

Nylon Highway Issue #51



... especially for the Vertical Cover



#51

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Page Last Updated on July 13, 2007

Please Note: The two PDF's in this issue ("Hang 'em High" and "Multi-point, Pre-equalizing Anchors") were protected by their authors. As a result, they couldn't be assembled in this combined PDF. You must download them separately from the website's issue of NH#51. We regret the inconvenience.

Nylon Highway

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ISSN

Year 2006
ISSUE #51

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The *Nylon Highway* is published by the Vertical Section of the National Speleological Society on a regular basis pending sufficient material. Material is posted on the Vertical Section's web site soon after being received by the Editor. A volume of all material is printed and distributed to those not having access to the electronic version on an annual basis.

It is the intent of this publication to provide a vehicle for papers on vertical work. All submitted articles containing unsafe practices will be returned to the author. Opinions expressed herein are credited to the author and do not necessarily agree with those of the Editor, the Vertical Section, its members or its Executive Committee. The reader should understand that some material presented in the *Nylon Highway* may be of an experimental nature and is presented herein for peer review. The reader should exercise good judgment and use common sense when attempting new vertical techniques or using new equipment.

WARNING: The reader must acknowledge that caving, climbing, mountaineering, rappelling, rescue work and other rope activities expressed in the *Nylon Highway* are inherently dangerous activities and serious injury or death could result from use and/or misuse of techniques and equipment described in this publication.

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In short, if you'd like to submit something for possible publication, send it to the Editor. Otherwise, send it to the Secretary/Treasurer.

HELMETS - Off-center Impacts

By Mark Taylor

For over two years, the BMC Technical Committee's Helmet Testing Program has conducted much useful research into the level of protection one can expect from the various types of climbing helmet on the market. However (as is inevitably the case with these things!) the investigations have thrown up some important new questions and areas of concern. Here, Mark Taylor of the University of Leeds (head of the testing program) looks at one such issue - the case of off-center impacts - and discovers some surprising facts.

At the end of the year 2000, the BMC climbing helmet testing program found itself with several unanswered questions amongst the mass of useful data it had generated, but one issue in particular stood out above the others. Testing had shown quite clearly that in an impact on the crown of a helmet, a traditional hard-shelled helmet with a textile cradle offers unparalleled protection, but as we all know, this only reflects one of the hazards that a climber faces where a helmet may provide protection.

When the original UIAA standard (on which the current EN standard is based) was written, these hard shelled helmets were all that was available, and the writers considered that the major risk to climbers was from falling objects. As a result, the major pre-requisite of the standard was that helmets for climbing and mountaineering should provide adequate protection against impacts on the crown of the head. Unfortunately, this means that requirements in both these standards for minimizing the effects of impacts elsewhere, or for preventing major injury if the climber hit the ground headfirst are minimal.

After several conversations with climbers about the effects of hitting the deck or swinging headfirst into a route we decided to look further into this crucial area. A new comparison test was devised whereby the front of a helmet (inclined at 45° from the vertical - see figure 1) would be subject to an impact equal in energy to the crown impact test stipulated in the EN standard - 98 Joules (or a 5kg weight dropped from 2m in real language!), using a at striker. Three common types of helmet were to be compared:

1. A traditional hard-shelled helmet
(e.g. HB, Joe Brown, Edelrid Ultralight, Petzl Ecrin Roc).
2. A modern thick foam/soft-shelled helmet *

(e.g. Cassin Mercury, Camp Starlight, Petzl Mercury & Meteor, Grivel El Cap).

3. A modern thick foam/hard-shelled helmet
(e.g. Black Diamond Half Dome, Camp StarTech, Petzl Elios).

A comparison of these results found and the standard crown impact results for similar helmets is shown below, and makes pretty disturbing reading. As we can see quite clearly, the helmets utilizing foam as an energy absorber offer far better protection in the frontal impact situation, with the thick foam/soft shell helmet * showing forces transmitted very similar to those experienced in the crown impact test. If the three types of helmet are carefully examined it is not too difficult to see why the results are this way:

Thick foam/soft shell* - The thickness of foam is constant throughout the whole shell, and as this is the main energy absorbing layer, it is clear that the helmet will be effective wherever an impact occurs.

Thick foam/hard shell - With these helmets the foam is concentrated around the crown, and thins out towards the edges or simply stops. Again the foam is the main energy absorber, and as it is thinner at the edges, the transmitted force is much greater for an impact in these areas than one where the foam is thickest.

Traditional - The main energy-absorbing component in these helmets is the textile webbing cradle, and the crucial clearance distance between this and the shell. This webbing is anchored to the shell at the rim, which means that the nearer the rim an impact occurs, the lower the energy absorption will be - in this case the force transmitted is over four times the maximum allowed for a comparative crown impact by the EN standard.

In light of these findings, we should remember that most incidents reported to the BMC do involve impacts in the crown area, and on the whole the helmet does its job more than adequately. In the past 20 years there have only investigated two instances that we are aware of where injuries were sustained to the forehead or back of the head whilst wearing a helmet. So, what does this mean for the user? As usual it all comes down to choice, preference and the type of climbing you will be doing, but the above results provide a couple of clear pointers to bear in mind when buying a new helmet:

For general rock climbing, you should be looking for a lightweight helmet that offers good all round protection (i.e. from impacts from all sides) with good ventilation to help keep the old noggin cool. Modern foam/shell combinations are a good choice.

For alpine and ice climbing, good top impact performance is more important along with good resistance to

penetration from sharp falling objects. Traditional shell/cradle models are more appropriate for this use.

(Ed. Note: for caving choose either a traditional hard-shelled or a modern thick foam/hard-shelled helmet, NOT a soft-shelled helmet)

* (Ed. Note: thick foam/soft-shelled helmets are not suitable for caving due to easy damage to the soft-shelled covering!)

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**Minutes of the
2006 NSS Vertical Section Meeting
August 9, 2006**

The 2006 NSS Vertical Section meeting was held Wednesday, August 9, 2006 at the Western Washington University in Bellingham, Washington. Executive Board members present were Chair Miriam Cuddington, Secretary-Treasurer Bill Boehle, At-Large members (John Woods proxy for Brice Williams), (Jim Hall proxy for Ed Sira), and (Ernie Coffman proxy for Ed Kehs, Jr.), Vertical Techniques Workshop Coordinator (Bart Rowlett proxy for Terry Clark), and Contest Coordinator Bill Cuddington. Approximately 30 Vertical Section members were in attendance.

- I. **Meeting opened at 1:10 PM by Chair Miriam Cuddington**
Announcements - Thank you to all who helped at the climbing contest on Monday and Tuesday.
- II. **Minutes of the Last Meeting** - were published on the website and read at the meeting. Minutes were accepted as published.
- III. **Officer Reports:**
 - o **Secretary's Report** - Bill Boehle. See attached.
Feedback from members is that they seem to be happy with the current membership service (i.e., prompt response to inquiries, checks deposited timely, membership status info available online).
 - o **Treasurer's Report** - Bill Boehle. See attached.
People ask me about the status of the Annual Volume. I refer emails to Tim White. I send Tim a list at the end of each year on who has paid to get the Annual Volume. However, it would be nice if I knew when the Annual Volumes were actually mailed. I also have received no invoices from Tim for any production or mailing costs. Miriam stated she would check with Tim on the status.

There were also some questions about the amount of money in our bank account versus what government regulations might allow for an organization of our type. It was believed that that number is about \$25,000. We have some expenses coming up such as contest

prizes, transportation subsidy, and restocking of T-shirts that will put a dent in our reserves. Excess funds are not expected to be an issue. Workshop items will also need replacement in the future. Also the Section should consider the purchase of "kids sized" harnesses to facilitate the vertical training of the JSS. Most harnesses are too big and don't fit the kids properly. This is a detriment to good training.

- **VS Symbolic Items** - Bill Boehle. See Treasurer's Report.
- **Nylon Highway Editor's Report:** - Information from Tim White (not present) relayed. Annual Volume was ready but not mailed. Working on next volume. He has some articles that need to be posted. Miriam will check with Tim after convention.

IV. **Committee Reports:**

- **Contest:** Bill Cuddington - Thanks to all who help during the vertical contest. We can always use more help. Whether you can only spend a little time or a lot, it all adds up. Without help it would be impossible to run the contest. We appreciate any help from section members and others with timing, pulling rope, running the rack, etc. This year we had 53 climbers in the contest. The contest is a race, but it functions as a workshop as well. People come in with new rigs and get to work out any problems they may have with their setup. If you can't use your rig under ideal conditions, it probably won't work in a cave. Thanks to PMI for donating 1200 feet of rope for the contest. The ropes will be cut up for use as prizes. Awards will be given out on Friday at 1:00 PM.
- **Vertical Workshop:** Bart Rowlett for Terry Clark - 2005 Vertical Workshop expenses were recovered without problem. Due to attrition, some of the equipment will have to be replaced over the next few years at a cost of about \$150 to \$200. Lynn Fielding could use some general help this year at the workshop. Lynn is Terry's assistant with the workshop and handles all the paperwork for Terry.
- **Education:** Bruce Smith (not present). No report. Intermediate Training course - ongoing development.
- **Rebelay Course:** John Woods for Gary Bush - Considering the size of this year's convention, the re-belay course was relatively well

attended. Thanks to Peter Jones for helping out with the session. This year 10 people signed up for the rope course. No one got hurt and it was well received by all who participated. A lot of time is spent helping people who come in with problems with their rigs. Improper rigs make rebelay work more difficult. Getting people setup properly would speed up the actual training on the rebelay course.

- **Web Page:** Gary Bush, webmaster - No report submitted this year.

V. **Old Business:**

- Miriam reports that the new contest boards are done and paid for.
- Miriam reports that the screw links needed for the workshop were bought and donated to the workshop.
- No other old business from the floor.

VI. **New Business:**

- Bill Boehle related a conversation with John Woods on what he tells people when they ask why we spend so much time on training. His compact answer is that "we would rather train you than rescue you". John wondered if something like that could be put on to some of our T-shirts. Out of this evolved an idea for a special T-shirt for our Vertical Workshop Instructors to recognize them for longtime service to the Section and to make them more identifiable during the workshop. These could be paid for by some of the income the workshop brings in to the Section. It would offer a more professional look for the instructors. A motion was approved for Bill Boehle to pursue this for next year.
- There was some discussion on the problems we have from time to time with the facilities provided for the Vertical Contest, Workshop, and Session. Terry Clark to coordinate facilities for the next NSS Convention vertical contests.
- John Woods raised a recurring problem observed by him and Gary Bush in putting on the Re-Belay Course. There are a lot of problems with the poor and mismatched gear people bring to these sessions and much time is wasted fixing these problems that should be

spent on teaching re-belay techniques. They suggest that we might need another type of session where people could come to "tune up" their gear. The need is high but we could be swamped. Is this something we should do? Much discussion followed. A motion was made and approved to try this at the convention next year. John Woods will coordinate this but will need others to help out.

VII. **Elections:**

- **Secretary/Treasurer** (1-year term) - Bill Boehle was nominated and reelected by acclamation.
- **Editor** (1-year term) - Tim White was nominated and reelected by acclamation.
- **At-Large Board Members** (2-year term, 2 to be elected) - Ed Kehs, Jr., Ed Sira, and John Woods were nominated. A ballot of the section members present was taken and Ed Sira and John Woods were elected. [Note: Current At-Large members Miriam Cuddington and Brice Williams have 1 year remaining in their terms.]

VIII. **Motion to Adjourn:**

Motion to adjourn was made and carried. Time of adjournment was approximately 2:40 PM.

[Additional note: Subsequent to the Meeting, the 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,
Bill Boehle

NSS VERTICAL SECTION
SECRETARY'S REPORT

JULY, 2006

By Bill Boehle

Number of Members (current/expired)	.....	240
Number of Members Current as of 2006	.....	137
Number of Subscribers Current as of 2006	.....	15
Number of Annual Volumes Paid for 2006	.....	12
Number of Complementary Subscriptions	.....	3

YEARS PAID:	MEMBER	SUBSCRIBER	ANNUAL VOLUME
Comps	--	--	3
2006	90	12	12
2007	25	2	4
2008	17	1	1
2009	2	0	0
2010	1	0	0
2011	1	0	0
<u>2012</u>	<u>1</u>	<u>0</u>	<u>0</u>
TOTALS	137	15	20

NSS VERTICAL SECTION
TREASURER'S REPORT

JULY, 2006

By Bill Boehle

INCOME:

New Memberships, Subscriptions, & Renewals	.....	\$ 363.00
Nylon Highway Annual Volume Sales	.....	\$ 130.00
2005 Convention Workshop Registrations	.....	\$ 850.00
Vertical Training Course Sales	.....	\$ 0.00
Symbolic Item Sales	.....	\$ 400.00
Nylon Highway Back Issue Sales	.....	\$ 79.25
Shipping/Postage Charges	.....	\$ 28.94
Donations	.....	\$ 0.00
Bank Interest (GMAC) June 2005 - June 2006	.....	\$ 443.75
Reserved	.....	\$ 0.00
TOTAL INCOME		\$2,294.94

EXPENSES:

Shipping/Postage Costs	.....	\$ 21.88
2005 VTW Transportation Subsidy (Terry Clark)	.....	\$ 150.00
2005 Climbing Contest prizes	.....	\$ 185.28
NH Annual Volume Production & Mailing Costs (1)	.....	\$ 0.00
Reserved	.....	\$ 0.00
TOTAL EXPENSES		\$ 357.16

ACCOUNT BALANCES:

Commerce Bank (NJ)	.....	\$4,966.10
GMAC	\$8,366.66
BALANCE ON HAND:	\$13,332.76

(1) Not Yet Billed by Nylon Highway Editor

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