

Nylon Highway Issue #48



... especially for the Vertical Caver



#48

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Danger!

Don't feed the micro-rack!

By Scott McCrea, NSS #40839

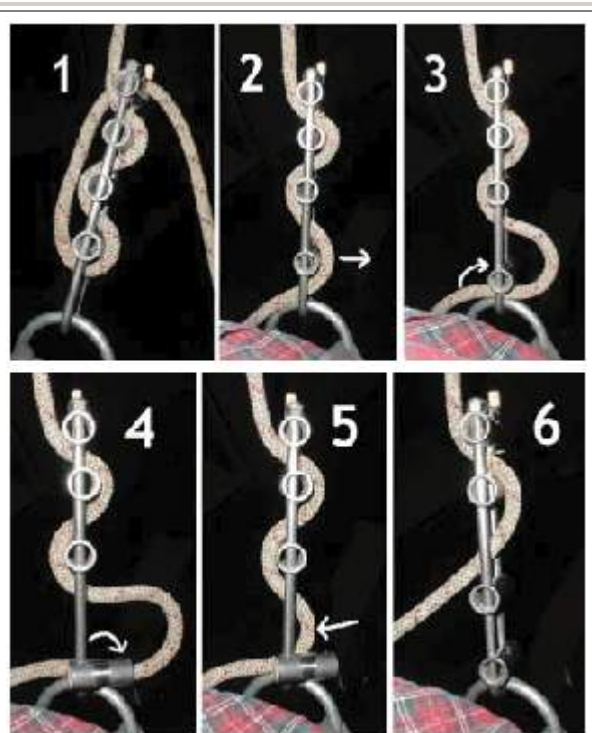
I love my micro-rack. It's great for most drops and works great with a frog system. However, there is a potential hazard with them. It is possible to accidentally drop to two bars. This happens when there is too much friction and a rappeller resorts to feeding rope causing the bottom bar to pop off. It is possible to pop bars off of any rack while feeding, but since a micro-rack only has four bars, the margin for error is slight.

The micro-rack is unique among racks in that very little variation in friction is available. Bars cannot be added or dropped like on a regular rack. There is only a small amount of space to spread the bars (there are long micro-racks available which increase the spreading space, but the feeding issue is still there). So, often the only option is to feed rope.

Imagine a caver rigs his trusty but stiff and dirty rope to a tree about 20 feet from the lip. The approach to the lip is sloped but not steep. The rappeller rigs his micro-rack a safe distance from the lip, but as he begins to back down towards the edge there is too much friction. He struggles to inch down the rope. Even without the hyper-bar and the bars spread, it's tough going. Feeding some rope into the rack speeds things up. At the lip, he turns around to look down the pit and plan his next move. Still feeding rope, he removes his hand from the rack, maybe to adjust a pad, swat a bee or to help balance. A loop of rope gets fed into the rack and all of a sudden, he's on two bars and going a lot faster.

So, how can this be prevented? Simple, pay attention. Ok, that's a little obvious. The best way to prevent this is to follow a simple but often broken rule that applies to any and all unlocked racks -ALWAYS keep a hand, finger, thumb, or something on the last engaged bar. A bar that you are holding will not come off.

Please note, there is nothing wrong with these racks. While the rack pictured here is a BMS Micro-Rack, this can happen with any four bar, U-shaped rack. They all work just fine, as long as they are used correctly. I am definitely not giving up my micro-rack and neither should you. Just be aware of the hazards, be prepared, practice, simplify and think.



1. Micro-rack rigged with all bars including the hyper-bar.
2. Hyper-bar disengaged, rope being fed creating a loop.
3. The rope outside the rack will push up and in on the bar and pop it off.
4. Bar swings open.
5. Rope slips out of the rack.
6. Rack is now rigged with only two bars.

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A simple and safe change-over procedure

*by Matthew Hazelton, WUSS #0449; NSS #47187, and
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Rappelling, ascending, and caving are inherently dangerous sports and should be experienced only after receiving proper training. Most importantly, all procedures described in this article should be practiced in a safe and controlled environment with direct instruction from a knowledgeable teacher. Accidents may happen even if these instructions are followed exactly. In no way can the authors, Wittenberg University Speleological Society, Wittenberg University, or the National Speleological Society be held accountable for any accident(s) due to gear malfunction, improper instruction, or unforeseen acts of God.

Vertical rope work is enjoyable and, if practiced properly, usually very safe. Occasionally problems arise while you are on-rope (e.g., the rope rigged too-short, clothing or hair become caught in rack, or you need to pass over a knot when two ropes are tied together). When a problem occurs, it is paramount that you have the training and experience needed to correct the problem and/or safely get off-rope. One fundamental skill for getting off-rope is "changing-over." This procedure involves switching from rappelling to ascending or ascending to rappelling while on-rope. The instructions that follow are intended to provide a refined technique for Single Rope Technique (SRT) users to change-over. This method specifically eliminates the problem of pinned rope (Figure 1), as described by Jancin (1994), while tying-off. Bain (1991) and Jancin (1994) addressed the use of the Carabiner Rack Configuration (CRC) (Figure 2), but until now the CRC has not been incorporated as a fundamental step of changing-over.

*Note: There are many ascending systems used by cavers (e.g., Three-knot prusik, Mitchell, single or double bungee ropewalker, Frog). The system used here is a hybrid, much like the one pictured in Smith and Padgett (1996: Fig 6-34).



Figure 1



Figure 2

Gear needed for ascending, rappelling, and changing-over

- Rope 7/16" (rigging equipment and know-how)
- Seat harness (Figure 3)
- Helmet (Figure 4)

- Rack (with stainless steel bars and a non-locking carabiner attached above the top bar of the rack (hanging on the open side of the rack) (Figure 5)
- Screw link (a.k.a. maillon) or locking carabiner (Figure 6) used with seat harness
- Chest harness w/ roller and non-locking carabiner attached (Figure 7)
- QAS (Quick Attachment Safety - e.g., Jumar with attachment to harness) (Figure 8)
- Foot ascender (with foot attachment) (Figure 9-1)
- Knee ascender (with foot attachment) also attached by cord to harness (Figure 9-2)
- Gloves (preferably leather palmed)

Full gear correctly positioned on a person (Figure 10)



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8



Figure 9



Figure 10

Rappelling:

Before you begin rappelling, you must make sure that the rope is properly and safely rigged and that there is a figure eight on a bight at the trailing end of the rope. For safety purposes, a full set of rappelling as well as ascending gear need to be worn for the rappel (this should be a procedure used by all cavers but is absolutely **mandatory** for the first person rappelling into a pit). Attach the QAS to the rope before you approach the edge. Announce to everyone around, especially your belayer (if you have one), that you are "On Rope." Attach your rappelling rack to the rope and make sure that you have the rack oriented and threaded correctly. Have a knowledgeable person double-check your gear to make sure that it is properly attached and ready for use. If you have a belayer, ask the question "On Belay?" Wait for the reply "Belay On" from your belayer. Hold the trailing end of the rope in your dominant hand and do not let go with this hand until your rappel is completed. Announce that you are "Rappelling" and wait for the response "Rappel On" from your belayer. Remove your QAS from the rope using your non-dominant hand, secure it to your seat harness, and begin your rappel. Once you are finished with your rappel, have removed the rack from the rope, and moved away from the rope call out that you are "Off Rope and All Clear."

Rappelling summary:

- Make sure that you have on a full set of rappelling and ascending gear (Figure 10)
- Make sure the rope has a figure eight at the trailing end
- Have QAS attached to the rope before approaching the edge
- Announce that you are "On Rope"
- Attach your rappelling rack making sure you are threading it correctly (Figures 2, 15, 17)
- Have a knowledgeable person check to see that all your gear is attached properly and ready to be used
- Ask "On Belay"
- Wait for reply "Belay On" (if someone is able to belay your rappel)
- Hold the trailing rope in your dominant hand (do not let go with this hand until the rappel is completed)
- Announce that you are "Rappelling"
- Wait for reply "Rappel On" from your belayer (if you are being belayed)
- Remove your QAS with your non-dominant hand
- Begin your rappel

Changing-over from rappelling to ascending:

Another unfortunate circumstance (e.g., rope does not reach the bottom of the pit) has forced you to change-over, this time from rappelling to ascending. Begin by bringing the rope under the last bar and pulling up to tighten the bars together. Then, take the loop of rope, which you just pulled up, and clip it to the carabiner attached above the top bar on the rack. Attach the QAS to the rope, above the rack, and push it as high as possible. Once the QAS is high on the rope, attach both your foot and knee ascenders to the rope. Make sure that your foot and knee ascenders are high enough on the rope so that when you stand, the QAS attachment to your harness becomes flaccid; yet the foot and knee ascenders should not be so high that it is excessively difficult to stand. Stand up on your foot and knee ascenders and push the QAS up the rope as far as possible. The attachment between the QAS and your harness should be taut. Now, sit down in your seat harness and detach the rappelling rack from the rope. Attach the roller of your chest harness to the rope and begin your ascent.

Change-over summary (rappel to ascend):

- Bring the rope under the last bar and pull up to tighten the bars together (Figure 18)
- Clip the loop of rope, which you just pulled up, through the carabiner attached above the top bar on the rack (Figures 18,19)
- Attach the QAS to the rope, above the rack, and push it as high as possible (Figure 26)
- Attach your knee ascender (Figure 24)
- Attach your foot ascender (Figure 14)
- Your foot and knee ascenders should be high enough on the rope that when you stand the QAS attachment becomes flaccid, but not so high that it is excessively difficult to stand
- Stand up on your foot and knee ascenders
- Push the QAS as high on the rope as possible (Figure 21)
- Sit down in your seat harness
- Detach the rappelling rack from the rope (Figure 17)
- Attach the roller of your chest harness to the rope (Figure 12)
- Begin to ascend

Ascending:

Before you begin ascending, as you approach the rope, announce that you are "On Rope." Attach your gear to the rope in a bottom-up sequence, beginning with your foot ascender. Next, attach your knee ascender, followed by attaching the chest roller to the rope. The Quick Attachment Safety (QAS) is the last piece of gear to be attached and the cord, or webbing, should run behind the chest harness or through a second chest harness roller if the harness has two. A knowledgeable person should check over the attachment of the gear before you begin to climb. Specifically, make sure the seat harness has its straps doubled back, all carabiners and screw-links are locked, the chest harness is tightened and the roller(s) properly closed, that each ascender's cam is closed correctly, and that the rope is properly and safely rigged.

Announce that you are beginning to ascend by calling out "Climbing." After getting the reply "Climb On" you may begin ascending. When you are climbing, take short steps and do not try to climb using your arms and QAS to pull you up the rope; it is much more efficient to climb by walking up the rope.

Ascending Summary:

- Announce that you are "On Rope"
- Attach gear to the rope from the bottom up
 - Foot ascender (Figure 9-1)
 - Knee ascender (Figure 9-2)
 - Chest harness roller (Figure 12)
 - QAS with its cord or webbing running behind the chest harness (or through chest harness roller if harness has two) (Figure 11)
- Have a knowledgeable person check over attachment of gear (carabiners locked, harness doubled back, gear correctly positioned and tightened, and the rope rigged correctly).
- Announce that you are "Climbing"
- Take short steps and do not try to climb using your arms and QAS to pull you up the rope. It is most efficient to walk up the rope.

Changing-over from ascending to rappelling:

Once you have reached a place or circumstance where you need to go back down the rope, you

will need to change-over to rappel. Begin by pushing your QAS as high on the rope as possible. Next, detach the chest roller from the rope and sit down in your seat harness. Be sure to replace the pin of the chest roller. Detach your foot ascender from the rope making sure to keep your knee ascender and QAS attached to the rope. Attach the rack to your seat harness screw link (a.k.a. maillon) or locking carabiner with a locking carabiner and position it so that the groove on the top bar is facing up at you (**NOTE:** NEVER unlock your seat harness screw link (maillon) or locking carabiner. Always use an additional locking carabiner to attach the rack to the seat harness). Thread the rope through the rack while keeping the rack as high on the rope as possible. The higher on the rope you attach the rack the more easily and safely the rest of the change-over will proceed. Once you have threaded the rack completely, bring the rope under the last bar and lift it up to position the bars closer together. Clip the rope, which you just pulled up, through the carabiner on the top of the rack and pull it down by your hip. You now have the rack tied off completely. This method of tying off the rack is far superior to the traditional method of bring the rope under the last bar and looping it over the top of the rack. The traditional tie off often results in getting the rope stuck "pinned" between the two top bars of the rack and the rope (Figure 1), thus making restarting your rappel difficult, to impossible, and unsafe. Stand up on the leg that is still attached to the rope, and slide the QAS down close to the top of the rack (but not touching the rack, otherwise it may get jammed). Sit down in the harness again and then detach the knee ascender. From this point on, you must hold the trailing rope in your dominant hand as if you are rappelling. Detach the QAS, keeping in mind that you must never remove your dominant hand from the rope. Now, hold the trailing rope vertically above the rack and unclip the carabiner at the top of the rack with your non-dominant hand. You are now ready to proceed with your rappel.

Change-over summary (ascend to rappel):

- Push QAS as high as it will go on the rope (Figure 11)
- Detach chest roller from rope (Figure 12)
- Sit down in seat harness (Figure 13)
- Detach foot ascender (Figure 14)
- Make sure the rack is correctly aligned (Figure 15) and attach it to your seat harness carabiner or screw link with a locking carabiner (Figure 16)
- Thread the rack and make sure to keep the rack as high on the rope as possible (Figure 17)
- Bring the rope under the last bar and pull up to tighten the bars together (Figure 18)
- Clip the loop of rope, which you just pulled up, through the carabiner attached above the top bar on the rack (Figures 19, 20)
- Stand up on your leg that is still attached to the rope (Figure 21)
- Slide the QAS down close to the top of the rack (but not touching the rack, it can get jammed in the rack) (Figure 22)
- Sit down in the harness again (Figure 23)
- Detach the knee ascender (Figure 24)
- Hold the trailing rope in your dominant hand as if you were rappelling (Figure 25)
- Detach the QAS with your non-dominant hand keeping in mind that you must never remove your dominant hand from the trailing rope for the remainder of the change-over or rappel (Figure 26)
- Hold the trailing rope vertically above the rack (Figures 27)
- Remove the rope from the carabiner at the top of the rack by unclipping the carabiner with your non-dominant hand (Figure 28)
- Proceed with your rappel



Figure 11



Figure 12



Figure 13



Figure 14



Figure 15



Figure 16



Figure 17



Figure 18



Figure 19



Figure 20



Figure 21



Figure 22



Figure 23



Figure 24

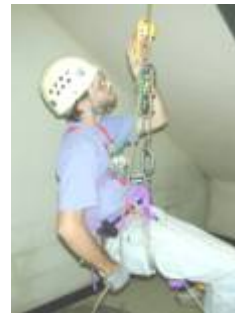


Figure 25



Figure 26



Figure 27



Figure 28

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ONE MAN'S VERTICAL SYSTEM (Revision #9) *by Bob Johnson*

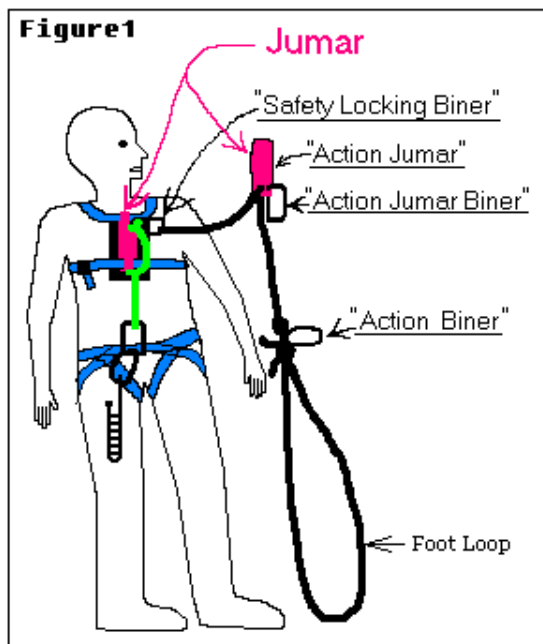
[Editor's Note: This is a revision of the same article that first appeared in NH#45, 2000.]

My name is Bob Johnson, NSS # 35023. I have been the Willamette Valley Grotto's vertical chairman for several years. I have been setting up vertical caving rope practices with an obstacle course. I try to simulate real cave conditions the best I can in the practice area. I like doing vertical rope work so I wanted to be able to do all of the obstacle courses easily. This forced me to modify my system many times to make it the easiest for all possible situations. I also wanted it simple and not too expensive. When fellow cavers would let me explain my system and tried it, they all wanted me to write to the NSS to share the features of my system. So here goes!

FIRST THINGS FIRST

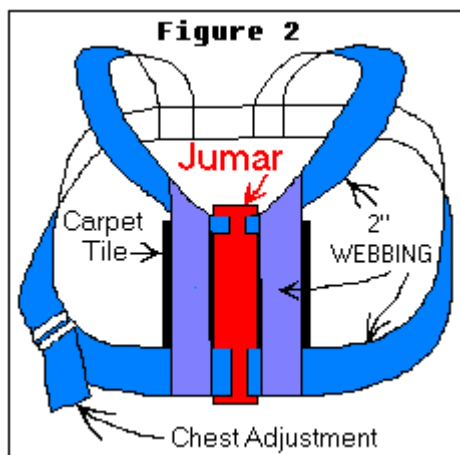
The first thing that I would like to do is to quote an article from the book "*On Rope*," Copyright 1987 National Speleological Society, entitled "Climbing Systems" on page 173, reprinted with permission from the NSS:

"The ideal climbing system should enable the climber to move comfortably and efficiently up the rope. It should provide a secure attachment to the rope, yet be easily removed as well as attached. It should fit the climber properly, be easily taken on and off with ease. It should be lightweight and not bulky. A good system is versatile, able to accomplish a variety of tasks such as being transformed into a rescue haul system. It should be redundant so that any failure will not place the climber in immediate danger. After a component failure, it should have the versatility to be transformed into a system enabling the climber to continue up or down safely. A system should be durable and incorporate interchangeable replacement parts. A good system climbs a wall as well as a free drop and allows a climber to ascend over difficult lips. Systems that fit climbers of different sizes are useful during rescues and training seminars. A great system incorporates the ability to downclimb."



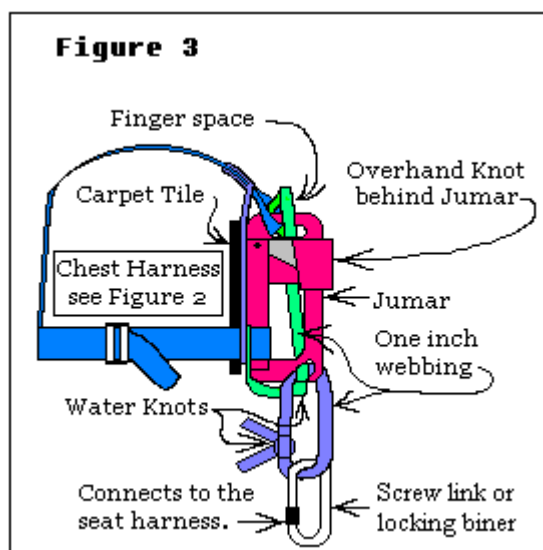
DESCRIPTION / CONSTRUCTION (See Figure 1.)

The first important thing is a good seat harness. My seat harness is a Gibbs style. The second important thing is a chest harness. (See CHEST HARNESS.) They must be connected together since rescue work requires that the seat harness be connected to the chest harness. (See CHEST TO SEAT CONNECTION.) I use two-inch webbing for all of my harnesses.



CHEST HARNESS

The chest harness is hand made. It has a webbing strap around the chest just under the tender area of the armpits and two shoulder webbing straps connected in back. The webbing around the chest should include an adjustable connection device making it comfortable for both male and female users. The chest webbing and shoulder webbing are sewed to a piece of carpet tile (for padding) and through a Jumar ascender. Use a left-handed Jumar here for a right-handed person. I found that the Jumar ascender works the best. The webbing should be sewn tightly and attached safely to the Jumar so that the Jumar is held upright and as high as possible on the chest. The chest strap goes through the Jumar's handle and is sewn tightly to the Jumar. The shoulder straps go through the top hole of the Jumar. I added two short webbing straps, one on each side of the Jumar. These straps are sewn to the shoulder straps and to the carpet tile and to the chest strap. (See Figure 2.) The short webbing straps help to prevent the shoulder and chest straps from pulling out of the carpet tile. The Jumar's opening for the rope is held away from the body. The Jumar is free to operate smoothly but it is sewn securely to the chest harness so it will not move on the chest. If all was done correctly and you were lying on your back, you could be picked up by the Jumar's handle like a suitcase. This Jumar, when connected to the seat harness properly and on rope, will allow you to rest in a seated position.



CHEST TO SEAT CONNECTION

Connecting the chest harness to the seat harness is done with the best one-inch webbing. I suggest a piece that is about four feet long. Find the halfway point. Put one side through the top Jumar hole and through the webbing loop that is in this hole already. Tie an overhand knot. (See Figure 3.)

Overhand knot procedure: Put both lengths of webbing in your left hand, palm down. The attached Jumar would be to the left of your left hand. The two ends of webbing should now be considered one. With the right hand grab the two ends and put the webbing on top of the left hand to form an eye or loop. Now use your left hand's thumb to pinch the loop so you can hold this loop in your left hand. With your now free right hand grab the webbing ends and put them through the eye from the bottom side to the top. Pull tight to make the knot.

The end loop should be neat and about two inches long and connected through the top hole of the Jumar and through the chest harness webbing. Adjust if necessary. Place one loose end through the bottom hole of the "chest Jumar" and tie a water knot. If all was done right, the webbing should be smooth and tight when one finger is placed in the top loop above the Jumar. The webbing should be near the rope-guide cam area of the Jumar but on the other side of the metal rope guide. The ends should be sewed to the carpet tile so that the top loop maintains the finger space. (See Figure 3.)

Take another piece of one-inch webbing three feet long and place one end through the bottom hole in the Jumar and through the loop you just made near the water knot. Be sure it's through the loop and the hole because it's your safety connection. The ends should be tied with a water knot at a length that will allow you to connect the webbing to your seat harness with a stainless steel screw link or a locking biner. (See Figure 3.) I like to secure the ends by sewing them down.

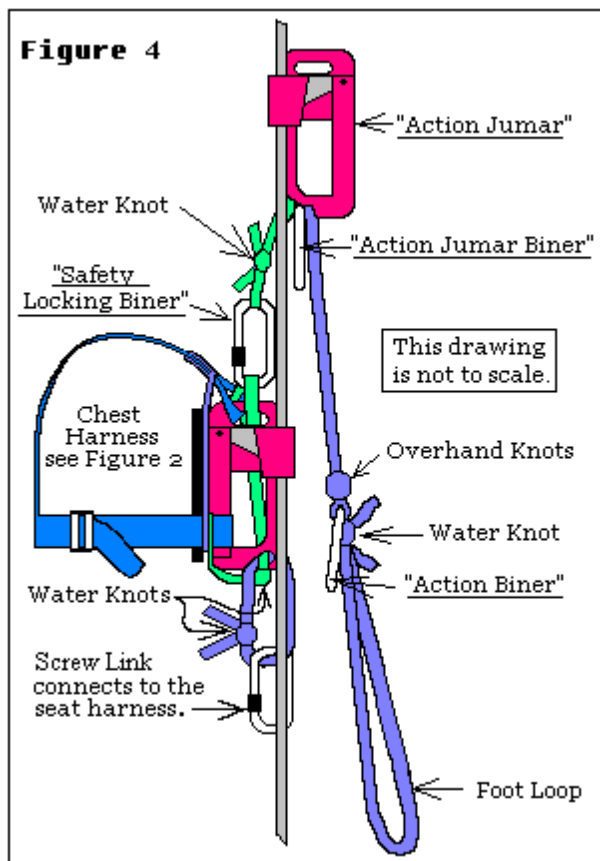
CHECK IT

If you assembled the chest harness and connected the seat harness connection properly you will stand hunched over. If you didn't, and you are standing straight up, then the chest harness will ride up and be in your face while you are on rope. Tighten the above paragraph's loop to fix this problem. A properly adjusted harness allows you to be in a comfortable sitting position off rope or on rope, even if you are unconscious. When not on rope, I unscrew the screw link connection and

put in an additional biner between the chest webbing loop and the screw link so I can stand up straight. Leave the two harnesses connected for safety! Be sure to remove the extra biner when you are about to go on rope and reconnect the screw link.

COW'S-TAIL

A safety Jumar or cow's-tail! Some climbing systems really need a safety Jumar when making a changeover from rappel to climb, or climb to rappel, or when passing an anchor point. So I said to myself: "Why not incorporate it into the basic system. No chance of dropping it then." I use the "Inchworm" / "Frog" climbing system. This system uses a safety Jumar or "action Jumar" (my name for clarity) and it has three things attached to the bottom hole in the Jumar. (See No. 1 through 3 below.) I used the best one-inch webbing for all of these.



1. This attachment is the safety attachment. In the top loop of the chest harness Jumar, clip in a locking biner. We will call this the "safety locking biner." Be sure to clip it onto the webbing only that is in the top hole of the Jumar. This webbing is your safety connection if the chest harness Jumar is broken. It connects to the seat harness. (See Figure 4.) To make the webbing measurements easier put on your seat harness and your chest harness and connect them together. Clip your chest harness Jumar onto a suspended rope and sit in the harness. While hanging on the rope, clip on another Jumar above your "chest Jumar." Use a right-handed Jumar for a right-handed person. I call this the "action Jumar." Grasp the "action Jumar" in the handle with your right hand and put your left hand on the top and sides, then slide it up the rope as far as it is comfortable. This is the travel length that you can use. (I get about 15-16 inches.) Be sure that the rope in the rope-guide cam is close to your head. The Jumar should be in the up position so you can work the release easily with your right thumb. Tie a loop of webbing through the bottom hole of the "action Jumar" and through the "safety locking biner" that is clipped onto the loop at the

top of the chest harness Jumar. Be sure that the "safety locking biner" is held up tight when you tie your water knot. (See Figure 4.) I also sewed the ends down once the final adjustment is done.

2. You should still be suspended on the rope. Push the "action Jumar" up as far as the attachment to your chest harness will allow. The next attachment uses a piece of webbing about eleven or more feet long, depending on your height. Find the halfway point and put one end through the bottom hole in the "action Jumar." Pull one side down so the other end is about a foot and a half below your navel. The loose webbing should now be hanging in front of you. Grab the two ends at about chest high and tie an overhand knot in the webbing with the knot at the midpoint of your "chest Jumar." Now tie a water knot one inch below that with the two ends. Next, raise one knee so the upper part of your leg is horizontal with the floor. Put the loop you just made under your raised foot and adjust the water knot so your foot is held in that position. This is your foot loop. You may need to adjust this after you see how it works. Spread apart the short section between the two knots and put in a non-locking biner. This is the "action biner." (See Figure 4.) After you have used this system and you like the foot loop where it is, you then can sew the ends down.

3. The last attachment is a non-locking biner placed in with the webbing in the bottom of the "action Jumar." It will be called the "action Jumar biner." (See Figure 4.) Place one strand of the two webbing's loops that are in the bottom hole of the "action Jumar" in the "action Jumar biner."

RAPPELLING DEVICE AND EXTRA ITEMS

A Rack or SRT (Single Rope Technique) for rappelling is locked onto the seat harness with a locking biner or directly on the screw link. This concludes the construction. Extra items for all the features, except for the Hualing Systems feature, would be: a pulley, one locking and two non-locking biners, long loop of one-inch webbing, eighteen inch loop of small diameter climbing rope, and a long line of small diameter climbing rope for the 2 to 1 rescue procedure.

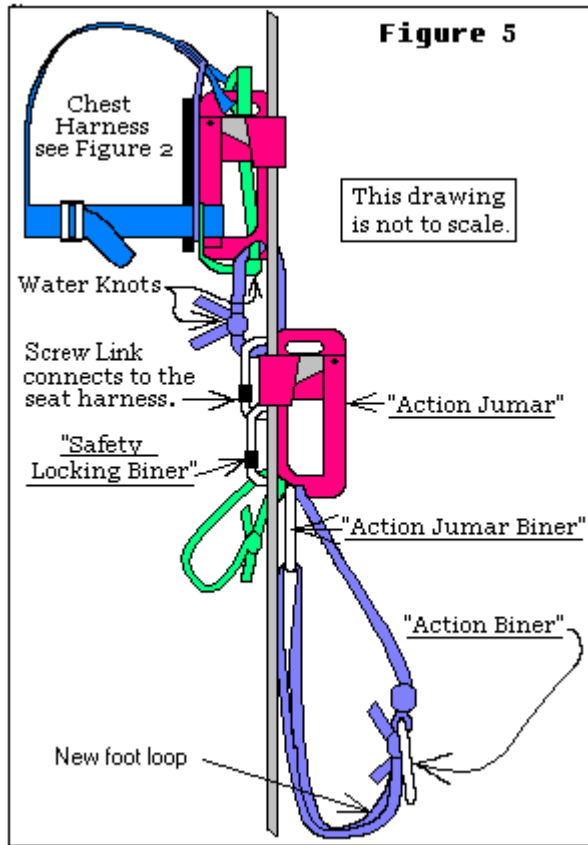
NO CHICKEN LOOPS

Why such a big foot loop and no chicken loops? Chicken loops indicate to me that the system will let you go upside down if one component fails. No one should ever have that happen! If your system would do it, fix it! My system does not need the chicken loops because if one component failed it would not let the person hang upside down. You can use it to climb with one foot or both. When climbing, and you want to rest, the big loop is used to put your feet and your knees in so you can rest your legs completely. Your legs now make a nice flat place to put things that you want to set down temporarily on. If the "action biner" is clipped to your descending device, when you are rappelling, the big loop can support your feet on a free drop rappel.

HOW IT ALL WORKS

With both Jumars on the rope, sit suspended. You now can put one or both feet into the foot loop. **Raise your foot loop** leg(s) and at the same time slide the "action Jumar" up as far as it will go with both hands. I like to use both hands for exercise. Stand in your foot loop and at the same time pull down on the "action Jumar" and toward your "chest Jumar." Your "chest Jumar" should feed the rope through. Sometimes it doesn't because the rope is very short below you. You can pull the rope down with one hand or trap the short end with your heels for starting. Next, sit down in the harness and repeat the process. **Raise your foot loop ... etc.** When I am against a wall, I use one foot for balance and one foot in the foot loop. The large loop enables me to switch feet easily. This sit-stand method of climbing can easily cause a bouncing rhythm when you climb. If you do this, the rope above you may be sawed in half by a protruding rock. To prevent the bouncing rhythm

from occurring, make the end part of your movements with a smooth gradual stop.



A second climbing mode. Make this second climbing mode like Figure 5. To do this "on rope", first tie a loop on a bight below your Jumars. Clip your "action biner" onto the loop and to your seat harness screw link. Remove the "safety locking biner" from the position shown in Figure 4 and clip it onto your seat harness screw link, See Figure 5. Never unlock a locking biner unless you will still have two points on the rope connected to your harness like we do here. Move the "action Jumar" below the "chest Jumar" and clip it onto the rope. Unclip the "action biner" from the screw link and the loop. Remove the loop from the bight of rope. Take the bottom of the foot loop and clip it into one of the non-locking biners below the "action Jumar." You now can use the sit-stand method with one finger pulling up the bottom Jumar, or put a bungee cord in it instead of your finger. You can climb up or down very easily. This position is ideal for climbing up over a difficult lip where the rope is on the ground at the top of the climb.

DOWNCLIMBING

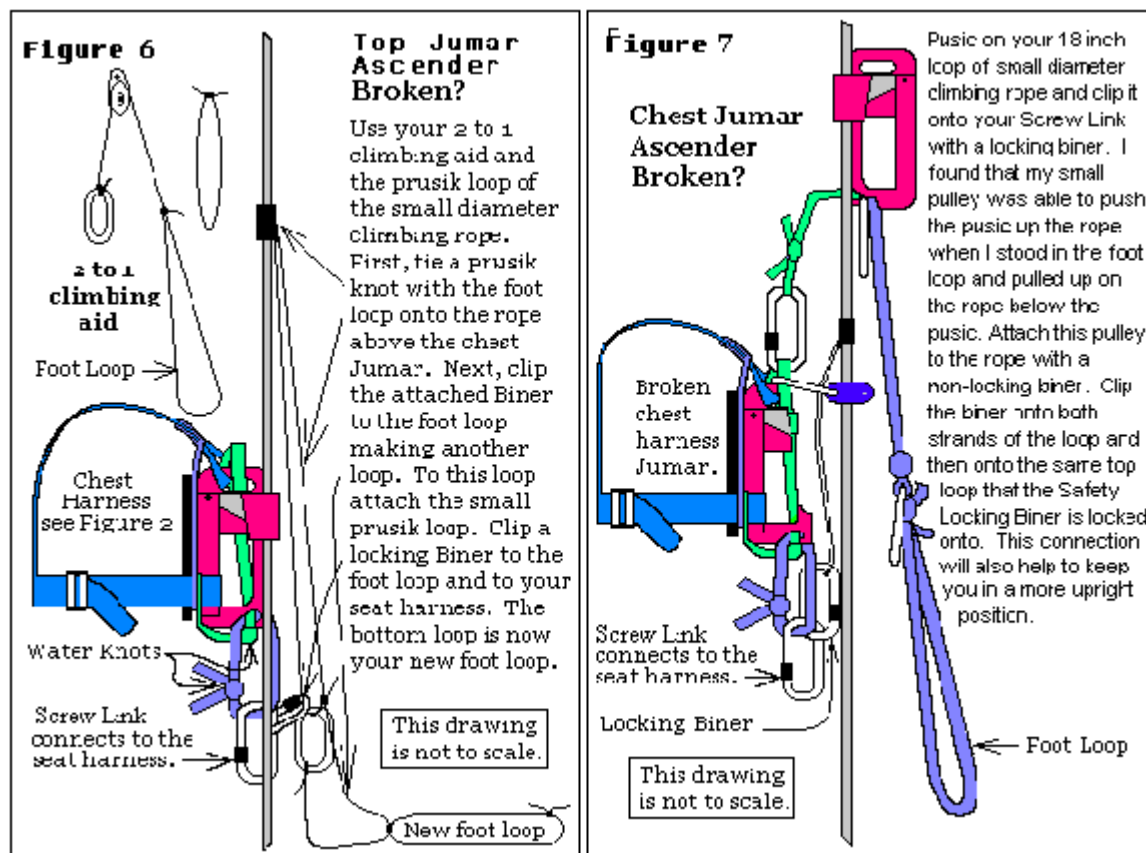
With both Jumars on the rope as seen in Figure 4, sit suspended. Lift your feet up and move the "action Jumar" down close to the "chest Jumar" and lock it. This is done by raising the Jumar slightly and at the same time releasing the cam with your thumb. **Stand in the loop** and move the "chest Jumar" down, using the thumb release method, almost as far as it can go by squatting down, and then lock it. Sit down and raise your feet and move the "action Jumar" down close to the "chest Jumar" and lock it. **Stand in the loop**.....etc.

RESTING

When you need to rest, the chest harness Jumar holds you in your last position. If you put the "action Jumar's" foot loop at the right height you can rest in a seated position. In some other systems, when you stop climbing, you have to squat down to get a device to jam so you can rest your muscles. Then you have to waste energy by standing back up to continue climbing.

IF ONE FAILS

If one Jumar should be broken or damaged by a rock, you still have one left to climb with. This is done by looping the rope, below the Jumar, around one raised foot. Bring up the down side of the rope and put it next to the rope above your foot. Grasp the two ropes in one hand to make a crude ascender. The sit-stand method still works up or down, it just takes longer and more energy. You have to keep making another crude ascender each time you use it. You can also use your rescue 2 to 1 climbing aid and your eighteen-inch loop of small diameter climbing rope, from your extra items, to replace the broken Jumar. (See Figures 6 & 7.)



THE CHANGEOVER

The rappel changeover to ascend. I put on my climbing system when I rappel. You never know when you may have to change directions of travel when on rope. (See Figure 4.) First you tie off your rappel device, then clip your "action Jumar" onto the rope above the rappel device at least 8 inches. Stand in the foot loop and clip on your chest jumar above the rappel device. Then remove your rappel device from the rope. Start climbing.

The climbing changeover to rappel. Just stop climbing when the "chest Jumar" is very near the

"action Jumar." You now have access to the rope below your "chest Jumar." Place your descending device on the rope as high as is easy. Lock it off. To remove your "chest Jumar", your weight should be on the foot loop so pressure is relieved from your "chest Jumar." After removing the "chest Jumar", sit down in the harness, raise both feet that are in the foot loop, and remove the top Jumar. Release the descending device's lock carefully and rappel down. If, inadvertently, you let the descending device slip down so far that you can't get your weight off of the top ascender, just clip the "action biner" onto the rope above the descending device. Tie off the descender. Stand in the foot loop and move the top Jumar down enough to get your weight onto the descender. Remove the "action Jumar" and the "action biner" and you are ready to rappel.

The tyrolean traverse changeover from a vertical rope to a sloping rope. You just climb up, or down, so you can get your seat harness as close to the tyrolean traverse as you can. You will need from your extra items, the pulley, the eighteen-inch loop of small diameter climbing rope, and a locking biner. Without unlocking the seat harness screw link, put one end of the eighteen-inch loop through the seat harness screw link. Then take the other end of the loop and put it through the first loop, trapping the seat harness screw link on the loop. Then use the extra locking biner and clip it onto the loose end of the loop. This now becomes an extra cow's-tail. Put the pulley on the tyrolean traverse and clip the locking biner onto the pulley and lock it. You may have to put your legs over the tyrolean traverse and raise your stomach to clip the locking biner. Another way would be to use your "action biner" to support your feet by clipping it onto the tyrolean traverse rope and putting your feet in the foot loop to raise your stomach. The "action biner" is also used as a second point on the rope. Once you have locked the locking biner onto the pulley, downclimb so that almost all of your weight is on the tyrolean traverse pulley. You may have to unconnect the "action biner" to do this. Then put the "action biner" back on after the downclimb. Unclip your "chest Jumar." Place some of your weight in the foot loop and pull yourself up the rope so your "action Jumar" is loose. Hold yourself in this position with one hand and with the other hand release the "action Jumar." If your tyrolean traverse is at a high point, you can go for a ride by letting go. Watch out for your hair, or whatever, getting caught in the pulley. If a ride is not appropriate, then go hand over hand down the rope. To rest, you can clip on your "action Jumar." The "action biner" is still attached to the tyrolean traverse rope for the second point on the rope.

For a really steep tyrolean traverse. In this situation you may want to clip on your "chest Jumar" and your "action Jumar" above the pulley and downclimb until it's not so steep. Be sure to attach both Jumars to the tyrolean traverse in such a way that you don't trap the vertical rope.

Once you get to the bottom of the tyrolean traverse sag and you want to go up the other side, use your "action biner" as your safety. Take everything else off the rope except the pulley and the loop hooked to your seat harness. The eighteen-inch loop that was put on the seat harness will allow you to turn around without binding the pulley. If you need to rest at this time, you can use the "chest Jumar" to hook the eighteen-inch loop strands to hold you in an upright position. (This "chest Jumar" method can also work in the switchover.) To continue up the other side, reverse the above procedures.

Upon reaching the other end's down rope, or up rope, just clip on your "chest Jumar" and your "action Jumar", remove the "action biner" and climb up so you can take off the pulley attachment. You are now ready to climb up or down.

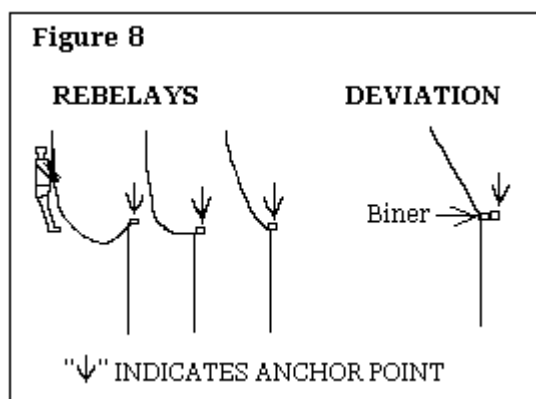
PASSING OBSTACLES

Climbing past a knot or anchor point. Move your two Jumars close together and close to the object. Clip your "action biner" above the object for a second point safety. Then move the Jumar that is closest to the object, past the object. Downclimb or climb up to put the remaining Jumar close to the object. Move the first Jumar some more and then pass the object with the last Jumar.

Remove the safety "action biner."

To change ropes. Use the "action biner" (or cow's-tail made from the eighteen-inch loop of small diameter climbing rope) and clip it onto an anchor for a second point safety. You may have to make a loop on a bight of rope for an anchor below your "chest Jumar." Clip the "action Jumar" onto the other rope, shift your weight and move your "chest Jumar" to the other rope also. Remove the "action biner" safety and the loop that you made.

To rappel past a knot. Execute a changeover to the downclimbing mode. Pass the knot, and then change back. Don't forget the "action biner" is used for a second point on the rope above the knot.



REBELAYS (See Figure 8.)

To rappel past a reanchor, a looped rebelay, a loose rebelay, or a tight rebelay, all you have to do is change over to a climb and downclimb past the knot, or the anchor, or whatever. Use your "action biner" or the cow's-tail, or both as a safety. Change back to a rappel and you are on your way.

DEVIATION (See Figure 8.)

The loosely redirection biner rebelay (deviation) can be passed by rappelling an inch or two below the biner and locking off the descender. Take your "action biner" and clip it to the anchor. Put your weight on the foot loop. Move the redirection biner from below your rappel device and attach it on the rope above your rappel device. Put your weight back onto your descender and unclip the "action biner." Unlock your descender and finish the rappel.

When climbing up and past a rebelay, treat it like any other obstacle. Remember, you can use an "action biner", cow's-tail, or an "action Jumar biner" to help you shift your weight.

CLIMBING SLOPES

When ascending a slope, the foot loop is not needed. Secure your foot loop out of the way by using the "action biner" or your "action Jumar biner."

TANDEM CLIMBING

The "action biner" is useful when you are on the top of a "tandem" climb. The "action biner," when clipped to the rope, will redirect the rope away from your crotch. This makes you more

comfortable, helps to keep you more upright, and makes your climb easier.

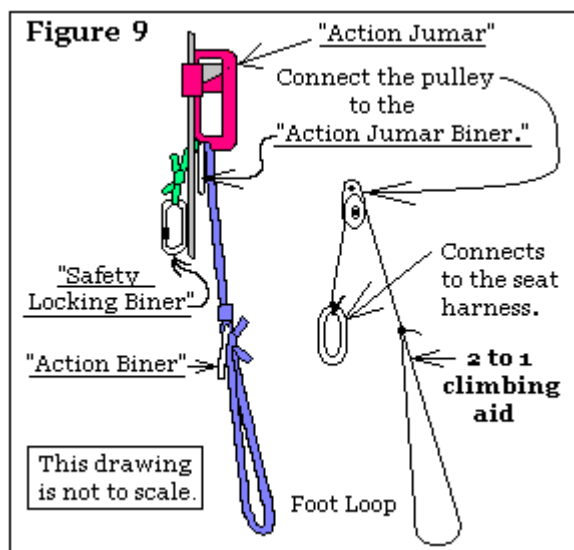
ROPEWALKER SYSTEM

Some people just have to have a ropewalker system. On my system, for the very long climbs, I can add a foot ascender attached to the ankle/foot area. A bungee cord attached to the top of the ascender and to the harness makes this work very well.

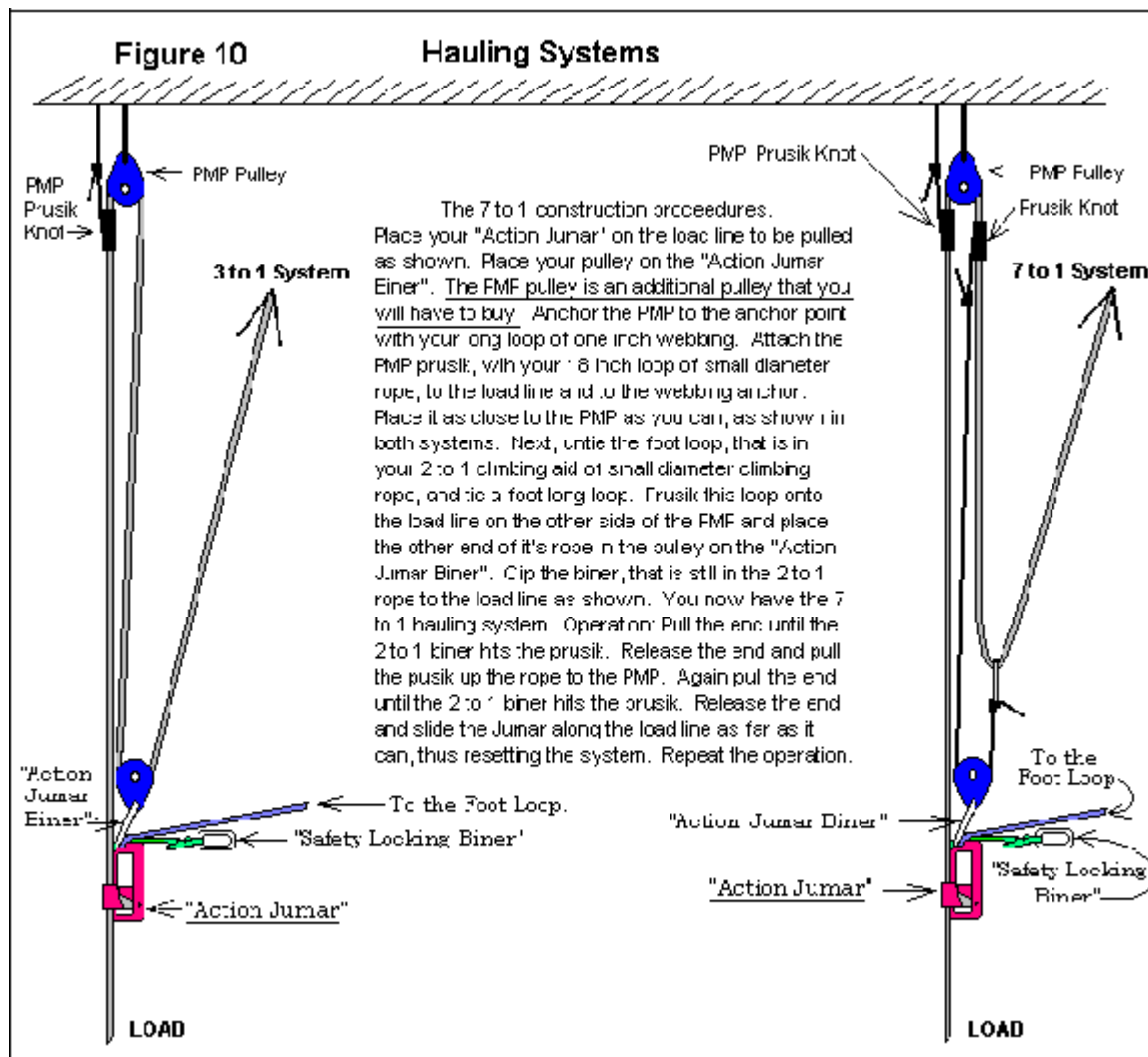
RESCUE

If you need to rescue someone who is on the rope and you are below him or her, this system will let you climb past. You just treat them like any other obstruction, except that it is more awkward. As you pass the person, clip onto the upper part of the person's harness with your extra biners and webbing and then to your seat harness. Make the webbing length sufficient so you can climb above the person and you won't hit them with your feet when hauling them up.

If you want to rescue someone who is below you, you may have to downclimb all the way. I think you will be glad to have my system for that. The setup in figure 5 works very well for downclimbing. The short cow's-tail works best for rappelling with another person.



I found some people so heavy that I could only lift them about one or two inches at a time. This was unacceptable to me, so I found that a 2 to 1 climbing aid was helpful. (See Figure 9.) From your extra items, clip the pulley onto your "action Jumar biner" and make a new foot loop from the long line of small diameter climbing rope. Copy the one that's on your system, but leave off the extra knot and the "action biner." Take the free end of the rope and put it through the pulley. Tie the end to a non-locking biner. Attach the biner to your seat harness screw link. With the "action biner" missing, you now can raise your legs higher. By yourself, you can get about the same amount of climbing distance. With a victim, you still climb with the "action Jumar" as before, but much easier. It helps to have the loaded webbing in front of your foot loop and between your toes, maybe?



DISCLAIMER

Caving and climbing ropes or rappelling is dangerous. If you would like to build my system, go ahead and do it, but have someone who has been doing vertical caving for many years check your work. After you've constructed the system, also have them make sure you are using it correctly.

QUESTIONS

If you have questions about my system or would like to communicate with me, I can be reached by email: ~~robert.johnson56@worldnet.att.net~~ verticalbob1@gmail.

Minutes of the 2003 NSS Vertical Section Meeting August 6, 2003

The 2003 NSS Vertical Section meeting and papers session was held Wednesday, August 6, 2003 at the Porterville College in Porterville, California. Executive Committee (EC) members present were Chair Barbara Ritts, At-Large member Bart Rowlett, and Vertical Techniques Workshop Coordinator Terry Clark. Approximately 15 Vertical Section members were in attendance.

- I. **Meeting opened at 2:10PM by Chair Barbara Ritts.**
- II. **Minutes of Last Meeting** - None available. Check future issues of the *Nylon Highway*.
- III. **Officer Reports:**
 - **Chair:** Barb Ritts -
Proxies present for Tim White (held by Gary Bush), Miriam Cuddington (by Terry Clark), Bruce Smith (by Barb Ritts), and Gary Taylor (by Bart Rowlett).
 - **Secretary/Treasurer:** Gary Bush for Bill Bussey -
Secretary's Report - 482 members in list, but 320 are in arrears for dues.
Treasurer's Report - Opening Balance & credits = \$2,610.85
Expenses = \$1,018.32
Balance on-hand = \$1,592.53
(See separate Itemized Report)
There are also outstanding receipts from Symbolic Sales (Bill Boehle).
 - **Editor:** Gary Bush for Tim White -
Nylon Highway #48 is on-line with 3 articles. Hope to have 2 more soon.
- IV. **Committee Reports:**
 - **Vertical Workshop:** Terry Clark -
There are 38 students signed up for this year's workshop. Room for walk-ins. Need help.
 - **Contest:** Terry Clark for Bill Cuddington -
There were 52 participants this year. Awards on Friday.
 - **Education:** Barb Ritts for Bruce Smith -
The "Basic Vertical Ropework Video" has been created and is available for purchase from most vendors. A practical approach to develop the Intermediate Vertical Rope Skills course is still elusive. Tim White has taken over distribution of the Basic Vertical Rope Skills course materials.

- **Symbolic Device Sales:** Bill Boehle -
A total of \$931.41 was collected for symbolic items, NH back issues, and membership dues.
- **Web Page:** Gary Bush -
Information and *Nylon Highway* articles are up to date. A rewording of the site's main page was suggested and implemented. The format, content, and appearance of the VS web pages is dated. Suggestions for improvement are requested. Please send your ideas to Gary Bush.

V. **Old Business:**

- None on the agenda
- A call to the floor yielded no new business.

VI. **New Business:**

- A proposal was made to review the section in the Convention Planning Guide, concerning the Vertical Section needs. The request will go to Carol Tiderman. Additionally, the Convention Committee should be reminded that fees for the Vertical Techniques Workshop should be returned to the Vertical Section, not to the Convention Committee.
- A VS representative to next year's NSS Convention in upper Michigan must be appointed to determine suitability of the facilities for our needs. A call for possible names was made. Matt Luckins was suggested. Barb Ritts will contact him.

VII. **Acknowledgement:**

The Chair expressed thanks to all Board members of the past year. She also thanked Bill Boehle, Gary Bush, and John Woods for their service to the Section this year.

VIII. **Floor Discussions:**

Amy Burns, Chair of the NSS Education Committee, announced she is looking for a new Chair for the Safety & Techniques Committee. Volunteers or suggestions for candidates should be forwarded to her.

IX. **Elections:**

- **Secretary/Treasurer** (1-year term)- Bill Bussey was nominated and elected by acclamation. Motion to vote by acclamation made by Bill Boehle, seconded by Terry Clark. Carried unanimously.
- **Editor** (1-year term)- Tim White was nominated and elected by acclamation. Motion to vote by acclamation made by Bill Boehle, seconded by Bart Rowlett. Carried unanimously.
- **At-Large Board Members** (2-year term, 2 to be elected) - Bart Rowlett and Ed Kehs were nominated and elected by acclamation. Motion to vote by acclamation made by Bill Boehle, seconded by Vance Nelson. Carried unanimously.

[Note: Current At-Large members Barb Ritts and Miriam Cuddington have 1 year remaining in their terms.]

X. **Motion to Adjourn:**

Motion to adjourn made by Terry Clark, seconded by Bill Boehle. Carried unanimously. Time of adjournment was 3:50PM.

[Additional note: Subsequent to the Meeting, the new Board Members elected Miriam Cuddington as Chair. The three appointed members were re-appointed to serve for another year. They are:

- Contest Committee - Bill Cuddington
- Vertical Techniques Workshop Committee - Terry Clark
- Education Committee - Bruce Smith]

Respectfully Submitted,
Gary Bush for Bill Bussey

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NSS VERTICAL SECTION
TREASURER'S REPORT

AUGUST, 2003

By Bill Bussey

CREDITS:

OPENING BALANCE	\$ 753.82
Bank One Account Closed	\$1,276.08
Back Issues of NH	\$ 65.60
Memberships, Electronic	\$ 340.00
Memberships, Print	\$ 36.00
Account Adjustment	\$ 0.64
VS Symbolics Sales	\$ 138.71
TOTAL CREDITS	\$2,610.85

EXPENSES:

Climbing Prizes & Awards	\$ 358.40
Vertical Training	\$ 118.25
VT Workshop Gear	\$ 435.56
Check Printing	\$ 9.00
Symbolic Device Charges	\$ 38.76
Postage & Shipping Costs	\$ 58.35
TOTAL EXPENSES	\$1,018.32

BALANCE ON HAND:	\$1,592.53
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