HF Conical Monopole Antennas

The HF conical monopole antenna was originally designed by Mr. M.L Leppart, who was a Naval Engineer back in the early 1960's. The idea was to design an antenna with a shorter height for a given frequency. This was achieved by making the width extremely wide in-relationship to the feedpoint and the top of the antenna.

Malloy Communications has been building these antennas for about 10 years. We conducted an extensive research of the technical literature on this antenna. To be quite frank, there was little information about it, other than how to build it. For example, you must pick a starting point for the frequency -- let's say, 12 MHz. The antenna only loads from the 12 MHz point up, but not down. Those who are familiar with the dipole antenna know that picking a starting point allows the antenna to swing +/- maybe 200 KHz on either side of the Fo (resonant frequency). This characteristic does not apply to the conical monopole. It only loads up from the starting point.

Once the antenna is in place, there is a way to tune it. If it is one of our smaller versions (10 MHz) built around a pole, rather than a Rohn tower, adjusting the entire antenna up or down to find a more desirable sweet spot allows the antenna to be tuned for optimum radiation at some desired frequency. Think of it as a variable capacitor.

One of the best ways to employ the conical monopole is at a listening facility, as a receive antenna. The design permits for multiple receivers to be connected all tuning into different frequencies. It makes for a great short wave receiving antenna, but due to the cost most SWL listeners opt for a dipole. They also require a lot of land, for the counterpoise (wire beneath the antenna). Due to their broadbanded nature, they must be kept away from other HF transmitting antennas. They will in fact re-radiate the other antennas' signal and cause all types of problems. They are also prone to pick up static noise, if located near high power tension lines or flashing neon signs as found at Burger King.

The antenna more or less has a 50 ohm feed point Impedance (Z). However you should note that the Z value will swing from say, 5 ohms to 125 ohms or so, as you sweep through the frequencies. That is the value of the conical monople. If the tuner goes south (quits working), chances are you will not blow up your radios with high VSWR (Voltage Standing Wave Ratios).

Every potential end user always says they want a 2-30 MHz HF antenna. The truth is, they do not load from 2-30 MHz with completely acceptable VSWR. You must use a tuner or antenna coupler mounted at the base, and you must put out a counterpoise at the base for the lowest design frequency. If we start with 2182.0 KHz+ as the base frequency, then the counterpoise must be at least 60 wires (100 is best), 110 feet in length at any given radius around the antenna. Without it, the antenna's electrical efficiency will drop significantly. Thus, any potential user must understand that these antennas require a lot of land, as noted above. Also as noted above, these antennas will cause re-radiation of other HF transmitted signals if in close proximity to a transmitting antenna. One has a lot to think about, before ordering a HF conical monopole. They do not conform to the notion that one size fits all. They are specialty items that work extremely well in the proper application.

They are extremely sensitive to RF signals over a wide band of frequencies. However, as noted above, they are also sensitive to noise, Burger King signs, etc., so they must be kept away from other antennas, motors, flashing lights, and telephone lines with high power tension wires.

The perfect marriage is the Winradio G33DDC SDR (software defined radio) and a conical monopole. For monitoring threat forces HF radio communications, the combination of the Winradio SDR and this conical monopole (size of the antenna will depend on your freqency requirements), will allow you to listen and record all radio transmissions generated from deep inside enemy territority.

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