

# NYLON HIGHWAY NO. 25



... ESPECIALLY FOR THE VERTICAL CAVER

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# NYLON HIGHWAY NO. 25

## JANUARY 1988

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**COVER** The Vertical Section's new logo as designed by Pandora Williams.

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# AGING ROPE

## STUDY ON ROPE AGING

By Bruce Smith

In the summer of 1986 at the annual convention an hypothesis was presented that suggested that nylon and their associated ropes got weaker with age. It is a concern because a large group of vertical types have purchased long ropes for that special long drop and then stored them away in hopes that another similar expedition will arise. Often the need for that rope goes unchallenged for years. Unwillingly to cut it up and use it now the condition of those stored ropes were the primary concern of this study.

Ropes were solicited from all over the world along with their histories. Over 100 rope samples were obtained.

### ROPE CATEGORIES

The rope's histories varied so dramatically that a decision was made to lump each type of rope into three categories, 1. like new or new, 2. used and 3. abused. The ropes were labeled (both ends) by sample number and transported to the testing area at Pigeon Mountain Industries. For comparison purposes the only ropes tested were 7/16" and 11 mm varieties.

Where the rope sample was actually taken from (center or used part of the rope or at the ends, the unused part of the rope) becomes another key variable. It is supposed that almost all samples were taken from the end of each rope. For many ropes the rappels, ascents and loadings are not experienced at each end. This, then, for the most part would tell a story about rope care and storage rather than numbers of climbs, rappels and shock loads. If there was a choice as to where to break a piece, it would be done at what appeared to be the strongest, healthiest in appearance part of the rope.

### THE TESTING

Each piece was wrapped in a standard manner (Federal Test Standard 191A, Method 6016) onto the pull barrels of a Dillon dymometer and pulled till destruction. After only a few hours it became easy to predict the destruction point based on the history and condition of each rope. The pull distance on the dymometer was only 30" and stretchy ropes became troublesome to break if not impossible. Goldline fell into that category. Not one piece of Goldline would break before the outer limits of the machine were reached. One piece of goldline made it to 4200 lbs. with no apparent signs of destruction.

The results were recorded and special notes taken as to the manner in which the ropes failed (i.e. with a loud snap, a thud, multiple snaps, core failure before sheath, explosively etc.). The manner in which a piece of rope broke was reflective upon the type of rope construction, care and cleanliness of the core, and the care and consistency of construction.

As one would hope a straight curve with all the breaking points lined up on the sheet of graph paper did not happen. Instead an large area was defined across the graph paper that explain the limits of rope failure having been treated in some manner. The varied histories became one of the key elements that help explain rope life and failure. After a graph space was defined a representative curve was superimposed through the area representing averages. From the averages a deterioration rate was determined (Chart #1). Manufacturers and catalogs were consulted to determine the actual new tensile strength.

## Aging Rope

As each year passed on each graph the range of actual failure increased depending on the care and storage. This plus or minus factor can be mathematically explained on most of the graphs by 1% each year of age. For instance, two ropes of identical life (say 9 years) and supposed identical care could vary as much as  $\pm 9\%$  or as much as 18%.

### RESULTS ROPE AGING

#### CHART #1

Rope Type	Approximate strength loss per year	New Tensile Strength
Blue Water II		6700 lbs.
New	1.8%	
Used	2.75%	
Abused	15.0%	
Blue Water III		6800 lbs.
New	2.1%	
Used	3.9%	
Abused	16.0%	
PMI		6800 lbs.
New	1.5%	
Used	4.4%	
Abused	12.5%	
Samson 2-in-1		6000 lbs.
New	2.5%	
Used	3.5%	
SSP		6770 lbs.
Abused	9.7%	
Dynamic Mammut and Edelrid		4800 to 5800 lbs.
New	1.4%	
Used	2.5%	

CHART #1 Deterioration rates were determined from approximate averages. For example, one could expect a typical piece of used Bluewater II to loose 2.75% of its original strength per year or 27.5% after 10 years.

#### WHAT DOES THIS MEAN?

These results are approximate averages as only one pull could be taken from any one sample. A single sample, once destroyed, could not be retested nor could its history be reduplicated. But in general there are two conclusions that we can conclude.

1. Nylon gets weaker with age. (Not stronger)
2. Care of a rope has a far greater impact on a rope's life than age.

Let's look at a sample and interrupt the above chart. A 15 year old piece of used Blue Water II, 2.75 X 15 = 41.25% loss of strength. 41.25% X 6700 = 2764# loss of strength or there is approximately 3936#  $\pm 15\%$  left of the ropes original tensile or the rope will snap between 2931# and 4941#. Let's take the next step and look at safe working loads. What are your tolerable limits? On the 15 year old previously described, using a 15 to 1 safety factor, a load limit of 262 lbs. would be the maximum allowable.

The determination as to whether a rope has been used or abused becomes a gut call. Abuse activities under this study included, leaving the rope hang in a cave over a season, towing a vehicle, extensive expedition use, and not cleaned in a regular or prescribed manner.

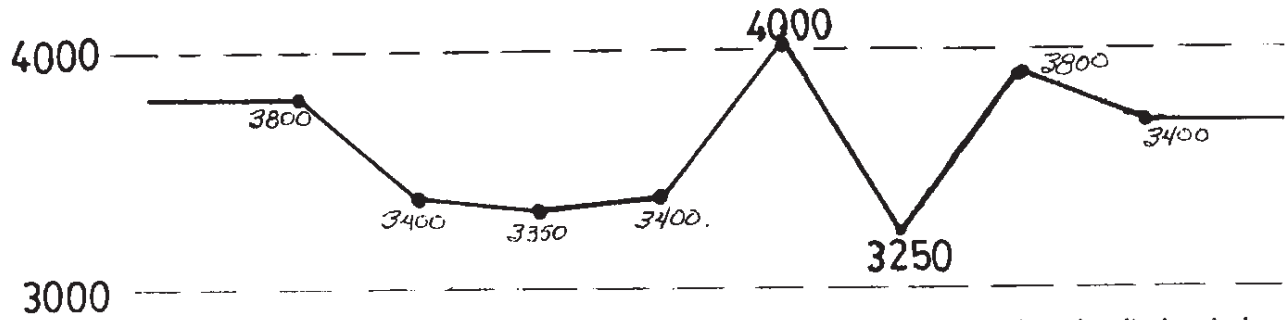
#### OTHER FACTORS

It has always been known that wet nylon rope was weaker than dry nylon. Columbia Cordage claims there may be as high as a 15% loss of strength after a 24 hour soaking in water. Curious as to why, a textile chemist shared with me (doing his best to put it in 4th grade terms) that some of the hydrogen from the water molecules infiltrate and temporarily bond with the nylon polymer chain. This chemically weakens the rope. This weakness disappears when the rope dries.

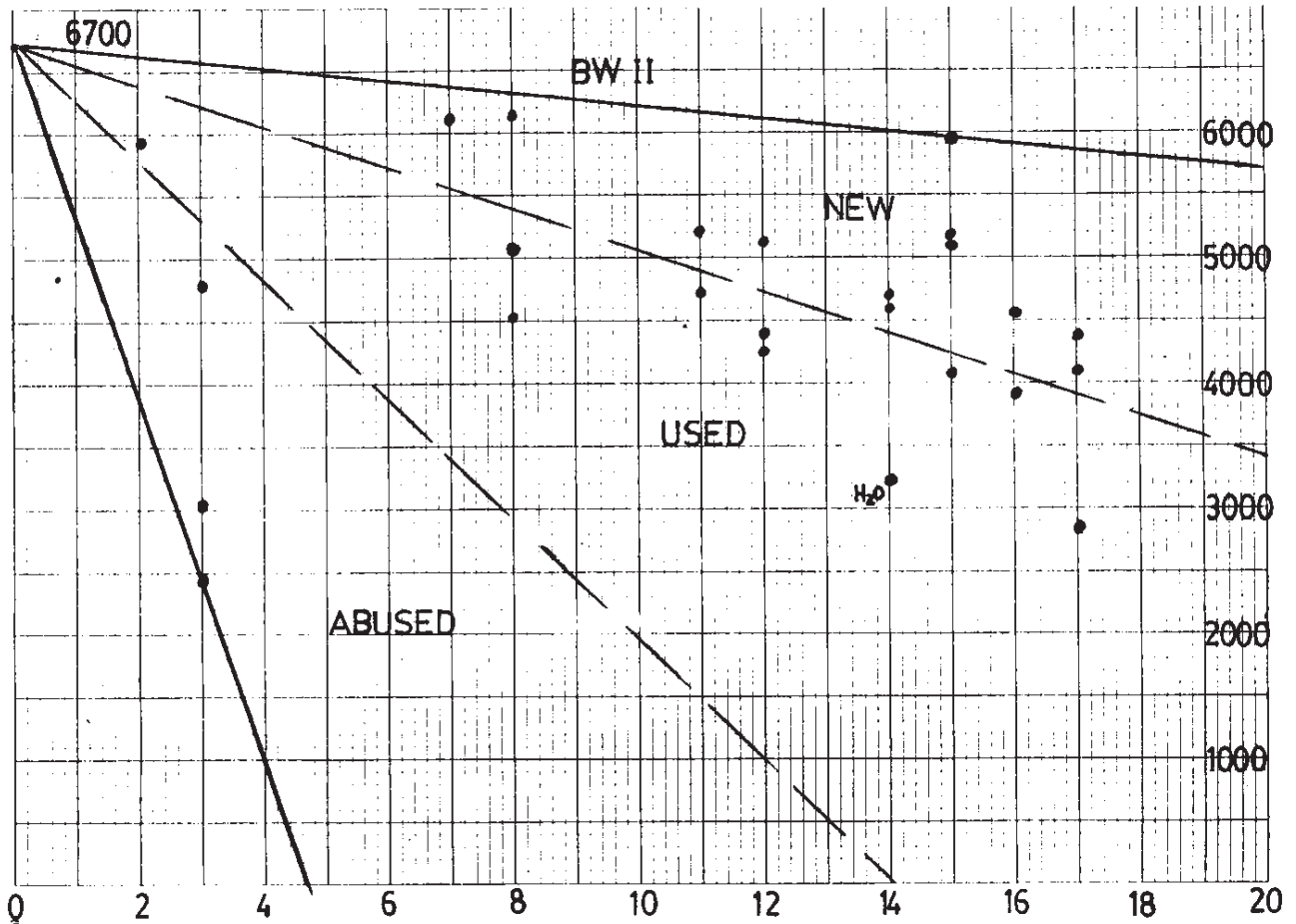
One particular scary result occurred with a piece of rope that had been soaked in a concentrated solution of Downy fabric softener. The seventy foot piece of PMI was broken in 8 places. Chart #2 shows the graph of each test. The internal fibers were not dry rather appeared and felt like cotton. My textile chemist speculated that the Downy held the hydrogen bond in place, permanently weakening the rope and as the tests

Aging Rope

### PMI 8 YEARS OLD



**CHART #2** One 70' piece of PMI soaked in Downy Fabric Softener tested at 8 spots showed radical and alarming degrees of remaining strength. I think it is interesting to note that the strongest and weakest part of the rope were next to each other. This also adds fuel to the argument that one snap of a piece of rope does not a test make.



**CHART #3** Blue Water II showed long life strength as the Deterioration Rate chart bears out. The dot marked H<sub>2</sub>O was a rope that was left hanging in a cave in a water for over a year. The abused 3 year old dot had seen heavy expedition use in Mexico however, showed no outward signs of abrasion or misuse.

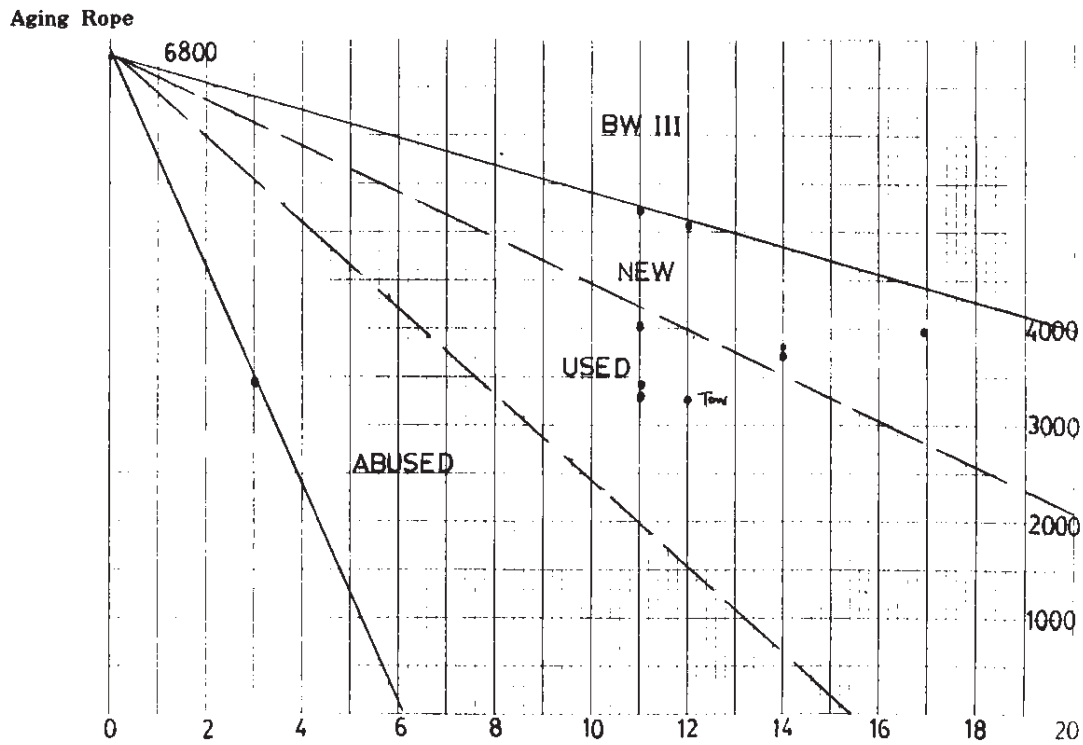


CHART #4 Blue Water III. Many samples were obtained justifying a graph for comparison. The dot marked Tow was a rope used for such purposes.

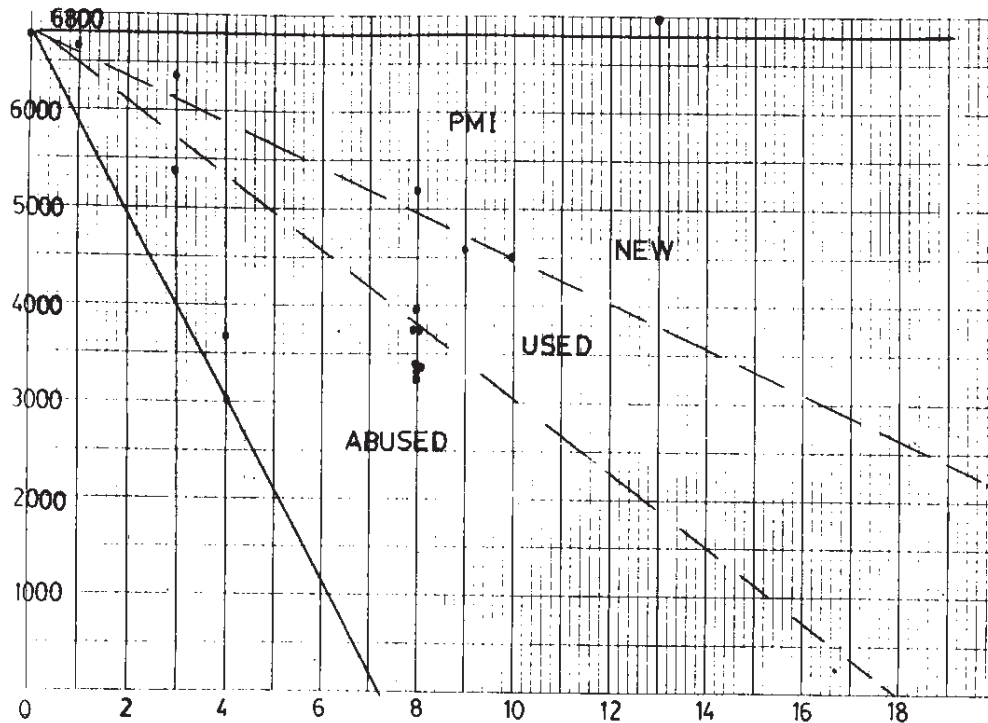


CHART #5 PMI was difficult to obtain as it is the newer of the kernmantle rope companies. The dot at 7000 lbs. was the original rope that was suspended into Golindrin and El Sotono. It has been stored ever since. PMI is a company that publishes only their lowest breaking strength at new. It is quite possible to obtain a new piece of PMI that will test 500 to 1000 lbs. higher than the manufacturer's advertised strength. PMI also explained to me that nylon batches coming from Dupont vary from day to day and can affect the strength of a finished rope. PMI ropes also provide a core runner with the year and quarter of production which provided for accurate assessment of age.

Aging Rope

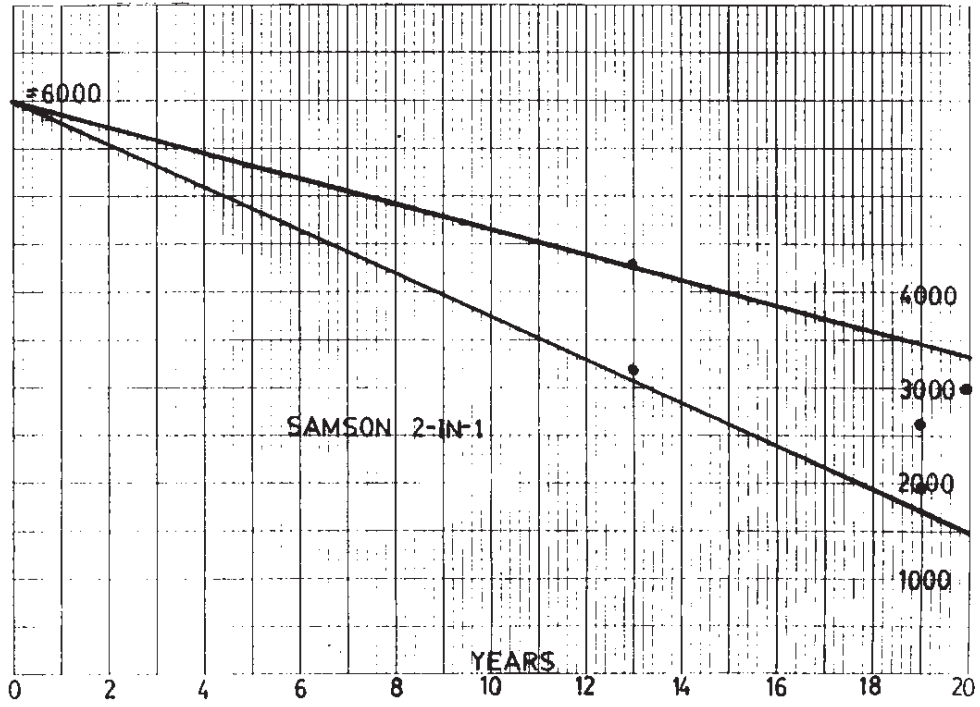


CHART #6 Samson 2-in-1, for those who still may have some around that looks useable, tested as low as 1950 lbs. after 19 years.

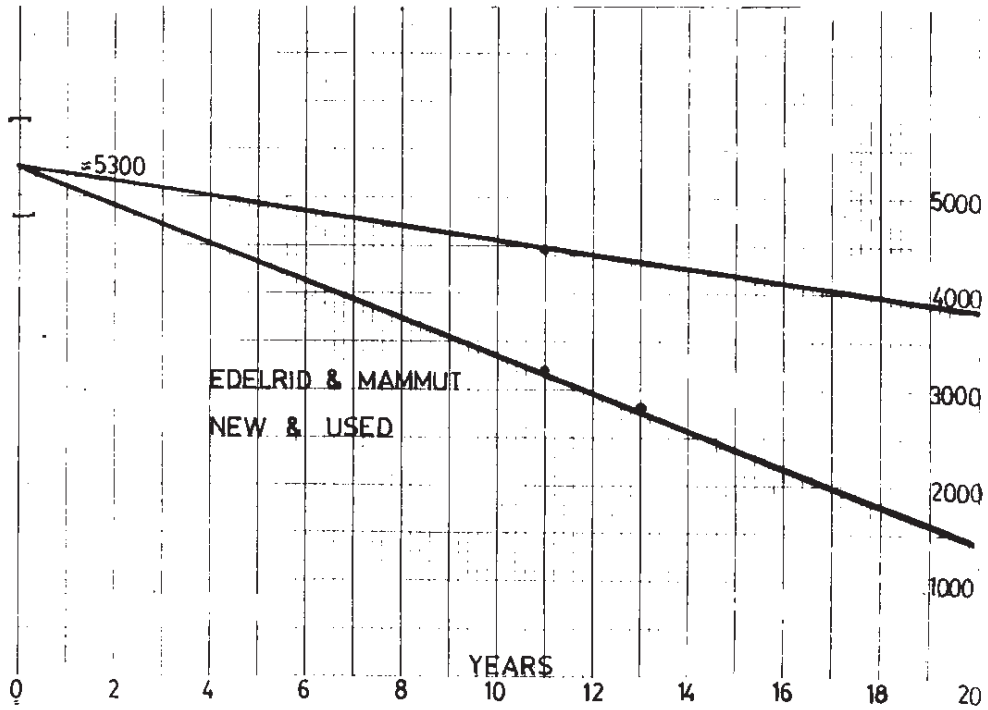


CHART #7 Dynamic rope seemed to perform fairly well, even after 11 years and moderate use.

## **Aging Rope**

bear out, substantially. Other than the Downy soakings, the care of the rope was one of the best. It is evident that soaking rope in Downy is an undesirable thing to do. I consulted with PMI and Columbian Cordage Works and they both highly discouraged the use of artificial fabric softeners in any form and at any strength level. Steve Hudson of PMI later called Dupont and they discouraged soaking their products in concentrated solutions of any kind including water. As to compounds, like Downy, they had not specifically tested their product with this product.

## **ROPE AGING**

The question still arises as to what affect does time have on rope? The best source for this answer came from the "Like New or New" categories of the test results. PMI and Blue Water fared equally with a 1.5% and 1.8% of original tensile lost per year. This means that after 10 years PMI and BW if left relatively unused will loose 15 to 18% of their strength. This does include rope that had been moderately used so true virgin rope results are unavailable at this time. Kyle Isenhardt, Blue Water and rescue equipment dealer, shared with me that the military discards life support nylon products after 10 years or earlier if abuse is evident. If this is applied to our situation, A never used 10 year Blue Water II should tensile about 5500 lbs.  $\pm$ 670 lbs. Most likely, the rope would have seen some use and the "used" aging factors would then come into play. Used rope would need to be discarded at approximately 7 years if the same 10 year "new" margins wish to be maintained.

## **CONCLUSIONS**

Rope gets old. Old rope is weaker than new rope. Care and storage is the strongest factor that influences rope strength, far more than age. A new piece of Blue Water or PMI used once in El

Sotano could probably be safely used again in Goiondrinas 9 years later. Ropes receiving moderate to regular use, properly padded, properly washed, duffed through caves, never shock loaded or walked on could lead a good useful life for 7 years. Your safety factors may be different. You may desire 9mm rope instead, other variables that make this test even more interesting. As this test is somewhat useful the only real way to determine rope age is to buy a large quantity of rope from every supplier, store them all identically and annually have 3 samples of each cut off and tested. While this may prove conclusively the actual age deterioration of a rope, I'm not sure if it would prove anymore than has already been proven. Age and use together are what most of us deal with day after day. I can't think of one climber who buys a rope to store it so it could be used 15 years from now. For me this test told me what I wanted to know.

**NOTE** A special public thank you is in order for Pigeon Mountain Industries and especially to Steve Hudson and Larry Caldwell for the unselfish use of their facility in testing these ropes. Thank you Steve and Larry.

## **NOTICE OF MEETING TO AMEND CONSTITUTION**

The regular Vertical Section meeting at the 1988 NSS Convention will also be a meeting called by the Executive Committee expressly for the purpose of amending the Vertical Section's Constitution. This can be done by a 2/3 favorable vote of those present at such a meeting.

Details of this proposed Constitution change will be published in **Nylon Highway #26**. For further information prior to that publication, please contact the Secretary/Treasurer.



# THE MAR-MEX ESCAPELINE

A COMMERCIALY AVAILABLE SQUEEZE BRAKE

By Bill Bussey

The Mar-Mex Escapeline is the first squeeze brake type rappel device to be offered commercially. It was developed by Juergen Meschke, President of Mar-Mex International Ltd. of Atlanta. The Escapeline is offered as a simple, safe, light-weight descending device for firement, rescue workers, mountain climbers, construction workers, travelers and homeowners for use in primarily emergency situations.

The Escapeline comes in two sizes. One size is for ropes of 3/8" to 7/16" diameter. The other, larger device is for ropes 7/16" to 1/2" diameter. This larger size is recommended for the static ropes used in caving and rescue and is the only device discussed in this report. As of May 1987, the price of the Escapeline is \$73.00.

## DESCRIPTION

Measuring 3" X 3" X 2" excluding control knob and weighing 12 oz. the Escapeline consists of two machined alloy plates connected by an integrated hinge. See figure A. Holes in both plates immediately in front of the hinge allow attachment of a seat harness carabiner. There is another set of holes above these holes which allow for device chaining or other gear attachment. On the left plate is a pin mounted knob, which swings across and over a groove on the right plate. When tightened, this knob closes the two plates together around the rope and provides primary control of descent. On the left side of the left plate there is a notch where the rope is placed. Placement in the notch induces two bends in the rope and allows braking of the descent by pulling on or tensioning the rope below the device; as one can do with a rack.

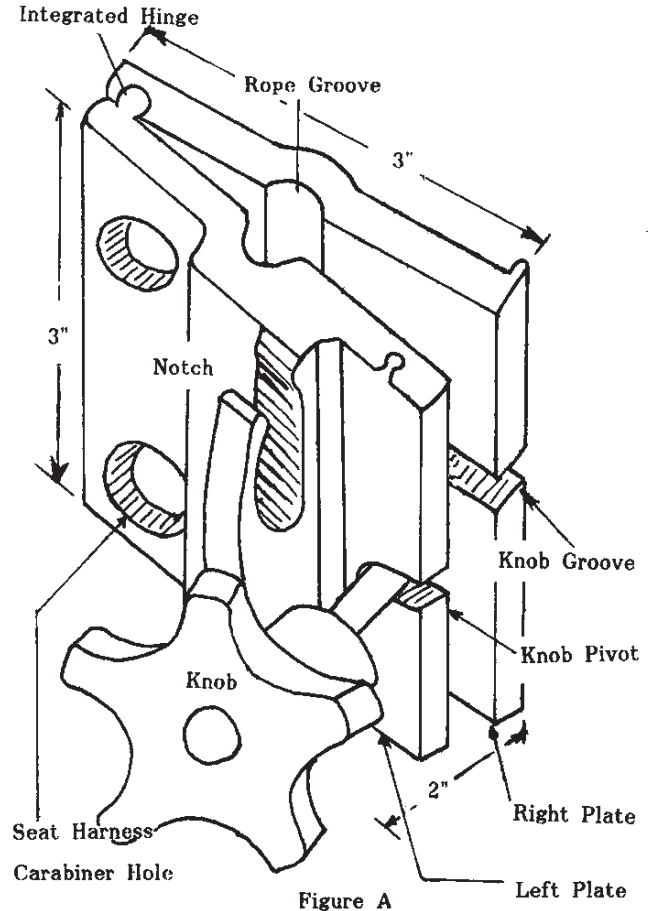


Figure A

## USE

To use the Escapeline one first attaches a locking carabiner to the bottom hole in front of the hinge. This carabiner can now or later be attached to the seat harness. The knob is turned counter clockwise until it stops. Pushing the knob left and to the side will open the device. (Fig. #1) The rope is then placed in the grooved track. The device is then closed around rope. The knob is pushed right to the closed position in it's groove and is tightened by turning clockwise (Fig. #2). If one has not done so already, attach device to one's seat harness.

## Escapeline

The device can be pulled along the rope until positioned for descent. The knob is then tightened hard so the device will not slip on the rope. The lower end of the rope is pulled up and placed in the notch opposite the side with the knob, (Fig. #3). The rope hangs from this notch. Keep your left hand on the rope for it acts like the brake hand with a rappel rack.

Make sure that the rope is in the notch, and that when the device is loaded with a full body weight, the user is not moving down the rope. Retighten knob if necessary (Figure #4). To begin descending, release the rope with the left hand, Slightly loosening the knob with the right (Fig. #5). To stop a descent, tighten the knob or place tension on the rope underneath the device with the left hand.

## TESTING

Mar-Mex had an independent lab test the device under several conditions. The following is a brief summary of the results of those tests as listed in information provided by Mar-Mex.

### "Body Weight" vs. Friction By Knob"

Test #2: Knob is fully tightened by hand, rope not in notch.

Result: 250 lbs. before slippage occurs.

Test #3: knob loosely tightened, rope in notch and simulated hand weight of 16 lbs.

Result: 480 lbs. before slippage occurs.

### Heat Test of Device

Descent speed: 200 ft. in 40 seconds (5 ft/sec) based on 250 lbs. weight simulation.

Tested at 3 different locations on device.

Static kernmantle rope: Yellows at 300 F after 5 hours; becomes sticky at 445 F; and melts at 480 F.

<u>Results</u>	<u>Location</u>	<u>Temp F</u>
	Notch in Flange	260
	Entrance to Clamp	242
	Inside Clamp	220

Mar-Mex literature lists more test results. Write them for more complete information.

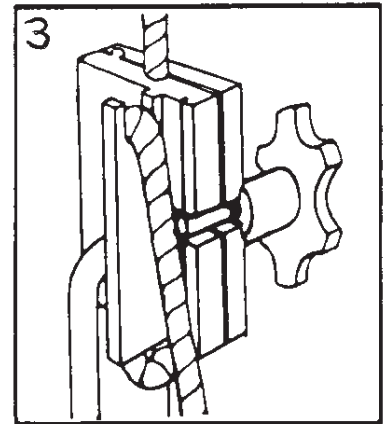
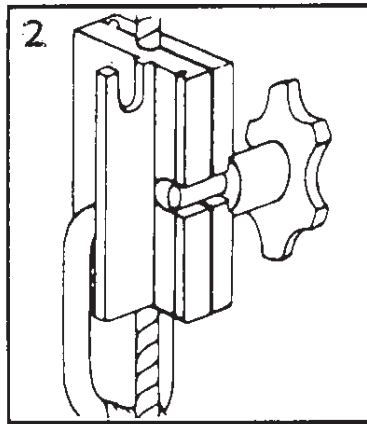
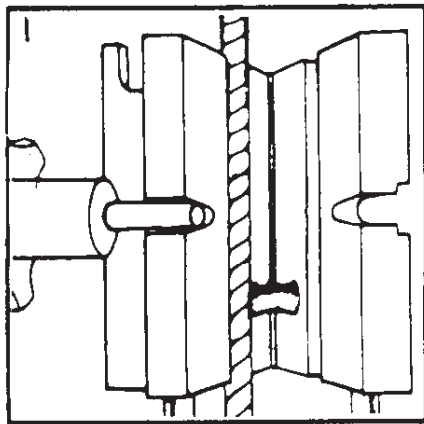
## PERSONAL IMPRESSIONS

Mr. Meschke, inventor of the device was kind enough to let me have a model of the Escapeline for trial under caving conditions. He had not considered the caver market and was interested in finding out mine and others impressions of the device. He is rather proud of his Escapeline, having developed it over a period of roughly five years. His story of development of the 14 prototypes could make an interesting story in itself.

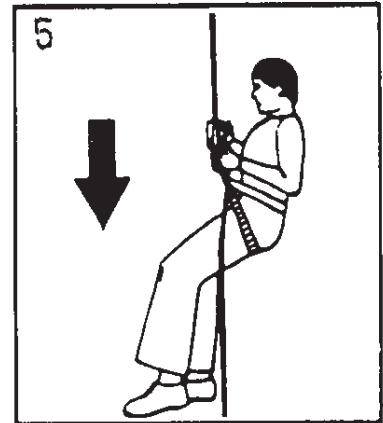
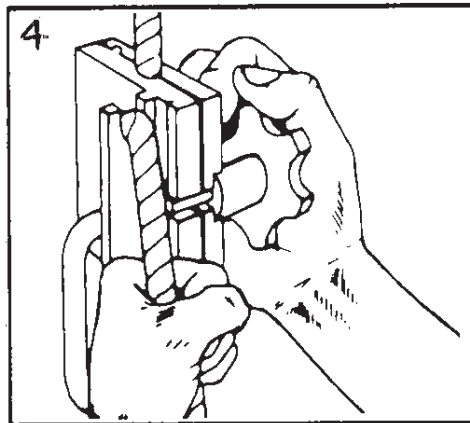
I used the Escapeline on drops of up to 160 feet, both in caves and on cliffs. I used it rather cautiously, considering the history of squeeze brake devices (see Nylon Highway #22) has not been without mishap. Using descent speeds of less than 2 ft/sec control was good. One is able to confidently maintain control using the knob alone. One can stop completely, quickly and easily by tightening the knob. On most uses, I kept my left hand on the rope below the device. This behaved exactly like a rappel rack allowing one to brake and stop with hand tension below the device. Belays from the bottom of the drop worked in a similar manner. Of course, using the device in this manner meant no hands were free for upper body support or other purposes.

With Mr. Meschke's urging, I finally "let go" with my left hand after starting descent, thus leaving total control to the crank hand. The device worked

## Escapeline



as advertised with the rope not coming out of the notch on rappel. To insure this, I personally modified this notch, squeezing the top of it to a smaller opening. Though the left hand is free, one should still keep it close by to brake if needed.



I made several belayed tests with the rope not running through the notch. This meant that the rope ran straight through the device being braked by the pressure from the plates alone. I did not suddenly speed up or fall in this condition; though this was started from a complete stop. Upon descent, however, it took noticeably more tightening of the crank to slow down and stop completely. Thus, though the device will work if the rope comes out of the notch, it is not recommended by Mar-Mex.

### PROBLEMS

My greatest complaint with Escapeline was the lack of "comfort" during use. Being much smaller than a rack meant that it forced my body's center of gravity lower. With a low point of attachment

on my harness, this lower center of gravity made me feel as if I was falling backward out of my harness. I was fighting constantly to keep my upper body more or less upright. With a rack this is easy, in that one has at least 12 inches of metal to grab to support one's upper body. One hand should be on the rack anyway for control of the bars.

But with Escapeline, one has three inches near seat harness level and a hand on a crank. I generally grabbed for the rope, which isn't safe. Chaining carabiners to raise the device from the seat harness helped some. Using the higher mounting on a climber's harness helped a little more. Mr. Meschke modified another device by enlarging the carabiner hole. The theory was to

## Escapeline

use a spacer to move the carabiner forward. It was better used to enable the use of a larger carabiner than would fit through the old circular hole.

He also drilled another carabiner hole underneath where the crank is mounted. This forced me to place the rope in the device before clipping to the seat harness. Of course, with weight on an oval carabiner this forced the two plates of the device together, rendering the crank useless. Descent was rather slow and uncontrollable. Though it did almost eliminate the center of gravity problem.

Generated heat was never a problem. Escapeline was not noticeably hotter than a rack after comparable usage. I could always handle the device after use; a statement I cannot say about the rack.

Smokey Caldwell, who used the device in April 1986 on a 200+ foot rappel at the Superdome in New Orleans, tells a different story. He told me that the device got so hot that he burned his hands. He also experienced control problems with the device dropping faster than he would have like at one point.

Still, I had no comparative difficulties with Escapeline, other than the comfort problems described above. Eventhough its size may lead you thing it is less substantial than a rack, it is surprisingly sturdy. However, I would not want to add a second person's weight to it as might happen in a rescue situation.

Wear began to develop at the bottom end of the guide track where the rope is bent upward into the notch. However, there were no rough edges and it wore evenly.

Thus, the device seems to hold up well. It also worked well with muddy ropes.

10

## CONCLUSIONS

Will I trade in my rack? No, I will continue to use the rappel rack as it is much more "fun" to use. I remain uncomfortable with the Escapeline due to the center of gravity problems. These may be personal as my upper body is a bit heavier than my lower body. Others might not have this problem and find the device a nice diversion from rack usage.

Because of its size, Escapeline may have application in European type SRT where one is crossing bolts constantly. Being smaller, one does not have the difficulties in working around it as with a rack or bobbin. It may have use in setting bolts where one has to stop and start constantly. It is far easier to turn a crank to stop and start, than to lock off and unlock a rack.

Escapeline, is no successor to the rack as it offers, in my opinion, no real improvement in capabilities and it costs more than a rack equipped with stainless steel brake bars. Nonetheless, it is worth further study. While intended principally for emergency use, I feel it could be used successfully in caving and some rescue applications.

For ordering information write:

Mar-Mex International Ltd.  
P.O. Box 723126  
Atlanta, GA 30339  
404-394-4413

**Editor** Historically squeeze brakes have shown an inability to quickly adjust to varying rope diameters. People would find themselves in varying combinations of a fast free slide and slow-readjust-the-crank areas of the rope. It would be interesting to know what type of rope Bill used as he claims he did not encounter this problem.

Also, one of the advantages of a squeeze brake device is that one can get on a loaded rope and rappel to a victim below, tandem rappel or whatever. Mar-Mex requires that the rope be looped over its notch to be safe which defeats, what I feel, as the whole advantage of a squeeze brake in the first place. Bill makes a good point, even if you were able to get to a victim using the knob alone, he was very reluctant to suspend two people from the same rappel device.

Most recently at the North American Technical Rescue Symposium in Fort Collins, CO it was suggested that 200 kg be used as the standard testing weight. This simulates one victim, one rescuer, and a litter w/gear. I would be interested in seeing the Mar-Mex tests duplicated using this standard especially if it is being marketed to the rescue community. □



# RACK AND BARS WITH SELF-BELAY SPOOL

By Horton H. Hobbs III

Described below is a modification of brake bars for use with a rappel rack. The two "spooled brake bars" are an early 1970 invention of Buddy Rogers who was the owner of the no longer-operative Bud's Sport Shop in Bloomington, Indiana.

Figure #1 shows a rack with top and bottom modified bars. The upper one has a double spool on one end and an opening in the extension of the opposite end. The bottom bar has a single spool on the end positioned away from the rappeller. These are for use in deep pits and function such that the main line passes through the rack in the

conventional manner. Instead of adding bars to maintain control as greater depth is attained, the rope can be looped up and over the inner spool on the top bar. If additional braking power is required or if one needs to stop, the rope is then passed beneath the lower spool and then back over the outer spool of the upper brake bar, see figure #2. Thus, this modification allows for additional friction points to control the rate of descent yet it enables the individual to make use of a shorter rack (4-5 brake bars) and thus reduce weight and bulk. Also the caver can stop on rappel to take photographs, look around, take a rest, etc.

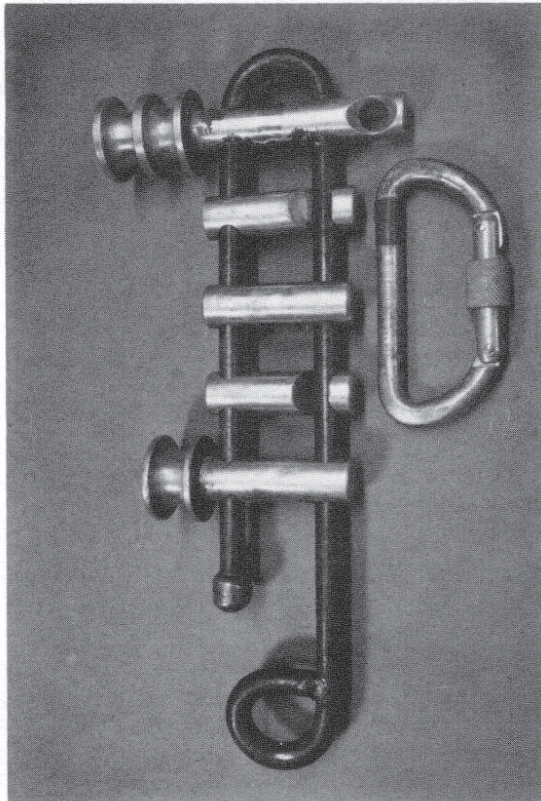


Fig. #1 Rack and Brake Bars with Self-Belay Spool.

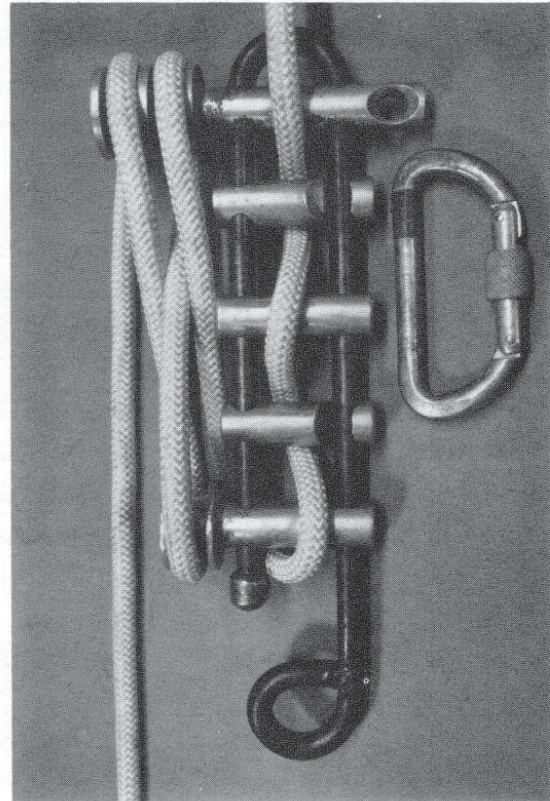


Fig. #2 Device using all the points of friction.



## Rack and Spool

One of the most useful aspects of the upper brake bar is the opening which is located in the end closest to the individual (Fig. #1). This hole is sufficiently large to receive a carabiner and thus allows the caver to clip the carabiner, and thus the bar, onto a chest harness. On a long drop (300 feet or deeper) the value of this becomes quite clear because the caver does not have to hold him/herself to the rope and therefore the ride down is much less tiring.

There are potential drawbacks to using the brake bar modification, the most obvious being that it places one's body close to the rack, thus increasing the risk of clothing or hair being caught in the device. It also restricts movement since the individual is connected at two points to the rack, a possible problem when a constricted section of pit is encountered. Also, it is best to attach the rack to the chest harness after the lip of the pit has been negotiated. As with any new climbing/rappelling device, one simply must try it "on rope" in order to make an assessment of its usefulness and reliability. One modification that might be employed is to attach a length of Perlon rather than a carabiner to the opening in the upper bar (Figure #3). This will allow the individual to adjust the distance between the rack and him/herself.

On a recent (December 1986) pit trip to Alabama and Tennessee by six members of the Witenberg University Speleological Society, the modified bars were used by four of the six. Drops ranged from 60 feet (Great Saltpeter Chasm) to 404 feet (Surprise Pit-Fern Cave). The system was an extremely useful aid, particularly on the 404' free drop in Fern Cave.

For those interested in making their own spooled brake bars, material recommended is a 7000 series aircraft aluminum and the bars are shaped with a lathe. One might make the top double-spooled bar with a somewhat larger diameter than the design,

it is imperative that all edges be filed and polished.

The Rack and Brake Bars with Self-Belay Spool may not be something everyone will want to try but I strongly recommend the use of some attachment from the rack to the caver on long, free drops. Perhaps a top bar with an extended piece bearing an opening for a carabiner is quite adequate. Whatever the adjustment, staying comfortably upright makes for a much more enjoyable rappel! □

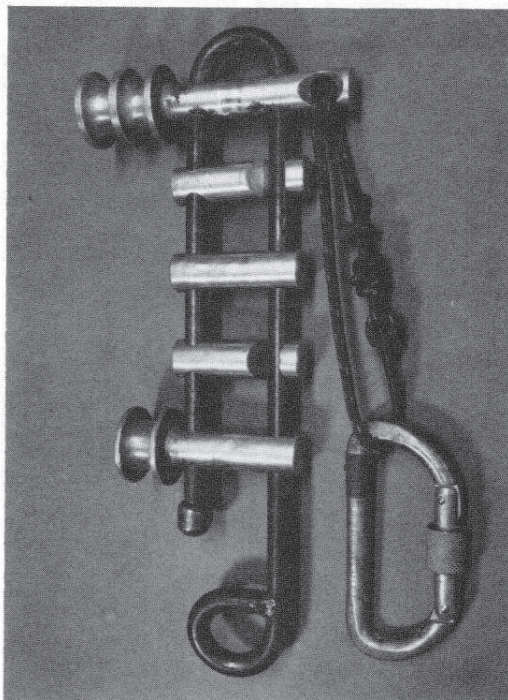


Fig. #3 Attachment to the chest harness can be adjusted using a piece of Perlon.

### SECRETARY'S REPORT

July 22, 1987

Number of Single Members	454
Number of Family Members (No. of people)	24
Number of Nylon Highway Subscribers	32
Number of Nylon Highway Gratis	10
Number of Nylon Highway Exchanged	24
Total Number of Nylon Highways mailed	532
Number paid through 1987	225
Number paid through 1988	148
Number paid through 1989	98
Number paid beyond 1989	27



# A NEW FIGURE 8 BASED DESCENDER

By Lloyd Johnson



Figure #1

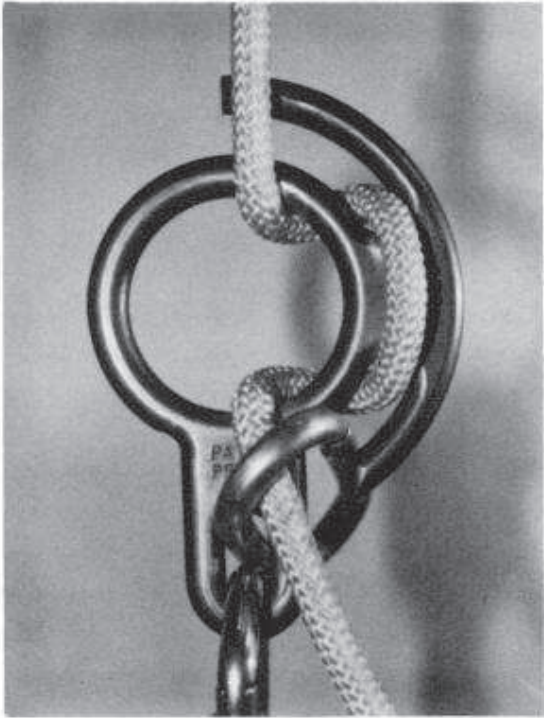


Figure #2



Figure #3

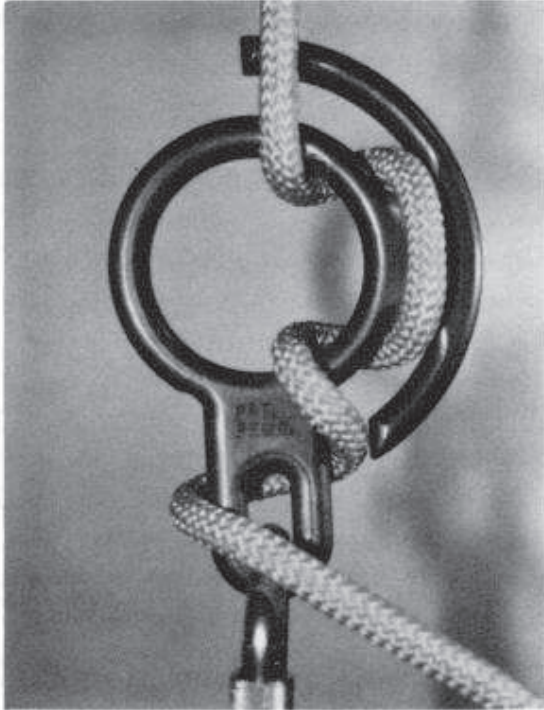


Figure #4

## New 8

The Figure 8 descender is often used on shorter drops where small size and weight are of importance and variable friction is not required. One of the disadvantages of the Figure 8 is that one has to remove it from the seat harness in order to attach the rope. This can lead to careless dropping of the device; as well as the potential for the seat harness falling off when the harness carabiner is removed, while close to the edge of a drop.

This new descender is designed to allow one to attach the device to the rope without disconnecting it from the seat harness. An added benefit is one can also add additional friction to the device at the top of the drop, before they need it.

Figure #1 shows the descender in the standard loaded rope configuration. This is achieved by forming a bight in the unloaded line, inserting the bight through the large circular opening, and then spreading the legs of the bight over the top and bottom hooks. A tug on the rope then dresses the line as pictured. All this can be very quickly done; and most importantly, without disconnecting the descender from the seat harness.

Figure #2 is essentially the same, the exception being the addition of a standard oval carabiner through the elongated slot and snapped into the lower rope slot. The rope is then inserted through the carabiner gate. This insures the rope will not accidentally become unloaded from the lower hook. Also, this keeps the rope in a known position if it should slip out of the control hand during descent.

I have personally had no problem with the rope accidentally unloading without using the oval carabiner safety. Of course, as long as there is tension on the rope, it cannot come off the descender.

Figures 3 and 4 show the descender with optional loading configurations for increased friction. These could be used, if warranted, when the person using the descender is heavy, is carrying a heavy load, or the rope is slippery. I have yet to find this necessary. Thus, I cannot say whether it would be possible to go from the standard load of figure #1 to either of these configurations in mid-rappel. However, it does appear possible, being perhaps easier to increase friction from a stopped position while on rope.

The stopped position is quite easily obtained and maintained by wrapping the line around the hooks a couple of times, as shown in Figure #5. This can also be done by tying a half hitch around the upper hook as shown in Figure #6.

The descender is machined from 6061-T6 half inch aluminum flat stock. I feel this is the best material for the application and the preferred method of manufacture. The aluminum dissipates generated heat better than steel and also has a higher coefficient of friction. Incidentally, the descender has shown no sign of getting hot on rappels up to 90 feet. Perhaps the hooks help to dissipate the heat.

At this time, no one is manufacturing these in a volume that would make the cost reasonable. A patent is pending on the device however.

I would appreciate hearing from anyone with questions or comments, pro or con, regarding the descender. If you are a potential manufacturer, distributor or even a potential end user, please feel free to write or call me.

Lloyd Johnson, Box 2680, RD #2, Bennington, VT  
05201 802-442-4573





Figure #5

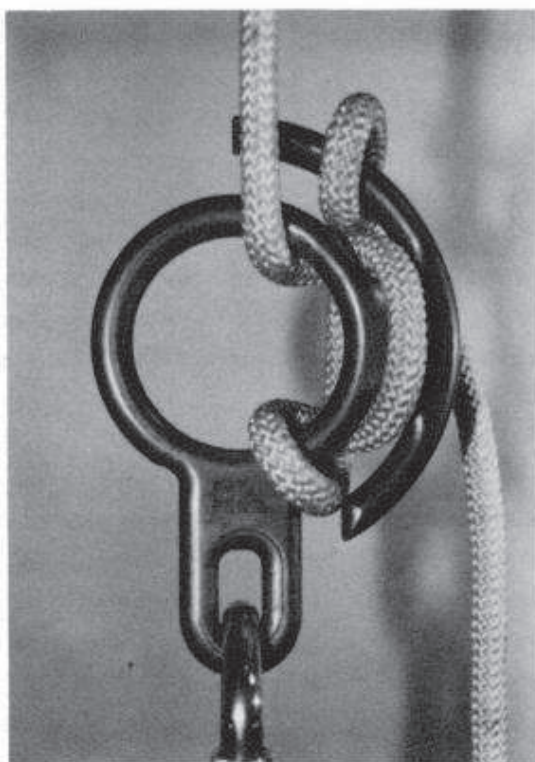


Figure #6

## TREASURER'S REPORT

NSS VERTICAL SECTION  
July 22, 1987

<b>INCOME:</b>	
Memberships	\$2027.00
Subscriptions	75.00
Back Issue Sales	1493.60
Bank Interest	116.41
Vertical Techniques Workshop	400.00
Advertising	60.00
Other	14.14
<b>Total Income</b>	<b>\$4186.15</b>

<b>EXPENSES:</b>	
<b>Editor:</b>	
Printing Nylon Highway #23	\$505.57
Mailing Nylon Highway #23	79.11
Printing Nylon Highway #24	571.39
Mailing Nylon Highway #24	55.96
Typesetting	32.18
Other Postage	70.53
Mailing Envelopes	106.91
Other Printing	14.49
Other Supplies and Materials	39.53
<b>Total Editor Expenses</b>	<b>\$1475.67</b>

<b>Secretary-Treasurer:</b>	
Postage	\$235.46
Postage - Dues Renewal Letter	44.00
Vertical Techniques Workshop Expenses	196.61
Supplies	38.25
Copies (Membership Forms)	28.62
Advertisements	53.00
Reprinting Nylon Highways 1-8	603.33
Reprinting Nylon Highways 15, 16	323.82
Check order	9.01
Bad Check Expense	9.00
*Pandra Williams Illustrator	1259.23
<b>Total Secretary/Treasurer Expenses</b>	<b>\$2800.33</b>

<b>TOTAL EXPENSES</b>	<b>\$4276.00</b>
1986-87 NET INCOME (Expense)	(89.85)

Balance as of June 19, 1986	\$2198.46
1986-87 Net Income (expense)	(89.85)
Cash Balance in the bank as of 7-22-87	2108.61
*Accounts receivable NSS	1683.74
<b>FINANCIAL POSITION JULY 22, 1987</b>	<b>\$3792.35</b>

# POLY FILM ROPE TAGS

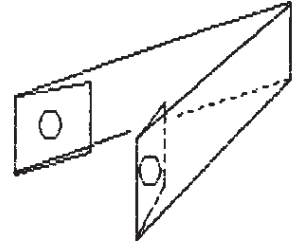
By John Ganter

Marking rope is essential for expedition and rescue use where people are working with ropes whose lengths, histories and owners are not known at all times. Writing with indelible markers on the rope or on tape wrapped around the rope is effective temporarily. Color coding with tape or plastic coatings is unsatisfactory because of the arbitrary nature of any code, and the need for everyone to know it. I have an alternative solution which is tough, highly legible, displays lots of information and is readable by anyone instantly.

## 1) Cut out strip and mark



## 2) Fold and melt holes



The idea came when I had to leave ropes in a cave for a long time. I wanted to make it clear to anyone who might wander in that the ropes were mine and that I would be grateful if they were not borrowed. Some sort of little signs were in order, but they would have to withstand being under water for long periods.



## 3) Attach with wire-tie

Here is the solution (See figure). Take a one inch wide strip of polyester drafting film (sometimes known as "mylar") and cut off about a foot. Don't go out and buy the film: anyone who drafts throws out baskets of scraps. Now fold it in the middle, and an inch or so from the ends, as shown. Take a nail held in locking-pliers and heat it up hot. Now, carefully pierce the folded film. Try to melt the hole so that it is nice and smooth. Re-heat, and then bore a hole through the very end of your rope. Connect the two with a nylon wire-tie, and cut off the excess. I put one on each end of long ropes.

Does drafting film on a rope sound a little delicate? Just try ripping one of these tags off.

Film is amazingly tough. And because of the microscopic pores in the surface, once you put permanent felt-marker on, it is totally non-removable. My tags have withstood expedition use and repeated washings. They will probably outlast the ropes.

Now you can write anything you want on the tag. Owner name and length are obvious. Add date-in-service, dates of washing and anything else you think necessary. Use colored markers if they turn you on. Now the information goes where the rope goes, is highly legible, and readable by anyone. It seems likely that other uses for poly film can be thought of, such as inventory and ID tags for medical kits, duffels, etc.

# THREE POINTS OF CONTACT ARE NOT REALLY NECESSARY

By Bruce W. Smith

All bats are rabid. My gear is always ready to go. Always climb with three points of contact. These platitudes may sound familiar, but they are in reality a falsehood and show a lack of understanding. It takes common sense to speak and be vertically competent.

Somewhere along the way the phrase "three points of contact" has been misinterpreted. This does not mean and has never meant a climber/prusiker should always have 3 ascenders on the rope at one time. It's becoming frustrating to hear people screaming, "He's not climbing with three points of contact," during climbing sessions or during rescue practice.

## BACKGROUND

For decades rock climbers have used the phrase "Three points of contact." This meant that as a climber moved up a rock face they should only move one hand or one foot at a time while the other 3 limbs remained substantially secured to the wall (2 hands & 1 foot or 2 feet & 1 hand). On a wall it is often said that one's butt counts for 2 points.

## WHAT'S REALLY ESSENTIAL

The critical essentials of any climbing system are:

1. If any ascender/component fails in anyway the climber will not fall.
2. If any ascender/component were to fail the climber should not be allowed to fall upside down.
3. If any ascender were to fail the climber should have a "ready to use" third ascender which can be attached to the rope or placed in service so that the climber could continue his/her ascent.

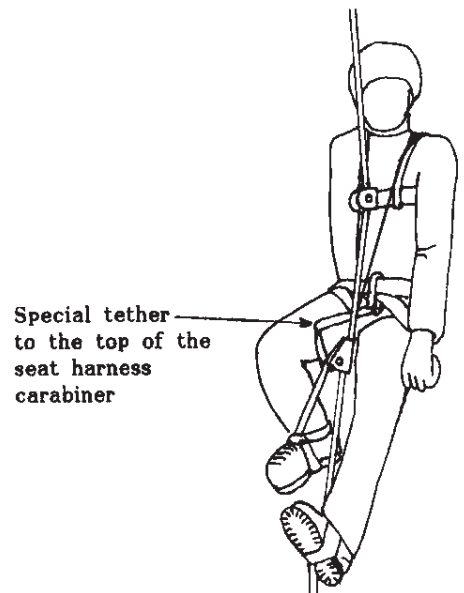
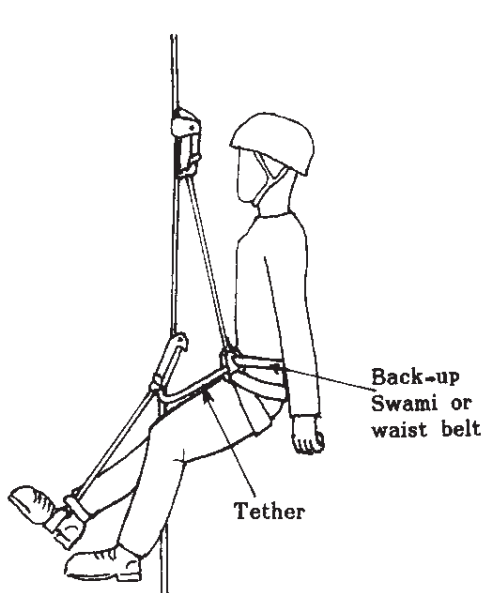
This does not mean or imply that a climber should have 3 ascenders attached to the rope. Infact, let's

look at the facts:

1. A rappel device is, after all, only one point of contact. Even with a shunt, it's only two.
2. Texas Prusik system uses 2 points.
3. Jumar method uses 2 points.
4. Frog system uses 2 points.
5. Mitchell system uses 2 points.
6. Gibbs ropewalker with a roller uses 2 points.
7. The Inch Worm climbing system uses 2 points.
8. The Wisconsin system uses 2 points.
9. The Mao method uses 1 1/2 points.
10. Pygmy uses 2 points.
11. Portly uses 2 points.
12. If the top Gibbs in a three-Gibbs rig malfunctions the climber will wind up upside down hanging by ankles. (note: A double heel hang is much worse than a single heel hang, harder to recover from and doubly painful.
13. Classic Three knot. If the top knot blows up (disintegrates) on a three-knot system the climber will find himself/herself upside down in a double heel hang.

**THE POINT:** All these systems are standard, accepted climbing methods throughout the world. Many of these systems qualify under criteria #1 (wouldn't fail if one ascender failed), but all fail under criteria #2 (falling upside down). Almost every system could qualify under criteria #2 if a tether were attached from the climber's seat harness to his/her lower knee level ascender. Almost every system could be easily adapted to qualify under criteria #3 if a safety Jumar or handled ascender is "ready to use" and attached to one's hip. **To make a system safe there really needs to be two ascenders attached at or above the waist (one in use and one "ready to use")**

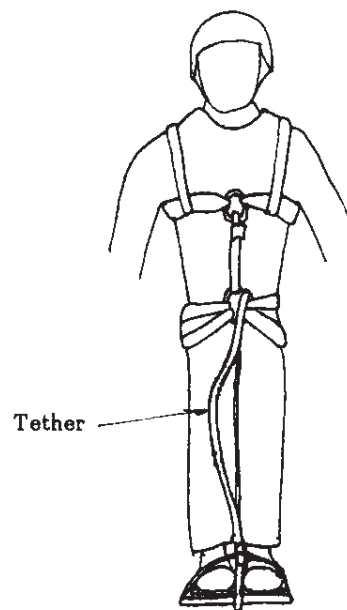
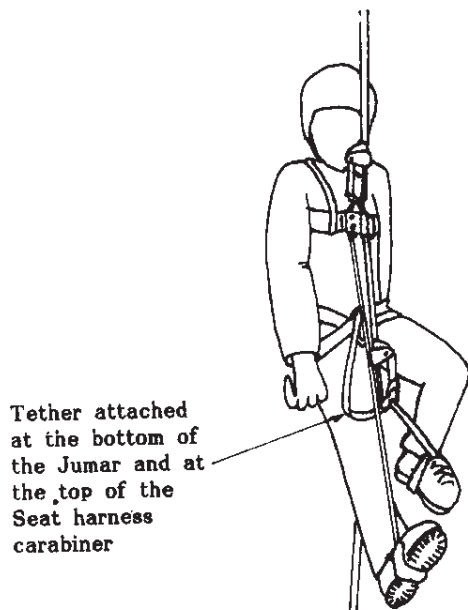
3 Points



**DO MORE POINTS OF ROPE ATTACHMENT MAKE THESE SYSTEMS SAFER?** I say no!! More points of rope contact lead to making a system more complex. Remember the old adage, "Keep It Simple...." The more parts to a system there are, the more that can go wrong. Complexity tends to confuse a climber and things often get tangled, inadvertently unhooked, and complicate a system to disfunction. Finally there is only so much "traveling space" or "working room" in front of a climber at anyone time. Each ascender consumes a substantial

amount of that "working room" and prevent other ascenders from moving their full distance or used to their optimum each cycle. Shunts, safetys, third ascenders etc. all use up valuable traveling space.

In reality a climber can only move one at a time. Any ascender that is not an integral part of the system (used to attain upward progress) is nothing more than a safety or a belay. A belay is a back-up and used or rejected as the experience and confidence changes with each climber.





### 3 Points

#### SAFE CLIMBING SYSTEMS

Safe climbing systems, I feel, rest with 3 solid ideals:

1. A system that will achieve all 3 criteria as mentioned earlier in this article is critical.
2. A system of regular maintenance and inspection should be in place, whereby, straps and cords are re-sewn, or replaced on a regular basis.
3. The solid understanding and careful use of the system one is using cannot be taken too seriously. Each point of contact should be carefully secured

to the rope and moved with mechanical precision. Each quick release pin snapped securely in place, each locking carabiner screwed shut, no loads against carabiner gates, webbing straps flat and untwisted, and knots dressed, set and properly backed up. Put the system on the same way each time so habits are formed and mistakes avoided.

There is nothing magic about 3 points of contact rather there is magic in a common-sense approach to safe climbing.

## THE TECHNICAL ROPEWORK SCHOOL

By Arnor Larson

Knowing the ropes can be very important in rescue work yet quality instruction in a cohesive system of integrated ropework from the basics to advance applications has previously been hard to come by. The Rigging for Rescue seminars have been recognized by U.S. and Canadian personnel from such diverse fields as Mountain Rescue, Fire Service, River Rescue, Emergency Medical, Military Para-Rescue, Caving, Guides, Industry and Federal, State & Provincial Governments as one of the most valuable rope rescue courses obtainable. To meet an increased demand, Arnor Larson will be offering sessions April 17-23 and May 8-14, 1988 in Wilmer, British Columbia, Canada.

This course has set new standards for the teaching of technical rope rescue and is invaluable to those who intend teaching others or who are in a position of responsibility. Rigging for Rescue facilitates an interchange of ideas and brings together years of research and systems testing with your skills, knowledge and concerns. This 7 (full) day course costs \$500 Cdn (approx. \$380 US) and has a maximum of 10 participants. The safety inherent in the techniques taught has allowed rope rescue systems to be used on a scale that was previously considered beyond the practical.

Rigging for Rescue clears away prevalent misconceptions and lays a basis of well thought out principles that allows the development of extensive capabilities utilizing very basic low tech equipment. Rigging for Rescue is only for those seriously in search of a definitive technical ropework treatment.

If you're the type of serious vertical person who feels they would benefit by such a course contact:  
Arnor Larson (604) 342-6042

Box 399, Invermere  
British Columbia, Canada  
VOA 1K0

#### SHOPPING FOR MAILLON RAPIDE'S

Just as one squeezes fruits or vegetables in the supermarket to determine freshness or suitability, so should one shop for vertical gear. When buying either the oval or delta screw-sleeved, Maillon Rapide, be sure to turn the sleeve from full open to full closed. Avoid those which exhibit any tightness or difficulty in turning the sleeve with ones fingers. Any tight sleeves when new will no doubt be tighter in the field.

# A CHALLENGE TO THE SPELEO-INVENTOR

By Louise D. Hose

For the last four years I have been living in exile in the karst-less land of Louisiana. As a result, my attention has strayed temporarily from caving to bicycle racing. A few weeks ago when I found myself drawn to the NSS Convention, my thoughts returned to vertical caving. Specifically, I was thinking about the vertical contests. It was immediately obvious that our present mechanical techniques are primitive and inefficient.

First, let me explain a few principles of cycling. The proficient cyclist locks the feet in the pedals. This allows the cyclist to "spin"; a good cyclist does not just push the pedal down but also pulls the pedal back and up to make a smooth and complete circle. This is a tremendous improvement on the efficiency of the movement. Our present vertical systems are stuck in "push" mode. Only the leg extensor muscles are used to lift the body. The leg flexure muscles only lift the legs and the prusiking (Gibbs) device. What a waste.

The most obvious approach to solve this would be to design a human powered Mechanical Ascending Device (MAD) (Wefer, 1968). It would have cranks and pedals that the feet could be locked into similar to a bicycle. There is no need for multiple gears, but like racing a track bicycle, the appropriate gear ratio for maximum efficiency could be chosen according to the distance to be ascended and the strength of the climber. Sprinters (30M event) used larger gear ratios and shorter crank arms. Pursuitist (similar to the 120M event in time) use smaller gear ratios and longer crank arms.

The rules of the NSS Vertical Contest separate any device without a one-to-one gear ratio from the traditional systems. This may lead to two

possibilities. One, sufficient tinkering may find that crank lengths and gear ratios can be used that give only a one-to-one ratio. Designed properly to allow for a more efficient spinning power stroke, it surely would beat traditional systems. Two, if one-to-one gearing proves too difficult for the body to handle, the device would be judged in a separate class and since it would still be human-powered, it may become a "status" event of the convention. It is a sure bet to raise a lot of eyebrows.

I am not a tinkerer not particularly mechanical but I am sure someone could rise to this challenge. I do have a fairly good understanding of the mechanics, both human and equipment, of bicycle racing and would be glad to share what I know. My biggest hope is that someone will successfully design such a system and I will have a chance to compete with it.

You may think my idea is frivolous as its application to real caving situations would probably be rare. But like the MAD, certain long, free-fall pits might be made much easier. When I mentioned my thoughts recently to Fred Wefer, he expanded on the idea in what I think is an immensely practical way. Fred suggested that the new device (at least a caving version) be modified from a functional mountain bike. In this way cavers could ride their ascending system to the pit, increase the fun, and save on carrying extra equipment.

## REFERENCES

Wefer, F. W., 1968, Equipment used at Golondrinias: Nittany Grotto News, Vol. XVIII no. 1, p. 23-26.

# WHAT'S NEW IN ROPE or WHO IS WELLINGTON?

By Jim Frank

Several members of the Santa Barbara Grotto have been into my shop\*, and often the talk turns to rope. Most know we are not a Blue Water dealer and when they learned that we no longer carried PMI, they want to know what are we selling as "Caving Rope". Who is this Wellington anyway?

Since fire departments outnumber cavers, Blue Water, PMI and New England Ropes have been selling static kernmantle ropes in the colors, sizes and features desired by rescue squads. It is basically the same rope in bright colors, usually 1/2 inch diameter and often 5/8 inch. Most of the customers like an easier handling rope than PMI's hard lay and so PMI offers their rope in EZ-Bend and Max-Wear versions. About five years ago, Wellington Puritan studied the rescue rope market and developed the Rhino Rescue Rope line.

Wellington Puritan is one of the largest rope manufacturers in the world with over 75 years of rope making experience. Their Safety Products Division is located in Madison, Georgia, not far from Blue Water and PMI. Wellington makes a wide variety of ropes like the cord and string at Sav-On to specialty ropes for industry. In our opinion, they make the best rescue rope on the market.

The construction of Rhino Rope and Pigeon Mountain Industry's rope are similar. Both are static, kernmantle ropes for low stretch and high abrasion resistance. Dupont's Type 6,6, Super 707 nylon is used by both companies. PMI uses an all left hand twist for the sheath on their rope, and Wellington uses a balanced sheath of half left

twist and half right twist. Wellington's rope is a little stiffer than PMI's EZ-Bend, but not as stiff as the Max-Wear.

To get even better abrasion resistance and to have a variety of color choices, Wellington introduced their Rhino-Kote process to static kernmantle ropes. Instead of dyeing the fibers, the rope is first made, then sprayed with a urethane coating. For the rescue market, the coating can be any color the customer wants. By "sealing" the surface of the sheath, the rope slides over rough surfaces better, reducing the snagging of fibers and the effects of abrasion on the rope.

We talked Wellington into selling us the uncoated rope in 7/16 at a discounted price. We called it "Caving Rope" and have passed the price reduction on to our caving customers. It has all the same features Wellington's state-of-the-art Rhino Rescue Rope has but without the Rhino-Kote.

The pre-production run of Rhino-Kote ropes were not to Wellington's satisfaction. They were almost as "lumpy" as PMI's ropes. The core was re-engineered and a polyester sheath was tried. We felt the result was an excellent rope. Because of problems with the appearance of two of the colors, Wellington is planning on returning to a nylon sheath.

New England Ropes have been making rescue ropes with a nylon core and polyester sheath all along. The sheath is there to protect the ropes load bearing core. Because of the properties of the

## Wellington

polyester, we feel it is an excellent fiber for the sheath of a kernmantle rope and some of the Wellington Caving Rope with the polyester sheath is still available.

Polyester's primary advantages are its resistance to degradation due to sunlight and its low water absorption. Exposure to sunlight is intermittent with a properly cared for climbing or rescue rope, and it is usually less for a rope used underground. Nevertheless the polyester will extend the life of the sheath some. More important, polyester absorbs only 1% of its weight in water compared to 15% or more for nylon. Water adds weight, and reduces both strength and abrasion resistance. It would seem that a drier sheath would keep the core drier for a longer time.

Polyester is also used in Wellington's new Prusik Rope. We have been switched back and forth between nylon prusik ropes of kernmantle construction (our preference was for accessory cord from New England Ropes) and polyester braid-on-braids. The braid-on-braids were strong, usually held well, and avoided the nylon-on-nylon heat generation problem that has occasionally fused a slipping prusik knot to the main line. In every brand we used, the core would pop out through the sheath. This often happened when the rope was stored in the pack. We had Wellington build a braid on braid but with a kernmantle type braid on the sheath. So far the performance has been excellent and we have had no negative reports from users. Wellington's Prusik Rope is available in 1/4 and 5/16 inch diameters.

Not really new products, but cavers may not be familiar with the water rescue ropes from PMI and Wellington. Both have polypropylene cores so the rope will float and nylon sheaths for strength and durability. They are used primarily as throw lines for river rescue. In a wet cave where a handline

is needed, it may be an advantage to have a rope that is floating on top of the water rather than lying somewhere underneath.

The interest of fire departments and rescue squads in rope and rope related equipment has attracted the attention of larger manufacturers. They have the manufacturing experience and product development capabilities which means better equipment for safer caving.

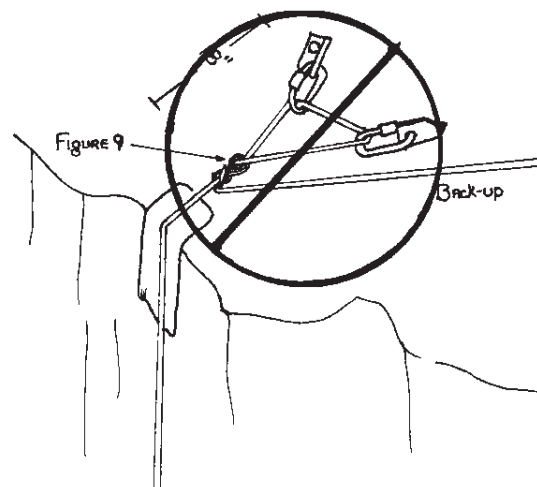
Reprinted from the Santa Barbara Underground Grotto's newsletter, Vol 2:1 Spring 1986

\* California Mountain Company, Ltd. □

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## RIGGING COULD BE SAFER

Arnör Larson, from Canada and Kootenay Highline System notoriety wrote the Editor of the Nylon Highway and was most concerned about the rigging depicted on page 23 of NH #24. The rigging as described was the rigging used on Half Dome during the first rappel and prusik of the drop. Recent rigging stress tests show that a triangular rigging as shown is a poor utilization of the strength of the rope. A better solution would include a bowline on a bight or a French bowline with self equalizing loops. As Editor, I wish to extend my appreciation to Arnör for his keen eye and precision in which his mind seems to constantly run. Point well taken. □





# THE EXPLORER'S GUIDE TO SPONSORING EXPEDITIONS

By Bill Stone

At some point along the way all expedition organizers must ask the question; "can the members of the team reasonably pay for this trip themselves?" If the answer is "yes" read no further, for the First Law of expedition sponsorship is: If you can pay for it yourself, do not seek sponsorship. If your answer is "no", and you are strapped with major equipment and transport costs well beyond the financial means of the participants, the following discussion on the mechanics of expedition sponsorship will be of some help. The rules and recommendations made are based on my experiences with nine expeditions which have received substantial backing during the past seven years. The procedures are written for the group with no prior experience. The basic rules are still followed even after firm relations have been established with corporate and institutional sponsors who are willing to back you on a continuing basis. Realize at the outset that sponsoring an expedition is not a matter to be taken lightly. Fund raising usually requires a solid commitment from the team and organizers a minimum of a year in advance of departure date. Two to three years lead time may be required if specialized equipment must be developed by prospective sponsors.

## Getting Started

1) Decide what the expedition objectives are going to be, and establish in your mind that, if you were a sponsor, this would be a worthwhile endeavor. These objectives must be clearly defined for a sponsor will want to know exactly what he is putting his equipment or funds up to do. Choose your objectives to cast a professional and altruistic

image for you and your team. In addition to direct exploration objectives (e.g. explore XYZ Cave system in an effort to prove that it is the world's deepest), consider the possible advantageous impact of your work on the quality of life of indigenous populations and the possible advancements to scientific knowledge that can be made by the expedition.

2) Make your expedition tax-deductible. This can be done in any number of ways. Three good ones are: become an official expedition of the National Speleological Society, become an official project of the National Speleological Society, or become an official expedition of some other tax exempt organization, such as the Explorers Club. There are two reasons for doing this. First, sponsors are more likely to donate funds or equipment if a charitable write-off can be made, and second, you can legally deduct expedition-incurred consumable expenses such as food and transportation.

3) Have some official, not overly ornate, letterhead made up. Probably 500 copies will do you at this stage.

4) Lay out an expedition brochure addressing the following questions:

- a) What (the expedition's objectives)
- b) Where (a crisp paragraph detailing geographic location)
- c) When (the itinerary)
- d) Why (the significance of the expedition and how you plan to meet the objectives)
- e) Who (your team, with concise, positively written bio sketches and good head and shoulder photos.

## Getting Sponsors

The objectives you lay out in your brochure become part of your agreement with your prospective sponsors. They expect you to address these goals. This may sound like a minor point, but when the going gets rough and the team is at each others throats after three months in the field, and the objectives have not been achieved, you have put yourself in a bad corner. "We expect professionalism in the field from any team we sponsor," Van Cochran, a past-president of the Explorers Club, once said. This requires a different mind-set than most cavers are used to dealing with. Once you accept sponsorship you have crossed that frontier where expeditions cease to become extravagant vacations and become business joint ventures. The consequences of not accepting this reality will be a lack of sponsorship for your projects in the future and, very likely, a lack of cooperation from those companies/institutions with whom you dealt towards other expeditions that may approach them. Most companies go by the old Irish saying, "Fool me once shame on you. Fool me twice, shame on me!" Does this mean forcing a fragmented team to address a goal that has proven unattainable (or dangerous) after reasonable effort? No. A better course of action is to ask yourself the implications of such a situation prior to the establishment of the expedition objectives. Temper absolute objectives (our goal is to break the world depth record) with more broad-brush ones: "To further explore the XYZ System in a effort to ascertain whether or not it is the world's deepest cave." Consider adding easily achievable, open-ended secondary objectives to the list such as "begin charting the topography of the unexplored XYZ Plateau", "develop new exploration techniques"; "study the effects of long duration subterranean camps on the diurnal cycle." These allow a graceful exit even if you are unsuccessful in achieving the primary objective.

The layout of the brochure is a key part of your

image. The working must be carefully thought out, concise, and gramatically correct. Waste no words. Avoid excessive use of superlatives. The size can vary considerably, depending on how much you have to tell and your budget. A single page 8 1/2 X 11 pamphlet printed both sides will run \$500 a 1000. A slick four page brochure with color photos can run \$2000. A general rule of thumb here is to spend approximately 1/100 of the expedition's budget on the brochure. The quantity of support you raise is generally proportional to the quality of the brochure. Use a few dynamic photos to get across the idea of the expediton (these do not have to be from the actual expedition area). Remember that in many categories you are competing with hundreds of other expeditions (mountaineering, scientific, polar exploration etc.) and non-profit organizations. Your writing and your image are all that will separate you from the rest.

5) Lay out a list of exactly what you need to put the team into the field for a successful expedition, everything including hardware, food, and transportation. Then organize it with the items you need most (and which you are most unable to afford) at the top of the list. This will be your structured priority for who you write first.

6) Identify who makes the products you need. This can be done most effectively with a Thomas Register or similar publication which lists most companies who make certain items and likewise lists what most companies make. Get as many companies as possible for any given item.

7) Now, the hard part comes: You must write a letter, a lure if you will, that has all the ingredients which make your project irresistible to a sponsor. This means that you will have to do some research on the sponsor. Find out what it does, what kind of budget it operates under--is it big small; does it have a company publication; does

## Getting Sponsors

it advertise nationally. Decide how much you want to ask for. Too much with a small company, or too little with a big company may result in a negative response. Often timing is critical. If a company is on the verge of a broad distribution of a new product your project can appear as an attractive, visible test of their goods. Call the company headquarters and ask for the name of the Vice-president of marketing or his equivalent. Address your letter to him/her personally. Stick to a first name in your communications. You mail the same letter to all sponsors (changing the company name in each, of course) who have the same item you want. Your letter should include the following points:

- a) Introduce yourself, and don't be shy.
- b) Identify the objectives and why they are significant. Tell an engaging story that is succinct, and to the point.
- c) At the end of you story, identify the problems you must overcome by using certain special equipment, food etc. Make it sound like the expediton will abolutely depend on these items. Then comes:
- d) the punch line...what you want from Company X, and it must sound like they are being privileged to provide you with their gear for your historic expedition. Do not beg! But do not be cocky, either.

## Viable Expedition Products

Because you are dealing with businessmen , it is essential to realize that, in exchange for their backing, they anticipate receipt of a usable product at the end of the project. There are three viable products that you and the expediton can generate for Company X.

- a) Expediton photos (slides, video or 16mm film) showing Company X's products in use on the expedition. How you take these photos is of great importance. They have to look relaxed, natural...not overly posed. For most technical hardware this is relatively easy. Other things, like food, are not so

simple and it will take some imagination to set up a scene that is just right for Company X. When in doubt, research some of their ads in magazines and see what kind of photos companies use to show their outdoor gear. Most importantly, no matter what the hassle, you must take these photo, bracketing exposures, and re-shooting if necessary, to insure that when you return to the States you have captured Company X's gizmos in use in exotic settings on the expedition. In desperation you can take all the gear down to the nearest entrance chamber and shoot it if it is unfeasible during the actual event.

- b) A written appraisal of the performance of Company X's gizmos on the expedition. This will have to be carefully written, as will be discussed below.

- c)A copy of the expediton reprot. In most cases you will have to commit yourself to writing a fairly detailed account of the expediton and publishing it in a reputable journal. Such publications might include the AMCS Newsletter, the NSS NEWS, or the Explorers Journal. Be prepared to send an original copy of the publication or an original re-print to each sponsor, regardless of the cost.

How many letters will you have to write to sponsor your expedition? Probably several hundred, depending on your needs. Julia James, a well known Australian expedition organizer once told me, "if you score one in twenty, you are doing well." We have done considerably better than that here in the U.S. The most recent expedition to the Pena Colorada in Huautla had 43 sponsors for approximately 400 mailings. That is a ratio better than one in ten. Fortunately, you need not compose 400 letters from scratch to get things going. A major portion of each letter will be the same, irrespective of the potential sponsor; only the "punch" paragraph will need to be changed. For efficiency it is mandatory that at least one member of the team own or have routine access to a word



## Getting Sponsors

processor and letter quality printer. With the continuing drop in personal computer prices every expedition organizer should consider purchasing one.

There will come a time, several months after you have bankrolled a stock of letterhead and brochures, when it seems nothing is going to happen. Persist. The Second Law of expedition sponsorship is: The first sponsor is always the hardest one to get. Try to organize your requirements into related categories, for example Diveing Apparatus, Shelf-stable provisions etc. once you land the first sponsor from a category, go back to the other potential sponsors in that category and work into your story that many of the items you need are already being provided by ABC Corporation. Since ABC Corporation is well known to Company X as one that does not take chances, there is a surge of subtle momentum to join the bandwagon, which leads to the Third Law of expedition sponsorship: 90% of your backing will come during the last 10% of the time you have allotted for the sponsorship drive. The final two to three months before departure are thus going to be hell on the chief organizer, particularly if he holds a rigidly structured 9-to-5 job. This time crunch is one of the trade-offs of sponsoring an expedition.

### The Wind-Down

After the expedition everyone will scatter to the wind and it will be painfully difficult to go through the tedious hassle of replying to the sponsors. Someone must take the responsibility of doing this followthrough, however. It usually takes three to five months of effort to get the replies off, depending upon the difficulty of obtaining the appropriate slides and duplicating them, and the number of sponsors. I have typically made up a portfolio of 20 slides for each sponsor, no matter how big or small. The majority of these should be the best action photos compiled from the

expedition. The remainder should show Company X's gizmos in use. A slide narrative should accompany the portfolio telling a brief story about each photo.

The reply letter must be written as carefully as the initial contact letter. The credo you must follow is: whatever it takes, make sure that Company X goes away saying, "Gee, that sure was worthwhile." You have then primed them for the next expedition. The response letter should include the following:

a) A brief introduction, breaking the ice, since you have not talked to them in probably eight months now.

b) A brief, succinct history of the high points of the expedition, relating as much of the color and vibrance of the endeavor as possible. Tell interesting anecdotes. This should be anywhere from one to three pages, single spaced.

c) A personalized synopsis of how Company X'S gizmos performed... put the positive aspects in the first paragraph. If you genuinely depended on those gizmos down deep, tell them an interesting anecdote about it. If the gizmos performed miserably, still give them a positive first paragraph... you really did need them. But in the second paragraph write: "I should mention that a few members of the team encountered these problems..." Then offer your suggestions for improvement. Do not underestimate the power of this opportunity. They will listen to your ideas better than anyone else... since you are now on the company "team".

d) A formal ending, thanking them on behalf of the team, informing them that a report will follow (it does not have to be with this letter...it may be six months to a year away from publishing, but you

### Getting Sponsors

will send it to them then) and that you will be available should they desire any further information on the expedition.

e) This is optional, but I usually include a copy of all news items that may have appeared on the expedition in the time it has taken to prepare the response packages.

Send the above via certified mail, return receipt. You then have a legal record that they received the goods. With respect to this you also want to keep accurate records (copies) of all official correspondence (before and after the expedition) with your sponsors. Not only will this resolve any problems that might arise at a later date, it will also give you a valuable indication of what works best...the winning recipe, as it were. Counting all of the above anticipate four to five hours of your time and \$20-25 for each reply.

### Notes On a Few Sticky Subjects.

Do not deal with companies only willing to loan you equipment for the expedition, unless they agree in writing to an unconditional loan wherein they will accept whatever you return to them, if it is not lost or destroyed in the meantime. The best policy is to get it free or forget it. If you lose a loaned item in the field (my current batting average for damaging or losing loaned equipment is 100%) the company will likely come after you looking for a cash reimbursement. That means a costly insurance policy if you are not willing to assume the risk yourself. Not paying them off may ruin your future on the expedition circuit.

If for some reason you are blessed with two sponsors for the same item--say Edelrid and Mammut want to each give you two of their fine climbing lines--take them. Your responsibility at this

point is as follows: give each company photos of their respective equipment in use on the expedition along with a confidential appraisal of its performance. It is a major blunder to tell Edelrid that the Mammut ropes you used performed poorly. Nor should you publish any such comparison unless you feel there is a real danger to the climbing/caving public. Rather you should tell Mammut that you encountered some problems that they should be aware of. If you "burn" Mammut, as in the above example, they will likely never sponsor you again, and that could be a real loss if Edelrid decides to stop sponsoring expeditions someday.

Throughout this discussion I have primarily talked about commodities hardware, food, transportation--which are basically manufactured goods or services. Every expedition also needs a certain amount of cold, hard cash to handle field expenses and purchase those things for which no sponsors can be found. Although the mechanics of approaching cash sponsors are identical to those mentioned above, there is an intangible additional element required... what is euphemistically known in the business as a "receptive ear". Writing to corporations or their foundations for outright grants is an exercise in futility. In 1983 we approached over 100 foundations and philanthropic institutions. None replied. On almost every occasion I know of, cash grants have resulted from a fortunate series of personal contacts who were able to make influential recommendations to change. In 1984 we raised eleven dollars of equipment sponsorship for every dollar of cash backing, a statistic which indicates that in the latter commodity, luck takes precedence over clever writing. It is for this reason that, even with the best of backing, expedition personnel will likely have to put up some cash.

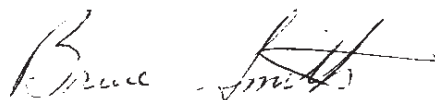
## LETTER FROM THE EDITOR

I have often sat through presentations of papers and research reports and it seems, without fail, someone will stand up and ask an absolutely ridiculous question that if the person thought about it, they wouldn't embarrass themselves and attempt to put the speaker on the spot. Last fall I actually heard someone ask a speaker, who was discussing a new rappel device, if he had any figures on skull penetration from different dropped heights. I'm sure the question was in jest, but I think you're getting my drift.

It even got to a point during a series of papers when there were only two tests that counted...1) The C1-30 test and 2) The Sherman test. Obviously, test one is a determination as to whether the device will survive a 30,000 foot fall out the cargo doors of a C1-30 and test 2 is a determination as to whether a device will survive being rolled over by a Sherman tank.

Obviously, adult mature questions are appropriate during or after most presentations. I would suggest that unless you're sure, it is probably best to sit quietly and hit the speaker after the presentation.

I heard one of the best responses to a speaker heckler that I shall never forget. When asked if the speaker had done "so and so" and it was obvious that the question was asked only to discredit the speaker and make the heckler appear, in his/her mind, better in some way, simply respond, "No, but I look forward to your paper covering that exact line of testing the next time we meet." Keep it in mind for those C1-30 questions and Sherman challenges.



## ADMINISTRATIVE

**NYLON HIGHWAY:** is published by the NSS Vertical Section, and is available to Subscribers and Vertical Section Members for \$3.00 per year. For Delivery outside North America add \$4.00 to the subscription rate for postage.

For Spouse memberships add \$1.00. Please insure that these payments are in U.S. dollars. Frequency of the publication is based on the availability of material. All material that is submitted must be readable. The Editor is able to arrange, upon request relatively quality drawings explaining your topic. As many of the articles published in the **Nylon Highway** are experimental, the NSS, Vertical Section, the Editor as well as any and all authors whose names appear in the **Nylon Highway** absolve themselves of all responsibility. It should be understood by the reader that the responsibility lies with those who choose to experiment further with the information contained here. The **Nylon Highway** attempts to screen and publish reliable high quality material that in the Author's and Editor's best judgement appears to be sound in principle and is backed up with supportive testing or facts. The science of SRT is ever changing because cavers and climbers are constantly finding better safer and more efficient ways of achieving our goals. Always experiment using good judgement and adequate caution. ...THE EDITOR

**OUR REPRINTING POLICY** We have always felt that it can only benefit everyone if the vertical procedures as described in the **Nylon Highway** be reprinted in every publication that will do it. We only request that the Author receive credit for his/her work and the **Nylon Highway** receive credit as being the original publication.



# NSS CLIMBING CONTEST WORLD RECORDS

COMPILED by  
BILL AND MIRIAM  
CUDDINGTON

OCTOBER 1987

## MENS MECHANICAL 100 FEET (30 METER)

AGE GROUP	TIME	NAME	YEAR SET
0 - 12	1:01.5	BILL STUCKLEN	84
13 - 16	0:47.3	BILL STUCKLEN	87
17 - 19	0:33.8	PETER SPROUSE	73
20 - 29	0:25.7	ROSSANO BOSCARINO	87
30 - 39	0:34.1	DICK GRAHAM	83
40 - 49	0:35.1	DICK GRAHAM	85
50 - 59	1:09.9	CHUCK WILKINSON	82
60 - 69	1:22.6	VANCE NELSON	84
70 - 79	0:45.4	DARRELL TOMER	85
OVERALL	0:25.7	ROSSANO BUSCARINO	87

## WOMENS MECHANICAL 100 FEET (30 METER)

AGE GROUP	TIME	NAME	YEAR SET
0 - 12	1:08.9	SUSAN MEDVILLE	85
13 - 16	1:02.1	SUSAN MEDVILLE	87
17 - 19	0:50.6	NORA WHITE	72
20 - 29	0:44.6	PATTY MOTHES	81
30 - 39	0:43.4	MARTHA CLARK	85
40 - 49	1:05.4	MIRIAM CUDDINGTON	84
50 - 59	1:25.1	AVIS VAN SWEARINGEN	83
60 - 69	13:22.3	SARA CORRIE	81
70 - 79	4:30.9	JANE FISHER	85
OVERALL	0:43.4	MARTHA CLARK	85

## MENS CLASSIC 3-KNOT 100 FEET (30 METER)

AGE GROUP	TIME	NAME	YEAR SET
0 - 12	18:05.0	JEFF FRANTZ	84
13 - 16	4:15.0	PETER SOUTHAM	79
17 - 19			
20 - 29	1:37.1	JEFF FORBES	81
30 - 39	2:03.9	PAUL SMITH	85
40 - 49	2:14.9	DICK GRAHAM	87
50 - 59	2:13.4	BILL CUDDINGTON	86
60 - 69	6:42.7	JOHN VAN SWEARINGEN	82
70 - 79			
OVERALL	1:37.1	JEFF FORBES	81

## WOMENS CLASSIC 3-KNOT 100 FEET (30 METER)

AGE GROUP	TIME	NAME	YEAR SET
0 - 12	6:13.0	EMILY GRAHAM	87
13 - 16	6:07.6	GINGER McPHEE	87
17 - 19	2:42.2	DENA HAWES	73
20 - 29	2:43.1	CYNDIE WALCK	86
30 - 39	2:05.0	MARTHA CLARK	84
40 - 49	3:26.2	MIRIAM CUDDINGTON	86
50 - 59	6:12.6	AVIS VAN SWEARINGEN	83
60 - 69			
70 - 79			
OVERALL	2:05.0	MARTHA CLARK	84

## MENS MECHANICAL 400 FEET (120 METER)

AGE GROUP	TIME	NAME	YEAR SET
0 - 12	8:26.0	BILL STUCKLEN	84
13 - 16	7:05.2	BILL STUCKLEN	86
17 - 19	5:55.4	PETER SPROUSE	73
20 - 29	4:10.7	ROSSANO BOSCARINO	87
30 - 39	4:50.5	BILL CORLEY	82
40 - 49	5:30.1	DICK GRAHAM	85
50 - 59	6:22.0	BILL CUDDINGTON	87
60 - 69	7:27.1	DARREL TOMER	78
70 - 79	7:24.2	DARREL TOMER	85
OVERALL	4:10.7	ROSSANO BOSCARINO	87

## WOMENS MECHANICAL 400 FEET (120 METER)

AGE GROUP	TIME	NAME	YEAR SET
0 - 12	14:12.1	SUSAN MEDVILLE	84
13 - 16			
17 - 19			
20 - 29	5:59.0	NANA BAIN	82
30 - 39	5:40.1	LOUISE HOSE	87
40 - 49	9:11.6	MIRIAM CUDDINGTON	86
50 - 59	11:11.1	AVIS VAN SWEARINGEN	83
60 - 69			
70 - 79			
OVERALL	5:40.1	LOUISE HOSE	87

World Records

**MENS CLASSIC 3-KNOT  
400 FEET (120 METER)**

AGE GROUP	TIME	NAME	YEAR SET
0 - 12			
13 - 16			
17 - 19	10:51.9	JOHN BASSETT	70
20 - 29	9:39.9	TRICK HOWARD	85
30 - 39	10:16.6	MARION O. SMITH	79
40 - 49	10:56.5	MARION O. SMITH	83
50 - 59			
60 - 69			
70 - 79			
<b>OVERALL</b>	<b>9:39.2</b>	<b>TRICK HOWARD</b>	<b>85</b>

**WOMENS CLASSIC 3-KNOT  
400 FEET 120 METER)**

AGE GROUP	TIME	NAME	YEAR SET
0 - 12			
13 - 16			
17 - 19			
20 - 29	24:10.4	CYNDIE WALCK	85
30 - 39	12:29.3	MARTHA CLARK	84
40 - 49			
50 - 59			
60 - 69			
70 - 79			
<b>OVERALL</b>	<b>12:29.3</b>	<b>MARTHA CLARK</b>	<b>84</b>

## 1987 MEETING MINUTES

The 1987 meeting of the NSS Vertical Section was held Monday, August 3rd, at Lake Superior State College in Sault Ste. Marie, MI. Executive Committee members present were Bill Bussey, Bill Cuddington, and Allen Padgett. Miriam Cuddington substituted for Darrell Tomer, and Bruce Smith substituted for Shari Lydy, as neither could make it to the Convention.

Due to chairperson Shari Lydy's absence, Bill Bussey chaired the meeting. Bussey called the meeting to order at 12:30 pm.

Bussey read highlights of the Secretary's report. It is reprinted elsewhere in this issue. A special supplementary report detailing how many members from each state or country was highlighted.

Bussey then discussed the Treasurer's report. It too is printed elsewhere in this issue.

### OLD BUSINESS

Bill Cuddington discussed: the climbing contest beginning the next day; Marion Vittetoe donating three stopwatches; Less than a 27.65 second climb

will break the 30M mechanical record. Gary Storrick offered discussion on this noting that old records on different lengths are old records. Cuddington concluded saying that children should be kept under control during the contest.

Bussey noted that several people had noticed and made mention of the stability of the contest since 1966 due to the Cuddingtons' efforts. There was a round of applause.

Karen Padgett showed the membership the proposed new logo. Membership was asked to decide whether the logo should feature cave formations. Storrick quipped, with formations, the BOG will gate the patch. Allen Padgett noted that a clean design of the logo without formations has a more universal appeal. A straw vote was taken. 17 for, 5 against. Discussion on prioritizing patch, sticker, or pin. Membership wants T-shirts. Scott Fee said he can get T-shirts made in small quantities which would avoid inventory problems. Patch, T-shirt, are both first priorities. Stickers seemed to have a high priority.

**Minutes**

Allen Padgett updated the progress of **On Rope**. Someone needed to drive the books from Michigan (Binder) to OTR (Old Timer's Reunion) or Huntsville to save on shipping. **On Rope** T-shirts are on sale for \$8.00 each. Bruce Smith expects a second printing withing 12 months. Padgett read the chapter titles.

David McClurg needs help in the Vertical Techniques Workshop.

**NEW BUSINESS**

Bruce Smith discussd the rehabilitation of PMI's rope testing dynameter used during the Aging Rope project. It would be considered Test Grant Money. Smith moved:

The Vertical Section give PMI \$250.00 with these (listed) stipulations for rehabilitation of their dynameter.

Scott Fee seconded.

Bob Thrun asked how his would affect the Section financially. We have \$2900 in total funds so we have the funds. Kirk MacGregor discussed proper terminology of the machine.

The vote was unanimous in support of the motion with Bruce Smith writing the letter of appreciation that would accompany the check.

Bill Bussey moved:

The Vertical Section of the NSS shall, as it sees fit, present an award to a person, persons, or group for outstanding contributions to the development of Vertical technology and/or techniques. The VS Executive Committee will decide the recipient of this award to be presented at the yearly NSS Convention awards banquet.

Allen Padgett seconded.

Discussion followed. A certificate along with a permanent plaque should be placed in the NSS office was mentioned as a possibility. The Section would do all it could to further the recipient's consideration for other awards in the society.

Vote was one against, rest for.

The next item of new business a motion by Bill Bussey that the editor of the **Nylon Highway** become a member of the Executive Committee. This would have added a 6th member to the E. C. Discussion followed. Gary Storricks noted that in argument for, its a person who does a lot for the Section and they are visible. The argument against is that an editor who writes articles should not be making policy decisions for the Section.

Kirk MacGregor noted that the Bylaws have a provision for amending them. Without a copy of the Bylaws, it was impossible to accurately determine the legality of a motion making the editor a member of the board. Thus, discussion was moved, seconded, and voted to be tabled.

Bill Bussey then made the motion to have a chair and a vice chair whom could run the meeting when the chair could not be there. Discussion followed. It was determined that it was not necessary to formally designate an office of Vice Chair. This would be determined by the E.C. The motion was postponed indefinitely. The meeting concluded with elections. Those elected were:

- Bill Bussey Secretary/Treasurer.
- Bruce Smith Editor/Executive Committee.
- Bill Cuddington Executive Committee.
- Scott Fee Executive Committee.
- Allen Padgett Executive Committee.

Gary Storricks said that he would write Bruce's Executive Committee article in order to have five separate articles.

The meeting adjourned at 2:00 pm.

Later during the week, the Executive Committee met and selected Bill Cuddington as Chairman.

Respectively Submitted,



# MARKING ROPE LENGTH

By Bill Bussey

One can mark the length of a rope by incorporating it into one's personal color code. At each end of the rope, use tape wrapped around the rope, or markers to indicate personal, unique, color code hopefully used on other gear. Tape seems better as it doesn't fade or discolor when applied to rope. Type (not write) rope length and owner name on paper. Length goes above the name. Cut

strip with info from paper, keeping it as small as possible. Use glue stick or Uhu stick on back of strip to hold it to rope. If white is part of your color code, incorporate strip in code. Else, place strip below code, as close to the end of the rope as possible. Cover and seal code and info with Clear Whip-End Dip. Use at least three coats and let dry thoroughly between coats. □

# ANOTHER WAY TO WASH A ROPE

By Bill Bussey

When its time to wash a rope one may not have access to a suitable washing machine. One way around this is to wash the rope by hand in the bathtub. Make a loose coil of the dirty rope in the tub. If available, fill the tub with warm water using the shower head. Water droplets provide agitation, knocking much dirt and oxide off the rope. At the same time, add a gentle liquid detergent. I use cheap dishwashing detergent. Detergents keep the dirt and oxides from settling back on the rope while sitting in the water. Using a plastic scrubber, or brush, start at one end of the rope and scrub. Be sure to scrub the entire rope diameter. Place some detergent on the

scrubber occasionally. Continue to dip the rope in the water while scrubbing. Continue scrubbing the length of the rope. When finished, turn on the shower head and with water running drain dirty water. After draining, fill tub again, again adding detergent. Shake and agitate the rope around in the water. If desired, scrub places which still need it. After five minutes or so of continued agitation, drain as above. Repeat as often as you like. Pull rope from water and allow to dry to allow rope to return to its maximum strength. (Editor Note: The addition of fabric softener is no longer a recommended part of rope restoration.) □

## CALL FOR 1988 VERTICAL SESSION PAPERS

This is a request for abstracts of papers to be given at the Vertical Session at the NSS Convention in Hot Springs, SD on June 27th 1988.

Abstracts, or at minimum, titles of papers should be sent to Allen Padgett, Vertical Papers Chair, no later than March 15th, 1988 so that they may be included in the Convention program. Later entries will probably not make the program.

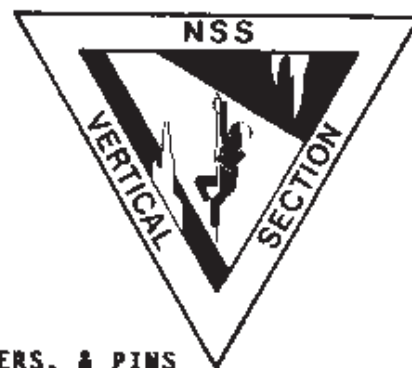
Papers can be on any subject relevant to Vertical caving or Single Rope Techniques. They do not have to be fancy or elaborate presentations.

Updates on old equipment used new ways, new equipment and techniques, safety tips or equipment, and more are all of interest. If you are doing something that would interest other Vertical cavers, go ahead and tell everyone about it!

We hope to have a standing rope for actual demonstrations. Slide projector, overhead projector and blackboard will be available.

To reserve your spot and make the convention program call or write **BEFORE MARCH 15TH**, Allen Padgett, 1988 Vertical Section Papers, Rt. 3, Box 3298, Cleveland, GA 30528, (404) 865-5390. □





**ANNOUNCING**

**VERTICAL SECTION  
T-SHIRTS, SWEATSHIRTS, PATCHES, STICKERS, & PINS**

T-Shirts, Sweatshirts, Patches, Pins, and peel on Stickers featuring the new Vertical Section logo are now available from the Secretary/Treasurer. The all Yellow shirts are 50/50 cotton/polyesterblend. Logo is yellow, dark blue, red and orange.

- T-Shirt in Small, Medium, Large, & X-Large.....\$7.00  
plus \$1.00 shipping
- 4" Embroidered Logo Patch.....\$3.00  
plus \$.50 shipping
- Sweatshirt in S,M,L,& X-Large.....\$14.00  
plus \$1.50 shipping
- 1" Cloisonne type Pin.....\$3.00  
plus \$.50 shipping
- 3" Vinyl Sticker.....\$2.00  
plus \$.50 shipping

**Will Take Special orders for:**

- Long Sleeved T-shirt in S,M,L & X-Large.....\$9.00
- Hooded Sweatshirts.....\$17.00
- Baseball type cap (yellow with logo).....\$5.00

(Add \$1.50 shipping for above special order items)

**Note:** These special order items are not presently kept in stock. Will accumulate orders for these items until minimum order is reached. S/T will hold checks for up to six weeks until go or no decision on manufacturing item is reached. If no go, checks will be returned. For further information, contact Sec./Treas.

**Conditions:** Prices for Vertical Section members only

- Non Members add \$3.00
- Allow 4 weeks for delivery
- S/T will inform if out of stock or other delay
- Item specifications may change without notice
- Money back if not delighted
- Checks payable to NSS Vertical Section

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Gastonia, NC 20854 (704) 864-5071