HOW TO BUILD A BIKE BACKWARDS

DANIEL STREKIER HAD A COUPLE OF MIDGET RACING CARS KICKING ROUND HIS GARAGE THAT GAVE HIM INSPIRATION TO BUILD … NOT A MIDGET CAR OUT OF METAL BUT A BICYCLE FROM WOOD

By Ian Parkes

Photographs: Adam Croy, Daniel Strekier

Daniel Strekier's wooden bicycle is clearly a work of art, and of craftsmanship, but it also works as a bicycle, albeit a unique one.

It's not as nippy around town as a Lime scooter and it's not ideal on hills, but give it relatively flat terrain and its fat tyres deliver a very comfortable ride.

Aware that the bike weighs nearly 60kg, Daniel wanted to see if that was too much for a decent hill, so he rode it up central Auckland's Queen Street to Karangahape Road.

"It would go up, but quite slowly," says Daniel. Coming down was a different matter. It got up to 38kph before Daniel hit the brakes. "It was quite bouncy," he says.

The oversize width and square profile of the tyres wouldn't be the first choice of most bike designers but their oversize dimensions make the larger frame section sizes that result from building in wood look quite delicate.

The tyres still might not even have been Daniel's first choice if he had been designing a bike from scratch, but the tyres came first, then the wooden wheels, then he had to have something to connect them. For a bike designed backwards, it's a visual and technical treat.

Just for the challenge

Daniel's mountain-biking friend and neighbour Bruce had asked him for help making a barrier for a radio-controlled car track and Daniel thought that he could cut it out of tyres. A local merchant suggested using some old midget racing car tyres, as they didn't have steel in them.

The tyres came first - then the wheels

> *The tyres still might not even have been Daniel's first choice if he had been designing a bike from scratch, but the tyres came first, then the wooden wheels*

That got Daniel wondering what else he could do with them. "I kept bouncing the wheel like a basketball wondering what to do," he remembers.

He decided, just for the challenge of it, to build a wooden wheel. He thought about a trike or quad bike but decided that they would be too big for footpaths. He was into mountain biking, so he settled on the idea of an off-road bicycle. In wood, naturally.

The wheel concept worked, so he decided to beef it up and make a sturdier version, and the bike project was underway.

He had so much fun making the bike that he couldn't actually stop. He decided to add mudguards, a chain guard, a long security chain and a working padlock, a saddle bag, oh, and a very funky bicycle helmet, all made out of wood.

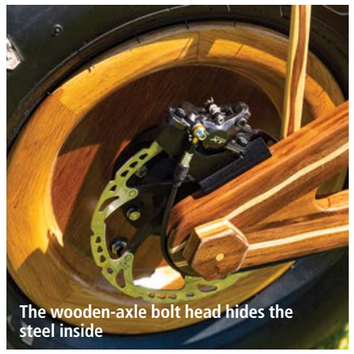
Woodworking has always been a passion. He clearly remembers using a saw aged nine or 10 and making little wooden cars as presents for his sister and other relatives. And now he has made toys for his son and other children.

Now a bubbly Kiwi

Daniel grew up in the town of Apóstoles, in a farming region in Misiones, Argentina, a province that sticks out like a thumb between Paraguay and Brazil, and is home to the Iguazu Falls.

He came to New Zealand for three months but when he went back to Argentina, he realized that he missed New Zealand. So he came back and his three months has stretched into 12 years. He loves New Zealand but remains proud of his heritage and, while his English is fine, his Spanish accent is as much a part of him as his bubbly personality.

He runs his own business,



The wooden-axle bolt head hides the steel inside

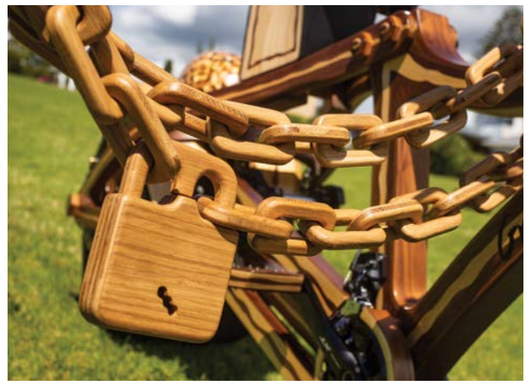
Curving every which way, the mudguards highlight Daniel's artistry

The maker's plate

Daniel and Grace

Clockwise from above: Wood and leather saddle bag; precision woodworking with organic highlights; working wooden padlock and chain; laminated pedals; tech trimmings; just right from any angle; bespoke engineering around Shimano gearbox

"I kept bouncing the wheel like a basketball wondering what to do"



Above: The forks and both sets of stays are laminated to curve around the fat wheels

Masterpiece Woodworks, "for craft and general woodwork, especially rustic style", from his home in Howick, Auckland, making bespoke furniture and fittings. He encourages his customers to do more with solid wood, but instead of starving his woodworking passion between commissions, he decided to challenge himself.

Asked which were the most challenging parts of the bike build, he replies: "I was enjoying it so much I forgot which part was the hardest. I enjoyed working everything out. When I was building it was a holiday for me!"

Thinking back, he says that building the wheels was quite tricky. He wanted something more sophisticated than the ancient cartwheel-type hubcaps he built for his van (that's another story). It had to be modern and smooth enough to support and hold the pressure of a modern tubeless tyre.

Building those wheels

Each side of the wheel started out as 16 pieces of flat wood joined with finger joints to form a circle with flat edges. Flat discs were glued to them and the two sides were joined together with a central wooden strut. The strut has flat sides, like a bolt head. That allowed buttresses to be glued between the strut and the wheel disc, helping to join the two securely.

After a proof-of-concept trial, Daniel built the real things, strong enough to take a real hammering. Having a front wheel collapse is not something he was prepared to risk.

They turned out good-looking and strong, but the tyres wouldn't stay pumped up.

"The bike is very heavy when it has low tyre pressure," he says.

He painted the wheels with extra coats of resin but they still would not hold their pressure. The final solution came when he painted on a layer of liquid silicone.

Meet 'Grace'

Daniel has clearly spent a lot of time on design. A traditional bike frame with its double-diamond basic shape lends itself easily to construction with straight pieces of wood, but you will find very little of that on Daniel's bike.

Only the forks, chain guard, and chain stays are straight — but not entirely. The forks and both sets of stays are laminated to curve around the fat wheels and the chain guard has wonderfully intricate laminated curves over the gears at each end. It came together so well that, even with its butch tyres, it suits the name Daniel has bestowed on it: Grace.

But the most striking feature of the bike is the free-flowing, wobbly stripes in contrasting walnut and ash on the frame rails and mudguards. They highlight this bike's organic essence. Daniel is often asked how he made this feature — people are convinced they can't be inlays because they are too unstructured.

Most people suggest they were done on a CNC machine, but no.

A friend, Thomas Rahm, used a lathe and a CNC machine to turn out the alloy and steel parts for the wheel hubs, brake carriers, and the other components that Daniel designed to transfer power from the pedals to the rear wheel, but none of the wooden parts was cut by CNC.

All pedal power

The photos show what looks like a small electric e-bike motor being installed, but this bike is all pedal power. Daniel used standard bicycle cranks and a bottom bracket with a two-speed crankset. The chain then connects to a gear linked to a Shimano 11-speed internal gearbox, a unit usually seen in the rear hub of touring and commuter bikes, mounted in front of the rear wheel. Another short chain links the output shaft on the other side to the bike's rear wheel.

"The performance of this gearbox is quite amazing," says Daniel. But maybe he'll get a motor for the next one.

Like other stylish modern bikes, the cables are also routed inside the frame to avoid distracting from the form, so that involved inserting flexible tubes from end to end inside the frame so that the cables could be fed through them.

"I was always thinking, how can I do it better?" says Daniel.

The handlebars, having to fit human hands, are one of the more delicate items on the bike. They are also laminated for strength with layers of carbon fibre in between layers of oak.

"I was able to hang my weight from one end," says Daniel. So landing jumps should be OK.

He takes similar care in the workshop. "One of my sayings is: 'Work safe — you need your fingers for the next job'."

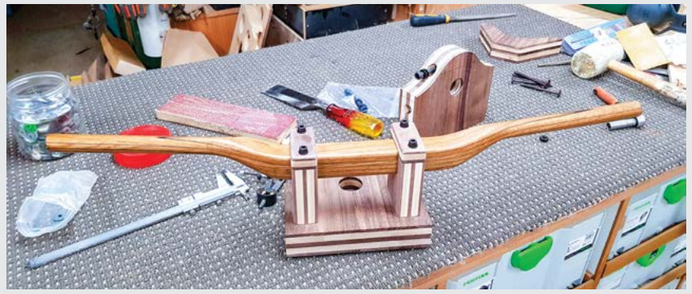
A real workout for Daniel's skill set

"Work safe — you need your fingers for the next job"

Wooden wheels, mudguards, headstock, and frame in build






Clamp that

It's also clear from the bike-build photos that Daniel needed a lot of clamps. Even if he'd been getting them as birthday and Christmas presents for several years, he would still have had to buy more.

On one lay-up alone he used 52 clamps. On another he used 33 — but only because he had run out of room for more. Some jigs, like those making a double bend, were quite simple. Others, like the jig for the internal face of the main frame, were also masterpieces of ingenuity.

The main frame is a box section with four sides, but there is no join on the internal face. Four 2mm strips were steam-bent and laminated on a separate form, which was lashed into a specially built frame so that pressure could be applied in all the right places. It was then left to dry for two days.

> *"It wanted to go in the ditch, and we just went in the ditch. I rolled like Jackie Chan"*

"I took a lot of care measuring many times and working out the angles. That was quite hard to do," says Daniel. "I need a challenge sometimes to feel happy and I got to learn. It was a big achievement."

The mudguards are much more stylish than they might have been. The square profile of the tyre would have made it easy to build a three-sided cover, like the deep slab-sided guards on a Harley-Davidson Fat Boy. But as the wheels already looked heavy enough Daniel decided on something much lighter and more elegant.

That created a raft of new technical challenges. Naturally they had to have the signature wobbly tiger stripes but the really tricky bit would be making the guards curve in every direction.

"They are not flat across the top," says Daniel. "They are like a barrel. This took a bit of learning how to do it."

He made them three layers deep. Only the top layer needed the stripes. To get the curve, they had to be made up in sections. Each guard is glued together from 32 pieces stuck together into nine building blocks for final assembly. Bicycle inner tubes were pressed into service to apply pressure in between the clamps.

Wooden nuts and studs, wooden helmet

Another feature of the bike is the wooden nuts and studs. To avoid having the studs shear, Daniel laminated them in his signature walnut, oak, and ash colour scheme before turning the threads. The bike also had steel axles that demanded steel bolts and washers to hold the wheels on, but that would not look right.

To give the wheels axle nuts of the right scale, Daniel put large washers on the bolts then drilled and screwed the washers from the underside into oversize six-sided wooden caps. The result is a steel bolt with a wooden head. As well as looking right, he actually needed the flats to lock the bolt and hold the wheels on to the axles.

Another cool piece of kit is Daniel's wooden helmet. He bought a plain cycle helmet then glued on lots of large plugs made of the three timbers in the bike — oak, ash, and walnut. Then he drilled into the margins to fill the gaps with a






Daniel (right) and friend and neighbour Bruce McKay tackle the Hauraki Rail Trail

smaller size of plug. This cut into the edges of the plugs that he had already installed and the glue that had run between them.

How did he avoid cutting into the helmet? "By being very careful," he says.

Then he sanded the helmet and repeated the process with more plugs, and smaller ones, three sizes in all. "I did it again, and again, and again," says Daniel. "I'm not sure if I finished or if I just got tired."

Bike trail test

But both bike and helmet are put to good use. This is more than a woodworking exercise; it's also an exercise exercise. Daniel took the bike on the Hauraki Rail Trail, where the gentle gradients suitable for trains don't pose too much of a challenge, but just keeping Grace on the path still provided plenty of excitement. There's a reason most bikes don't have big square tyres.

You can't lean the bike as hard as a normal two-wheeler, as that pops it up on the corner of its tyres with unpredictable consequences, so Daniel has just taken to steering hard and leaning his body more. He says you have to look out for camber changes too.

"It wanted to go in the ditch, and we just went in the ditch. I rolled like Jackie Chan," he says.

Another time when he noticed the bike heading ditch-wards, he hit the brakes, the rear locked up, and he coasted into the ditch anyway.


Daniel's next challenge – a ride from Cape Reinga to Auckland

"I have to lean out a lot and just keep pedalling," he says.

Daniel's not ready to hang up his wooden helmet yet. He is currently training for a charity ride from Cape Reinga to Auckland, a trip which does include a fair few hills. But he's keeping his ambition in check, as he knows the challenge is severe.

"I will call it 'To the Next Town'," he says. "I will just keep pedalling and keep leaning."

So how did he create those wavy stripes? Figured it out yet? He laid a strip of dark timber on top of a strip of light timber, fastened the two together then cut two wavy slots through them both at the same time on the bandsaw. Then he could pull the centre piece from the strip below to mix and match. Neat, eh?

Daniel thanks Thomas Rahm, Bruce McKay, Tony Wilson, Michael Gwilliam, Craig Murray, and Bruce Chan for their help and support throughout the six months of the build, and Rob Hallie for the tyres.