The EZ-BZ Deck Antenna

A compact 20-meter dipole with linear loading and a bend.

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If you'd like a compact 20-meter antenna that can be erected on your deck or porch in a jiffy, consider building the EZ-BZ. For an investment of about $25 in materials (excluding coax) and a couple of hours at your workbench, you'll have a 20-meter dipole that's much smaller than a standard half-wavelength dipole, yet performs very well.

The EZ-BZ gets me good signal reports on SSB with my Ten-Tec Argosy at 50 watts and also with my 12-watt monobander, an MFJ Model 9420. Some DX stations are surprised to learn that I'm using modest power and a home-brew loaded dipole—from my deck!

Design and construction

About a year ago, I set out to design and build a compact 20-meter dipole that could be easily erected on my deck and quickly dismantled at day's end. Ideally, its performance on 20 meters wouldn't be too different from that of my half-size G5RV. The result of my efforts is the EZ-BZ deck antenna, named for its easy *(EZ)* assembly and its two main components, *B*amboo stakes and Zip cord (not to mention my call!). Long a favorite for home-brew antenna projects, bamboo combines rigidity and light weight, and is readily available at garden supply stores. Two six-foot bamboo stakes support the wire radiator: ordinary 18-gauge zip cord. Zip cord was chosen because it is insulated and very flexible.

At the outset, I knew that some form of loading would be required. I opted for linear loading because it is considered to be less "lossy" than a loading coil. In the EZ-BZ, the linear loading consists of three lengthwise runs of zip cord along each six-foot bamboo stake (**Fig. 1**). To make the antenna resonant at 14 MHz, an additional six feet (approximately) of zip cord are required. The six feet of zip cord simply droop from the end of each stake, making the EZ-BZ a bent dipole. The bent dipole design keeps the horizontal span to a minimum (11 feet), yet does not cause very much signal loss.

The zip cord is fed directly by RG-58 coaxial cable, without a balun. The coax is connected to the zip cord via two screws in the conduit portion of the antenna mount (**Fig. 2**). The other prominent feature of the antenna mount is a PVC T. The T holds the two stakes securely, yet permits the antenna to be assembled or dismantled in just a few minutes.

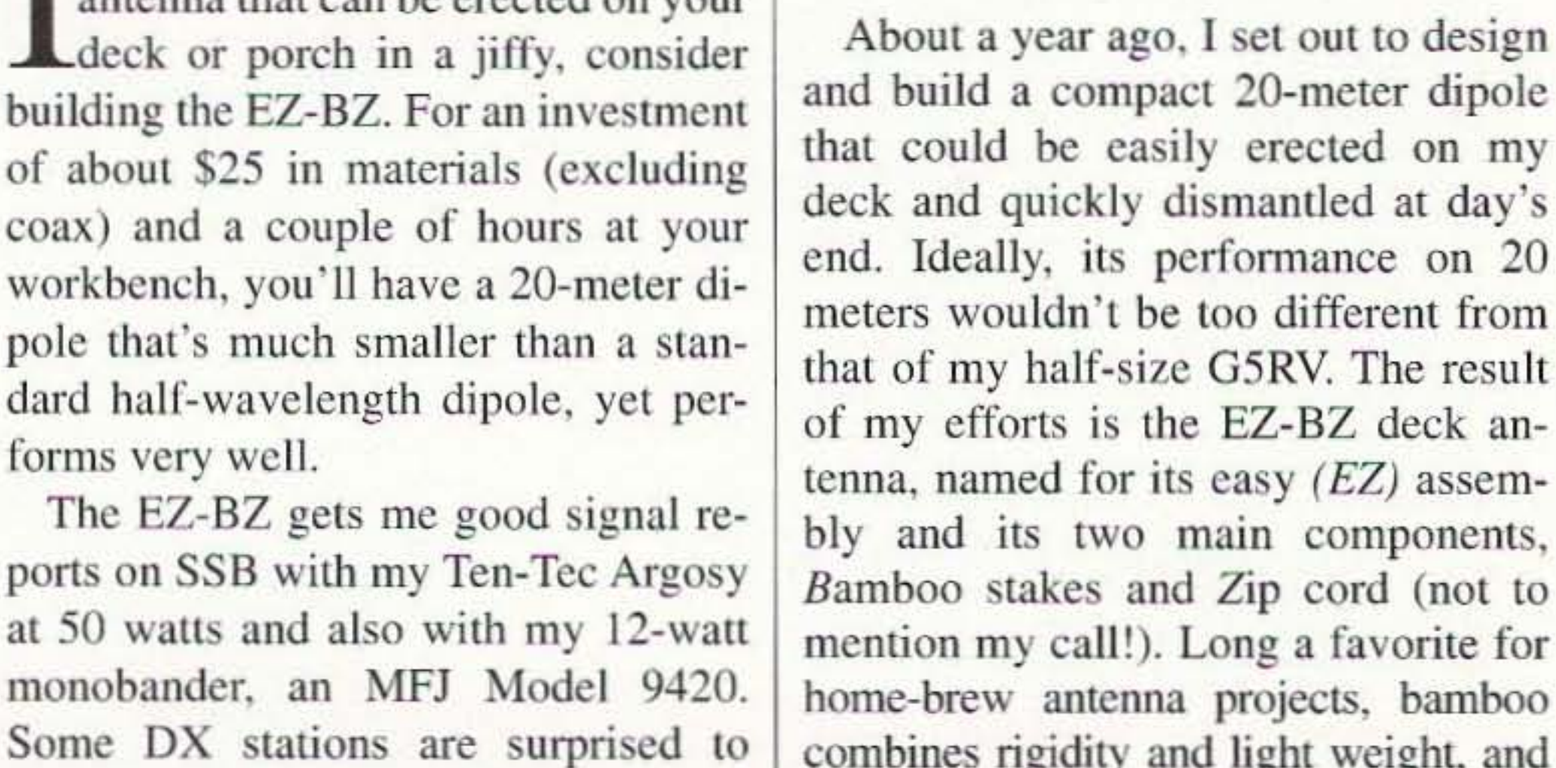

Fig. 1. Linear loading of the zip cord on a bamboo stake (not to scale). See text for details.

Assembling the antenna mount

The parts required for the EZ-BZ are

listed in **Table 1.** The antenna mount consists of a heavy-duty 1-1/4-inch PVC T attached to a length of 1-1/4-inch PVC electrical conduit (**Fig. 2**). I used a one-foot length of conduit, but for some installations a longer conduit might be more appropriate. The first step in constructing the antenna mount is drilling two 5/32-inch holes in the conduit to accommodate the screws. The screw holes should be one-half inch below the junction of the conduit and the T. A one-quarter-inch hole, drilled five inches below the screw holes, permits the coax to exit the conduit.

The PVC T supports the two bamboo stakes by their own levered weight against the inner edges of the T (**Fig. 2**). The angle between the two stakes is about 150°, making the EZ-BZ a—slightly—inverted V. As an option, you can increase that angle to about 165° by reducing the interior diameter of the PVC T. Simply insert a one-inch length of the PVC conduit into each end of the T until the ends of the inserts are flush with the ends of the T.

Selecting and weatherproofing the bamboo stakes

The pair of bamboo stakes used for the antenna should be fairly straight and have about the same diameter. Weatherproofing is done with a wrap of black vinyl electrical tape. The tape is wrapped from the tapered end of the stake toward the wide end, with an overlap of about half the tape width on successive turns.

Attaching the zip cord to the stakes

In the finished product, the zip cord is secured to the wrapped bamboo stakes with cable ties. Since the snugged-up cable ties cannot be loosened, the zip cord is initially affixed with twist ties. Begin the process by completely separating the two conductors in 23 feet of zip cord and attaching a split ring connector to one end of each. The split ring connectors will be at the feedpoint.

Fig. 1 shows the pattern of the linear loading on a bamboo stake. The pattern of the runs on the two stakes should be mirror images, since the two halves of a dipole should be mirror

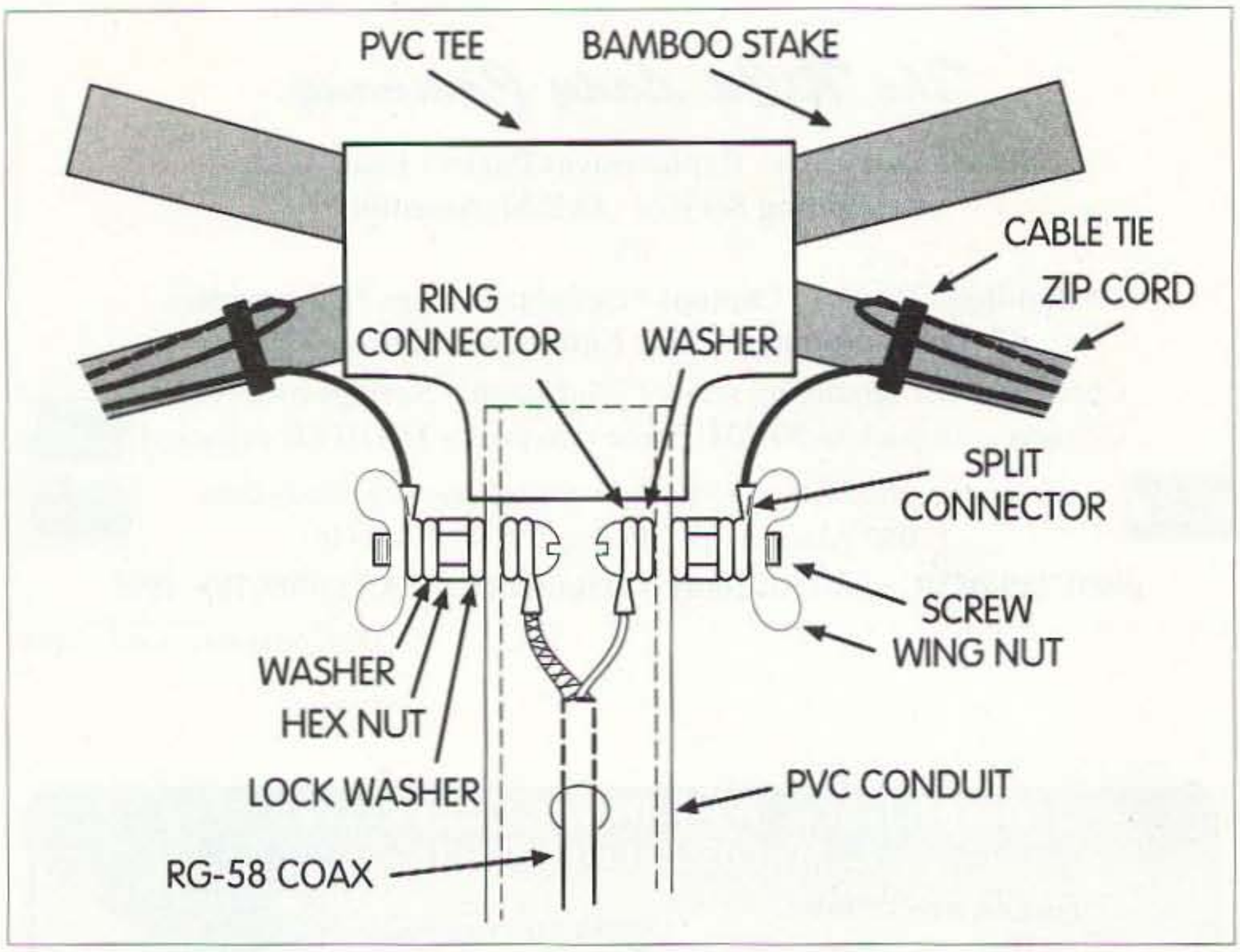

Fig. 2. *Construction details of the antenna mount, showing the PVC T, which supports the bamboo stakes, and the connections of coax to zip cord via screws in the PVC conduit.*

images of each other. Start the first lengthwise run by attaching the zip cord, three inches from the split ring connector, to a wrapped bamboo stake, seven inches from the wide end. Secure the zip cord with twist ties every seven inches (or closer), with the last tie being two inches from the tapered end. After the third (final) run, add a twist tie one-half inch from the tapered end so that the "tail" will droop from the tip.

Approximately six-and-a-half feet of zip cord will initially hang free from the end of each stake. The exact length doesn't matter at this stage, but it should be the same on the two stakes. If not, adjust the lengths of the runs so that the overhangs are the same.

Finally, replace the twist ties with cable ties. At the turns, secure the cable ties over both wires. Check that the adjacent runs of zip cord are evenly spaced around the circumference of the stake and that they do not touch each other.

Assembling and erecting the antenna

To assemble the antenna, insert the wide ends of the bamboo stakes into opposite ends of the T until about an inch of each stake protrudes from the other side. After you secure the split ring connectors with the wing nuts, the antenna can be erected.

The required mast height will depend on the height of the deck. For my deck, a 10-foot mast seems adequate because the deck floor is nine feet above the ground. I use two five-foot lengths of one-and-one-quarter-inch PVC electrical conduit, which is the same conduit used for the antenna mount. Electrical conduit is sold in 10-foot lengths, with one end flared. I strap one five-foot section to a deck post and insert the other five-foot section into the flared opening of the bottom section. A PVC connector secures the antenna mount to the top of the mast. To rotate the antenna, I simply turn the mast by hand.

CAUTION: The ends of a dipole have high RF voltages, which can cause burns. The antenna should be erected high enough or the deck cordoned off that the ends cannot come into contact with people or animals. For RF safety, the power output should be limited—and antennas should never be erected near power lines.

Adjusting antenna length

The electrical length of the EZ-BZ is adjusted after the antenna has been erected on a mast at its final location. For a deck installation, the EZ-BZ should initially be positioned so that the axis of the antenna is perpendicular to the side of the house. This orientation generally gives the lowest SWR readings.

When adjusting the length of the zip cord, trim both drooping ends about one-half inch at a time until the SWR is at a minimum at the desired frequency. Initially, my 20-meter EZ-BZ had an overhang of six feet, six inches, and was resonant at 13.7 MHz (1:1 SWR). Trimming eight inches from each drooping end (final length: five feet, 10 inches) increased the resonant frequency to 14.15 MHz (1:1 SWR). The SWR curve is shown in **Fig. 3**. Since the SWR does not exceed 1.7:1 across the entire 20-meter band, I am comfortable using the EZ-BZ without an antenna tuner. All SWR measurements were made with an Autek RF Analyst, Model RF-1.

Parts List

Qty.	Description
23 ft.	black 18-gauge zip cord
6	6-foot bamboo stakes
2	round head 8-32 3/4-inch brass screws
2	brass hex nuts
2	brass wing nuts
4	brass washers
2	bronze lockwashers
2	ring connectors
2	split ring connectors
	Black vinyl electrical tape, 3/4-inch or 1-inch wide
	4-3/8-inch-long (across top) heavy-duty PVC tee, 1-1/4-inch diameter
	Schedule 40 PVC electrical conduit (gray), 1-1/4-inch diameter
	RG-58 coaxial cable
	Cable ties
	Twist ties

Table 1. *Parts list.*

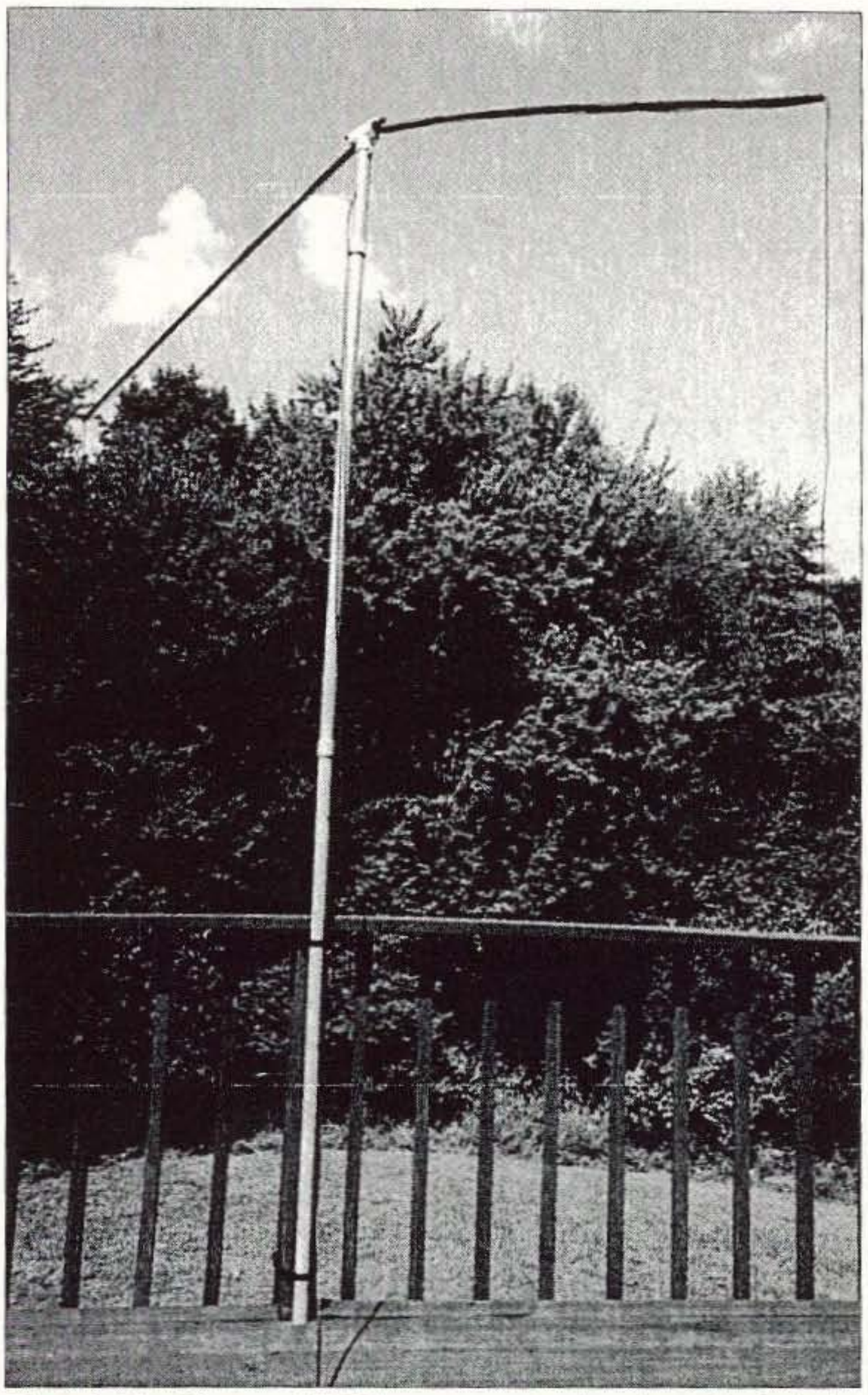

Photo A. The 20-meter EZ-BZ antenna erected on the author's deck.

The basic design of the EZ-BZ can be adapted for use on other HF bands. Trimming the tails to about 21 inches creates a 17-meter EZ-BZ. For a 10-meter EZ-BZ, no linear loading is required. Each bamboo stake supports about eight feet, one inch of zip cord: five feet, eight inches are attached to the six-foot stake and the remaining two feet, five inches droop from the tapered end. To work more than one band, just switch the bamboo stakes, which takes only few minutes.

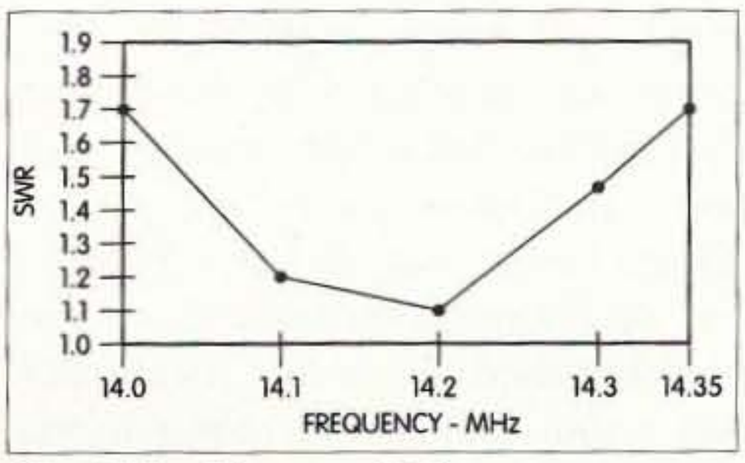

Fig. 3. The 20-meter SWR curve.

Performance

I have used the 20-meter EZ-BZ for nearly a year with considerable success. Using the Argosy at 50 watts, I have compared its performance to that of my half-size G5RV. The EZ-BZ was erected 20 feet above the ground and rotated to the same orientation as the G5RV, which is 35 feet above the ground. The comparisons were made the old-fashioned way—by switching antennas during QSOs with very patient hams. In a QSO with Andy VE3ORE, located 200 miles north of Toronto, the signal report was S7 for both antennas. Likewise, Dick K9FA in Wisconsin could detect no difference in signal strength, with both antennas scoring S8. An interesting comparison was made during a QSO with two hams, John VE6AIV in Alberta (Canada) and Larry W4ERN in Florida. John gave the edge to the EZ-BZ (S6 vs. S5), while Larry gave it to the G5RV (S7 vs. S6). In all of the comparisons, I could detect no obvious differences in signal strength on receive. Rotating the EZ-BZ occasionally results in a change in signal strength, but rarely is the difference dramatic.

In conclusion, the EZ-BZ has definitely met my requirements for a compact, easy-to-assemble antenna with respectable performance. It may be just the ticket for those who would like to "clear the deck" and make way for a different style of hamming! 73