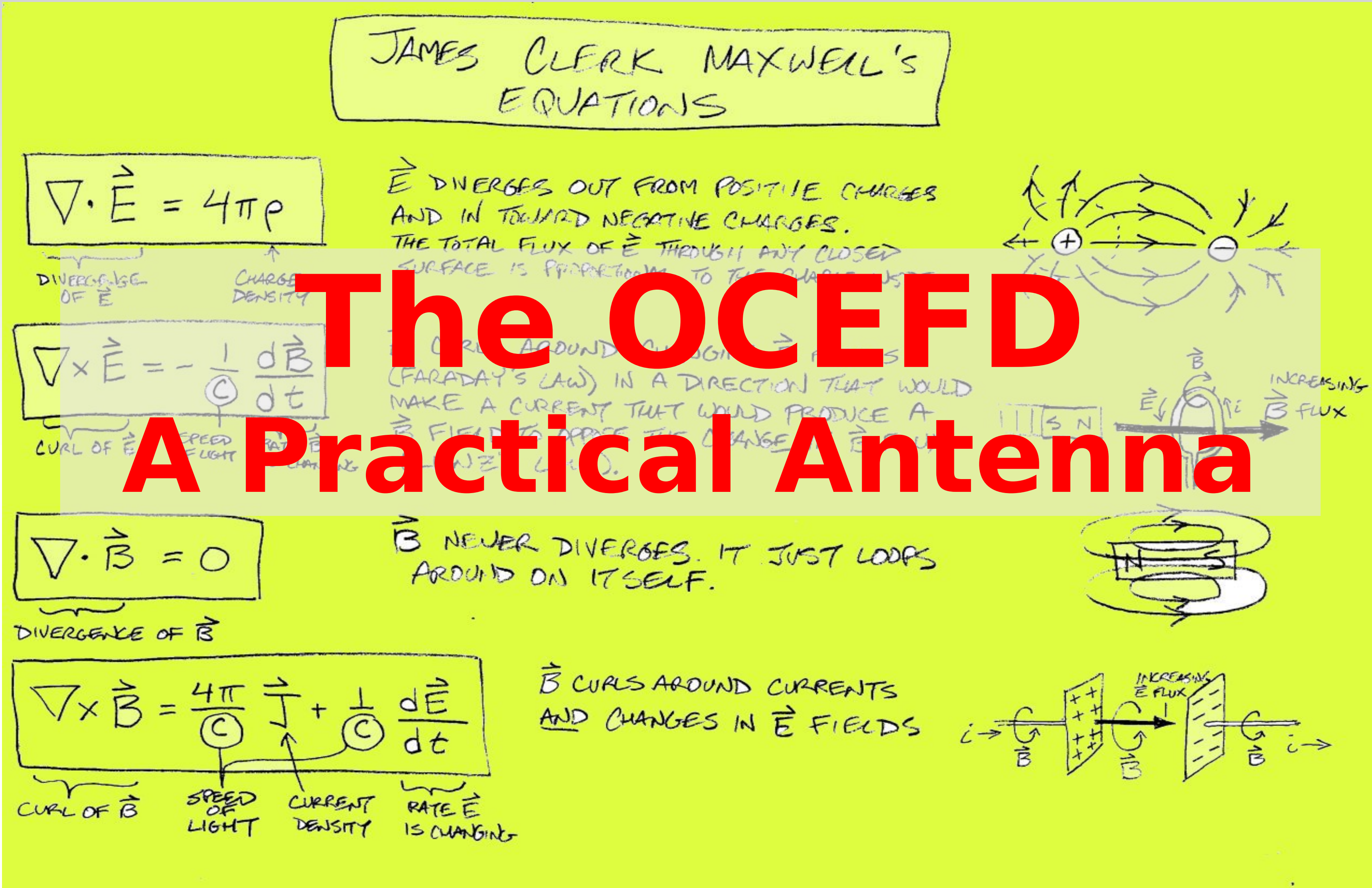
The OCEFD
A Practical Antenna



Jim Stekas / K2UI

NPARC 9-Dec-2013

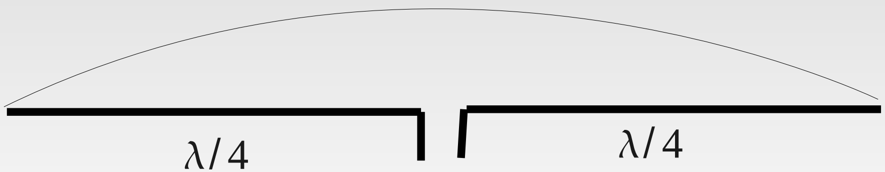
Practical Antenna Definition

- Low cost, easy construction
- Simple to erect
  - Single support.
  - Convenient to feed.
  - Suitable for portable / QRP operation
- Decent performance
  - No lossy elements
  - Multi-band
  - Easy to match.

The OCEFD
A simple preactical antenna

Classic Half-wave Dipole

$$I(z) = I_0 \sin\left(\frac{2\pi z}{\lambda}\right)$$



$$R = 75\,\Omega$$

$$P = R\,I_0^{\,2}$$

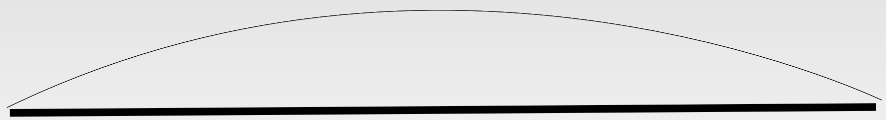
The Good

- Simple to build
- Relatively easy install
- Low cost
- Works on odd-harmonics
  - e.g. 40M / 15M
  - Low SWR == low loss
  - Easy to match (auto)

The Not-So-Good

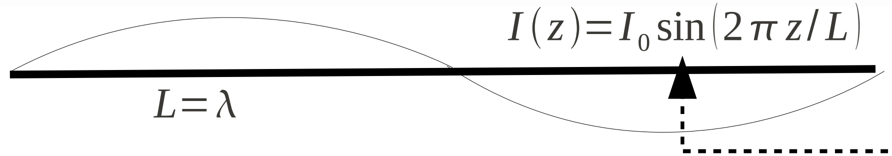
- Need support at both ends.
- Heavy feed line at center.
- High R on even-harmonics
  - High SWR == high loss
  - Tougher match, good tuner needed

Classic Half-wave Dipole Operated on Harmonics



$L=\lambda/2$ $\quad I(z)=I_0 \sin(\pi z/L)$

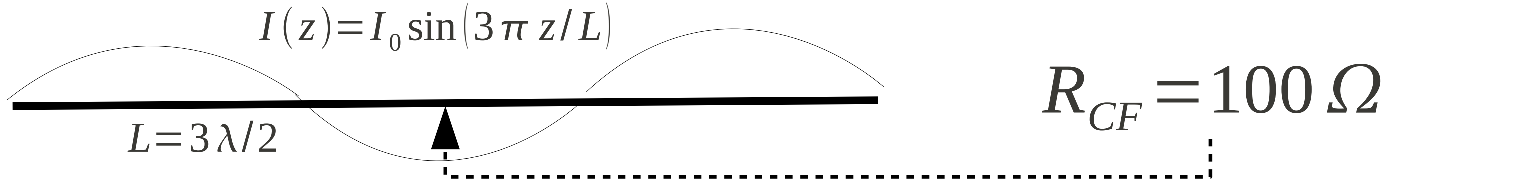
$R_{CF}=75\,\Omega$



$I(z)=I_0 \sin(2\pi z/L)$

$L=\lambda$

$R_{CF}=\infty\,\Omega \quad R_0=200\,\Omega$



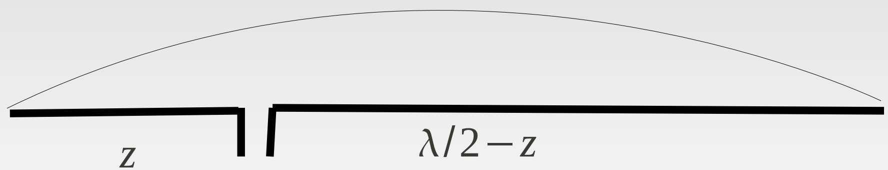
$I(z)=I_0 \sin(3\pi z/L)$

$L=3\lambda/2$

$R_{CF}=100\,\Omega$

Off-Center Fed Dipole

$$I(z)=I_0\sin\left(\frac{2\pi z}{\lambda}\right)$$



$$R_0=75\,\Omega$$

$$P = R_0 I_0^{\,2} = R(z) I(z)^2$$

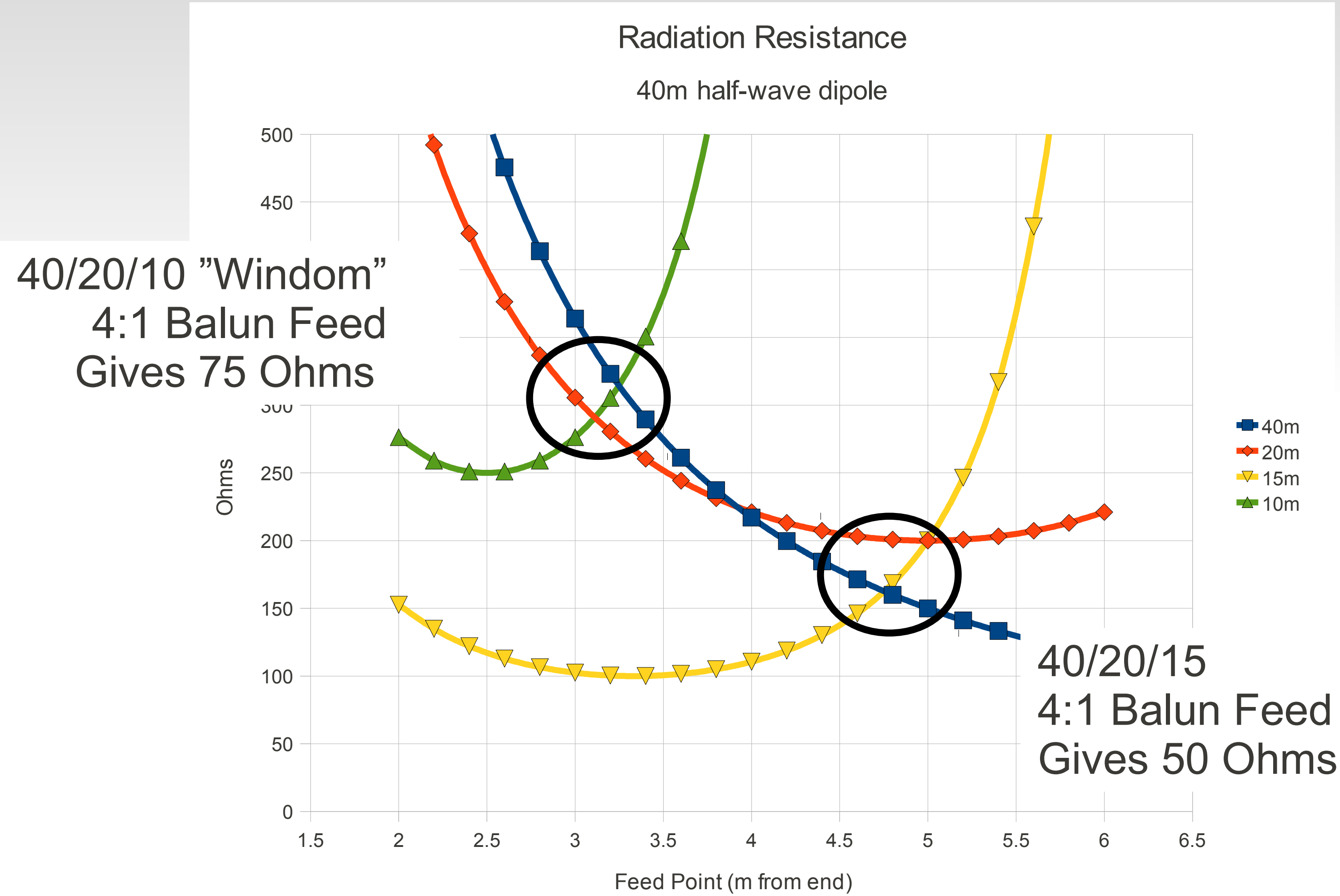
$$R(z) = R_0 \frac{I_0^{\,2}}{I(z)^2}$$

- Off center feed at z.

$$R(z)=\frac{75}{\sin^2\left(\frac{2\pi z}{\lambda}\right)}$$

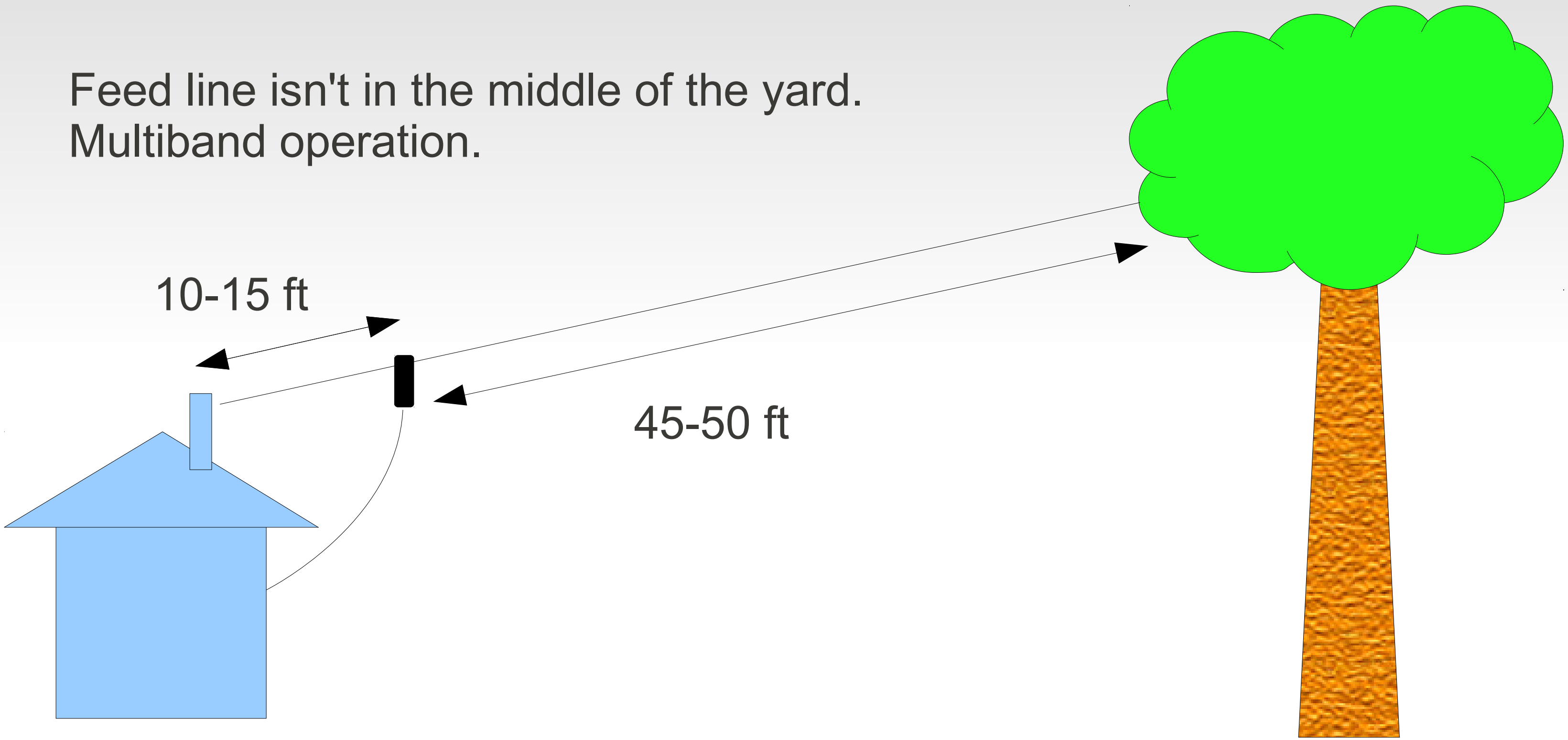
$$R(\lambda/6)=100\,\Omega$$

40m Dipole OCF Impedance
Approx – Ignoring end effects

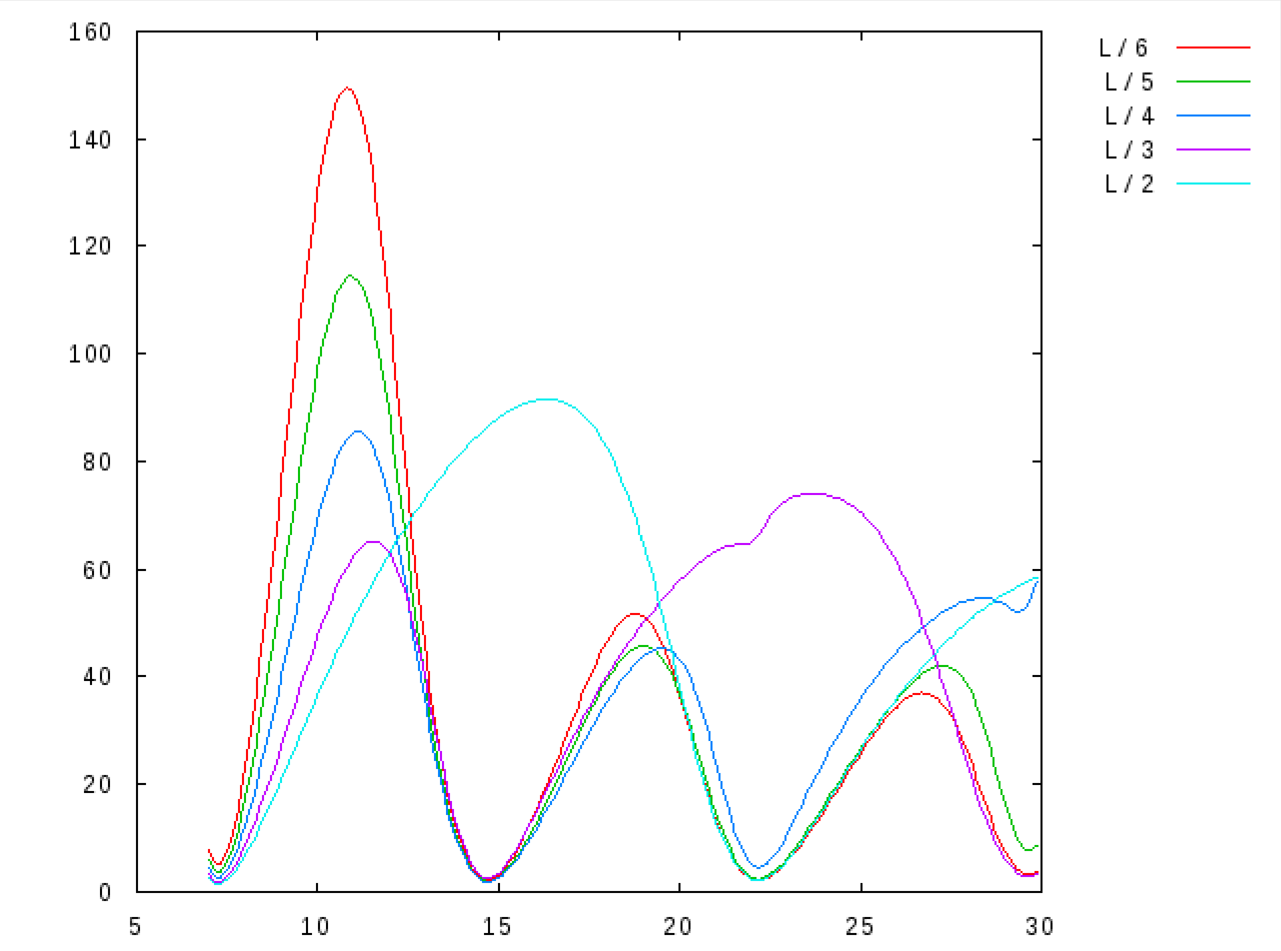


OCF is Easier to Feed

Feed line isn't in the middle of the yard.
Multiband operation.

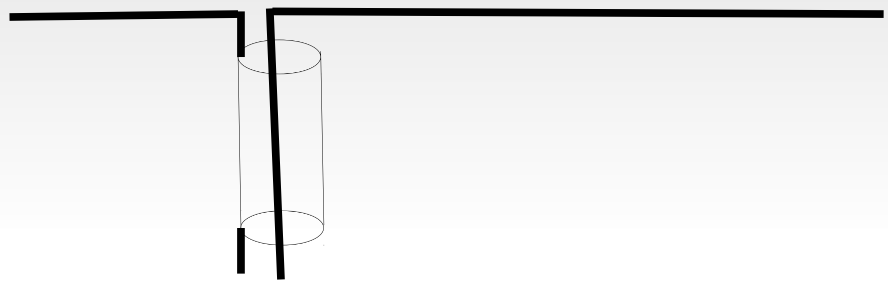


NEC2 Sim of Various Feed Points

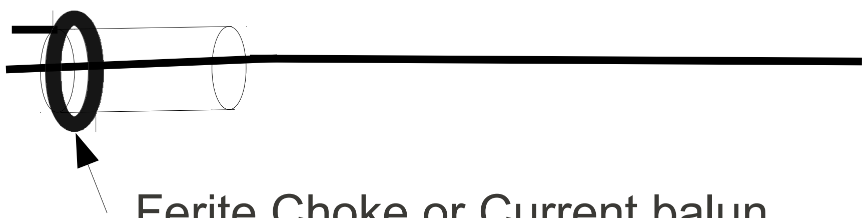


... better still ...

1. Remove the balun and feed with CATV cable. SWR < 4.

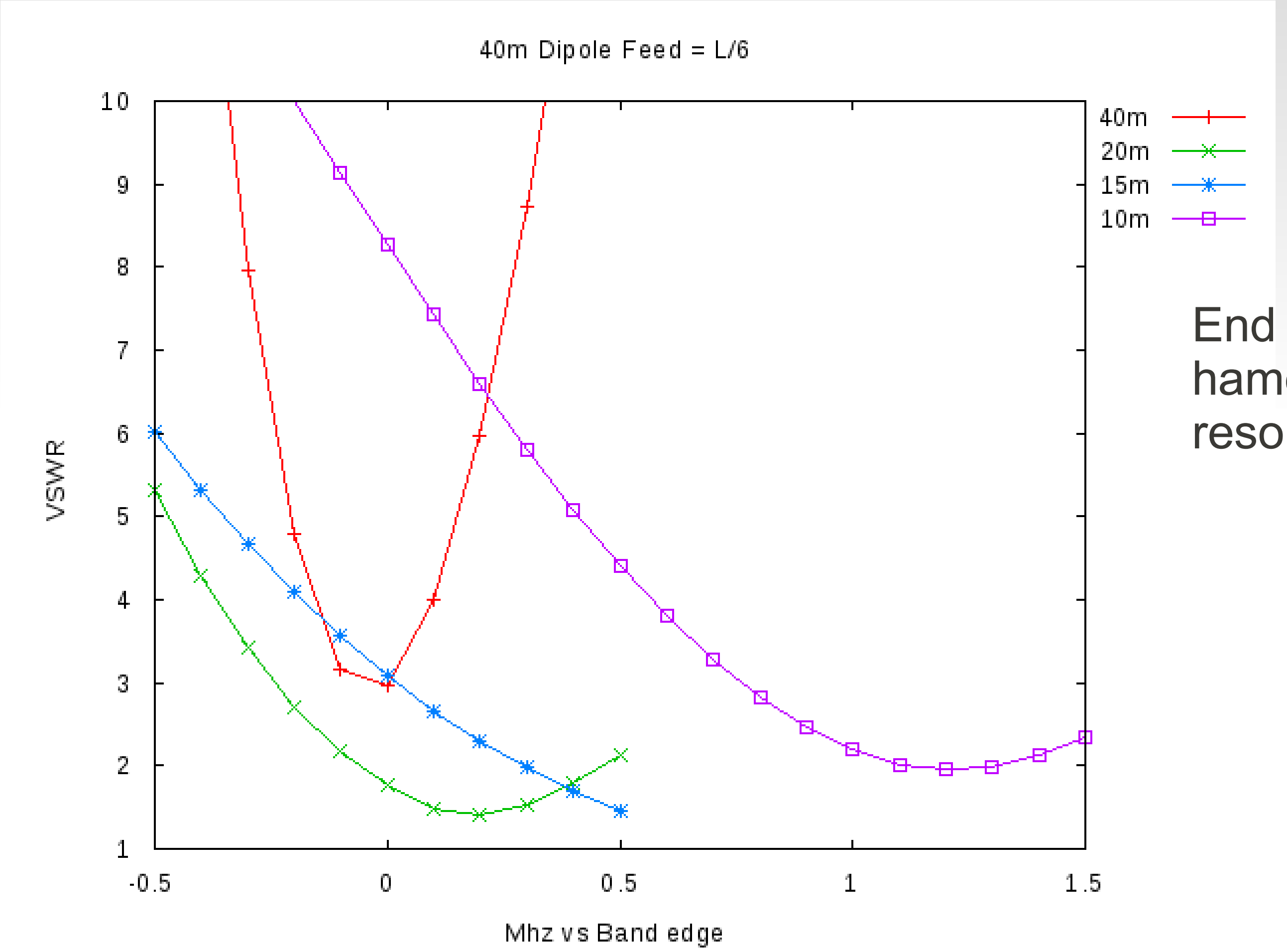


2. Now use the outside of the braid for the short end of the antenna.



Ferite Choke or Current balun
Choke position can be used to tune antenna.

NEC2C Sim of OECFD



End effects break the exact hamonic relations between resonances.

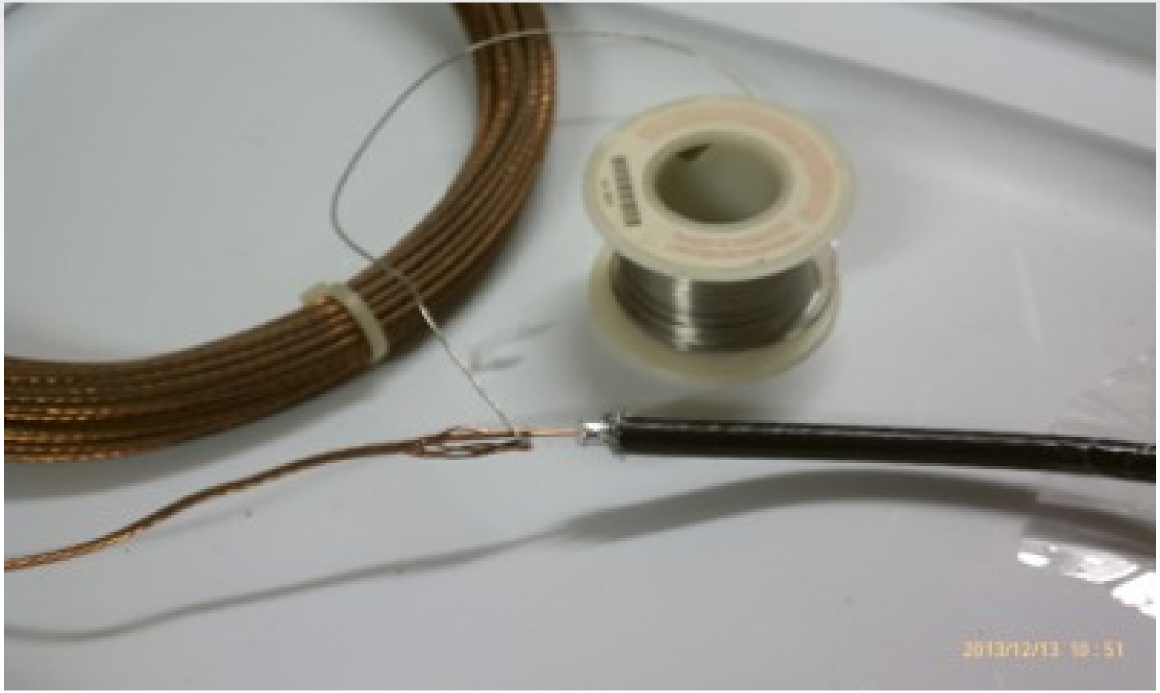
Does it Work?

- SS 2013 - CW
  - K1 @3.5w
  - 1.5 hr 20/40
  - 11 QSO /10 SEC
- SS 2013 – Phone
  - IC-718 @75w
  - 5 hr 10/15
  - 57 QSO / 31 SEC
  - 24 States (HI, AK)

Wire Connection to Coax

Solder wire directly to center conductor.

Then seal from the elements.



Choke Options at Feed

To the RIG

Antenna end.

Final Notes

- Choke is ***absolutely required***
  - Low freq ferite chokes can be bulky.
- Antenna ends have high RF potentials.
  - Leave room between the rig and feed point.
- Great for camping and vacation.
  - Only one tree needed.
  - No dangling feed to support.
  - Rolls up for storage.