

Stacking, Baying or Boxing Ant

From: G8MNY@GB7CIP.#32.GBR.EU  
To : TECH@WW

By G8MNY

(Updated Jan 05)

AERIAL SPACING

Aerial spacing figures are variable depending on what books you read etc, the manufacturers data may help if it is based on real measurements. But without any other information a good guide is about half the boom length for normal yagi aerials up to 4 wavelengths long. Longer aerials can be stacked closer.

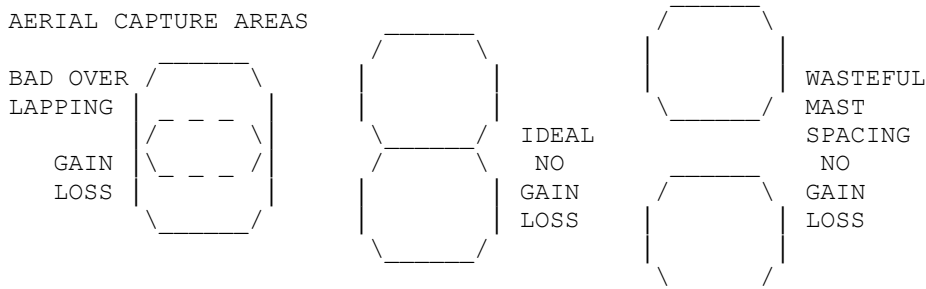
Stacking formula to fit some data looks like this...

$$\text{Stacking Fraction} = \frac{\text{Boom Wavelengths} - 1.13}{0.86}$$

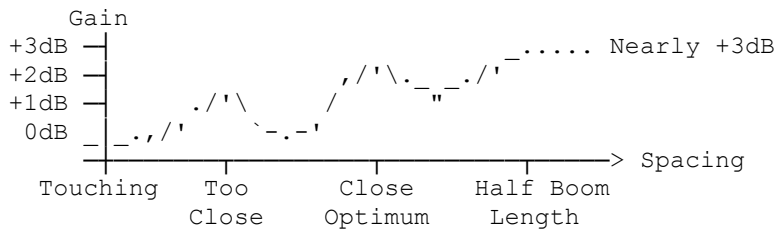
Use 2/3 of the boom length (or of the formula above) for the higher gain aerials like Quad loops, loops, HB9 & ZLs.

This only a rule of thumb as the relationship to length, gain & capture area is not linear.

AERIAL CAPTURE AREAS



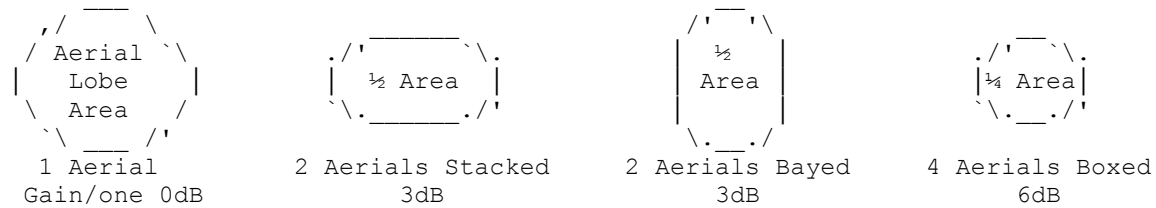
Makes sure that the aerial capture areas (as if they were dish aerials) do not overlap.



Closer stacking or baying, gives variable results as all the aerial elements will couple, & this will result in a different polar diagram & gains less than optimum. But closely mounted aerials with high gains are possible, if difficult to get the distance just right & for just one spot frequency!

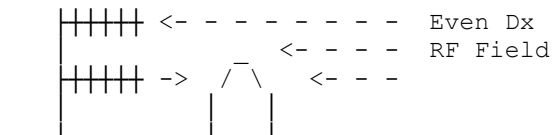
STACKING, BAYING or BOXING AERIALS

The aim of using more aerials is to improve performance by reducing aerial beam lobe size (Beam angle) to increase gain.



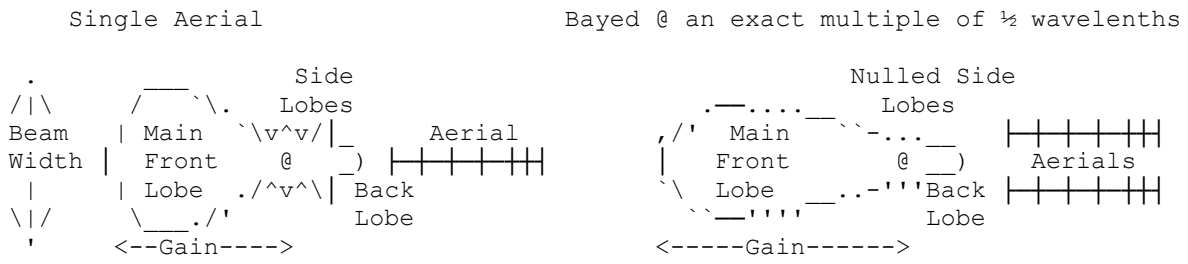
From these plots you can see that stacking offers gain without the reduction horizon beamwidth, or contact opportunity, that baying 2 aerials has or even 4 Boxed aerials with its nice 6dB gain.

Another point often forgotten is that both aerials should see the same RF field to work. If one aerial is much closer to the ground or buildings it can cancel any advantage as Rx signal power can actually be lost in the lower aerial!



SIDE LOBES

The baying distance also affects side lobe nulls. This is very difficult to get right, as a fraction of a wavelength of boom location or movement can cause tightly nulled out lobes to reappear.



See my bulletins on 4x Power Splitters for 2M & 70cm, Making a Phasing Harness.

Why Don't U send an interesting bulletin?

73 De John, G8MNY @ GB7CIP