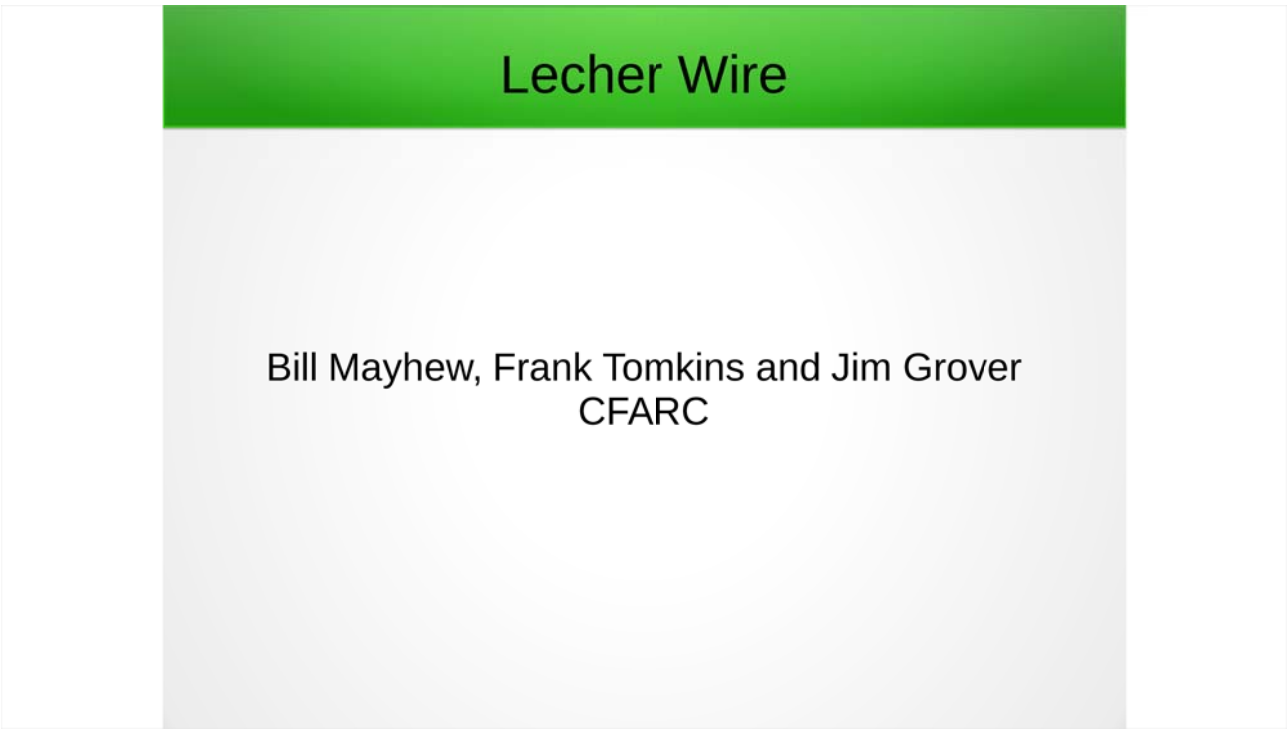
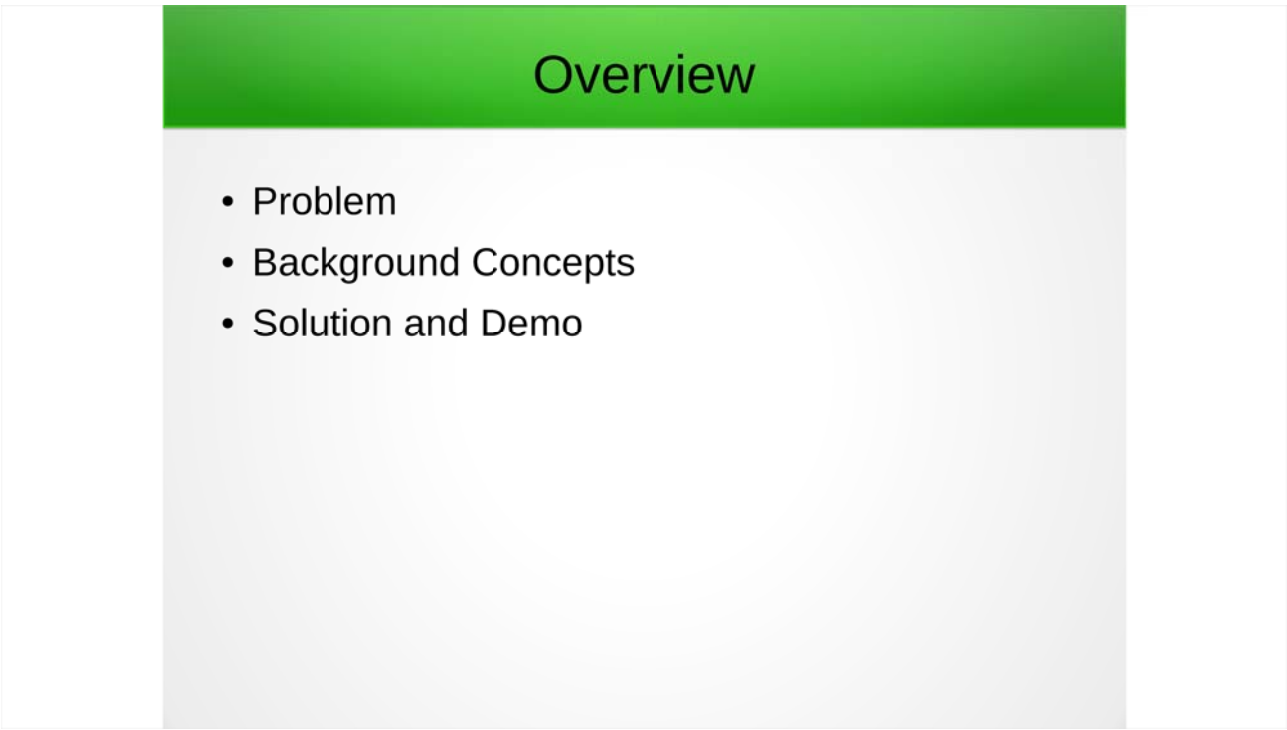


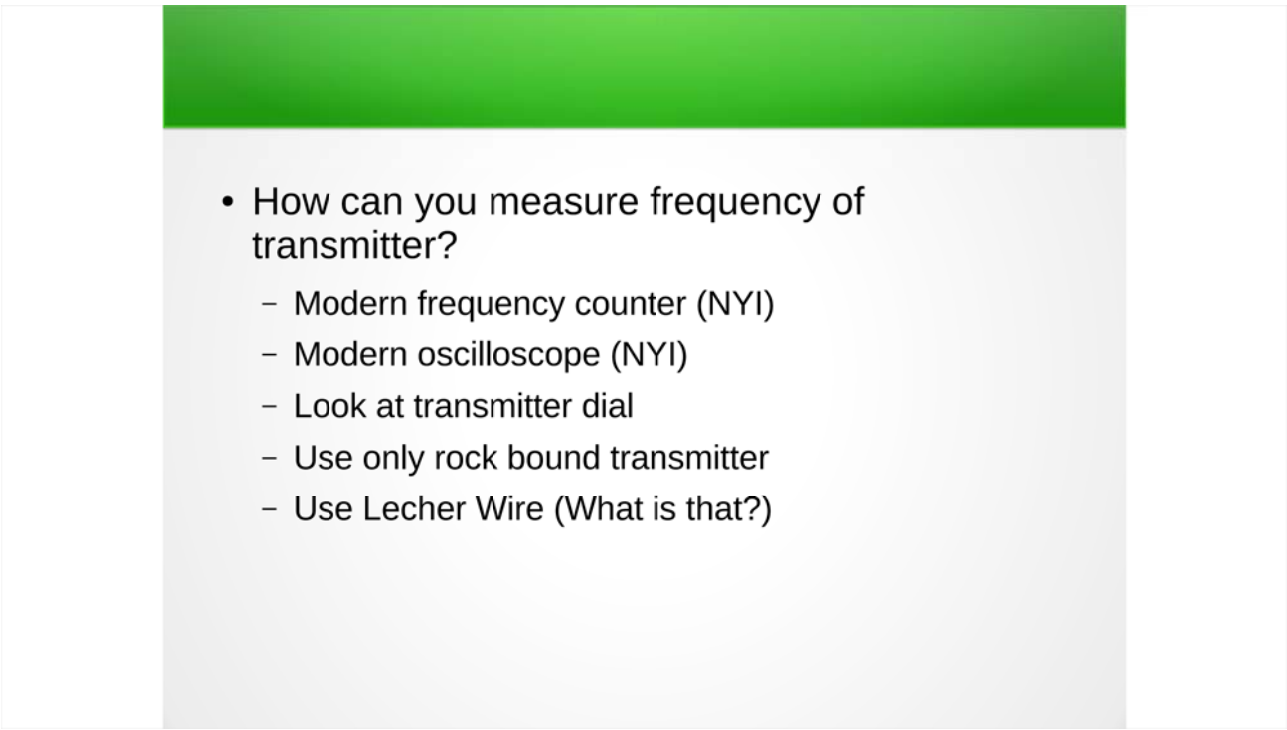
A Lecher wire is a method for measuring the frequency of a radio frequency that goes back into 1888 and was originally proposed by Heinrich Hertz and Oliver Lodge.



The problem is simply stated is how do you measure the frequency of a radio frequency signal without resorting to modern instruments such as frequency counters.

First we need some background knowledge that related frequency and wavelength. Then we must understand a little about standing or stational waves.

Then we can understand the demonstration of a Lecher line or Lecher wire.

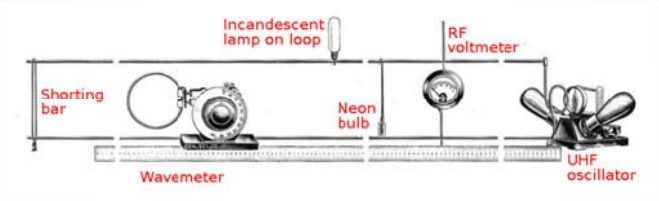


Without using modern measurement instruments we must resort to fundamental principles of waves.

We might choose to only use crystal controlled transmitters, but how does the manufacture measure the frequency of oscillation? We might just use the analog dial on our transmitter, but how does the manufactuure calibrate the dial? The answer is to use a Lecher wire.

Lecher Wire

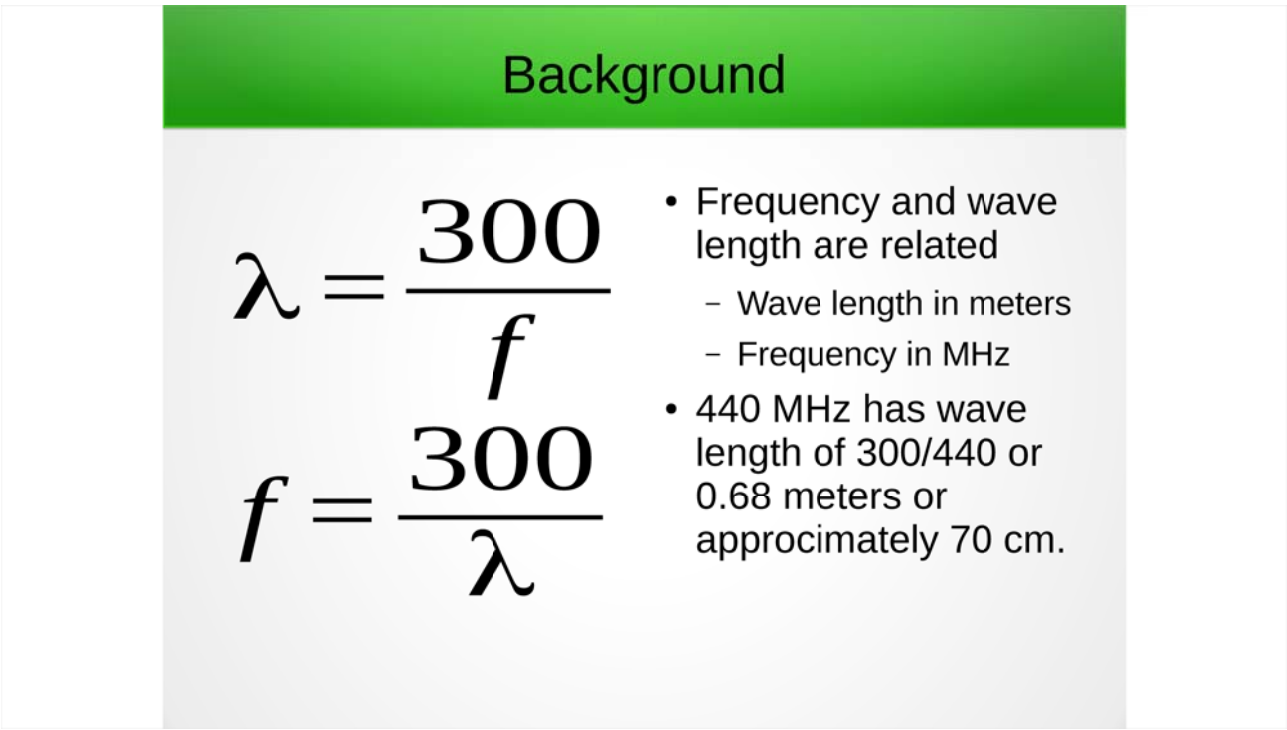
- Source
- Parallel wires
- Measurement devices (detector meter and tape measure)



By Irving J. Saxl - Retrieved March 23, 2014 from Irving J. Saxl, "Short Wave Experiments" in Radio News magazine, Teck Publishing Corp., New York, Vol. 13, No. 12, June 1932, p. 996, fg. 4 on American Radio History website, Public Domain, https://commons.wikimedia.org/w/index.php?curid=31756041

The Lecher wire apparatus consists of an RF source, two parallel wires and two measurement devices. These measurement devices are a meter with a detector and a meter stick, tape measure or the like.

Note no modern instruments such as frequency counters and oscilloscopes are involved.



The speed of a wave in a medium is constant and is related by the product of the frequency of the wave and the wavelength. That is to say:

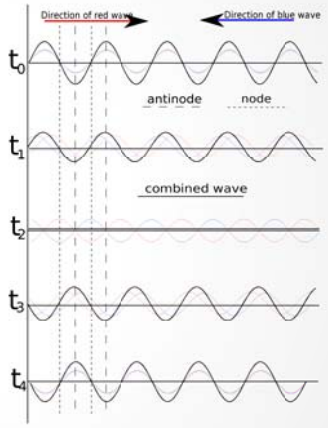
$300 = \lambda \times f$

$\lambda = 300 / f$

$f = 300/\lambda$

Standing Wave

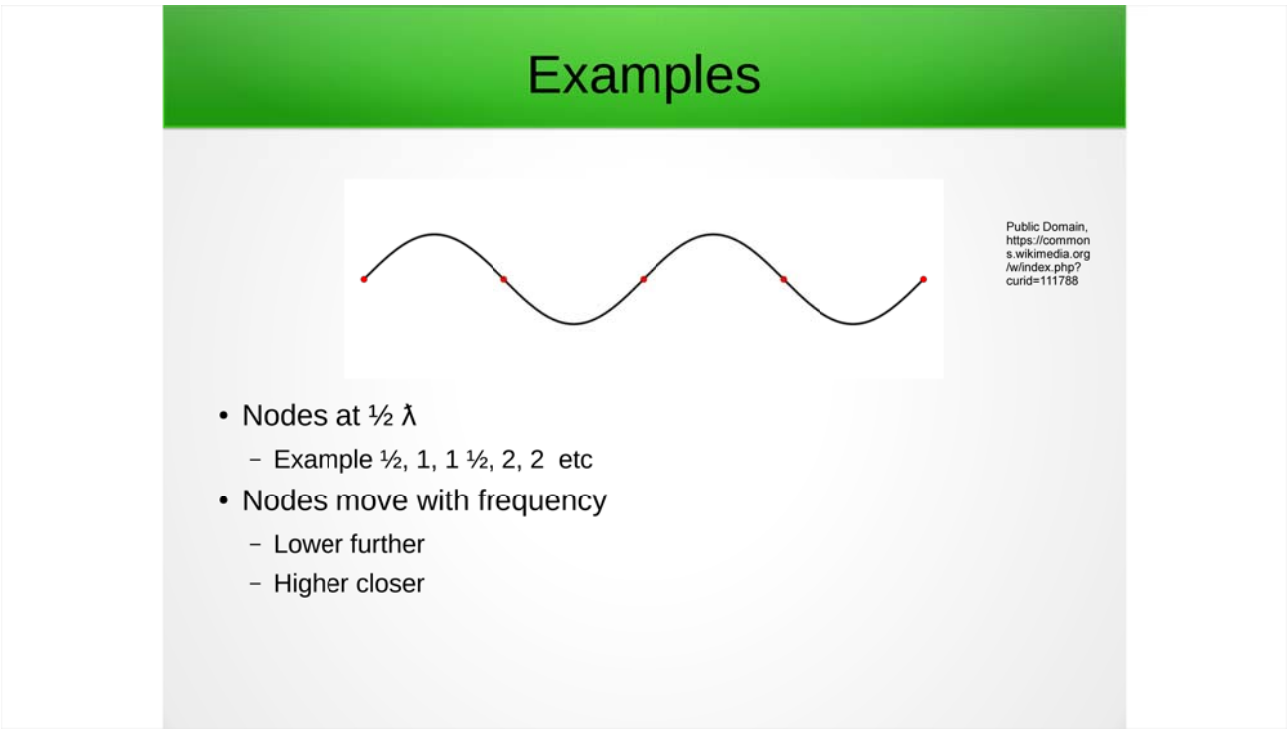
- Forward and reverse wave combine to form standing or stationary wave
- Standing wave is a wave in a medium in which each point on the axis of the wave has a constant amplitude
  - Node where amplitude is minimum
  - Antinode where amplitude is maximum



By Wjh31 - File:Standing_wave_2.gif, Public Domain, https://commons.wikimedia.org/w/index.php?curid=10072287

If we have a forward wave that reflects off some discontinuity there will be a reverse wave that will combine to form a standing wave. A standing or stationary wave is a wave in a medium in whichn each point on the axis of the wave has a constant ude.

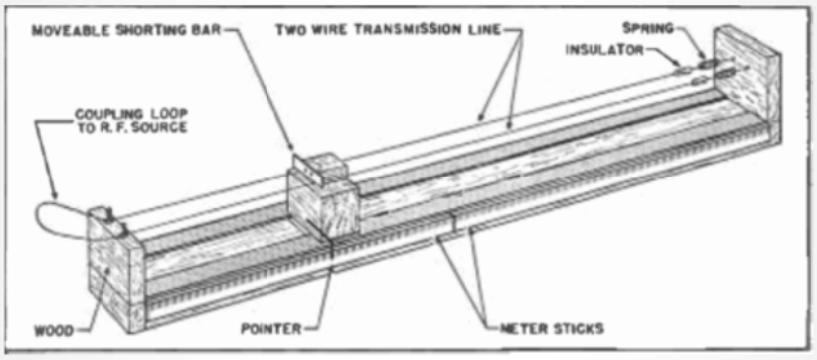
Where the amplitude is a minimum we call that a node. And where the amplitude is a maximum we call that an antinode. There is no name for intervening points



The above animation is that of a standing wave. Note that the maximum and minimum points are peak values and not instantaneous values.

Also note that the nodes and antinodes are separated by ¼ of a wavelength and the nodes and antinodes repeat every ½ wavelength.

Demo



- Bill Mayhew, N8WED, Amateur Extra

Now for a demonstration of the actual device. An online demonstration can be found on YouTube at:

https://youtu.be/SbVbMR6jmSI