KE4PT OCEF Dipole

and DX-Go-Bag Station

Kai Siwiak, KE4PT

[bis6] 23 Sept 2013

Source material for

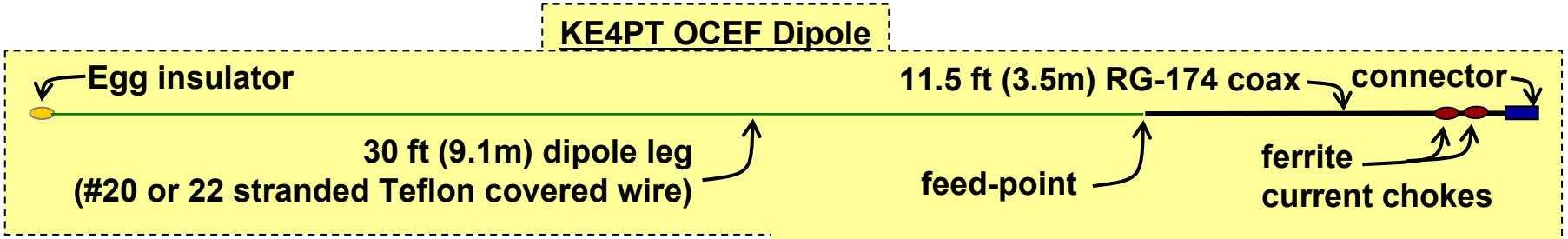
- **QRP Quarterly, Spring 2012**
- **Świat Radio, July 2012**

Design Goals

- Intended for ad-hoc portable operation
- Can be matched with automatic antenna tuner from at least 7 to 54 MHz
- Mounting not critical, can be drooped, draped or stretched out for use
- Lightweight and compact for easy storage
- RF Safety Analysis

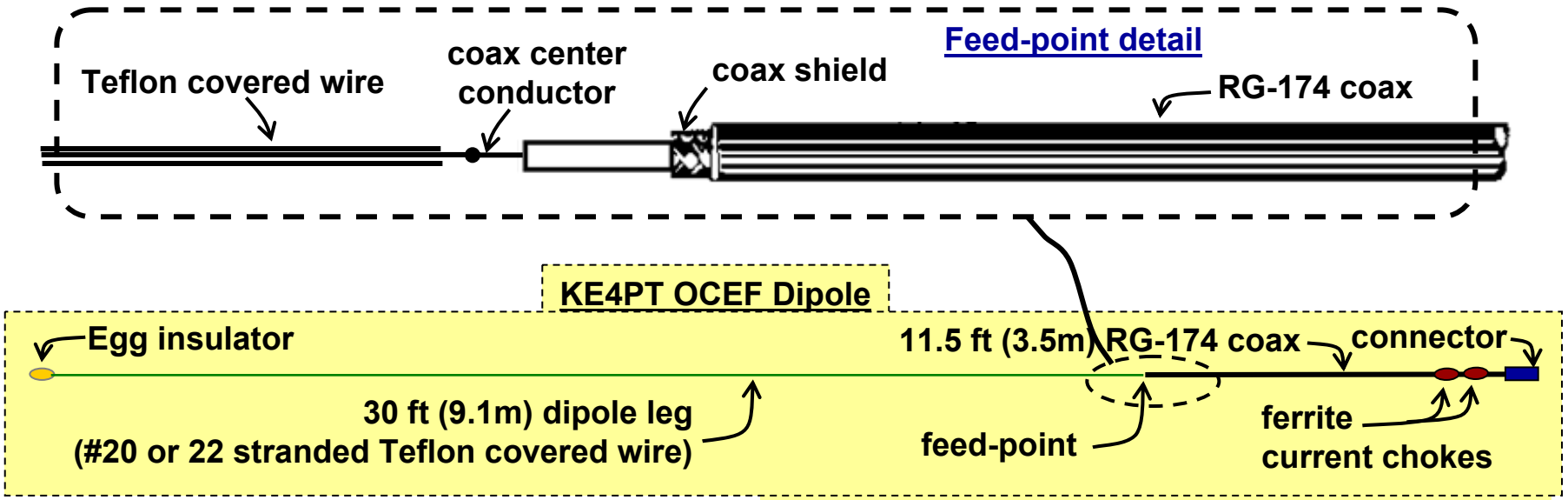
KE4PT OCEF (Off-Center-End-Fed) Dipole

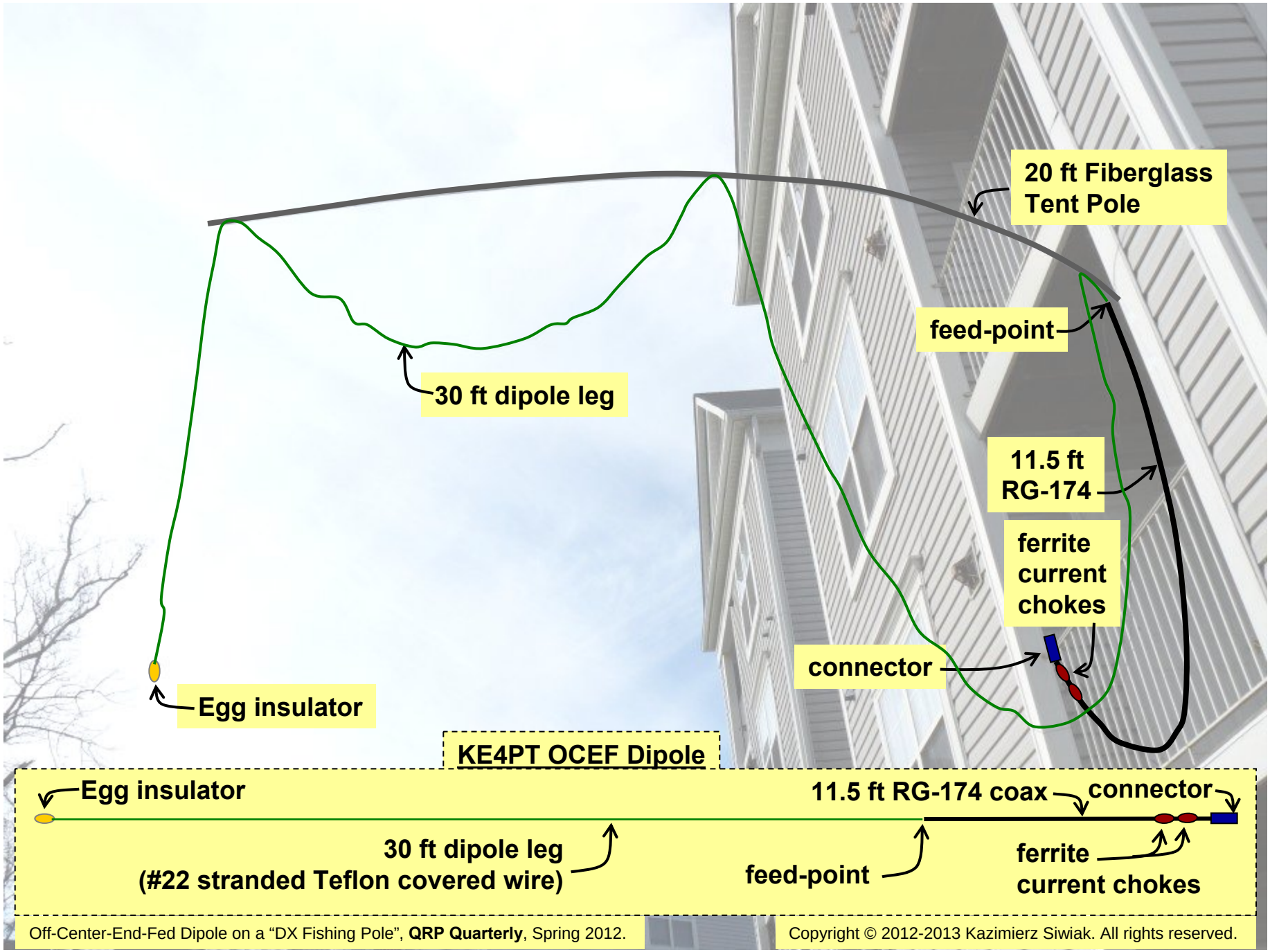
- Constructed from thin coax [RG-174 preferred, but RG-58 is ok, even 75Ω CATV cable] and thin flexible wire (very small package!)
- Neither wire length is an even multiple of a half wavelength on any ham band
- Use with automatic tuner (tested with Elecraft T1):
  - good matching performance from 7 – 54 MHz
  - limited matching performance down to 3.5 MHz
- Needs just one support at the egg-insulator end, or can be "drooped" over an insulated pole (fiberglass tent pole)



KE4PT OCEF (Off-Center-End-Fed) Dipole

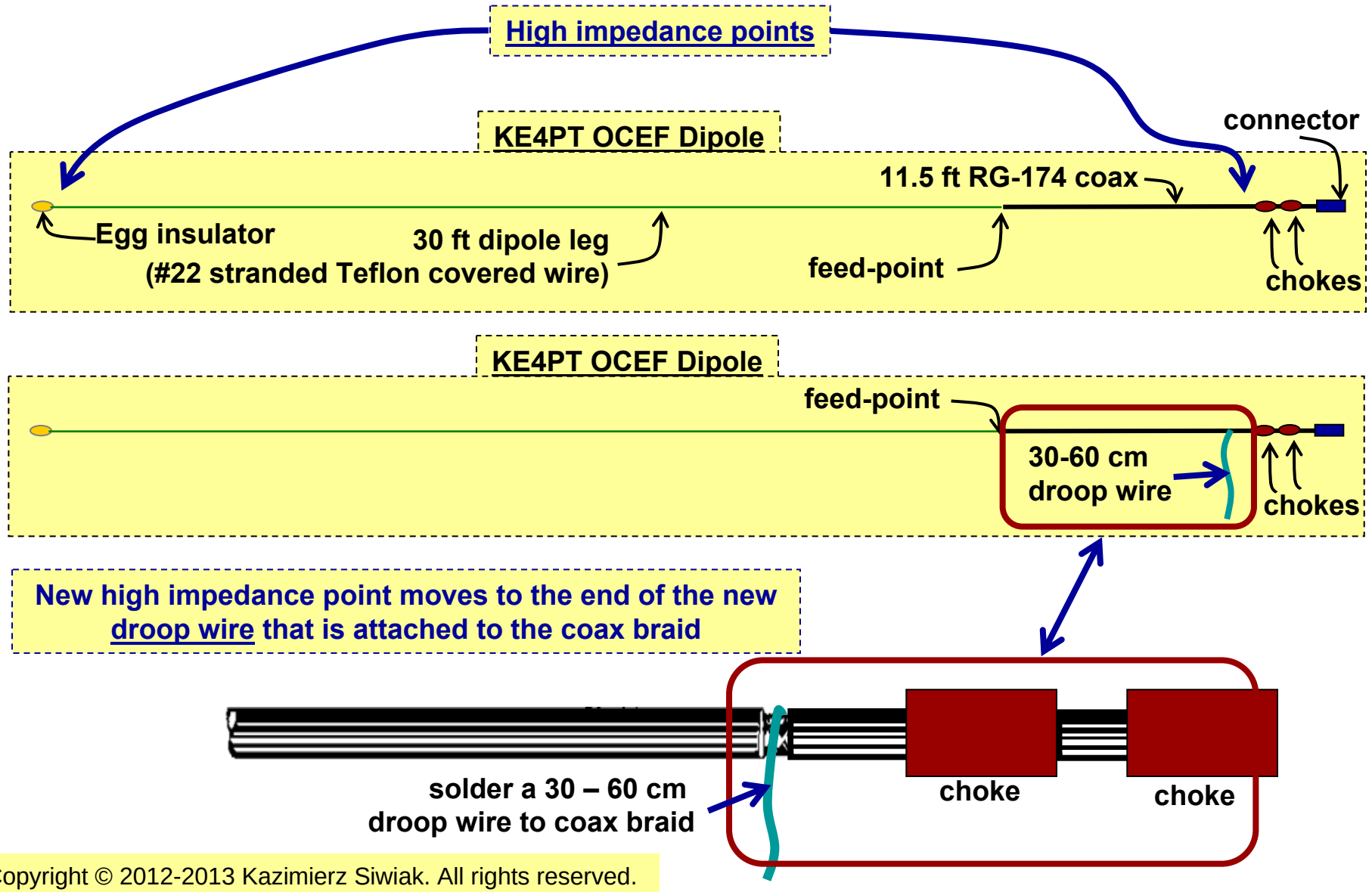
- Constructed from thin coax [RG-174 preferred], and thin flexible [Teflon covered] wire (very small package!)
- Teflon covered wire extends 30 ft. (9.1m) from coax center conductor
- Coax shield is open circuited at the feed point, so 11.5 ft (3.5m) of coax shield from feed point up to the two ferrites radiates
- 2 or 3 turns around two Ferrite “clam-shell” current chokes define the end of the dipole after which a BNC connector may be attached
- Feed point region should be coated with insulating tape for weather proofing

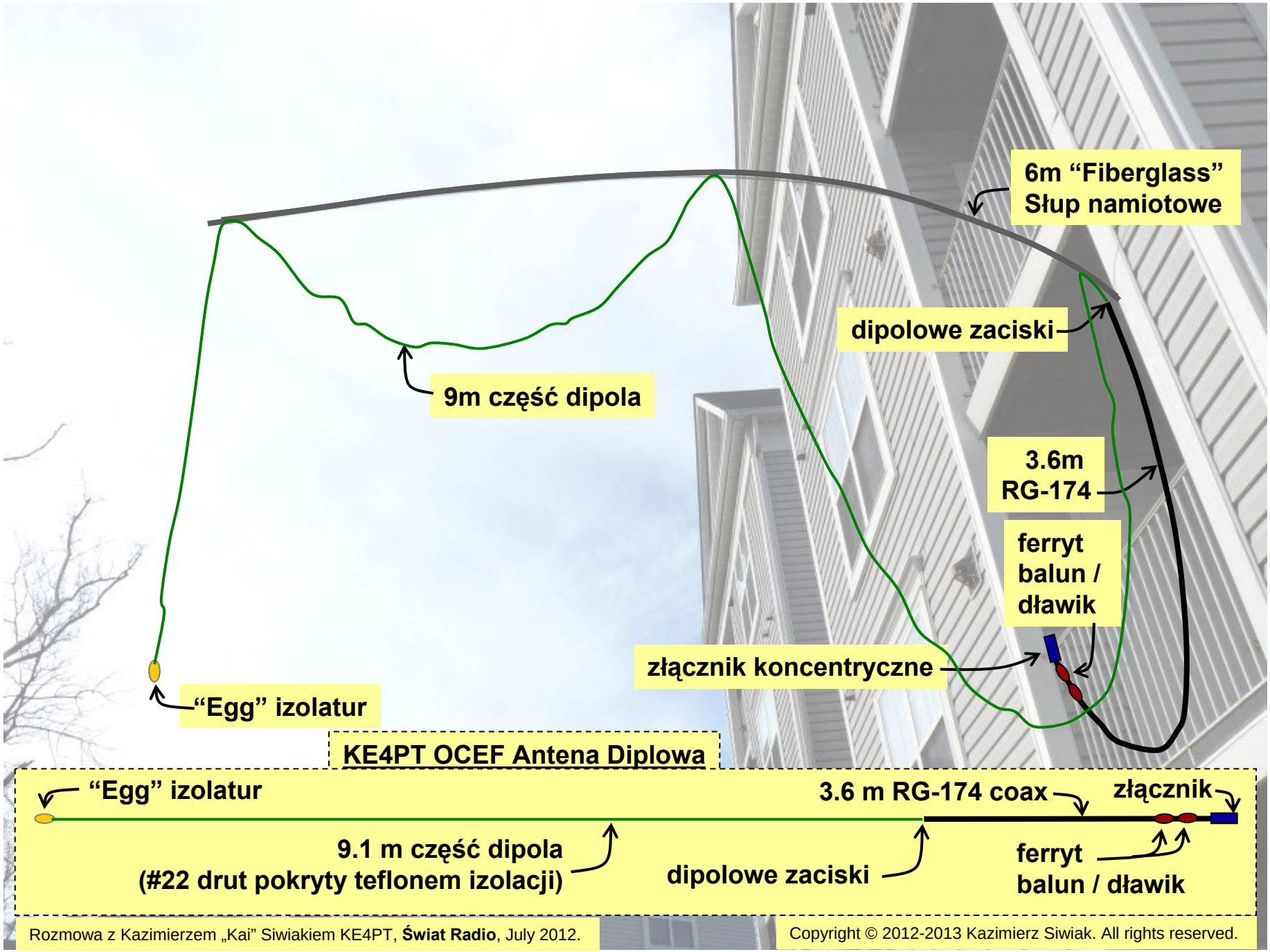




Off-Center-End-Fed Dipole on a "DX Fishing Pole", **QRP Quarterly**, Spring 2012.

Taming a High Impedance Point with an Optional "droop wire"

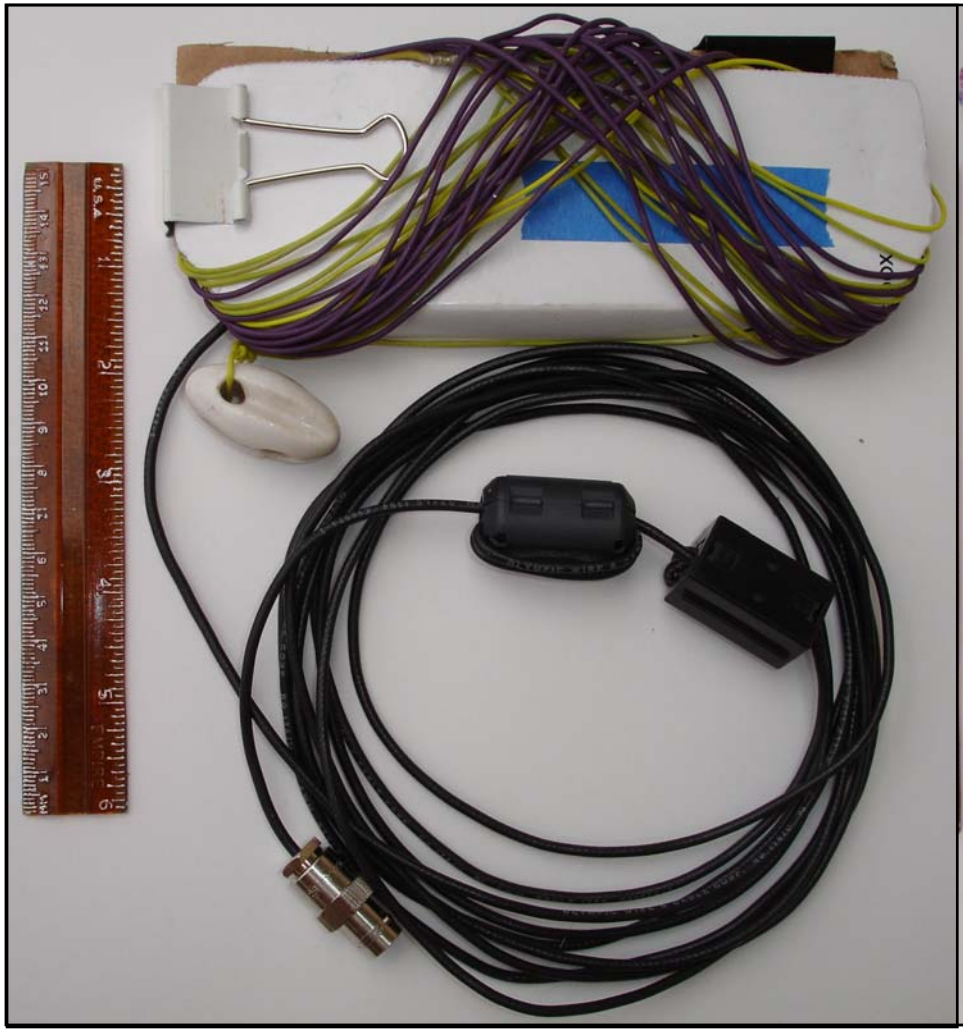




Rozmowa z Kazimierzem „Kai” Siwiakiem KE4PT, **Świat Radio**, July 2012.

KE4PT-OCEF Dipole:

rolled and stowed



Stowing the KE4PT-OCEF Dipole

- I used two lengths, one purple connected to one yellow (they were originally a twisted pair) to make the 30 ft (9.1 m) dipole leg
- To stow, wind this wire in figure-8 fashion around a card board form, that way the wire will not twist
- Bull-dog clips may be used to stabilize the winding for storage
- Wind the coax in a roll
- Stow the rolled dipole in a Quart-size plastic baggie

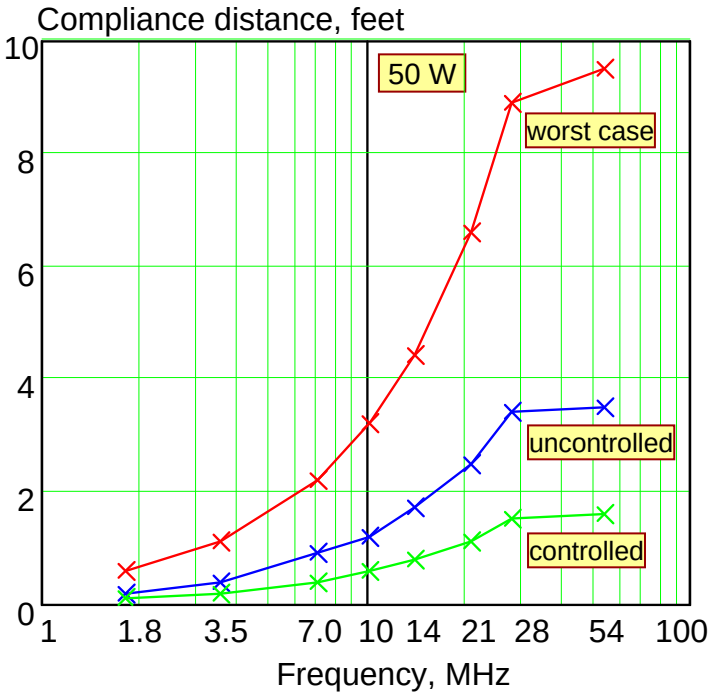
KE4PT-OCEF Dipole Theory of Operation

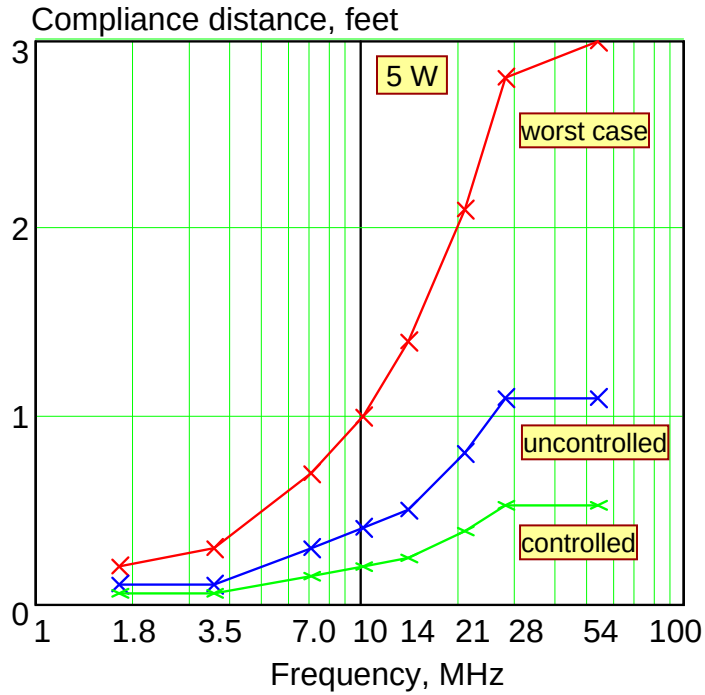
The 12.6 m (+ droop wire) length between the "egg insulator" and the end of the optional droop wire at the ferrite bead end acts like a dipole radiator. The lengths of each of the two sections from the feed point to the ends (3.5m + droop wire and 9.1m) are not resonant in any ham band from 80m to 6m band. Those lengths should never be near a half wavelength at any frequency at which you use the dipole. This is a "non-resonant" design, so you need an antenna match box (Elecraft T1, for example) to present a 50 ohm load to the transmitter. You can attach an optional 30 – 60 cm long “droop wire” to move the high impedance point to the end of the droop wire, easing the job of the ferrite chokes. You can also wind the droop wire back around the coax and out of the way to change the impedance seen by the T1 if needed. The ferrite beads stop radiating currents from flowing on the coax shield on the transmitter side of the coax. The current on the coax shield between the droop wire and the feed point radiates as one element of the dipole. The two dipole elements are of different lengths. I chose those lengths so that the actual complex impedances at the feed point would be relatively easy for the T1 tuner to match. Again, no magic here, just a judicious choice of lengths, and good engineering.

When stretched out and hung in an area clear of obstacles, the dipole is self-resonant near 300/12.6/2 = 11.9 MHz (slightly lower with the droop wire), and also near harmonics of 11.9 MHz. We do not use the antenna near any of the self-resonant frequencies.

Antennas do not need to be self-resonant to radiate effectively. With this design I can match the antenna using the T1 tuner in any ham band from 40m to 6m, even if the antenna is deployed in a random fashion (such as drooped over a fiberglass tent pole). I've even had success on 80 m when the antenna is fully stretched out. The T1 takes care of the matching.

KE4PT OCEF Dipole
RF Exposure Analysis





Worst case – 100% duty cycle + ground reflection
Uncontrolled – 40% transmit duty cycle
Controlled – 40% transmit duty cycle

KE4PT DX-go-bag Station