

Wave fence



Chris and Jean Grace build a beach-themed feature fence with some help from a friend

PHOTOGRAPHS BY JEAN GRACE

We had been keeping our old fence going for a number of years by adding wooden bracing, metal brackets and quite a number of stainless steel screws. However, we were getting to the point where a more permanent solution was needed as every time there was a storm, Jean rushed outside to check if the fence had survived!

I had been thinking about a design for a new fence for some time and had been refining an idea in my CAD – computer aided design – program. The idea was simple, but getting it from my head to reality proved a little tricky. What I had in mind was a wave, inspired by our house's proximity to the sea – we're about 150m from the seafront. However, I wanted it to look more realistic than the up/down curved panels you typically see. My idea was a wave increasing in height and breaking on the shore. This presented a number of challenges in its construction because, in order

to make the waves flow, they could no longer be constructed using portions of a circle. Simply using a string-and-pencil compass or bowing a thin batten wouldn't really work.

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Research was required into wave shapes, particularly the curl where the wave breaks, and, after further refinement in the computer, I arrived at a pleasing shape. But how to make it in the real world? I toyed with the idea of making the panels flat then lifting them into place, but by this stage I'd considered a number of timbers and had decided on yellow balau (*Shorea spp.*) decking. While sturdy and designed to last for many years – we didn't want to put all the effort in if it wasn't going to last –

it was evident that it would be too heavy to lift and would have to be constructed in situ. So, how about constructing straight panels and cutting them to shape with a saw? I couldn't reach! Finally, I resigned myself to cutting each piece accurately on the chopsaw and building the wave in a series of facets. I tested this method in the computer and it appeared that it would work.

All I needed now was the timber. Unfortunately, no one had any in stock in the size and finish I wanted. Because of the design, I needed plain – unreeled – planks, 90mm wide. Eventually I found a supplier at a country fair who had stock, so we were in business.

Off to the workshop with some scrap pine boards of similar size to the intended fence material to make the top portion of the most complex panel. This mock-up taught me more about how to create the real thing and proved the concept.

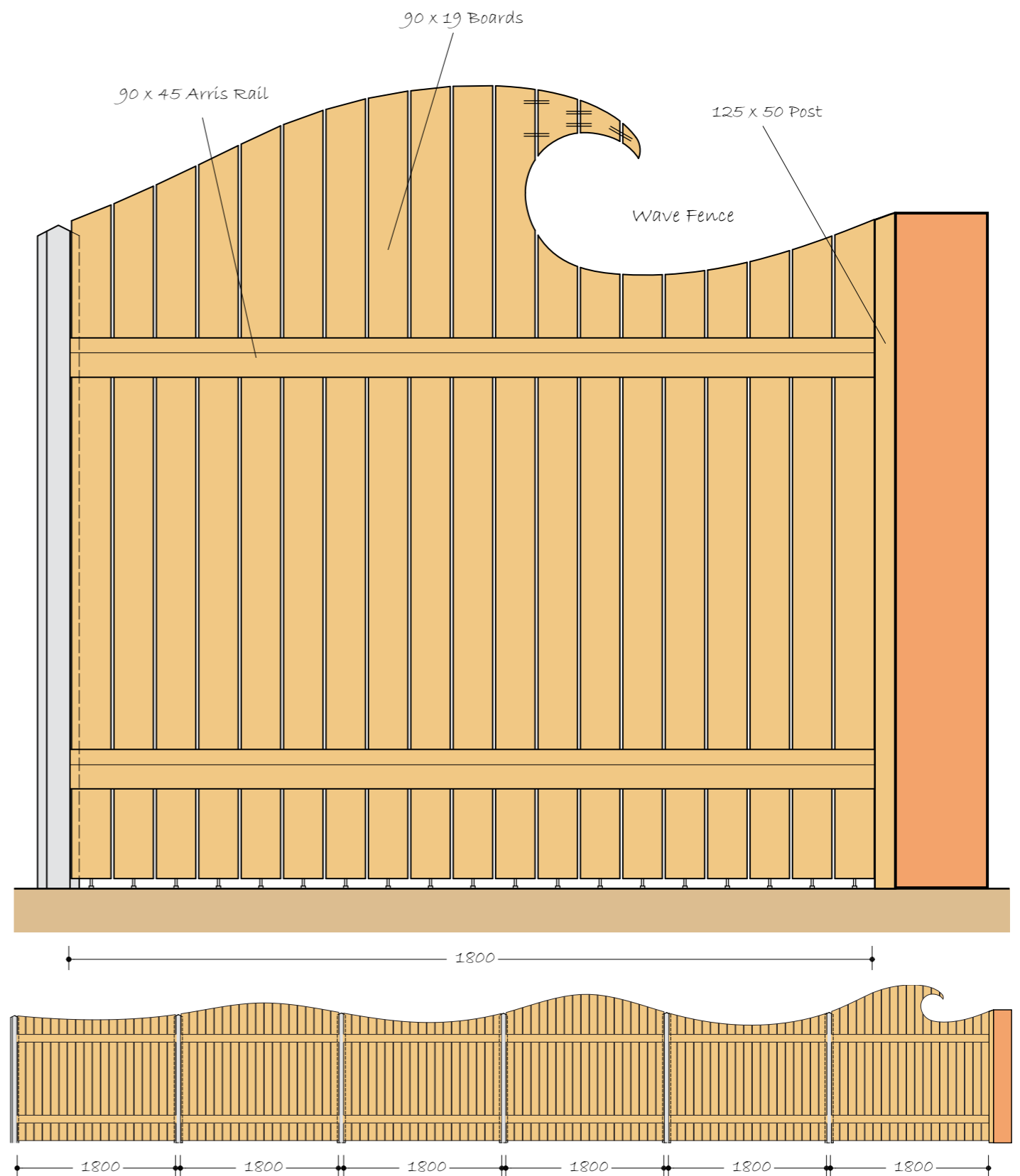
Finally, let's start fence building.

You will need

Chopsaw
Measuring and marking tools
Hand drill(s)
Impact driver
Tablesaw
Lathe
Jigsaw
Clamps

Cutting list

- 1 x 125 x 50 x 1,600mm post
- 12 x 90 x 45 x 1,800mm arris rails
- 60 x 90 x 19 x 2,400mm boards
- 120 x stainless socket cap bolts
- 250 x 45mm stainless Spax screws
- 20 x 6mm x 100mm bolts and washers as spacers



1 It had been clear for some time that we needed a new fence – periodically we found a bit flapping in the breeze – but up until now it had been easier and quicker to just fix it than to make a new one.

2 Although I'd already worked out the design and details using a CAD program, I wanted to see what the faceted design would look like in reality, so I built a full-scale mock-up of the top of the most complex bit from cheap pine boards.

3 Happy with the mock-up, I started preparing the timber. First the 90 x 45mm planks were chamfered on a tablesaw to form arris rails.

4 Carefully marking each vertical plank to the correct angle according to my cut list was essential, so I measured and marked both edges of each board to form the correct angle. As the boards were 2.4m, I needed to use the offcuts from each down-wave to form the next up-wave, so I numbered the boards as I cut them.

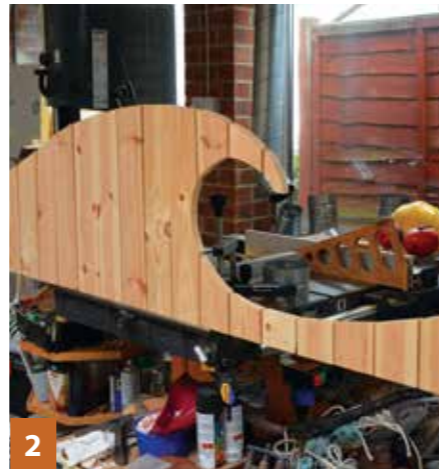
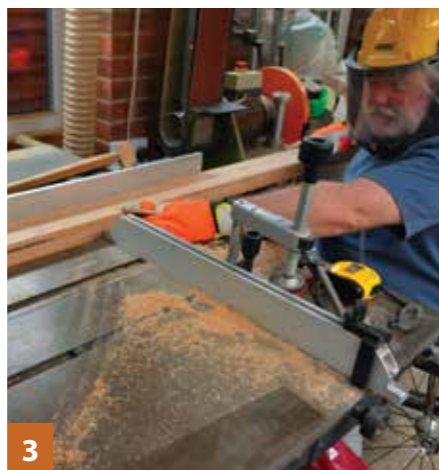
5 Cutting was made easier using the laser on my chopsaw: just line it up front and back and it will cut at the correct angle. Don't forget to clean up the edge and put a small chamfer on.

6 I pondered how to drill holes into the bottom of each board to accept a stainless socket cap bolt. The answer was to use a table on my small lathe, simply sliding the plank along a fence onto a drill held in the headstock by a Jacobs chuck.

7 The holes were drilled a little smaller than the bolt and screwed in, using a block to set their length equally. The impact driver was already starting to earn its keep.

8 Outside, the arris rails needed to be tapered with an electric plane to fit into the slots in the existing concrete posts.

TOP TIP 1. Keep the timber moving at all times; this will help to minimise the problem of scorching. Any minor marks can be sanded out later.



9 As the slots were not completely even, each arris rail was fitted and checked for clearance.

10 'Stilts' were clamped to the posts for the arris rails to rest on, which ensured that they were all set at the same height and parallel to the ground.

11 At last it was time for the first board, but I needed help from my friend, Alan. We clamped the board roughly in the middle at the top, then measured to ensure it was central, repositioning it as required.

12 It was essential that the middle board was exactly vertical, as all of the other boards would be spaced from it. A second clamp was used to temporarily secure it to the bottom arris rail.

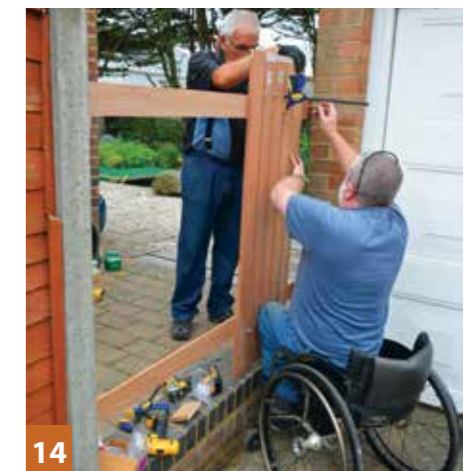
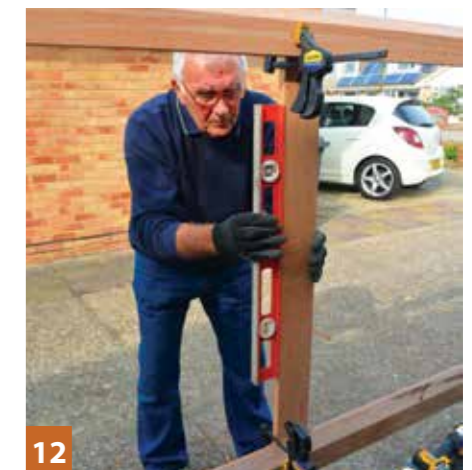
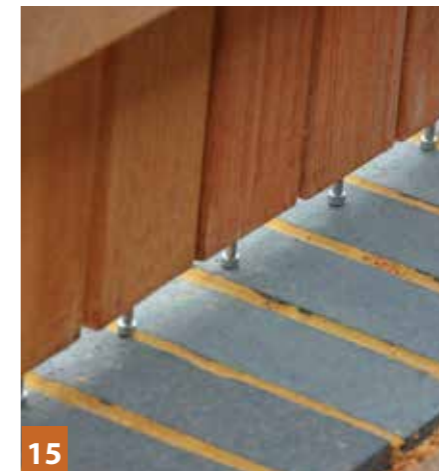
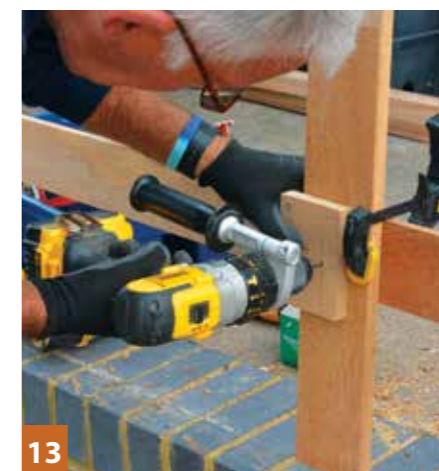
13 We used a jig to mark where the screw hole would be drilled. Having used the drill to mark the hole, the jig was removed so we could pilot, counterbore and countersink each hole before setting the 45mm Torx head screws in place. This was essential because of the very hard wood.

14 Working on one side of the central plank at a time, we ensured an even gap by using a 6mm bolt and clamping the next plank in place.

15 The bolts in the bottom of each plank served two functions: first to enable us to level the boards so that the design flowed, and second to ensure that the planks were held off the ground to avoid contact with standing water, which was an important consideration.

16 We clamped half a panel at a time so that we could look at the line of the wave and amend it if necessary by loosening a board and adjusting its bolt.

TOP TIP 2. Use jigs wherever possible to speed up a job; these will also help to provide an extra pair of 'hands' or to provide greater accuracy to your project.



17 Having set the height of all the boards on one side we were able to drill the holes and screw them into place with an impact driver. When clamping the first panel we kept dropping the spacing bolts through the boards. The solution was simple – tape washers to them!



18 Using the modified spacers between each board and a clamp on every other one, we were able to make good progress on the next four panels.



19 Now it was back to the workshop to start the construction of the curl of the wave. I began by measuring for the dowel holes that would eventually hold the pieces in place.



20 Drilling wood accurately is often tricky, so a good centre punch mark is important. Grain can push the punch off-line, so start with a light tap – that way you can correct it if necessary.



21 A digital level is a great tool for setting angles. It was used here to angle the drill hole for the tip of the curl.



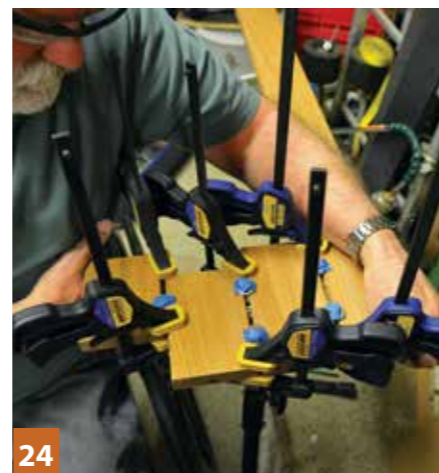
22 I carefully drilled the angled holes so that they lined up accurately. Use a sharp drill and allow plenty of time to cut to minimise wander due to the grain. I used an impact driver with a 6mm socket adapter to turn it into a light bolt gun. The bolt heads were cut to length with an angle grinder to form dowels, which I notched to help them grip the glue better.



23 The corresponding dowel holes were drilled one drill size larger than the dowel to allow for any inaccuracy. The epoxy glue filled any gaps.



24 All the sections were spaced like the fence planks and clamped while the glue dried.

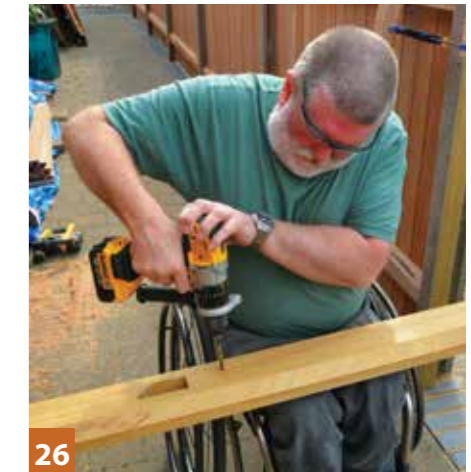


3. Don't be afraid to review your methods partway through a job and change how you do things. This may benefit you.

25 Mortises for the arris rails were cut in the wooden post that would be attached to the brick pier using pilot holes at the corners and a jigsaw.



26 Once I had determined where the holes needed to be drilled in the brick, I transferred the positions to the post and drilled that first. I used a small SDS drill bit to transfer the hole positions from the wood to the brick pier, then drilled the holes to the correct size and depth.



27 To assemble the last two arris rails I pushed them through the mortises in the wooden post with the other end perched on the 'stilt', then slid it round to the brick pier before securing it with 100mm stainless frame fixings.



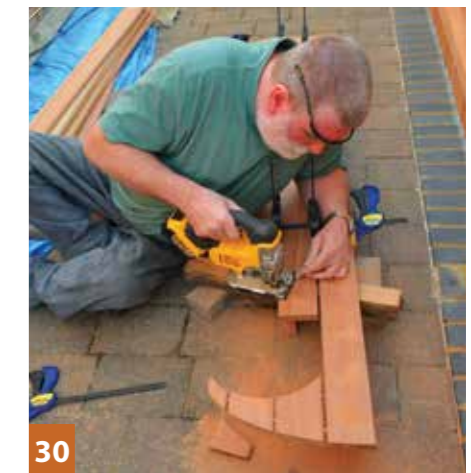
28 Once the glue-up had dried, I clamped the next three lower boards to the one with the extended top portion and transferred the curl outline onto the wood with a sharp knife using a full-sized template taped to the wood.



29 I couldn't see the line clearly enough so I traced over the cut with a pencil.



30 While jigsawing the shape of the breaking wave, the design finally started to come to life.



31 The second half of the last panel was the best bit and we couldn't wait to complete it, even though it was late in the day – note the shadow line.



32 Finally, I thanked Alan for helping us create a wonderful new fence that will hopefully last much longer and require minimal maintenance. ■



4. If a job is a bit too big for you, don't be afraid to rope in some help!

5. When laying out curved pieces, work from a straight reference line. I often make a square portion before cutting the curves.