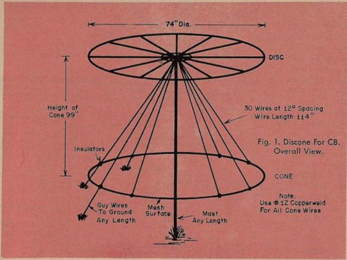
All Hail The Discone



CB's FORGOTTEN SUPER-ANTENNA

Discone is a word which strikes apathy in the minds of most CB'ers, but don't pass this article by if you're interested in hanging out a CB antenna which will put a walloping signal out for your base station. It isn't too difficult to build and the one outfit which was making these for CB'ers some years back no longer seems to be around. First you must ask yourself if you're really looking for a smashing signal.

Of course you are—just like everybody else. And no matter how many chunks of metal and wire you hang in the air, you're never going to stop looking for that *ultimate* antenna, because it will never be built. Base station antennas have too many different requirements for any single design ever to be "the ultimate."

But the discone—originated during World War II and re-discovered for a short period in 1961 for CB use—comes awfully close to being that impossible "ultimate sky-wire." It offers a near-perfect match to 52-ohm coax cable; an operating range of 10-to-1 in frequency (relatively unimportant for CB use but essential should you ever decide to go into ham radio or the commercial FM systems operating between 30 and 175 mc.); and freedom from any critical tuning adjustments.

In addition, because of our limit on antenna height, the discone offers greater ground-wave range possibilities than do many other vertically-polarized antennas. This comes about because its most effective portion is located right at the top of the pole; other designs have their most effective portions part-way down the mast which usually results in a closer "radio horizon."

By now, you're probably asking "Where can I get one of these gadgets?" As this is written, you can't but you *can* build one at a reasonably outlay of time and cash.

Before starting construction, though, it's best to know just what a discone antenna is and what it is supposed to do. Basically, the discone consists of an inverted (point to the sky) metallic cone with a large disc (also metallic) balanced on the point. The disc is really fastened firmly, and insulated, instead of balanced—but at any distance it looks like a balancing act (see Figure 1).

The coax feed line comes up inside the cone. The shield of the coax connects to the cone, and the center conductor connects to the disc.

Thus, the cone becomes a continuation of the shield, while the disc becomes a reflector connected to the center wire.

In practice, outgoing RF energy hits the disc and is reflected out the open side of the affair. If the "slant angle" of the cone sides is correct, though, the outgoing signal can't tell what's happening to it and the SWR will be down to 1.0.

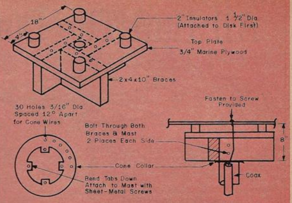


Fig. 2. Insulator Details.

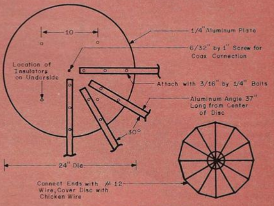


Fig. 3. Details Of Disc Assembly.

The important things electrically, then, are to keep the slant angle of the cone sides proper and to keep the top disc level. Good insulation between disc and cone at the center is also essential.

Mechanically, an 11-meter discone is quite an impressive array—and offers much, much wind resistance. If you built one out of solid sheet metal, the first breeze would tend to whip it away like a sail.

However, a fine-mesh screen looks to RF like a solid sheet of metal if—and *only if*—the spacing between conductors in the screen is small compared to the wavelength of the RF. This is the key to our construction.

For instance, a screen spacing of 0.01 wavelength is plenty close enough to look solid to RF. Yet at 11 meters this becomes a spacing of 0.11 meter or 4½ inches (approximately) so that you could use very coarse fencing mesh for lowest wind resistance.

Best results were obtained with a type of fencing usually called "chicken wire" screening. This has a hexagon screen pattern about an inch wide between conductors. You can use it for the surface of both the cone and the disc, cutting wind resistance to an absolute minimum.

However, the chicken wire is too flexible to stand up by itself. You must put a framework behind it for support. Wooden framing is okay, but aluminum angle stock is just as easy to work with and lasts longer.

The only really tricky part about the whole antenna is construction of the insulator that goes between the disc and the cone. It's shown in detail in Figure 2; follow the drawing closely and you won't go wrong.

Actual construction procedure is as follows: First, put up your mast. It can be any length between 9 feet and 19 feet. Next, fasten the insulator-and-guy-ring structure to the top of the mast. Now, connect the coax to the insulator-and-guy-ring assembly on the ground and get it into position on the insulator aloft (this may require some help.) Attach the guy wires to the assembly and secure them at anchor points selected so as to give the proper slant angle. Finally, cover the guy-wire structure with chicken wire, soldering the joints, and you're ready.

The disc assembly referred to above is shown in detail in Figure 3. It should be completely assembled on the ground and lifted to the top of the pole before securing to the insulators—otherwise, the affair will be too top-heavy.

When you're finished, hook the other end of the 52-ohm coax to your transmitter and fire up.