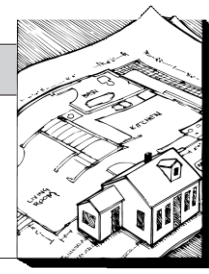

Fencing in the Wind

by Gordon Tully

Many years ago a friend of mine at MIT did research to find out which type of wooden fencing provided the most effective wind break. His experiments with a wind tunnel showed that the ideal configuration was a fence with horizontal slats that had small openings at the top and larger openings at the bottom.

I recalled his experiments when I set out recently to design and build a wind break to protect a seaside garden that gets blown by westerly winds. Specifically, his test showed that the ideal wind break fence:

- used horizontal boards with about 50% of the fence open; and
- was 25% open at the top, graduating to 75% open at the bottom (see Figure 1).

My friend's test showed that such a fence provides calm air for a distance equal to 20 times the height of the fence. So for a 4-foot fence you'd get 80 feet of "wind shadow."

Although the openings allow some turbulence just downwind of the fence, the air soon calms a little further downstream. By contrast, a solid fence creates almost no wind shelter because of the eddies that develop just past the fence on the downwind side.

A Few Kinks to Iron Out

I knew the theory; the question was how to actually build such a thing and make it look good. Pressure-treated Southern pine seemed a good start, perhaps with 1x4 horizontal boards nailed to 4x4 posts every 8 feet or so. The posts could be 8 feet long with half their lengths in the ground.

Laying out the boards proved a challenge, because you can't, with boards of one width, satisfy all the design rules. But I came up with a solution for spacing the 1x4 boards into a 4-foot-high fence that satisfies the 50% rule and almost satisfies the 75/25 rule (see Figure 2).

Having established this coursing, I had to keep it consistent the whole length of the fence. This created a problem, however: Because I didn't want to nail the boards too near their ends, lest they split, the boards couldn't butt together at each post; but neither could I stagger them vertically, because of the windbreak coursing requirements. I solved the problem by having successive sections of board start on alternate sides of the posts (see detail, Figure 3, next page). This creates an offset in the fence when viewed from one side. From the other side, the fence looks continuous.

Some sketching convinced me to use 16-foot boards, creating offsets at every other post, and to face all the offsets the same way so the fence would look continuous to people approaching from the house and garden. I put two panels on one side of an opening into the garden, and three on the other.

To make the fence follow the lines of the existing landscaping, I decided to curve it. I spent an

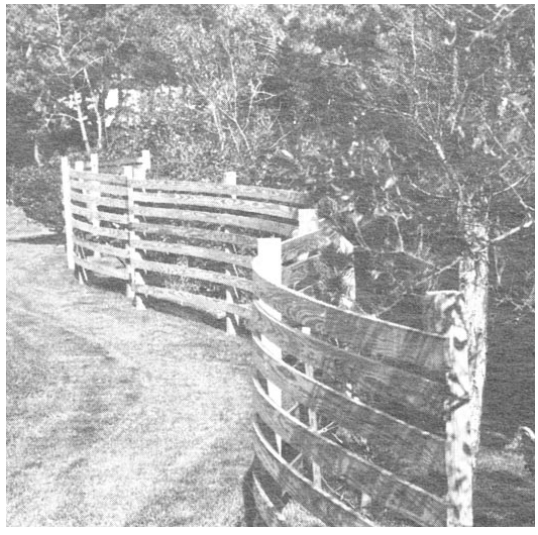

Figure 1. *To shelter a seaside garden from wind, the author built this curved frame. The curves serve no wind-breaking function; the secret to the fence's wind-cutting ability is in the graduated spacing between courses.*

Spacing On a Wind Fence

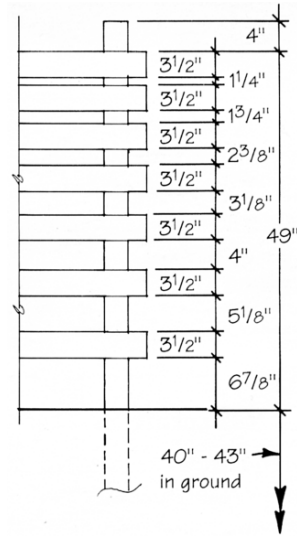

Figure 2. *The ideal wind fence is half open space, half fence, with 25% of the open space at the fence's top and 75% at the bottom. The author varied this formula slightly to accommodate 1x4 stock.*

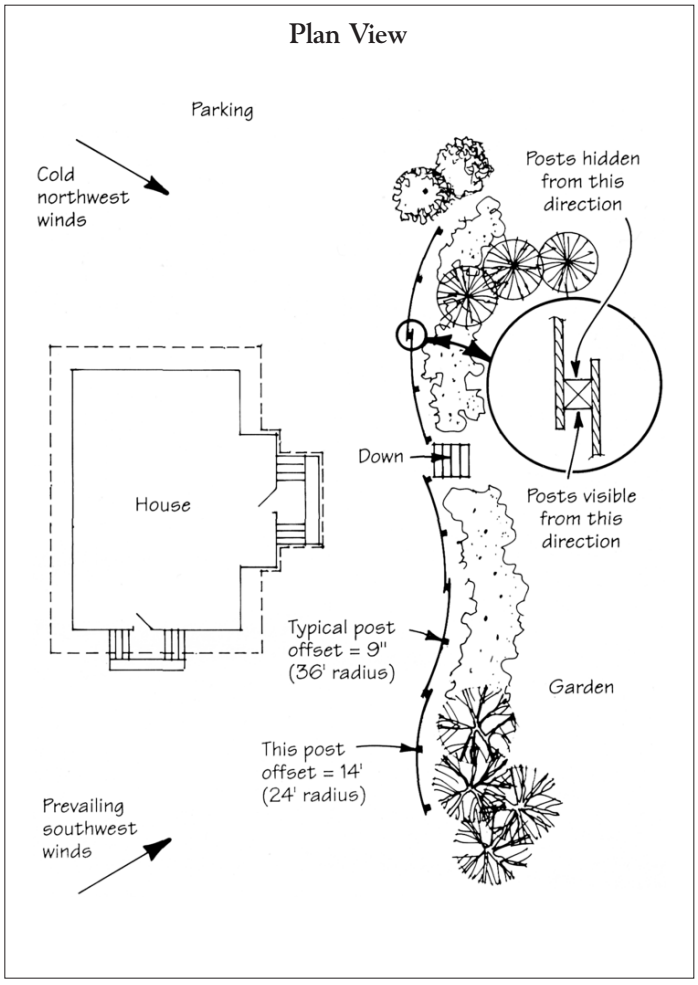

Figure 3. *The author produced a serpentine-shaped fence that followed the contours of the existing landscaping. Where sections overlap at end posts, he passed the boards to either side of the posts to give a wide nailing surface and reduce the chance of splitting. From the main approach, these offsets don't show.*

entire day experimenting with curves, using a rope laid on the ground. I tried at first to keep the radius constant. This didn't work, so I made one section "whip" faster than the others. Then I spaced the posts along the rope, stretched a line between posts 1 and 3 (for example), and measured the offset of post 2 (see Figure 3). Using offsets, I could maintain the same curve over several posts, and keep the reverse curves even.

One constraint is that the curve has to stay constant over the entire length of a board. Reverse curves can only occur at the ends. Otherwise, you end up with straight boards.

I bought the required PT lumber and set the posts to dry for a week leaning almost vertically against the shady side of the house under the eaves; the boards I stacked flat on stickers to dry, again in the shade. None of them warped or twisted, so I must have done something right.

Despite some problems with bending the boards to smooth curves and keeping the posts plumb, the fence looks smashing and draws many compliments from passersby.

But Does It Work?

Does the fence block the wind? Well, yes, mostly. In moderate winds, only the open gate in the middle lets wind in; otherwise, the entire garden is still. The effect is really amazing. There are places where the ground falls away from the bottom board, opening the fence up too much and letting wind in. I plan to close these up, and also to add a gate.

The plants right next to the fence are not fully protected, but these need to be acclimated to the wind and salt anyway, so they can someday form a vegetative windbreak, allowing us to remove the fence. The main problem is that in strong winds, the trees in the garden deflect the wind down, somewhat defeating the effect of the fence.

All things considered, this wind-blocking fence is a great success, and it was fun to build. I hope more people try curved fences: they look great! ■

Gordon Tully is an architect practicing in Arlington, Mass. He also teaches at the Harvard Graduate School of Design.