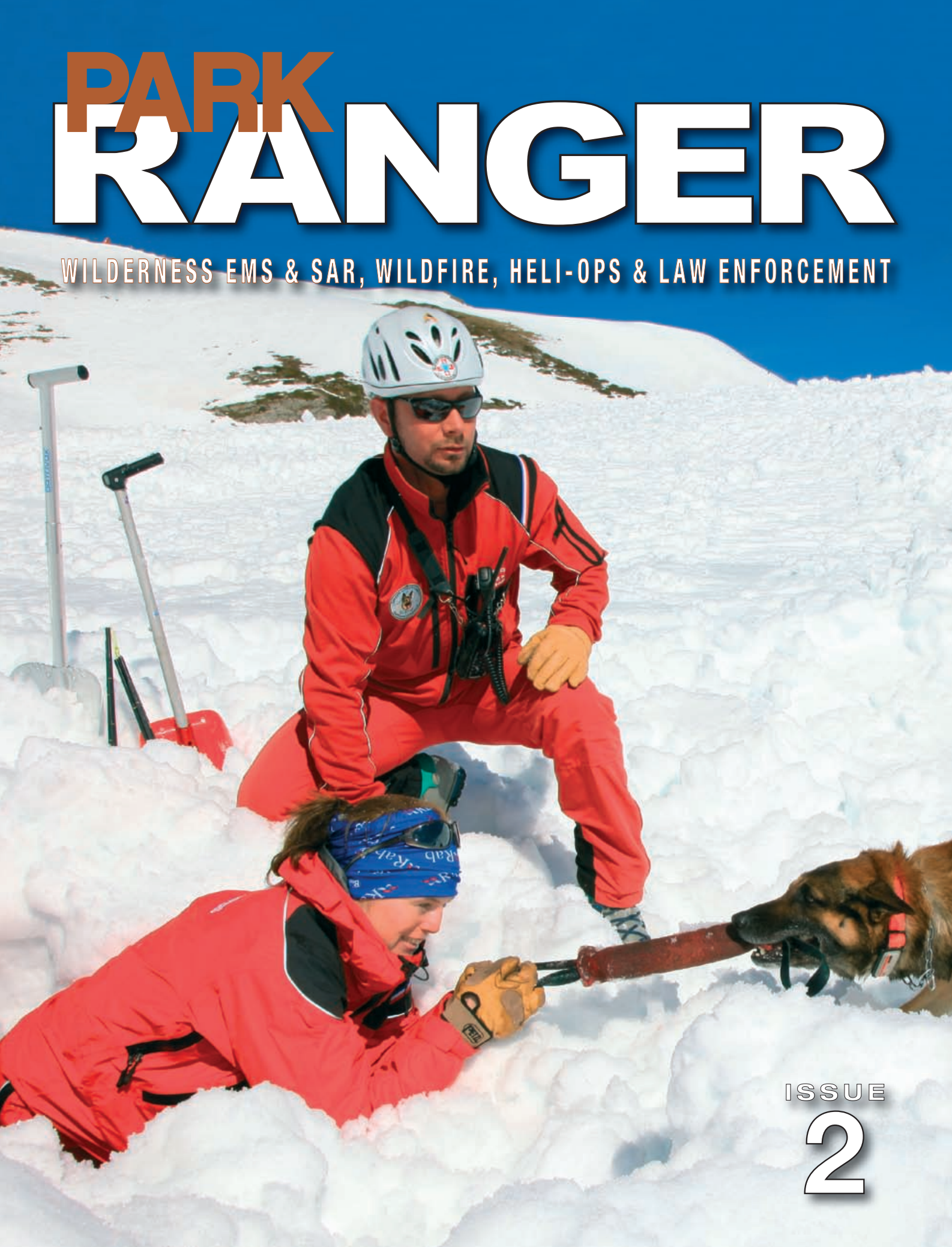
PARK RANGER

WILDERNESS EMS & SAR, WILDFIRE, HELI-OPS & LAW ENFORCEMENT



ISSUE 2

Weight-loss tip:
eliminate every unnecessary gram.

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Forget about weight on your head, thanks to the ultra-light design of the ALVEO helmet (345 g). For optimal stability in action, its CenterFit adjustment system ensures perfect centering of the helmet on the head. It is extremely modular, allowing integration of a VIZIR face shield and hearing protection. Available in two versions: ALVEO VENT (ventilated) and ALVEO BEST. Contains Alveolen® of Sekisui Alveo AG

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CONTENTS

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FRONT COVER:
Carolyn Elliot and Jean-Michel Morlot of the French Fire Service with Jean-Michel's dog Buzz. Having constructed a hole in the snow for the 'casualty' with an inflatable tube and the piste basher, buzz is required to search, locate and help extract the avalanche victim.
Picture by Eric Roustand

This Page:
Satellite shot of the North California coast showing the interaction between cold sea currents and mountains - cloud and fog!

Standards?

You should want them!

In 1988 ASTM International formed the F32.0 committee, a committee whose purpose is to develop standards for Search and Rescue professionals. Today this committee consists of 80 members who are involved in 3 separate sub-committees who continue to develop Standards. I am 1 of these 80 people and truly believe that our efforts enhance SAR around the world.

I have previously expressed the idea that people in SAR have egos that can prove problematic and when it comes to standards this is certainly true. I cannot tell you how often I hear people say that SAR is too complex to have standards, our area is unique, so the standards do not apply, or that you cannot tell our team what to do or how to do things. These beliefs demonstrate either 1) a misunderstanding for what standards offer, or 2) an inward looking view of one's team. The former is readily corrected through education; the latter is frankly dangerous and is an accident waiting to happen.

First, let us consider what the ASTM SAR Standards represent. These standards are essentially minimal knowledge, skills, and abilities standards that have been developed by a collective of individuals that identify common ideas and distill them into a working document that provides the required information to interested parties. I personally believe that every team should examine the appropriate standards for their team and see how they "measure" to this collective baseline. I hope that every team operates at a level that is "superior" to the standards. And remember – if your team operates above "minimal standards" that does not mean that the standards "suck", another issue I hear from individuals that look at the standards.

What if your team does not meet one or more aspects of a standard? This is where using standards can improve your team. Consider the issue – is there a reason why your team can clearly define why that issue is not applicable. For example, does the standard indicate personnel shall be trained in basic swift water but your team's response area has no rivers, creeks, or streams. In this case a simple clarified statement addresses the issue. ASTM standards are voluntary, a clarification statement can be utilized to explain why your team excludes a "requirement".

The other side of this example is that your team might benefit from other's ideas and experiences. For example, basic aviation safety is common to many of the SAR standards. Your team may not actually utilize aviation resources with SAR, so no training has been implemented for the team. Well – what if a plane or helicopter crashes in your area? Do your team members understand the very hazardous chemicals they might be exposed to? Do team members know that the battery shut-off in civilian helicopters is commonly located in the nose of the helicopter and that it should be shut-off? The standard might have identified a "life-safety" issue that has escaped your training program. An addition to your training addresses the issue and your team is all the better for it.

The utilization of standards also offers your team validity to the public, reduces liability, and can be used to validate budget/equipment needs. Your ability to point to a third party that consists of experts in the field and say, "Our team member's training meets or exceeds ASTM 2209 – Standard Guide for Training of Level I Search and Rescue Member" strengthens your team reputation in the eyes of the public. If your team is sued say for negligence - you can point to the standard and say your team member training meets or exceeds recognized training standards. Lastly, if a standard indicates that training in a specific area is required, then the standard can be used to justify why a budget might be increased over time.

I appreciate that the ASTM Standards have a strong bias to the US; however, members are beginning to look beyond the US with the belief that the standards should be more universal. However, even with the US centric focus, these standards can be used by teams around the world to focus training and identify possible weaknesses. Where a standard specifies a US specific item, simplify adjust to the equivalent in your area. Another option is to seek out other organizations that are active in the SAR community and that have developed standards, for example, IKAR (www.ikar-cisa.org) or the Australian National Search and Rescue Council (http://natsar.amsa.gov.au) both of which have developed various Standards.

I have provided a list of the current ASTM Standards currently approved on the following page. However, I can also say that there are many other Standards in progress that one day, hopefully, will be approved and offered to SAR professionals. These standards offer access to literally 100s of years of experience – why in the hell would anyone not take advantage of that?

SAR PRODUCTS

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You may hate gravity, but gravity doesn't care!

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Fully compliant for two person loads as in EN12841-C

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SAR ROCKER

Rescue BackUp Device

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Tel:+44 (0) 161 621 0309
email:sales@sar-products.com

Active F32 Standards:

F1422-08 Standard Guide for Using the Incident Command System Framework in Managing Search and Rescue Operations
F1583-95(2012) Standard Practice for Communications Procedures—Phonetics
F1591-95(2012) Standard Practice for Visual Signals Between Persons on the Ground and in Aircraft During Ground Emergencies
F1633-97(2008) Standard Guide for Techniques in Land Search
F1728-96(2007) Standard Practice for Multiple Persons Cold Water Survival/Rescue Technique: Huddle Position
F1729-96(2007) Standard Practice for Single Person Cold Water Survival/Rescue Technique: HELP Position
F1730-96(2009) Standard Guide for Throwing a Water Rescue Throwbag
F1765-97a(2007) Standard Guide for Ice Staff Self-Rescue Technique
F1766-97a(2007) Standard Guide for Ice Awls Self-Rescue Technique
F1767-98(2005) Standard Guide for Forms Used for Search and Rescue
F1768-97(2007) Standard Guide for Using Whistle Signals During Rope Rescue Operations
F1846-98(2008) Standard Practice for Symbols and Markings for Use With Land Search Maps
F1847-98(2012) Standard Guide for Demonstrating Minimum Skills of Search and Rescue Dogs and Handlers
F1848-98(2012) Standard Classification for Search and Rescue Dog Crew/Teams
F1879-98(2005) Standard Guide for Demonstrating Obedience and Agility in Search and Rescue Dogs
F1993-99(2005) Standard Classification of Human Search and Rescue Resources
F2047-00(2012) Standard Practice for Workers' Compensation Coverage of Emergency Services Volunteers
F2099-01(2007) Standard Guide for Use of Universal Transverse Mercator (UTM) Grids When Preparing and Using a Field Map for Land Search
F2662-08 Standard Guide for Minimum Training of Dispatchers and Telecommunicators of SAR Incidents
F2752-09 Standard Guide for Training for Level I Rope Rescue (R1) Rescuer Endorsement
F2794-09 Standard Guide for Level 1 (Basic) Mounted Search and Rescue (MSAR) Responder
F1549-94(2011) Standard Terminology Relating to Underwater Search, Rescue, and Recovery Activities
F1739-96(2012) Standard Guide for Performance of a Water Rescuer—Level I
F1740-96(2012) Standard Guide for Inspection of Nylon, Polyester, or Nylon/Polyester Blend, or Both Kernmantle Rope
F1783-97(2007) Standard Guide for Performance of an Ice Rescuer-Level II
F1824-97(2007) Standard Guide for Performance of a Water Rescuer-Level II
F2209-10 Standard Guide for Training of Level I Land Search Team Member
F2685-07 Standard Guide for Training of a Level II Land Search Team Member
F2751-09 Standard Guide for Training of Support Level Land Rescue Team Member (LRT-Support) Member
F2852-10 Standard Practice for Training a Land Search Tracker
F2954-12 Standard Guide for Training for Level II Rope Rescue (R2) Rescuer Endorsement
F2955-12 Standard Guide for Training for Level III Rope Rescue (R3) Rescuer Endorsement
F1764-97(2012) Standard Guide for Selection of Hardline Communication Systems for Confined-Space Rescue
F1772-12 Standard Specification for Harnesses for Rescue, Safety, and Sport Activities
F1773-09 Standard Terminology Relating to Climbing, Mountaineering, Search and Rescue Equipment and Practices
F1774-99(2005) Standard Specification for Climbing and Mountaineering Carabiners
F1823-97(2012) Standard Guide for Water Rescue Personal Flotation Device (PFD)
F1956-99(2005) Standard Specification for Rescue Carabiners
F2116-01(2007) Standard Specification for Low Stretch and Static Kernmantle Life Safety Rope
F2266-03(2008)e1 Standard Specification for Masses Used in Testing Rescue Systems and Components
F2436-05(2011) Standard Test Method for Measuring the Performance of Synthetic Rope Rescue Belay Systems Using a Drop Test
F2491-05(2010)e1 Standard Guide for Determining Load Ratios for Technical Rescue Systems and Equipment
F2684/F2684M-07(2012)e1 Standard Test Method for Portable High Anchor Devices
F2821-10 Standard Test Methods for Basket Type Rescue Litters
F2822-10 Standard Specification for Fixed Anchorages Installed on Structures used for Rope Rescue Training

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Nothing matches the **DEUS 3100** for safe, reliable and fool-proof escape or rescue descent. That's because only the 3100 offers completely hands-free operation, quadruple redundant brakes and speed limiting technology to guard against free fall. It works every time, even under duress and in the harshest conditions...just like the firefighters it's made for.

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ON THE COVER

Caroline ELLIOTT *is Park Ranger's Pyrenees-based mountaineer/firefighter/SAR dog Handler/Ski Patroller so she ticks many of our target readership boxes and is a renown UK climber to boot. She has recently been undergoing rigorous avalanche training with her dog Fjord and, as can be seen on this front cover, has been assisted by colleague Jean-Michel Morlot and his dog Buzz. Caroline will be filling us in on the business end of Mountain Rescue with French Fire Service and associated agencies later in 2013 but in the meantime we asked her to introduce herself.....*

How would I describe myself?
As a Brit displaced due to her passion for the mountains and her desire to be in touch with raw nature.....At the innocent age of 10 my dream was to become a ski instructor as a result of spending the majority of my winter holidays in the Austrian Alps. I was told by my brother that it was a job with no future. (He now works behind closed walls for a bank in front of a computer screen!) Nevertheless I had a go during my university years.... but there was something lacking.....

30 years later after the seed of the job in the mountains was planted in my stubborn head I now find my office in the snowy mountains of the Pyrenees here in France ..... And I so wouldn't have it any other way.
I work in Ski patrol rescue in the winter..... ironically I did my initial training for the profession 'Down Under' in the lovely resort of Thredbo.....and then redid it all again in France in 2007 from the 'test technique' to the final exams to gain the 1st degree as a pisteur secouriste. (It's a tricky business being awarded an 'equivalence' certificate in this land....). Just 4 years in 2011 after qualifying I decided to spend another 3 full on weeks training, this time at ENSA (Ecole National de Ski et Alpinisme) in Chamonix to gain at the 2ème degré or 2nd level, a qualification to gain skills in crevasse rescue, orienteering, in depth snow studies amongst other fascinating elements related to the mountain wilderness.

But that just couldn't be the end to my quest for knowledge! To enrich further my skills in the domain, in November 2012 I followed at the ANENA (Association National des Etudes de Neige)....a technical course to work as an 'artificier' or pyrotechnician to destroy snow accumulations which could transform into potential avalanches. Lots of fun surrounding those magically formed snow crystals!
And lastly but by far not the least .....the Crème de la Crème and the definite succulent cherry on the top of the cake just has to be the training and efforts over 3 weeks in the Alps for the Maitre Chien d'Avalanche... which Fjord and I passed at the end of December at his ripe old age of 2 years, 2 months, and 2 weeks. GOOD BOY!

Caroline Elliott

PRODUCTS

Mini MA

The perfect mini mechanical advantage system can literally fit in a pocket. When extra power is needed, this system creates a 4:1 or 5:1 increase in force, depending on orientation. For use in partner/self rescue, adjustable directionals, piggy-backed haul systems, tensioning lines and multiple other rigging needs.

Kit Includes:
- SR Mini-double pulleys (2)
- 50 feet of 8mm rope with sewn eye
- Hawk Autolock Carabiners (2)
- 6mm sewn prusik
- Screwlink

www.sterlingrope.com.com

We're always a little skeptical of full-size tools that try to do do too much since they often end up as the archetypal Jack-of-all-trades, master-of-none. Nevertheless there are occasions when wildernes operators need to travel light and retain multi-role options. The McLaski has been around for a few years now and is still actively marketed by Rescue 42 so here's a reminder of what it does in case you feel like checking it out:

Available with 48" or 60" composite handle.

COST: $149.00

Wildland firefighting has gone through enormous changes in the last hundred years, but te primary hand tools we use to fight those fires have not not changed at all to meet the needs of modern firefighters who have to do more with less in a wildland environment filled with structures. So we developed the McLaski tool. The McLaski combines the best features of two traditional fire tools; the Mcleod and the Pulaski.The McLaski is manufactured of laser cut AR450 steel, some of the toughest steel available . This gives the McLaski the ability to hold an edge well past the point where other tools would be dull.

•FUSEE HOLDER - is designed to hold the Fusee/flare tightly while still allowing it to flop around whcih helps prevent snapping of the brittle Fusee. The Fusee holder allows you to light backfires without having to constantly bend over and kjeeps your face and hands away from the fire.

•SPANNER WRENCH - is used to aid in uncoupling stubborn hose connections by biting onto a lug.

www.rescue42.com

AFFORDABLE RESCUE INFLATABLES

Rescue Features are Standard

Rescue ONE's Inflatable Boat Series is built with a host of standard features that make it rescue ready. Among these are the 5 separate air chambers. Each chamber has its own fill valve and most importantly, pressure relief valves to enable the boat to be filled with an SCBA or SCUBA bottle without fear of bursting the tube.

- 15 Internal D Rings For Securing Gear
- Lightweight, Rigid Aluminum Floorboards
- Snap In Storage Bag For Additional Equipment
- 5 Separate Air Chambers with Pressure Relief Valves (SCBA Fill Adapter Available)
- Double Layer Tube Bottom
- Reflective Panels For Safe Night Operations

The days of paying a lot of money for a boat that has a limited life is over. No matter the material or construction, inflatable boats are susceptible to tears, rips, punctures, and other damage. With this in mind, we have priced our boats at 1/3 the cost of other well-known inflatable rescue boat brands, while still providing a 5 year warranty that covers any manufacturer or material defect. While all boats come with a repair kit, this provides you the peace of mind that if the boat is damaged beyond repair, it is not going to blow your budget to replace.

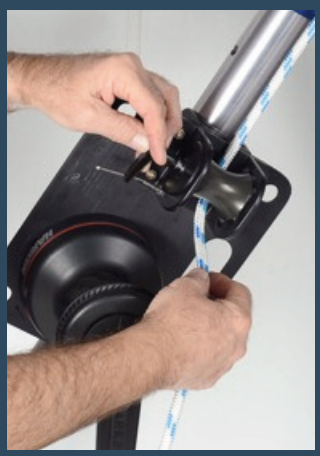
www.rescueone.com

	380RS	430RS	470RS
Max Persons	6	8	10
Maximum HP	30 (short shaft)	40 (short shaft)	50 (long shaft)
Max Engine Weight (lb/kg)	165 / 74	185 / 83	225 / 102
Max Load (lb/kg)	1720 / 780	2395 / 1086	2640 / 1197
Weight (lb/kg)	216 / 97	253/ 114	275 / 124
Length (ft/cm)	12'6" / 380	14' 2" / 430	15' 5" / 470
Tube Diameter (in/cm)	18 / 46	20 / 51	20 / 51
Beam (ft/cm)	5' 8" / 172	6' 5" / 195	6'9" / 206
Air Chambers	5 + keel	5 + keel	5 + keel
Floor	Aluminum	Aluminum	Aluminum
Includes	Aluminum paddles, storage compartment, seat, pump,& repair kit		

SpecOps Winch

SkyHook Spec Ops Multi-Mission SKSO-20 (Letter Size)
The Spec Ops Multi-Mission winch, SKSO-20 uses a smaller version of the Harken rope winch system. The Spec Ops rope winches also provide reliable, rugged and user-friendly design in miniature.
The Spec Ops winch system allows the user to be used in rescue, military &law enforcement ops.
This version is also use in confined spaces such as cave rescues or exploration.
The lightweight winch is ideal for off road operations or rural rescue locations and can be carried or backpacked to the sight.

Milwaukee cordless 28vDC Lithium Battery System
The Spec Ops winch weighs 10.1 lbs. / 4.6kg.
The Milwaukee cordless battery pack drill weighs 8.5 lbs. /3.8kg
The Spec Ops Harken winch has one speed, providing a gear ratio of 5.4 to 1 mechanical advantage.
Being powered by a cordless drill eliminating extra personnel, keeping them out of the work area or danger zone.



Attaches Almost Anywhere
The universal anchoring channel accepts webbing straps, ball lock pins stabilization outriggers, davits and tripod legs.
The SkyHook rope winch system allows as much as 1500 ft. / 472 meters or more of rope to be used in work, inspection, and rescue related disciplines.
The electric assisted Spec Ops winch provides a 5 to 1 manpower efficiency ratio; it will do the workload of 5 men eliminating unnecessary personnel. All Winches will accept accessory electric drill motor power heads.

www.skyhookrescue.com

HITCH PLATE

$249.95

www.conterra-inc.com

(Please check and make sure that your receiver is 2.00 inches)

Over the years, we have performed dozens of roadside rescues using vehicles as anchors or changes of direction. We have attached to wheels, tied through frame holes, and even seen folks girth hitch tow balls! It was always time consuming and stressful guessing the safety of our attachment. The Conterra Hitch-Plate™ answers the question of exactly where and how to anchor to your rig when performing a vehicle based rope rescue. The Hitch-Plate™ is beautifully made and wicked strong.

It is CNC machined entirely from billet aluminum in Conterra's ISO 9001 certified fab shop. It sports five large rigging holes and will fit in any 2" vehicle receiver. It has an ingenious system that keeps the pin and cotter attached to the device so that they can't be lost. It comes with it's own padded Ballistics nylon case with grab handle and hang loop. Meets NFPA Standard 1983 (2012 ed.) and is UL certified. Rated for General Use (G) MBS 50 kN. (For rope rescue only. Not for vehicle recovery or towing.)

KONGUR MRT JACKET

Not a new product since we first mentioned this in TRm a few years ago but we like to highlight any initiatives specifically aimed at the emergency services and The Kongur MRT remains a current product. Mountain Equipment have a solid reputation in mountaineering so it's no surprise that theexcellent Kongur jacket makes such a good base for a Rescue version.

- WEIGHT: 640g
- SIZES: S - XXL
- RRP: £330.00
- 3 Layer Gore-Tex® Pro Shell Ascendor II
- 3 Layer Gore-Tex® Pro Shell Lofoten reinforcements
- 3M® reflective detailing for visibility in poor weather & darkness
- Super long cut provides exceptional protection
- Super Alpine HC hood
- Stealth construction techniques used throughout
- Slim double centre front storm flaps
- 2 large chest pockets can be used whilst wearing a rucksack or harness
- 2 external map pockets allow hidden access to stored items
- Underarm Water resistant pit zips for ventilation

The Kongur's longer mountain cut, affords extra protection – whether hollowing under the downdraft of a search and rescue helicopter, battling winter storms or enduring a wet day on the crags. The hood on the Kongur is a larger helmet compatible design. Easily adjusted thanks to its Stealth adjustment, ensuring all the workings are hidden out of the way where they cannot be damaged or flung into your face in violent gusts, it will move with your head
whether or not you a wearing a helmet. Furthermore it features a laminated and
wired visor. Forming a natural arc when cinched down to provide maximum front
and peripheral vision whilst being unaffected by storm-force winds.
www.mountain-equipment.co.uk

UNIVERSAL FOCUSING OBJECT

This new generation of rigging plate allows you to position in three dimensions, giving you the most flexibility and control when rigging in unpredictable environments.

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PMP PULLEYS

NEW FOR 2012

The PMP pulleys are the answer for heavy load situations, with their large 2.0" sheaves and NFPA-G ratings.

MINI-MACHINED PULLEYS

Our machined pulleys are milled from solid 7075 aluminum allowing us to use a flush head axle screw. That's why these pulleys are more compact, stronger and lighter weight than conventional stamped pulleys.

AZTEK PULLEY KIT

Our compact mechanical advantage system continually amazes rescuers with its many uses and versatility. It can be used as a pick off, travel restrict, adjustable directional, high directional guyline, high angle attendant tether, high angle litter scoop, load release hitch and much more. The Aztek Kit comes with pulleys, pin, cover, color coded prusiks, travel restraint, 50' rope and bag as shown.

STEEL CARABINERS

Choose from two frame shapes of Stainless Steel carabiners - our new HMS Assault, and our proven rockD. Also available is the classic rockSteel - one of the lightest NFPA-G rated carabiners out there. All carabiners available in screw-lock and three stage autolock.

OMNI-BLOCK SWIVEL PULLEY

The Omni-Block replaces a conventional pulley, carabiner & swivel and is lighter, less expensive and saves valuable vertical space. The rotating sideplate allows installing and removing the rope while the pulley is still anchored. Available in 1.1", 1.5" and 2.0" sheave.

rock exotica

GEAR FOR THE Z AXIS

MADE IN USA

WWW.ROCKEXOTICA.COM

yamaha RHINO

ALL TERRAIN VEHICLE

by Rich Hackwell
Head of Technical Rescue Training
HM Coastguard UK

SPECIFICATIONS:

Manufacturer:	Yamaha Motor Corportaion
Model:	Rhino 700 FI
Origin:	USA
Cost:	$11,499 - $12,049
Colours:	Red, Hunter Green, Camo
L x W x H	113.6 x 56.6 x 73 in
Wheelbase	75.2 in
Turning Radius	153.5 in
Ground Clearance	12.1 in
Fuel Capacity	7.9 gal
Wet Weight	1199 lb
Bed Capacity	400 lb
Towing Capacity	1212 lb
Website:	www.yamaha-motor.co.jp/global

Technically the Rhino would prefer to be called a Utility Vehicle or even a Recreational Off-Road/Highway Vehicle rather than All Terrain Vehicle. This is probably because the civil market for such hybrids somewhere between an ATV and a true car-style 4WD is prospectively huge. With a 'side-by-side' seating arrangement , proper doors if you want them, steering wheel, foot pedals and recognisable lighting and electrical components this is the ultimate in big-boys toys.. The Rhino comes up against the Polaris Ranger and John Deere Gator amongst others and as such this is a variation on a proven market for Park Rangers and wilderness responders/workers. We chose the rather more marginal but perhaps more vexing beach and mud estuary environments to test the Rhino.

IN ACTION

The Rhino is very similar to driving a standard 4x4, the transmission was easy to use and controls well placed, any operator familiar with a standard off road vehicle will feel right at home behind the wheel of this ATV. It would be easier to convert and train people to use the Rhno than other ATV's. such as quad bikes and tracked or skid steer vehicles which require differing skills. The 4x4-like characteristics of the Rhino makes initial training easier and eases competency maintenance as it shares many skills with regular off-road vehicles.

The Rhino took a range of difficult terrains in its stride; it handled muddy foreshore and wet sand, rocky terrain (Including loose rocks and scree), agricultural fields, ditches and gullies. The transmission allowed safe progression through the terrain without the need to 'gun it' or power through, this is essential to ensure both people and equipment get to the scene safely.

The Rhino scored highly on crew comfort, it feels very stable off road, both driver and passenger felt very secure, the seating was comfortable, with a good windscreen and rollover protection (although I'd recommend the windscreen wiper option). All this adds to user confidence and ensures rescuers get to the scene ready to do the job, without recovery time to get over the journey there!

The vehicle appears to be solidly built with sturdy fixtures and fittings. It has good protection for components, including the all-important underside which was well tested over loose rocks and scree, it took all we threw at it with no problems.

With a bed capacity of 400LB/181kg the rhino has a good payload for rescue or work equipment, this would allow the rapid deployment of equipment to the incident over mixed terrain or where access is limited to larger vehicles. Adaptation to rear bed would allow carriage of a stretcher and tender, a number of companies are producing these for similar vehicles so we can surmise tha t the Rhino will be similarly catered for. Yamaha themselves have done some work with vehicles equipped for fire fighting.

We found the Rhino to have a good towing capability, both on and off road. We used it to tow, launch and recover a Yamaha Waverunner FXHO RWC perhaps not the heaviest of loads but appropriate to the scale of vehicle. It towed well on tarmac, wet sand, rocky foreshore and mud.

The Rhino had a good speed range for a variety of conditions; off road, un-made tracks and tarmac.It felt stable in all these conditions and stopped well. It can be prepared as road legal (which it would otherwise not be in the UK but other countries regulations will vary) which would allow great versatility in emergency response or for use as a work vehicle. Alternatively it can easily be transported by road trailer for deployment further afield.

The demonstrator we tried was complete with emergency service markings and lights/siren giving the vehicle great visibility and clearly identified it as a response vehicle. These lights were fitted by a sub contractor to the base vehicle. The lights and sirens were effective offering both blue response lights and orange hazard lights which provided effective warning to the public.

We did have one issue with the lights when a wire came

loose during an off-road test which incapacitated the lights and siren. The fault was traced to the aftermarket electrics added to the base vehicle and did not match the rugged capability of the Rhino. Yamaha UK have dealt with this issue and have asked for the sub contractor to beef up their wiring, it is fair to add that Yamaha's own electrics coped with all our test conditions.

The test team could see this vehicle being suitable for a variety of emergency responders including; SAR Teams, Coastguard, lifeguards, wildland firefighting,wilderness medical, Rangers, disaster response, event rescue/ medical teams etc.

CONCLUSIONS

•Very similar to driving a standard 4x4 so conversion and training is simple at the outset and easy to maintain.

•Good off-road capability,

•Stable on and off-road

•comfortable seating

•good windscreen and rollover protection.

•Worthwhile payload for rescue equipment (180kg/400 lbs),

•Strong towing capacity (550kg/1200lbs)

•Quality construction - at least appeared that way for the period we had the Rhino)

A confidence inspiring vehicle and welcome addition to a shortlist of similar excellent vehicles in this class. PR

The Greatest Job?

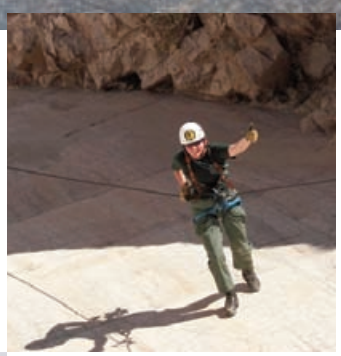
by

MICHELLE SCHONZEIT

"You're job is SOOO COOOOL!"

I usually respond to this with some dignified answer regarding the mission of the National Park Service and the many diverse services that my co-workers and I provide. But, when it comes down to it, yes, my job is pretty darn cool. After all, that is why I fought tooth and nail to get my foot in the door years ago and why I encourage others I know to look into careers with the National Park Service.

After all, I can throw down some pretty awesome things I've gotten to do on work time. I rappelled down the Hoover Dam with members of North Las Vegas SWAT. Yep, that was cool, and I was the only girl there in the group of about 20 buff guys. I also got to rappel down the interior of the Statue of Liberty with my high angle rescue team looking for better ways to evacuate visitors injured or ill at the top of the stairways. I've been on rescues on El Capitan, Mt Olympus, and in the Tetons among other awesome places.



This summer I spent 2 weeks running around fires in Utah as a Line EMT-Intermediate. I've been SCUBA diving in Crater Lake, Lake Mead, the Delaware River, and Jackson Lake. I have spent lots of time on skis patrolling at Crater Lake. How can you go wrong being on skis at work? I worked a full summer conducting 10 day backcountry patrols at Olympic NP, leaving the Hoh Rainforest and ending up on the Blue Glacier of Mt Olympus. I also found that in telling stories of magnificent backcountry patrols, it is better to focus on how great it was to work and live out of a 1910 historic backcountry ranger station rather than the amount of time you spent digging outhouse holes. Everything from marinas on fire and sinking vessels to law enforcement cases with drugs, assaults, gangs and counterfeit purses. I mean, really, who would think a Ranger would happen to

arrest someone with a bunch of knock-off Prada purses?

I think that many permanent Rangers with the NPS share a common story line. I know that the first time I was offered a position working in a park I was 18. Coming into that first summer, I had spent several years volunteering with both the Whiteface Mt Ski Patrol and Search and Rescue of the Northern Adirondacks. During my free time, I worked as a NYS Critical Care Tech out of the Emergency Care Center at Champlain Valley Physicians Hospital. In my first few seasons with the NPS I quickly learned how much I didn't know and a bit after that I learned a lot more about the quiet professionalism of the Rangers in this service.

It might have been the excitement of helicopters buzzing around Yosemite that brought me to the National Park Service, but it isn't those stories that make me love my job.

When I think back to the many corners of the US that the National Park Service has taken me, what I remember most is the amazing people I have worked with and those I work with currently. No, we don't always see eye to eye and most of us bring strong personalities to the table. After all, those who work in the fields of Law Enforcement, Search and Rescue, EMS and Fire have to make split second decisions without the benefit of 20/20 hindsight. Wishy-washy doesn't cut it! But, personalities aside, there is very little I wouldn't do to help out any one of my NPS family members. I have seen firsthand as the members of this service have rallied to help those in need, and while I never needed help on the scale that I have witnessed in many parks, I've never arrived at a new duty station without an offer to help unload and unpack. And to quote one of my neighbors from Boulder Beach at Lake Mead, "Man, you have a lot of outdoor stuff." That I do.

Developing a Critical Stress Management Resp

The Importance of Peer Support for Park Rangers

by Park Ranger Major **Chuck Hecker**,
Chief of Employee Development, Maryland Park Service, **USA**

Background

It was a typical hot and sunny day in the summer of 1993 at a park in western Maryland. Several visiting families were enjoying a picnic near the park's popular scenic waterfalls. A group of young family members had ventured off to discover a place where the water was deep enough to jump in to cool down. The first one to jump did not resurface. Alarmed by the sudden disappearance, a second person jumped in to try to save him. Finally, a third person plunged in the water to help rescue his family members. Tragically all three drowned that day. They ranged in ages from 7 to 12.

Park Rangers responded quickly to the scene once the emergency call was received. Several entered the water in an attempt to locate the victims, but, were rendered fatally unsuccessful. The Rangers left the park that day burdened by a sense of responsibility and helplessness. They believed it was their job, their duty to protect and rescue others from the unpredictable hazards in nature. In their minds, this was a day that they had failed and the devastating consequence was the loss of three young children's lives. A day they would probably never forget and on their own to emotionally reconcile. There were no crisis intervention resources in place to help them cope with this tragic event. No one from the organization knew how to help them through this difficult time. One year later a new Park Manager took leadership and detected something was not quite right with the staff. She discovered the staff was still haunted by what happened on that triple fatality day. The Park Manager was referred to Dr. Jeffry Mitchell, who had developed a program for providing psychological care for emergency services responders.

Dr. Mitchell facilitated what is known as a group debriefing session for the affected responders in an effort to mitigate the lingering impact of the event.

This fatal tragedy and the restorative follow-up care leveraged the Maryland Park Service to develop a Critical Incident Stress Management Response Team (CISM). Today the team is comprised of 18 peer members and 3 mental health care professionals. The CISM team includes Park Rangers, Maintenance and Administrative personnel operating at the heart of the program. The team has executed between 90 and 120 responses each year since its inception in 1998.

Park Rangers encounter many emergency situations that have resulted in a fatality or life threatening injury. Urgent incidents most often include, but are not limited to, suicides, accidents associated with boating, climbing, swimming and search and recovery. Incidents can be distinguished by three categories; intentional, accidental and natural disasters. Powerful and complicating circumstances are often intertwined with the situation such as harsh or challenging environmental conditions, loss of life especially involving children, multiple casualties, unsuccessful missions and media and/ or public scrutiny. Intentional traumatic events marked by human cruelty, violence or malice are usually more difficult to encounter and require enhanced efforts to restore psychological resiliency as it can fracture one's faith in mankind.

Adequately and effectively training team members is an essential component of any viable CISM program. Training peers for specific crisis intervention skill sets, protocols and core competencies has the potential to accelerate healing and mitigate the development of more entrenched symptoms long past the event. Park Rangers may also be vulnerable to a gradual build up effect from managing numerous critical incidents or a variety of life and workplace pressures combined known as cumulative stress. Cumulative stress can be a slow and subtle creep of deterioration over time and difficult to detect until symptoms become serious. CISM Peer Response team members can provide valuable frontline psychosocial support and information related to strategic coping and restoration of stress resistance prior to and after an event by facilitating individual and group discussions and preventative educational strategies.

Why should you have a CISM Response Team?

There is significant evidence that Park Rangers encounter various stressful situations to put them at risk for a wide range of acute, delayed, chronic and cumulative stress related physical and psychological disorders. CISM provides psychological first aid, reassurance, education and the potential link for professional assistance should the need present to the impacted Ranger and others responding to the scene. This can greatly enhance the overall psychological immunity and well-being of one's co-workers and workforce. A robust and respected CISM Team can reach out to help in many ways. The return on investment is immeasurable. Some of the benefits include reduction in acute distress symptoms and emotional isolation by enhancing natural peer support networks and diminishing stigma for receiving a helping hand. Interventions are designed to reinforce recovery and encourage healthy coping, accelerating healing and personal mastery. Overall, programs promoting psychological first aid efforts create a healthier work atmosphere and

Incident onse Team

Additional text by : Alexandra Mahr, MSW, LCSW-C,Clinical Director, Maryland DNR CISM Response Team

more resilient organization.

Our team was mobilized for New York and the Pentagon following the events of September 11, 2001. We have deployed teams to assist following line of duty deaths, drownings, suicides and natural disasters such as Hurricane Katrina. We consider ourselves brothers and sisters to all who serve our country regardless of your emergency service professional affiliation. CISM programs are intended to bolster the resiliency of an individual, group or organization at risk for stress related wounds inflicted by line of duty exposure to threatening situations.

An excerpt from the National Park Service's CISM Response handbooks states "The National Park Service (NPS) supports its employees during critical incidents through the nationwide Critical Incident Stress Management Program (CISM). The National CISM program enables managers to offer tangible support by providing valuable techniques to reduce the impact of an incident on employee productivity."

Critical Incident Stress

Critical incident stress is the reaction or response a person or group has to a critical incident or crisis situation. A critical incident is an event that has a stressful impact severe enough to overwhelm the usually effective coping skills of either an individual or a group. Examples of critical incidents potentially impacting Park Rangers include line-of-duty death, suicide of fellow employee, significant event involving harm to children, knowing the victim(s), multi-casualty disasters, serious line-of-duty injury or near-injury, a prolonged hard won operation, a grueling rescue or failed mission. Psychological injury can be a serious consequence to fulfilling one's job responsibilities over the course of a career as a Park Ranger.

Common reactions to critical incidents manifest as natural and expected temporary disruptions in one's cognitive, physical, emotional, spiritual and/or behavioral capacities. Individuals react to stress in their own personal way depending upon a myriad of pre-event, event and post-event factors influencing the ability to adapt effectively. Given the uniqueness of each individual's experience it would be impractical to list every possible human stress reaction symptom constellation.

Some of the more common reactions are re-experiencing the event or the sensory elements of the event such as sights, sounds, or smells as if the event is happening in the here and now. These symptoms can present with intrusive images or memories, flashbacks or nightmares. Headaches, changes in appetite, nausea fatigue, teeth grinding and chest pain are possible examples of physical stress. Emotional symptoms such as depressed mood or anxiety, feelings of guilt, helplessness fear, irritability and anger are also common. Cognitive symptoms may present as memory loss or lack of concentration, difficulty in making decisions potentially leading to a decline in job performance. Family or marital problems may be a troublesome outcome of withdrawing from others, diminished interest in pleasurable activities, excessive silence or emotional outbursts ultimately impacting meaningful relationships. Self medicating with alcohol, substances or the internet to escape or numb discomfort may be a significant warning sign on how powerful the event was for an individual. Avoidance of anything anyplace or anyone that may remind one of the situation is a hallmark symptom of post traumatic stress. Anger at one's higher power or a loss of a sense of belonging and purpose may be indicators of a spiritual wound as an aftershock of the critical event. Symptoms may appear rapidly or be delayed for weeks, months or even years after the event has passed. Additionally, symptoms may persist continuously for a few hours, days or weeks or come and go overtime with intensity. Again, this sample of symptoms is not exhaustive and do not usually occur singularly but in clusters across the spectrum of a person's overall functioning. Exposure to a threatening event may impair the way one thinks, feels, behaves, relates to others, one's sense of purpose and meaning and physical well-being temporarily or indefinitely

Building a CISM Response Team

A CISM Response Team consists of mental health care professionals, peer support coordinator, peer responders, and oftentimes clergy. The recruitment and selection of peer team members is a crucial component and should follow a consistent strategy that includes a selection committee, an application review, structured interviews and finally the successful completion of the mandatory training requirements. A successful and credible program requires high potency leadership, steadfast ethical practices and confidentiality policies, political neutrality, ICS integration, voluntary participation, education for first-line supervisors, team maintenance activities, continued training and a conservative budget.

Pam McMillan, CISM Program Coordinator, oversees over 50 trained "peer supporters" located in various park units and park divisions service wide, "The National Park Service is dedicated to keeping our employees healthy and ready to re-enter the workforce after a critical incident.", was her response to our inquiry as to why the NPS has this program.

During difficult economic times funding to actively maintain a CISM peer support program may be reduced or cut. This was the case in South Carolina recently. South Carolina State Park's Director Phil Gaines reported that "although the formal program was eliminated, the concept and principles and the message of CISM remains strong and is used in South Carolina State Parks today. A heightened awareness and sensitivity of the stress associated with the critical incidents that Park Rangers deal with is recognized and addressed in a sensitive manner."

The International Critical Incident Stress Foundation (ICISF) provides leadership, education, training, consultation, and support services in comprehensive crisis intervention and disaster behavioral health services. The ICISF hosts 42 courses in crisis intervention that address areas such as suicide, pastoral crisis counseling, terrorism, trauma in law enforcement, CISM and its application with children, compassion fatigue, emotional and spiritual care in disasters, response to trauma in the corporate settings, and managing crisis in school settings, to name a few. ICISF's membership spans the U.S. and abroad, and has CISM teams in all 50 states and in more than 15 countries worldwide.

(To learn more about CISM we recommend that you visit the website of the International Critical Incident Stress Foundation at www.icisf.org. The Foundation can assist organizations interested in providing this care to their employees.) PR

arc'teryx ALPHA SV SHELL JACKET

by Mel Harms

Tested in the back, front, side, and high countries of Colorado and Utah the Arcteryx SV shell has become a member of my immediate gear family. When I am firing down a ski line at Cameron Pass it's like my best friend. When in the alpine winds of Rocky Mountain National Park it's a protective parent.

Technically speaking I'm impressed with the construction of the SV shell. Arcteryx is front running with its "Expedition fit" which allows you to throw on a puffy under your jacket and still move your arms while avoiding becoming a wind sail. (Order your true size, not up.) It is tapered for a woman's body so anything you put under it layers well without bunching in the wrong spots or pulling too tight around your ladies. The "Hemlock" at the bottom of the jacket is designed to keep it from slipping through your harness preventing those blasts of cold air up your back while making a move, which makes me shriek words that my mom would wash out of my mouth.

Bottom line, this is a no drama jacket. You are not going to be fighting with it all day to get it to do its job. It has great big front pockets instead of side pockets. This took a bit getting used to, but it enabled the shell to maintain its function whilst in a harness. This jacket is designed for purpose, not to look cool, but it does that too. Arcteryx seems to understand that if you are rocking the activities that this jacket is designed for, you are already of badass status. Plus with the vibrant colors available like Cayenne, you will be sure to be seen, which in the back country, is imperative. The hood works great with both a climbing and a ski helmet and if you happen not to have a helmet on, it adjusts just dandy to your dainty melon.

Critics of this jacket say that the fabric is noisy. While I can understand their complaint, it just does not bother me considering that when I need this jacket for what it is technically designed for, the wind will probably be blowing 75 miles an hour and I will not be able to hear much anyway. I will, on the other hand be happy I am not wearing a bunk jacket.

There are other great shells on the market, but they are not as technically engineered as the SV. Some are missing taped zippers (really!) and others just simply made a jacket out of less bomber material. It is always hard to swallow the price tag of a GORE-TEX jacket, but it is a necessary piece of gear. If you are going to spend a house payment on a jacket, it should protect you like a one. I really believe this jacket IS THE BEST GORE-TEX JACKET ON THE MARKET, because of the attention to detail in the design for people in the backcountry, the way it delivers that function, and the fact that it fits, period. I get just as excited to put it on now as I was the day I pulled it out of the box and will literally cry if mine ever disappears. With as many people (both men and women) who have recently admitted their "jacket envy" to me while I was wearing it, I'm going to have to start bringing a lock box for it. PR

SPECIFICATIONS:	
Manufacturer:	Arc'teryx
Model:	Alpha SV (womans)
Origin:	Canada
Cost:	£500. $625
Colours:	Cayenne (orange) Blackberry (purple) Calypso (turquoise)
Waterproofing:	N80p-X GORE-TEX® Pro
Weight:	443 g/ 15.6oz
Sizes:	XS, S, M, L, XL
Fit:	Expedition (hip-length)
Website:	www.arcteryx.com

TECHNICAL FEATURES

- Waterproof
- Snow-shedding
- Windproof
- Breathable
- Highly durable

CONSTRUCTION

- Micro-seam allowance (1.6 mm) reduces bulk and weight
- Tiny GORE® seam tape (13 mm)
- Fully seam-sealed for waterproofness
- GORE-TEX® three-layer construction
- Laminated high-strength hanger loop
- DWR finish (Durable Water Repellent) helps bead water from fabric surface

DESIGN

- Generous cut for easy layering
- One-hand adjustable drawcords

PATTERNING

- Anatomical shaping for fit and comfort
- Gender specific patterning

Articulated patterning for unrestricted mobility
Articulated elbows
No-lift gusseted underarms

HOOD CONFIGURATION

Helmet compatible Storm Hood™
Laminated brim
Glove-friendly hood adjusters

COLLAR CONFIGURATION

Laminated chin guard

ZIPPERS & FLY CONFIGURATION

WaterTight™ external zippers
Molded zipper garages
Pit zippers for easy venting
Corded zipper-pulls reduce noise and are easy to grab
WaterTight™ Vislon front zip

CUFF & SLEEVES CONFIGURATION

Laminated die-cut Velcro® cuff adjusters with elastic

HEM CONFIGURATION

Drop back hem
Laminated hem
Adjustable hem drawcord
Harness HemLock™ inserts keep jacket in position under harness

POCKET CONFIGURATION

Sleeve pocket with WaterTight™ zip
Two high, crossover hand pockets with laminated zippers
Two internal laminated pockets
Note: Our WaterTight™ zippers are highly water resistant, but not waterproof. We do not recommend keeping items in your pockets that may be damaged by moisture

REINFORCEMENTS

Fully reinforced for maximum durability

LOGOS & LABEL CONFIGURATION

Embroidered logo
Non-chafing label

WAIST & BELT CONFIGURATION

Adjustable elastic waist drawcord

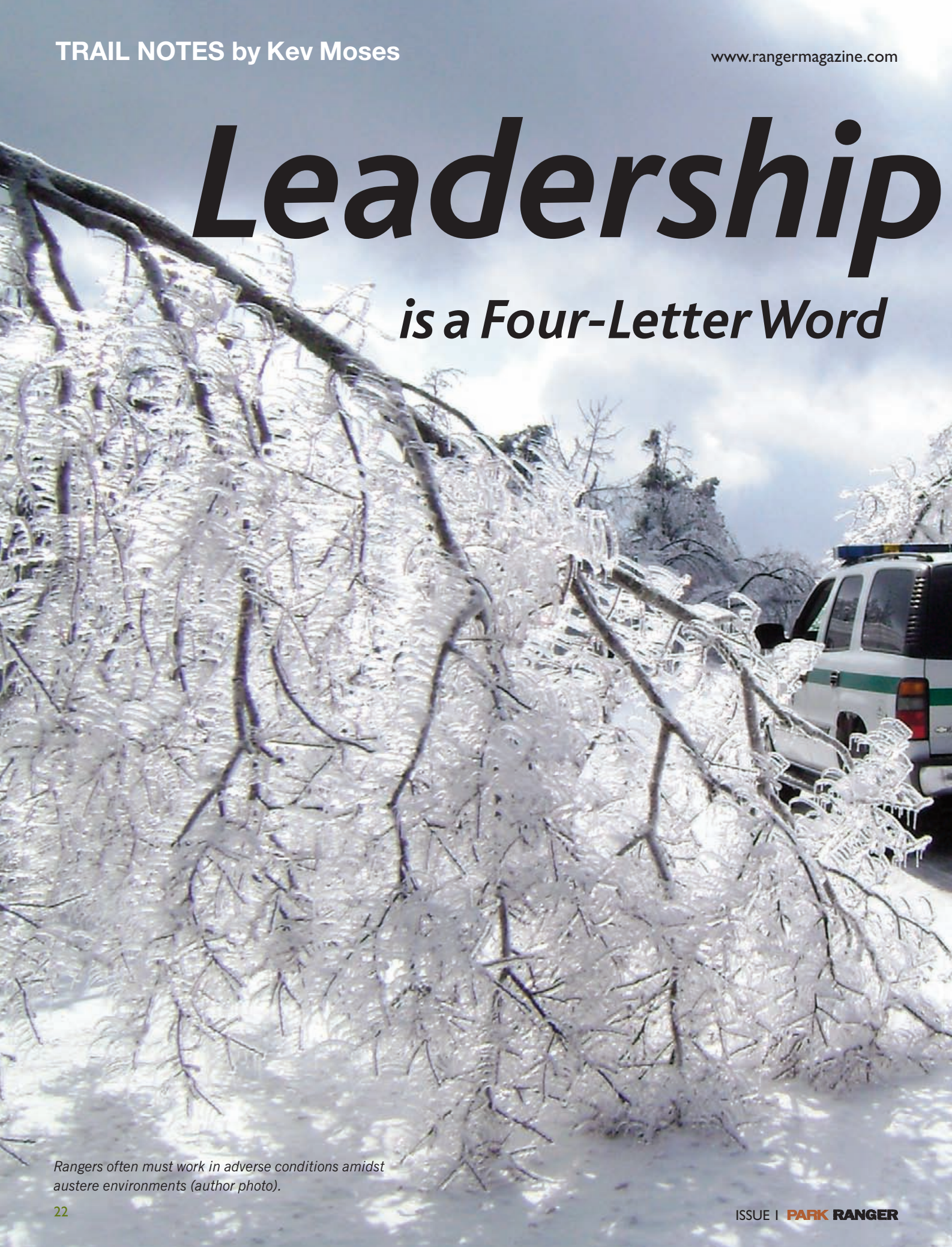
Arc'teryx Pro Purchase Scheme

Arc'teryx provide rescue-specific versions of their 'pro' standard clothing including their top-of-the-range Alpha which ic available with retro-reflective panels (see inset picture opposite) and custom lettering. Most of Park Ranger's readers are eligible for a discounted rate via Arc'teryx's direct purchase policy - if you are a member of the following organisations contact them direct via: propurchase@arcteryx.com

Outdoor Professionals
IFMGA - International Federation of Mountain Guides Associations (IVBV, UIAGM)
ACMG - Association of Canadian Mountain Guides
AMGA - American Mountain Guides Association
AMGA - Accredited Organizations
CAA - Canadian Avalanche Association
NOLS - National Outdoor Leadership School
Outward Bound
Mountain rescue organizations
Professional avalanche forecasters
Professional full time paid ski patrol
Professional ski instructors (holding a Level 2 or higher certification)
Park Wardens and rangers

Leadership

is a Four-Letter Word



Rangers often must work in adverse conditions amidst austere environments (author photo).

TRAIL NOTES by Kev Moses

Jeff, Keith, and I were riding our Ninja bikes as fast as we could knowing full-well that we were AWOL and that our platoon sergeant, Sergeant First Class (SFC) Saam, was none too happy about it. He wanted us back at Bragg NOW!

Problem was, it was "pourin' the rain" (as the locals would say in rural North Carolina), and Ninja bikes don't adhere to the roadway so well when too much throttle juice is applied in such soggy conditions, as might be the case when the bikes are driven by 18-year-old paratroopers who fear what lay ahead for them at the hands of their Neanderthal-looking platoon sergeant.

On we drove, trying our best to keep the bikes upright, while at the same time trying to put the miles behind us. To make matters worse, Jeff had lost one contact lens, but he assured Keith and me that he still had one good eye and through it, he could "mostly see okay."

Eventually our knees—taking the full brunt of the chilly wind and rain—necks, and hands went numb. We could feel our fine motor skills sapping away, and despite our youth, we knew what we were doing was flat-out dangerous. We knew that if we kept plodding ahead, one of us was going to lay his bike down at 70 miles an hour.

We pulled over, got some hot coffee, and—with extreme trepidation—called SFC Saam. We couldn't tell if our fingers were shaking because of the cold or the fear. We drew straws and Jeff got to do the talking (or whimpering). I could hear SFC Saam shouting into Jeff's ear from three feet away, and Jeff kept wincing like he was in physical pain.

But right before Jeff hung up, SFC Saam added something to his tirade: He told Jeff that late is late, whether it's five minutes or five hours, and all that mattered right now was that we drive safely and get our butts back to our unit uninjured.

Either SFC Saam just didn't want to hassle of injury-related paperwork, or…he cared about us.

The best part of this story is that Jeff, Keith, and I knew that he cared about us. Because of that, we'd follow him anywhere, including into battle. To be sure, SFC Saam had innumerable other qualities that, together, made him an outstanding leader. But none of his troops ever questioned whether he cared about us. We knew 100% that the only thing that he placed above the welfare of his men was the accomplishment of his mission, and that's just the way it is in the military—mission first, then troops.

Leaders have to CARE!

When they don't, their would-be followers notice it.

And when they do, their followers notice it.

This truth applies to leaders in any arena requiring groups of people to work together toward a common goal: sports team coaches, military unit commanders, corporate world CEOs, class presidents, fire chiefs and crew bosses, SAR team captains, and so on. How true is this, then, for the leaders of park rangers world wide?! Rangers need strong leadership, and they need to know that their leaders care about their welfare.

Each year my agency requires that employees in supervisory positions complete 40 hours of "supervisory" training, and first-year supervisors must complete 80 hours of it. I think this is a great idea, because when a ranger is a supervisor, I believe he or she actually has two jobs, and both bring with them full-time duties. The only problem I have with the "supervisory" training requirement is that it's up to individual employees to identify courses to satisfy the requirement, which allows for too much hit-or-miss regarding the training's practical applicability to actually leading rangers. Too often the chosen training is weak, diluted, generic, and deals plenty with supervision, administration, and managing, but not nearly enough with honest-to-God leadership.

Supervision is important. So is managing, and so is administrating. But the three of these together do not automatically equal leadership. They don't even come close.

Leadership—the true art of leading people—is more about providing purpose, direction, and motivation—and in some cases providing it under adverse conditions in austere environments—than it is about "managing" a budget, or "administering" a program, or "supervising" a work schedule. It's about setting an example, doing the right thing even when the right thing is tough to do, striving for excellence oneself before asking others to do the same, and actually inspiring people to want to be the best they can be, thereby strengthening the team and accomplishing the mission.

An NPS district ranger attends sand-table training alongside the rangers he leads during a course designed to foster fireline leadership skills (author photo).

Sometimes caring about the folks one is leading is as simple as taking care of their feet (photo by Justin Gibbs).

And it's also about caring about people.

There is a spot-on perfect illustration of this concept early on in the movie Gettysburg. It was late June, 1863, near the border of Pennsylvania and Maryland. Colonel Joshua L. Chamberlain, commanding officer of the 20th Maine Infantry Regiment, was preparing his decimated unit for what rumors were predicting would be a bloody battle when he was informed that he must take responsibility for 120 "mutineers" from the 2nd Maine Infantry Regiment who chose to quit after their unit had become disbanded because when they signed on, they did so believing they would fight only with their own unit, the 2nd Maine. He was furthermore informed that if they refused to join his regiment, he was authorized to shoot them.

Col. Chamberlain didn't shoot the men. Instead…he fed them.

The first thing he asked them is, "When did you men last eat?" After promptly giving them breakfast, he relieved their guards, listened to their concerns and grievances, gave them some of his time—which was probably his most limited commodity at the moment—and gave them his sincerity. As he spoke with them, they could tell he genuinely cared about their welfare. He gave them his empathy, too…told them that his unit started with a thousand men, was already reduced to less than three hundred, and that they had all seen good men die. He told them that, like them, he was from Maine, and like them, he had volunteered to fight for his home, his country. He also gave them the truth: he told them that due to his unit being ordered to march that very morning, there was little he could do about their plight right then, but as soon as possible, he would provide fair treatment.

It was about this point in his interaction with them that he moved into that fabled realm where only the truly great leaders find themselves…he inspired them. He straight-up asked the men, who moments before were bent on quitting, to join his unit and fight beside him. He told them that this army was different from most every other army in the history of the world: rather than fighting for riches, power, loot, and land, his army—the Union Army—was out to set other men free and that "We all have value…you and me."

"What we're fighting for in the end…" he told them, "…we're fighting for each other."

When he finished his impromptu speech, he gave them what little time he could afford to talk among themselves. By the time his unit was ready to move out, 114 troops out of the 120 had chosen to fight beside him. To those 114, he gave three more things: 1) he gave them their arms back—that is absolutely pivotal for a soldier; and 2) & 3) he gave them identity and purpose—both also vital! They were once again

soldiers in a Maine regiment and they once again had a cause worth fighting for. As if all that he had already given them wasn't enough, he went on to allow those 114 men to march and fight beside one another—their own little band of brothers.

Within the first ten minutes of meeting Col. Chamberlain, these Union soldiers knew without a doubt that he cared about them. And because of that, they followed him into battle.

Col. Chamberlain had earned something that former U.S. Marine Captain Nathaniel Fick calls "moral authority." Fick, who led an infantry platoon from the Marines' First Reconnaissance Battalion into battle in both Afghanistan and Iraq, later authored a book about his combat experiences titled One Bullet Away: The Making of a Marine Officer. In it, he says that "legal authority" is worn on the collar, but that real battlefield authority, "moral authority is the legitimacy granted to a leader who knows his job and cares about his men."

Captain Fick goes on to add, "Strong combat leadership is never by committee. Platoon commanders must command, and command in battle isn't based on consensus. It's based on consent. Any leader wields only as much authority and influence as is conferred by the consent of those he leads. The Marines allowed me to be their commander, and they could revoke their permission at any time."

Whoa! That is powerful stuff for aspiring leaders! Imagine if every leader knew in his or her heart that their ability to lead their troops isn't half as much given to them from someone higher up the chain of command as it is from those lower down! Captain Fick, as a young officer, discovered a little pearl of wisdom about leadership not usually figured out until much later in most leaders' careers: Show your troops that you care about them and they will grant you moral authority to lead them. Then, lead them well, and they will follow enthusiastically.

Captain Fick's book has morphed into an exhaustive authority in and of itself—a sort of blueprint for leading people. The U.S. Marine Corps Officer Candidate School includes it on their list of required reading, and many non-military entities have recognized it as a source for molding their own young leaders.

That brings me back to that required annual "supervisory" training my agency requires for its supervisors. This past year I requested to attend a wildland firefighting course and use it as my required supervisory training. The course, L-380: The Fireline Leader, used Captain Fick's book as a template, and was hands-down the best leadership (or supervisory) training I have participated in since becoming a park ranger.

It's primary take-home message was loud and clear: Leaders must care about those they lead.

So HOW do park ranger leaders show that they care about the rangers they're charged with leading? Now there's a subject that can fill an entire book of its own…a dozen books. For each team, crew, unit, district, park, region…whatever…a different approach might be needed, but enough commonalities exist to explore some simple suggestions that can be broadly applied by most leaders in charge of rangers.

More on specific tactics will appear in future editions of this column, but for now, the actions and attitudes of SFC Saam, Col. Chamberlain, and Captain Fick are as good a starting point as I've ever known. Each, in his own way, demonstrated to his troops—his followers—that without exception he cared about them.

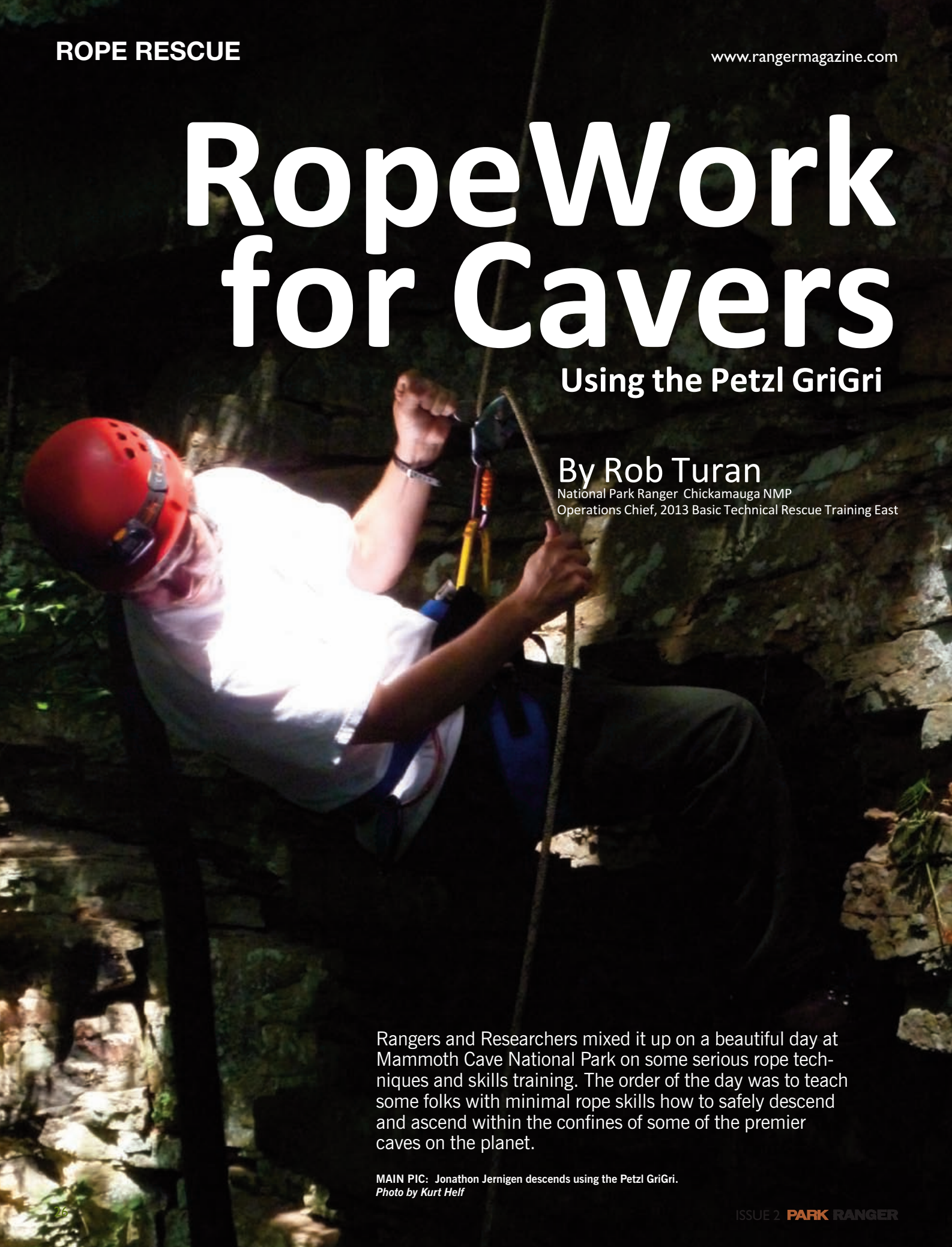
Each of these great leaders knew that true, solid leadership is a four-letter word. PR

Two crew bosses on the Skyland Fire, Flathead National Forest and Glacier National Park, MT (photo by Brian Sacia).

RopeWork for Cavers

Using the Petzl GriGri

By Rob Turan
National Park Ranger Chickamauga NMP
Operations Chief, 2013 Basic Technical Rescue Training East



Rangers and Researchers mixed it up on a beautiful day at Mammoth Cave National Park on some serious rope techniques and skills training. The order of the day was to teach some folks with minimal rope skills how to safely descend and ascend within the confines of some of the premier caves on the planet.

MAIN PIC: Jonathon Jernigen descends using the Petzl GriGri.
Photo by Kurt Helf

Now the Ranger-types would ultimately be tasked with the responsibility of rescue recovery and extrication. But the scientist-types, now that was a whole different ball game. At any given time each member might find themselves doing the single rope rumba inside a cave, meaning there would be no secondary belay rope. And truth be known, caving is just that way period. Unlike much of the outside rescue world which has migrated like the proverbial lemming to always having a second rope attached, caving has remained true to its routes. One person, one rope. A beautiful philosophy. Pure and simple. And they better know what they are doing. There have been far too many caving accidents over the years, from lack of knowledge and skill while dangling from the rope lifeline, and especially from the act of the changeover, going from descend to ascend, while mid rope, and vice versa.

So the task at hand in instructing a one day rope class, was to get as much knowledge and safety built in as possible within the given time. The methods and instruments of choice were, to the instructor, pretty obvious. After a round of hands-on teaching and practice with anchors and anchor systems, the gear that was to become standard issue, was of course, the always impressive, useful, and downright fun, Petzl Grigri and its big brother on steroids, the Petzl ID. Dug out of the gear bag and dangled in front of the wide eyed students. These two tools of the rope trade are used with such a degree of success worldwide in such a variety of situations and environmental conditions that they have achieved legendary status in the world of climbing, caving, rescue, and industrial work ranking right up there with kernmantle ropes.

Oh boy!! Toys!! The group had seen the big burly rappel racks in the rescue cache and expected to be learning the tricks of the trade with them. But the instructor thought different and wanted the neophytes handling a device that was a true self arrest, self-belay, the GriGri.

As scientists studying the cave ecosystem, the team members might need to scrutinize every nook and cranny within a cave. Therefore they might have to go down and back up, in multiple, small increments, throughout the entire day. They had previously indicated that although they are the team responsible for the cave research in all the Southeastern parks, the biggest single drop faced would be 120 feet or less. That puts the descent into the realm of a standard Grigri and well within the capability of the ID, which is rated for up to 200 meter descents.

For those unfamiliar with the operation of a GriGri and why it comes so highly recommended, it is basically a small, autolocking belay device/descender which will arrest a fall even if the break hand lets go of the rope. It can stop you at any point during a descent or ascent and hold the climber or caver in place without the need to tie -off or maintain a grip on the trail rope as would be the case with manual devices like the rack. Both hands are free to work whatever requires working at that moment while dangling. Should the rope be wet or muddy or have some ice on it, the end result is that it will still work, although the movement and rhythm of the rope as it passes through the device may be rather "herky-jerky".

So the GriGri is controlled - a release lever opens the cam to allow the rope to pass through, and descend the rope. Now comes what I consider to be a thing of beauty; oops! I have

The GriGri can be connected via a Petzl Freino carabiner or similar. You can run the trail/brake rope thru this hook to increase friction and therefore control. Particularly useful for heavier loads

ABOVE: Our belay device of choice was the Petzl GriGri (top right). The newer Mk2 version (blue) is slightly larger than the original version shown at the top. The GriGri has automatic locking, is intuitive and simple to use with high-load arrest capabilities.

LEFT: A tensionless hitch around the tree giving maximum rope strength for a deviation

Rope training in and around one of the many sink-holes in the Mammoth Caves National Park. Here, Rob Turan lowers Bill Moore via a deviation which provides a little more friction to aid control. Inset photo left with the rope connected directly to the GriGri more control by the belayer is required.
Top left: time to take control yourself. Bill Moore familiarises himself with the action of the GriGri as a descender.
Photos by Kurt Helf

gone a bit too far and I need to get back up this bit of cave cliff to check out the hole I just rappelled past. You simply grab the brake or trailing rope and pull upwards while stepping against the rock and driving off the feet. Kind of like Batman, and to that end climbers use the term “bat-manning”. Pull up the brake end of rope while propelling oneself upward to alleviate load on the GriGri and let go at the moment inertia stops. The cam engages and your bodyweight is arrested with no loss of vertical gain. A grand experience for a virgin bat-manner, gaining inches and feet of vertical gain on a rope with so little effort. [ED: this method is similar to the traditional tree climbing hip-thrust technique using a prusik loop]. But let’s say more upward movement is necessary and the face is sheer with no protruding rock for footholds to push up from. Then it is a simple matter of attaching a handled ascender with a foot loop to the rope above the GriGri. Other devices will work for sure, but a handled ascender is the simplest and most efficient. Once correctly attached with your ‘gain’ distance between the ascender and the GriGri (probably no more than a foot or so), you put your full bodyweight onto the ascender foot loop taking weight off the GriGri. Then, stepping up, pull the brake/trail end rope up so that it runs through the GriGri whichprogresses up the rope towards the ascender - then stop and sit down with your weight now taken by the GriGri. Step, pull, and rest. With rest every stroke, once any sort of proper timing with the system is acquired, the package becomes the best and most safe system for going up and down the rope. It is the fastest way to ascend a rope as compared to a rope walker, or frog system. And in rappel mode, the rope does not flow quite as smoothly as some of the other descending devices. But this system uses the minimum of equipment and does not require your ultimate safety - the GriGri - to be removed from the rope with all the dangers that this entails and as mentioned before the cause in dark, wet cavesof numerous accidents and several deaths amongst cavers.

Thus it came to pass, that this group of Rangers and scientists, learnt how to safely negotiate small cave systems. Since familiarity with one or two systems is better than less familiarity with many, the day progressed well and skills were sharpened with multiple laps on the fixed lines. By the end of the session the instructor would know that this all important group of National Park Service personnel could get on a rope, in a cave, and be ***safe***.

An additional story will be presented on the work of this team and especially on their research on ‘white nose syndrome’. PR

PROLOGUE

MAIN PICTURE - ***by Nick Wigston - Downstream Edge***

Make sure you have two lines on the boat...one to unwrap with. Sometimes this may be all you can muster, if so you need to have an immediate plan to release the load as soon the boat swings down stream...just like a throwbag rescue where the victim gets pulled under...the whole system can and often will get pulled in the river..this IS gear bustin', anchor bustin' territory, for real...I've seen 'biners, prusiks, Gibbs, webbing, and ropes de-sheath and D-rings pop off..including self bailers. Trying to surf over in big haystacks...it's scary. Often the most dangerous part of the evolution is release of the wrap. In severe wraps in dangerous, strong flow, steep gradient and/or technically challenging shoreline, let the boat just flush out and retrieve it downstream with a safety boat...best bet if possible. Overly complex rope systems require too many super skilled rescuers who have to be completely vigilant

RAFT WRAP RAP

by Dr MichaelCroslin & Casey Garland

Jim Segerstrom was the best wrap artist I ever worked with…He would often wrap at the end of a high water Tuolumne trip on the row out!…just before dark?…bullshittin, and falling victim to the changing light angles masking rocks lurking in ambush in the glare of the setting sun. Yosemite rangers would tag along to watch and learn from

of
in

the day on a one day Tuolumne Spring

ions

develop. Might add that although Jim and I had

trips in later years were often welcome reunions and needed respite from our exploits traveling, teaching and developing swiftwater training around the world…even though we would simulate wraps and unwrapping techniques in our program, there is no substitution for getting a severely wrapped boat separated from a rock it fell in love with, real attachment issues here!! Ironically,

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Huck Finns for Sierra Mac.. We had two bona fide natural disasters…mine came first.... an hour of using a

by

oad
It

was a ringer of a wrap…and it came off like an electromagnet had been switched off as soon as I let the floor flush. Second wrap was another SOTAR, not mine…I honestly felt relieved that my liberal views were greatly appreciated on a wrap that required both unloading the raft, a Z rig and another magical release upon cutting some webbing on the floor lashing. Trip ended tied 1 to 1. Second wrap 1 hour. Lessons learned. Go for the floor flush sooner Letting the water flow freely through the overloaded cockpit of the raft lifts those tubes real QUICK. Best yet…lets talk about prevention…AVOIDANCE. What follows is a more lucid Wrap-rap put together by Casey Garland…AKA Dr.Whitewater and myself that reviews the basics .

Its not easy driving a school bus down the river, you're gonna hit rocks period. Practically every technical river on earth is a pinball wizards dream come true.

and athletic to manage them. I would add that I've salvaged alot of rope left behind by poorly planned and executed de-wrap evolutions. This is careless and unnecessary... no rope left behind is the mantra...no exceptions. This is why a *Reach* in the wrap kit of each boat is a must. It should be a standard guideline for all raft trips to capture errant or lost rope in the river, for environmental and safety reasons to ensure safe navigability for follow on traffic.

Bouncing of rocks is unavoidable and advised for many technical rapids…gotta know how to do it right. Generally speaking on oar rigs our strong stroke is a pull, weak a push, a spin a push pull… We use rocks for strategic bouncing and set ups constantly and the general rule is to hit the rock with most of the boat on the stronger flow side and chosen route side…same usually. If the boat is loaded heavily…put most of the weight behind you and take a wild ass guess where the center of gravity is located. Why? Pull stroke is strongest and going backwards off a drop or into a tight channel is fine..in fact it helps naturally stack your oars if you've forgotten…don't.

PHOTO by Nick Wigston - Downstream Edge

Before entering the fray..after your boat is loaded take it out and practice the feel of turning the boat quickly, over and over and over…you wanna pinball you gotta have your spin mastered so if you misjudge fractions…get too much boat on the wrong side or get boat centered you can add some instant spin to the potential pin…get those oars ready to push pull spin automatically during all bounce offs. Get your spin instinctive, powerful and hardwired. Same for paddle crews…practice, practice, practice. Stay vigilant even during calm stretches…some of the worst wraps occur when vigilance expires .Respect seemingly benign rocks. Of course have your crew know how to highside quickly, instinctively climbing towards or onto the rock t get the upstream tube to rise while you try and spin with your oars, or if with paddle crew get them all on the highside diggin' those paddles like crazy on your turn command…really explain the importance of instant action to your crew…practice it on a few pinballs…save you a lot of trouble later.

Just as these river abound, so do the solutions people come up with to unwrap rafts. Unfortunately some of the methods employed don't always yield satisfactory results. While some may argue the relative merits of one technique over another, I say the bottom line is: If all the passengers are safe and you still have a functional raft, you done good.

WHAT IT IS

What actually happens to cause a raft wrap? When a raft goes sideways against an obstacle, the cushion of water in front of the obstacle is displaced to the upstream side of the raft providing relentless pressure against the upstream tubes and the floor. Generally speaking, the more tube and floor under the surface, the worse the wrap. Also, the softer the raft tube pressure, the easier it is for the river to conform the raft to the unique features of the subsurface terrain. Often we refer to wraps according to their severity…a broach being a simple landing of the boat between rocks on or just below the surface…common now with self bailing inflatable floors. Today the most common modern self bailer wrap is really a broach that that allows water to spill over the upstream tube, overwhelming the outflow of water through the floor seams or holes..often progressing to a submersion of the entire raft…sometimes from just the simple broaching of the rock on a shallow rock…one not even big enough for a true old school saran wrap…modern professional self bailers are stiff and less likely to fully contort to the shape of a downstream rock…especially if not overloaded with gear, i.e. paddle power. However if loaded with a oar frame and heavily loaded with gear they are very prone to broach progressing to severe volume overload and wrapping/sinking. Unique to their design the methods for salvage are also unique

CORRECTLY ASSESS THE SITUATION

The first priority in any wrap must be a safety check of all the passengers. Some of the crew may have been thrown from the raft and others may have scrambled to the top tube or on to the obstacle. The worst case scenario could find a person

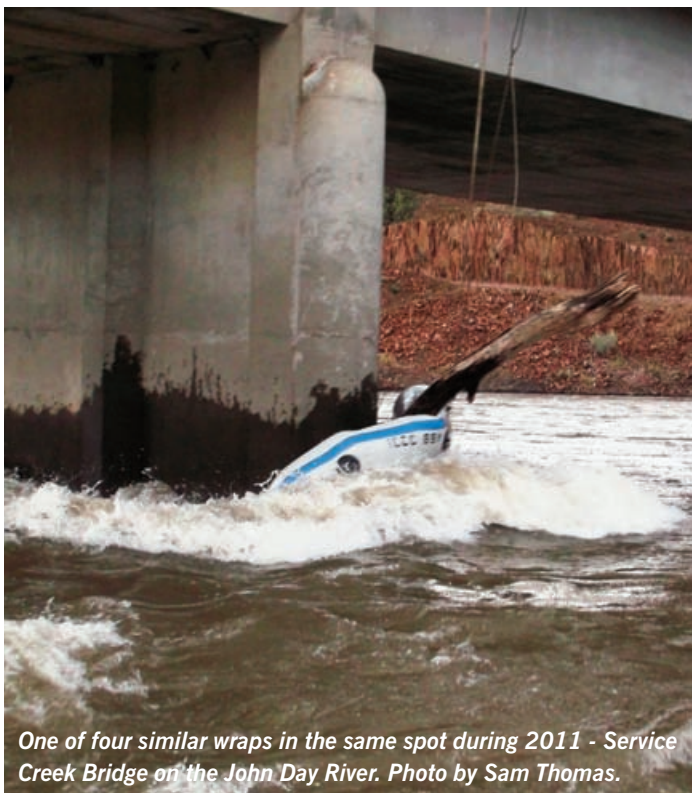
trapped or pinned between the raft and the obstruction. If crew members are missing and not accounted for downstream, the floor should immediately be cut to see if a victim is pinned. This sounds drastic, but flush holes need not be huge to often lift the tubes off a pinned boater. Care should be taken when trying to cut inside what is essentially an entrapment zone inside the boat…especially around thwarts, frames and tie downs…getting a fellow rescuer to back belay off your lifejacket while you reach into cut is ideal. Try cutting the flush flaps from outside bottom if possible. There was a fatality on a commercial trip on the Tuolumne this year from a self bailer getting broached exactly as described and pinning a passenger…the guide could not access the passenger in time. This was at low, technical flows in a paddle boat just below Clavey [a major staircase rapid where the Clavey meets the Tuolumne]. No time to mess around, make sure that knife is ready and willing to cut…Inflatable floors lashed in with webbing via grommets can be tough to cut through…here re-rigging the continuous lashing with short segments of independent anchoring and marking the bitter ends with capture type balls…large versions of the pull balls on QRHS lifejackets, allows quick cutting of a small lashed in segment of the floor..just cut the ball off and the floor will flush that segment. For glued or welded floors…Stab, Cut, Rip, Whatever…No hesitation.

SEVERITY OF WRAP

The next priority is to assess how badly the boat is wrapped. Most often rafters experience a "broach" and find that, by weight shifting, they can free the raft from the rock. If bouncing and weight shifting doesn't work you've got a "bad wrap". Is the raft partially or totally submerged? Is one side more wrapped than the other? It is vital to determine where most of the pressure is coming from and which side of the obstacle the raft will eventually come off on. Generally, efforts should be directed to the end of the raft which is most off of the obstacle. Can the passengers work from the obstacle and raft to free it, or will they need a line to shore? If a wrap is severe enough to require a Z-rig from shore then you have a "true wrap" or what has been referred to in some circles as a "super glue". Most old wrap strategy…basket boats..bailers centers around peeling the boat back like peeling a banana…There is lots of opinions about the best direction to pull, how to add vectors ad nauseum…I have lots of past experience salvaging abandoned rafts…all were bailers and most of this experience is honestly useless…no agency, commercial outfitter or serious rafter uses these wrap nightmares much anymore…best advice here…think banana wrap…or apply vectors as if you are unpeeling a ugly political sticker off your bumper…then go buy a self bailer…you'll be a lot happier and safer. Strictly speaking, because they are resistant to wrapping…catarafts prevail as the safest platform for agencies tasked with swiftwater rescue.

RESCUE/REMOVAL PROBLEMS

Once the primary assessment is complete, investigate the secondary problems that might compromise the rescue. How



One of four similar wraps in the same spot during 2011 - Service Creek Bridge on the John Day River. Photo by Sam Thomas.

long is this going to take and how much daylight is left? Have we lost any vital equipment or food? If we can dislodge the boat, are all the remaining passengers ready to hop back in instead of being left stranded on the obstruction? Should the passengers be ferried safely to shore along with other equipment before attempting to unwrap the raft? What is going to happen when this raft comes free of the obstacle? Do we still have bail buckets or is this 2000 pound swamped raft going to careen down river without a back up system? Getting a line to a wrapped boat can be a challenge, if the river the channel is severe a Reach device comes in handy to remotely snag on flip lines tie downs , frames ect. Many expedition style boaters have reported great success avoiding swims and heroics using line capture…in severe access cases a tension ferry or high line may need to be set up to access the boat.

COORDINATE PEOPLE AND GEAR

After completing the secondary assessment it's time to make plans. The first step in any plan is to designate one person who is in charge of the operation. If its only the passengers involved in the wrap or additional people on shore, the person in charge should meet and/or communicate with the group to discuss possible rescue options, including who will do what jobs and when. Also, do an initial inventory of all available rescue gear, ropes, pulleys etc., as your plan may be impacted by the quality and amount of available equipment or human resources.

IDENTIFY OPTIONS AND DETERMINE THE BEST METHOD OF RESCUE

Rescue professionals agree the way to effect a rescue is to use methods that present the least amount of risk to the rescuers first and then graduate to the higher risk approaches as needed. Initially, you should try to identify the quickest and simplest approach that is low risk, requires the least amount of equipment and has a good chance of success. Good luck. No doubt about it, making this decision is one of the hardest aspects of river rescue. Since every situation is different, it pays to analyze options and not always treat each rescue with the same approach.

If the choice is to get a line to the closest shore, how do we get it there? Sometimes just getting a line to shore can be difficult and the highest risk aspect of the scenario. Can a line be thrown from shore to boat or boat to shore? If the distance is to great..often is..is there a Reach System available in the boat or on shore that can remotely connect to a line thrown short? Can another boat ferry a line between boat and shore or can a swimmer make it? Is there enough man power on shore or will we have to mechanically tension a line. Do we have the equipment to do that safely? Are there people on shore and on the boat who can identify adequate anchor points to hook on to? Generally, shore based systems are safer than boat based approaches, however if time is a factor, a boat based attempt may be tried while a more time consuming shore based system is being prepared. Perhaps you don't need a line to shore in the first place.

While the new self-bailing rafts are harder to get wrapped because of the inflatable floors' floatation and rigidity, wraps certainly can and do happen. Fortunately, bailers' also provide more unwrapping options. If all that is needed to free the raft is to spill water or direct it away from the pressure point, the webbing or line connecting the self bailing floor to the tube can be cut allowing the floor to move away from the tube. This creates a place for the water to flow through and release water pressure on the whole raft. The subsequent repair work simply involves replacing the webbing. Once your options have been explored and a plan is made, remember to have a backup plan in the works just in case the first plan fails. Also, be sure to have throw baggers or support boats downstream to back up the effort.

ATTACHMENT OPTIONS AND LOAD-DISTRIBUTING ANCHORS

While D-rings are the optimum point to secure a line, sometimes they are weak, inaccessible or blown, and you need to create an anchor point by placing a line or webbing around the entire raft tube. The holes and spaces in the self-bailing floors make convenient locations to pass a line through. The same "girth hitch" or "larks foot" can be used on

conventional floors by making a small cut in the floor just under the tube. Tying a haul line off to one D-ring has gotten wrapped rafts off but it has blown lots of D-rings as well. In order to establish a positive anchor point on a raft, multiple D-rings and the thwarts or tubes should be used and linked together so that they each share a portion of the load. This "load distributing anchor" can be set up in various locations to best suit your specific needs. Caution! setting up anchor points on the submerged portions of the raft is difficult and very risky. Some back up system or person should be holding on to the rigger who secures these points. Attaching a line to shore may not always be needed or possible. What if you wrapped in the middle of a wide river and no amount of line could be put ashore? What if stringing a line creates a hazard for other boaters on a busy river? Perhaps gaining leverage or mechanical advantage from within the raft may be the logical choice. You can do this with a throw line and some caribiners if need be, but if you have pulleys, webbing, prusiks or ascenders available, an more efficient Z-rig can be used to create mechanical advantage inside the raft. When this approached is used, some air will probably need to be released from the tubes to allow the boat to flex. By placing the anchors in strategic places this simple Z-rig can be used to spill water out of the raft and that might be all that is necessary to unwrap the boat.

...when the line broke, the recoil of this rope caused serious injury to the rescuers...

TO DEFLATE OR NOT TO DEFLATE

Don't count on me to report an unbiased position on this issue. While I have heard several success stories throughout my years of rafting and kayaking, I've never actually seen a wrap situation improve by deflating the tubes. I have seen several wraps where, when the tubes were deflated, ripped or shot at, the raft collapsed and conformed to the rock and making the situation worse.

Reasons against deflating the tube/tubes:

• It's often difficult and dangerous to get at the valve;
• it's nearly guaranteed you'll get water inside the tube and that's time consuming and difficult to completely dry out;
• the softer raft will probably conform and wrap worse;
• what have you got if you've deflated and succeeded in getting the raft off? A swamped, partially deflated, barely navigable boat with you and your buddies in it cruisin' for a bruisin'.

Reasons for remaining inflated:

• Air in the tubes is a lifting force that can assist in extrication and provide a potential anchor point;

- *no water will get inside the tubes;*
- *a stiffer raft is harder to wrap;*
- *when you do come off you've got a more functional craft.*

The only time I prescribe a partial deflation is when you need the raft to curl up and spill water. Then partial deflation allows the raft to bend or "taco" toward the direction of pull. Example: if you were using a throw bag and a few carabiners to make a Z-rig inside the raft, the friction of the carabiners and the stiffness of the boat could be overcome by slightly deflating the appropriate tube enough to make it begin to bend. This could be used in addition to a shore line to spill water and pull off the obstacle at the same time.

POSTWRAP RAP

After your "wrap session" is over it's important to debrief the event, and assess the situation again, particularly if injuries or loss of critical equipment are experienced. If everyone is fine and all relevant equipment is intact, its Miller time. If however, your party is 3 days into a 7 day expedition, and you have injuries or less rafts, spend time exploring options. How far away from medical facilities are you and how long will it take to get there? Can you get by with your own first aid supplies or should we send message rafts/kayaks on ahead to get medical help on its way? Try to base group decisions on how much you stand to gain or lose by following any given option. "There ain't no river nowhere worth dying for". Even when injuries are nonexistent, be on the lookout for signs of mental trauma in people who had or thought they had a close call. Debriefing brings people together and facilitates the groups' mental health check. Subsequent professional counseling may be necessary if serious injury or death has occurred.

'WRAP KIT'

For rafters and/or rescuers.
This should include:

- 200ft static rope
- Carabiners
- Prusiks
- Pullies sufficient for a 3:1 Z-rig
- Slings
- Stronger professional grade water rescue rope in all throwbags (several in each boat)
- Reach System (or similar) in each boat

Effectively an expedition style kit even if it's an afternoon run.

An Inconvenient Death

by **Rob Thomas**
PRm South African Editor

A dead female Eland was discovered floating in one of the pools in Castle Gorge, just below the first waterfall and was contaminating drinking water for several farms downstream, one of which is a wilderness school. Farm workers felt that the risk of butchering in-situ and removing the pieces was too risky for them. There are a further 4 waterfalls immediately below the pool the Eland was floating in. Also, many SA farm-workers don't swim well so even if one of them survived a fall into a lower pool uninjured, he'd quite probably drown.

A request was placed to the Air Force by the farming community for assistance. However, one really can't justify a flight just for THAT. However, the Air Force helpfully suggested that a Mountain Rescue training session planned for the following day be used for the extrication of the carcass, if Mountain Rescue were agreeable. They were.

The plan was to use the opportunity to practice a (fortunately seldom needed) mass body-recovery technique to extract the carcass - a female Eland typically weighs around 460kg. This technique involves a long-line using a cargo net into which the bodies are placed (normally individually bagged first).

The remainder of the day before the sortie was spent planning, assessing risk and looking for contingencies. One of the contingencies was to take 2 full SCUBA sets in case anyone had to go into the water. The SCUBA would offer some protection against ingesting contaminated water and offer a lower-risk option in the event that the net had to be untangled from hoof or horn underwater, or in the event of a rescuer becoming ensnared (fortunately the water is very slow moving).

First, though, we called the aircraft commander and got his OK to fly with 2 full SCUBA cylinders on board.

Early thenext morning the team met at the air-force base. A briefing was held in the crew room and the plan decided on. Because this technique is not often used the emphasis was on safety of execution and on shared understanding - everyone had to have the same mental picture of what was to happen during the next step.

The aircraft was loaded and departed to the mountains - some 20 mins flying away, where we were to met by a farmer from an adjoining farm with his labourers.

On arrival a recce flight was done, checking clearances, heights, wind and escape routes. We landed and shut down, unloaded the aircraft, parked the SCUBA gear in the shade and prepped the longline system. The cargo slings would be too short and needed to be extended. An 11mm static rope was doubled and knotted (Giving an approximate breaking strength of 45kN) and used to extend the cargo sling with the sandbag connected 2m from the end.

This done and inspected by both the flight engineer and a rescuer who was not involved in the setup, the team traipsed off to net the carcass, flight crew in tow.

Before work started an emergency recovery line was anchored and dangled into the pool immediately below the one containing the carcass, just in case someone slipped and went into the water. A swift-water rescue throw-bag was placed immediately next to the anchors. The team members

who would be working next to the water donned PFDs and helmets and two of us hopped across to the opposite side of the pool and laid out the net. The 4 corners were extended using 5m lengths of 11mm rope before the ropes on two adjacent corners were passed back to the opposite bank and the net persuaded to sink in the pool. A gentle push on the carcass with a twig floated it into the middle of the pool and the net was pulled up, neatly capturing it.

The 4 corners were gathered and linked together before being parked on an anchor system while the extraction phase was briefed. While the ground team were netting the carcass the flight crew had been looking at the site, looking at snags, obstacles and escape routes. A 5m tag-line with freshly cut ends was tied to the net to stablise the load during the initial lift. The freshly cut end is less likey to snag than one which has been sealed. A quick round of reviewing the ground-to-air patter followed on from a kit check (including hook knife for ground team leader) and a readback of roles, tasks and contingencies.

We were ready to go.

The aircraft got airborne, checked comms with the ground Team Leader, Lip-Man and LZ team before starting the insertion of the sandbag. Once the team leader had the carabiner in his hand the team member disconnected the load from the anchors, checked the load for snagging on

anything on the ground or in the water, then held the ring for the Team Leader to connect the carabiner to.

Click!

"Load connected. Ready for lift" came the call. Slowly the heli inched higher. From the Lip-Man's perspective the ropes just seemed to be getting thinner!

"Hold!" the Lip-Man called a temporary stop. "Confirm that the load is out of the water?"

"Huuuuuueeeeeeey! Huue..Huuey! Affirm. Load clear of the water.

Tag-Line released.

Continue lift.

Huuueeyy!" came back from the Team Leader. It's difficult to speak clearly when your gag-reflex is being provoked by the smell of rotting flesh.

The aircraft continued to lift.

"Load passing the lip now" came from the Lip Man, followed soon afterward by "Tag-line clear of the lip". The aircraft crept up to Obstacle Clearance Height before slowly moving forward, performing a slow, wide right-hand turn to the LZ.

"Oryx, LZ. On your nose, 600m" came the call from LZ. The aircraft came to a stop above the LZ and started descending.

"100 feet... ...60 feet... ...30 feet... ...10 feet... ...6 ...5 ...4 ...3 ...2 ...1.. Load on the ground". The line went slack and the 3 releasable corners of the cargo net were disconnected.

"Oryx, LZ. Net open. Ready for lift." Slowly the aircraft climbed, rolling the carcass out of the net onto the ground for nature's cleanup crew to dispose of over time. There's a healthy vulture colony not too far away.

The aircraft moved off the the proper landing zone, a team member taking control of the rope as the aircraft landed. The now smelly cargo net got loaded into a body bag for the flight back. Aircraft loaded, time to go home. PR

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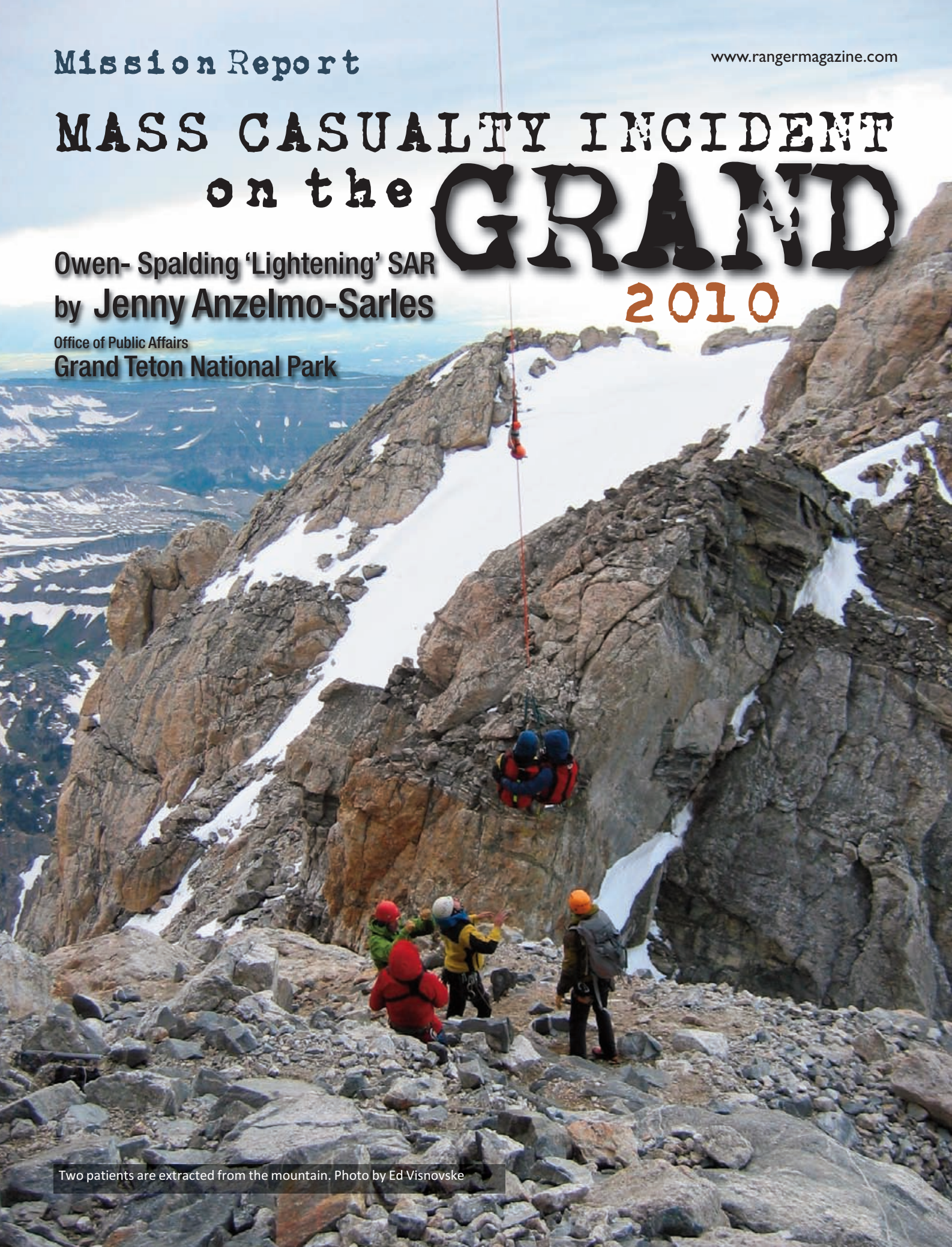
MASS CASUALTY INCIDENT on the GRAND 2010

Owen- Spalding 'Lightening' SAR

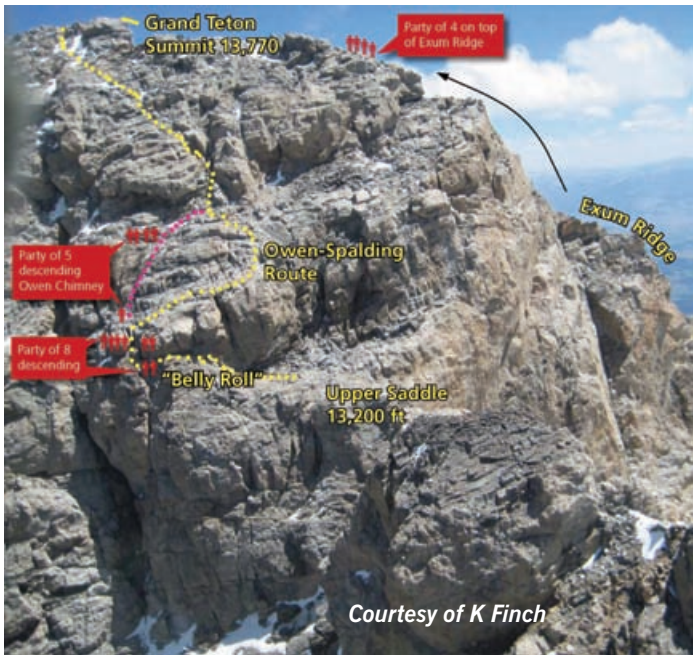
by Jenny Anzelmo-Sarles

Office of Public Affairs

Grand Teton National Park



Two patients are extracted from the mountain. Photo by Ed Visnovske



Crack! Boom! The house vibrated. I was sitting at home watching the weather contemplating a grocery run but thinking staying inside seemed like a much better idea when I heard the page. All Stations stand by for a Jenny Lake page. The tone cut through my house. I felt it in my gut—it was telling me this would not be good. My heart began to race.

To a degree we all crave that page, we secretly hope for it, we wait for it, we need it. No matter how many times it goes off, no matter how mundane the call may be, it never fails to raise your heart rate. All Jenny Lake units this is a call for a possible SAR on the top of the Grand Teton. Five people in the party, 3 have been reported struck by lightning and paralyzed. They are in the Owen Chimney. I knew then, this was the big one. It got bigger.

I sat and listened to the radio traffic for about an hour. It was my Saturday and I'm not a climbing ranger. I drive the desk answering media inquiries, writing press releases, promoting park programs, and telling the story of Grand Teton National Park and the National Park Service. But that Wednesday, July 21, 2010 my mission was different.

The scope of the incident grew quickly. First there were five people, maybe three paralyzed—one not breathing, both common human responses to being stuck by lightning. Another party hit by lightning too? A report came in via the Lincoln County Sheriff's Office of a party of seven struck by lightning with one member missing. A few minutes later, the Lincoln County dispatcher relayed, two parties of five, one party of eight, seven struck by lightning, one had gone over the edge. Three climbing parties all on the Grand Teton—all affected by lighting. They were caught high on the mountain in this truly epic summer storm.

Were there really three separate parties or were we getting duplicate reports? The 911 cell phone calls placed from the mountain were going to a handful of different sheriff's offices in Idaho and Wyoming, some getting transferred to the Teton County Sheriff's Office before ending up in Teton Dispatch. Other calls were going to family members halfway across the country. It wasn't until the first team of park rangers would land on the Lower Saddle and begin scaling the mountain that the true scope was understood.

120, 122 can I help with something, I relayed to my boss over the radio. 122 can you respond to the rescue cache I think we have some reporters on their way there. Give me a call from there.

Aerial of the Lower Saddle from 7HE. Photo by NPS

I threw on my green and grey uniform, jumped into my car, and drove the 4 miles north to Lupine Meadows; the valley base for most mountaineering excursions in the Tetons. Lupine Meadows is also the park's base for most rescue operations. A two-story log structure serves as the park's rescue cache outfitted with a kitchen, restroom, conference room, loft, dispatch center, large central room, and all the gear needed for mountain rescue operations.

I passed by the sign greeting anyone attempting to drive down the road "Authorized Vehicles Only", the white letters standing out sharply against the wet ubiquitous brown park service sign. I proceeded towards the cache. The road was lined with vehicles stacked bumper to bumper. With no place to park I retreated back over the creek to the west side and walked around.

Opening the door of the cache I was hit with the buzz and hum of people scurrying. The building was full, people oozing out doors, a human wall on the outside of building—forming its own structure. White boards around the central room were a rainbow of colors, detailing organizational plans, locations of rescuers, gear needed on the mountain, and flight weights. This was an emergency operations center in full activation.

Who's the IC? I asked?

Springer. Someone responded.

I found Jim Springer in the dispatch room leaning over the dispatcher's shoulder studying a weather map, as she spoke into the mic, phone clenched between her shoulder and ear all while typing into the log on the split computer screen. Dispatchers are the pros of multitasking, simultaneously answering phones, typing, talking on the radio—anticipating what's next. Dispatchers turn chaos into masterful art. They are like the conductor of an orchestra, cuing moving parts to create spectacular harmony.

A team of two climbing rangers, Jack McConnell and Helen Bowers, and Exum Guide Dan Corn were already on the mountain. Helicopter 7HE had set the park's pair down on the Lower Saddle at 11,600 feet in the midst of ominous dark and low cloud cover coupled with gusting winds and pelting freezing rain. Jack, Helen, and Dan scurried up from the Lower Saddle quickly running into two climbers from two different parties. Helen, serving as the operations section chief on the mountain, interviewed the

Helen Bowers attends to some of the injured climbers. Photo by Ed Visnovske

two and relayed the information to the rescue cache before sending the pair down to the National Park Service hut on the Lower Saddle. The rangers maintain a seasonal hut on the Lower Saddle that serves as a high mountain base camp for rangers on routine backcountry patrols and as a high altitude rescue cache.

Passing the Eye of the Needle, the three continued on up to the Upper Saddle where they ran into the group of seven. Most climbing parties attempting the Grand's summit choose this route, the Owen-Spaulding; it's the simplest and least technical way up the mountain. Just above the Upper Saddle those with a penchant to live rope up here and start scrambling on belay not because of the technical nature of the climb but the sheer exposure as one navigates across the Belly Roll Almost and Belly Roll proper. A fall from these early features on the Owen-Spaulding route means a multi-thousand foot fall and almost certain death.

This was the fate that day for a young man from Iowa. Brandon Oldenkamp, a 21 year-old soon to be senior at Dort College was on the climbing trip with his girlfriend's father. Members of Oldenkamp's party insist he was anchored to the mountain when the lightning stuck. The investigation into what caused Oldenkamp to fall over the edge never revealed a clear answer.

Jack and Dan were swiftly moving up the mountain despite water gushing down the rock face in ad hoc waterfalls. Helicopter 7HE ferried additional rescuers and gear loads to the Lower Saddle. A second ship on loan from Yellowstone National Park showed up as short-haul efforts commenced on the summit block. 7HE, one of two AStar B3 helicopters under a shared contract with Grand Teton National Park and the Bridger-Teton National Forest plucked off the climbers high on the mountain, in pairs whenever possible, delivering them to the Lower Saddle. From there, the Yellowstone Llama shuttled the injured to Lupine Meadows.

Anticipation was heavy when we got word of the first inbound load from the Lower Saddle. After the first two injured arrived on the valley floor there was a lull while we waited for a weather window so the ships could fly again. After that, there was a steady stream of cold and emotionally exhausted climbers delivered to Lupine Meadows. The two pilots had figured out their routine, gracefully sharing air space and one landing pad on the Lower Saddle. Multiple

Jack in orange and Helen in green assist 7HE as it lands on the Lower Saddle
Photo by NPS

7HE in cloud.

Lightning damaged this ice axe carried by one of the climbers among other gear. Photo by Scott Guenther

7HE short-hauls two injured climbers to the Lower Saddle. Photo by Ed Visnovske

ambulances from Grand Teton National Park and Jackson Hole Fire/EMS lined the fence at Lupine Meadows waiting to receive the injured. Climbers triaged as green were loaded into 15 passenger vans and transported to St. Johns Medical Center in Jackson, Wyoming with EMTs monitoring them en route. The yellows and reds were loaded into the ambulances. All but the most severely injured were transported in pairs to the hospital with two medical providers in the back of each ambulance.

Coordinating the medical response was the park's co-medial directors, Dr. Will Smith and Dr. AJ Wheeler. Dr. Wheeler was flown to the Lower Saddle where the Exum hut was used as a makeshift medical tent. As patients arrived off the summit block, Dr. Wheeler provided care and triaged patients sending the most severely injured to Lupine Meadows first. Once safely on the valley floor, Dr. Smith orchestrated transport to definitive medical care.

Once I arrived at the cache the day became a blur. Between placing phone calls to headquarters relaying the latest on the rescue and jumping in and out of ambulances to attend to the injured there wasn't much time to stop or to take a minute to comprehend all that was happening. I shepherded news media

Patients are escorted to waiting ambulances at Lupine Meadows. Photo by Patrick Hattaway

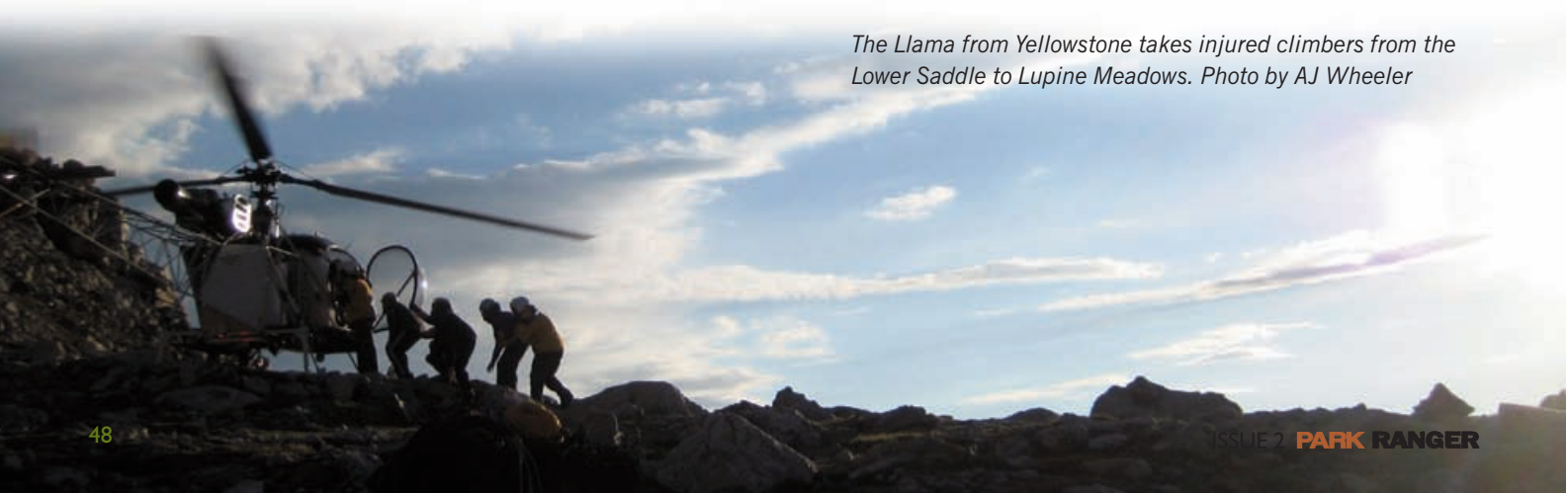
Medical Personnel, including Dr. Will Smith in the orange vest, wait to receive injured climbers on the valley floor. Photo by Patrick Hattaway

around, trying to find a balance between access and intrusion. I made regular phone calls to the information team that had assembled at park headquarters, providing them with status updates—they fielded the hundreds of news media calls.

This rescue that we call the Owen-Spaulding Lightning SAR, is the first major SAR I recall being a part of, even if only on the sidelines. Since then, I have spent several hundred hours with this team during training and actual SAR missions.

At the time, the Owen-Spaulding Lightning SAR was the largest rescue effort in the park's history. It took an extraordinary synchronized effort that included over 80 personnel from Grand Teton National Park, the Bridger-Teton National Forest, Exum Mountain Guides, Jackson Hole Fire/EMS, St. John's Medical Center, Yellowstone National Park, the Grand Teton Lodge Company, and a handful of other local businesses and organizations. I think Jack summed it up best when he said it was like a bus wreck on a mountain.

It is quite something to see the Jenny Lake Rangers in action. They masterfully work through puzzles figuring out where people are, planning needs of the rescuers, continually assessing risk, and assisting family and friends of the injured or deceased. It is a privilege for me to have a glimpse into their world.



The Llama from Yellowstone takes injured climbers from the Lower Saddle to Lupine Meadows. Photo by AJ Wheeler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KERNMANTLE LOW STRETCH ROPES

10-10.9mm

by Ade Scott

Variously known as *STATIC, SEMI-STATIC, LOW STRETCH* and *ABSEIL/RAPPEL/ LOWERING* ropes this huge class of ropes is the mainstay of all rope access and rope rescue activities. Dynamic (elastic or stretchy ropes) also have a large role in Mountain Rescue but on the whole it is the inelastic properties of the ropes discussed here that make them so desirable. They are intended for permanent load/life support rather than the preventative and shock-absorbing qualities of a dynamic rope which only comes under load in the event of a fall. Mountaineers will of course routinely use dynamic rope for abseil/rappel because it can deal with both climbing and abseiling whereas a static or low stretch rope is never normally exposed to shock loading beyond FF0. On long lowers like this picture of YOSAR in Yosemite NP the yo-yo effect of a dynamic rope would play havoc with edge abrasion and smooth stretcher travel.

YOSAR (Yosemite National Park) Rescue by Dave Pope

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We begin a new series of Market Guides to Kernmantle Ropes across all three of our titles with the two main classes of abseil/rappel ropes used in wilderness and mountain rescue- 10-10.9mm in this issue and 11 to 11.9mm in the next with ultra-light 8-9.9mm somewhat out of sequence later next year. Since Park Ranger magazine focuses on 'wilderness' areas encompassing mountain and cave rescue we will look at all ropes from 9 to 11.9mm including *Dynamic* or *Climbing* ropes whereas our more fire-service and agency oriented magazine *TECHNICAL RESCUE* will look at the 11 to 11.9mm class and 12-13mm ropes with an eye towards the NFPA L and G classes . There is some confusion as to why some ropes are static (the term we have used traditionally) and some are semi-static or low stretch. Our friends at PMI have differentiated the various terminolgies as follows:

[Cordage Institute] CI 1801 CLASSIFIES ROPE AS FOLLOWS:

LOW STRETCH *- Ropes with 6-10% elongation at 10% of Minimum Breaking Strength*

STATIC *- Ropes with less than 6% elongation at 10% of Minimum Breaking Strength*

NFPA 1983 CLASSIFIES ROPE AS FOLLOWS:

ESCAPE *- Single-purpose, one time use emergency personal escape rope.*

LIGHT USE *- designed for light-use loads (300 lbs) or escape*

GENERAL USE *- intended for general use loads (600 lbs), light use loads (300 lbs) or escape.*

EN 1891 CLASSIFIES ROPE AS FOLLOWS:

TYPE A *- ropes, are low stretch Kernmantel ropes designed for general use by persons in rope access including all kinds of work positioning and restraint, in rescue and speleology.*

TYPE B *- ropes, are low stretch Kernmantel ropes of a lower performance than type A ropes, requiring greater care in use.*

Ropes not specified as Type A or Type B have lower elongation and energy absorption properties than required by EN 1891.

Rope diameter can be a contradiction because not only do quoted diameters often vary by a couple of mm either side even *before* load is applied but a number of manufacturers seem to have lost their calculators or they are simply rounding the figures off so that you may see a 3/8" rope given as anywhere between 9mm and 10mm when in fact, to be precise it should be 9.52mm. We have an Espirit rope for instance which we have included because it is listed as 10mm or 3/8" so you'll probably also see this in our 8 to 9.9mm guide. Using imperial inches doesn't really clarify things much either because, aside from the afore mentioned Espirit rope the 10mm family is usually catchily classified as 25/64ths or 27/64ths!. So the long and the short of it is, you need to persevere through the entire series from 8mm to 11.9mm to truly appreciate comparative data because we've had to produce these articles with set parameters whereas the reality is that a 9.8mm rope may be just as applicable to your needs as a 10.5mm. And a 10.5mm will almost certainly need to be compared to an 11mm to get a true picture of it's relative merits..One thing we can say about a nominal 10.5mm as compared to an 11mm is that it should be lighter to carry which together with COST is a key factor for wilderness rescuers. There is often a disparity between names and data quoted by retailers so we use only those quoted by the manufacturers.

CONSTRUCTION:

At the risk of going back to basics just a bit too far we had better recap exactly what a kernmantle and static or low stretch rope is and how it differs from your mum's washing line. If it doesn't differ from your mum's washing line you either need to upgrade your life insurance policy or someone at your station should check the inventory. Traditionally rope has been constructed by twisting bundles of fibre together - *LAID* rope. Laid rope is like Rapunzle's hair - pre-twisted strands of fibre (or hair) make a larger bundle of fibre which can then be spiralled or braided so that it forms an interlocking spiral of rope (or hair) fibres. You can see all the 'workings' of a laid rope, you can push stuff through the middle of a laid rope and, in the case of the industry standard 3-strand Nylon, you can cut or contaminate all of your load-bearing fibres because they're all exposed. Oh, and it's quite an elastic rope because all the fibres are spiralled so in any given linear inch of rope there is actually 2 inches of rope (or whatever the figure happens to be). Variations on 3-strand include *MULTI-PLAIT* in which some of the bundles are plaited in one direction and others the opposite way - this circumvents the unfortunate inclination of a spiralled rope to want to twist back to its virginal, parallel state. All of the more complex designs attempt to balance the direction of spiralled fibres so that they no longer have the inclination to untwist - this is known as an S-twist and a Z-twist. The next step up from 3-strand and multiplait is to cover all those exposed fibres with a sheath - a *BRAIDED* rope. Typically in yachting and your mum's washing line this may be simply to protect the core or even just to add colour to an otherwise bland rope - people with large boats like to colour-coordinate. Next is *BRAID-on-BRAID* or *DOUBLE BRAID* also used in yacht ropes but equally for life-support working. This has a braided outer and inner which tend to share the load. When a single sheath becomes a load-bearing component of the rope it is termed a kernmantle. Kernmantle could be deemed to be the same as a single braid rope but tends to be differentiated as life-support rope. Kernmantle comes from the German for *KERN* meaning core and *MANTLE* meaning sheath. A woven protective sheath covers a core of twisted/plaited multiple fibres. Broadly speaking we talk of static ropes as having a parallel bundle core and dynamic rope as having a spiralled core although even static ropes

Low stretch ropes feature a braided sheath and a core comprised of bundles of monofilament fibres. There may also be a marker thread or tape giving details like year and materials. Right: an extra Kevlar sheath makes this rope more able to withstand the heat of rapid descent or from an external source.

Lower. Raise. Repeat.

Sterling Rope's AZTEK Elite™ is a multifunctional rescue and haul system. It's exceptional versatility allows for use in edge restraint, litter rigging, self-rescue, pick offs, haul systems, or as an adjustable directional, high directional guy-line, load release hitch, attendant attachment, and more*. With the AZTEK Elite, you can create a mechanical advantage system of either 5:1 or a 4:1 with a change of direction. This essential system contains a storage bag, two AZTEK Omni-Block swivel pulleys, three twist-lock SafeD carabiners, 50' of 8mm Edge Restraint cord, 6mm Travel Restraint, and two 6mm sewn prusik "ratchets" for progress capture.

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*Proper training required. AZTEK (AZ Technician's Edge Kit) Elite is a trademark of Sterling Rope Co., Inc. | photo courtesy: Reed Thorne, Ropes That Rescue

will have some spiralled fibres or bundles. The job of the sheath is to protect the core from abrasion and heat damage and traditionally this meant that three-quarters or so of the rope's total load bearing capacity remained intact within the core while the sheath took a pummelling. Over the years this has changed somewhat so that sheaths now often constitute around 40% of the total rope strength making them A) an even more vital load-bearing element than they traditionally have been and B) a huge influence on the handling characteristics of the rope. It used to be that a soft, easily tied rope was a bit of sissy when it came to withstanding abuse and you needed something like the Sterling HTP with it's iron bar like characteristics to withstand a sharp granite edge or to highline the Grand Canyon. Now, it's not so clear cut although on the whole this remains a reasonable rule of thumb. The question is, do you want better handling and easier knot tying or do you want a rope that's a pig to work with but will take whatever abuse you throw at it? If you really want to go all out in the bombproof stakes there's a rope by Tendon (Lanex) in the Czech Republic that has stainless steel fibres as part of it's sheath to prevent it being cut. This is a bit of a departure from the more usual Kevlar-Aramid-type fibres and we haven't tried it but it's an interesting concept for law enforcement Probably not much good as a water rescue throw rope although it's not as heavy as you might expect at only a couple of grams per metre more than Aramid. Another interesting development which sees the traditional definitions upended is the integration of some core fibres into the weave of the sheath. Platinum from Teufelberger, Meetic ropes from Courant and Unicore from Beal are examples. This is not an attempt to share load but rather to eliminate one of the drawbacks of a separate sheath; slippage or creep which can be exacerbated by the cams of a descender squeezing and bunching the sheath as it pulls through under load.

When it comes to **MATERIALS** there are two basic truths - Nylon (more correctly termed Polyamide) is king and its mate Polyester would like to be. Nylon or Polyamide is the fundamental rope material of choice because it has good strength to weight ratio and shock absorption, doesn't melt at too low a temperature (around 460° F or 238° C), can operate in wet and ice (albeit at reduced capacity) and is pretty robust when it comes to being dragged over rough edges. Polyester thinks it has the upper hand because it can withstand abuse from Nylon's nemesis acid. So in certain caving and mining situations as well as some specific industrial applications Polyester is your choice. It's also a bit tougher, has a slightly higher melting point (around 480° F or 249° C) and retains more strength when wet. but since it can also have the handling and force absorption characteristics of a Chevy exhaust pipe it normally only constitutes one or two ropes in any manufacturer's range. There are some other specialist materials used in rope manufacture - principal amongst these is Aramid/Kevlar/Technora/ Twaron - all variations on the ballistic material theme that can make a rope extremely tough and highly resistant to heat (and bullets?). Many of the military ropes will incorporate these materials, particularly into the sheath which is the rope's first line of defence while some, like the Beal Hotline has a second sheath of Aramid beneath its nylon exterior. Most still maintain a nylon core because those bullet proof materials absorb shock like a wire rope and that is not the most desirable characteristic to have. Some of the water -related ropes incorporate polypropylene into the core because it floats but it has terrible heat and UV resilience so you don't really see it as an abseil rope only as a throw rope. Water rescue ropes are a separate article but there are one or two 'water/abseil' ropes in the 10 to 11.9mm categories. Canyoning ropes are specially heat treated during fibre construction to enable better strength retention when wet and this is a process seen more and more in standard ropes as it pre-empts the shrinkage that is otherwise common in static ropes and the reason that the first thing a new rope sees in its new home is the bath tub! Canyoning ropes are a worthwhile consideration for rescuers because they are designed to be pretty tough and operate well when saturated- at smaller diameters this limits your rescue potential but they make excellent access and hauling ropes.

MBS is Minimum Breaking Strength and this may be given (depending on the manufacturer) in Kilo Newtons, kilograms, lbs or lbs of force. The units of of force are kN and lbf but they pretty much equate to the more recognisable kg and lb. We've included the European favourite of breaking strength in a figure 8 knot but this is not a test normally undertaken by US manufacturers who instead give a more detailed % elongation at 3 weights - 300lbs, 600 lbs and 900 lbs. Similarly the number of Factor one falls that any given rope can withstand is more of a European convention than American hence you will see n/a for *not available* quite a lot. Incidentally, since a low stretch rope should never be used for climbing protection it is not necessary to test beyond fall factor 1 equivalent to the distance you would fall on a length of rope when you are level with your anchor. Even this measure is such poor form that it should really only occur in rescue in the most extreme circumstances. A more realistic worst-case fall factor is usually taken to be fall factor 0.3 which is a fall of one metre (or foot) on 3 metres (or 3 feet) of rope.

For **COLOURS,** a forward slash/ in our tables denotes a combination of colours in the *same* rope with lower case denoting a minority percentage of total colour or more usually a runner thread. Some brands like Edelrid, Mammut, Tendon and Marlow use the runner thread to readily identify diameter so that 9mm would be one marker thread, two threads would be 10 or 10.5mm and 3 threads would be 11mm This isn't uniform throughout the industry so you cannot simply assume that any 3-marker thread rope is 11mm but within those ranges that adopt this marking it makes life easier, particularly where there could be a difference in standards between two similar sized ropes which could adversely affect your legal position in the event of an accident. Another example of marking is the PMI range which uses 'barber-pole' sheath runners to denote nylon and a cross-pattern to denote polyester content.It's interesting to note that Edelrid quote an increase in weight of a gram per metre on coloured as compared to white ropes and coloured ropes are almost always more expensive than

continued on page 68

FALL IN LOVE BEFORE YOU TIE THE KNOT

Allow us to introduce you to a partner you'll be happy to dedicate your life to—Talon® rope from PMI. With its 16 carrier nylon sheath over a polyester core, this beauty combines durability and friction that's a pleasure to hold. And, like all PMI products… it's easy on the eyes.

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KEY FEATURES:

16 carrier construction
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CERTIFICATIONS:

CI1801, Static, NFPA 1983, L

COMPLIANTS:

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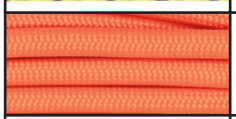
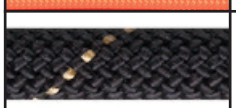
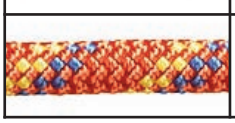
Images NOT to scale	MODEL	COMPANY	ORIGIN	COST /metre	Ø	Type	Standards	Materials	Carrier	Access	Rescue	Cavin
	Access Unicore	BEAL		$3.39 €2.14 £1.78	10.5	Semi-Static Type A	CE EN 1891	Nylon	n/a	■	■	■
	Antipodes/ (Intervention)	BEAL		€1.78 £1.45 (€1.82)	10	Semi-Static Type A	CE EN 1891	Nylon	n/a	■		■
	Antipodes/ Industrie/ (Intervention)	BEAL		€1.84 £1.37 (£1.76)	10.5	Semi-Static Type A	CE EN 1891	Nylon	n/a	■	■	■
	Top Work	BEAL		€1.74 A$3.40	10.5	Semi-Static Type A	CE EN 1891	Nylon	n/a	■		■
	Contract	BEAL		€1.56 £1.00 A$2.80	10.5	Semi-Static Type A	CE EN 1891	Nylon	n/a	■		
	Dynastat	BEAL		$3.85 €2.70 £2.12	10.5	Semi-static &Dynamic Type A	CE EN 1891 CE EN892	Nylon	n/a	■	■	■
	Pro-Canyon	BEAL		£1.69	10.7	Semi-Static Type B	CE EN 1891	Polyester sheath Polypropylene core	n/a			
	Raider	BEAL		€6.49 £3.50	10.5	typeB	CE EN 1891	Aramid sheath Nylon core	n/a			
	Spelenium	BEAL		€1.45	10	Semi-Static Type A	CE EN 1891	Nylon	n/a	■	■	■
	Spelenium	BEAL		€1.55 A$4.20	10.5	Semi-Static TypeA	CE EN 1891	Nylon	n/a	■	■	■
	Protach	BLUEWATER		$3.07	10 25/64	Static	CE EN 1891	Polyester sheath Nylon core	32			
	Protach	BLUEWATER		$3.19	10.5 27/64	Static	CE EN 1891	Polyester sheath Nylon core	32			
	Armortech	BLUEWATER		$5.60	10.5 27/64	Static	n/a	Technora sheath Nylon Core	32			
	BW2	BLUEWATER		$2.90 A$4.50	10.5 27/64	Static	n/a	Polyester sheath Nylon core	16	■	■	■
	SpecStatic	BLUEWATER		$3.10	10.5 27/64	Static	NFPA pending	Polyester	32	■	■	
	E-Safe	BLUEWATER		$5.43	10	Static	NFPA 1983-T	Technora sheath tech/nylon core	32	■	■	

NOTES: ORIGIN = Company selling the product, not necessarily the country of manufacture TYPE: manufacturer's own definition of rope chara

USES				MBL	Knotted BL	F1 Falls	Wt g/metre lbs/100ft	Colours	Static Elongation %	Sheath Mass	NOTES	WWW.
	Tactical	Water	Canyoning									
				27 kN 5952 lbf	19.5 kN 4299 lbf	16	65g	Orange/grey/white Blue/grey/white	3%	38%	Bonded sheath and core	beal-pro.com
	■			24 kN 5291 lbf	17 kN 3747 lbf	6	62g	White/red/black (Khaki, Black)	4.4%	43%	(Intervention = military/tactical version)	beal-pro.com
	■			30 kN 6613 lbf	19.5 kN 4299 lbf	16	65g	White/red/black, (Khaki, Black)	3%	44%	(Intervention = military/tactical version)	beal-pro.com
				26 kN 5732 lbf	19 kN 4188 lbf	15	64g	White/black	4.8%	36%		beal-pro.com
				25 kN 5511 lbf	17.5 kN 3858 lbf	12	68g	White/black	3%	44%		beal-pro.com
	■		■	25 kN 5511 lbf	16.5 kN 3637 lbf	24	75g	Yellow/black	2% (35%@ff1.77)	43%	abseil/access rope that becomes dynamic (8.5kN@ff1.77) in the event of a fall	beal-pro.com
			■	26 kN 5732 lbf	19 kN 4188 lbf	10	68g	Orange	2%	43%	zero shrinkage	beal-pro.com
	■			23 kN 5070 lbf	18 kN 3968 lbs	6	69g	Black/gold	3.2%	32%		beal-pro.com
				25 kN 5511 lbf	n/a	6	61g	White/black/red, White/red, White/blue, Yellow	4.1%	41%	3% shrinkage	beal-pro.com
				28 kN 6173 lbf	n/a	15	67g	White/black/red, White/red, White/blue, Yellow	3.7%	38%	3.3% shrinkage	beal-pro.com
	■			27.2 kN 6000 lbf	n/a	n/a	67g	Black, Olive Drab	4.4@1.35kN /300 lbf 7.6@2.70kN/600 lbf 10.2@4.40kN/1000 lbf	57%		.bluewaterropes.com
	■			29.5 kN 6500 lbf	n/a	n/a	72g	Black, OD, Tan, Grey	3.1@1.35kN /300 lbf 6.1@2.70kN/600 lbf 8.4@4.40kN/1000 lbf	50%		.bluewaterropes.com
	■			36.3 kN 8000 lbf	n/a	n/a	76	Natural	3.2@1.35kN /300 lbf 6.4@2.70kN/600 lbf 8.9@4.40kN/1000 lbf	48%	cut and heat resistant	.bluewaterropes.com
				29.5 kN 6500 lb	n/a	n/a	78	Gold	3.8@1.35kN /300 lbf 6.9@2.70kN/600 lbf 8.9@4.40kN/1000 lbf	50%		.bluewaterropes.com
				27.6 kN 6100 lbf	n/a	n/a	88	Black/white, White	2.6@1.35kN /300 lbf 3.1@2.70kN/600 lbf 3.9@4.40kN/1000 lbf	47%	Dry coat option	.bluewaterropes.com
	■			33.3 kN 7355 lbf	n/a	n/a	69.5g	Natural	2.1@1.35kN /300 lbf 3.4@2.70kN/600 lbf 4.4@4.40kN/1000 lbf	46%		.bluewaterropes.com

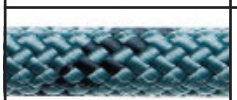
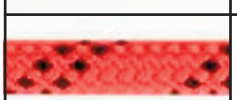
acteristics **COST:** Approx SRP/RRP mostly inclusive of local tax. Coloured options may be more expensive

Images NOT to scale	MODEL	COMPANY	ORIGIN	COST /metre	Ø mm inches	Type	Standards	Materials	USE			
									Carrier	Access	Rescue	Caving
	BigWall	BLUEWATER		$3.03	10	Static	n/a	Polyester sheath Nylon core	32			■
	Ultima	COURANT		€1.35	10	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Ultima	COURANT		€1.45	10.5	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Equirial	COURANT		€1.25	10	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Equirial	COURANT		€1.30	10.5	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Canyon X	COURANT		€1.40	10	Static Type A	CE EN 1891	Nylon	32			■
	Truck	COURANT		€0.99	10.5	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Bandit	COURANT		€1.05	10	Static Type A	CE EN 1891	Nylon	32			■
	Bandit	COURANT		€1.15	10.5	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Sécurité Industrie / Intervention /ACLS	COUSIN-TRESTEC / ALLCORD		£1.77	10.5 27/64	Static Type A	CE EN 1891	Nylon	32	■		
	Sécurité Industrie Pro	COUSIN-TRESTEC		€1.50 £1.95	10.5 27/64	Static Type A	CE EN 1891	Nylon	32	■	■	
	Crystaline	COUSIN-TRESTEC		**£1.75**	10.5 27/64	Static Type C	CE EN 1891	Polyester / Polypropylene	32			
	Techtonic	COUSIN-TRESTEC		£1.92	10	Static Type A	CE EN 1891	Nylon	32			■
	Techtonic	COUSIN-TRESTEC		£2.05	10.5	Static Type A	CE EN 1891	Nylon	32			■
	Abseil Braid	DONAGHYS		n/a	10	Low-Stretch	AS4142.3	Polyester	24	■	■	■
	Response/ Response XT	DONAGHYS		n/a	10	Low-Stretch	AS4142.3 EN 1981	Nylon	32	■	■	

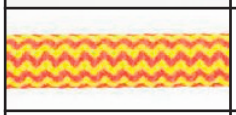
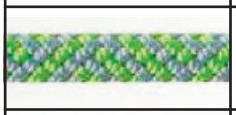
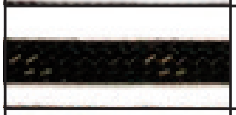
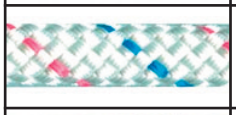
NOTES: ORIGIN = Company selling the product, not necessarily the country of manufacture TYPE: manufacturer's own definition of rope chara

S	Tactical	Water	Canyoning	MBL	Knotted BL	F! Falls	Wt g/metre lbs/100ft	Colours	Static Elongation %	Sheath mass	NOTES	WWW.
			■	30.8 kN 6800 lbf	n/a	n/a	70g	Blue, Red	3.8@1.35kN /300 lbf 6.7@2.70kN/600 lbf 8.9@4.40kN/1000 lbf	44%		.bluewater ropes.com
	■			26.8 kN 5908 lbf	19 kN 4188 lbf	11	61.3g	White/purple/black, Black, Red, Blue, Yellow, Fox, Scorpion, Wolf	3%	41%	3.9% shrinkage. 'Meetic' - sheath/core fusion	cordescourant.com
	■			31 kN 6834 lbf	28 kN 6172 lbf	17	69.6g	White/purple/black, Black, Red, Blue, Yellow, Fox, Scorpion, Wolf	3%	43%	3.6% shrinkage 'Meetic' - sheath/core fusion	cordescourant.com
	■		■	31.8 kN 7010 lbf	20.45 kN 4508 lbf	11	66g	White/green/black, Green,Black,Khaki, Blue,Red/yellow, Fox, Scorpion, Wolf	3.8%	43%	3.9% shrinkage 'X-Braid' multi-braid core	cordescourant.com
	■		■	32.4 kN 7143 lbf	28.9 kN 6371 lbf	14	73g	White/green/black, Green/black,Blk,Blue Khaki, Red/yellow, Fox, Scorpion, Wolf	3.7%	40%	3.6% shrinkage 'X-Braid' multi-braid core	cordescourant.com
			■	26.8 kN 5908 lbf	n/a	11	61.3g	White/purple/blk Orange/purple/blk	3%	41%	'Meetic' - sheath/core fusion	cordescourant.com
				31 kN 6834 lbf	21 kN 4629 lbf	15	73g	White/purple	3%	47%	3.5% shrinkage	cordescourant.com
	■		■	28 kN 6173 lbf	17 kN 3747 lbf	10	59g	White/purple/orange, Black,Blue Khaki, Red/yellow, Fox, Scorpion, Wolf	2.3%	42%		cordescourant.com
	■		■	32 kN 7054 lbf	20 kN 4409 lbf	13	68g	White/purple/orange, Black,Blue Khaki, Red/yellow, Fox, Scorpion, Wolf	2.3%	37%	Replaced 'MIX' rope	cordescourant.com
	■			27.4 kN 6040 lbf	15.3 kN 3373 lbf	10	71.3g	White/black, Black	2.8%	42.1%	2% shrinkage Black = £1.99/m	cousin-trestec.com allcord.co.uk
	■			>29.1 kN >6415 lbf	>15 kN >3306 lbf	>13	65.2g	White/black Black Blue/red Red/blue	2.9	38.4%	3.6% shrinkage sometimes listed as 10.7mm	cousin-trestec.com
			■	22.3 kN 4916 lbf	>11kN >2425 lbf	>5	73g	Orange	2.8	44.8%	0.1% shrinkage	cousin-trestec.com
				29.3 kN 6459 lbf	>15 kN >3306 lbf	14	63g	White/green/yellow	5	41%	2.7% shrinkage New 10mm Rescue rope - Equinox 26kN. 71g/m	cousin-trestec.com
				31.4 kN 6922 lbf	15 kN 3306 lbf	>20	71g	White/green/yellow	4.6	43%	2.6% shrinkage	cousin-trestec.com
				23 kN 5070 lbf	n/a	n/a	68g	White/blue	3.9%	50%	Double Braid	donaghys.com
				28 kN 6173 lbf	n/a	n/a	79g	Orange/ylw/blue	4.4%	44%		donaghys.com

acteristics **COST:** Approx SRP/RRP mostly inclusive of local tax. Coloured options may be more expensive

Images NOT to scale	MODEL	COMPANY	ORIGIN	COST /metre	Ø mm inches	Type	Standards	Materials	Carrier	Access	Rescue	US Caving
	Safety Super II	EDELRID		€2.23	10	Low-Stretch Type A	UIAA CE EN1891	Nylon	40		■	
	Safety Super II	EDELRID		£2.22 €2.96	10.5 27/64	Low-Stretch Type A	UIAA CE EN1891	Nylon	40	■	■	
	Performance Static	EDELRID		£2.05 €1.69	10	Low-Stretch Type A	UIAA CE EN1891	Nylon	36			■
	Performance Static	EDELRID		€1.87	10.5 27/64	Low-Stretch Type A	UIAA CE EN1891	Nylon	40	■	■	
	Bud	EDELWEISS		n/a	10.5	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■		
	Proline	EDELWEISS		n/a	10	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■	■	
	Proline	EDELWEISS		n/a	10.5	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■	■	

SES Tactical	Water	Canyoning	MBL	Knotted BL	F! Falls	Wt g/metre lbs/100ft	Colours	Static Elongation %	Sheath mass	NOTES	WWW.
■			25 kN 5511 lbf	17 kN 3747 lbf	n/a	67g	White/black Black/grey	4.0%	40%	Pre-shrunk, High abrasion resistance, designed for rescue devices. Replaced SUPERSTATIC	edelrid.de
■			27 kN 5952 lbf	18 kN 3968 lbs	n/a	74g	Black/grey Green/black	3.9%	39%	Pre-shrunk, High abrasion resistance. Replaced SUPERSTATIC	edelrid.de
			25 kN 5511 lbf	16 kN 3527 lbf	n/a	63g	White/grey	3.7%	43%	Value for money, Diameter code in sheath	edelrid.de
			28 kN 6173 lbf	18 kN 3968 lbs	n/a	72g	White/grey Grey/black	3.7%	36%	Value for money, Diameter code in sheath	edelrid.de
			24 kN 5291 lbf	17 kN 3747 lbf	12	67g	White/red	3.1%	36.4%	5% shrinkage	edelweiss-ropes.com
■			23 kN 5070 lbf	17 kN 3747 lbf	6	64g	White/black Black	2.2%	41.1%	3% shrinkage	edelweiss-ropes.com
■			26 kN 5732 lbf	19 kN 4188 lbf	15	75g	White/black Black, Red/black Blue/black	4.8%	43.7%	Dry treatedt Unicore Option 3.5% shrinkage	edelweiss-ropes.com

Images NOT to scale	MODEL	COMPANY	ORIGIN	COST /metre	Ø	Type	Standards	Materials	Carrier	Access	Rescue	Us Caving
	ProMax Unicore	EDELWEISS		n/a	10.5	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■	■	
	Elite Rescue	EDELWEISS		n/a	10.6	Low-Stretch Type A	UIAA CE EN1891	Polyester/ Nylon sheath Nylon Core	n/a	■	■	■
	Duotech	EDELWEISS		n/a	10.5	Semi-static &Dynamic Type A	CE EN892 CE EN1891	Nylon sheath Nylon & Vectran core	n/a	■	■	
	Speleo	EDELWEISS		$2.65 £2.00	10	Low-Stretch Type A	UIAA CE EN1891	Nylon	36	■		■
	Speleo	EDELWEISS		n/a	10.5 27/64	Low-Stretch Type A	UIAA CE EN1891	Nylon	36	■	■	■
	Canyon	EDELWEISS		$2.80	10	Low-Stretch Type A	UIAA CE EN1891	Polyester/Nylon sheath, Nylon core	36			
	Canyon	EDELWEISS		n/a	10.6 27/64	Low-Stretch Type A	UIAA CE EN1891	Polyester/Nylon sheath, Nylon core	36			
	Old Glory / Sport Static / Tactical	ESPIRIT		n/a	10 3/8*	Static	n/a	Nylon	n/a	■	■	
	Old Glory / Super Sport / Tactical	ESPIRIT		n/a	10.5 5/12	Static	n/a	Nylon	n/a	■	■	
	Symbio	EXPE		€1.55	10.5	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■	■	
	Expé II Plus	EXPE		€1.30	10	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■	■	■
	Special II	EXPE		€1.37	10.5	Low-Stretch Type A	UIAA CE EN1891	Nylon	n/a	■	■	■
	Tectra	HEIGHTEC		£1.62	10.5	Low Stretch Type A	CE EN 1891	Nylon	n/a	■	■	
	Semi Static (00099-1116)	LIROS		€2.00	10.5	Low Stretch Type A	CE EN 1891	Nylon	32	■	■	■
	Performance Static	MAMMUT		SFR3.6 £1.66	10	Static Type A	CE EN 1891	Nylon	32	■	■	■
	Performance Static	MAMMUT		SFR4 €2.70	10.5 27/64	Static Type A	CE EN 1891	Nylon	40	■	■	■

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SES	Tactical	Water	Canyoning	MBL	Knotted BL	F1 Falls	Wt g/metre lbs/100ft	Colours	Static Elongation %	Sheath mass	NOTES	WWW.
				26 kN 5732 lbf	19 kN 4188 lbf	15	65g	White/red/black	4.8%	44%	sheath/core fusion	edelweiss-ropes.com
				25 kN 5511 lbf	18 kN 3968 lbs	15	71%	Yellow/Red	4%	37%	High abrasion resistance.. Dry treated. 1.5% shrinkage	edelweiss-ropes.com
	■			30 kN 6613 lbf	16.5 kN 3637 lbf	>20	75g	Green/Grey	4%	43.7%	Shock absorber will kick in at 3kN making the rope Dynamic	edelweiss-ropes.com
				19 kN 4188 lbf	17 kN 3747 lbf	7	66g	White/red/blk Black/red/white	5.5%	31%		edelweiss-ropes.com
				27 kN 5952 lbf	18.5 kN 4078 lbf	7	70g	White/red/blk Black/red/white	5.5%	35%	4.2% shrinkage	edelweiss-ropes.com
			■	23 kN 5070 lbf	17 kN 3747 lbf	16	68g	Yellow/red	4.5%	35%	Dry treated. Increased abrasion resistance	edelweiss-ropes.com
			■	25 kN 5511 lbf	18 kN 3968 lbs	15	71g	Yellow	4.0%	37%	Increased abrasion resistance	edelweiss-ropes.com
	■			27.2 kN 6000 lbf	n/a	n/a	4.1 lbs	White, Orange, Blue, Red, Yellow Black,Khaki,Camo	3%@300lbs	n/a	*manufacturer lists this as 3/8" or 10mm	espritropes.com
	■			32.6 kN 7200 lbf	n/a	n/a	5.1 lbs	White, Orange, Blue, Red, Yellow Black,Khaki,Camo	2.5%@300lbs	n/a		espritropes.com
				31 kN 6834 lbf	22 kN 4850 lbf	12	74g	White/blue/black	3%	37%	Sheath/core fusion 2% shrinkage	expe.fr
				24 kN 5291 lbf	17 kN 3747 lbf	6	62g	White/pink/blue	4.4%	43%	4% shrinkage	expe.fr
				27.4 kN 6040 lbf	20 kN 4409 lbf	10	71g	White/pink/blue Red Blue	2.8%	n/a	2% shrinkage	expe.fr
				30 kN 6613 lbf	15 kN 3306 lbf	28	74g	White/orange	4.5%	43.1%	2.5% shrinkage	heightec.com
				33 kN 7275 lbf	n/a	n/a	n/a	White/blue/black	>5%	n/a	Also a new rope- Safe White 10mm	liros.com
	■			30.2 kN 6657 lbf	19.7 kN 4343 lbf	11.5	60.8g	Orange/black, White, Black	3.4%	36.5%	2.4% Shrinkage	mammut.ch
	■			32.5 kN 7165 lbf	21.4 kN 4717 lbf	10.3	65g	Red/black, White, Red	3%	35.2%	2.4% Shrinkage	mammut.ch

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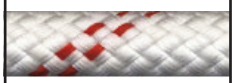
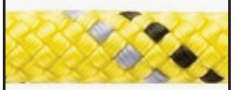
	LSK	MARLOW		£1.25	10.5 27/64	Static Type A	CE EN 1891	Nylon	16	■	■	■
	Monster Static	METOLIUS		$2.42	10	Static	UIAA CE	Nylon	40	■	■	■
	Canyon Triaxiale	MILLET		€2.45	10.9	Static	UIAA CE	Nylon/ Polypropylene	32			
	Parallel	PETZL		£1.54 €1.76	10.5 27/64	Type A	CE, EN 1891	Nylon	n/a	■	■	■
	Talon	PMI		$2.86	10 25/64	Static Class L	CE, CI1801, NFPA 1983	Nylon sheath Polyester core	16		■	■
	Classic Pro/ Max Wear	PMI		$3.18	10 25/64	Static Class L	CE, CI1801, NFPA 1983	Nylon	16		■	■
	Retro	PMI		$5.15	10 25/64	Static Class L	NFPA 1983	Nylon	16		■	■
	Classic Sport/ Max Wear	PMI		$2.64	10 25/64	Static	CI1801	Nylon	16		■	■
	Passage	PMI		$3.48	10 25/64	Static	CI1801	Nylon	16			
	Route 44	SINGING ROCK		$3.10 €1.98	10.5 27/64	Static Type A Class L	UIAA CE EN 1891 NFPA_1983	Nylon	44	■	■	
	Super Static	SKYLOTEC		€2.00	10.5	Static Type A	CE EN 1891	Nylon	32	■	■	
	Safety Pro	STERLING ROPE		$4.90	10	Static Type A Class L	CE EN 18911 NFPA_1983,	Nylon	n/a	■	■	
	Safety Pro	STERLING ROPE		$2.86	10.5 27/64	Static Type A	CE EN 1891	Nylon	n/a	■	■	
	Static 10/ Military 10/ Pro Work 10	TENDON		€1.98 £1.29 A$3.50	10	Static type A	CE EN 1891 UIAA	Nylon	40	■	■	
	Static 10.5/ Military 10.5/ Pro Work 10.5	TENDON		£1.45 €2.20	10.5 27/64	Static type A	CE EN 1891 NFPA-L UIAA	Nylon	48	■	■	
	Speleo 10	TENDON		£1.29	10	Static type A	CE EN 1891 UIAA	Nylon	32			■

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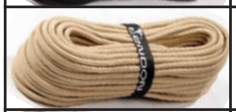
SES	Tactical	Water	Canyoning	MBL	Knotted BL	F1 Falls	Wt g/metre lbs/100ft	Colours	Static Elongation %	Sheath mass	NOTES	WWW.
			■	33.4kN 7340 lbf	19.5 kN 4188 lbf	>10	67.2g	White/red, White/black, Black	2%	n/a	Optional Dry-coat	marlowropes.com
			■	30 kN 6613 lbf	n/a	30	67g	White/black, Black/gold	3.8%	39%		metoliusclimbing.com
			■	22.3 kN 4900 lbf	n/a	>5	73g	Orange	2.8%	n/a	Centre rope marking	millet.fr
			■	27kN 6070 lbf	15 kN 3306 lbf	16	65g	White/ylw/black Yellow/white/blk Black	3%	38%		petzl.fr
	■			22.6 kN 5000 lbf	n/a	n/a	64g	Blue/grey/yellow	1.2@1.35kN/300 lbf 2.0@2.70kN/600 lbf 2.8@4.40kN/1000 lbf	42.4%		pmirope.com
	■			27.5 kN 6070 lbf	n/a	n/a	66g	Multiple	1.8@1.35kN/300 lbf 3.0@2.70kN/600 lbf 5.2@4.40kN/1000 lbf	43.8%	MaxWear elongation= 2.1@1.35kN/300 lbf 3.7@2.70kN/600 lbf 6.3@4.40kN/1000 lbf	pmirope.com
				26.6 kN 5845 lbf	n/a	n/a	66g	Orange/Blue/ Retro	1.5@1.35kN/300 lbf 3.1@2.70kN/600 lbf 6.3@4.40kN/1000 lbf	43.8%		pmirope.com
				27.5 kN 6070 lbf	n/a	n/a	66g	White/red/black	2.5@1.35kN/300 lbf 4.9@2.70kN/600 lbf 7.3@4.40kN/1000 lbf	43.8%	Max Wear Elongation= 2.1@1.35kN/300 lbf 3.7@2.70kN/600 lbf 6.3@4.40kN/1000 lbf	pmirope.com
		■	■	27.5 kN 6070 lbf	n/a	n/a	66g	Red/yellow	1.8@1.35kN/300 lbf 3.1@2.70kN/600 lbf 6.3@4.40kN/1000 lbf	43.8%		pmirope.com
	■			35.8 kN 7892 lbf	22.3 kN 4916 lbf	15	72g	White/red Red Black Khaki	3.4%	35.9%	1.1% shrinkage	singingrock.com
				31 kN 6834 lbf	19.5 kN 4299 lbf	18	71g	White/orange/blk	4.4%	37%		skylotec.de
	■			25.8 kN 5687 lbf	19.1 kN 4210 lbf	>5	62.5g	Blue, Black, Red, Yellow, White	3.2%	40.3%	0.3% sheath slippage 2.9% shrinkage	sterlingrope.com
	■			27.2 kN 5996 lbf	18.8 kN 4144 lbf	>5	70.4g	Blue, Black, Red, Yellow, White	3.5%	46.6%	0.8% sheath slippage 2.5% shrinkage	sterlingrope.com
	■			34 kN 7495 lbf	17 kN 3747 lbf	30	69g	White, Khaki Black, Camo, Red, Blue	3.4%	39%		mytendon.com
	■			38 kN 8377 lbf	18 kN 3968 lbs	40	72g	White, Khaki Black, Camo, Red, Blue	3.4%	36%		mytendon.com
				33 kN 7275 lbf	16 kN 3527 lbf	20	66g	White	3.5%	42%		mytendon.com

acteristics **COST:** Approx SRP/RRP mostly inclusive of local tax. Coloured options may be more expensive

Images NOT to scale	MODEL	COMPANY	ORIGIN	COST /metre	Ø	Type	Standards	Materials	Carrier	Access	Rescue	US Caving
	Speleo 10.5	TENDON		£1.45	10.5 27/64	Static type A	CE EN 1891 UIAA	Nylon	40	■	■	■
	Speleo Special 10.5	TENDON		£1.54	10.5 27/64	Static type A	CE EN 1891 UIAA	Nylon core PES sheath	40	■	■	■
	Canyon Grande	TENDON		£0.87	10	Static	CE	Polyprop core Nylon sheath	40			
	Canyon Wet	TENDON		£1.05 A$3.65	10	Static type A	CE EN 1891 UIAA	Nylon	40			
	Force	TENDON		£2.84	10	Static	CE	Nylon + stainless steel	32			
	Aramid	TENDON		£5.45	10	Static	CE NFPA - L	Aramid sheath Nylon core	32			
	Salamander	TENDON		£1.23	10.2	Static	CE	Polyprop core Nylon sheath	40			
	Contra	TENDON		£0.84	10.5 27/64	Static type A	CE EN 1891 UIAA	Nylon	40	■		
	Platinum Protect PA	TEUFELBERGER		€4.49	10.5 27/64	Semi-Static type A	CE EN 1891A:1998	Nylon	32	■	■	■
	Platinum Protect PES	TEUFELBERGER		£4.15 €4.29	10.5 27/64	Semi-Static type A	CE EN 1891A:1999	Polyester Sheath Nylon Core	32	■	■	■
	Patron	TEUFELBERGER		€1.49	10	Semi-Static type A	CE EN 1891A:2001	Nylon	32	■	■	
	Patron	TEUFELBERGER		€1.69	10.5	Semi-Static type A	CE EN 1891A:2002	Nylon	32	■	■	
	Patron Plus	TEUFELBERGER		€1.59	10	Semi-Static type A	CE EN 1891A:2004	Nylon	32	■	■	■
	Patron Plus	TEUFELBERGER		€1.89	10.5	Semi-Static type A	CE EN 1891A:2005	Nylon	32	■	■	■
	Static 10.2	XIAMEN-ANPEN		n/a	10.2	Static	n/a	Nylon	32	■	■	
	Static 10.5	XIAMEN-ANPEN		n/a	10.5	Static	CE EN 1981	Nylon	32	■	■	

NOTES: ORIGIN = Company selling the product, not necessarily the country of manufacture TYPE: manufacturer's own definition of rope chara

SES	Tactical	Water	Canyoning	MBL	Knotted BL	F1 Falls	Wt g/metre lbs/100ft	Colours	Static Elongation %	Sheath mass	NOTES	WWW.
				34 kN 7495 lbf	17 kN 3747 lbf	18	72g	White	3.4%	46%		mytendon.com
		■		33 kN 7275 lbf	15 kN 3306 lbf	12	76g	White	3.5%	51%		mytendon.com
		■	■	19 kN 4188 lbf	12 kN 2645 lbf	n/a	61g	Yellow	3.2%	49%	Floating	mytendon.com
			■	22 kN 4850 lbf	17 kN 3747 lbf	12	66g	Orange	2.1%	33%		mytendon.com
	■			24 kN 5291 lbf	13 kN 2866 lbf	n/a	68g	Black	2%	40%	Increased cut resistance - patented	mytendon.com
	■			35 kN 7716 lbf	15 kN 3306 lbf	10	66g	Natural, Black	n/a	50%	Increased cut resistance	mytendon.com
		■	■	26 kN 5732 lbf	12 kN 2645 lbf	n/a	60g	Yellow	2.6%	47%	Patented 4-layer safety construction, Floating rope	mytendon.com
				30 kN 6613 lbf	18 kN 3968 lbs	20	69g	White	3.49%	36%		mytendon.com
	■			28 kN 6173 lbf	18 kN 3968 lbs	>5	72g	Blue/grey/white	4.3%	46%	Sheath integrated into core preventing slippage	teufelberger.com
	■			28 kN 6173 lbf	15 kN 3306 lbf	>5	78g	Green/grey/white	2.9%%	50%	Sheath integrated into core preventing slippage Abrasion resistant	teufelberger.com
	■			27kN 6070 lbs	16 kN 3590 lbs	>5	66g 4.44 lbs	White/blue	4%	37%		teufelberger.com
	■			32 kN 7190 lbs	18 kN 3968 lbs	>5	72g 4.84 lbs	White/blue/red	3.5%	37%		teufelberger.com
	■			27kN 6070 lbs	16 kN 3590 lbs	>5	66g 4.44 lbs	White/yellow, White/black, Black/white, White/blue	4%	37%	More robust and abrasion resistant model. Good for winches	teufelberger.com
	■			32 kN 7190 lbs	18 kN 3968 lbs	>5	72g 4.84 lbs	White/yellow, White/black, Black/white, White/blue	3.5%	37%	More robust and abrasion resistant model. Good for winches	teufelberger.com
	■			23 kN 5070 lbf	n/a	n/a	75g	White/green/black Black, Red,	n/a	n/a		anpen.net
	■			25 kN 5511 lbf	n/a	n/a	77g	White/green/black Black, Red,	4.12%	39%	1% shrinkage	anpen.net

acteristics **COST:** Approx SRP/RRP mostly inclusive of local tax. Coloured options may be more expensive

Contunued from page 54

a predominantly white rope. Also, in case you think we've missed some obvious ropes, the Edelrid *Safety Super II* has replaced the ubiquitous *Superstatic*. The Edelrid *Basic,* Courant *Mix* and Cousin *Equipole* have also gone but all these ropes may still be found while retailers' stocks last .

This article concentrates on 10mm to 10.9mm diameters as strong but lighter weight ropes requiring much greater handling skills because the thinner rope may run faster through devices and is harder to grasp. These ropes are aimed more for wilderness use so to discuss the unique requirements of mountain and cave rescue as compared to urban and industrial rescue I asked PRm Editor Lee Lang a National Park Ranger who is on the NASAR board and a veteran member of Larimer Search & Rescue...

ADE: In relation to using a 10mm over an 11mm rope, why do you care about shaving a pound off the weight of your pack?

LEE: Wilderness/Mountain SAR typically requires that the rescuers manually move the equipment long distances to the scene of the rescue. Apart from the rescue equipment each rescuer needs to bring sufficient gear for environmental risks (snow, rain, wind) and extended stays on scene, possibly overnight and an extra pound of rope weight is a pound of food or clothing not carried. The terrain tends to be difficult to move through, and is frequently an uphill slog so that pack weight becomes exponentially a big issue as fatigue sets in. This not only slows the rescuers but it can result in possible rescuer injury diverting rescue team resources away from the original casualty. A backcountry evacuation can last for 24 hrs start to finish... during that time the rescuers are expected to perform for the entire duration... so imagine a 6 hr approach with gear, a 4 hr rescue of the injured person and then a 10 hr extraction from the backcountry - during which you are moving yourself, your gear, and an injured person on a wheeled litter through rocky rough terrain. To the mountain/wilderness person EVERY pound truly counts..

ADE : What kind of compromises does this mean in terms of two person rescue?

LEE: Typically, gear is selected that is multi-purpose.. for example prusiks can do all types of things beyond a emergency belay on the rescue line as compared to a Petzl ID and they are a fraction of the weight. Wilderness rescue folk typically are not as heavy as the firefighter types so the rescue loads are adjusted downward in total weight. Wilderness rescue folk also tend to use a 10:1 rather than the firefighter's 15:1 safety factor. So a 2 person load (subject and attendant) defaults to 20 kN and the weakest portion of the rescue system should be greater than 20 kN. We all like simple math, so we say a knot reduces a ropes strength by 1/3 so a 30 kN rope with a knot has a breaking strength of 20 kN. in real life commonly used knots are stronger so a 27 kN rope would still be over 20 kN which is why I use 27kN as my guide to 2-person capability.

ADE: Do you look for other benefits to offset the smaller diameters like dry treatment or increased sheath percentage?

LEE: Dry treatment can be important helping shed water and therefore weight and to maintain strength while working in a wet environment (snow or rain). This and sheath percentage affects how easy the rope handles, makes and breaks knots and how smoothly it runs through braking devices but a big one is resistance to an abrasive environment or sharp edges which are improved by both dry treatment and sheath %.

ADE: What safety margins are you looking for in MR and why are NFPA L & G so inappropriate for wilderness rescue or are they, in fact, relevant?

LEE: As mentioned earlier we use a 10:1 static safety factor. It is assumed that the rescuer, subject, and gear weighs ~440 pounds (2 kN). In fire they assume that the rescuer, subject, and gear goes at 3 kN.This assumption is most likely based on the concept that the rescuer and subject tend to be more fit and lighter based on the environment as compared to the avg person. Again a big issue is weight and equipment limitations... remember mountain rescue was born out of climbing so a fundamental bases for equipment is climbing equipment. The original equipment available was the climbing equipment itself... the mountain rescuer faced with climbing to an injured subject could require carrying 20 carabiners plus other climbing gear, suddenly carrying 20 steel "rescue biners" plus the other gear is no longer reasonable.

ADE: Do you look for different rope characteristics depending on the type of job you're likely to encounter eg.using HTP or high tenacity polyester/ultra low stretch for highlines or hauling or do you have such weight restrictions that one type of rope pretty much has to do everything?

LEE: This is increasingly coming into play in the mountain rescue world. Only recently have teams had the ability to go beyond the "PMI Classic" to have a selection of ropes that meet the criteria that they face. For example my team put into service one of the new Bluewater polyester/ nylon ropes which is supposed to have better durability simply because we trash 400-600 feet of rope a year through operational damage (nicks, cuts, soft spots).

ADE: What would be a typical amount of rope you'd take as an entire team for a known high angle risk?

LEE: Ah, this is an ever evolving question... in PRm1's Crestone Incident Report the teams brought something like 1200 feet of rope up and over a 14'000er... the IC now admits he would never do that again.. and would lean more towards an alpine style (which I am a advocate of). So on that note a typical team would have as minimum (if it were a serious rescue) 2 x 300 ft, 2 x 150 ft, and maybe 1-2 x 75 ft ropes on scene. If the lower is longer than 300 ft then add in 2x either 150s or 300 ft sections.

Also worthy of noting. is that in mountain rescue there is a need for lead climbing rescue using a dynamic rather than the ubiquitous rappel rope - no lead rope is actually certified as "rescue rated" although we are now seeing CE-certified dual-purpose ropes that act as a static rope for normal rappel and lowering but should the rescuer fall has a shock-absorber style break-thread that converts the rope to a dynamic to absorb your impact. We'll look at these in more detaill in the Dynamic Rope Guide after next issue's 11mm Static Rope Guide. Smaller diameter cords (prusik cord) will also be covered in separate PRm Rope Guides. PR

safariland SAVVY SM01F II FEMALE BODY ARMOR

by Michelle Schonziet

Keeping it close to the vest…

Selecting body armor is a big decision. Chances are you will be wearing this vest more than anything else you own for the next 5 years. And if you are wearing this body armor for a position such as a Park Ranger, chances are really good that you'll be doing a lot more in it than sitting in a patrol vehicle.

I received my SAVVY Model SM01F II vest in April of 2012. I've had a chance to wear it for about 6 months. In those 6 months it has gone hiking, on rescues, on boat patrols, gotten absolutely drenched and been standing (concealed) out in the sun. It has been sweated in, frozen in and everything in between.

What I cannot say about testing this vest is that it was shot at… I'll leave the ballistics testing up to Safariland.

What originally drew me to the SAVVY line of concealable body armor was that it is truly designed to fit women. It isn't a men's vest with a kind-of-tailor-to-fit-a-girl version. This has more meaning than just how the vest fits. By being specifically designed for a woman, the vest is designed to provide better coverage over the chest, where many male versions lack side coverage. It also has a special pleating design that keeps the bulk to a minimum on the sides of the vest, where the panels that make up the front overlap. This pleating makes the sides much more comfortable than a male's vest with lots of overlap.

In my 6 months of use of the SAVVY level II Concealable Body Armor, overall I'm impressed. The Velcro is certainly the best on any vest I have owned or used. The panels where the straps connect offer lots of options for how the fit of the vest can be adjusted. The elastic bands also seem especially resistant to stretching out. I'm sure many have experienced the phenomenon of the elastic becoming worn out to the point that it takes the shape of cooked bacon strips. However, I did manage to damage an elastic thread in the strap. I think this was likely caused by rubbing from wearing a backpack. The vest also picked up slight fraying to the elastic strap and carrier where it wears under my arms. While this wear seems a bit early to me in the carrier's life, I would have little doubt that the carrier would, in fact, hold up for the life of the vest. Of course, ordering a second spare carrier is worth its weight in gold.

The carrier has a Gore-Tex® outer panel covering with heat sealed edges, as well an interior liner that is designed to be anti-microbial. I am not sure that the Gore-Tex® has any applicable function. A vest by its very nature doesn't allow breathability. A better wicking liner would be a more applicable use of technical fabrics. It does seem to clean well and doesn't seem to retain odors or stains. The lining doesn't provide any great wicking potential, not that any other vests I've come across do.

The vest seems a bit heavy and stiff compared to other level II vests I have owned and worn. I attribute a lot of this increased weight and stiffness to the newer, more stringent NIJ Testing and Compliance Standard 0101.06.In fact, it isn't a lot lighter than the IIIA I have. Just among Safariland's SAVVY line the difference in weight between a level II and IIIa vest is only 1.79 lbs. While 1.79 lbs seems like a lot when you start thinking of backcountry use, that

SPECIFICATIONS:

Manufacturer:	Safariland	
Model:	Savvy SM01F II (womans)	
Origin:	USA	
Cost:	$	
Colours:	Black/Grey	
Thickness:	0.308 inches/7.82 mm	
Weight:	5.66 lbs/2.57 kg	
Construction:	Perimeter stitching with Radial Offset Pleating	
Materials:	Twaron® Core Matrix Technology, Gold Shield®	
Panel Covering:	Gore-Tex® fabric with Heat Sealed Edges	
Panel Suspension:	Grip-Lok™ Suspension System	
NIJ:	NIJ Standard-0101.06	
NIJ Test Rounds:	9mm (lighter threat), .357 Mag (heavier threat)	
V50:*	.357 Mag	1724 fps
V50:	9mm	1770 fps
Warranty:	5 years	
Website:	www.safariland.com	

*V50- A statistical test originally developed by the US Army that identifies the velocity at which a projectile has a 50% chance of penetrating an armor panel

is only equivalent to about the weight of a portable radio. What I can say, is that for that extra bit of weight and stiffness, this level II armor will stop a lot more than the earlier II and IIIa vests I owned.

I asked a few coworkers about their body armor choices and found two that absolutely hated the SAVVY line of concealable armor. When I asked about what they disliked about the product, it wasn't that they had issues with how it was made or held up, it was that they didn't like the fit. This led me to realize that sizing is the most critical element of purchasing body armor. I had this vest measured professionally. The two Rangers I spoke with who were unhappy with the fit of their SAVVY vests had used the self measurement charts. The problem with the do-it-yourself measuring is you don't necessarily end up with the best coverage or the best fit. Comfort is important to a certain degree - Wearing a vest for 5 years that has a spot that rubs or pinches is a nightmare. The key with having a vest that fits is that you are far more likely not to take it off. Even when policy dictates wearing body armor is mandatory, many give the option for taking vests off in prolonged backcountry use. Having a vest that fits comfortably might make its owner a bit more likely to wear the vest in these optional circumstances. Just keep in mind that your vest's very important job is not comfort, and very few people plan to be involved in a shooting.

My best recommendation on sizing is even if you live in the middle of nowhere, it is worth your time and effort to find a professional to measure you for your body armor. I think this is especially critical for women since our sizing is a bit more complicated than it is for males. Remember, you will be wearing this every day for the next 5 years.

My overall recommendation for this SAVVY Level II Concealable Body Armor is a thumbs up. Be safe and remember that body armor can only do its job if you are wearing it!

Disclaimer: The above review represents the personal opinion of the writer and does not in any way suggest an endorsement or recommendation of the writer's employer, the National Park Service, or any of the writer's affiliations. PR

SAR DOGS

K-9 102 for Search Management

by Charles E.(Chuck) Melvin

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K-9 101 for Search Management was published in the Technical Rescue magazine, issue 60, and served as a basis for a presentation at the National Association for Search and Rescue conference in Sparks, NV in 2011. The article is available at www.k9team.org under suggested readings. This article is based on that foundation and specifically addresses issues and comments presented over the last year by search managers.

Search Incident Commanders have many tools available to them to use in the management of a missing person incident. One of those tools is the Incident Command System (ICS) originally developed for wild land fire and later adopted for SAR, Hazardous materials incidents, multi-agency response, etc. The system provides for a common terminology and defines a span of control not to exceed seven responders per leader/management level. More information is available at www.osha.gov/SLTC/etools/ics/what_is_ics.html Another tool available to the Search Incident Commander is a properly selected & trained search dog. Correctly chosen and deployed, a dog team can be a tremendous resource, both from the standpoint of successfully concluding a mission and from a public relations standpoint. On the other hand, a poorly trained dog/handler or worse yet, a fraudulent handler, or an incorrectly selected, deployed dog can be a liability as witnessed in some of the literature. A number of posts on the K9 Forensics and the K-9 SAR lists have alluded to improperly and incorrectly represented search and rescue canines. An excellent reference documenting such abuse is Gerritsen, R & R. Haak's K9 Fraud! published by Detselig Enterprises, LTD., Calgary, Alberta, Canada in 2010. Gerritsen and Haak refer to both law enforcement and civilian misrepresentation of human scent detection dogs worldwide.

One area of question among Incident Commanders is the large area vs. small area air scent dogs. Unfortunately, there is no clear definition for these terms. Within this author's training and experience, a **large area air scent dog** tends to work wide grids across several acres (hectares) searching for larger quantities of human scent. The width of the grid is determined by the handler based on the training &

experience of the dog, terrain search urgency, and environmental conditions, especially wind, and microclimates within the area. Depending on the region of the USA, these sectors may be as small as 5 acres or up to 640 acre in some cases. All variables being equal, the wider the grid, the more area searched, but the Probability of Detection will be decreased. A large area team can cover extensive sectors fairly quickly, depending on terrain and physical conditioning of the dog and handler. Larger sectors tend to be assigned in areas of open to fairly open plant cover, less severe terrain, more consistent wind & relative humidity and to physically fit teams.

A **small area air scent dog** tends to work very close grids, sometimes on a long line, and is working toward a high probability of detection within a comparatively small space. Small area dogs may be useful in finding small pools of scent associated with evidence or articles, small pieces of human remains, etc. if trained for those specialties. Small area canines are also useful tools for working in the scent pools reported by large area or trailing dogs when that dog is unable to pinpoint the source of odor. Small area dogs may be handled by a person with less physical ability, but if that ability is accurately represented, that dog team may be invaluable in regions of high Probability of Area and unresolved scent pools to raise the Cumulative Probability of Detection. Some air scent dogs will do both large and small areas but must have the training and conditioning to do so effectively.

Another area of question among Incident Commanders seems to be the trailing dog resource vs. the area dog resource. Trailing dogs are best deployed when there is a valid Last Known Point as an Initial Planning Point, although many trailing dogs can pick up a trail outside that point using a valid scent article, correctly collected and preserved, if trained to do so. Generally, **trailing canines** work on lead and are presented with a scent article, asked to determine a direction of travel, and to follow that trail to the missing subject. This resource is best deployed as soon as possible to decrease contamination of the LKP and the surrounding area, since they likely utilize a variety of residual scent sources. A trailing dog that successfully determines a subject's direction of travel allows the IC to focus other resources more efficiently since the theoretical area is significantly decreased. Trailing canine teams can be deployed concurrently with man-tracking teams very effectively and efficiently, provided the teams have trained together and know what to expect from one

another. The combination of these two resources greatly increases the probability of accurately determining the subject's direction of travel.

There is considerable controversy in the literature currently over how extensive a time frame can exist between scent deposition and deployment of a trailing dog to reliably expect them to accomplish their task. At least one court case in Colorado rests on this very question. SWGDOG. org defines "Aged trail: A trail that has been present for some period of time. One leading trailing handler/trainer with years of law enforcement canine handling in the USA questions a trailing dog's ability to reliably and consistently follow a trail over 12 hours old, but volunteer SAR handlers claim success with weeks or months old trails. Reviews of some of the certification standards within the USA seem to expect a successful trail in the 24 hour range. In many cases, the certification process for trailing dogs is not a double blind exercise which allows the handler to cue the dog and is it not correctly designed to eliminate an air scent solution. The air scent solution in the real world of search is moot; the subject is found. For a trailing evaluation, however, an air scent solution is invalid in that it should be outside the scope of a trailing test. Controversy aside, the more quickly a trailing dog resource can be deployed; the more successful they will be due to less contamination requiring resolution. Incident Commanders need to be concerned about excessive claims from the handlers, both in age of track and length of track previously successfully completed.

Area search dogs utilize air scent to find the subject and generally work off lead. The dog may be scent specific, meaning that the dog will use a correctly collected and preserved scent article to search for that specific subject only. The scent specific area dog may function as non-specific if no scent article is available. These teams are trained to find any human scent in the assigned area, which could include the rubble of an urban search. Specialties within area search include avalanche, human remains, cadaster, urban, etc. Area search dogs are best deployed as soon as possible also, especially as hasty searchers, but they can be a valid resource in later operational periods to raise the Cumulative Probability of Detection in areas searched with other resources, clear areas of difficult terrain, and to search areas of questionable Probability of Detection. Again, Incident Commanders need to be concerned with unsubstantiated coverage claims and excessively high Probability of Detections. An IC is certainly justified in asking for GPS tracks to be downloaded and mapped for verification of area covered. Some teams will be able to provide GPS data from both the dog & the handler.

Proper debriefing of canine teams can be complex. Incident Commanders should spend additional time with these teams and expect very specific detail oriented information from these teams. Using the ICS forms as a guide to address this issue, the IC can expect a handler to articulate exactly what they did during the deployment, including GPS data, and if the assignment was completed. If it was not completed, why was it not finished? The handler or assistant should have previously radioed in any clues found, including scent, along with the location in the correct format and datum defined by the IC, and perhaps reliability of clue. The handler should be able to describe in detail the microclimate at any scent clues found. The handler should be able to give an accurate Probability of Detection. If the Plans Section defined that Probability of Detection as part of the Incident Action Plan, did the handler achieve that level? If it was not achieved, why was it not? The handler should be able to give the location and description of any hazards to either dog or human observed. Lastly, the handler should be able to offer recommendations for future searches in the area, assuming the subject wasn't found. As the IC team listens to the debriefing session, the same level of skepticism should be applied to canine teams as any other reporting team. If the analysis of the canine team performance seems unreasonable, it probably is. Dogs are a tool; they are not magic, contrary to what some handlers will unfortunately portray.

Search & rescue dogs and their deployment is a complex topic within the canine world and must seem unbelievably complicated to an IC trying to utalize the best possible resource during a mission. An overburdened ICS staff could well profit from the recruitment of a canine strike team leader before the mission from within the SAR dog community. That individual can then provide invaluable insight for the ICS staff regarding the available canine resources. The selection of the strike team leader would require careful vetting to avoid the inherent politics of the SAR dog world, unfortunately.

Acknowledgements: Mr. Lee Lang for his editorial patience and support! Ms. Kimberly Kelly for her continual encouragement, support, being a team mate on two teams, and for being a best friend. And, last but not least, to the canines and K-9'ers that have had unbelievable patience with my ignorance and mistakes over the past 28 years!

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