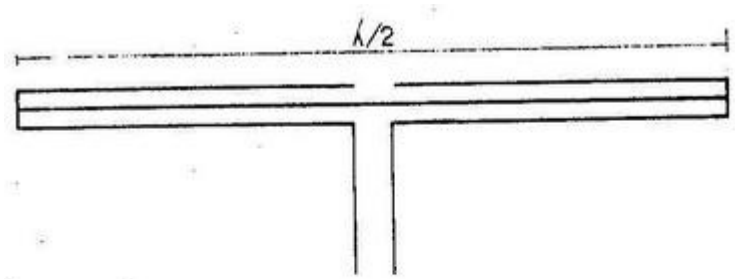
A folded dipole 14-MHz bandwidth for sailors: the double bazooka.

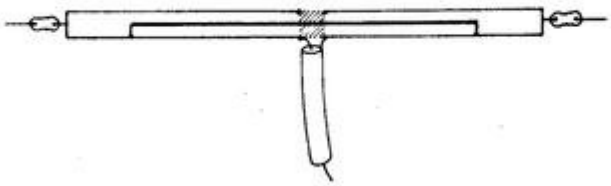
In addition to our wire antenna (backstay) with matching box, the construction of a dipole box without any agreement covering the band 20 m is not negligible and will be very useful in case of need. It fits in a box very easily and does not take place.

Summary of the theory:

The antenna in the United States known as the "double bazooka" is nothing but a length of coaxial resonant half-wave at the center of the selected band, and fed at its center by a coaxial line of any length and the same impedance.



la bazooka en théorie



the bazooka in practice

explanations:

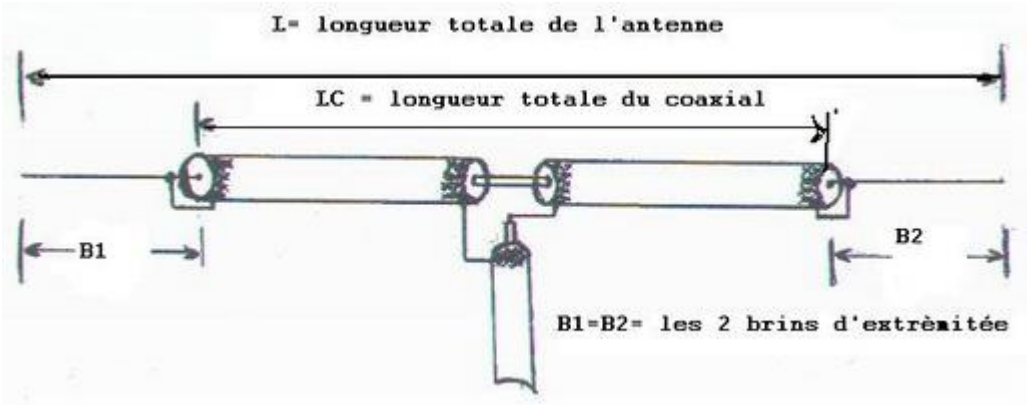
In fact, the radiating part is the cable sheath and behaves like a half-wave and the central core of the coax is ¼ wave two sections that present a high reactance at resonance decreases but all away from it more than you:

The result is a **fairly large expansion of bandwidth,** which is interesting for us seamen: 14,118 descend on the QSO but the captain to go up to 14,300 maritime emergency frequency (IARU), **without using a box of agreement,** with a minimum TOS, and with a better signal / noise than a conventional dipole, less QRM in reception, and less QRM tvi in issuance and a gain (3.5 dBi) slightly higher than the dipole (2 , 5 dbi).

It is much less affected by the environment as the masts and the rigging of the boat, a conventional open dipole. This is great interest for us sailors.

It works very well inverted V (120 ° 90A): Personally, I install it on the basis of the foremast, some along the Moroccan to the mast, the other party back along the backstay.
ATTENTION IN V, the coasts of the antenna are different see below references in Chapter **realization marinisée calculations.**

references calculations



I always give a summary for a better understanding of the antenna and to allow OM to achieve this antenna on other bands using the formulas. **This is only a single band.**

The formulas take into account the velocity factor of coaxial cable and to our calculations, we took 0.66 corresponding to the current coaxial RG 58, RG 213, etc. ..
Lt = 140.208 / f (MHz) = length of the antenna
LC = 99.06 / f (MHz) = length of our coaxial line.
(L - LC) / 2 = length of strands B1 and B2
(Dimensions in meters)

IMPORTANT: If the expected inverted V up to 90 ° to 120 °
the lengths of coax and two strands will be longer.
A formula should be F lower than 300 kHz

For reasons of ease of adjustment, parts B1, B2 are made of solid core wire that is added. this allows: you can resize the length of the coax for fignoleurs, and b1 and b2 to adjust easily to get an SWR of 1 / 1 at the resonant frequency chosen.

The use of a line of type 300 ohm twin lead, as seen on some mounting B1 B2, does nothing to better the antenna and a good coated wire 2.5 mm2 or more.

ACHIEVEMENT MARINISÉE

FOR BAZOOKA a HORIZONTAL:
LT = 9.91m LC = 7 m = B1 B2 = 1.45 m

For my calculations, I have chosen the resonance f ° = 14.150 Mhz. The length of the coax as gives us the formula LC = **7 m.** So I cut coax 7.08 m, c is to say, more than 4 cm on each side for splices. Right in the middle to 3.54 m, I opened only by cutting the braid but certainly not the dielectric or the central core 3 cm with a needle to undo the braid on each side 1.5 cm to weld then the PL259 plug frame or directly on a downhill 50-ohm cable as pictured. And with the help of the analyzer is adjusted coaxial strands b1 and b2. According to the formula, B1 and B2 should be **1.45 m.** (Always add 3 cm to the loops and welds). It is marinisée because as you will see. we have made strong and completely waterproof.

FOR BAZOOKA a V
LT = 10.12 m 7.15 m LC = B1 = B2 = 1.485 m

(Khz 300 is removed to the resonant frequency-selected
Fz for calculations = 14.150-0.300 = 13.85
For f = 14,150 we obtain = LT = 140.208 / = 140/13 Fz, 85 = **10.12 m**
LC = 99.06 / 13.85 = **7.15 m**
B1 = B2 = (LT-LC) / 2 = (10,12-7,15) / 2 = **1.485 m**
(+ Still add 3 to 4 cm for splices and welds)

Materials needed

the middle of the antenna

An electrical connection box
A stainless steel support

ring (eyelet)
A female chassis plug PL259 coax or descent
8 m RG213 coaxial (a little rab)
4 m of wire gain of 4 mm2 or more.
Two insulators
1 / 2 liter of polyester resin and hardener (catalyst) going with.

First, I prepare my case: a hole cutter to switch my support loop antenna. Lightly tighten the nut against inside by putting a puck. The polyester resin solidify all. A bit of Sikka on the outside. (Photo).

Then, after removing the sheath and the braid with a bare needle 3 cm the center of my coax, I pass in the box, I connected directly to a coax down to 50 ohms. (See photos).

the center of our antenna

our case

the complete sealing of the housing

respecting a few drops of hardener to be mixed with the resin, will get a totally waterproof and super durable.

pictures worth a thousand words

our case covered 291 sika

a fresh coat of paint anti uv

termination LC

Follow the guide

termination ends of LC

I found it clever to bypass the ends and weld a lug 8mm plug (see photo), B1 or B2 extension will connect with it the same system with a terminal screw and nut.

And all this junction is embedded in the resin, once found the right length (see below):

The system allows screwed when embedded in a resin super strength in tension.

b1 and b2

the terminal at one end (screw that of LC) and the insulator on the other side.
We fine tune the setting by shortening B1 and B2 cm cm on the side of insulators (leave room for the loop with the insulator).

Why lugs and screws, not solder a pure and simple?

Because they are holding in extension in the resin.
That does not stop me from welding the two lugs plus before pouring the resin.

Consolidation and sealing LC/B1/B2

I found two tubes of 60 ml plastic syringe pharmacy m 'were used as support. I put the coax and two terminals connected by a screw and a nut and weld extra. A bit of dough on the outside so that the resin does not run away from the bottom. We put up the whole, the resin is poured, it is expected that it hardens: Then we turn the tube with the cutter (the resin does not on plastic) and a little bit of white paint: and that's all good and waterproof. And rock solid.

junction and LC b1 or b2

the two straight tubes, poured resin. Given that the syringe is 60 ml, I have prepared 150 ml of resin with 3 ml of hardener (max. 2%) and after Stirring with a small stick is poured into our tubes.

all the beautiful liaison over

After release of the tube, we see the finite. (J have used the transparent resin). Then I painted to protect a primary and a UV topcoat. a set super tough, and required to tender to death on the air.

a fresh coat of paint

the complete antenna to store easily in a safe

jotamastic home JOTUN

The box was covered with paint Sikka and bi-component UV. Our air infiltration or no risk of corrosion: A simple dipole eventually corrode rapidly in the marine environment. and losses due to the proximity of the rig is very important.
It is the interest of this antenna for us. and of course the choice of 14 MHz, the band dx par excellence.

To use Earth

Not recommended on a sailboat, because we are always moving with variable voltages, the weakfish can be very brutal and points of weakness in the coax-wire connections must be highly enhanced, as the attachment points.

On land, can be simplified by making a connection with a single coax wire solder and shrink tubing as realized in these photos of OM, because the antenna is stable and does not undergo any intensive effort.

SETTINGS

Before welds, insulation: the ultimate is to get 1 / 1 at the chosen frequency. We must cut on each side, **the coax** and **B1 B2**

That is why, to the extent with the parser before cutting, cutting and welding. It does not solve the antenna with B1 B2, we play on the length of coax and as a consequence of calculation on B1B2.
It is easier to cut than to redo the antenna.

Looking at the frequency for which there are 1 / 1 with analyzer and see if that is above, so one should extend the antenna by redoing the calculations for both LT SC (B1B2 and difference) by decreasing the frequency of the gap to redo the calculations.

Can be refined by adjusting the angle of the two strands of the antenna as well.

The effect is important.

Better to provide a little lower in resonant frequency chosen for the implementation of the antenna, allowing quicker then! (Easier to shorten than to do it again.)

However, given the bandwidth, if you follow the guide in specifying your choice: **horizontal or V,** and taking my data for the 14 Mhz you will not have to touch up and the results will amaze you.

CONCLUSIONS

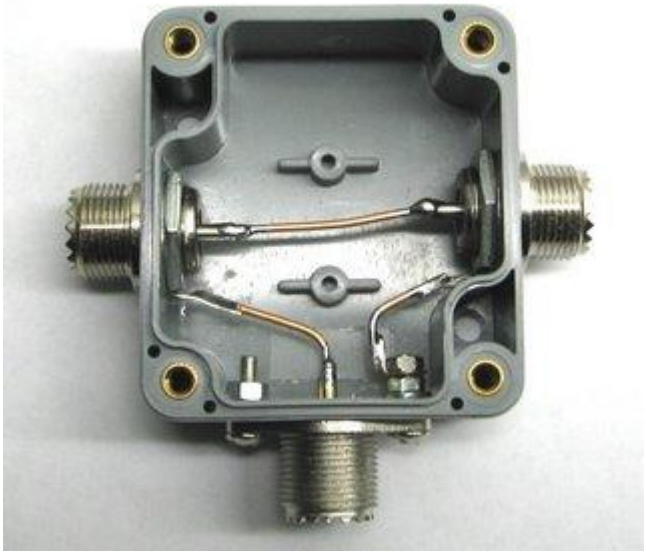
On land: little interest.

If you are on the ground, the bazooka is of little advantage over a simple dipole, it is heavier (and less easy to do). A simple dipole at the right height, 1 / 2 lambda, will be perfect. In my opinion, the only interest of the bazooka for a landowner may be for bands 80 m, 10 m and its bandwidth.

At sea, everything is different. On a sailboat, it is not possible to install a dipole along without a backstay, a guy or a Moroccan or a prop.
Absorption losses are very important with a classical dipole, whereas they are much less with the bazooka, not including **the insulation** in the marine environment.
My experience is formal. The bazooka, no matter the distance or spread, give better results than conventional dipole on a sailboat.
In addition we win easily 5-6 db **signal to noise ratio** compared to a dipole. For me, receiving the noise factor is very important in a hostile environment.

It will serve me as a **reference** for comparing the long wire backstay and the magnetic loop or any other antenna.

for fadas bazookariens



This universal housing allows you to control all your achievements
A to follow the formula calculations mentioned above .... and drown it in the resin. 73 f3dd/mm

To prevent marine, three months after use you can not unscrew your PL259 that will be oxidized and welded, but for testing, it's great. In the marine environment, retain our highest achievement.

A possible improvement
a filter for the current sheath:

Although the antenna has neither need balun, or agree to work box, the output of the box, you can, on a mandrel of 75mm dia pvc, roll 7 m of RG213 in contiguous turns, forming shock-balun as close to the antenna, eliminating the current sheath

potential due to the mast.
All this seamless welding or taken any intermediate, and join the TX.

The antenna position on the boat

An inverted V Boitard some 130 °, but it works great. ROS from 1.1 to 1.3 over the entire 14 MHz band. Like a sailboat, it must be mounted as V, the weight is not very consistent in 14 MHz and voltage, given our manufacturing, there is no problem. It may well be the tender, so that she does not interfere with the movement of the mainsail. j I put a small spar support the top of the mizzen mast.

TIPS for sailors: the tensions between the two masts can be considerable in order to So `navigation avoid a cable break, I found clever after the insulator to a **stainless steel spring** between the fixed point of the mast and iso to compensate for this phenomenon. SO, from the mainmast: -6 cm **stainless steel spring** wire teflon-insulator-LC-b1 / 2 box on top of the mizzen mast to the back porch LC/2-b2-isolateur-câble teflon .

I have noted in recent days, the rear spar of the mast, and now the bazooka at an angle of 120.

you have new photos later

the new bazooka balun with shock and V

The photos in order to achieve worth a thousand words
I remember that clicking on a picture, you expand the.


photo 5


photo 6


photo 7


photo 8