CONSTRUCTION TECHNIQUES USING PVC PIPE
TO MAKE ANTENNAS

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Support plus protection from the elements

PVC (polyvinyl chloride) pipe is a plumbing and electrical material that can be used to support, enclose, and seal antennas from the weather. Acid rain can cause antenna damage particularly in salt water areas. If you doubt you have a problem, hunt up an old corroded 2-meter beam, file a bright spot on each end of a director and apply your ohmmeter across the element. Try each element. I bet you'll find some open circuits.

PVC pipe and its associated fittings make for easy construction of antennas with the added advantage of providing protection from the atmosphere. A plumbing supply house stocks many kinds. CPVC is the size and equivalent of copper tubing but is hard to find and will *not* fit regular pipe equivalent PVC.

In addition to the regular gluable PVC there is a gray threadable PVC. This is more expensive and not as handy. The glue-together white PVC is the best choice.

The pipe comes in different thicknesses. Schedule 40 is heavy duty, cold resistant, and the most common. In the South, thin wall schedule 20 is used — it's quite a bit lighter — a big advantage for antenna elements.

There is a full complement of plastic pipe fittings available for antenna construction: tees, elbows, caps, four-way junctions, to name a few. Larger diameter pipe can be used for hf verticals or masts. Short pieces make good insulators, feeder spreaders, and loading coil forms. PVC pipe can be cut with a hacksaw, a tubing cutter, or a special tool sold in plumbing supply houses.

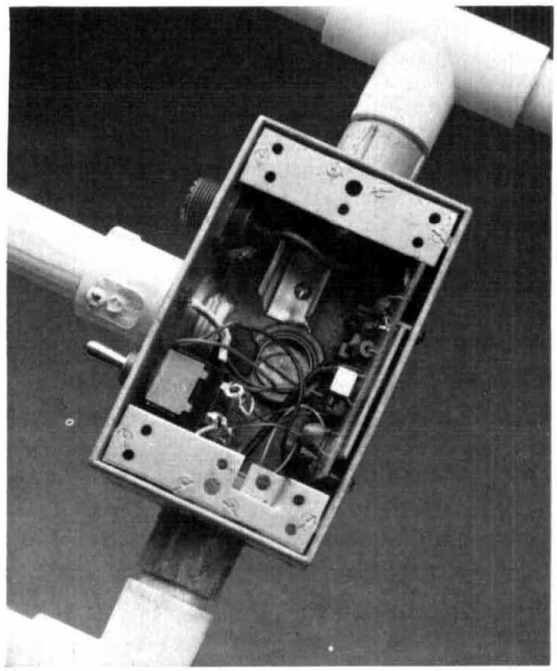
You can use almost any type of copper wire inside the plastic pipe. I find no. 14 or no. 16 "enameled" solid wire the easiest to use. Put the end of a length in a vise, grab the other end with a heavy pair of pliers, and pull until the wire stretches or gives. This straightens the wire and allows it to be cut to size and worked easily. A good grade of twin lead works well, and is easier to keep in place inside the pipe.

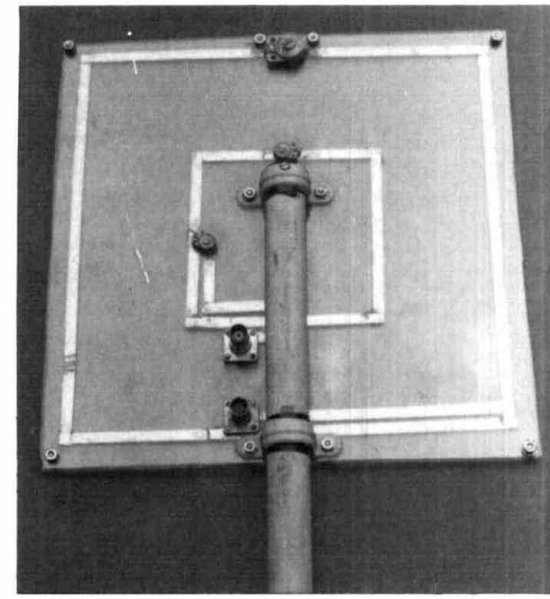
Styrofoam peanuts stuffed in the pipe and anchored with silicone rubber (RTV) will hold the wire in place. Thin string or lacing cord can be tied to the wire and held by the plastic pipe caps on the ends.

If you want to take it apart again, fasten the PVC pipe together with sheet metal screws. For a permanent job use the cement made for this purpose.

A mop handle will support your VHF antenna better than PVC because pipe is too flexible to hold a system of two or more elements. For portability, fit the end of the wooden support with an adapter (designated slip to male pipe thread). Then fit the center of your antenna with a tee-combination (slip x slip x female pipe thread); this will give you a threaded end on your support mast.

If you wish to install some electronics at the antenna, like a preamp or a doppler DF circuit, use a





waterproof outlet box with five threaded 1/2-inch holes. Purchase a box at an electrical supply outlet; a Mulberry no. 30221 or equivalent is needed. This cast aluminum box with its waterproof cover can be used at the center of the array to house the electronics and perform the job of a tee section. Electrical and plumbing supply houses carry threaded to slip joint transitions. The electrical (gray) ones thread into boxes easily.

PVC pipe has a velocity factor of 0.95. This has little effect on antenna length, but shortens a tuned stub an additional five percent when slipped into the PVC pipe. I tuned a twin lead J antenna for 157 MHz for a spare marine radio antenna. I inserted it into some schedule 40 PVC, rechecked, and found I had a 149-MHz antenna!

W6SAI demonstrated the use of PVC pipe for a collinear 2- meter antenna and a 160-meter vertical in his May 1987 column. Yagis for 432 MHz and above can be made of brazing rods stuck through a PVC boom.

I use a signal generator with a sensitive VSWR indicator to "VFO" around to find out where the VSWR dips. A frequency counter is tee-ed on the line to check the frequency accurately. An HT with extended frequency coverage may be used on low power for a signal generator.

This inexpensive, easy-to-use material gives the experimenter a good way to try out a new antenna.

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ham radio