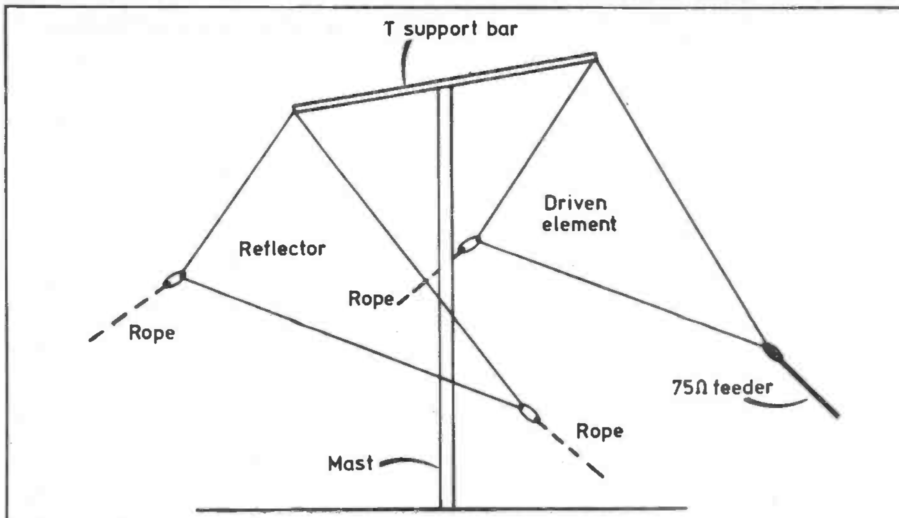


**Fig. 12. Pair of delta loops used as beam aerial**

polarised loops ideally need a wooden mast. Fortunately in this case much less pole height is needed.

The formulae normally used to determine the overall wire lengths for full wave loop elements are:

Driven element $\frac{306}{f(MHz)}$ in metres

Reflector $\frac{313.6}{f(MHz)}$ in metres

Practical experience at the author's location has shown the need to make the driven element slightly shorter and the reflector slightly longer than the dimensions predicted by the formulae but this may be due to local environmental effects.

Of course both elements may be made of the same size and a separate feeder attached to each. This allows the use of a phase shifting stub to the switched from one to the other feeder for reversing the direction of fire.

## 3.5/3.8MHz band

Much of what has been written in detail about aerials for the 7MHz band also applies for the 3.5/3.8MHz band except that mechanical difficulties are much more severe. A height of a half wavelength is 43m (for 3.5MHz); so even a horizontal dipole is outside the scope of most amateurs at this height and rotatable beams need not be discussed in this article!

So let us turn our attention to the more simple wire aerials which are possibilities worth consideration by serious 80m DXers.

The full size halfwave sloping dipole needs a support height of nearly 30m to keep the bottom end out of reach of people, again assuming a 45° slant which seems near optimum when a metal tower is used. Nevertheless many operators have found this an excellent DX aerial. For all round coverage, an 80m version of the system described in reference 6 may be constructed. The author has also tried shortened half-wave slopers both of the G5RV type and those using traps but performance has fallen short of that obtained with the full size version.

To avoid a repetition of what has been written about verticals, slopers and Delta loops for the 7MHz band it should be noted that all the observations and comments made, equally apply to the larger versions of these aerials for use on the 3.5/3.8MHz band. Additionally the following points are worth bearing in mind:-

**1)** It is difficult to design an aerial to cover the entire 3.5/3.8MHz band. The easiest way out is to decide if one is essentially a CW or SSB DX enthusiast. Then a bandwidth of only about 25kHz is usually sufficient (even the VK's can now use the 3.8MHz end!)

**2)** The author has found that ¼ verticals work rather better with resonant ¼ radials (even if they are only about 1m above ground) than buried radials.

**3)** A pair of phased verticals constitute an excellent DX aerial. A separation of 40-50m is required for in-phase operation when a bi-directional broadside pattern results. A unidirectional pattern can be secured by spacing the verticals a quarter-wave apart and using a quarter-wave delay line in one feed or the other (to change the direction of in-line fire).

**4)** A single Delta loop is almost invariably better than a ¼ vertical. One reason for this is that all the RF power at the aerial end of the feeder goes into the aerial. Series ground losses reduce the effective power going into any aerial (eg the ¼ vertical) excited against ground. In the writer's opinion Delta loops are among the best practical aerials available to the average amateur for use on the 7 and 3.5/3.8MHz bands.

**5)** Where adequate mast height is unavailable for a full size half-wave sloper, the ¼ half-sloper may be tried. Considering the small space occupied it can provide fair results but is not in the same class as a Delta loop erected in the clear. Some controversy exists with regard to the functioning of half-slopers (references 7,8 and 9).

The author has used a pair of co-linear inverted Delta loops for DX working on 3.8MHz. This gave very good results to the USA which is in the broadside direction. Whilst individual feeders were used in this case it should be possible to use a single feeder as shown in **Fig 13.**

Perhaps the most effective 3.8MHz aerial the author has tried consists of a pair of Delta loops mounted one behind the other. See **Fig. 14.** Both are driven using 75Ω balanced twin feeder. One Delta loop is strung between two widely spaced 20m masts and is inverted with the 'apex' hanging downwards. The second loop is supported at its apex by a wooden mast which is some 16m behind the inverted Delta loop. This somewhat unusual arrangement was evolved purely because of practical constraints. It was decided to drive both elements rather than use a parasitic reflector (or director) because this arrangement leads to easy beam reversal by operating a single switch in the 'shack'.

An inverted 'V' half-wave dipole with its apex at about 15m has been used as a comparison aerial. All have proved considerably superior to the inverted 'V' for DX operation.

## 1.8MHz band

It has not been found possible to erect an 'ideal' top band aerial at the author's location without removing the 7MHz and 3.8MHz aerials.

Vertical aerials using inductive loading have been abandoned in favour of capacity hat loading. Both the radiation resistance and