BUILDING A FLAGPOLE VERTICAL ANTENNA

AKA: THE FOURTH TIME IS THE CHARM!

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FLAGPOLE VERTICAL

- AROUND THE COUNTRY, HAMS ARE HAVING ISSUES WITH THE LOCAL HOA.
- ANTENNAS ARE USUALLY RESTRICTED TO ONLY 'OTARD' TV ANTENNAS BEING ALLOWED!
- MY CC&R's WERE THAT WAY..
- BUT FLAGPOLES ARE ALLOWED
- SO I BEGAN PLANNING ON A FLAGPOLE FOR HF BANDS

THE FOURTH TIME IS THE CHARM…..

- GEE, PUTTING AN HF VERTICAL IN A FLAGPOLE SOUNDS LIKE A SIMPLE, STRAIGHTFORWARD WAY TO GO, RIGHT??
- TURNS OUT IT WASN'T FOR ME
- TO AVOID EXCESSIVE TIME SPENT TUNING THE THING, I BOUGHT A HUSTLER 6BTV (80, 40, 30 , 20, 15, & 10 METER) ANTENNA FROM DX ENGINEERING
- NOW, HOW TO HIDE IT INSIDE A FLAGPOLE..
- AS IT TURNED OUT, IT TOOK 4 DIFFERENT TRYS TO GET IT RIGHT.

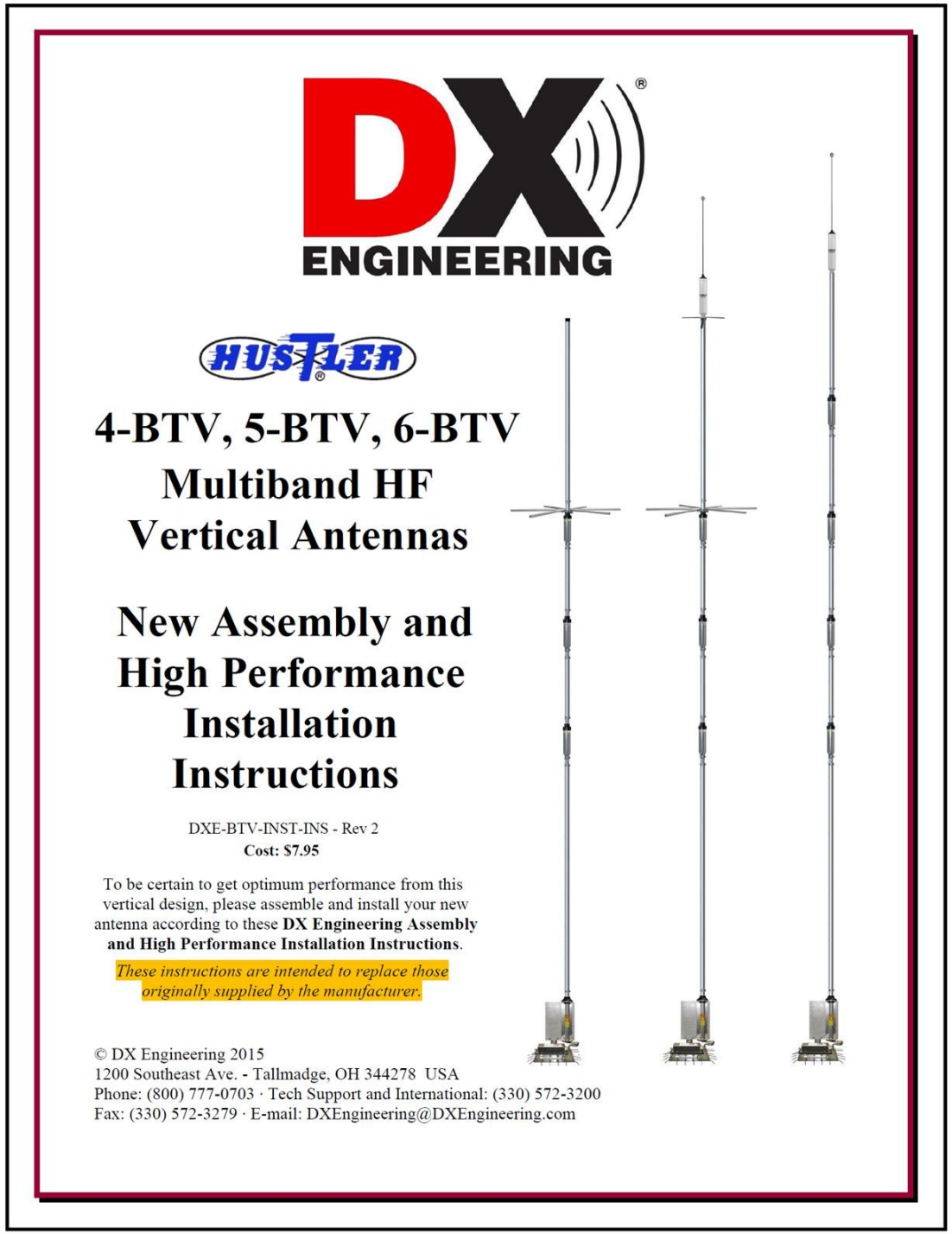
THE FIRST TRY…

Put a Hustler 6BTV vertical inside PVC pipe & support from the chimney!

Didn't work well and was really ugly!

CHOICE OF THE HUSTLER

- THE 6BTV HAD THE BANDS I WANTED
- THERE WERE NO CAPACITY HATS TO FIGURE OUT HOW TO MOUNT!
- THE HEIGHT WAS REASONABLE FOR A TYPICAL FLAGPOLE
- PRICE DIDN'T SEEM BAD
- DIDN'T HAVE THE REPUTATION OF THE BUTTERNUT....
- BUT NO COILS TO HIDE!



THE SECOND TRY….AN ALUMINUM FLAGPOLE

- DISCOURAGED BY THE FIRST TRY, I CHANGED COURSE AND BOUGHT A 25 FOOT ALUMINUM FLAGPOLE
- THE IDEA WAS TO USE AN EXTERNAL TUNER MOUNTED AT THE BASE
- THE FLAGPOLE WAS FOUND ON AMAZON
- I MOVED IT AWAY FROM THE VILLA AND DUG A HOLE FOR A 1.5 “ STEEL PIPE; 60” LONG
- GRANDSON AND I DUG A 40 INCH HOLE 12 INCHES IN DIA. AND MOUNTED THE PIPE IN CONCRETE
- BE CAREFUL WHAT IS UNDERGROUND.....
- I 'FOUND' THE IRRIGATION SYSTEM. BUMMER.

A MAST FOR MOUNTING VERTICALS

THIRD TRY; JUST PUT A FLAG ON IT!!

- THE PERFORMANCE OF MY TUNED ALUM FLAGPOLE WAS OK ON 40, 30 AND 20, BUT DISMAL ON OTHER BANDS
- SO I DUG OUT THE HUSTLER AGAIN AND PUT IT UP
- TO MAKE IT 'OFFICIAL' I MOUNTED A SMALL FLAG ON IT
- NOW I HAD DECENT PERFORMANCE, BUT IT WAS OBVIOUSLY NOT GOING TO HOLD A FLAG IN A STIFF WIND WITHOUT EVENTUAL DAMAGE!
- GUYING IT PERMANTENTLY WAS NOT POSSIBLE, SO WHAT TO DO NEXT?

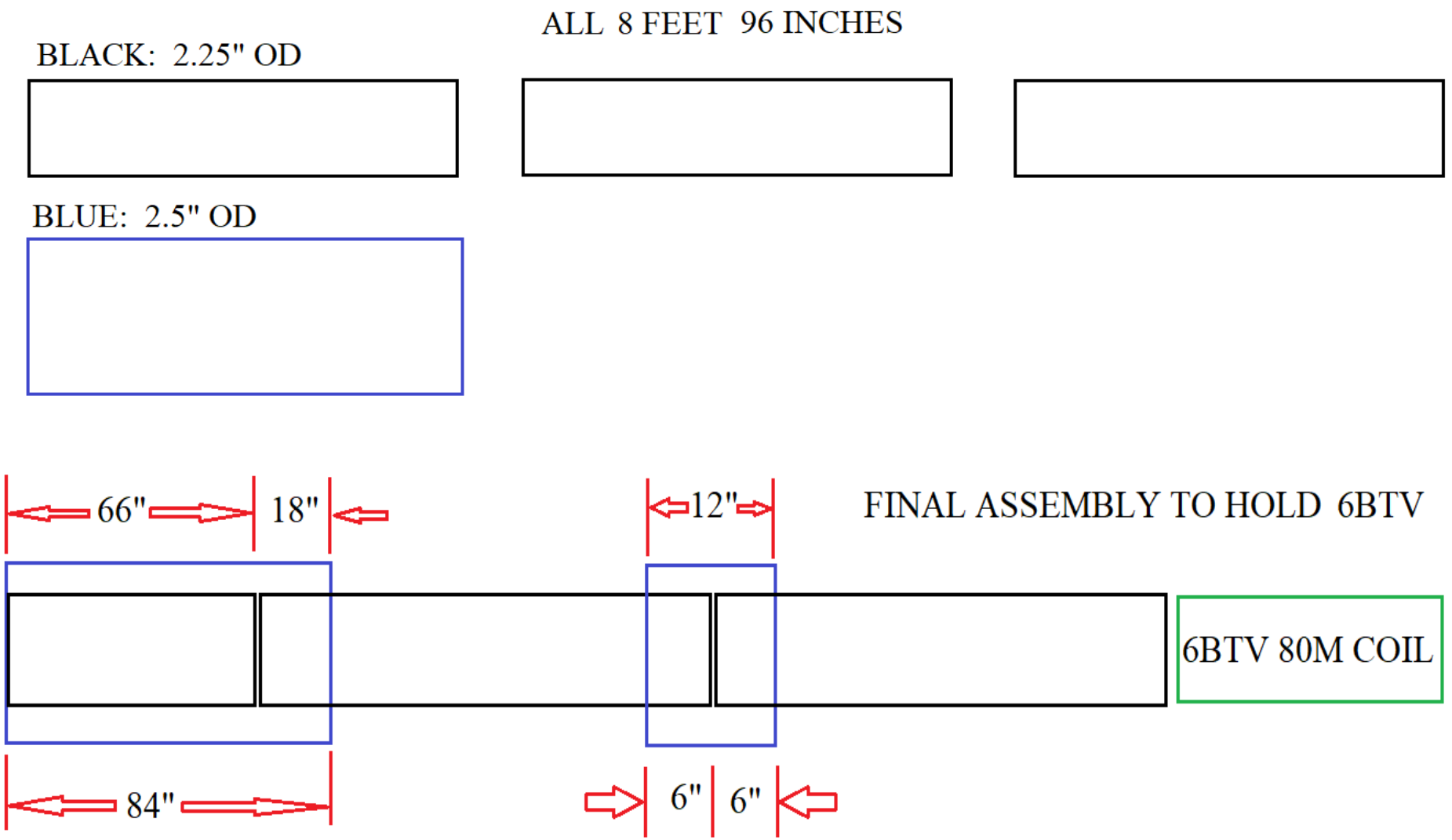
FOURTH EFFORT: PUT IT IN FIBERGLASS!!

- PVC WOULD BE TOO HEAVY AND FLEXIBLE (I KNOW; I TRIED)
- MAKING THE ANTENNA SUPPORT THE 'DISGUISE' WOULDN'T WORK EITHER
- BUT WHAT IF I USED STRONG LIGHT WEIGHT FIBERGLASS TUBING
- DX ENGINEERING HAS A LINE OF 8 FOOT FIBERGLASS TUBING DESIGNED FOR ANTENNA STRUCTURES
- NOT CHEAP, BUT I DECIDED TO GIVE IT A TRY!

WHAT FIBERGLASS IS NEEDED

- DXE's FIBERGLASS COME IN 8 FOOT SECTIONS
- THEY ARE SPEC'D BY OUTSIDE DIAMETER
- I NEEDED 2 INCHES OF INSIDE DIAMETER TO HAVE A CHANCE OF PUTTING THE HUSTLER INSIDE, SO I NEEDED ABOUT 22 FEET OF 2.25” TO ENCLOSE THE ANTENNA
- FOR THE BOTTOM, I ADDED A 8 FOOT 2.5” OD FOR EXTRA STRENGTH AT THE BASE
- CAVEAT: DXE DID NOT INTEND FOR THESE TUBES TO BE 'TELESCOPED' SO YOU HAVE TO BE CAREFUL WHEN MATING THEM UP
- THE FOLLOWING DIAGRAM SHOW HOW THEY ARE CUT AND JOINED

DIMENSIONS OF FIBERGLASS



DON'T BE IN TOO MUCH OF A HURRY!

- YOU KNOW WHAT THEY SAY:
- MEASURE ONCE, CUSS TWICE
- OK, MEASURE TWICE OR THRICE; CUT ONCE!
- ALWAYS FULLY ASSEMBLE THE VERTICAL AND LAY NEXT TO THE FLAGPOLE BODY TO DOUBLE CHECK DIMENSIONS!!
- FIGURE OUT HOW YOU PLAN TO CONNECT THE FEED POINT TO THE ANTENNA AND HOW DO YOU MOUNT AN SO-239 (IF USED)

THINGS YOU HAVE TO MODIFY

- THE HUSTLER ANTENNA WILL NOT FIT INSIDE A 2 INCH INSIDE DIAMETER TUBE WITHOUT SOME MODIFICATIONS
- THE HOSE CLAMPS THEY USED ARE TOO BIG; I FOUND SOME 'LOW PROFILE' CLAMPS TO SUBSTITUTE
- THE BASE MOUNT AND FEED SECTION OF THE HUSTLER IS TOO BIG.
- I FOUND A PIECE OF ALUMINUM TUBING THAT I CUT TO ALLOW ATTACHING THE FEED WIRE TO THE BOTTOM OF THE ANTENNA

THE END PRODUCT……

DETAILS OF THE HINGE BASE AND FEED POINT

DETAILS OF THE CONNECTOR FOR THE TOP SECTION

USING “STEALTH ROCKS” AS A WATERPROOF ENCLOSURE

RADIALS ARE NEEDED

- I HAVE ONLY 7 RADIAL WIRES BURIED IN THE BACK YARD
- THE PLAN IS TO ADD MORE
- CURRENTLY, PERFORMANCE ISN'T BAD, SO NOT IN A HURRY
- TO CONNECT THE RADIALS TOGETHER, I USED A GROUNDING BAR WITH 10 SCREWS (BOUGHT AT MENARDS)
- THE GROUND BAR IS THEN CONNECTED TO THE TILT BASE AND COAX CONNECTOR FOR THE VERTICAL

PERFORMANCE TO DATE

- SO FAR, SO GOOD!
- SWR IS DECENT ON 40, 30, 20, 15, & 10 METERS; WHOLE BAND
- 12 METERS EVEN WORKS FINE WITHOUT THE TUNER
- 80 IS GOOD RIGHT AT 3820 (LRBN) BUT VERY NARROW BEYOND +/- 25 KHZ. THIS WAS EXPECTED.
- HAD LOTS OF FUN ON CQ WW DX CONTEST
- I HAVE BEEN WORKING A LOT OF PARKS ON THE AIR ACTIVATORS
- OK EVEN WITH MY 100 WATT IC-7300

THE DOWN SIDE OF FLAGPOLES & VERTICALS

- IT IS NOT ALL ROSES...
- VERTICALS TEND TO BE NOISY!
- A SEPARATE RECEIVE ANTENNA MAY BY NEEDED
- SWR CAN CHANGE DRASTICALLY WHEN THE GROUND GETS WET
- BURYING COAX HAS ISSUES OF ITS OWN; USE QUALITY, NEW COAX
- BE MINDFUL OF LAWN MOWING CREWS; AVOID EDGING DAMAGE!
- ILLUMINATE THE FLAG IF LEFT UP OVERNIGHT, PLEASE!

WHAT'S NEXT??

- THERE IS ALWAYS A 'NEXT', RIGHT??
- MAYBE TRY A SCREWDRIVER COIL AT THE TOP...
- ..THAT WOULD ALLOW FULL 160 AND 80 METER TUNING; HMMM
- THOSE MAGNETIC LOOP ANTENNAS SEEM TO BE EASY TO BUILD AND WORK EFFECTIVELY, SO I'D LIKE TO GIVE ONE A TRY
- NEED TO FIGURE OUT SOME SNEAKY GAIN ANTENNAS FOR 6, 2, 1.25, 0.70 AND 0.23 METER BANDS. WITH SWITCHABLE POLARIZATION!
- GOT ANY SUGGESTIONS??

OTHER RESOURCES

A Disguised Flagpole Antenna

NEW HAM COMPANION

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Is it a flagpole or an antenna? Actually, it's *both*.

I moved to a retirement community in October 1991—a community which has restrictions against erecting any sort of antenna. I was eager to get on the air and began looking around for an inconspicuous antenna. It couldn't be just *any* antenna; I needed one with multiband capability. Many multiband antennas use tube-like assemblies made of coils and capacitors. These are known as *traps* and they electrically separate one part of the antenna from another, depending on the frequency of the transmitted signal. Traps do their jobs well, but they send a clear message when they're displayed in public: **HAM ANTENNA HERE!**

I was visiting a local ham dealer one day when I noticed a Hustler vertical antenna on the roof. I took a closer look and began to wonder how I could hide such a thing. Suddenly, it occurred to me that the antenna—including the traps—was thin enough to fit *inside* a 2-inch diameter PVC pipe. Hmmm . . . an enclosed antenna would not only radiate well, it could serve as a flagpole to disguise its real function!

Construction Begins

I purchased the Hustler 4-BTV, a four-band trap vertical antenna. (I'm sure a five-band vertical would work just as well for my purposes but, of course, it would be taller.) As soon as I got it home, I took one of the trap assemblies to the local hardware store and tried to squeeze it inside a 2-inch PVC pipe. The trap's hose clamps were too large to fit! Knowing nothing about plumbing and even less about PVC pipes, I was very discouraged.

I journeyed to another hardware store that carried all sorts of plumbing and sprinkler supplies. I found another 2-inch section of PVC and again tried to insert the trap. To my great delight, it fit perfectly! This was *thin-wall* PVC. The first one I tried was heavy-duty PVC. Maybe there was hope after all!

I decided to go full blast with the project and purchased a 14-foot section of 2-inch thin-wall PVC along with a 12-foot section of 1½-inch PVC. I assembled the Hustler and cut the 2-inch PVC to fit over the lower part of the antenna, ending about two inches above the 20-meter trap. At that point I used a reducer to couple to the 1½-inch PVC I had slipped over the thinner top section that remained. When I finished, the entire antenna was enclosed in PVC! The 40-meter section used an assembly called a *capacitance hat*, but I had to leave it off. I later found that I had no trouble operating on 40 meters without it.

I drove a 1½-inch thick wall pipe about 4 feet into the ground to serve as the base of the antenna. I trimmed the length so it would keep the feed point about 4 inches above the ground. I also drove a five-foot section of copper pipe into the soil to serve as my ground connection. This was hardly an ideal ground for a vertical, but it was impossible to bury a bunch of radial wires in the lawn without attracting unwelcome attention!

I fed the antenna with 50-Ω coaxial cable (discreetly buried, of course) and used about 10 turns of coax near the base to act as an RF choke. I placed a similar choke near the transmitter. Using my MFJ 989C antenna tuner, I was pleased to see that the antenna loaded very well on all bands.

Finishing touches consisted of adding a used toilet-tank-float ball on top of the pole as an ornament, and a three-inch bolt near the top to mount a pulley. The base is hidden by a group of flowers, which I water often to enhance my ground conductivity! My neighbors see the Stars and Stripes flying proudly day after day, unaware that the flagpole is really a multiband vertical antenna.