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First Flight at Peter's Mountain

(by David Salmon)

Peter's Mountain is part of a 60-mile ridge facing North Northwest in the south of West Virginia. There is a slot cut in the trees for a hang glider launch but I am told it is unsuitable for paragliders. Dwayne McCourt had visited a farm owned by David Cole Sr. and talked about paragliding three years earlier. David Cole Jr. offered to show us to the summit where he has a house at a spectacular location on top of the ridge. Burt Nunley drove Dwayne and me up the hill, following David's Jeep.

At the top we surveyed the scene. There was a nice clear area next to the house where a paraglider could be laid out. A band of trees 30 yards down the hill looked as if it might snag the feet of a departing pilot. The nearest landing field was over a mile away at a down elevation of 17 degrees. It was a brown field surrounded by tall trees, which we called the "Burnt Field". It may not be a satisfactory landing zone but at least it is a break from the endless trees. Beyond the burnt field, at a down elevation of 15 degrees, were open green fields around the house and farm buildings of Dave Cole Sr.

Periodically, turkey buzzards cruised along the ridge in weak lift.

Periodically, turkey buzzards cruised along the ridge in weak lift. They favored a spine half a mile down the ridge to the left. We could not see it from our location but there is a golf course on top of the ridge there.

I was wearing sandals and realized I had left my boots in Dwayne's SUV at the bottom of the hill. Burt kindly leant me a pair of his boots and I squeezed them onto my feet.

David Cole Jr allowed us to cut some trees to make the launch safer. Dwayne produced a chain saw and cut a notch. With one last tall tree to fell, the chain jumped off the saw. I scrambled up the

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Ralph Sickinger

Pre-Flight

I don't have much of a column this month, since I elected to use most of my page count describing how to build a windsock mast (*see page 3*).

I want to remind everyone that there is no club meeting in August; I've decided to give the writers and production crew (*that put this fabulous newsletter together*) a break, so we're all going to take the month of August off, so we can enjoy the summer too.

I'd like to thank everyone that gave up a Saturday to go clean up Bill's Hill. I promise I'll try to make it out next time. (*Really!*)

I hope you enjoy this month's issue; we'll see you all again in September!

Summer Camp and Hang Gliding

(by Brian Vant-Hull)

I have the privilege of spending a couple weeks each summer teaching physics to teenagers at a math and science camp for gifted kids. It's an incredible atmosphere, with so much going on behind the scenes that my first attempt to describe it ended up rambling into 10 pages or so, and those were just the parts I thought would be funniest. So now I'll try to focus on the hang gliding aspects, with the whole rest of the experience encapsulated in a single paragraph.

The camp is located about 45 minutes from Ocean City on the campus of the University of Maryland Eastern Shore, one of the most beautiful campuses in America (*they've got a sign out front to prove it, and a $25 fine for walking on their prize winning grass*). The camp is sponsored in large part by the largest employer of mathematicians in the country: the National Security Agency. I'm talking code crackers here. About half the teaching staff are volunteers from the NSA, teaching courses like cryptanalysis and advanced problem solving: a fun bunch of people actually. We aren't allowed to publish any pictures of them, but we are allowed to take them out and get them drunk all night. Which we did. Frequently. One night at Ocean City we even went skinny dipping off the boardwalk. I'm proud to say I led the charge, and once they saw I wasn't getting arrested, they all came in. If this doesn't demolish the stereotype of the NSA, let me just mention that

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(Photo by Dwayne McCourt)

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hill to ask for a wrench and returned with a large shifting wrench and some pliers. Too large, the wrench could only fit the chain-adjustment nuts with the handle at right angles. Neither Dwayne nor I could loosen the nuts. David came down to help and exhibited great hand and arm strength as he loosened both nuts. Once the chain was replaced, Dwayne soon brought the last tree down.

David Cole Jr. was impatient for some action, and I decided that I had watched the wind and the turkey buzzards long enough. I laid out my glider, waited for a good wind cycle, and took off. I was lifted up over the trees and out from the house. I turned left and moved tentatively towards the spine favored by the buzzards. The golf course above the spine invited a top landing but I was 100 ft too low to reach it. I was torn between moving directly to the spine where I might or might not find weak lift, and heading out over the trees to a landing spot over a mile away. Unfortunately, going to the spine meant crossing even more trees before reaching the landing zone. I chickened out and turned towards the burnt field. I did not encounter any strong sink and soon realized I could reach the farmhouse. I arrived about 400 ft over and searched for lift over a low ridge past the house. I found patches of light lift but could not sustain my height. I landed in a nice grass-

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Joe Brauch

Prez-Sez

- A slow month for me! Very challenging conditions seem to prevail. Extremely light ridge lift at Woodstock requires a very strong run to get the most out of a flight. A light day at the pulpit requires smooth coordinated turns with persistence to stick with that "no-lift" thermal 'til it supports you better a little higher on the ridge.
- These are the days to hone your skills. When you have light winds on launch you have to run hard to get your airspeed, remember…. you should run that hard in any condition. That hard run with a smooth take off might gain you that extra 20 feet to keep you in the little lift band at the top of the ridge. It can mean the difference between a sled and a very fun day trying to stay up in light lift. Also do not forget on these really hot days that the air is a little thinner, which increases your stall speed just a bit. Keep that speed up on landing.
- When flying in light lift you are testing your senses and your abilities to fly smooth. Very light thermals need to be finessed into giving up their lift. Sharp turns or high siding to correct too steep an angle will not be forgiven. You will just get dropped like a 200lb sack of Dacron. Feeling the lift seems to work better than waiting for that vario to tell you that you are going up. My last flight at the Pulpit really improved my skills in these light conditions. So go ahead, try that light winder! I am glad that we have these "older" (*I mean wiser*) pilots to push us snot-nosed "younger" pilots off in marginal conditions. It really helped me; I recommend it fully.
- Finally, I would like to congratulate the new 2's and welcome them to the mountains. It is really neat seeing these new pilots develop their skills. Keep bugging those observers, they love it!
- Run hard and thermal slowly!

From Cragin Shelton: Roll-call for the Bill's Hill site maintenance day on July 13th: Brian Vant-Hull, Steven Hengen, Cragin Shelton, Allen Sparks, Bruce Engen, George Tutor, John Codd, Mark Cavanaugh, Ellis Kim, Mark, Sheila & Bridget Gardner, Joe Schad, Frank Sherman, Connie Philips. The launch had seen a large encroachment of trash trees and monster weeds. Grass on the top and in the slot was three feet high and littered with heavy weeds. Part of the work crew beat the grass and weeds down in the center, to recreate a launchable slope. Others took power tools to the trees at the sides and bottom. While Bill's is once more flyable, it will take at least one more major work party to clear the sides back to the true tree line, and to take the new trash trees at the bottom of the slot back down. For all those pilots who fly Bill's, bring clearing tools whenever you head in that direction. Come to the next work party day (not yet scheduled). And be sure to provide a cold beverage for the folks who were out on the 13th for your benefit.

Capital Hang Gliding and Paragliding Association

CHGPA represents hang glider and paraglider pilots from the Washington, DC mid-Atlantic region. We are committed to the safety, growth and solidarity of hang gliding and paragliding.

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How To Make a Windsock Mast

(by Ralph Sickinger)

SO... There you are; all those trips up the training hill have paid off, and your instructor has finally decided that you're ready for "the big one"... your first mountain flight! You've got your glider, your harness, your helmet, and your parachute. You probably have a radio too, (*You've taken the ham radio exam, right?*), and you've spent plenty of time visualizing your flight; from pre-flight, through launch, flying out to the LZ, making your approach, right on down to the perfect flare and a no-step landing. Have you forgotten anything?

When you fly the training hill, you know which direction to land in: probably the same direction you took off in. Or, there were a bunch of streamers out in the field, placed there by your instructor; but out in the mountains, you're responsible for your own flying. The wind in the LZ can be very different from the wind that you launched into, and you're going to have to figure out which way it's blowing (*and how hard*), all by yourself. The advanced pilots can give you all sorts of advice on determining wind direction from the air: looking for smoke or dust blowing, ripples on water, circling and establishing drift direction... These are all good techniques to keep in the back of your mind, but nothing beats a good old windsock standing in the middle of the LZ.

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they are nearly all rabid fans of Buffy the Vampire Slayer. We watched part of the first two seasons nearly every night. Spooks from the NSA. Go figure.

Back to the Hang Gliding. I was part of the two-member team teaching "All the World's a Physics Toy". Originally they spent the first week talking about rockets and then built and fired model rockets; the second week they talked about roller coasters and other carnival rides before going down to Ocean City to ride and take measurements to compare against calculations. I thought the first week was kinda lame compared to hang gliding, so I completely redid the curriculum with the new focus, culminating with a trip to Ridgely. (*Good timing, you guys!*)

We started by talking about the definitions of velocity and acceleration, then programmed our calculators with a simple numerical analysis routine which would calculate position at any time given the initial conditions and accelerations (which we could tie into the forces later). We used this to calculate the path of a projectile, with results so accurate that they could shoot a stuffed animal off my head from the other side of the room. One of the kids decided we were practicing cruelty to class mascots, so swiped the stuffed frog and presented it to the head of the cryptanalysis team, who was known for having a soft spot for stuffed frogs. Last year when a similar thing happened it resulted in all sorts of coded messages flying back and forth; most being cracked within 20 minutes by the professionals from the NSA.

From there we proceeded to vectors, with treasure map directions and a twist: they had to locate the treasure without crossing the grass, and the directions would lead them across forbidden territory. Can anyone say "vector components?". Then Newton's laws for forces let us combined motion with vectors and the real world. Hang gliding involves balance, so we talked about torque and designed mobiles from plans the kids designed based on calculations.

Finally we could talk about fluid flow. By making fairly simple assumptions about the way air flowed around a wing, we could use vector principles to calculate both the size and direction of the forces. Note that there was no need to even mention pressure at this point. In this view the shape of the wing is seen mainly as a method to reduce drag-inducing turbulence while efficiently deflecting air downwards. Stability factors such as sweepback and dihedral ended the discussion with demonstrations involving toy gliders. All this was done in a single morning, with the kids designing and building airfoils out of balsa and paper in the afternoon. Hopefully next year we can do some wind tunnel work.

The next morning we brought in the pressure concept, and showed how the only way the air could flow the way it did was if the pressure patterns took on a particular arrangement. The speed was related to pressure via Bernoulli's equation, but, contrary to popular belief, it's not easy to apply Bernoulli's equation in this particular case without some very advanced math: unlike fluid flow in a pipe the airfoil problem has no defined boundaries. Something called conformal mapping is required, with a gratuitous fluid circulation thrown in to make the flow lines look right. The whole approach is so deeply buried in mathematical theorems it's useless for anyone to even think about applying the Bernoulli principle to the wing without rigorous training. Pilots, by the way, almost never get enough training to apply the theory correctly. So half the morning was spent helping the kids disentangle reality from mythology.

The other half of the morning was spent talking about glider control via weight shift, followed by stability and tails. In the afternoon they attached the wings to the body, using a tail for stability since designing a single wing for stability like our hang gliders is pushing handicraft far beyond normal limits. Then we test flew them. "Flew" should perhaps go in quotes; I had required that they be able to adjust the angle of attack of both the wing and tail, which makes for rather flimsy construction. The video we have of the test launches makes for some pretty hilarious viewing. But no matter, at least they learned the principles of flight, even if they didn't have enough time to tweak them into actual flight.

So after watching the gliders they designed crash and burn, they got to go out to Ridgely and fly for real in a glider designed by someone they had never met. Fortunately, it was never put to them in this way until after the flights were over. But Sunny's ground session would have inspired confidence in any case. I think most of us have never witnessed in full the way they broach the topic of hang glider safety to the uniniti-

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How To Make a Windsock Mast (by Ralph Sickinger)

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Recognizing that your observer is an advanced-rated pilot, who normally flies cross country (*when he isn't generously sacrificing his flying time to throw you off the mountain*), if you want to have a windsock in the landing field, you're going to have to put it there yourself. USHGA has a very nice sock available on their web site, which I highly recommend, but you'll have to make your own mast for it. Here is a design for a windsock mast which is inexpensive, fairly simple to construct, very compact and transportable, and quick and easy to set up and break down.

First, a little bit of background on the design: My windsock mast has gone through several iterations since I first built the original in 1999. For my original design goals, I wanted a mast that was quick and easy to set up; but it had to fit in the trunk of my car (*which dictated a maximum length of 4' for any segment*). It had to be at least 7' long (*the sock itself is almost 5', and the mast has to be tall enough for the sock to clear tall grass*), and sturdy enough to be free-standing (*guy wires take too long to set up, especially if they get tangled while they're in the car*). My original inspiration was a pool cue; I built my mast out of wooden dowels, and it took me weeks to construct the screw mechanism to join the two halves. It was a sturdy design, but it took too long to thread and un-thread the pieces, and then one day, somebody hit the windsock while landing. As I gazed at the wreckage of my masterpiece, I realized two things: first, if you put a windsock in the LZ, at some point it WILL get hit; and second, because of this, the design needs to be impact-tolerant. Ideally, the mast will give when it gets hit, so it doesn't upset or damage the glider that hits it. You also want the pieces to be easily replaceable, so that you can repair the damage quickly and easily. My design is for a two-piece mast made out of inexpensive PVC pipe, with a wooden dowel core; the two halves are joined with 3/4" hardwood dowel which should serve as a break-away if the mast gets hit. It's anchored by a 17" long 3/8" steel rod, which will hold the mast up even in soft, damp, Spring earth. All in all, it's a pretty simple design, so this shouldn't take too long to build. Ready to get started?

Let's go shopping...

In addition to the USHGA Windsock ($44.95), you'll need the following parts from your local hardware store (Lowes or Home Depot):

(1) 10' x 1" (o.d.) PVC pipe
(3) 4' x 3/4" round hardwood dowel
(1) 3' x 5/16" round plated steel rod
(1) package [10 pcs] #10 x ½" pan head sheet metal screws
(1) 5/16-18 x 1" hex cap screw (bolt)
(2) 5/16" flat washers

Total cost of the parts: $12.50

The PVC pipe [actually, it's 3/4" electrical conduit] can be found in the electrical section of the hardware store. You'll want to find one that is as straight as possible - a lot of them have pretty severe bends in them, and you won't be able to straighten them. If you can't find one that's straight, try to find one with the bend in the middle, so that you can at least get two straight sections out of the ends. You'll know you have the right size if the 3/4" wooden dowel just barely fits inside the pipe.

In addition to the above, you'll need a 3/8" auger bit (*see Figure 1*), and some way to grind metal. If you don't have an actual bench grinder, you can use one of those combo sanding/cutting/grinding disks, the kind that go in a hand drill.

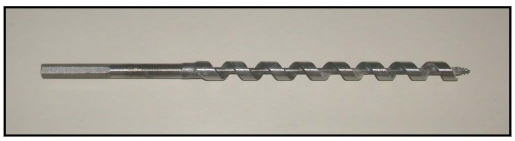

Figure 1: 3/8" Auger Bit

Cutting things down to size...

In step one we're going to cut the conduit, the dowels, and steel rod. We'll use a hacksaw to cut the steel rod into two parts; this will give us two spikes, so we'll have a spare in case one gets bent. (*It happens.*) I like to cut 16"-17" from each end, leaving a 2"-3" middle section as scrap. You could just cut the rod in the middle, but you'll end up with 18" spikes, and that's that much more that you have to drive into the ground. In my opinion, that's longer than you need, and you'll appreciate the shorter spikes in August, when the ground is baked and every inch makes a difference! Next, we'll cut two pieces from the PVC pipe; the bottom section should be 46" long, and what will eventually be the top section should be 44" long. One end of the conduit is flared, and we'll cut that off and discard it. This will leave us with a leftover piece approximately 28" long; we'll save this for use as an optional center extension. Next, we'll cut 4 pieces from the wooden dowels: 36" long, 28" long, one the same length as the center extension, and one piece about 6" long. Figure 2 shows all of our assorted pieces-parts, labeled and ready to be worked.

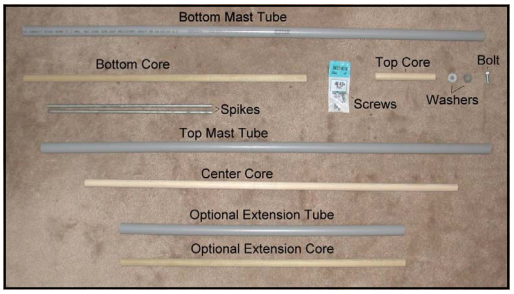

Figure 2: Raw materials.

The shape of things to come...

Now comes the fun part. The steel rods need to be ground down into spikes. The best way to do this is with a bench grinder and a hand drill. I put the end of the rod in the drill chuck, and hold the other end against the side of the grinding wheel. The drill keeps the rod turning as it gets ground down, resulting in a nice round point. If you're not using a bench grinder, you can use the grinding disk, or a even a file, and simply file the rods down to a square or triangular point. It's up to you decide how sharp a point to put on your spikes, and how long you want to taper them. It takes more time to grind a longer taper, but it will go into the ground much easier.

Now that we're done with both spikes, we can move onto the base core. This is the 28" wooden dowel, and we want to bore a 3/8" diameter hole down it's axis, as shown in Figure 3. We want to make this hole as deep as possible, and the 3/8" auger bit will bore a hole 6 ½" deep, which will do. It's important to keep this hole as straight and as centered as possible.

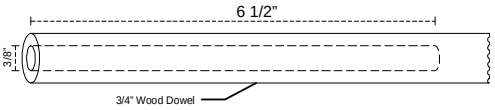

Figure 3: Hole bored in bottom core.

Next, we'll take the top core [the 6" dowel piece], and drill a 1" deep hole using a 1/4" drill bit. We actually want the hole to be just a little larger than 1/4", but not as large as 5/16", so we'll "wiggle" the drill bit a little to expand the hole. We'll take the hex bolt, and use a wrench to carefully turn the bolt, so that it screws itself into the wooden dowel, creating it's own threads as it goes. Be patient when you do this - it's easy to cross-

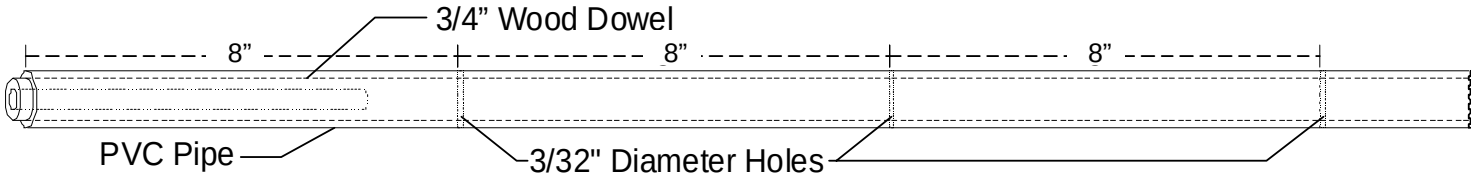

Figure 4: Holes drilled completely through bottom mast section.

thread the bolt and strip the threads that you’re creating. Also, keep in mind that you only need to thread the hole about ½" deep - the other half of the 1" bolt is going to extend beyond the end of the mast to hold the windsock itself.

At this point, we’re almost done; if you want to paint your mast though, now is the time to do it, before we go into final assembly. I recommend sanding the outside of the PVC pipe, for two reasons. One, the paint will adhere better; and two, if you don’t remove the lettering on the outside of the pipe, it will show through the paint, even through 3 coats! (*Don’t ask me how I know this.*)

Putting it all together...

Now we need to mount the two fixed core pieces into the main mast sections. For the bottom piece, insert the core until about a 1/4" is left protruding from the end of the PVC tubing. Using a 3/32" drill bit, drill three holes all the way through the PVC and the wooden dowel (*see Figure 4*). Make sure that the first hole is at least 8" from the end of the pipe - you don’t want to go through the drilled core of the dowel! Insert a pan head screw into each end of each hole (*total: 6 screws*), to anchor the dowel within the PVC (see *Figure 5*).

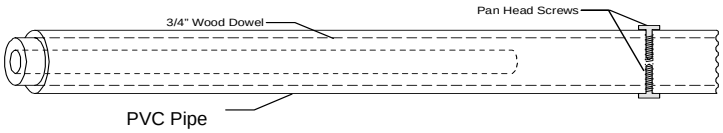

Figure 5: Set screws, holding the core in place.

Now do the same with the 6" dowel piece and the top mast tube, which only needs one hole drilled through it and 2 anchor screws. And we’re done! Figure 6 shows all of the completed parts, laid out side-by-side. I added some pieces of bicycle inner tube near the bottom, to hold the spikes when they’re not in use. You can also use rubber bands for this purpose, or just call me - I have plenty of inner tube left!

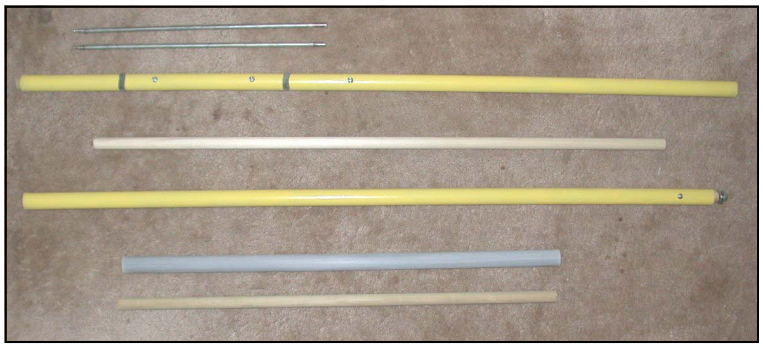

Figure 6: Finished pieces of the windsock mast.

A special thanks to Holly Korzilius for allowing me to use her windsock and mast for this article. ~RS

In the field...

To set up your windsock, drop the rope loop over the top of the mast; place one of the washers on the bolt, and insert the bolt through the grommeted hole in windsock’s plastic frame. Place the other washer on the bolt, and then screw the bolt into top of the windsock mast, as shown in Figure 7.

Figure 7: Attaching the sock to the mast.

Be careful not to tighten the bolt - you want the sock to be able to rotate freely!

Insert one of the spikes in the hole in the base, and drive it into the ground. If the spike hasn’t gone into the ground far enough, you can actually use the base to pound it in further. (*This is why the core is anchored to the PVC with screws, instead of just being glued in.*) Drop the center core [the 36" dowel piece] into the base, and then put the top part of mast over the core. (*See Figure 8.*) And that’s it!

With our completed windsock, we are now ready to go fly the mountains.

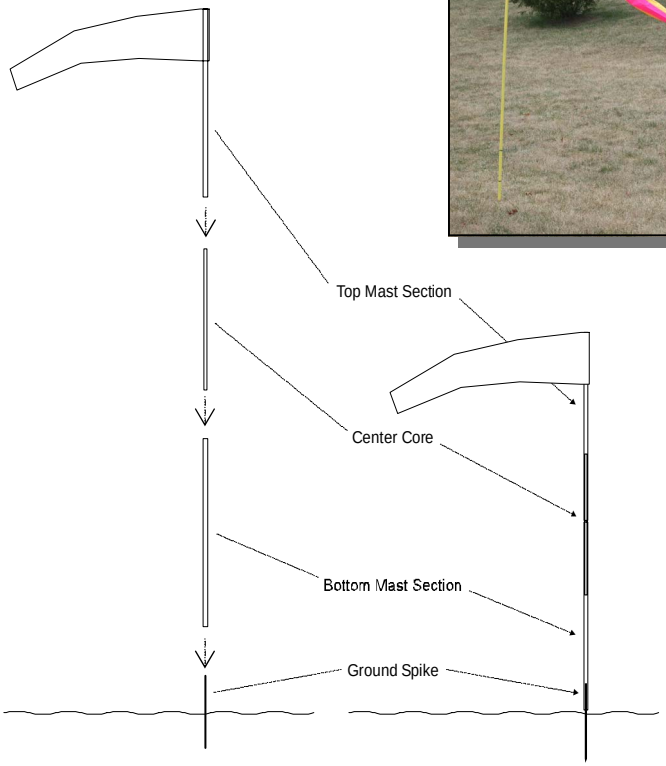

Figure 8: Setting up the windsock.

CHGPA Photo Album

Lauren Tjaden shows off her "VNE" tattoo.
(Photo by Christy Huddle)

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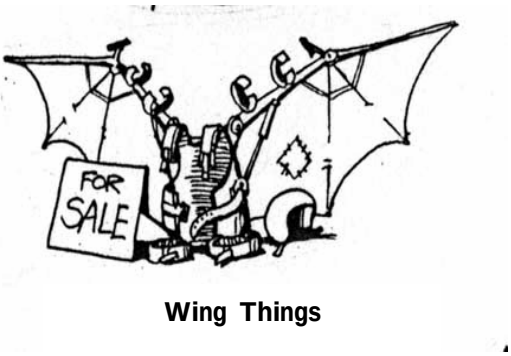

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(Continued from page 3)
ated, but with their combination of measured presentation style and key facts they could win over any mom in the world.

I wish I'd had Sunny or Chad along on the morning of registration. As I've mentioned before I was able to talk to most parents before they read the waiver, and they all signed. But I missed a couple. After registration we had a big parents meeting where we all described the classes. My partner stood up and said something like "we'll take your kids and spin them around in loops, and drop then down long inclines, and take them up half a mile in the air and let them go, and they'll still be around to calculate what happened to them". Then I stood up and said "if any of you missed me this morning, make sure you catch me right after this meeting...I have some waivers for you to sign." They all laughed. "No, really, I mean it" I said with a hurt quaver in my voice. They giggled, and even when the camp director re-iterated that I was serious there was still some snickering. No one came up to me after the meeting. The ten out of twelve who did fly had a great time, though they never could find the words to describe it. Sunny pointed out that the girls were relaxed and into it, while the guys were all rather tense. Remember this is a geek camp. The four adults were more articulate, weighing the benefits of the thrill of a wingover versus the altitude it burned off. Even the two kids who couldn't fly had a good time: for one thing, time in camp is so structured they never really get free time, and here they had 5 hours of it. They got to meet the world record holder for loops in a hang glider, when Chad walked up to the group all tanned in tank top and sunglasses, coolness incarnate. And they could play pi chess (*don't even get me started*) and laze in the sun, and we all went out for pizza at Sam's afterwards.

So if you have kids of the teenage persuasion who don't cringe at the thought of algebra, send 'em along. They'll be safe enough with us: it is the National SECURITY Agency after all.

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(Continued from page 2)
covered field next to the house, observed by most of the Cole family.

Dwayne was to follow, but a slowly forming thunderstorm disturbed the light wind up the face of the ridge. While he waited for suitable wind, Dwayne joined David and some of his relatives in making music and partaking of liquid refreshment. As the storm developed, I watched the turkey buzzards flying over the small ridge behind the farmhouse. The trees were lashed by winds emanating from the storm, but the buzzards soared in smooth air just feet from the trees.

The storm continued, evening approached, and Burt and Dwayne drove down the hill.

(Photo by Dwayne McCourt)

Capital Hang Gliding and Paragliding Association

15914B Shady Grove Road #L-197
Gaithersburg, MD 20877-1315

Next CHGPA meetings will be held:
July 24, 2002
NO MEETING IN AUGUST!
September 25, 2002

Meetings are held downstairs at: Lasick's Beef House

Directions: 0.8 mile inside the beltway on Route 1 South, just past the Super 8 Motel (College Park exit off I-495).
Note: If coming from points north on I-95, at the Capital Beltway stay right at the split and then take the immediate left exit to Route 1 South, College Park.

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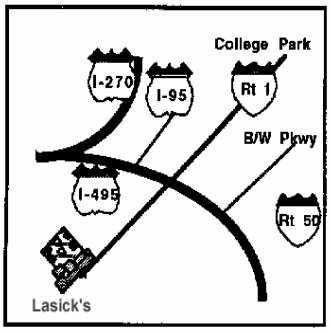

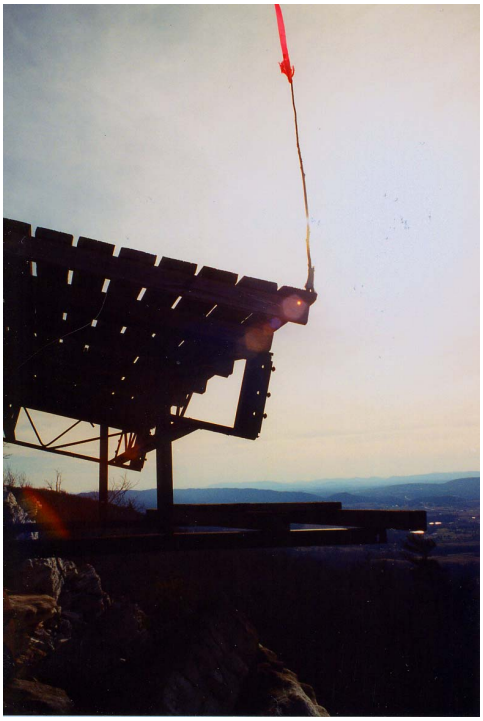

Pulpit Ramp at Dusk—Photo by Susanna Clapsaddle