KD7IK's "Quad Lite"

Do you think a 20-meter quad is out of your reach? Not this one!

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That—*thing*—in KD7IK's back yard is neither a giant spiderweb nor monster macramé. The 50-foot-high geometric pattern—composed of rope, wire, wood and wheel—is Randy Brink's full-size, rotatable, 2-element, 20-m quad. It's an antenna with very little visible means of support. But it works!

Randy is a veteran DXer in the 300+ country category. Twenty years ago, he fell from a tree while installing an antenna. That accident left Randy confined to a wheelchair. Since then, he's usually had to rely on outside help with antenna projects—*except for this one.*

Cause and Effect

Last year, Randy's tree-mounted, 3-element tribander was wiped out by high winds. Sky-high costs for professional tree-climbing services precluded repairing the antenna and led Randy to search for an affordable alternative. That alternative is the antenna shown in Figure 1 and the accompanying photographs.

Construction

The quad's suspended from a $^3/_8$-inch diameter polypropylene rope strung between an 80-foot-tall tree in Randy's back yard and a 40-footer in the front yard. Despite his handicap, Randy erected the quad by himself. His antenna-raising equipment consisted of a Wrist-Rocket slingshot, a fishing reel, some monofilament fishing line and a handful of sinkers. Bracing the rod and reel against his wheelchair cushions, he lobbed line and sinkers over the trees and support rope. Then he wheeled around to the other side to tie on, pull up, or haul over as required. In keeping with house rules, Randy kept one wheel on the ground at all times.

A $^1/_4$-inch-diameter poly line running through a pulley (hanging loosely a foot or so below the appropriate spot on the support rope) raises and lowers the entire array. This line is fastened to the experimentally determined balance point of the top boom, which is made from an 8-foot-long piece of 2×2-inch lumber. Two 16-foot horizontal spreaders are U bolted to the ends of the boom. These top spreaders are made of 10-foot lengths of $^1/_2$-inch-diameter electrician's metallic tubing (EMT), with 6-foot EMT extensions attached to the 10-foot sections.[1] This is accomplished by running lengths of $^1/_2$-inch-diameter wooden dowel inside the tubing sections. The bottom spreaders are constructed similarly, but are made of $^1/_2$-inch-diameter PVC pipe.

The antenna elements can be made of any stranded wire #18 or larger. The loop circumference is determined by the formulas:

$$\text{Driven Element (in feet)} = 1005 \div F_{MHz}$$
$$\text{Reflector (in feet)} = 1035 \div F_{MHz}$$

[1]EMT is inexpensive and readily obtainable, but it tends to rust, so it should be weatherproofed for longevity. Of course, aluminum tubing can be substituted for the EMT at higher cost.—*Ed.*

The driven element is fed at the top center with RG-58 or RG-59 coax routed to the center of the top boom, then dropping down (alongside the hoisting line) to the bottom of the array. The driven element is split; the coax center conductor goes to one side, the shield to the other. The reflector element is a closed loop and, because its circumference is greater, the reflector's bottom spreader hangs somewhat lower than that of the director's. Element wires are simply taped to the spreaders with no attempt to connect to them electrically.

Lengths of $^1/_4$-inch line drop from each end of the top boom, connect to the center of the PVC bottom spreaders, then continue down to another boom (an 8-foot piece of

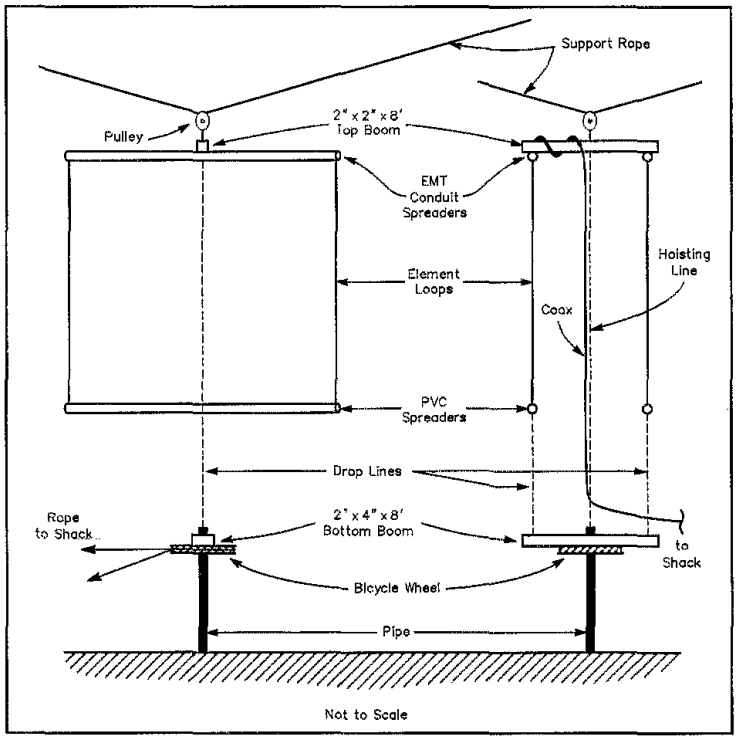

Figure 1—Details of KD7IK's quad. The support rope is strung between two trees: one in the front yard, another in the back yard. A pulley and length of rope secure the 2×2 top boom that separates the two 16-foot EMT spreaders. Element loops run between the top spreaders and the lower PVC spreaders. The latter are secured to the lower boom by drop lines. The hoisting line and coaxial feed line run between the two elements to the pulley and top boom. The bicycle wheel beneath the bottom boom allows the antenna to be rotated manually—by pulling on a rope around the wheel rim.

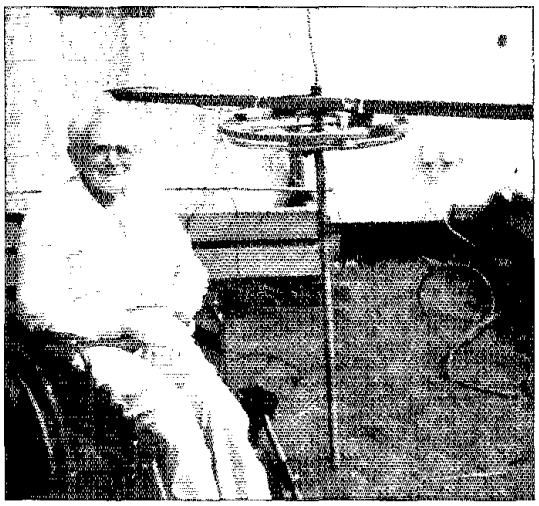

Figure 2—Randy, KD7IK, alongside the bottom of the quad. The water pipe supports the bicycle wheel rim and 2×4 lower boom. Rope around the wheel rim leads to the shack wall (in the background) allowing Randy to rotate the array by simply pulling on the ropes (the "armstrong method").

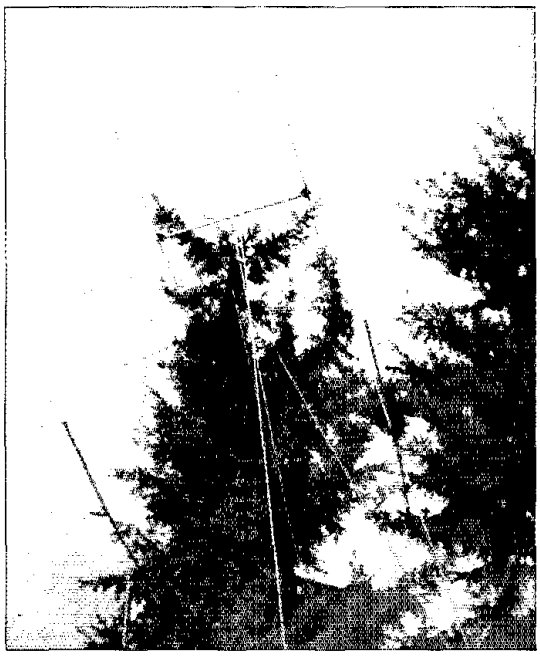

Figure 3—Here's the quad raised to its duty position ready to haul in the DX.

2×4-inch lumber) a few feet above the ground. Randy drove a length of 1½-inch-diameter water pipe into the ground directly under the pulley on the support rope. He fastened the bottom 2×4-inch boom across a bicycle wheel and slipped it over the pipe. The drop lines fasten to the ends of this 2×4. A ground-wire clamp attached to the pipe serves double duty as a wheel rest and a height adjustment for the lower 2×4. Once set, the drop lines are cinched up tightly.

Handling the Quad

When the bottom boom is rotated, the top boom follows neatly, swiveling on the short line extending from the pulley. Randy's shack is alongside the wheel at the bottom of the antenna. A line around the wheel, with both ends run through holes in the shack wall, permits Randy to rotate the antenna from inside the house using the "armstrong method."

It takes only seconds to raise or lower the array, making it a snap to dress up boom balance and line tightness. Because almost everything is tied together, few tools are required. The total cost, using all new parts, is less than $100. At the cost of a little more wire, additional director elements (set in the diamond configuration) could be draped over the support rope about 8 feet in front of the driven element. The added elements wouldn't be rotatable, but could add gain in the direction the support rope runs.

Summary

This quad operates as well as a rigid metal model. It sways a bit in gusty winds, although with little effect on signals. If a severe storm is anticipated, the whole array can quickly be dropped to the ground. Repairing any damage would be a snap.

Randy maintains regular schedules with another handicapped ham, Victor Shinov, RW0CV, of Sovgavan, Siberia. Randy lives in Everett, Washington, a sister city of Sovgavan. For the past few years, the two hams have coordinated a number of cultural and student exchanges as well as medical assistance across the Pacific. Although Randy's tribander went kaput in January, this quad keeps these international goodwill efforts right on track.

Jack Bock was first licensed 1940 as W9KCY. During WW II, he was a radio operator for the AACS. After the war, with the assistance of the GI Bill, Jack attended the University of Michigan, obtaining his MA in Journalism and Political Science. Between 1960 and 1966, Jack worked as a technical representative for Philco and Burroughs in Japan, Okinawa and Thailand, then went on to Civil Service work as an antenna engineer in 1966, and also worked for the US Navy Comm Sta Japan from 1966 to 1972. After returning to the US in 1973, Jack retired to Whidbey Island to work DX in 1975. Jack edited the West Washington DX Club Newsletter from 1981 to 1987, and in 1989, went with a club group to the (then) USSR as guest of the Zilan DX Club (Kazan). Jack says "I'm now fully retired, sweating out the bottom of the sunspot cycle and listening to my arteries harden." QST

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