

DL7JV

Capacitive Antennas

I had always dismissed and therefore had not continued to consider the reports on strongly shortened, capacitive antennas (Micro Vert) as "QRP-plaything". Before 10 years I purchased a magnetic antenna (AMA3 - 29 to 14 MHz). In attempts however always it resulted that mono volume dipoles were better. So critically adjusted I did not believe in a use of the chapter antenna with my radio station.

At the 2.April 2004 I heard a Spanish station in the QSO with an Englishman in the evening on 80 meters. The Spaniard brought 9+20 with to micro a Vert (something over 1 m) from Italian manufacturing. Its transmitting power amounted to 100 Watts. It reported of its attempts: At the mast into 25 meters height the results would be bad. It was disappointed over the antenna. As it had developed it on a 4 meter high plastic mast in the garden played the antenna much better. The Englishman asked for DX and the Spaniards reported "the last three QSO's before you was PY, and UA0". Now I became nevertheless hellhoerig - the signal of the Spaniard was really strong and I decided also such a part to build.

Search for references

So far I had seen the micro Vert only from the distance and placed myself it the question about the dimensions. The search in the InterNet brought me to homepage of DL7PE. Its remarks on were not for me sufficient there. DL7PE offers a detailed description as CD Rome for the purchase. I found better Tipps with DL7AHW. He builds antennas from hair spray doses and Tetra luggage bags (rear ones). DL7AHW gives two small programs for the calculation of the antenna on its page. Also a small collection of formulae and useful references are there indicated.

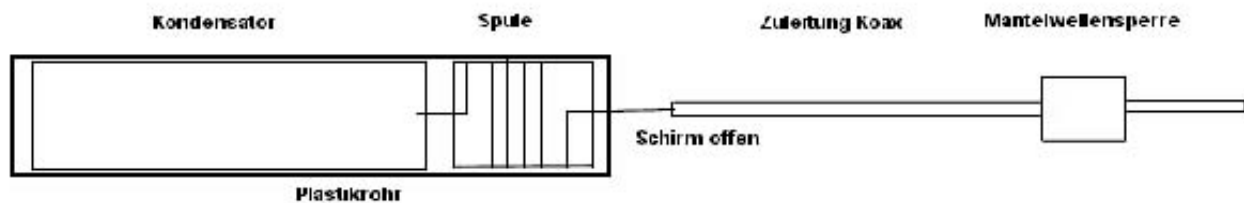
First the pocket calculator is used

With the DOS program "Mitspule.exe" by DL7AHW is to be computed it possible a capacitive antenna. There one selects only the working frequency and all relevant data, related to a 22 mm pipe as condenser, is indicated. If one does not have a 22 mm pipe available, one must convert

the surface indicated there to another pipe diameter. The same applies to the coil data. As an assistance for coil conversion DL7AHW gives the program "Spulenprg.zip".

Structure of sample

To the comparison I built 2 antennas from the tinkering crate. One for 7.050 MHz and one for 3.550 MHz. For 7 MHz version I selected a 75 mm PVC pipe as radio tower, for 3.5 MHz a 110 mm PVC pipe. I made the condenser from somewhat thicker aluminum foil. In addition I marked the calculated mass with a felt-tip pen on the pipe and stuck double tape up. The double tape keeps the aluminum foil optimal at the pipe. The coil wound I from schaltlitze "H07V-K" 1 mm². Since the cable diameter with isolation amounts to 2.5 mm there, I had to consider the new length during the coil computation. "Spulenprg.zip" was very helpful.



The distance between coil and tubular capacitor amounts to approx.. 20 mm.

Mass

7 MHz

Condenser C = 10.3 pF, F = 46353 mm², D = 75 mm, h = 197 mm

Reel L = 50.1 uH, D = 77.5 mm, h = 100 mm, Wdg. = 33,5

Wire length 8208 mm

Inlet RG58, 6950 mm

Antenna length 350 mm

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3.5 MHz

Condenser C = 18.5 pF, F = 108179 mm², D = 110 mm, h = 313 mm

Reel L = 151.8 uH, D = 112.5 mm, h = 111 mm, Wdg. = 44,3

Wire length 15657 mm

Inlet RG58, 13400 mm
Antenna length 600 mm

First attempts

First I tested 7 MHz version. The experimental setup was simple without inlet RG58, on the table. The wire of the coil put into the Antennentuner and co-ordinated.

I was inspired - read signals around S9! I heard a German station CQ calls. A Japanese station (5 el Yagi) answered. As comparison my lying loop (42 meters under roof) served. The DL station brought S8 at the loop, at the chapter antenna S9+5. The Yes station brought S9 at the loop, at the chapter antenna S8. UNBELIEVABLY - this small antenna stands in the middle in Shack and hears the Japanese.

Tuning

Over with the small antenna to sending this must be exactly co-ordinated. With permanent change of station the chapter antenna reacts very sensitively. The inlet should not lie "interlocked" or in loops. Better it goes, by laying the cable out evenly in loops, or straight.

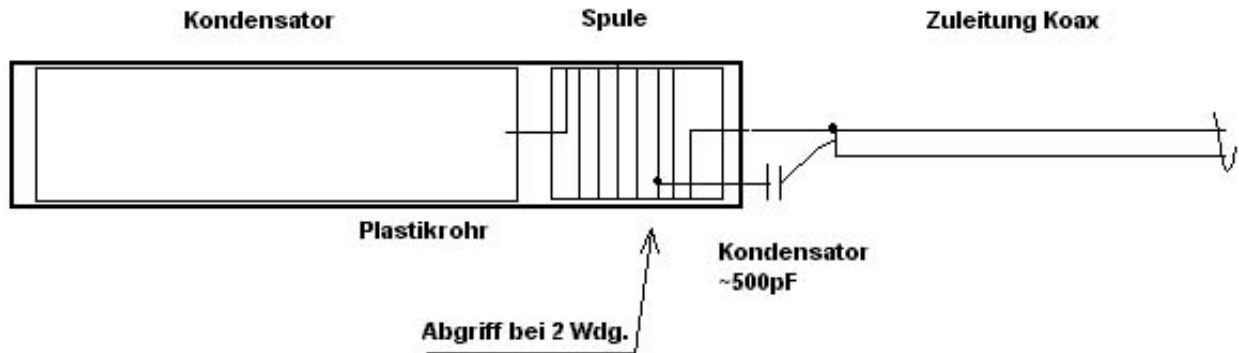
For co-ordinating shortening the coil by I a soldered on needle into the cable of the coil sting. The SWR can be improved in such a way, does not become not optimal however.

Hereunder applies, shorter coil = increase of the resonant frequency.

Modifications

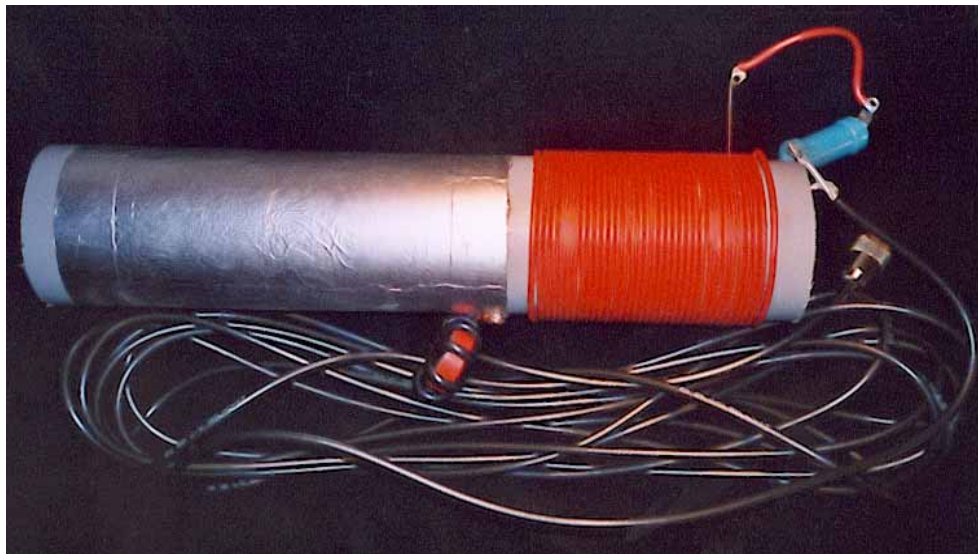
From DL7AXO I received some references in the discussion still. He received a Micro Vert even built for 7 MHz by a SWL which it also for sending used. The trick is to close the open end of the antenna inlet on also at the antenna. In addition become approx.. 2 turns of the coil at the coil beginning measured (or 2 turns again wound). Now the coil at the Koax screen is attached (the screen was open before). To the Koax soul is soldered a 500pF condenser. This becomes then at the coil pick-up (2 Wdg.) attached. Through determine the exact situation of the coil pick-up can the antenna well be co-ordinated now. The SWR does not react any longer so sensitively to enviromental influences.

DL7AXO did not determine the value from 400 to 500 pF with a radio Drehko "*comes there it on 50 piko on*". I decided for a 500pF fixed capacitor with high tension strain on 1kV.



Transmission attempts

When I had finished built and had co-ordinated both antennas after 2 days, it went to QSO driving.



7 MHz antenna stood on the cabinet in the Shack, 3.5 MHz version in the kitchen on the table.

To 4-4-2004 was moderate radio conditions due to a solar storm. However nevertheless the following connections could be manufactured in the evening: 19:20z - 7 MHz - EA5OT - 579/559... 22:40z - 3.5 MHz - YT1NT - 579/559... 23:00z - 3.5 MHz - G4KKI (Magloop/30W) - 579/559 QSB.

I was content. Shortly some field tests with different mast heights are to be tried out.

Result

The capacitive antenna is a very space-saving antenna with good receiving characteristics for the interior also for sending with 100 Watts to be used can. Send-site the antenna cannot keep up up to now with large antennas. However still attempts in the free one follow, then will turn out the radiation is as good.

Regarding the problem of the structure height of long dipole antennas for the volumes 80/160 meter (40 bzw.80 meter structure height for flat radiation with DX) this antenna form perhaps still their place in the amateur radio world is gotten.

I will build and will test still another antenna for 1.8 MHz.

Christian, DL7JV- 2006

Links about capacitive antennas:

<http://members.tripod.com/~oe7okj/kurzfassung.htm>

<http://www.qsl.net/kd5ahg/tower.pdf>

<http://www.hb9lu.qrv.ch/content/beilagen/microdip.pdf>

<http://www.darc.de/f39/bastel/2003/berichte/2003.html>

http://www.c-15.de/hints_kinks/microvert_antenne/MicroVert.pdf

<http://freenet-homepage.de/dl7ahw/>

<http://people.freenet.de/dl7ahw/Spraycanantenne.htm>

<http://www.qrpproject.de/kgd.htm>

<http://www.datacomm.ch/hb9abx/antenne-abx.htm>

<http://download.antennex.com/preview/archive4/Apr601/microvert.pdf>

<http://www.swschwedt.de/kunden/dm2ble/nahf-microvert.htm>

<http://www.dk2nb.de/projekte/microvert80/microvert80.html>

<http://www.dc4fs.de/microvert.xls>

<http://www.dk3red.homepage.t-online.de/de/s6d.htm>

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