20-24.4"	HARD SHELL HYBRID ABS EPS Nylon/Nylon		-20 -4 +50 122	- - - -	■ - - -	■ ■ ■ ■	● ● ● ●	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	5 - - -	■ ■ ■ ■	■ ■ ■ ■	- ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	*Also in Hi-Viz + ■ (red/white) with fluorescent shell, luminous clips,reflective decals. Aluminium mesh vent guards.	kask-safety.com					
		Superplasma HD WHE00036/37 Superplasma PL AHE00005/6	KASK		£86 \$130 €80 €180	450g 13.3oz 420g 14.8oz	51-62cm 20-24.4"	HARD SHELL HYBRID ABS EPS Nylon/Nylon		-30 -22 +50 122	- - - -	■ - - -	■ - - -	- - - -	● ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	5 - - -	■ ■ ■ ■	■ ■ ■ ■	- ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	*Also in Hi-Viz + ■ (Lime EU) with fluorescent shell, luminous clips,reflective decals. PL= Europe-Only EN12492 version Aluminium mesh vent guards..	kask-safety.com				
		Zenith WHE00024/25/26/48/32/33	KASK		\$135 €195	430g 15.2oz	53-63cm 21-24.8"	HARD SHELL HYBRID ABS EPS Nylon/Nylon		-30 -22 +50 122	■ ■ - -	- - - -	- ■ ■ ■	● ● ● ●	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	- - - -	no * ■ ■	■ ■ ■ ■	■ ■ ■ ■	4 - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	*Zenith unvented and technically an ANSI type 1 but partially meets EN12492. Superseded by X version. *Also Hi-Viz versions *3x Pre-fitted Combo colours Superseded by X versions.	kask-safety.com				
		Zenith PL WHE00027/28/29 Zenith Air WHE00040/41/42/43	KASK		£65 \$150 \$100 €80	400g 14.1oz	53-63cm 21-24.8"	HARD SHELL HYBRID Polypropylene EPS Nylon/Nylon		-20 -4 +50 122	- - - -	- - - -	- - - -	● ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	4 - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	PL= Europe-Only EN12492 version. *Also Hi-Viz versions *3x Pre-fitted Combo colours Zenith Air also in Blue	kask-safety.com				
		Zenith X WHE00073/4/7	KASK		£90 \$135 \$330 €102	490g 17.3oz	52-63cm 20.7-24.8"	HARD SHELL HYBRID Polypropylene EPS Nylon/Nylon		-30 -22 -4 +50 122	■ ■ ■ -	- - - -	■ ■ ■ ■	● ● ● ●	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	- - - -	no ■ ■	■ ■ ■ ■	■ ■ ■ ■	4 2	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	*Also in Hi-Viz versions (cost = 15-20% higher than shown) *3x Pre-fitted Combo colours (pic shown)	kask-safety.com					

NOTES: N/A = info Not Available/not given COST: Approx. Inc local tax/VAT VENTS: ■ = closable ● = mesh covers ○ = minimal openings EAR: ○ = Will fit most accessories but check ■ = OPTION VARIANT data shown in blue or outline if it differs from the base model

images <u>NOT</u> to scale	VISORS AND EAR DEFENDERS ARE SHOWN AS AN EXAMPLE OF WHAT CAN BE FITTED TO THE HELMET, NOT NECESSARILY WHAT YOUR STOCKIST SUPPLIES	MODEL Variant/ AKA	COMPANY	ORIGIN	COST BARE HELMET COMBO inc Tax £ NO VAT	WEIGHT (BARE HELMET)	SIZES	CONSTRUCTION SHELL INNER STRAPS/HEADBAND		STANDARDS					EYE PRO			Goggle Visor	EAR	FEATURES			CRADLE		CHIN	COLOURS	NOTES	WEBSITE			
										TEMP RANGE °C / °F	ANSI 289.1	CSA AUS/NZ EAC	EN14052 / UKCA	EN397 (Industrial)	EN12492 / Lateral	GOGGLES INT	FULL VISOR INT	MESH VISOR INT	CLEAR	SMOKED	MIRROR	UNI SLOTS/RAILS	VENTS CLOSABLE	ID/LOGO REFLECT	NAPE GUARD UV				LAMP CLIPS BRKT	SLIDE COG ADJUST	REPLACE PADDING
		Zenith X Air WHE00075/6/8 Zenith X PL WHE00079/80/81	KASK		£100 £115 \$150 \$330 €103	490g 17.3oz	52-63cm 20.7-24.8"	HARD SHELL HYBRID Polypropylene EPS Nylon/Nylon	-30 -22 -20 -4 +50 122	■	-	■	-	●	■	■	■	■	■	-	■	□	□	4 2	■	■	■	-		* Also in Hi-Viz versions (cost = 15-20% higher than shown) *3x Pre-fitted Combo colours (pic shown)	kask-safety.com
		Zenith X2 AIR WHE00099/100 Zenith X2 WHE00097/98	KASK		\$154 \$150	470g 16.6oz 460g 16.1oz	52-63cm 20.7-24.8"	HARD SHELL HYBRID Polypropylene EPS Nylon/Nylon	-20 -4 +50 122	-	-	-	-	■	■	■	■	■	■	□	■	■	□	4 2	■	■	-	■		*X2 = unvented and technically an ANSI type 1 but meets EN12492. * Also in Hi-Viz versions (cost = higher prices shown) *3x Pre-fitted Combo colours	kask-safety.com
		Leef 997002.....	KONG		£100 \$139 €130	230g 8.1oz	54-61cm 21.3-24"	IN-MOLD polycarbonate EPS Nylon/Nylon	-30 -22 +50 122	-	-	-	-	■	■	-	■	■	-	■	-	-	4	■	■	-	■		Kong Accessory slot required for ear defenders and visors	kong.it	
		Mouse (Sport/Tactical) 99716.....	KONG		£62 £116 \$95 €64	380g 13.4oz	52-64cm 20.7-25.2"	HARD SHELL ABS Web/EPS Polyester	-30 -22 +50 122	-	-	-	-	■	■	■	■	■	-	■	■	□	- 1	2 1	■	■	□	■		*Yellow is Hi-Viz version. *Gloss black or Tactical version=matt black. □Also available as WORK industrial version with EN397 chin strap	kong.it
		Spin 99720.....	KONG		£60 \$85 €70	385g 13oz	52-62cm 20.7-24.4"	HARD SHELL ABS EPS/Web/Foam Polyester	-30 -22 +50 122	-	■	-	-	■	no	■	-	■	■	-	■	●	- -	4	■	■	■	-		Listed as suitable for climbing arborists but only has EN397 certification/additonal tests.	kong.it

NOTES: N/A = info Not Available/not given COST: Approx. Inc local tax/VAT VENTS: ■ = closable ● = mesh covers ○ = minimal openings EAR: ○ = Will fit most accessories but check ■ □ = OPTION VARIANT data shown in blue or outline if it differs from the base model

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











































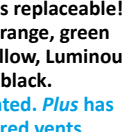































































































































































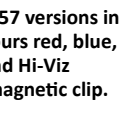






















































































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ARBO MASTER

SAFETY FIRST

images NOT to scale	VISORS AND EAR DEFENDERS ARE SHOWN AS AN EXAMPLE OF WHAT CAN BE FITTED TO THE HELMET, NOT NECESSARILY WHAT YOUR STOCKIST SUPPLIES	MODEL Variant/ AKA	COMPANY	ORIGIN	COST BARE HELMET COMBO inc Tax £ NO VAT	WEIGHT (BARE HELMET)	SIZES	CONSTRUCTION SHELL INNER STRAPS/HEADBAND		STANDARDS										EYE PRO		Goggle	Visor	EAR	FEATURES				CRADLE		CHIN		COLOURS	NOTES	WEBSITE
										TEMP RANGE °C/°F	EN50365 LT HT	ANSI Z89.1 CGE	CSA AUS/NZ EAC	EN14052 / UKCA	EN397 (Industrial)	EN12492 +Lateral	GOGGLES INT	FULL VISOR INT	MESH VISOR INT	CLEAR	SMOKED	MIRROR	UNI SLOTS/RAILS	VENTS CLOSABLE	ID/LOGO REFLECT	NAPE GUARD UV	LAMP CLIPS BRKT	SLIDE/COG ADJUST	REPLACE PADDING	<254mm Release	>504mm Release				
		F2-X-Trem	MSA-GALLET MSA-CAIRNS		£177 \$175 €160	700-750g 24.7-26-5oz	52-65cm 20.5-25.6"	HARD SHELL FR Thermoplastic Polyester/Nylon/ Plastane Flame-retard mix		-30 -22 +60 122	- - - -	* * - -	* * - -	- - - -	● ● - *	■ ■ - -	■ ■ - -	■ ■ - -	- - - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	* Unvented version meets NFPA & EN Technical Rescue standards with offset impact testing *Also Hi-Viz Yelw, Orange and Photoluminescent. Actual Goggles not visor-goggles	msasafety.com				
		F2XR	MSA-GALLET MSA-CAIRNS		£160 \$235 €150	700-750g 24.7-26-5oz	52-65cm 20.5-25.6"	HARD SHELL FR Thermoplastic Polyester/Nylon/ Plastane Flame-retard mix		-30 -22 +60 122	- - - -	* * - -	* * - -	- - - -	● ● - *	■ ■ - -	■ ■ - -	■ ■ - -	- - - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	■ ■ - -	* Unvented version meets NFPA & EN Technical Rescue standards with offset impact testing *Also Hi-Viz Yellow, Orange and Photoluminescent. *integrated rear & optional front lighting. Clip-in ear guards	msasafety.com					
		V-Guard H1 TriVent Non-Vented	MSA		£96 \$95 €85	515g 18.2oz	52-64cm 20.5-25.2"	HARD SHELL HD PolyEthylene EPS Polyester/Nylon		-30 -22 +50 122	- - - -	■ - ■ ■	■ - ■ ■	- - - -	● - - ●	■ - - -	■ - - -	■ - - -	- - - -	■ ● ● ●	■ ■ ■ ■	■ ■ ■ ■	3 3 3 3	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	Unvented version meets electrical insulation requirements. *Also Hi-Viz Yellow. Rescue whistle integrated into chin-strap.	msasafety.com					
		MP2	PAB		£150 \$170 €160	820g 29oz	52-64cm 20.5-25.2"	HARD SHELL FR Thermoplastic Heat Resist Foam Flame retardent		-30 -22 +50 122	- - - -	■ ■ ● -	- - - -	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ● ● ●	■ ■ ■ ■	■ ■ ■ ■	1+ 1+ 1+ 1+	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	Technical Rescue Helmet NBL MP1 Pro does not have ear defender slots/mounts. *Luminous *Option Velcro light fixtures	pab.hr					
		R5SLV	PACIFIC HELMETS		£195 \$230	n/a	52-65cm 20.5-25.6"	HARD SHELL Kevlar composite None (Web Cradle) Polyester/Nylon		-30 -22 +50 122	- - - -	■ - - -	■ ■ - -	- - - -	■ - - -	■ - - -	■ - - -	■ - - -	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	3 3 3 3	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	20 inc ■<							

NOTES: N/A = info Not Available/not given COST: Approx. Inc local tax/VAT VENTS: ■ = closable ● = mesh covers ○ = minimal openings EAR: ○ = Will fit most accessories but check ■ = OPTION VARIANT data shown in blue or outline if it differs from the base model






















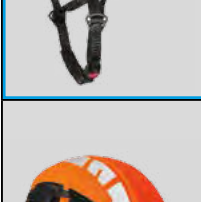








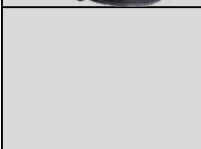


images NOT to scale	VISORS AND EAR DEFENDERS ARE SHOWN AS AN EXAMPLE OF WHAT CAN BE FITTED TO THE HELMET, NOT NECESSARILY WHAT YOUR STOCKIST SUPPLIES	MODEL Variant/ AKA	COMPANY	ORIGIN	COST BARE HELMET COMBO inc Tax £ NO VAT	WEIGHT (BARE HELMET)	SIZES	CONSTRUCTION SHELL INNER STRAPS/HEADBAND		TEMP RANGE °C / °F	STANDARDS					EYE PRO		Goggle Visor	EAR	FEATURES				CRADLE	CHIN	COLOURS	NOTES	WEBSITE					
											ANSI Z89.1 ✓CGF	CSA AUS/NZ EAC	EN14052 / UKCA	EN397 (Industrial)	EN12492 / +Lateral	GOGGLES INT	FULL VISOR INT	MESH VISOR INT	CLEAR	SMOKED	MIRROR	UNI SLOTS/ RAILS	VENTS CLOSABLE	ID/LOGO REFLECT	NAPE GUARD UV				LAMP CLIPS BRKT	SLIDE COG ADJUST	REPLACE PADDING	<25daN Release	>50daN Release
		DynamoHybrid RC05H.. Dynamo/Plus RC05/P..	ROCK HELMETS		£54 £85 \$56 €55	460g 14.5oz 410-420g 14.5-14.8oz	54-62cm 21.3-24.4"	HARD SHELL HYBRID ABS EPS Polyester/Nylon		-40 -40 +50 122	   	   	   	   	   	   	   	   	   	   	   	   	   	   	   	4	   	   	   	   		ALL components replaceable! + Florescent orange, green yellow, Hi-Viz Yellow, Luminous & matt black. Dynamo is vented. Plus has mesh-covered vents	rockhelmets.com
			Flash Aero W9602 Flash W9601	SINGING ROCK		£51 €54	455g 16oz	53-63cm	HARD SHELL HYBRID ABS/Polycarbonate web cradle Polyester/Nylon		-10 +14 -30 -22 +50 122	   	   	   	   	   	   	   	   	   	   	   	   	   	   	   	4	   	   	   	   		Flash Aero - Red or White only * High Vis Yellow
			Inceptor GRX Mnt BE590.. GRX Mnt HighVoltage BE592..	SKYLOTEC		£110 \$145 €111	470g 16.6oz	54-63cm 21.3-24.8"	HARD SHELL Polycarbonate/ABS EPS/web cradle Polyster/Nylon		-30 -22 +50 122	   	   	   	   	   	   	   	   	   	   	   	   	   	   	   	4	   	   	   	   		Also other EN357 versions in additional colours red, blue, yellow and Hi-Viz *Buckle is a magnetic clip.
			Advance X-Climb	STIHL EUROPE		£145 €179	495g 17.5oz	53-59cm 20.9-23.2" 58-63cm 22.8-24.8"	HARD SHELL ABS EPS/Koroyd Nylon		-30 -22 +50 122	   	   	   	   	   	   	   	   	   	   	   	   	   	   	   	4	   	   	   	   		*NB additional accessories / visors from Stihl and 3M
NOTES: N/A = info Not Available/not given COST: Approx. Inc local tax/VAT VENTS:  = closable  = mesh covers  = minimal openings EAR:  = Will fit most accessories but check   = OPTION VARIANT data shown in blue or outline if it differs from the base model																																	

SPIN

more info

conform to CE EN 397 and ANSI Z89.1-2009 | UNI Size | just 385g | removable and washable padding

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images NOT to scale	VISORS AND EAR DEFENDERS ARE SHOWN AS AN EXAMPLE OF WHAT CAN BE FITTED TO THE HELMET, NOT NECESSARILY WHAT YOUR STOCKIST SUPPLIES	MODEL Variant/ AKA	COMPANY	ORIGIN	COST BARE HELMET COMBO inc Tax £ NO VAT	WEIGHT (BARE HELMET)	SIZES	CONSTRUCTION SHELL INNER STRAPS/HEADBAND	STANDARDS										EYE PRO		Goggle Visor	EAR	FEATURES				CRADLE	CHIN	COLOURS	NOTES	WEBSITE
									TEMP RANGE °C °F	ANSI 289.1 CGF	CSA AUS/NZ EAC	EN14052 / UKCA	EN397 (Industrial)	EN12492 / +Lateral	GOGGLES INT	FULL VISOR INT	MESH VISOR INT	CLEAR	SMOKED	MIRROR	UNI SLOTS/RAILS	VENTS CLOSABLE	ID/LOGO REFLECT	NAPE GUARD UV	LAMP CLIPS BRKT	SLIDE/CG ADJUST	REPLACE PADDING	<25daN Release			
		Arborist	STIHL USA		\$130 \$164	630g 22.2oz 720g 25.4oz	53-63cm 20.9-24.8"	HARD SHELL HYBRID Lexan Polycarbonate Copolymer EPS 5/8" Nylon	-30 -22 +50 122	- - - -	■ - - -	■ - - -	- - - -	- - - -	● - - -	* - - -	* - - -	■ - - -	* - - -	■ - - -	■ ● - -	■ □ □ -	■ □ □ -	5 - - -	■ ■ - -	- - - -	■ ■ - -	*NB additional accessories / visors from Kask. Not available in the UK	stihl.com		
		Special Vent Plus	STIHL INTERNATIONAL		€98 €150	450g 15.9oz 440g 15.5oz	54-62cm 21.3-24.4"	HARD SHELL HYBRID ABS EPS/Koroyd* Nylon	-30 -22 +50 122	- - - -	■ ■ - -	■ ■ ■ ■	- - - -	- - - -	* - - -	* - - -	* - - -	■ - - -	■ ■ ■ -	■ □ □ -	■ □ □ -	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	*NB additional accessories / visors from Petzl *Option for both EN397 & 12492 chinstraps. *Vents must be closed to meet ANSI C, then does not fully meet EN12492. Not in UK.	stihl.com			
		SHK-1 Vented SHK-1 Unvented	STUDSON		\$140	495g 17.5oz	53-59cm 20.9-23.2" 58-63cm 22.8-24.8"	HARD SHELL ABS EPS/Koroyd Nylon	-30 -22 +50 122	- - - -	■ - - ■	■ ■ - -	● - - -	■ - - -	- - - -	- - - -	- - - -	■ - - -	no	■ - - -	■ - - -	□ □ □ -	□ - - -	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	Includes a MIPS style enhanced impact system called Brainshield. Non-vented version in white, grey ylw or orange. Embedded NFC chip with emergency information	studson.com	
		EXFIL SAR Back Country	TEAM WENDY		£245 \$221* €250	630g* 22.2oz	53-63cm 20.9-24.8"	HARD SHELL HYBRID Lexan Polycarbonate Copolymer EPS 5/8" Nylon	-20 -4 +54 130	- - - -	- - - -	- - - -	■ ● ■ -	■ ■ - -	- - - -	- - - -	- - - -	□ ■ - -	*	■ ■ - -	■ □ □ -	- - - -	1* - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	*Weight & cost is without rails. Add £\$€40 and 90g for rails. *Buckle is a magnetic clip *requires \$£€10 adaptor. Peltor ear defender adaptor	teamwendy.com		
		SecureFit x5000	3M		£90-115 £149 £140 \$110-145 €106-135	400g 14.1oz	50-63cm 19.7-24.8"	HARD SHELL ABS EPS/web cradle Nylon/HDPE	-30 -22 +50 122	■ ■ ■ ■	- - - -	- - - -	■ ■ - -	■ ■ - -	- - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ □ □ -	■ ■ ■ ■	- - - -	4 - - -	■ ■ - -	■ ■ - -	- - - -	■ ■ - -	Add approx 10% for reflective on standard helmet, Hi-Viz comes with reflective in price.	3m.com		
		Pheos Alpine	UVEX		€84-96 €150	490g 17oz	52-62cm 20.5-24.4"	HARD SHELL ABS web cradle Nylon/PP	-30 -22 +50 122	- - - -	- - - -	- - - -	■ ■ - -	● - - -	- - - -	■ ■ ■ ■	- - - -	- - - -	■ ■ ■ ■	■ □ □ -	■ □ □ -	- - - -	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	Version shown is the Forestry to illustrate visor and ear defenders but shows the basic Pheos not Pheos Alpine.	uvex-safety.com		
		Perfexxion	UVEX		€130	550-570g 19.4-20oz	52-58cm 20.5-22.8" 59-63cm 23.3-24.8"	HARD SHELL ABS EPS/mesh cradle Nylon/PP	-30 -22 +50 122	- - - -	- - - -	- - - -	■ ● ■ -	■ ■ - -	- - - -	■ ■ ■ ■	- - - -	- - - -	■ ■ ■ ■	■ ■ □ -	■ ■ □ -	- - - -	1* - - -	■ ■ - -	■ ■ - -	- - - -	■ ■ - -	*Rear clip recesses flush to the shell when not in use	uvex-safety.com		
		Pronamic Alpine MIPS	UVEX		€148	480g 16.9oz 490g 17.3oz	51-63cm 23.2-24.8cm	HARD SHELL ABS EPS / MIPS Nylon/PP	-30 -22 +50 122	- - - -	- - - -	- - - -	■ ● ■ -	■ ■ - -	- - - -	■ ■ ■ ■	- - - -	- - - -	■ ■ ■ ■	■ - □ -	■ - □ -	- - - -	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	MIPS version =enhanced anti-rotational impact protection	uvex-safety.com		
		Apex X2 ZAX201HV/202HV Apex Exo APX05	ZERO HEIGHT SAFETY		£65 \$80 €62	425g 15oz 430g 15.2oz	54-62cm 21.3-24.4" 51-62cm 20-24.4"	HARD SHELL HYBRID ABS Polypropylene EPS Nylon	-40 -40 +50 122	■ ■ ■ ■	- - - -	- ■ - -	■ ■ - -	■ ● - -	■ - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	Apex Exo is EN12492 only *Fluoro Orange & Lime *Direct fit half face visors available EN166	zeroheightsafety.com		
		Pinnacle Zertec ZPK01/01M/02 Pinnacle Exo ZPE01/02/A02/HV	ZERO HEIGHT SAFETY		£118 £78 \$140 \$90 €132 €85	445-465g 15.7-16.4oz 410-440g 14.5-15.5oz	54-62cm 21.3-24.4"	HARD SHELL HYBRID ABS EPS/Koroyd* Nylon	-40 -40 +50 122	■ ■ ■ ■	- - - -	- - - -	■ ■ - -	■ ● - -	■ - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	Zertec 02 =unvented & ANSI E (20,000v) + EN50395 <1500vDC. Zertec has NFC chip with emergency contact details. *Exo does NOT use Koroyd and has mesh vents.*Fluoro Orange & Lime, luminous white	zeroheightsafety.com		
		Zone/Zone MIPS Zone Electro	ZEKLER		€93	419g 14.8oz	53-63cm 20.9-24.8"	HARD SHELL HYBRID Polypropylene EPP/web cradle Nylon/HDPE	-30 -22 +50 122	■ ■ ■ ■	- - - -	- - - -	■ ■ - -	■ ■ - -	- - - -	■ ■ ■ ■	■ ■ ■ ■	- - - -	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	4 - - -	■ ■ - -	■ ■ - -	□ - - -	■ ■ - -	Also rebadged by CRESTO *Hi-Viz yellow. ELECTRO in Blue, White Yellow & Hi-Viz yellow	zekler.com		

NOTES: N/A = info Not Available/not given COST: Approx. Inc local tax/VAT VENTS: ■ = closable ● = mesh covers ○ = minimal openings EAR: ○ = Will fit most accessories but check ■ = OPTION VARIANT data shown in blue or outline if it differs from the base model

GEAR REVIEW

PETZL

SWIVEL PULLEYS S1, S1-Open, L1, L2 & L1D



LEFT: Completing the impressive Spin family are the Reeve and Twin Release NOT reviewed here

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SPIN

by Adam Jones

Edges and corners are an issue for rope users, with tensioned ropes requiring a form of protection to maintain their effective use, or a change of direction to redirect your load-bearing efforts. Pulleys are great tools for this job and in the right hands and correct configurations, they can mitigate an array of potential problems as well as allowing the multiplication of imparted energy with compound systems.

Petzl's Spin range, includes two 'small' models the S1, and S1 Open (shown opposite with gated eye), three 'large' models L1, L2 (with double sheave and becket), L1D (with one-way locking sheave) and two absolute masterpieces that we've not yet reviewed – the Reeve (zip/highline trolley) and the Twin Release (the L2 with a descender style release handle). These all bring the utility and efficiency of top end performance to your rack. Simplicity is a key attribute, minimizing the risk of confusion and complication and bringing an operational efficiency to your rigging that probably belies your actual skill level. There's nothing like flashy looking hardware to impress the client!

Whether you are setting up systems on the ground or redirects in the canopy, for lowering, hauling or access, these small and relatively light pulleys will open up options and minimise complexity (despite appearances) weighing in at 290g/10.3oz (145g-S1, 480g L2), so there is not enough weight difference with their closest Omni-Block competitors for arborists to worry about.

It's the swivel that allows the Spin to be described as multi-purpose pulleys and actually be a multi-purpose pulley. They are constructed from a combination of aluminium, stainless steel and nylon. The high efficiency sheave (95% is Petzl's

stated figure), is carried in rotation by sealed ball bearings, minimizing risk of contamination and dirt ingress. The alloy cheeks feature one opening plate, allowing the installation of the rope while the device is connected to the anchor. The opening of this moving side plate is protected by an unlocking button, a clever triple action mechanism, easy to learn and operate,

even with gloved hands. Although both locking parts of this mechanism are sprung to return to the safe position when the moving side plate is rotated home, a red marker is still provided to give clear indication in the case of incomplete return.

Anchorage of the pulley is achieved with a range of options using the generously sized main attachment eye. This can accommodate up to three carabiners (although all manufacturers' illustrations show only two connectors inserted), or sling or rope connection. The attachment hole is mounted to the main body or frame via a swivel which allows optimal orientation when under load. The L2 has a second sheave, making it an excellent option for the construction of haul systems. This version has an additional



Relative size of Small and Large Spins



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GEAR REVIEW

attachment point at the bottom of the frame for line termination in haul systems.

Both the *L1* and *L2* are similar regarding the sheave design, the *L1D* is however slightly different. Moving away from a conventional smooth sheave, the *L1D* has a faceted sheave



which rotates in only one direction so rope takes in (hauling) efficiently with a degree of progress capture because the one-way sheave and faceting limits any slipping back of the rope. When lowering you not only have the frictional increase of a non-rotating sheave but the enhanced grip of the scalloping which creates the 10 or so facets on the sheave surface. Each facet is an angled groove that further 'grips' the rope as it passes. Unlike many of the assisted braking devices that impart additional friction via a camming action or acute change of direction to the loaded rope, the *L1D* has a relatively passive action.

The *L1D* sheave is 2mm wider at 40mm than *L1/L2* versions which are 38mm. The side plates protect the rope path and on the *S1D*, there is the tell-tale corner instead of curve on one side that provides a braking post which the prusik butts up against in order to open its coils enough to allow rope travel during take-in and then on release of the rope can extend back out to capture the rope in a hauling system. If you are climbing to reduce, dismantle or remove dead wood,

Midline attachable Swivel pulleys	Petzl SPIN L2	Petzl SPIN S1/ OPEN*	Petzl SPIN L1/L1D*	SMC APEX 1.5	Rock Exotica OMNI 1.5
Origin	France	France	France	USA	USA
Sheave (inner)	40mm/1.5"	40mm/1.5"	40mm/1.5"	38mm/1.5"	38mm/1.5"
MBS	36kN	36kN	36kN	38kN	36kN
WLL	6kN	6kN	6kN	9.4kN	8kN
Length	150mm/5.9"	150mm/5.9"	150mm/5.9"	149mm/5.86"	135mm/5.3"
Width	70mm/2.75"	70mm/2.75"	70mm/2.75"	74mm/2.9"	63.5mm/2.5"
Weight	290g / 10.2oz	290g / 10.2oz	290g / 10.2oz	306g / 10.8oz	303g / 10.7oz
Rope Capacity	13mm/ ½"	13mm/ ½"	13mm/ ½"	13mm/ ½"	13mm/ ½"
Bushing or Bearing	Bearing	Bearing	Bearing	Bearing	Bearing
Materials – Frame	Aluminium	Aluminium	Aluminium	Aluminium	Aluminium
Materials – Sheave	Aluminium	Aluminium	Aluminium	Stainless Steel	Stainless Steel*
Prusik Minding (PMP)	No	No	No/Yes*	Yes	Yes
Midline Attach	Yes	Yes	Yes	Yes	Yes
One-Way Lock	No	No	No/Yes*	No	No
Standards	NFPA, CE	NFPA, CE	NFPA, CE	NFPA, CE pending	NFPA, CE
COST:	£98/\$105/105	£98/\$105/105	£98/\$105/105	£97/\$98 /€120	£98/\$99/€121
NOTES	Double sheave with Becket	*S1-OPEN= Swivel can be opened for attachment	*L1D version= PMP with one-way sheave lock		*Also available with Aluminium sheave 9.2oz

and looking to take a mobile lightweight but heavy-duty rigging system with you, the *L1D* is worth having on board. It provides sufficient friction to provide your groundy with a decent advantage to perform a well-controlled lower (within a limited range) and also allowing the easy and rapid retrieval of the lowering set up to the climbers' position. We always find it to be far less faff than other options for frictional increase like bollard posts. The *L1D* seems to have had little fanfare but it might actually be our favourite tool in this genre of swivel pulleys.

The ability to introduce the pulley anywhere along the rope while it is safely anchored is a great benefit though clearly not unique to the *Spin*. You have the convenience of adding or taking out of a work system, without the need to end-feed or de-rig, and the added advantage of the safety and security of not dropping your hardware because it can stay connected to the anchorage.

Their physical size and fact that these pulleys can have a variety of roles should secure them a place in your go-to equipment for climbing and rigging operations. Their huge attachment eye make the *Spins* great for zip/transport lines and anchoring/redirects where fabric slings like the *Texora* can be used while the swivel allows the pulley to orientate in line with the direction of load and save your rope dragging over plate edges and limits potentially damaging torque on carabiners and fixed eyes.

Unusually for *Petzl* the *Spin* range represents an attempt to improve on an existing design, at least for the swivel pulleys, rather than innovating but their *L1D*, *Reeve* and *Twin* show where they can take this concept. If you're going to take on something as good as the *Rock Exotica Omni-block* at a similar price bracket, it has to be done well and 'done-well' *Petzl* certainly has. They had the advantage of being able to tweak a long-standing design so do have an advantage and it shows in some of the best pulleys we've ever used.



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UK South West		SORBUS INTERNATIONAL	L1- L3, Commerce Park, Marshall Way,	Frome	BA11 2FB	sorbus-intl.co.uk
USA North-East		ARBORTECH SUPPLY	11494 James Madison St	Remington	VA 22734	arbortechonline.com
USA North-East		GAP ARBORIST SUPPLY	835 PA-41	Gap	PA 17535	gaparboristsupply.com
USA East		MOUNTAINTEK	1034 Maple Street	Hendersonville	NC 28792	mountaintek.com
USA North West		WESSPUR	2121 Iron Street	Bellingham	WA 98225	wesspur.com

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