

**Saturday, May 14, 2011**

**Reader Feedback: 2-Meter 300-Ohm Twinlead J-Pole, January 2011 WRO**

I was quite interested to read the article on the “Loose-Wire Double Radiator 300 ohm Twinlead 2-meter J-Pole antenna” in the January issue of WRO.

From what I understand, this is a modification of a J-Pole, modeled by the late L.B. Cebik, taking into account the unconnected “loose wire” opposite the normal  $\frac{1}{2}$  wave radiator.

This design is also based on what Cebik calls “a non-standard” J-Pole design, where the  $\frac{1}{2}$  wave element is made shorter than a “normal”  $\frac{1}{2}$  wavelength, and the  $\frac{1}{4}$  wave matching section is made longer than a “normal”  $\frac{1}{4}$  wavelength.

What concerned me, however, was that the build dimensions published for the J-pole construction, appear to be those taken from what Cebik calls his “...bare-wire proof of principle model”.

Note especially this term “bare-wire”, which clearly could not apply to anything made from 300-ohm plastic insulated twinlead. Cebik also repeats several times throughout his text, his reference to his “...bare-wire proof of principle model”.

Cebik points out that there are many varieties and shapes of flat, insulated, twinlead, making modeling with antenna design software like NEC-4 a challenge, so he states that “Therefore, models of twinlead must begin with bare-wire versions, with the caution that the dimensions that emerge may not be close to the dimensions demanded by vinyl-covered twinlead.”

In other words, Cebik does not expect his “...bare-wire proof of principle model” to be built as-is, without substantially modifying the theoretical dimensions, to account for the effect of both wire insulation and most importantly the velocity factor of the particular twinlead used.

I still can't quite believe that many hams could have built up J-Poles using these dimensions, without finding performance issues. Also strangely, in all the positive reports that WRO mentions, no one seems to have actually measured SWR! I keep looking for some other rational explanation, but it still looks to be related to misinterpretation of Cebik's “bare-wire proof of principle model”.

In order confirm this to myself, I have built a J-Pole as close as possible to the information provided in the WRO January 2011 issue. Although I could not obtain any of the pictured semi-clear TV twinlead, (no longer available) I doubt that it would have made any difference.

The Twinlead I used was Radio Shack # 15-1174, with a published velocity factor (Vf) of

0.733. (in my testing I measured the actual Vf on a sample as 0.77)

To sum up, my findings were that for the J-Pole sample I built from the published dimensions, the swr performance is extremely poor. The SWR was high across the band from 144 - 149 MHz (9.2 – 4.5) and was not resonant anywhere.

Frankly, I would not want to use this antenna on any radio of mine.

Details of my results are given in the table that follows the text.

You will see that I tried to modify some of the published dimensions by adjusting some of them for Vf, and obtained at least some improvements over the original test results. These “experiments” are highlighted in the table.

### Summary of Measurements

FREQ	J-pole per WRO Jan 2011 SWR	Modified J-pole per WRO Jan 2011 SWR			Reference J-Pole per QST Sep. 1994 SWR
144.000	9.2	2.4	4.9	3.3	1.3
146.500	6.2	3.5	5.0	2.6	1.3
149.000	4.5	3.5	4.6	3.0	1.8

### Dimensions Compared

Dimension	J-pole per WRO Jan 2011	Modified J-pole per WRO Jan 2011			J-Pole per QST Sep. 1994
Over-all length "	56.50	56.50	56.00	50.25	51.00
1/2 wave radiator "	34.00	39.25	38.75	33.00	34.25
1/4 wave matching, "	22.50	17.25	17.25	17.25	16.75
50 ohm tap point	2.00	2.00	1.50	1.50	1.25

Note 1

Note 2

Note 3

Note 4

Note 1: 1/4 wave section shortened by .77 (Vf of cable). This increased the 1/2 wave section.

Note 2: Tap point shortened, again by .77 (had to remove .5", also shortening 1/2 wave section)

Note 3: Shortened 1/2 wave radiator to 33"

Note 4: J-Pole previously built per QST Sept 1994 measured for reference

SWR measurements done with MFJ-269

In the end, it proved a larger task than I was prepared to continue, to come up with a final

Copyright © VA3DDN

Published by WRO Jan 2100, also in [www.trailfriendlyradio.blog.spot.com](http://www.trailfriendlyradio.blog.spot.com)

set of dimensions that would yield a resonant low-SWR design from Cebik's model. I have included the dimensions in the table only to illustrate what I had done.

For comparison purposes, I also measured using the same set-up, a "conventional" twinlead J-Pole I made some years ago based up a design published in the 1994 September QST issue.

This J-Pole clearly outperforms the WRO J-Pole under discussion.

There are many references in the literature illustrating practical dimensions for similar "conventional" or standard twin-lead J-Poles.

I have listed some below:

"The DBJ-2: A Portable VHF-UHF Roll-Up J-pole...", QST March 2007

"More on the Ribbon J-Pole Antenna", QST June 2003

"The DBJ-1: A VHF-UHF Dual Band J-Pole", QST February 2003

"The Twin-lead J-Pole" by WB3GCK, 1998

"An Easy Dual Band VHF-UHF Antenna", QST September 1994

"144-148 MHz PVC Water Pipe J-Pole antenna", K5LN, 6/22/97

"The 300-ohm Ribbon J Antenna for 2 meters; A Critical Analysis", April 1982

Sincerely,

Don Dorward, VA3DDN