MOUNTAIN SPARK GAPS

NPARC—The Radio Club for the Watchung Mountain Area

Website: http://www.nparc.org
Club Calls: N2XJ, W2FMI
Facebook: New Providence Amateur Radio Club ((NPARC)

VOLUME 52 NO. 1 January 2017

UPCOMING EVENTS

Auction

February 24, 2017
New Providence High School
35 Pioneer Drive, NP
Doors open:
5:30 PM Sellers, Buyers 6:00 PM

Regular Meetings

2/13 & 2/27
Mondays at 7:30
DeCorso Community Center

Meeting Schedule

Regular Meeting: 7:30—9:00 PM
2nd Monday of each month at the
NP Senior & Adult Center
15 East Forth Street
New Providence

Informal Project Meeting: 7:30—9:00 PM
4th Monday of each month
Same location
Everyone is Welcome
If a normal meeting night is a holiday, we usually meet the following night.
Call one of the contacts below or check the web site

Club Officers for 2017

President: W2PTP Paul Wolfmeyer
201-404-6914
Vice President:K2GLS Bob Willis
973-543-2454
Secretary: K2AL Al Hanzl
908-872-5021
Treasurer: K2YG Dave Barr
908-277-4283
Activities: AC2GL David Hartman
908-908-665-1419

On the Air Activities

Club Operating Frequency
145.750 MHz FM Simplex

Sunday Night Phone Net
Murray Hill Repeater (W2LI) at 9:00 PM
Transmit on 147.855 MHz
With PL tone of 141.3 Hz
Receive on 147.255 MHz
Net Control K2AL

Club Internet Address

Website:http://www.nparc.org
Webmaster K2MUN David Berkley
Reflector: nparc@mailman.qth.net
Contact K2UI, Jim

MOUNTAIN SPARK GAPS

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Contributing Editors:
WB2QOQ Rick Anderson
W2PTP Paul Wolfmeyer
K2UI Jim Stekas

Climatological Data for New Providence for December 2016

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 35 years.

TEMPERATURE -
Maximum temperature this December, 56 deg. F (December 27)
Last December(2015) maximum was 68 deg. F.
Average Maximum temperature this December, 41.9 deg. F
Minimum temperature this December, 13 deg. F (December 16)
Last December(2015) minimum was 29 deg. F.
Average Minimum temperature this December, 27.3 deg. F
Minimum diurnal temperature range, 6 deg. (41-35 deg.) 12/24
Maximum diurnal temperature range, 27 deg. (55-28 deg.)12/18

Average temperature this December, 34.6 deg. F
Average temperature last December, 46.4 deg. F

PRECIPITATION -
Total precipitation this December - 3.23" rain/melted snow; 2.3" snow
Total precipitation last December - 4.57" rain; Trace snow

Maximum one day precip. event this December -
December 12, 0.62" rain; Dec. 17, 2.0" snow
Measurable rain/snow fell on 12 days this December, 15 days last December.
YTD Precipitation - 41.75" (includes rain + melted snow, as of 12/31/16)

==========
Rick Anderson
1/5/17
243 Mountain Ave.
New Providence, NJ
(908)464-8912
rick243@comcast.net
Lat = 40 degrees, 41.7 minutes North
Long = 74 degrees, 23.4 minutes West
Elevation: 380 ft.
CoCoRaHS Network Station #NJ-UN-10

President's Column January 2017

NPARC is off and running for 2017—the first big activity is the Auction on February 24th at 6:30 PM (note the slightly earlier time) at New Providence High School. The time change should give us a bit more time for the after-auction flea market. And from past experience, using the school cafeteria enables us to set up fairly quickly so we should be ready to go at 6:30. Our activities manager, Dave Hartman AC2GL, has most tasks assigned. We can use folks more to help set up (beginning at 5PM) and tear-down. I'm leading those tasks so let me know if you can help and have not already offered help.

Your Executive Committee—the officers—met to begin planning for 2017. Of particular interest is membership and "reacquiring" folks we haven't seen for a while. So if you know of someone who has "fallen away" in recent years, reach out and invite them back… The club offers camaraderie, information, assistance, a place to share like and diverse interests of ham radio-- from contesting to qrp to portable ops to building "stuff" to….

By the way, we'd like to make improvement in our web site. It's become very cumbersome and difficult to update. Bob Willis K2GLS is leading that and working with Dave KC2WUF.

I'm interested in hearing what you would like the club to do…a tour last meeting Bill Hudzig W2UDT brought to our attention how, as an "ARRL affiliated club", we could "pool" and sort our outgoing QSLs to the bureau and save substantially over the new fee structure versus sending the cards as individuals. We'll talk more about it at the next meeting.

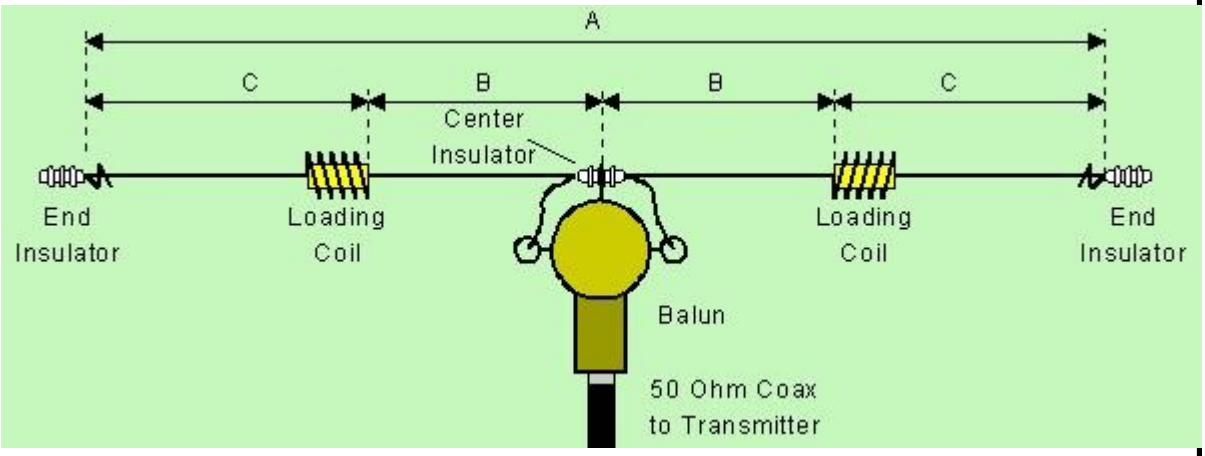
73 for now
Wolf
W2PTP
201-404-6914 or W2PTP@arrl.net

Loading Coil Magic

Jim Stekas - K2UI

In my never ending hunt for the perfect wire antenna I am always on the lookout for new ideas. Many of the new ideas actually turn out to be old ideas coming back with a new wrinkle. Back in the 80's the G5RV became the rage as hams reported taking a clever antenna design and getting it do things that the laws of physics don't permit. (After all, Maxwell's E&M ***is*** just a theory.) These days end fed single wire antennas are everywhere, in resonant (End Fed Half Wave, EFHW) and non-resonant configurations. Looking at the reviews on www.eham.net, one would think it impossible to construct a bad end fed anything. I am not tempted to jump on the end fed bandwagon, but that's a different article.

This past FD, W2PTP set up his operating position with a short 80/40m dipole that looked like a trap dipole, but what looked like tuned traps were actually loading coils. Brilliant! Not only did it reduce the length of the 80m dipole from 132 feet to a more manageable 82 feet, it also gave a good match on 40m. A nice bit of ***loading coil magic***.



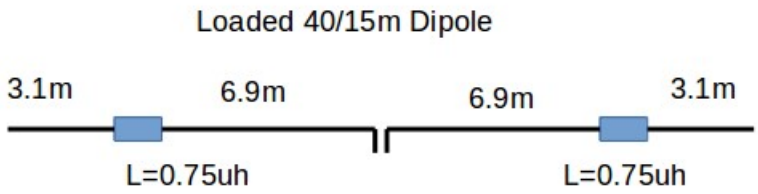
Above is a generic diagram of a loaded dipole. Both legs are mirror images of each other to maintain balance. The dipole has three parameters that can be independently adjusted:

A – the overall length.
C – the distance of the loading coil from the end insulator.
L – the inductance of the loading coil.

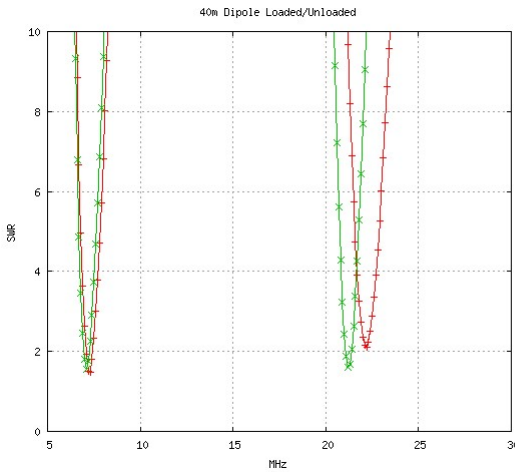
Whatever these parameters are, there must be a lowest resonant frequency which we will call F1. Above this frequency there will be other resonances: F2, F3, F4, … If L=0, we have an unloaded dipole and lowest resonance will occur at F1 for which A is one half wavelength. The higher resonances will be approximate harmonics of F1 , with the odd resonances (F3, F5, …) having low impedance and low SWR and the even resonances high impedance and high SWR. If we add a coil of L≠ 0, at some position C, we have effectively lengthened the dipole, lowering F1, so we will need to reduce the length A in order for F1 to remain unchanged. But what will happen to F3 ?

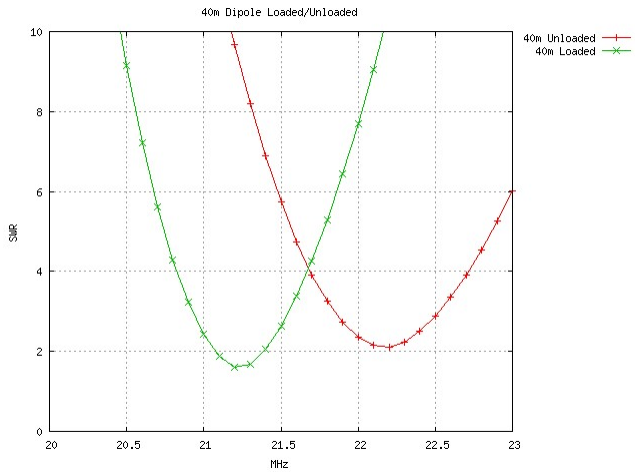
That's not clear (yet), but it's highly unlikely that F3 wouldn't change. So it looks like we can adjust A, C and L to keep F1 fixed and move F3 to a more desirable spot.

The most obvious application for this loading coil magic is moving F3 of a 40m dipole into the 15m band. A 40m dipole cut for 7.15MHz will have an F3 = 22.2MHz. At 21.3MHz the SWR=7.7 rising above 10 at the bottom of the band, 21.0MHz. Below is 40m loaded dipole design that moves F3 down to 21.25MHz using a small inductance of 0.75uH.

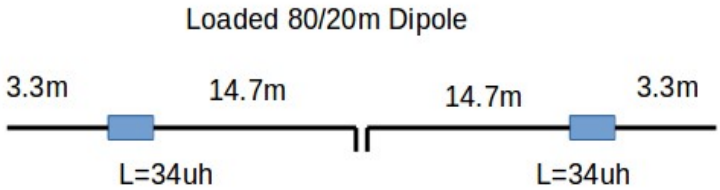


The SWR plots below shows the dramatic improvement of the loaded dipole versus the un-loaded version in the 15m band. A 100:50 ohm transformer would drop SWR below 2 over both 40m and 15m bands.

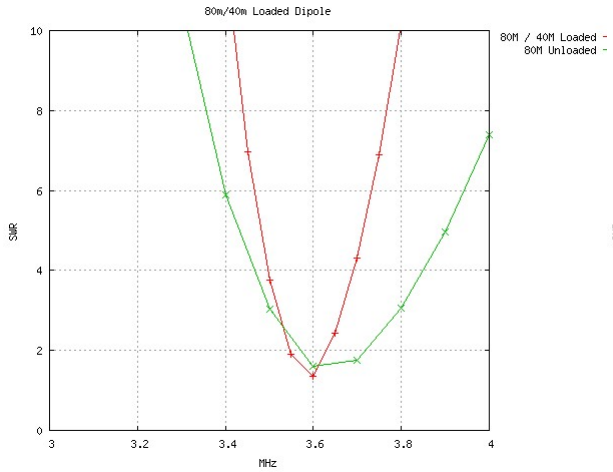


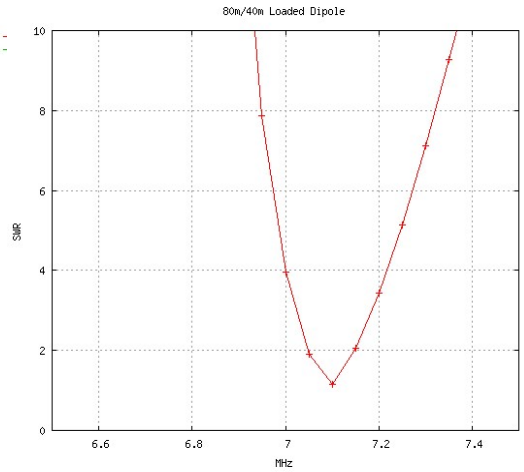


I don't have the dimensions of our FD antenna but I designed one that resonates in both 80m and 40m bands. The goal was not to so much to shorten the 80m dipole, as to add a usable match on 40m. The figure below gives the design details...

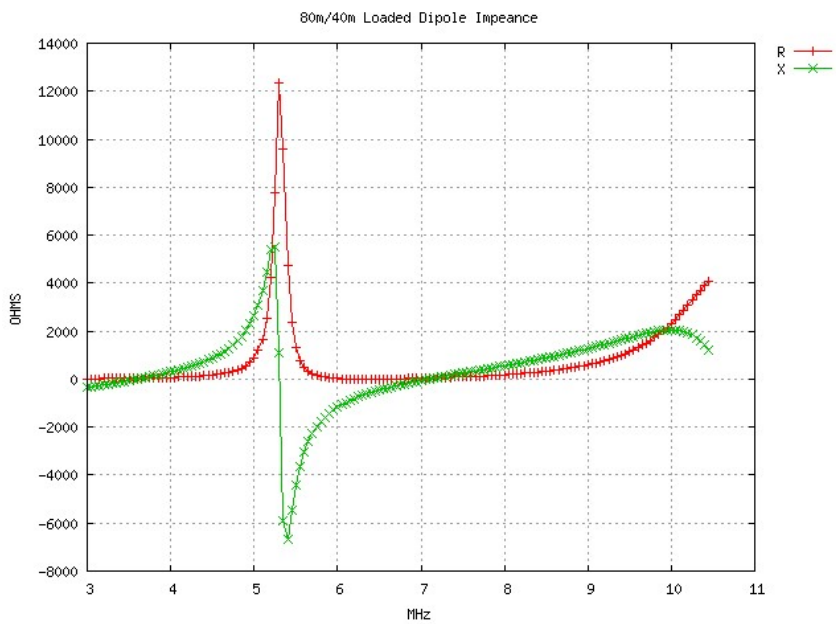


The SWR in the 80m and 40m bands is shown below. In the 80m band the SWR profile of an unloaded dipole is also shown for comparison. Clearly, the loading coil brings some bad magic along with the good in the form of reduced bandwidth. Bandwidth is what we sacrifice for the flexibility of moving resonances around.



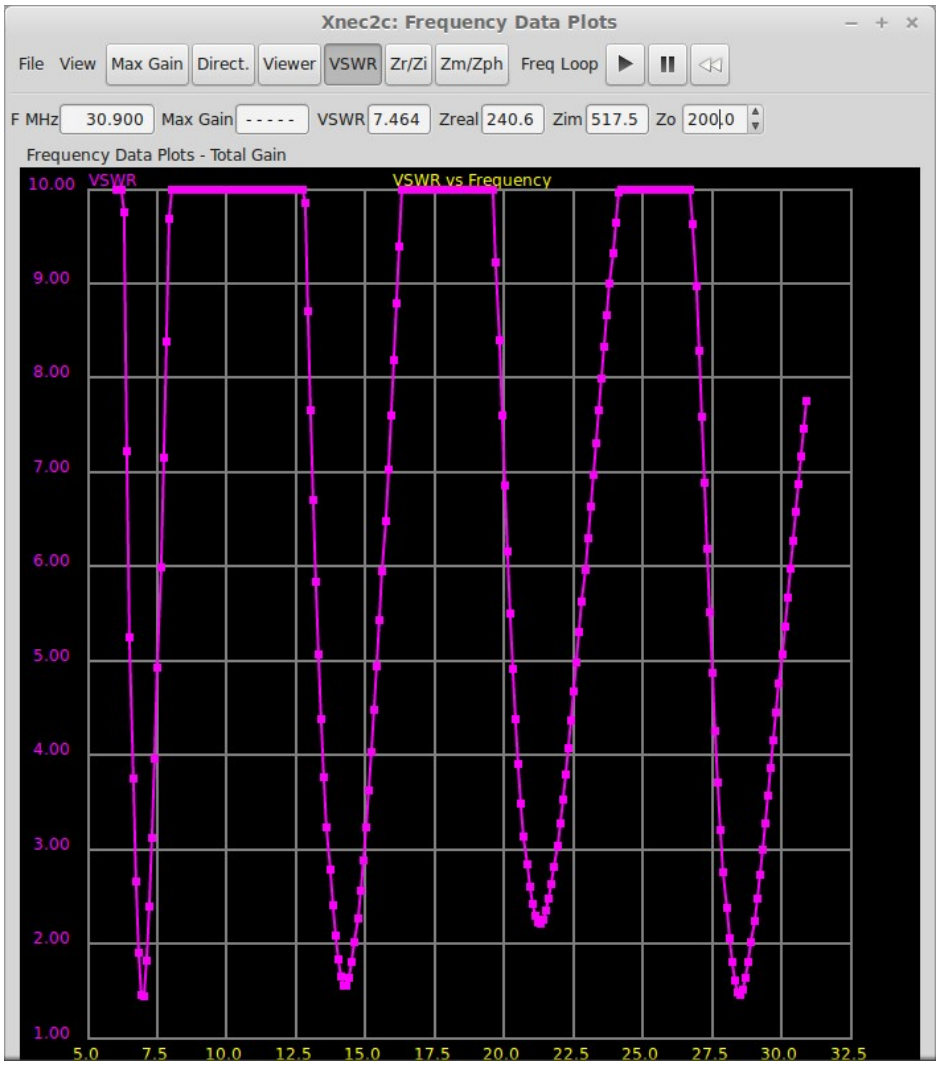


The 80m/40m dipole is very different from the 40m/15m because it looks like we are working F1 and F2. But at F2 the antenna should have a high impedance and high SWR, so what's going on? The answer can be seen in the impedance versus frequency plot below.



The plot above shows a high impedance resonance around 5.3MHz, which is what we expect at F2 . The resonance in the 40m band is the third resonance, F3 . If we removed the loading coil we would find the fundamental resonance at F1 = 4.0MHz, and the 3rd harmonic at F3 = 12.3MHz. What the loading coil in this example did was to shift F3 down from 12.3MHz to 7.1MHz.

My favorite bands are 40, 20 and 15m. There are lots of OCF dipoles around that work 40, 20 and 10m, and they generally are pretty useless on 15m. Turns out by adding a single magic loading coil to an OCF dipole fed with a 4:1 balun it is possible to build an antenna that works on 40, 20, 15, and 10m bands. Here is what the SWR looks like. I plan to review this design at an upcoming meeting, along with a few more load coil magic tricks.



References:

1. https://www.alphadeltacom.com/ - Makers of the DX-DD 80/40m antenna.
2. http://www.k7mem.com/Electronic_Notebook/antennas/shortant.html – Loaing coil exam ples and calculators.
3. http://www.k3bu.us/loadingcoils.htm – Interesting article on current distribution in loading coils. Something new to argue about.

4. ARRL Antennas Book – Any year.