

HORSHAM AMATEUR RADIO CLUB

HARCNEWS

Coming Shortly

Jun 5th Club Evening Home Brew

Jun 12th Social Evening Bax Castle Southwater

June 2003

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Loop Aerials

by Ron Polly G3PYC

Since my first attempts with loop aerials in Jan 2001 I have solved some of the problems associated with these high Q devices. I have found them to not be compatible with a properly erected DIPOLE, of the same frequency, in receive, but in transmit it depends on the distance of the receiving station.

The loop tends to be around 2 S points down on received signals generally. The same applies on transmit within the ground wave distances, but out at the first skip distance and beyond there does not appear to be a noticeable difference from a dipole. I have not found there to be any noticeable directivity with these loops.

Old fashioned radio receivers that used multi turn loops for the aerial, had to be rotated so that the loop was end on to the transmitter for best results and certain interfering stations could almost be nulled out by putting

the loop square on to the interfering station.

My first loop was made with 4m of 10mm dia copper pipe formed into a single turn loop. With a 100pF wide spaced variable, across the ends of the loop, it tuned 10, 14, 18 and 21mhz bands. I wanted it to work on 80m. This required an additional 500pF across the 100pF. This was made up of 5 off 100pF high voltage ceramic capacitors.

The coax braid was connected to one end of the loop and the inner connected to a length of PVC covered copper wire wrapped loosely round the loop element starting from the end connected to the braid. A point was found on the loop that gave a minimum swr. This was around 3 to 1. Inserting 850pF, a twin gang 500pF, between the coax and wire gave a 1 to 1 swr.

This system worked over the 80m band using 5W of RF, but when 100W was tried the ceramic capacitors got warm and changed capacity sufficient to move off the required frequency.

The second loop aerial was made from 6m of cu tube made into 2 turns and spaced 4cm apart. A 220pF wide spaced variable was connected across the ends and it tuned across the 80m band. The variable has a 50 to 1 slow motion worm drive and to this I have added a further 10 to 1 spur gear connected to a motor. Mike G3LHZ said that I could do away with the twin gang 500pF in the feed wire if I spent time to find the right length of wire to couple the coax to the tapping point on the loop.

This I did and found that the wire did not have to wrap around the tube, in fact it was too short to do so. I formed the wire into a small loop within the main loop and got 1 to 1 across 80m. Whilst doing tests I noticed that the small loop had fallen from the lash up and was at right angles to the main loop but still giving 1 to 1. The wire feed ended up in an inverted V as it was the best way to support it.

The third loop aerial was made from a 10m length of copper pipe wound into a 3 turn flat spiral. The spacing between turns was 4cm. The tuning capacitor was a 350pF variable with a 30pF variable, both wide spaced, across it acting as a band spread. The 350pF tunes both 160m and 80m. Each band has a separate wire feed, which a slide switch from the coax inner selects.

Conclusions.

The first loop with just the 100pF variable and a single wire feed via the twin gang broadcast 500pF variable could be made to load on the four bands quoted. For each band only a single setting of the twin gang variable was required.

The optimum position for the twin gang was found by trial and error and this had to be set first before the main tuning could be finally set prior to transmission, very fiddly, but once found for each band, very easy to change bands. With this RF was noticeable down the outside of the coax so a balun had to be installed in the coax feed.

The second loop is still in operation in the loft. Remote

tuning across the 80m band is a bit tedious but in the 2002 AFS SSB contest I was able to work stations that were calling CQ. I was pleased when a GM station in the Orkney's came back to me with only a single statement of my call sign.

The third loop is still being refined, but has worked on both 160 and 80.

Considerations

Loops can be set up in the shack but if the loop is to work elsewhere then be prepared to alter tapping points etc when it is moved to its final work area. A loop that is set to work outside and in the open, will load the same if the loop is 1m or 7m above the ground, which shows to me that it is magnetic in its operation.

A loop tuned to 160m at 1m above ground, bottom edge, only moves up in frequency slightly when it is raised to 7m. Weather proofing the variable capacitors is a must for permanent use outside. A large plastic bag over the loop works all right if it is not wet and windy at the same time. The wet flapping plastic changes the

frequency of the loop randomly. I have not found any difference if the variable capacitors are at the top or bottom of the loop. It is easier to tune by hand if at the bottom, though you should be at full arms length from the loop whilst tuning. I have found that when introducing a ground plane or earthing system to the loop, the earth/ground plane, becomes a frequency sensitive part of the system, which can throw the desired frequency and swr out of the window.

Does this indicate that earth/ground plane are part of electric type radiation and they don't mix? I do all my testing with a 100W Transceiver with a Power meter in line. I set both to 5W and do all the testing at this level knowing that no harm should come to a 100W Pa transistor if I get things totally wrong. The power meter is set to the reflect power, so I know how much RF is being reflected from the device under test.

Those amateurs confined to flats could use loops. The loops that I have are less than 4ft dia and only 6ins deep and store easily indoors. The higher the frequency the smaller the loop required, within reason.



Horsham-Crawley Pub Quiz.

Last month, a team consisting of G3ZBU, G4FQR, G4LRP and M3GCR beat four other teams at Crawley, as mentioned in the last Harcnews.

Here are some more details.

The quiz-master was Roy G4UMJ. Instead of the usual sort of questions about radio call areas etc, this was a general knowledge quiz covering all sorts of subjects. We had questions about horse racing, famous horses, horse racing courses, history.

History involved dates of revolutions and kings. Then there was a section of foreign languages, for example various numbers in

Italian, French and Spanish.

It did appear, however, that some of the 'answers' were wrong!

Each table could play a joker for one round. That sounds simple except that each round was somewhat cryptically coded to make it impossible to predict what sort of questions would be asked in that particular round!

Luckily the HARC team luckily played the joker at the correct point to regain the lead after temporarily spending a short time in second place.

This was a very good quiz, and many thanks to Roy for taxing our brain cells!

Foxhunt

Its time for a 2m foxhunt on Sunday 15th June. The fox ala G4LRP will be using G4HRS/P from his cunning lair and will transmit on 144.725 Mhz for 2 minutes every 10 minutes. First transmission will be at 10am, and the last around mid day or until all find foxy, or give up! The

start will be from Robin's (G3OGP) qth at the Haven. All would be hunters are advised that OS maps for 'Dorking, Crawley and Reigate' and 'Brighton and The Downs' should help you locate the fox, but 'Chichester and The Downs' may help...!



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