

Antenna Workshop

You should get out more!

Dick Pascoe
G0BPS says
summer is
approaching
and encourages
you to get out
into the fresh air
for a session on
the air in the
open.

Fig. 1: One 'dipole' three bands, all halfwave length long. A simple idea but, if each element is adjusted for the band of interest, then no a.t.u. is needed in operation.

Now that summer is approaching, it's the traditional time to get out into the open and work the DX from mobile and portable stations. In many cases the station will be the car and a mobile whip for h.f. operating. Manufacturers have created many antennas for this form of operation. I have used many of the commercial mobile antennas available including the 'G-Whip', the Hustler (which I rated highly) and later the huge 'Texas Bugcatcher' (which is even better).

Whilst many of the commercial mobile antennas are quite good, none will compare with lots of wire, high up in the air. I have used kites on camp sites, poles to get long wires up in the air on demo stations and of course trees in the middle of caravan sites, as far apart as one on the outskirts of Paris and another in Liechtenstein (although not at the same time of course!).

One of my favourite antennas for several years at my last house was a group of three simple dipoles, often called a 'Nest of dipoles'. The three-story house with its fairly long garden was ideal for such

an antenna layout. In fact, I remember one commercial antenna maker at that time who used simple medium-weight household wire to make his antennas, cutting one wire to length for 28MHz operation, another wire cut to resonate on 21MHz and the earth wire for 14MHz.

Of course the simple single-cored household wire failed after the first night and the first puff of wind; but the idea was good. I soon adapted the technique for my portable antenna too.

Plastic Bottles

The first thing is to collect several large plastic bottles and cut strips of about 150x50mm. By using a sharp drill put a row of four holes in each spaced neatly. The drawing of Fig. 1 shows the overall idea of the layout of this antenna. This is an antenna that's easy to use and to build. Each length of wire is usable on a single band. Whilst I only used lengths for 14, 21 and 28MHz, 7MHz can easily be added as well. Cutting and trimming each leg to resonance will remove the need for an antenna tuning unit (a.t.u.)!

All three (or four) wires are joined together at the centre and insulated at their far end. One easy way to ensure this centre joint is insulated is to use a plastic film can as shown in the basic layout drawing of Fig. 2. After the joints are made, the coaxial cable is secured inside the canister, and the whole this is filled with hot melt glue.

I try to use two trees or other support

poles to get both ends of the antenna as high as possible into the air. But often only one pole is available so, the antenna can be used as an inverted 'V' as shown in the illustration of Fig. 3.

The main difficulty encountered in using an inverted 'V' as a portable antenna is getting the centre point high in the air. I used sections of alloy tubing, each with one end

swaged down so that they slot together. The sections I use are each just one metre long so fit into the boot of my wife's Corsa car easily. Rob G3XFD, the editor, told me he uses a broom handle slotted together as a central support.

Whether you need four bands or not, even a

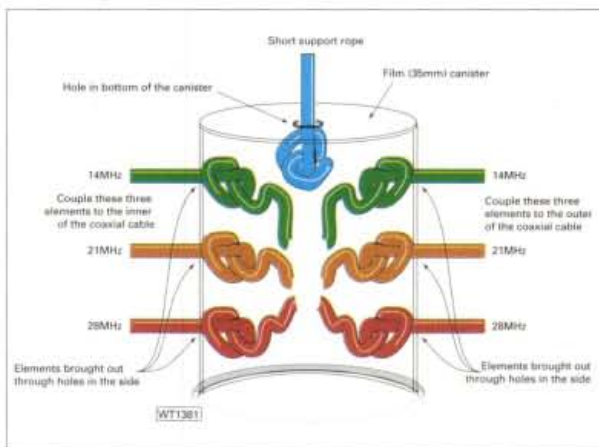
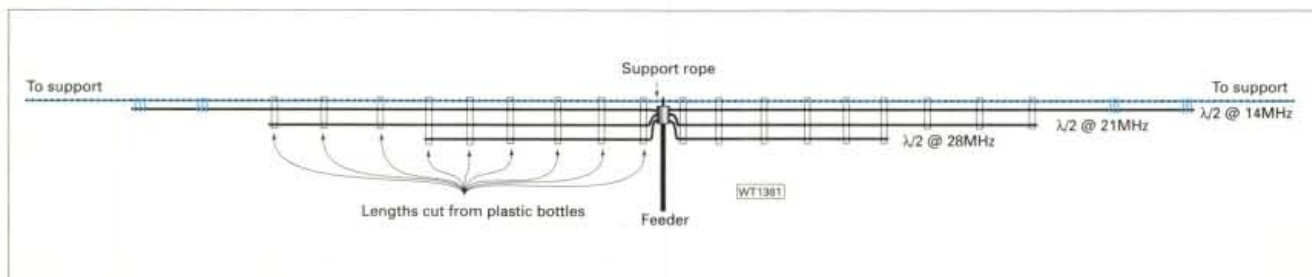


Fig. 2: A simple and cheap dipole centre made from a single 35mm film canister. The coaxial cable enters from underneath and should be secured to the support rope before the canister is filled with hot-melt glue or other non conducting filler.



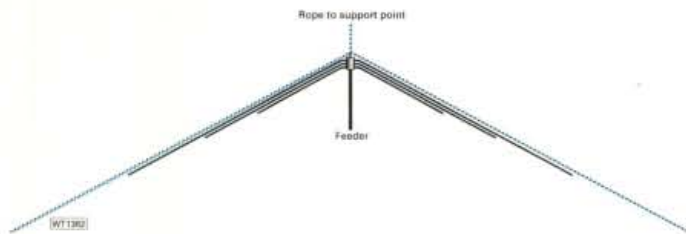


Fig. 3: The same 'Nest of dipoles' as featured in Fig. 1, may be used as an inverted 'V' system if only a single support is available.

single dipole can be used in this way. Guys will be needed if the mast is to be self-supporting, although not use your car for the support. The weight of the car can be used to keep the mast upright by using a metal bracket. By positioning the car wheel on the base the mast will be kept in place easily.

The PW Tenna Tourer base (Fig. 4) was designed along these lines, and was on offer in the September 1999 issue of PW is ideal for this type of operation (a unit that is still available - please contact the PW office for more details).

There are many other ways of getting antennas up in the air whilst out and about. In a previous workshop we looked at the use of kites. These can be

an excellent method to use. Trees are also useful! If you have two trees available don't just think dipole or long wire how about a delta loop? The 'gain' off the sides of a loop can be used to advantage by turning it.

During one demonstration event the Dover Radio club was putting up a long wire antenna. The trees had been selected and the branches chosen, all we had to do was get the wire over the tree. Some may try to throw a weight over; some would rather use a bow and arrow. My preferred method is a



Fig. 4: The PW Tenna-Tourer mobile antenna base, with its hinged socket for the mast makes single-handed antenna erection a simple operation. There were two different sizes available in the offer of September 1999's issue of PW. (A unit that is still available - please contact the PW office for more details)

fishing rod with fairly heavy line. (I don't use a lead weight either).

Fruit Powered

Instead of a lead weight at the end of a line, I use fruit power! An apple or orange as the weight will do the job just as well and if it hits anyone is unlikely to do a great deal of harm. Practice will ensure that the weight drops over the required bough first time. The fruit is removed and the wire attached and the line recovered.

Warning Do NOT hold the wire at any time whilst it is running out. I saw an amateur almost lose a finger doing this; only a rapid trip to the hospital saved his finger.

I've also found that ex-service equipment can be used to great advantage, I have a bag full of ex-army copper rods in my garage each about 1m long that screw together. They make a good vertical antenna when mounted on an insulated base. They are fairly cheap too!

Even the simple ground plane antenna can be used to advantage. A quarter wavelength of metal bolted to (but insulated from) the ground mounting

bracket can be used. The mast used to raise the dipole can be brought into use as an antenna if it is insulated from ground.

Ground Base

Using a metal plate ground base with bolts in each corner, as shown in Fig. 5, then one or more counterpoises can be laid out on the ground. A short length of wood at the base of the mast insulates it from ground. Now all that is needed are the connections to the pole and the ground base. The counterpoise lengths will be around five metres long for the 14MHz band version, but of course the same one can be easily made up for 21 or 28MHz operation.

The feed-point in this case is at the base of the mast with the inner of a length of 75Ω coaxial cable coupled to the mast and the outer shield to the ground plate. To make a good match to this you should use a quarter wavelength of 50Ω coaxial cable, as a matching transformer to couple this to the a.t.u.

The more radials you put out the better it will work. I remember a contest group using a simple scaffold pole as a quarter wave vertical on 7MHz. There were no radials but the sea (salt water) was just a metre or so from the base of the antenna. Rumour has it that they won their section of the contest.

When I was first licensed I used a roof rack on my elderly estate car with a scaffold pole on a base plate just outside the passenger door attached to the roof rack. Twisting the pole easily rotated the 144MHz beam at the top. The beauty of this is that it all packed away neatly on the roof rack for transport.

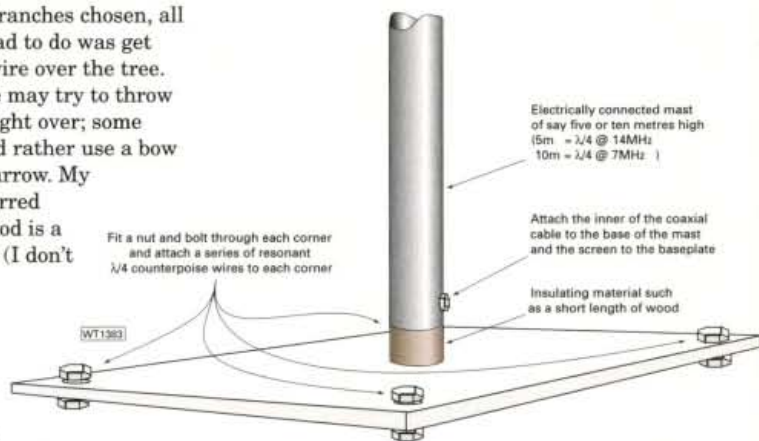


Fig. 5: A metal ground plate with radials under a metal mast can form the basis of an excellent vertical antenna on the h.f. bands as well as supporting v.h.f./u.h.f. beam antennas.

Whatever method you choose; try to remember that there can be high voltages on the line if high power is to be used. Make sure everything is insulated and well away from any possible sticky fingers. Especially those whose owner shouts 'what's that mister?' while holding it.

Over the summer months I plan to get a three-band quad on the tower, which will also hold a 144MHz beam and a couple of verticals. I hope to be able to report on our success in another 'Antenna Workshop'. Cheerio until then!

PW