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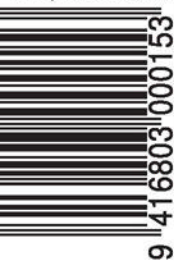


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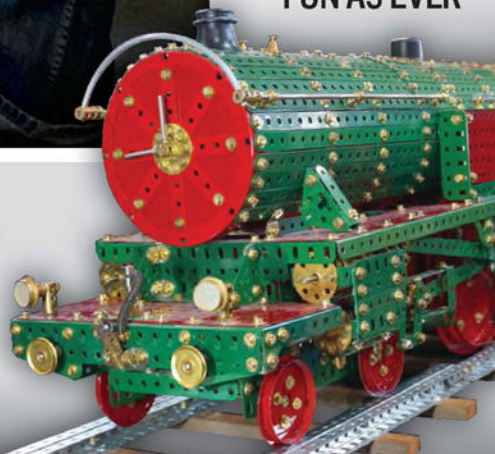
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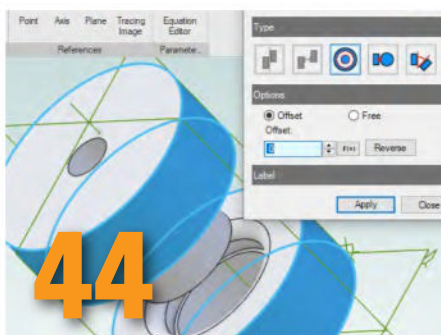
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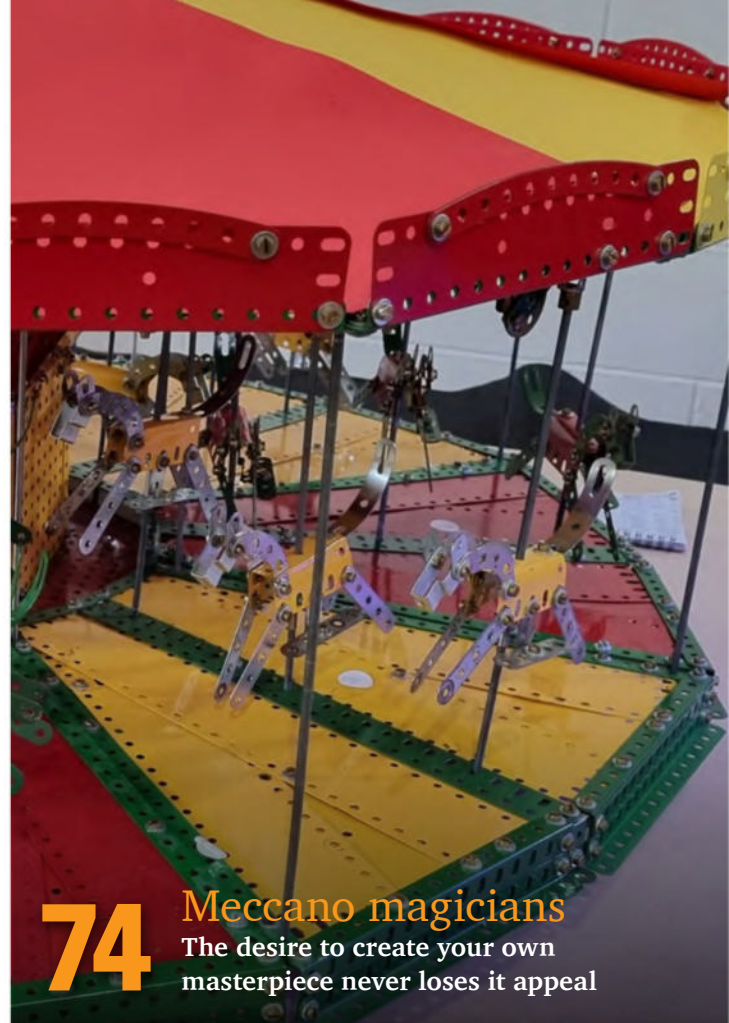
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THE ELEPHANT IN THE ROOM

We love it when our readers write to us and always look forward to receiving letters to the editor. FYI, you don't write to us enough – just saying.

But I digress. In the previous issue of *The Shed*, Issue No. 109, we published a letter from *Shed* reader Dave Robbie, who had noticed a photo of a small petrol engine installed in a sharpie yacht built by Neville Watkinson (see Issue No. 107).

Dave sang the praises of small engines, and asked if we could delve deeper into them for him. Our team loved that and dived in. You will see Neville's article on the small engine installation in this issue. I hope you like the article, Dave, but the conclusion may dispel a few myths for you.

When deciding on what engine to install in his yacht, Neville did explore the possibility of an electric power plant. Back then, though, it was too early in the development of small electric motors, so a petrol-driven engine won the day.

It occurred to me that, even 10 years ago, some of us were thinking about moving away from oil for the sake of our climate, yet here we are today with reports that the Earth has just had its hottest day ever recorded. Are we all just playing the fiddle while Rome burns?

I sincerely hope we are all doing something to reduce climate change and reduce waste. I monitor myself constantly these days; I may be becoming a bit of a

climate change zealot, but it may also be a symptom of ageing – LOL.

My own car use has decreased hugely with my working from home permanently this year. My monthly petrol bill has decreased by 60 per cent at least. When I do use the car, I ensure that I do all my errands and shopping, thereby avoiding the need to pop out again in the car just to shop. I keep a firm hand on waste and do whatever I can to reduce; reuse; and, if there is no other option, recycle. I am beginning to wonder, however, if it's all just too late.

Sir David Attenborough tells us, "It's not too late but we must act now", but I wonder if he is just trying to keep our spirits up. Nothing is really changing with the habits and behaviour of the majority of the human race, and the reports of doom are increasing. When the teenagers protest and march to parliament complaining that any change is way too slow, I tend to agree with them. More Teslas to fix our climate issues just doesn't cut it for me, I'm afraid. Oh dear!

What do you think? Am I being too negative, too apocalyptic? Are we doing enough? What are you doing that is making a difference and is something that other sheddies could also undertake? 🐘

Let me know what you reckon; send a letter to the editor:

Greg Vincent
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THE FRIDGE MAGNATE

To some, it's an old, outdated kitchen appliance; to this man, it's a classic beauty with a life still to be lived

By Jason Burgess

Photographs: Jason Burgess and Mark Bedford



Mark working on his distillery ice bank conversion. In the background is his Bedford CF camper-van restoration



A sample range of mid-century refrigerator models

Mark Bedford's stand-alone '60s cinderblock unit sits at the far end of a long driveway skirted by large-scale factories. For this appliance engineer, musician, and general tinkerer, the industrial setting offers the right kind of seclusion. Here, he gets to grind, saw, restore, and rebuild or just bang his drums without the hassles of disturbing the neighbours.

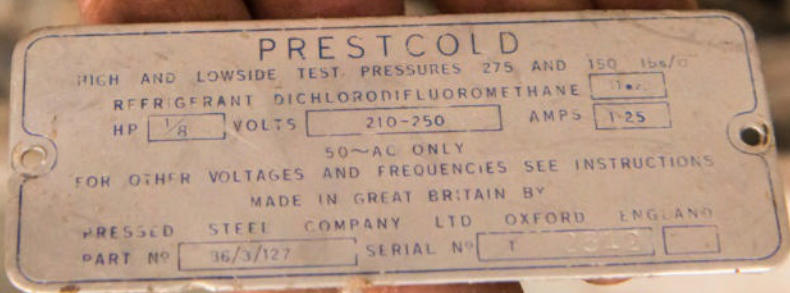
A shed for all seasons

Mark's place is equal parts workshop, man cave, and band rehearsal room. His business, hobbies, and work life merge as one. By the roller door, a primer-grey 1980 Bedford CF camper-van conversion sits up on blocks awaiting the installation of a new power-steering system. Next to it, a free-standing 1950s commercial fridge restoration project is in the mock-up stage.

On the floor, an air-cooled refrigeration unit is being tested and rejigged into an ice bank for a boutique distillery startup. Guitars, drum kits, and a PA crowd the centre, and a testing centre for finer electrical work is framed by a rack of bucket shelves filled with new appliance parts. ►



A finished 1950s Kelvinator in a custom turquoise finish, as per a client's request



Prestcold ID tag (above) and Frigidaire manual (right)

Decades of experience

With more than three-and-half decades of experience in the refrigeration and appliance trade, Mark is as familiar with ammonia plants in freezing works, giant cold-storage systems, colossal CRAC (computer room air conditioner) systems, and commercial air-conditioning and refrigeration projects as he is with residential appliances.

His passion, though, is restoring vintage fridges, which is something that he began doing when he started trading solo at the age of 25. At the time, he was also performing repairs for appliance shops, whose owners began referring to him art directors looking for period pieces. Since then, Mark has restored,

reconditioned, and repurposed fridges for everything from ad campaigns and property staging to live theatre productions such as *Death of a Salesman* and the *Evil Dead* TV series.

As well as keeping refrigeration history alive, Mark is engaged as an engineering, production, sales, and quality manager for a breakthrough nanotech catalyst called Nano LiquiTec, which he says increases efficiency in heating, cooling, and refrigeration systems by at least 25 per cent. The German-based company has recently tasked Mark with inventing a prototype micro-blender to enable in-house manufacturing across its various international outlets. ►

His passion, though, is restoring vintage fridges, which is something he began doing when he started trading solo at the age of 25

The classic styling of a Leonard icebox door





The Prestcold keg-fridge door in prep stage



Original packaging for a 1950s Astral fridge



A pre-resto door from a late '50s American Philco (made in Philadelphia)

Improvised ingenuity

At 17 years old, just six months into his apprenticeship, Mark was sent out by his boss, with a van full of tools, to work alone.

"I had to fix everything, from domestic appliances to industrial cool rooms. It was the best thing that happened to me," he says.

Servicing a largely rural sector from the Clevedon to Awhitu, Mark sometimes had no choice but to wing it. He quickly learned how to be pragmatic and creative all at once: "When you are in a milking shed on a farm, miles away from town, with no parts on hand and thousands of litres of fresh milk riding on you, you have to be able to think outside of the box. The thing needs to keep working until you can get back and fix it correctly. Refrigeration is a multi-skilled trade. It's not just the products; it's plumbing, electrical, and

construction – a bit of everything. I think it's naturally built into me too. My parents were great DIYers and my grandfather was an engineer and munitions worker in World War II. I remember his crusty workshop, the lathes and stuff. He was a crazy old bugger."

Strangest job

Mark reckons that the strangest job he did during his training was maintaining the fridge system in the Kingseat Hospital morgue. "It was an old unit and the fans went out a few times."

He remembers being called out there one crisp winter's morning: "I arrived and it looked like the scene in a '60s horror movie; the morgue was covered in fog. One of the fans had shorted out, and the fridge system was not working."

To fix a fan meant climbing in on a body tray, so Mark first checked with the



orderly that the multi-level fridge was clear of cadavers. He then proceeded to climb in. He was well into the inspection when something on a lower tray caught his eye – an unlisted corpse staring back at him.

“That,” says Mark, “was the fastest I ever fixed a fan!”

Fridge collecting

Mark's passion for classic fridge designs began in his apprenticeship, when he decided to freshen up his parents' old HMV fridge. That experience more or less prepared him for his first commissioned 'tickle up', which was also a 1940s HMV. After re-gassing and resealing the fridge, making some remedial body repairs, and adding a lick of paint, Mark was pretty proud of the result.

“I stood back and thought: *That's awesome!*”

As more fridge restorations came through the door, Mark began collecting fridges in earnest.

“I went mad for a while,” he says, “buying them out of the *Trade and Exchange* weekly paper and picking them up with the van and a trailer from the inorganics on the side of the road. I would get two or three each time.”

At that point, his workshop was a former stable close to Ponsonby Road. He got so passionate about collecting that it was soon dubbed ‘fridge mountain’.

That was before scrap metal became valuable. After that, “you would turn up and find the interiors ripped out with sledge hammers”. ►

An unlisted corpse staring back at him. “That,” says Mark, “was the fastest I ever fixed a fan!”



An embossed-leather Westinghouse manual (above); a 1950s ohm meter in original carry case (right)



Mark searching among accessories in one of his four containers full of fridges and appliances

“In the ’30s, fridges were designed by the engineers who developed the process, so they wanted to show off the motor on top”

Price and rarity

“I used to take everything I could get my hands on. I had five shipping containers full – around 150 to 160 fridges in various states of repair,” he says.

During lockdown, Mark culled the units that were too far gone and

stripped out spare parts like handles and hinges – accessories that are no longer available. He still buys fridges, but only if they are rare and the price is right.

“In some ways,” says Mark, “I think I’m rebelling against the throwaway society, plus there’s no styling in modern fridges. In the ’30s, fridges were designed by the engineers who developed the process, so they wanted to show off the motor on top.

“Through the ’40s and ’50s, the designers came from the auto industry, so they hid the motor and made doors that looked like bonnets with big chrome handles – particularly American fridges after General Motors took on appliances. My interest stops in the mid ’60s, when things changed from glass-wool insulation, which is in a cabinet you can pull apart and rebuild, to the expanded polyurethane insulation, which you can’t. That is where the construction moves to plastic rather than steel and porcelain. The process and the styling shifted to square boxes that people didn’t want to see anymore, integrated and hidden away. Before then, people were proud of their appliances.” ►



The 1920s GE Monitor Top for the former Mount Roskill fire station



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The star of the collection

The pride of Mark's stock is his 1930 General Electric (GE) free-standing, double-door fridge. GE produced the first domestic free-standing electric refrigerators in 1927.

While he has a few single-door versions from this era, he thinks his two-door model may be the only one in the country.

"Before this," Mark explains, "a domestic fridge was essentially a block of ice in a cabinet, which the iceman replaced every week. This one is all original. It's called a 'Monitor Top'; the motor is fully encased on top."

The name came about because the fridge design bore a resemblance to the ironclad gun turret on the 1860s warship USS *Monitor*.

Mark's interest does not end at the actual appliances; he also collects appliance memorabilia – from original manuals and magazine ads to fridge money boxes and tin toy fridges with battery-powered interior lights and fans. As far as promotional giveaways go, he has a cache of branded cigarette lighters, ashtrays, manufacturers' menu books, water jugs, thermometers, and even appliance models for a doll-house kitchen.



Mark checks the hinges of his 1930 GE double-door Monitor Top

Close up of the control panel of the double-door Monitor Top





The workshop with the 1950s Kelvinator three-door commercial fridge, the keg-fridge door nearly ready for vinyl cover, and the Bedford CF in the background



Checking the mock-up for the Kelvinator three-door fridge



A vintage Kelvinator badge

Three-door Kelvinator

In the centre of Mark's workshop, a late-1950s three-door commercial Kelvinator freezer is being rejigged into a two-drawer freezer unit with two separate fridge compartments, one of these alone being equivalent to a full-size fridge.

For this, he is using the existing external condenser but adding new compressors on freshly minted mounts and a customised steel frame.

"This used to have an icebox all the way through it," he says. "It originally had a cold plate at the back, all one temperature. I'm modernising it by transplanting the parts of two modern fridges. It's mocked up, ready to test. When it's finished, it will

be a self-defrosting modern fridge in a vintage cabinet."

The Kelvinator is for repeat clients, who have commissioned three classic fridges from Mark for various properties.

"Their first was a double-door '50s. Then, when they renovated the Mount Roskill fire station, I refurbished and installed a 1930s fridge for them."

The next stage for the Kelvinator is to make up the sheet-metal panels.

Mark says, "I have a company up the road that allows me to use its folder. I do as much as I can; the only thing I don't do is sand-blasting."

He admits that upcycling fridges is not necessarily cheap. ►

"When it's finished, it will be a self-defrosting modern fridge in a vintage cabinet"



Mark stands alongside the finished Prestcold keg fridge with its vinyl-wrapped Alice Cooper graphic



The keg fridge icebox door



Close up of the beer tap and drip tray



Interior of the keg fridge with a 50-litre keg in situ

"But," he says, "I guarantee the motors for the life of the compressor, and, if you look after the cabinets, they should last for at least another 50 years. Nothing is going to wear out or fall off."

Keg fridge

Another on-the-go project is a refurb of one of Mark's early 'keg fridges'.

This one was repurposed from a mid-'50s Prestcold (Pressed Steel Company of England).

While Mark reckons that the principle is basic enough – a modified classic fridge cabinet, large enough to house a beer keg; a hose through the door to an externally mounted tap, and a bottle of CO₂ with a regulator on the back to push the beer through – it is his detailed fine

finishing that sets his work apart. For this fridge, the drip tray was cut from an old fridge door using the corners of two other doors so that it was "nice and rounded". The tray had rusted out because the fridge had sat in an outside bar for 15 years. As the tray was a real effort to make, Mark says that he went to town on restoring it: "I soaked it in white vinegar to clean up the rust, treated it with a rust inhibitor, then added epoxy with fibreglass matting because it needed bogging too."

To complete the new look, an image from Alice Cooper's infamous 1970s 'gallows' stage show has been vinyl wrapped on the door, as per the owner's request. The rest is jet black with a silver speckle. ►



A Kelvinator in its bare metal "birthday suit" with a clear lacquer finish

A '50s Frigidaire being prepped for an ad campaign

The back of a Freezolux (made by Electrolux) 1930s absorption/gas fridge, with its hinged kerosene fuel tank in the foreground

Restoring and repurposing fridges

Mark says, "I enjoy fixing things that are fixable, bringing things back to life; things that will be able to be fixed into the future. Old fridges are very simple. Today's appliances are run by computers, have built-in obsolescence, and are only about 10 per cent recyclable."

The only real negative that he sees in restoring old fridges is their weight. A new compressor may lessen that marginally, but some of the larger units were, and are, three-man lifts. However, his clients get original-character appliances that run as efficiently as any modern version and are fully customised to their specifications – everything from the colour and wine racks to specific accessories. His next mission is to work out an effective way to convert an original icebox into an icemaker.

A simple test before buying a retro fridge is to check the compressor.

"In the appliance world, fridge compressors are probably the most reliable component of anything. They spin around hundreds of thousands of times during their lifetime. Old fridges were built to last; some of my fridges from the 1920s are still running. [The compressors] are a sealed unit, lubricated. If they get a leak then moisture and/or air can stuff them up; otherwise they are very reliable – particularly commercial ones. You can restore old compressors, but for the work involved there is no guarantee that the thing will last. Original compressors that work are good but they can be noisy. The modern ones look similar design-wise, and most will not need sound-proofing. Some do, but, equally, some clients like hearing the whir," he says.

Mark has some advice for anyone beginning a fridge restoration: "Mask up before starting to remove pre-plastic fridge walls. They are full of glass wool."

In older models, there could be the presence of sulphur dioxide – a natural refrigerant.

"You can smell it when you open the doors of old fridges. It is super-efficient but highly toxic – similar to ammonia. You have to bleed it off through an ammonia-water mix, which makes it inert, but you still don't want to get a whiff of it," Mark explains.



Even the freezer box of the '50s Philco has some classic automotive design touches

Ice bank

On a trestle near the roller door, Mark tests an air-cooled refrigeration unit off a 15-year-old fridge cabinet, which he is converting into a brine cooler, effectively an ice bank, for a gin still.

In this scenario, Mark is saving his client a lot of money by repurposing: “It cost \$1 to buy this second-hand fridge, instead of three grand to buy a new one with a plate-head exchange.”

As well as making the primary cooling system, Mark has added a new filter and re-gassed the unit with

hydrochlorofluorocarbons (HCFCs). The original dial, which operated the thermostat, was replaced with a new digital controller thermostat to provide a much broader range of possible temperatures.

While Mark confesses that sometimes he gets frustrated with the restoration process, and at times the work costs him, he reckons that most often, “the enjoyment of doing it and the end result outweigh the money and time spent”.

For more info, contact Mark Bedford: mbedford021@gmail.com.



Ice bank with digital controller (right-hand side) installed



Two mock-up compressors to test the '50s Kelvinator three-door commercial fridge. Once testing is complete, new compressors will be installed

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SOUTHMACH 2023

Robots have a major presence at engineering and tech trade show

By Ritchie Wilson

Machinery House was introducing several very attractive new machines

After an absence of four years, SouthMach, the engineering exhibition, returned to Christchurch. It is the largest South Island manufacturing, engineering, and technology trade show and was held over two days at Canterbury Arena, a cavernous space that has had several names over the years and is usually home to rock concerts and professional netball.

By my count, there were 83 exhibitors displaying their products and services.

Two local machinery importers, Scott Machinery and Machinery House, had large stands. Machinery House was introducing several very attractive new machines: a high-end tube bender, a shaper, a welding-fume extractor, and – the one I would have most liked to take home – a small English wheel. I had a lively conversation with Bryan Richards, the Machinery House representative, about what a useful and safe tool

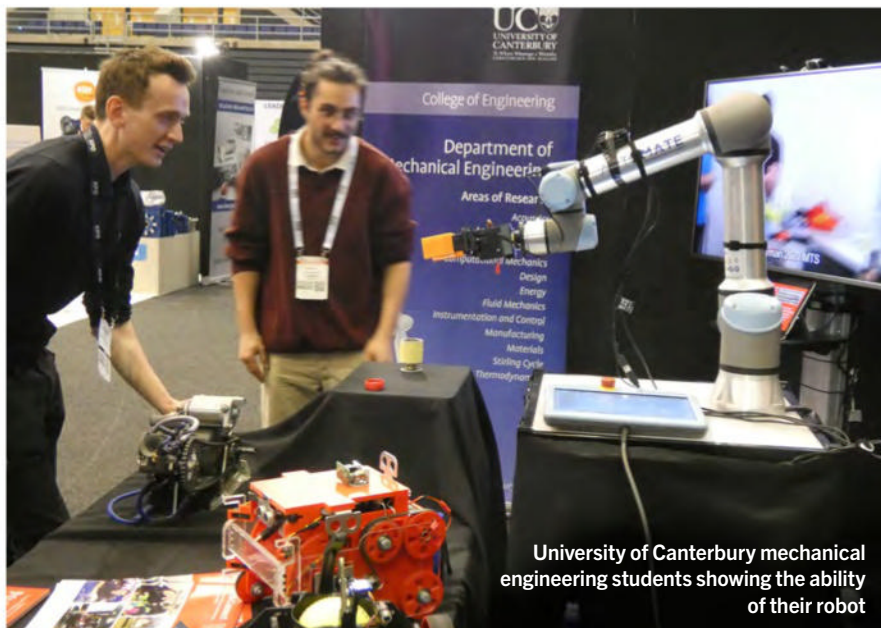
a wheeling machine is.

A couple of the very large machines at Scott Machinery's stand had 'Sold' notices on them. It was one of several stands that was too crowded for me to speak to anyone.

A friendly bunch

Everyone I chatted with at the show had interesting stuff to tell me; they were friendly and cheerful, and they struck me as being folk it would be pleasant to have a beer with. Exactly the sort of people, in fact, that you would choose to represent your company at a trade exhibition.

While in the registration queue, I struck up a conversation with a man who worked – on the tools, I guess – for a hydraulics company. Later, I saw him at an exhibit. He was telling the representative that the company he worked for had bought one of the exhibitor's CNC machines. The machine



University of Canterbury mechanical engineering students showing the ability of their robot

One of the teams uses Epicor programs to make sense of the streams of data the race cars generate as they compete

was apparently most capable, and its cutting tool was able to make the most minute progressive cuts in, for instance, the bore of hydraulic cylinders.

Robotics predominate

The way that the industrial world has been going for a generation is shown by the category listings of the exhibitors. Some of the largest categories were automation equipment, CNC, measurement and control, software applications, 3D printing, and robotics. There were robots everywhere at SouthMach 2023.

Epicor is a software company and its man, Robin Tang, explained to me the sort of industries the company works in. One is Formula 1 (F1) racing, where one of the teams uses Epicor programs to make sense of the streams of data that the race cars generate as they compete. We chatted about Australian computer magnate Dave Dicker's Rodin Cars – located in rural North Canterbury – which has just been reported in *The Press* as having F1 ambitions. We agreed that it was about time New Zealand had a team following in the footsteps of Bruce McLaren – and perhaps using Epicor software.

Christchurch firm Design Energy

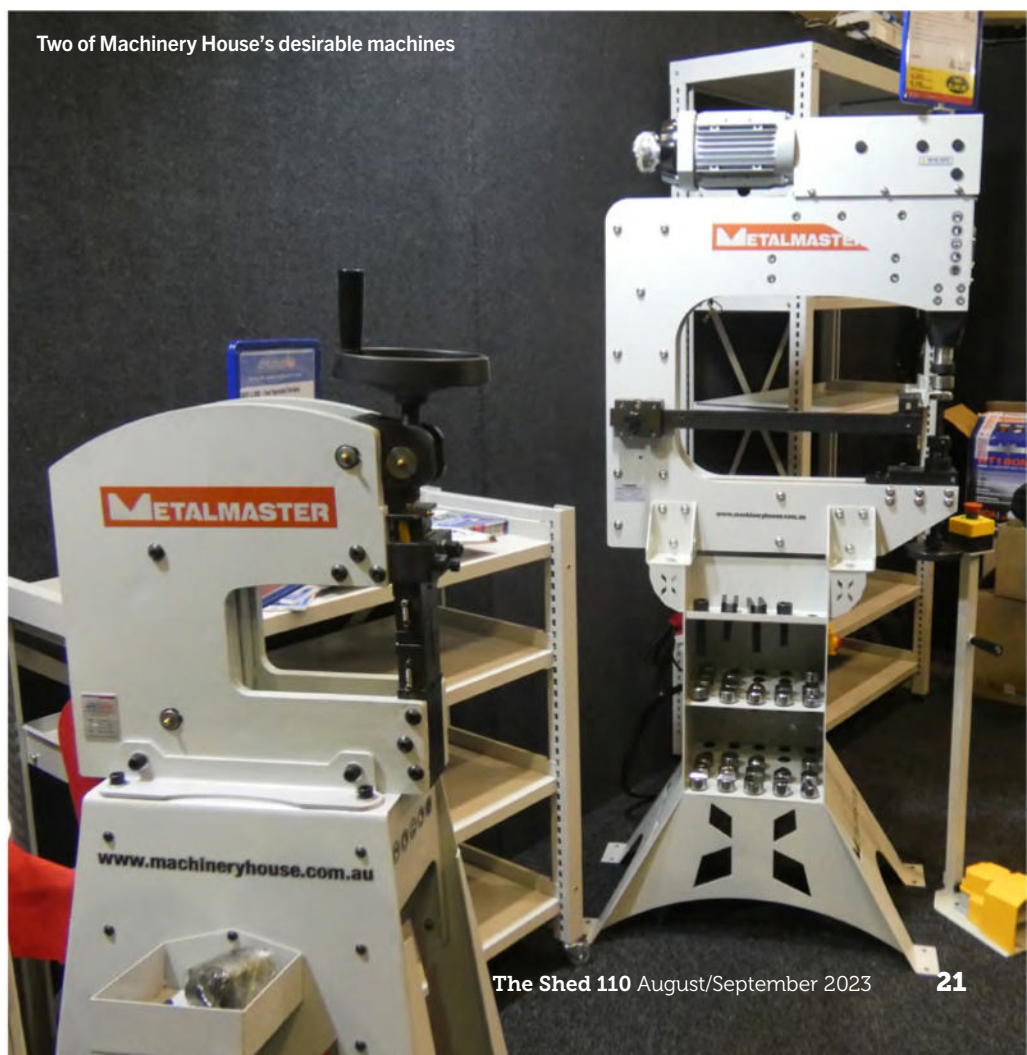
had a large site. The company provides robots for applications that are too tedious for workers to be expected to do, such as stacking cartons or production

line welding. I had seen a couple of the company's robots in action at Sutton Tools' Kaiapoi drill-bit factory before its disastrous fire.

There was, of course, a robot on the University of Canterbury Department of Mechanical Engineering's stand – as well as a large rocket. Dr Malcolm Taylor showed me images of welds made by beginners using welding handpieces that gave feedback to the operator, so that the operator could then optimise their technique and run impressively neat beads. This is called a 'tele-welding system', and it has the potential to reduce drastically the time taken for a person to become a reasonably skilful welder. It seemed like an excellent idea to me. Both Dr Taylor and I thought that becoming a mechanical engineer is a most worthwhile ambition.

Air-quality issues

Something I have become more interested in recently is air quality. My local Menzshed has spent a lot of effort installing a powerful extraction system, which takes air from around dust-producing machinery and sends ►



Two of Machinery House's desirable machines

it outside the workshop. The air quality is also monitored, particularly for the insidious, and potentially lethal, PM2.5 particles.

Industry takes air quality very seriously. One SouthMach exhibitor, Camfil, markets a comprehensive range of filtration systems. I was particularly impressed that it has systems that can remove, from a stream of gases, particles of less than one thousandth of a millimetre in diameter (PM1). Camfil's hand-held detectors can detect the presence of even tinier particles.

At Source installs systems that remove exhaust gases from Fire and Emergency fire stations. The problem these systems solve is that the fire stations fill with exhaust fumes when the fire trucks are started. The At Source system's flexible tube grips the parked truck's exhaust pipe using compressed air. When the truck is started, the system picks up the vibration and activates an extractor fan, which removes the exhaust gases that are being blown into the tube. The fan is mounted on a track on the station's ceiling, and is pulled along as the truck moves forward. The tube on the exhaust pulls off as the fire appliance leaves the station. Sensing this, the system shuts down. When the truck returns from the emergency, the crew reconnects the tube to its exhaust.

I had no idea that such an obviously useful system existed. I was told all this by Michael Malatios who, when not ably

**A friend
wants a
very small,
very quiet
compressor
to power
model
engines**

representing At Source at exhibitions, travels the country servicing the systems.

Christchurch-based Taylors Manufacturing, which has been around for more than a century (my father-in-law used to work for the company), also makes dust-extraction systems for a wide range of industries.

Impressively quiet

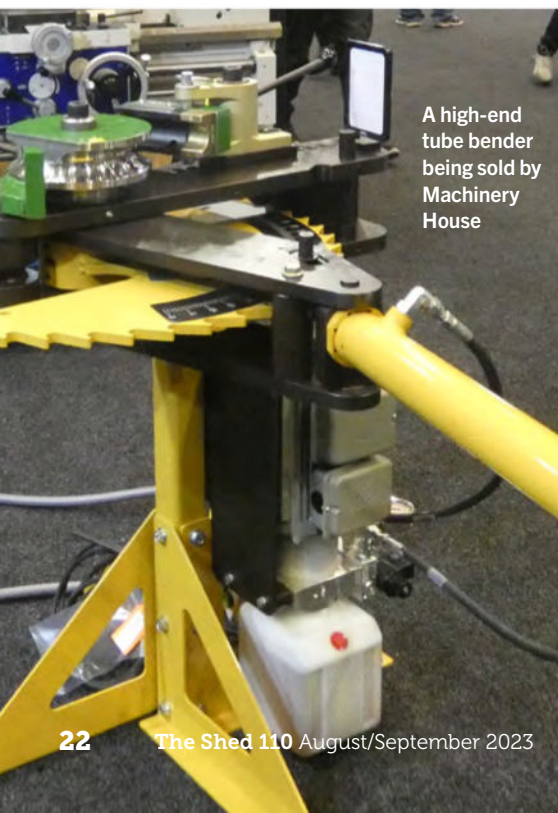
The large screw compressor that supplied compressed air to the exhibitors was provided by Shape Energy. The system ran throughout SouthMach's two days and was impressively quiet. I had a most interesting conversation with the company's representative, Neil Beeslaar, about the architecture of large compressors, the similarities and differences in different brands, and the common components, such as motors and displays, used by competing companies, perhaps based in different countries.

If Neil wrote a book on compressors, I would read it.

A friend wants a very small, very quiet compressor to power model engines. I posed the problem to Neil. He looked doubtful.

"The smallest screw compressor is 2.5kW, which is still pretty big. Anything smaller will be a piston compressor and will be much more noisy," he said. "Small and quiet don't go together in compressors." And that, I would suggest, is the final word on that subject.

I asked a number of the exhibitors if they felt SouthMach had been worthwhile for them. None of them expressed even a small doubt about its value. As a visitor interested in engineering, I found it totally fascinating. 📖



A high-end tube bender being sold by Machinery House

THE SHED ONLINE

What's happening online at the-shed.nz?

Every week, we upload new content onto The Shed website to add to the hundreds of articles and videos already on the site for readers to discover, learn from, and enjoy. Some uploads of the past few months include:

A classic car gets variable-speed wipers and a temperature gauge run by Arduino

<https://the-shed.nz/wipe-wipe-that-classic-windscreen/>



A video of a power-tool racing competition

<https://the-shed.nz/video-of-power-tool-racing-in-belgium/>



Making a bar stool is a learning curve for the TIG welding novice

<https://the-shed.nz/raising-the-bar/>



Build a hydro power plant using the motor from a Fisher and Paykel washing machine

<https://the-shed.nz/build-a-hydro-power-plant/>





FORGET BITCOIN; SHEDCOIN IS NOW THE BEST INVESTMENT

Hi Greg,
Another superb issue (No. 109) arrived in the mailbox in May. Well done to all concerned; a splendid production effort. I thought that the letter from Mr John Sanders regarding the purchase of

surplus or unwanted issues by a reader was quite amazing. In this age of throw-away everything, I have never seen any copies of *The Shed* up for sale in second-hand bookshops or indeed on auction sites. I have, I believe, every copy produced, and was lucky enough to contribute to a few of the very first magazines all those years ago under young Terry Snow, the first editor. I understand he is now living in the Netherlands and I wish him well, bless him; a lovely chap. I have decided that I am far too attached to my back copies to even consider letting them go for sale. I frequently go back to earlier issues to look up something that I want to make, or improve on an idea that someone else has had. They are

much like those old *Popular Mechanics* mags our dads had that were always around the house – the holy grail of practical magazines.

I have been considering if, in fact, I should start a new currency called 'Shedcoin' and register it on the stock exchange in competition to Bitcoin and other crypto currencies – a sure winner. These could be thrown in the bottom drawer and pulled out 20 years later and be worth zillions, just like the Microsoft and Apple shares I never bought.

Well bugger!

Best regards,

Bryce Clifford

Suburbia,

Palmerston North



MINIATURE MODELLING IS MY THING

Dear Ed.,
I've been really inspired by many of your stories on scale modelling. I'm fairly new to the game but have been inspired and pushed by some of the exceptional model makers you have been featuring in the last few issues.

These include Issue No. 109's Mad Modeller, Issue No. 106 with Ian Roberts' miniature masterpieces, the beautifully crafted remote control yachts in Issue No. 105, and George Hawkins' unbelievable model railway in Issue No. 103.

I get a big kick out of building miniature worlds, and it has been a great way to spend time with the kids. We have been creating in all sorts of different scales, from a 1:12 table for fingerboard skateboarding to 1:200 floating island creations.

I recently bought a scroll saw from a local lady who told me she builds doll-house

dioramas. When she sent me a picture of what she created, I was utterly blown away. That got me thinking about what tools were available for scale (miniature) builders like me and whether there was a company in NZ that specialises in such tools.

I believe that it is vital to have a hobby or distraction away from our busy lives, and think that these crafts where we are using our hands to create forms of art are good for kids' learning and mental health. You won't see me finishing my 4.5-metre-wide slot car track layout for a while. It's a beast!

Last but not least, perhaps there is an opportunity in your magazine to have scale modelling as a regular feature or column? Keep up the good work.

Steve Johnson

Herald Island,

Auckland



LETTER OF THE MONTH PRIZE

Every issue, our Letter of the Month winner will receive a copy of *Best of The Shed 1 and 2*. More top projects from 15 great years of *The Shed* magazine.

MAKING YOUR OWN CAMPER-VAN

With good planning, an ordinary van becomes a camper-van

By Bert Toomey

Photographs: Steve King, Bert Toomey, and Terry Snow





Converting an ordinary van to a camper-van is a project I have been talking about for some time. As a retired technical teacher, I felt that I had the necessary skills, and when a Kia Pregio van in excellent condition became available I decided to take the plunge.

The van is a 2.7-litre diesel, manual, with 26,000km on the clock and a cargo space of 2.8x1.58m. My plan was to fit the space with two beds, one each side. These can be expanded to become a double, covering the full width with a mattress on a board bridging the gap between the two side benches. Fitments include a cupboard with the sink on top and tanks for clean water and grey water below.

I had to consider what to do about the fridge – mains voltage only at this stage or a second-hand dual-voltage fridge? These are hard to come by and a lot of folk manage quite well with a mains-driven fridge. This is my first venture into a camper-van and I intend to use camping grounds wherever possible, so mains power will be available. As I intend using camping grounds, the toilet facility will be a Passport Potty.



Electrician

The van will be wired for mains electricity, to be done by a registered electrician. I shall be installing a 12V system, which will be charged by a solar panel on the roof and a mains-driven smart charger, which stops charging when the battery voltage rises to a predetermined level; I have already made this unit.

All the fitments will be made from



Melteca, which has a melamine surface laminated to both sides of pieces of fibreboard or particle board. I have organised for a pop-top to be fitted; I wouldn't tackle this myself, as it has to be done by approved installers and you'd really need to know what you were doing. Fortunately, I have had help and advice from a friend who has been buying vans for fitting out for some years, and who used to fit out vans for a living. ►



Sorting out layout; frame and floor battens installed for benches

Floor

The first job is to cover the floor with 12mm plywood. All the fitments are screwed to this.

After consulting the makers to be sure I wasn't compromising the structural integrity of the van, I took out the two panels separating the cargo bay from the driver's compartment to give access to the cab from inside the van. This meant drilling out the heads of several, heavy-gauge blind rivets. Hint: cover the seats with sheets to catch any swarf.

Next, I secured the 12mm ply to the floor of the van using 30x8mm gauge, self-drilling and tapping, CSK screws. The recommended speed for using these screws is 2500rpm, with a starting hole

drilled of about 3.4mm in diameter.

This approach may be fine for the professionals but I took the cautious approach, drilling a 3mm hole first, then giving the screws a tap with a hammer and putting them in by hand. I also slid a piece of dowel over the drill to make sure it didn't go too far, as I didn't want to drill into a brake or fuel line. The metal flooring is raised in places, and I was careful to put the screws into these 'blisters'.

As I'm not the youngest kid on the block, I'm working on my own, and I'm not keen to manage a 2400x1200mm sheet, I had the suppliers cut the ply so that the floor is made up of three pieces: a central piece and a narrower section each side.

Top

After the floor was laid, I had the pop-top fitted by Vanco, as it has to be done by an approved installer. This took about a week. When it was completed, the New Zealand Transport Agency inspected it and issued a stamped metal certificate for the vehicle – this has to be riveted onto an accessible place within the vehicle.

Interior plan

I had a photo of a professionally fitted-out van but no measurements. I spent a lot of time making scale drawings of the layout, using pieces of cardboard as scale models and remembering to keep sight-lines through the back for driving when planning the furniture.

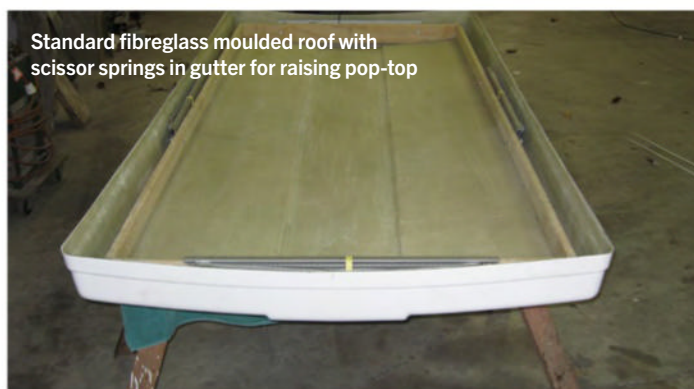


Measuring 12mm ply bulkhead

I spent a lot of time making scale drawings of the layout, using pieces of cardboard as scale models



Metal lip riveted on roof for pop-top



Standard fibreglass moulded roof with scissor springs in gutter for raising pop-top



Hauling down spring into roof fixing are (from left) John Fraser and Kim Ellery, with Rob Baillie supervising



Roof clamped while springs are located

The item on which the whole layout seemed to pivot was the fridge. It's a 147-litre, mains-only, compressor-type bar fridge, rated at 100W. Initial thoughts were to put the fridge in the middle of the van, which would give a benchtop about a metre long. However, the engine housing in the middle sticks out too far and is too high for the fridge to be fixed above it. The final layout, with the fridge near the side, was the best compromise.

The fridge is fixed to a plinth approximately 50mm high. The thinking behind this was that it would allow a current of cool air to flow up behind the fridge, which is spaced 110mm from the side of the van. A computer fan has also been installed at the top and rear, hopefully to give better ventilation in hot weather.

Why didn't I buy a proper three-way fridge? I felt they were far too expensive, and running on gas would have added further complications. The camping grounds that I will stay at will supply the mains power.

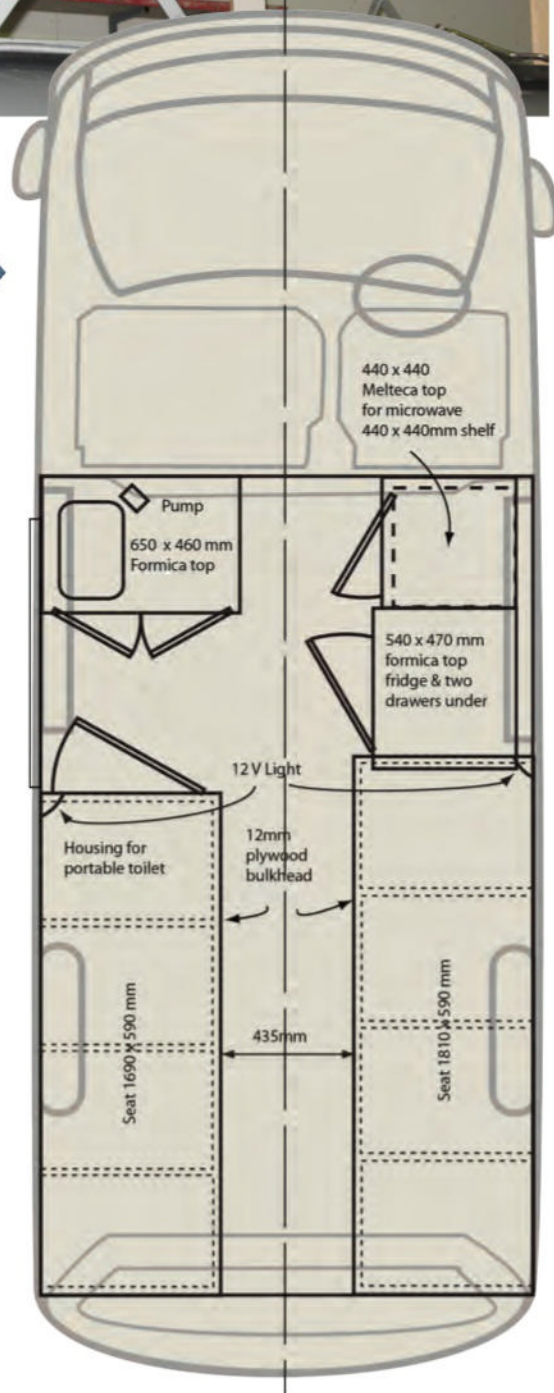
Seats

Before setting out the seats and the layout, I drew a centreline down the middle of the van. It's the same as building a boat. Then I marked the positions of the units on the floor using a builder's square to find right angles.

I drew a centreline down the middle of the van. It's the same as building a boat

With the pop-top fitted, the van wouldn't fit into the garage, so it had to be measured out in the yard. The backyard slopes in two directions for storm-water run-off and is definitely not level. I obtained van levels by lining up the heating elements of the rear window with the tops of units, taking levels from the window sills.

The floor of the van also slopes as much as 10mm in the first 400mm back from the engine compartment. It is also humpbacked, sloping to the outside edges from the longitudinal centreline. This caused problems when setting up the two cupboards, which, like the sides of the seats, are made from 16mm Melteca. I used wedges underneath the large cupboard to level it. ►





Bench progress



Fitted lids

Once I had set out the basic layout, I made careful measurements and ordered the Melteca from a cabinetmaker, who cut it to size and did the edge-banding. Fortunately, few mistakes occurred, but I did have to compromise on the height of the cupboard that has the microwave affixed to it; that dratted fridge again.

Cupboards

The cupboard by the van side door has a floor because it sticks out over the edge of the step and I couldn't have it unsupported. All the cupboards – for the sink and water bottles, for housing the fridge, and the large one for general storage – are fixed to the floor with screws and small angle brackets; the tall one is also fixed to the side of the van with 25x3mm aluminium brackets. I also anchored the fridge with a back bracket, using two lugs on the boxes, and strapped the microwave on top of its cupboard through body screws.

The fridge door is kept closed during travel with a movable bolt through a top plate I screwed on. The bolt goes down into the hole in the fridge door, built with this to allow for left–right opening.

Under the sink, grey and fresh water are stored in 20-litre plastic containers. Requirements by the Department of Conservation for camping grounds for a self-contained camper-van mean you must have the same capacity for waste water as you have for fresh



Fridge is anchored at back

water. The grey water can be drained off from the storage bottle via a tap. I chose a manual pump for two reasons: electric pumps can break down, and children love playing with buttons that control them.

Electrics

The mains wiring must be installed by a registered electrician who will/should give some sort of certificate, stating when the wiring was installed and by who.

To charge the battery, I fitted a homemade, 3A, mains-powered adjustable smart charger similar in design to those which motor caravanners often use. Later, I might fit an inverter to run the fridge, but this

You must have the same capacity for waste water as you have for fresh water

would need to be at least 600W rating, preferably 1000W surge with true sine wave output. I have put clips on this mains charger in case I need to charge another battery.

I took care of the low-voltage electrics myself. Normally, I would have fitted a deep-cycle battery or something similar but I was given a new car battery – “the charging indicator doesn’t work!” – and it will do very well for the time being. The battery is housed in a ply box screwed to the floor.

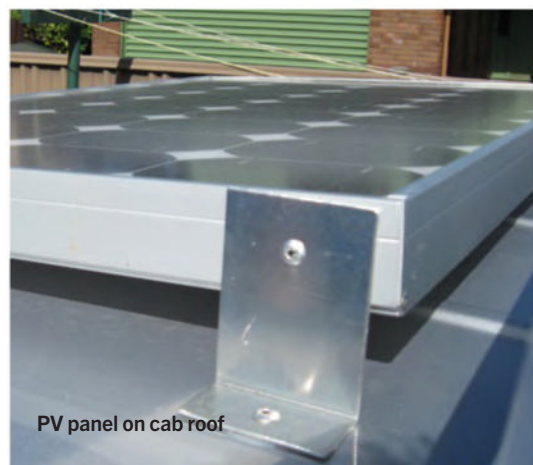
The battery is charged on the move from a photovoltaic (PV) solar panel on the cab roof via a homemade adjustable charger. This volt-transfer charger steps down the charge from 20V from the PV panel to 13.5V and cuts out when the battery reaches 13.5V. The PV variation from the sun means that the charge floats on and off and enables the battery charge to cycle up and down; otherwise the battery would eventually run down completely. ►



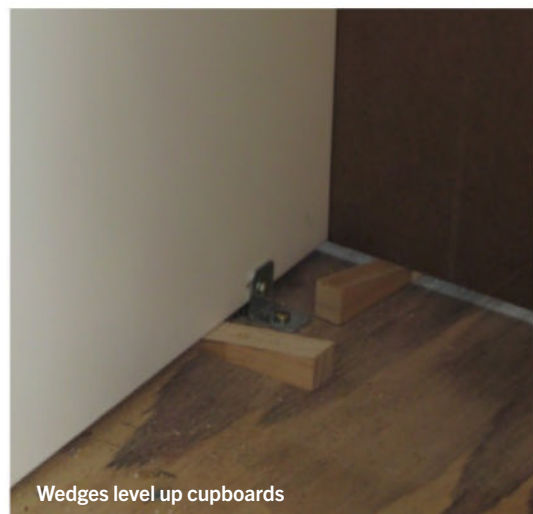
Battery box with mains charger (back) and PV charger (grey box)



Kitchen set-up — note cupboard floor to support it over the step



PV panel on cab roof



Wedges level up cupboards



Full bed set-up



Tucking in canvas



Lowering the pop-top

I have enjoyed fitting out the van. It's been a big learning curve and an eye-opener

Finishing

I fitted two lights on advice from a friend, who recommended this from experience. To run the wiring to the light near the door, I routed a shallow groove in the floor and covered it with aluminised gaffer tape. Hint: cover the wiring with a narrow strip of greaseproof paper first; this will allow the wiring to be pulled through if need be.

The van has bench seating for three people in the camper section. The backs of the bench seats also fit in between the main squabs, giving two

single beds, a double, or a king-size.

I have enjoyed fitting out the van. It's been a big learning curve and an eye-opener as to what things cost these days. Having the pop-top and mains power socket fitted cost \$5400. To date, I have spent a further \$3600 on materials and having the mains wiring done. I expect the carpet and an awning will set me back around \$250. I have been very fortunate in that various folk gave me help when I needed it, along with screws, hinges, the curtain track, etc., and good advice, for which I am very grateful. 📦



Bert Toomey: enjoyed fitting out the van. Pop-top canvas has summer ventilation built in



Convert-a-ball

This bolt-on Convert-a-Ball pintle hitch and ball mount combo is ideal for heavy-duty towing, retaining the ability to tow with a standard coupling. It includes three interchangeable, stainless-steel hitch balls with towing capacities from 3500lbs to 10,000 lbs, and a pintle sleeve adapter (GTW 25,000 lbs). The polyurethane interior acts as a shock absorber. The double-engagement, rust-resistant locking system converts quickly from pintle to standard ball mount — no tools needed. Convert-a-Ball is made in America. Call 0800 698 227 for where to buy, or more information.



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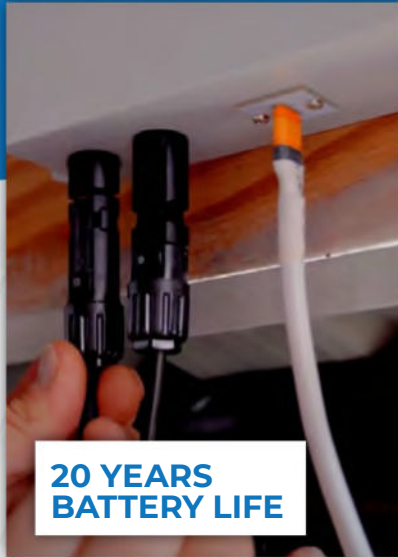
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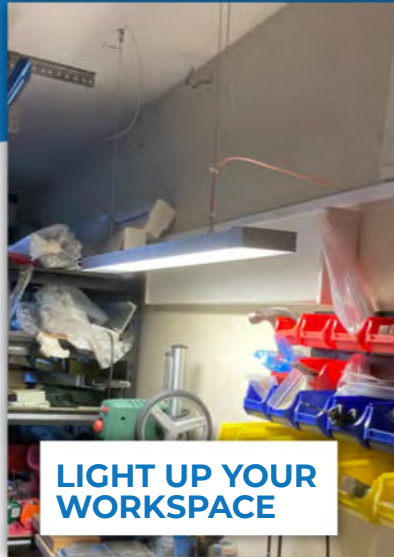
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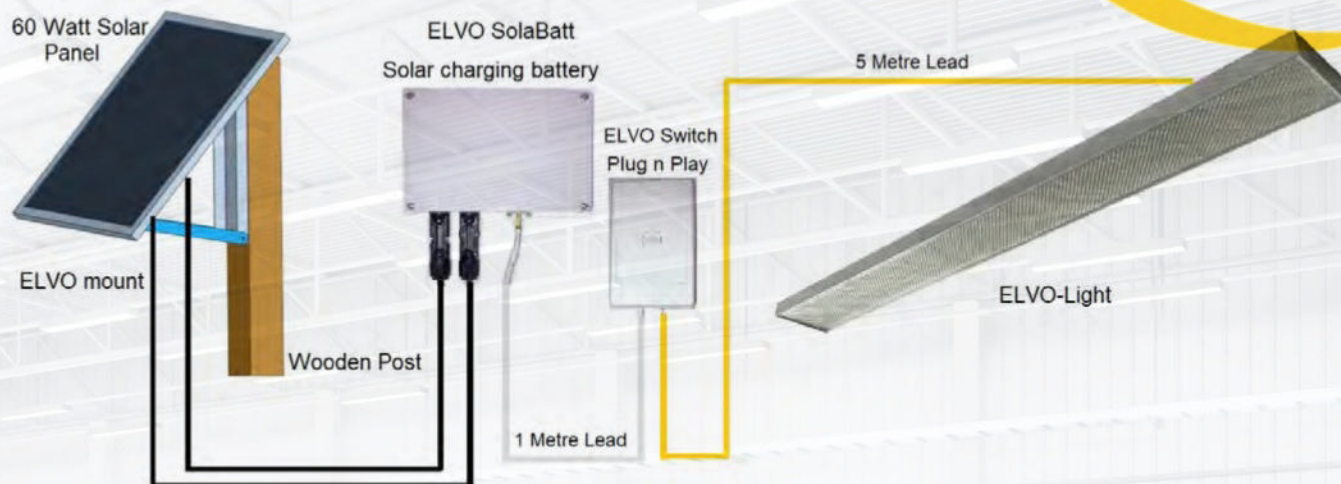
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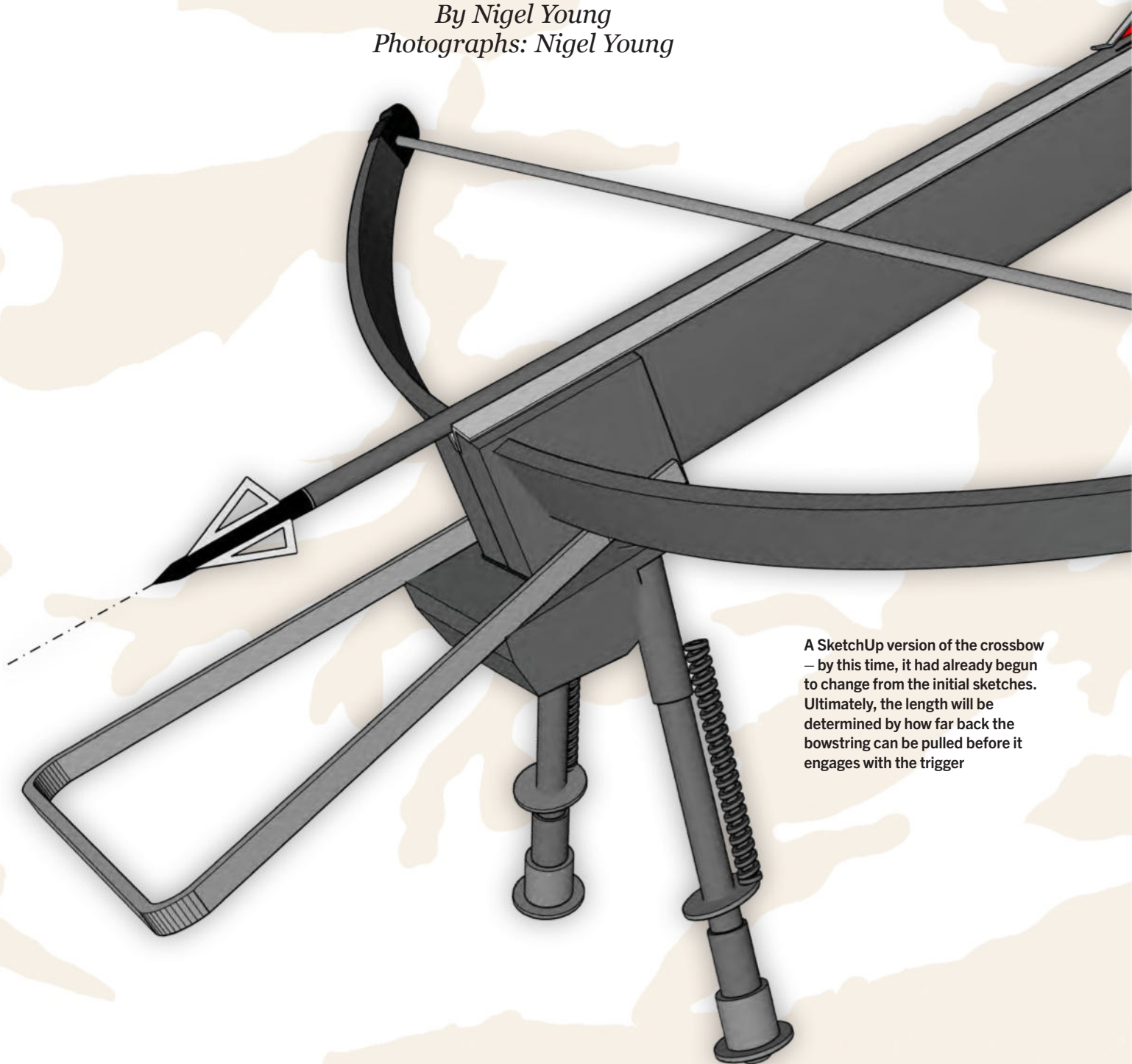


CROSSBOWS

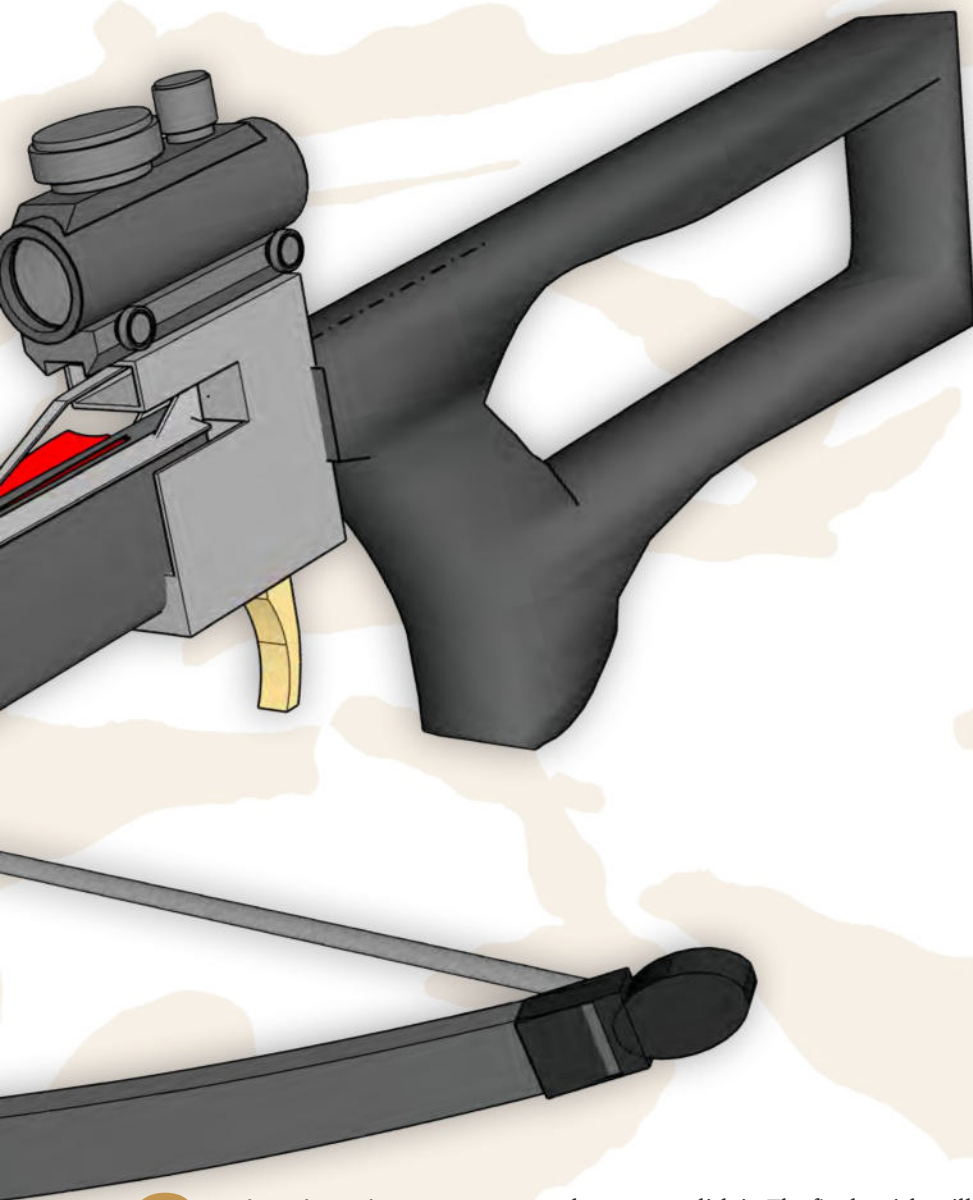
VERY OLD, VERY COOL, VERY LETHAL

This DIY project is imbued with history and tradition – a weapon that has been used in warfare and by hunters for more than 2000 years

By Nigel Young
Photographs: Nigel Young



A SketchUp version of the crossbow – by this time, it had already begun to change from the initial sketches. Ultimately, the length will be determined by how far back the bowstring can be pulled before it engages with the trigger



Crossbows have always fascinated me. As a weapon, they transformed warfare from around 650BCE through to the beginnings of gunpowder-based firearms; as a project, they have all sorts of interesting challenges.

Just because they fascinate me, however, doesn't mean that I know anything about them, but I'm a designer, so – in the words of Jeremy Clarkson – how hard can it be?

This article will take us from determining the nature and extent of my ignorance on this subject, through some sketches that I've drawn up to help me understand it, and finally to a foam-board mock-up of what I would like to achieve.

The next article will be about the design itself, based on what I'm aiming for – pun intended – and what I need to

do to accomplish it. The final article will be about the build itself. I'll be running through costs as I go, and explaining why I spent money where I did, and ultimately we'll test it.

I have added a sidebar outlining the legal and responsibility issues around the use and abuse of crossbows. I've included the seven safety rules for firearms – they apply equally to crossbows or longbows.

For more information, go to firearmssafetyauthority.govt.nz/firearms-safety/7-rules-firearm-safety.

I intend to make as much as possible myself; however, I will buy some parts. Some time back, I bought a trigger mechanism through AliExpress for around \$15. My only other cost to date has been \$11.95 for a piece of 510x760mm foam board from a local retailer.

The jargon

Like most things, crossbows have their own terminology. It seems that I'm an 'arbalester' who makes 'arbalests' – crossbows. Arbalests fire arrows – also known as 'bolts' and 'quarrels', the latter presumably named because afterwards there weren't any more – quarrels, that is. Perhaps it's a bit like calling a Colt .45 revolver a 'peacemaker'.

The bow itself is called a *lath* or *prod* – I'll use 'prod' throughout – the body is the 'stock' or 'tiller', and the entire firing and release mechanism and its components are referred to as the 'lock'. To avoid confusion, I will refer to the body of the crossbow as the 'tiller'; 'stock' will refer to what I would call a rifle stock – from the shoulder to the trigger.

Responsible hunting

There is no 'one size fits all' crossbow, as any brief search of the internet will soon show. So, part of the exercise is to determine what you want to use it for. For me, it's the opportunity to make what has been in my mind for a while, and to shoot at targets or perhaps rabbits and the like. I'm not a hunter as such, so for me it's about the crossbow itself as opposed to any singular intention.

For those who are hunters, using a crossbow on Department of Conservation (DOC) land comes with strict conditions – I've reproduced them following, as specific design criteria must be adhered to. These apply to drawing weight, multi-bladed heads, minimum length of arrows, the need for a safety device, good hunting practice – and no depleted uranium tips and the like.

DOC's minimum criteria:

- minimum drawing weight factor: 150 pounds (68kg)
- minimum diameter of multi-bladed head: $\frac{7}{8}$ inch (approx. 2.2cm)
- minimum length of complete arrow: 16 inches (41cm)
- only non-barbed hunting arrows are permissible
- hunting arrows must not be placed into a loaded crossbow under any circumstances unless the target is located. Crossbow must have a positive mechanical safety device in working order
- arrows with any poison, explosive, or other chemical substance on or in the head or shaft are not permitted. ►



Initial sketches, trying to understand the dynamics of what is happening. I watched some YouTube slow-motion videos of what happens when the trigger is pulled – they are a reminder of the forces involved and the need to err on the safe side. If the prod were to break at the moment of release, the result could be catastrophic

Note: The DOC uses the term ‘arrow’ as opposed to the more correct *bolt* or ‘quarrel’. Note also that archery uses imperial sizes instead of metric. To avoid confusion I’ll use *bolt* instead of ‘bolt’ during construction (note the use of italics to distinguish between the two – I’ll use this convention for all the crossbow components).

I made enquiries with DOC around these criteria, but at time of submission my emails had not been responded to. For more information go to doc.govt.nz/parks-and-recreation/things-to-do/hunting/permits-and-licences/bow-and-cross-bow-hunting/.

Design implications

The one that surprised me the most – another ignorance hurdle identified – is the *bolt* length at 16 inches (41cm) minimum. I had intended to use shorter *bolts* because I was concerned about the

whole thing getting too big. Amazon lists *bolts* at 6½ inches (16.5cm) – around the size I had been considering – as does AliExpress. These, it turns out, are intended for mini-crossbows, a whole other subset. So, if I want to use my crossbow on DOC land, I have to allow for a 16-inch minimum length *bolt*.

That is one dimension determined by a third party. There are others – the depth of the rifle stock to accommodate the drawback mechanism that I have been considering, for example. What also needs to be understood is: the longer the *bolts*, the further back the *prod* must be pulled, and the greater therefore the draw weight factor and the impact all this has on the components and materials used throughout. To that end, I should consider catering for a 24-inch (61cm) *bolt* – the longest one I could find online. That means about

25–26 inches (63.5–66cm) in front of the trigger barrel pins, depending on how that finally comes together.

Having to cater for longer *bolts* had an impact on the length of the crossbow, as it now went from its original 7.6cm to 9.85cm, allowing for an approximate 5cm overhang for the largest *bolt*.

Finally, the need for a proper safety device is listed. I had been thinking about this, and my initial thoughts were to 3D print a ‘cap’ that would go over the barrel pins on the trigger mechanism and would simply not allow them to separate once the trigger was pulled. Another option is a pin that prevents the trigger from being pulled in the first place. That’s another area that needs more research.

Rules and regs

Watching YouTube how-to videos (one example being a crossbow made from

timber with a PVC prod held in place with leather) is all very well, but they don't have the emphasis on rules and regulations that apply – ultimately, it is a weapon and that must always be at the forefront of its design and construction. I made one when I was about 12 out of a length of 75x50mm timber using a fibreglass rod for the prod, and fixed it using fencing staples, if I recall correctly.

If the crossbow is only to be used for target shooting in your own backyard, I guess it's not so critical, but, once public land enters the picture, there must be standards and limitations to ensure the best outcomes for everyone.

The process

Doing the sketches helped me identify a number of separate processes to consider:

1. The stock will be open, as I want to be able to put my hand through it and around a decent grip. I've also decided that I want to mount some form of bowstring drawing mechanism within it.
2. The prod – what should its configuration be? What size, draw weight factor, and materials should I use in its construction?
3. A foldaway stand at the front – could this double as a foothold when drawing back the bowstring?
4. The positioning of the trigger mechanism seemed to me to create

a weak point, as effectively I had only about 3cm of depth from where the mechanism is fixed to the stock to accessibility of the trigger itself.

5. The seat/guide for the *bolts* and how to accommodate the bowstring. This also includes their size and nature.

Other issues may arise as I progress.

Four that come to mind are:

1. two fixing positions for a shoulder strap
2. a position for a sight of some sort – possibly using the fixing points for the trigger as the back sight. The front site would be incorporated in the prod fixing mechanism
3. a method to lock the *bolt* in place prior to release
4. whether the *prod* could be folded or removed for ease of storing or carrying until required.

Where to begin

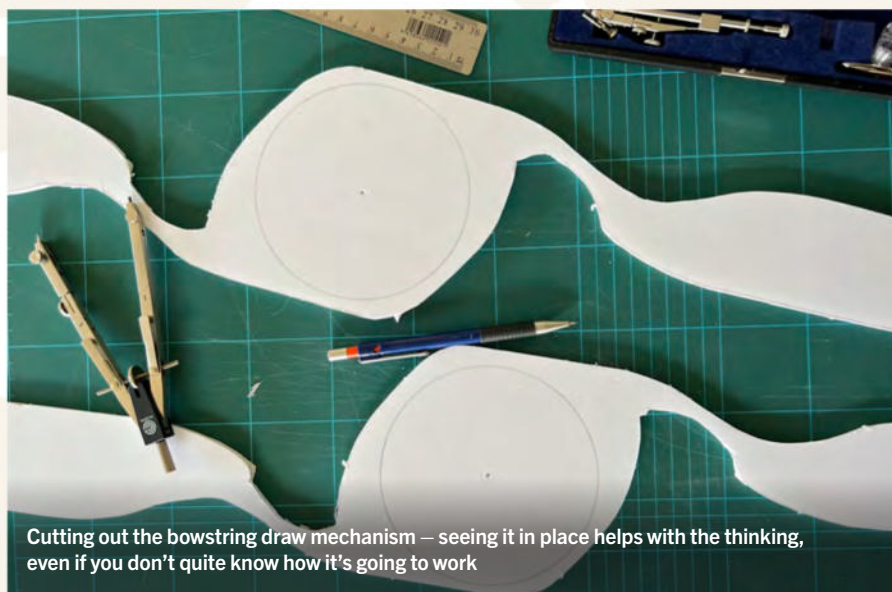
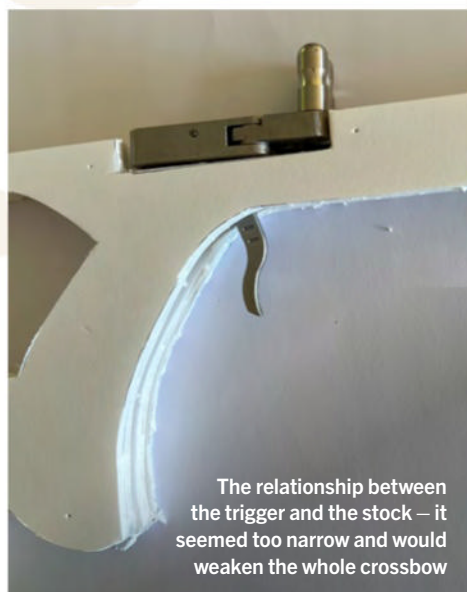
It's one thing to sketch something; it's another to make it. The foam board was 5mm thick, which was a useful thing to know, as I wanted to keep the overall width of the stock to no more than 4–4.5cm – after that, it seemed to be extra weight with no benefit. Keep in mind that this could well be my first ignorance hurdle – that extra width may well provide stability down the length of the tiller. Time would tell.

The foam-board method was also ►

Once public land enters the picture, there must be standards and limitations to ensure the best outcomes for everyone



Cutting out the first of the foam-board templates to get a sense of how it would look. This process is well worth it, given that the foam board only cost \$12



It will need a decent mounting mechanism to take the pressures and strain under both load and release

useful, as I had been thinking about making the crossbow by laminating together several templated stocks and tillers, which would allow me to modify the whole design easily, on the fly. One place this thinking would apply was the bowstring mounting and drawing mechanism – the lock – while another was the positioning and fixing of the stand. I can put small M4 or M6 bolts through them to make it easy to disassemble in order to fine-tune it as I go. Once I'm happy with its performance, I can glue the final version together if I so desire.

The first step was to translate my 1:1 sketches across to the foam board. For that, I used the end of a small artist's paintbrush to impress the lines through the sketch and onto the foam board. Old-fashioned carbon paper would be another

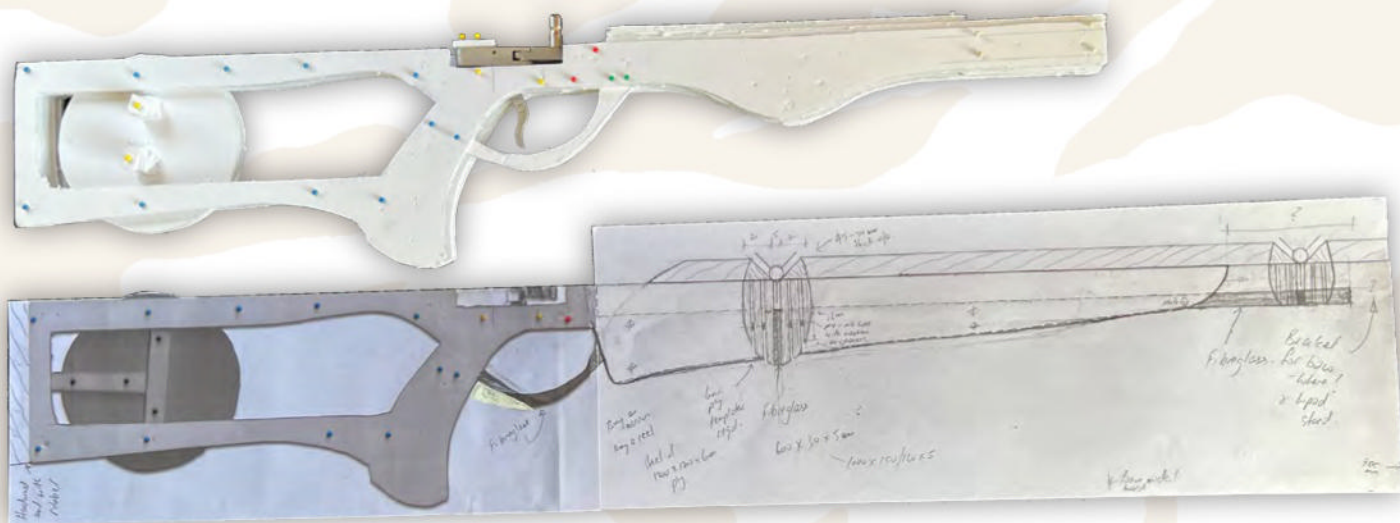
way of doing it, but I didn't have any on hand.

The trigger mechanism is 7.5cm long and 2.5cm wide (3x1 inches) while the depth of the trigger 'body' is 1.2cm (½ inch). This is the main part to accommodate within the stock; the trigger and the twin barrel pins – for want of a better term – are what do the work, and need to be easily accessible. They are 6cm and 2.5cm long, respectively.

The trigger uses a spring-loaded mechanism that simply releases the two barrel pins when pulled. It feels quite substantial in your hand, and, when added to a foam-board mock-up, makes a significant difference to the weight. At first, I thought I had bought the wrong thing, a suspicion that lingered throughout the project. This will be covered in the subsequent articles.

At this stage, tools and materials were very simple:

1. one sheet of 510x760x5mm foam board. I used white, as it was easy to write on and measure for any marks as needed
2. one packet of map pins that I found in a drawer. I ended up colour-coding the mock-up with the different-coloured pins – I'm not sure if that will be useful, or if it says more about me than I would like
3. a cutting board – I used a large green cutting mat, as it has useful guides that help to keep a cut line straight
4. a sharp cutting knife
5. a metre-long steel ruler
6. a pair of scissors
7. an artist's paintbrush – or anything thin with a rounded end
8. both single-sided and double-sided tape
9. a soft pencil to go over the outlines that I had pressed through into the foam board
10. some correction fluid in case I make a mistake that can't be rubbed out or cut out – it works well over toner
11. the trigger mechanism that I had bought, as I'm designing the crossbow around it.



The original foam-board mock-up against the extended 1:1 drawing. This eventuated in a second mock-up, having learned much from the first one

Cutting out the stock and tiller

The next step was to cut out four templated copies of the stock and tiller, giving me an initial thickness of 2cm to start with. The stock didn't include the trigger guard, as this was also going to be mounted inside in the same way as the stand and bowstring draw mechanism.

The length of the stock and tiller was determined by the foam board – 760mm long. This, however, isn't sufficient to allow for a 16-inch (41cm) minimum *bolt* – to achieve that I need to add about 80mm; to allow for a 24-inch (61cm) *bolt* – another 8 inches (20cm) – meaning a final length of 9.85cm if I'm to accommodate its entire length.

One big advantage of starting with a mock-up is that you can position parts without having to understand how they will eventually fit and look. This applied particularly to the bowstring draw mechanism mounted within the rifle stock – I didn't know how I was going to achieve that; however, having it mounted as if it were already there would help me to work it out eventually. My initial thinking around this was to use a geared fishing reel – time will tell if I'm right. This, however, will also have an impact on the depth of the stock in order to fit the reel, so that can't be determined until an appropriate reel is purchased – another example of the design being directed by a third-party component.

The prod was just pinned to the front to help with visualisation – it will need a decent mounting mechanism to take

I now had an updated 1:1 picture, which proved to be very useful

the pressures and strain under both load and release. I also need to buy a 24-inch (60cm) *bolt* to establish its position and how it sits prior to being released.

The fishing reel as the bowstring pullback device seems like a good solution. **There are several factors to consider here:**

1. The mechanism needs to be geared.
2. The mounting bracket needs to be as short as possible, given space limitations.
3. A left- or right-hand version ensures maximum usability.
4. It needs to be as narrow as possible.

The advantage of the fishing reel

One advantage of using a fishing reel is that its mounting bracket makes fixing it to the rifle stock so much easier. I had envisaged making a mounting bracket in the form of a 'T' rotated 90 degrees, as can be seen on my mock-up, so that was both the means and the method dealt with together.

As to the bowstring, it can be bought,

but I'm considering either Kevlar string or a nylon deep-sea fishing leader – although the latter is liable to stretch; perhaps a combination of two? The bowstring will need to accommodate a small flat section to fit into the nock of a bolt, which in turn will have a single extension that goes back through the barrel pins to a notched catch that is held back against them until the trigger is pulled and the catch is released. That's the theory anyway – we'll find out if it works in the next articles.

Accessing the upgrade

To visualise the 'upgrade' to a 24-inch *bolt*, I scanned the stock end of my foam mock-up, photoshopped the shape to tidy it up and to remove the areas that were empty – the trigger guard and the stock – and then saved the file as a PNG.

PNGs are one of my favourite graphics formats, as they allow for both transparency and scalability. I imported this file into Apple Pages, scaled it to the right size, turned on the drop shadow, which emphasised the empty areas – the trigger guard and the stock – and printed it out on my A3 printer. This picture took me from the shoulder end of the stock to just past the trigger mechanism. I used double-sided tape to stick it to a piece of A2 paper, measured out the impact of the new larger sized *bolt*, and then drew on it the shape I wanted as an extension of the stock picture. The only thing left to be resolved is the composition and placement of the prod itself. I now had an updated 1:1 picture, which proved to be very useful. ►



The second foam-board mock-up, a wooden version that can be used once the final length is determined, and the 1:1 drawing showing the position of the bipod, a foot stirrup, the trigger, a bolt, and a repurposed strap from a laptop bag

Conclusion

The apparent glamour of a crossbow can't be allowed to mask its lethal nature – crossbows are often used for hunting. That I can understand, due to their quiet action along with the ability to retrieve the *bolt* for use again later. Is that second assumption another ignorance hurdle? Again, time will tell.

Any weapon, if used improperly, will end in poor results and potentially unintended consequences – consequences that may well find the user in court on various charges. The onus then is on the user to observe the

same rules as firearms users, the most important being 'identify your target', which means being just as aware of what's behind your target as of the target itself – as there's a good chance that a *bolt* won't just stop when it gets to the target.

The crossbow appeared first in China, around 650BCE, according to Mike Loades in his book *The Crossbow* (ISBN: PB 9781472824608). The fact that there are modern military versions of crossbows reminds us that it is still a formidable weapon, and must be treated accordingly.

Part two of this project will appear in the next edition of *The Shed*: Issue No. 111, October–November 2023.

Disclaimer: This and the subsequent articles are about my experience in researching and designing a crossbow, and I am sharing the information as a writer for The Shed, for the benefit of the magazine's readers. If anyone makes a crossbow on the basis of this article, I'd like to hear about the attempt and its outcomes, but I cannot be held responsible for any failures, mishaps, or consequences arising from someone else's efforts and experience in making one. That rests solely with the maker. 🏠

Rules for crossbow use

Hopefully it goes without saying that a crossbow is a weapon – one with a very long and brutal history. As with firearms, there are rules and procedures regarding crossbows; failure to follow them may have devastating consequences.

At this point, Aotearoa New Zealand does not require either a licence to buy and own or to register a crossbow. The New Zealand Police website points out that, although a licence isn't necessary, crossbows are still regarded as an offensive weapon under Section 202A of the Crimes Act.

According to Jason Bruce – District Arms Officer Canterbury for the recently

formed Te Tari Pūreke Firearms Safety Authority – the mantra surrounding ownership is 'intent', which he defines as "lawful, proper, and sufficient purpose".

I have listed following the seven basic rules of firearms safety – modified from a crossbow perspective – as outlined in the *New Zealand Police Firearms Safety Code*: firearmssafetyauthority.govt.nz/sites/default/files/2022-11/Firearms%20Safety%20Code%202022.pdf.

They are:

Rule 1: Treat every crossbow as loaded.

Rule 2: Always point a crossbow in a safe direction.

Rule 3: Load a bolt only when ready to fire.

Rule 4: Identify your target beyond all doubt.

Rule 5: Check your firing zone.

Rule 6: Store and transport crossbows and bolts safely.

Rule 7: Avoid alcohol and drugs when handling crossbows.

The other party with rules around crossbow use is DOC, as outlined earlier. See doc.govt.nz/parks-and-recreation/things-to-do/hunting/permits-and-licences/bow-and-cross-bow-hunting/.



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ALIBRE 101

And, just like that, it all comes together

By Bob Hulme
Photographs: Bob Hulme



Fig. 1. A 1961 Lotus 20 with dimpled hole bulkhead

In this, part seven of our Alibre Atom 3D series, we will look at how assemblies can be shown. There are two methods for making assemblies in this program. The first is called 'bottom up', whereby the separate parts that come together to make an assembled product are already designed. The second is, not surprisingly, called 'top down'. This allows parts to be designed as the assembly is created, and parts can be configured to suit the other component parts as they are fitted together. This does not mean that parts cannot be altered when the bottom-up method is used. In fact, it's not difficult at all to change each part when you find a problem – such as parts not actually

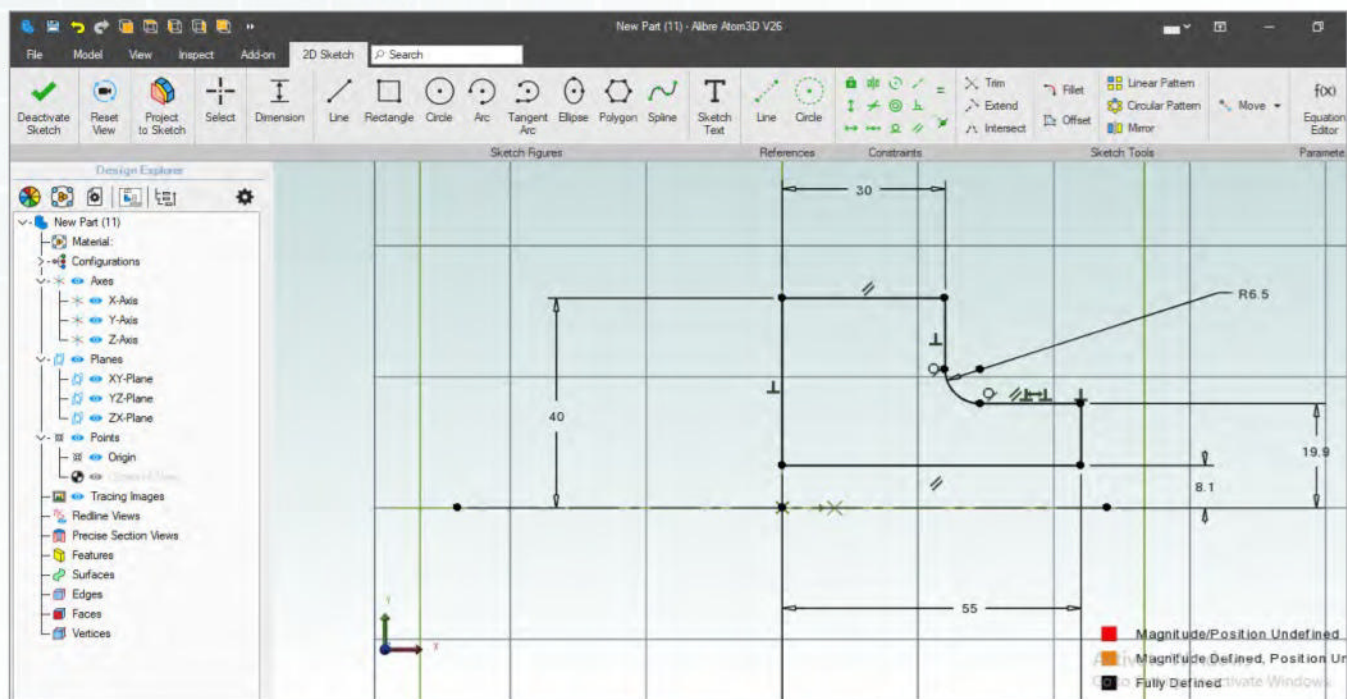


Fig. 2. Male die dimensions

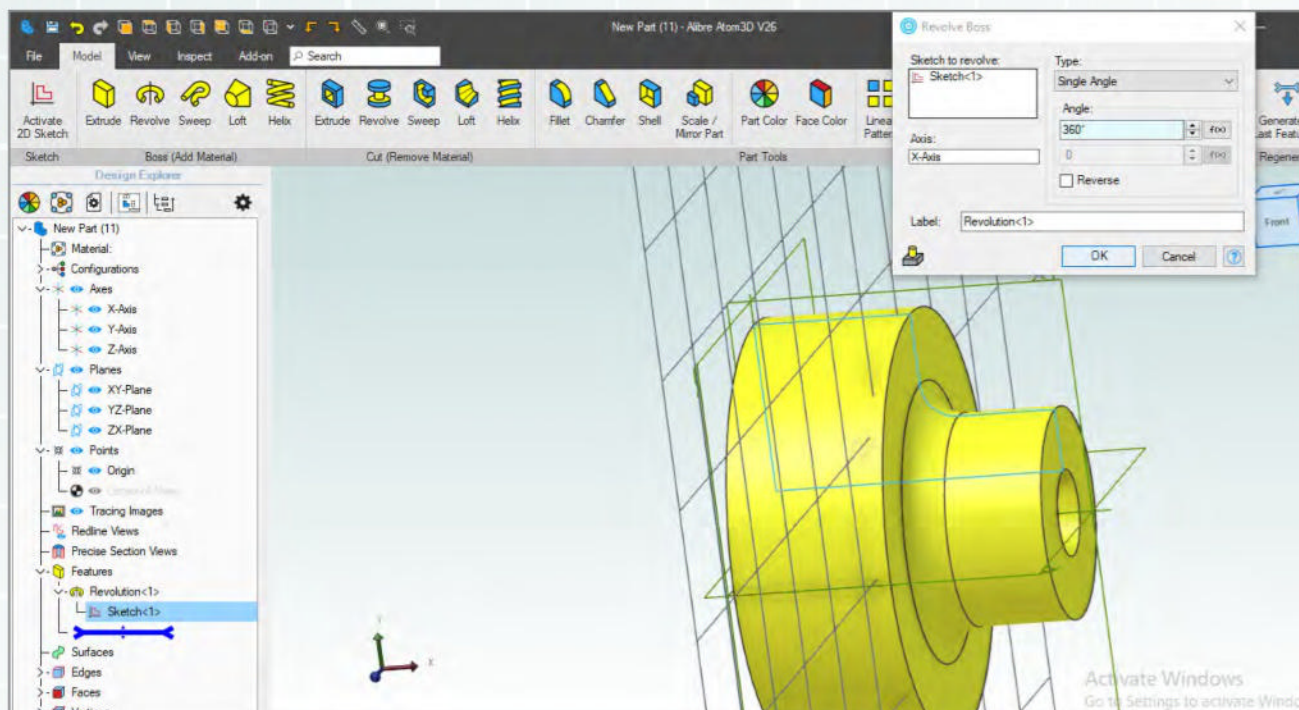


Fig. 3. The rotated solid

fitting together. However, it does mean that you have to open the Individual Part file to make the changes and then update the assembly. We will use bottom-up assembly for the purposes of simplicity.

A handy tool

The example for this exercise is a tool for improving the strength of a lightened sheet-metal panel. Sheet-metal panels are often drilled to reduce weight – typically in aircraft and racing cars. To restore the lost strength and actually increase the rigidity of the panel, the edge of the holes can be rolled (Fig. 1).

Depending on where you were

brought up, this is called either ‘dimpling’ or ‘flaring’. The tool has two main parts, which are used on either side of the sheet that forms the metal to shape when squeezed together as a central bolt is tightened.

The aim of the tool in our example is to dimple 40mm holes that have already been cut out of a 1.2mm thick mild-steel sheet panel.

Creating the parts

The male die will be designed first. I will not go into too much detail on how to do these designs, as previous parts of this series have already covered that,

but I will quickly run over the steps.

Make a sketch on the XY plane as shown and dimension it so that a closed sketch results. The dimensions are shown in Fig. 2. Close the sketch and do a 360-degree rotational extrude around the axis. This should look like Fig. 3.

Click on File in the top left corner of the screen, and then on Save As. Name the file ‘40mm Dimpling Die Male’.

Next create the female die. Fig. 4 shows the dimensioned sketch and Fig. 5 shows the finished die, which has been made into a revolved solid. Save it as ‘40mm Dimpling Die Female’.

Bolting ahead

Hopefully, it is all coming back to you and you are finding this easy. Better still, this is boring for you because you have been using your Alibre program so much since the last issue of *The Shed!* The bolt is what we will tackle next. This will be a two-sketch job, with one sketch for the cylindrical shank of the bolt and the other for the hexagonal head.

Horses for courses

Some 3D CAD programs have libraries for standard items such as bolts, washers, and nuts. However, that costs money. It is worth getting a more expensive version if you are using the program every day as part of your occupation, but for home use it is debatable. The Atom 3D version of Alibre is aimed at home users and is priced to suit that market. ►

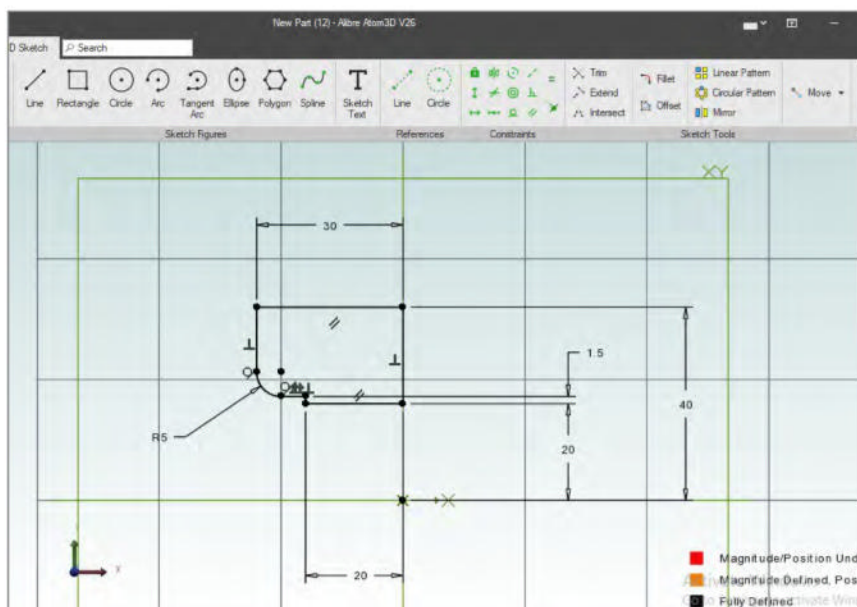


Fig. 4. Female die dimensions

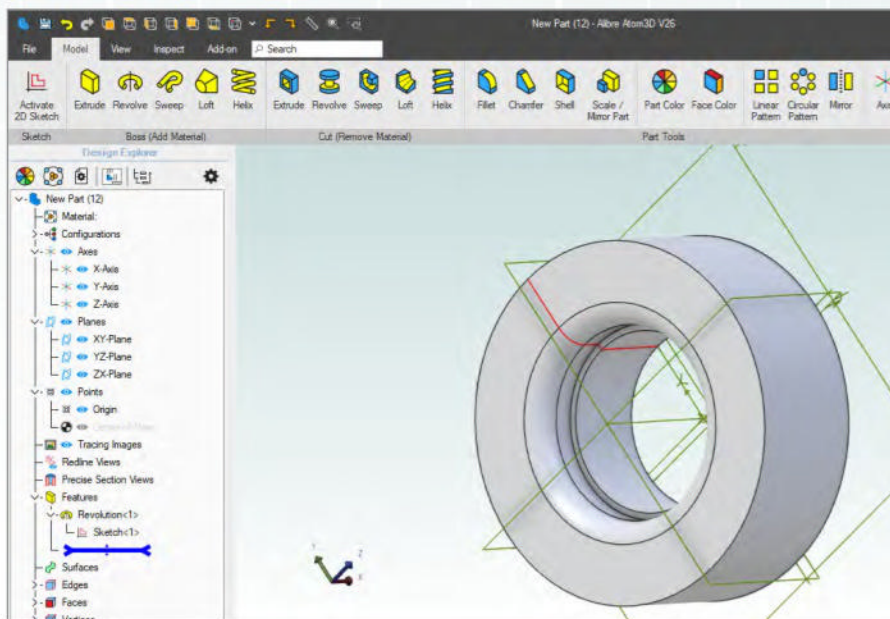


Fig. 5. Female die completed

So, we will create a bolt ourselves. This brings us to another capability that is only in the professional versions of Alibre. The tool for creating a screw thread by entering the thread type and size alone takes a big chunk of processing and therefore computing capacity. It is my understanding that the required computer size to download Atom 3D if it had that function included would rule out many home computers. So, again, it is developed to suit the home/hobby market.

Making our own

Activate a sketch on the XY plane. Use the Circle tool from the Sketch tool ribbon and draw a circle of any size, making sure that its centre is on the origin point. Dimension it to 16mm diameter.

Close the sketch and use the Boss Extrude tool to make a solid cylinder that is 60mm long. Then make a sketch onto one end of the cylinder and use the Polygon tool to draw a hexagon that is 24mm across the flats. Extrude the head 13mm from the end of the cylindrical solid. That is our bolt.

If you would like to make it look a bit more realistic (and why wouldn't you?), add a machined chamfer on the top of the hexagon head. This is different to chamfering the edges.

To give the realistic machined look, make a sketch on the YZ plane and make a triangular sketch as shown in Fig. 6. Close the sketch and use the Revolve Cut tool from the tool ribbon to machine a bevel on the end of the bolt head just as would be done using a lathe (Fig. 7). You can use the Chamfer tool for putting a 2mm or similar chamfer on the end of the bolt shank to complete the look.

Save the bolt as 'M16 x 60 Hex Bolt'. We will need a nut too. Create that by sketching a hexagon with the same A/F size as the bolt head, extrude it to 13mm long, create a plain 16mm hole through it, then apply the bevels to each side in the same way we did the bolt head. It will also look right if you use the Chamfer tool to chamfer the edges of the hole at each end. Save it as 'M16 Hex Nut'.

Finally, create a special flat washer 55mm outside diameter with a 16.2mm bore and a thickness of 5mm. Save it as 'M16 Heavy Wide Washer'.

That was fun and quite straightforward, wasn't it? Now the real fun starts, as we put it all together.

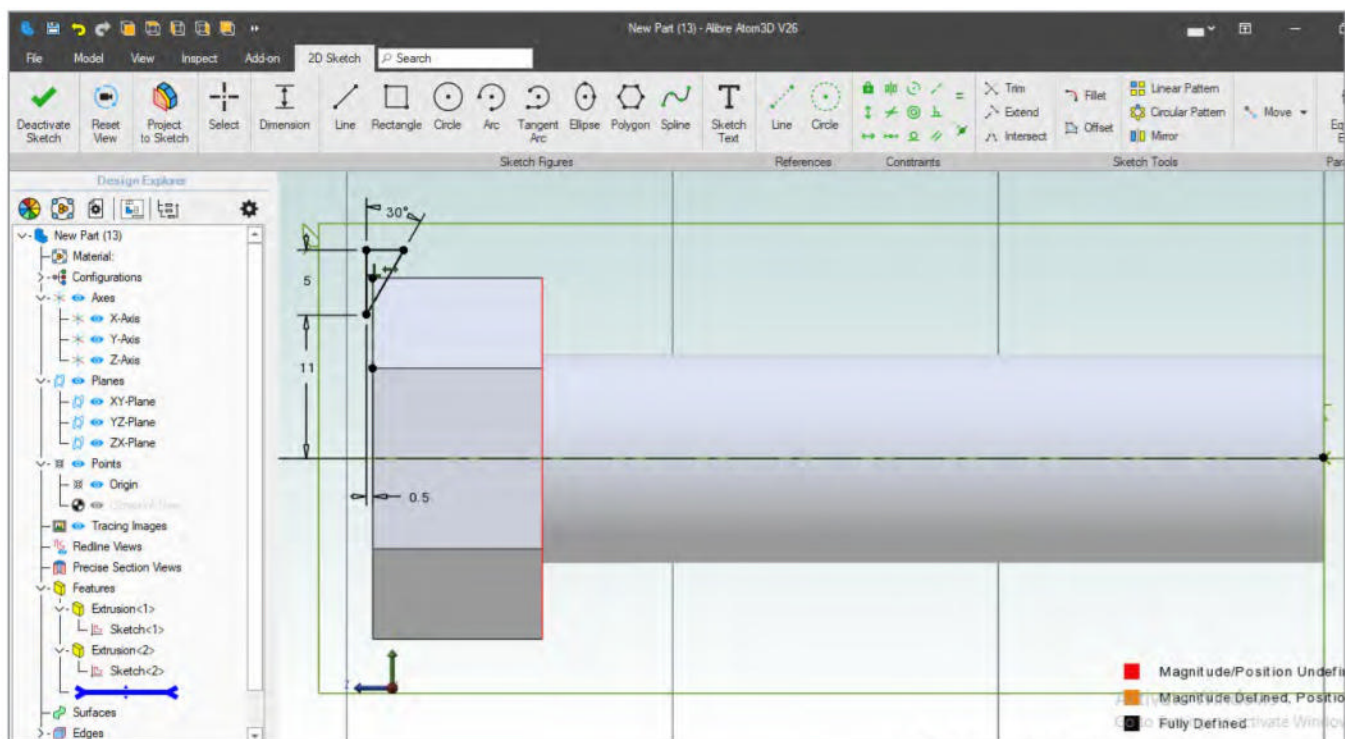


Fig. 6. Sketch for the chamfer on the bolt head

The build-up

So far, we have been using the Create New Part icon in the Alibre home screen when opening the program. This time, we will use the icon for combining multiple parts (Fig. 8).

After you click on the icon, the workspace that appears should also have a window that lists your saved files. From that list, select the female dimple die by double clicking the file name. Note: if you click in the workspace, the component will be inserted on screen the same number of times as you click. This will be handy later when we add two washers. If you get more than one image of the female die, just click on the Go Back arrow in the top left corner of the screen.

Before we fetch the other parts, it is important to note that in any assembly there must be one component that is 'anchored'. This means that it will stay still as you move the other components into place. It can still be moved around the workspace, but is essentially held in a fixed place as far as the other components are concerned.

So let's anchor that female die. Simply click on the die, then click the Anchor tool in the tool ribbon. Its icon is a big anchor.

Introducing its mate

To add another component, click on the Insert Design tool and the list of files will return. Double click on the male die and it will appear in the workspace (Fig. 9).

Click on its image and hold the left mouse button down. You can now move the male die around using the mouse. Note that the female die stays put. Next, we have to tell it how to fit with the female die by applying constraints.

Click on the Constraints tool at the left end of the tool ribbon. (I know; things are in different places now that we are in the Assembly screen, but you will soon get used to it.) Move the cursor over the male die and, when its outer diameter turns blue, click on it. Do the same with the female die (Fig. 10).

In the Assembly Constraints dialogue box that has popped up, the Type Constraint will automatically

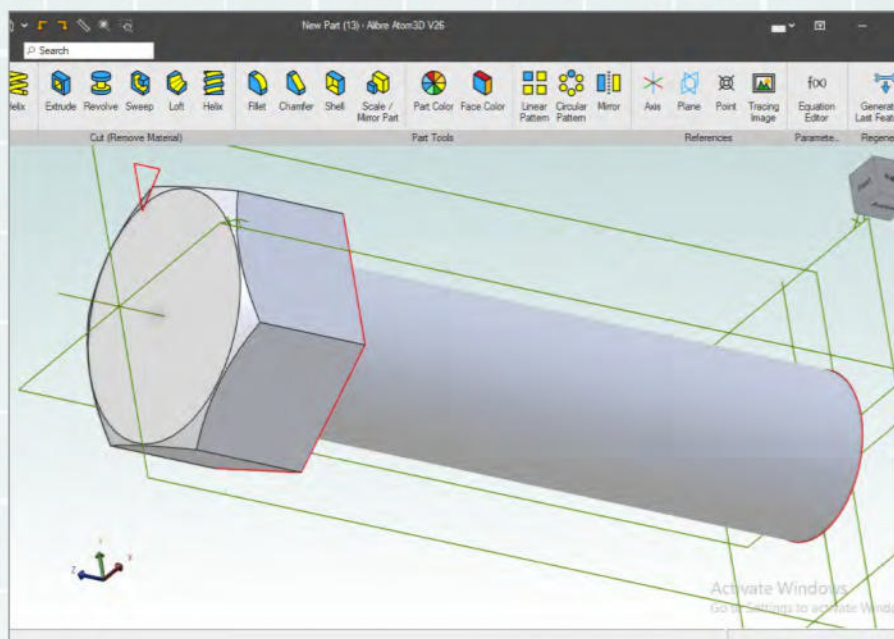


Fig. 7. Realistic chamfer on the bolt head

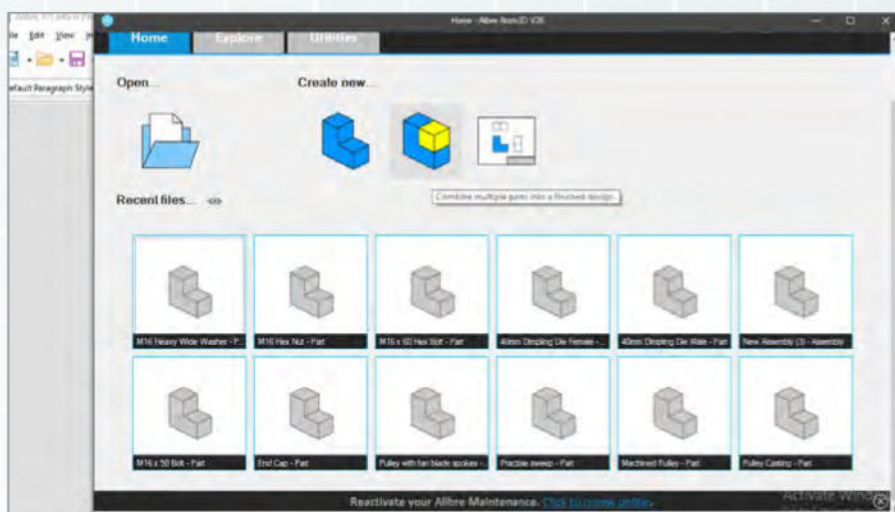


Fig. 8. The home page, with the Assembly button highlighted

be selected as the coaxial type. This is a useful bit of intelligence from the program that can save time. If the selected one is not what you want, you can change it. However, in this case the coaxial one is exactly what we want, as it will line up these two parts but still allow them to move relative to each other along a common centreline. Click on the Apply button, then close the Constraints window. Try moving the male die around and it will become clear how it is affected by the constraint.

Bolting together

Click on the Insert Design tool again and add the washers. Yes, that is right. Add two washers; one each side.

Apply the same coaxial constraint to keep them on the same centreline as all the other parts, but this time we need them to be hard against the die faces. With the Constraint tool open (the dialogue box will be shown), highlight the face at one end of a die as well as the face of the washer that is nearest to it. You may have to manipulate the image to see the faces you need to click on. Just hold down both mouse buttons and move the mouse to manipulate the image. Do this for both washers so that they end up as in Fig. 11.

Next add the bolt. Apply a coaxial constraint and then a constraint to keep the underside of the head of the bolt hard against the washer. ►

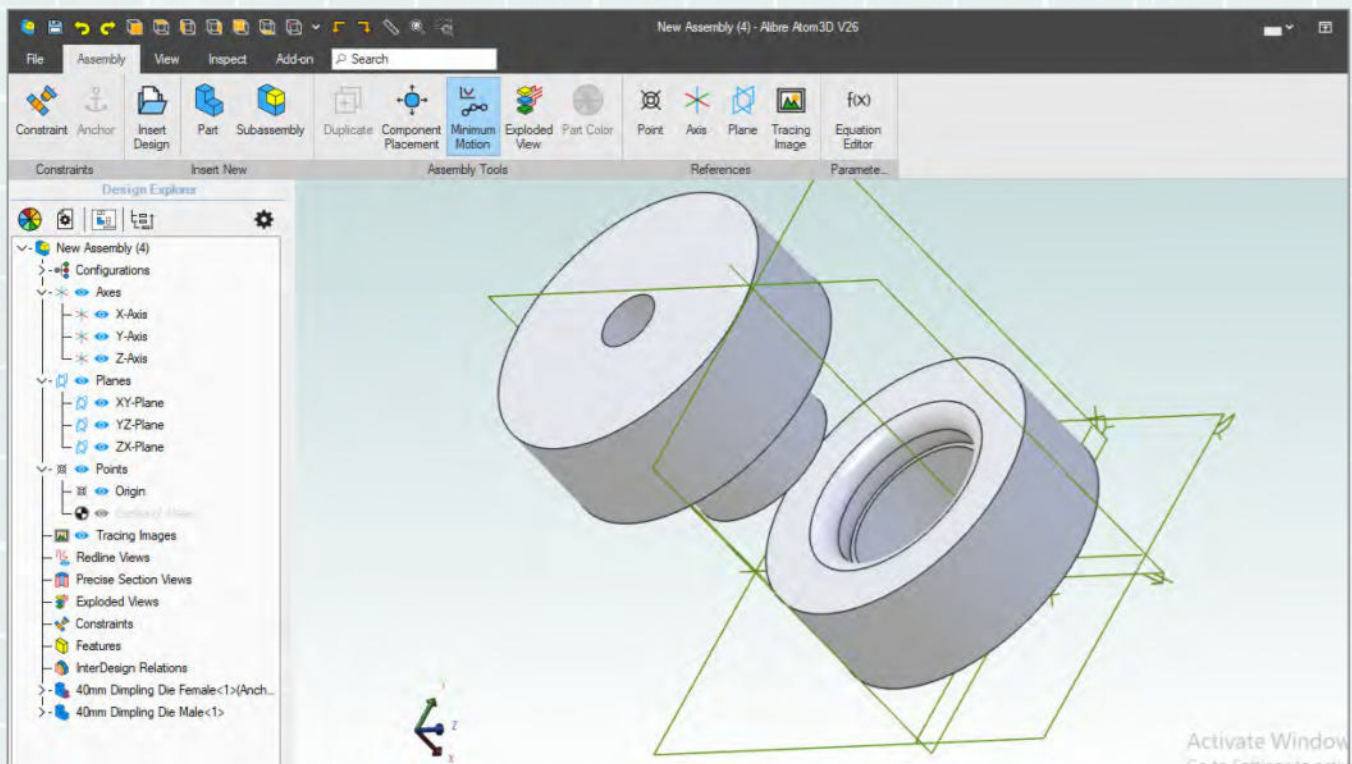


Fig. 9. Both dies in the Assembly workspace

A problem

Oops! Looks like the bolt is too short, as it is not showing through the other side.

Bolt length needs to be generous enough so that the nut can be screwed on when you start to use this tool. The dies do not come right together until the dimple is formed, so allowance must be made for them to be around

6mm apart at the start.

This can be solved by editing the part file of the bolt. To do this, we will need to save the Assembly file so we can close it and open the Bolt file.

Save the assembly work done so far as '40mm Dimple Tool', or in a folder of that name if you are asked to do that when you click on Save As.

Not really a problem

Open the file for the M16x60 bolt. Right click on the extrusion that made the shank of the bolt in the Design Explorer. Click on Edit in the dialogue box that appears and the workspace will display the process you went through when performing the extrusion. Change the length to 100mm. Click Apply and the length will

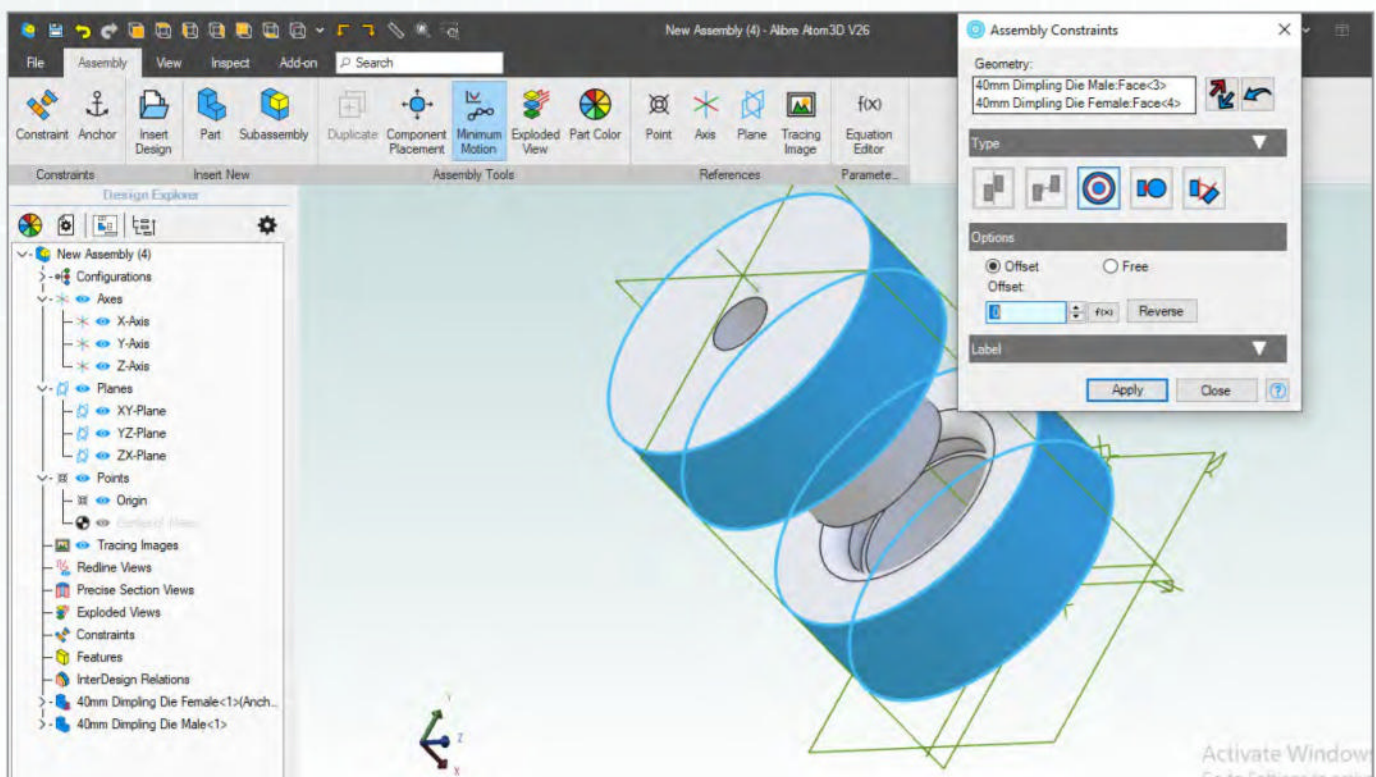


Fig. 10. Constraining the dies to share the same centreline

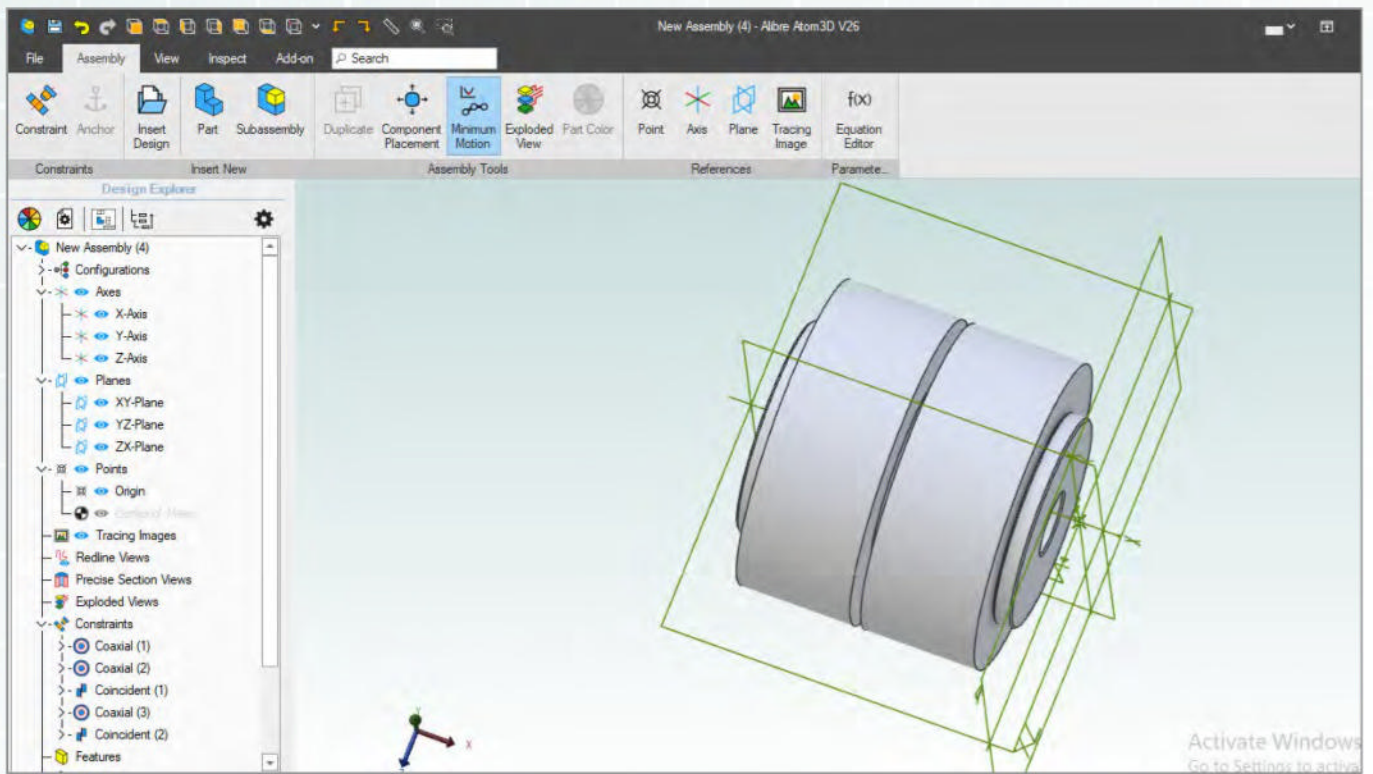


Fig. 11. Washers now constrained in place

be changed. Slide the dog bone in the Design Explorer right down past the last operation done when creating the bolt, and then save the file. You should also rename the file to state the 100mm length.

Magic

Open up the Assembly file again and it will magically update to show the lengthened bolt (Fig. 12).

Lastly, add the nut to the assembly and constrain it coaxially and then onto the face of the washer. Job done.

If you want to see the assembled dimple tool without lines showing planes, etc., click on View at the top left end of the screen above the tool ribbon. At the far right end of the View tool ribbon is Toggle References. Click on that to see the finished assembly as it would appear if you held it in your hand (Fig. 13).

What have we learnt from part seven?

We have learnt how to make our own nuts and bolts. We have learnt that once you have drawn a standard part, like a bolt, it is easy enough to use that design for others, by editing the sizes. Even if the parts are not right, you can make them fit by simply changing them.

Stay tuned for more fun in the next issue of *The Shed*, October–November, Issue No. 111. 📄

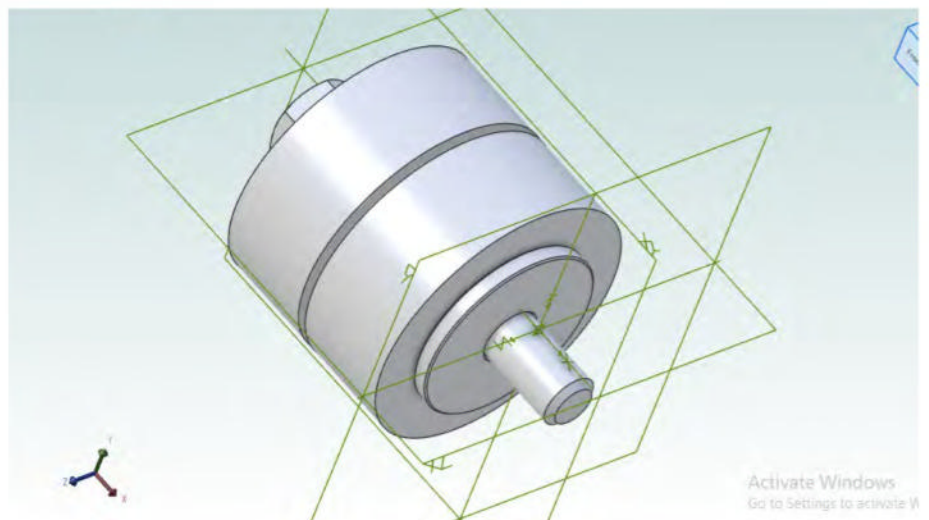


Fig. 12. The bolt is now the right length

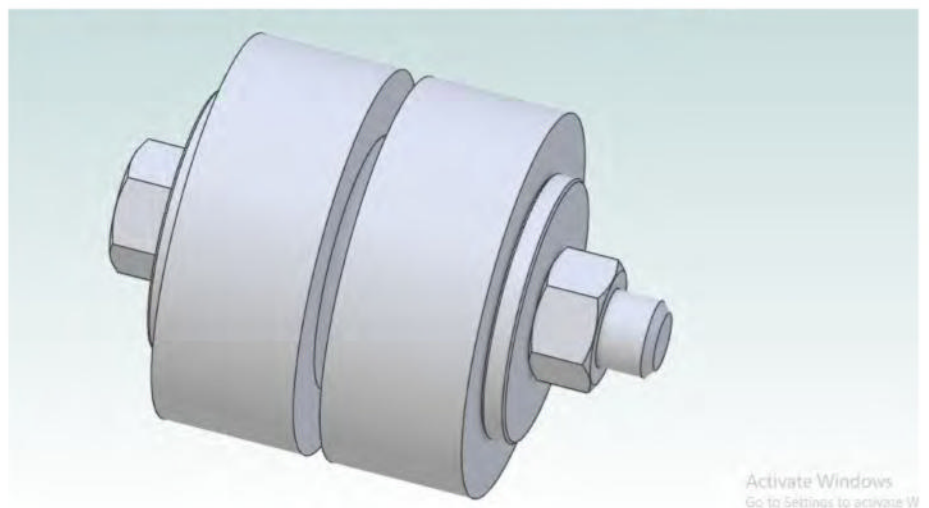


Fig. 13. The finished assembled dimpling tool



SIMPLE AND CHEAP ENGINE INSTALLATION

Auxiliary power: petrol or electric? That is the question

By Neville Watkinson

Photographs: Neville Watkinson

When designing the Milford 20, (see Kiwi Ingenuity, The Shed, Issue No. 107, March–April 2023), I realised that some form of auxiliary propulsion would be desirable. Many slipways in New Zealand are located within the confines of a marina, and these places typically don't allow sailing within their area.

Initially, I thought about oars; however, to be effective they would need to be quite long, and that created a stowage issue. The next obvious solution was an outboard motor. I think these represent one of the best solutions for a small boat if it doesn't lend itself to oars:

a relatively cheap, simple, self-contained power unit that is also portable. Modern outboards are fairly refined and quiet, qualities that I value in a power unit, and can be very fuel efficient, depending on the hull shape.

What type of outboard?

Exploring this theme, I next considered an electric outboard. This would be environmentally friendly and nicely refined and quiet.

I wasn't too worried about range, as I really only wanted the motor for close-in manoeuvring. A little online research revealed a couple of problems. ►

Modern outboards are fairly refined and quiet

The engine compartment, neat and unobtrusive, sits under the bridge deck of the yacht. The instrument to the left is an engine-hours gauge. The white, triangular shaped object above the engine compartment is an air scoop





The secondary drive from the layshaft on the left to the prop shaft on the right. The stainless-steel aftermarket motorcycle muffler is visible on the left. The floorboards and some of the engine case have been removed

I felt there was room to fit an inboard engine. Luckily, the skeg hadn't been made yet so it could be modified accordingly

Back then (around 10 years ago), electric outboard manufacturers were making quite wild claims about what they termed the 'power equivalent' of their engines. This made selection and comparison quite difficult, and I notice that they don't seem to be making these same claims today.

Next came the pricing issue. Like-for-like power outputs placed the electric outboard at about three times the price of a petrol model. Finally, reviewing some YouTube clips revealed an unexpectedly high – and to my mind unacceptable – level of noise. Idea shelved.

The best petrol option

Reverting to the petrol outboard concept, I looked at how best to package this. As the boat has an overhanging counter stern, a transom mount wasn't really possible. I rejected a side-deck mount on the basis of aesthetics, and, when I drew up a short-shaft engine mounted in a well anywhere in the cockpit, I realised that, because of the low freeboard, the power head would protrude well above deck level and look unsightly. It would also further reduce what was quite a confined area.

The only possible solution seemed

to be inboard power. A few minutes at the drawing board revealed that there was potential to run a shaft through the skeg ahead of the rudder, and protrude into the hull at a five-degree angle. This was quite neat, but there wasn't a lot of room and the shaft would need to run forward almost to the main mast before there would be enough clearance under the shaft for the radius of a drive pulley. This meant the engine would have to be offset to one side.

In the middle of the boat, there is a bridge deck supporting the main mast, under which I felt there was room to fit an inboard engine. Luckily, the skeg hadn't been made yet, so it could be modified accordingly.

Power requirements?

I didn't really know how much power was required, so I bought a book on sizing propellers and worked backwards.

Applying the formulae in the book suggested 5.6 horsepower (hp) and a propeller of 7.25-inch diameter by 6-inch pitch at a maximum 2800rpm would be ideal. I get the impression that propeller sizing is equal parts art and science, as the book described three different formulae and all produced a similar result.

I found a replacement (plastic) propeller that was common to small Mercury and Evinrude outboards; \$42 spent from the power-train budget ►

The \$42 propeller sits between the rudder and the skeg



The yacht's floor removed to show the motor, drive belt, and prop shaft

**Swayed
in part by
Honda's
two-year,
commercial-
use warranty,
I chose that
motor**

and we had a starting point. At this point, the 'simple and cheap' philosophy was still holding up, but measurement of the blade area suggested this was too small and cavitation was likely. We would suck it and see.

My propeller book calculated a 12.5mm (½-inch) prop shaft would be adequate, but the smallest stern tube, cutlass bearing (water-lubricated bearing at propeller end of shaft), and shaft seal I could find were ¾ inch, so another decision was made. A length of 19mm stainless round bar was acquired and machined to fit the propeller, which is retained by a split pin and driven with a 4mm diameter shear pin.

Sorting the prop driveshaft

The shaft would be belt driven at the inboard end, and needed some suitable support. A bulkhead-mount ball race was fixed at the forward end to take the thrust, and a pillar block bearing was fixed to the keelson, just behind the drive pulley. Both bearings were in

non-corrosive nylon mounts, secured with stainless fasteners.

With the shaft sorted, I turned my attention to the drive source and again considered electric power. The advantages were compact dimensions, quiet running, easily reversible, and simple installation with a single belt to the prop shaft. The downside was the cost for motor, controller, and batteries. At that time, the focus was on lead-acid batteries, which would be heavy and high maintenance with finite life expectancy. It might be a different decision today – which I will come back to.

Fitting a clutch?

I looked at industrial petrol motors and found a Honda GX-200 6hp motor for \$900 and a Chinese copy for about half that. Swayed in part by Honda's two-year, commercial-use warranty, I chose that motor and added a commercial-grade centrifugal clutch. I was offered a simpler go-kart clutch but felt it was too lightly constructed. It's been suggested

The primary drive arrangement at the front of the motor





The engine compartment doors open to show the Honda motor

that a clutch isn't necessary for the application, but it is handy to be able to run the engine without drive. I had already decided that we would forgo any reverse gear facility, and this hasn't been a problem in practice.

Another attraction lurking at the back of my mind was the Honda option of electric start and lighting coils, although this would mean using a battery. Remembering simple and cheap, and finding the electric option slightly more than tripled the engine cost, a pull start it would be.

Problem

What was an immediate problem, however, was that the engine direction of rotation was opposite to the requirement of my planned installation. I removed the fuel tank and found that the engine would fit in the available space OK, although it was a tight fit. I installed two engine beds, the top faces of which were angled at five degrees to match the propeller shaft angle.

These provided the basis for a 10mm aluminium plate, 230x350mm, mounted on four lag screws through slotted holes to provide belt drive adjustment. The

aluminium was easy to machine, and I could simply drill two holes and file away the bridge to create a slot. No milling machine required!

The engine is designed with a flat crankcase and a mounting hole at each corner, so it was straightforward to mount it with four bolts. This put the engine in a convenient position, with the controls and pull cord immediately to hand. ►

Finding the electric option slightly more than tripled the engine cost, a pull start it would be



The dripless bearing fitted to the centre of the prop shaft, which is just visible at left



The Honda petrol tank, painted white, looks suitably nautical

However, I now had the engine output shaft facing forwards, away from the prop shaft. I couldn't extend the prop shaft forwards and link the two with a belt, as the main mast was in the way. The solution was to run a lay shaft alongside the engine to receive the primary drive at the forward end, and to transmit the secondary drive from the aft end across to the prop shaft. The lay shaft was an easy fit on two more pillar block bearings, again mounted on slotted holes to allow for primary belt drive adjustment.

Belt and pulley size

This installation would probably work with a V-belt drive. I couldn't find much data about power-transfer capability or efficiency for these, and I've always liked the idea of toothed timing belt drives. These are quiet, 98 per cent efficient, and needed 1.8mm of adjustment for fitting and 0.8mm adjustment for tensioning. I would need a lot more for V-belts.

I found an online calculator offered by MIT, which enabled me to calculate belt and pulley size for both primary

and secondary drives, and also the best way to achieve the 1.25:1 step-down ratio that I needed to bring the propeller to 2800rpm.

Fuel tank

With the mechanics of the engine installation decided, I thought about a fuel tank. I figured I could mount the Honda tank under the bridge deck opposite the motor. The tank is a simple pressed-steel arrangement and not fully painted in the hard-to-reach areas. I had it sand-blasted clean, then painted it carefully with epoxy primer and two-pack polyurethane paint. I try to keep it full of fuel, and it shows no sign of rust after 10 years. I built a cabinet to enclose the engine, and at first glance its presence isn't noticed.

I still had a concern about noise and engine heat. The engine is air cooled and effectively in a close-fitting wooden box. I removed the silencer and brazed a copper plumbing elbow to the outlet. I extended this downwards with a length of pipe, then a U-bend terminating at a flange near the base of the engine.

I still had a concern about noise and engine heat

To this I bolted an aftermarket moped silencer sourced off Trade Me. The silencer has a stainless wrapping and end caps, and is also lasting quite well.

Before installing the engine, I wrapped the original silencer and pipework in fibreglass header wrap to help with noise and heat suppression. The moped muffler exhausts through a hole in the bridge deck and is angled overboard. It all works quite well in practice, although when the motor is running, I have one of the locker doors open and have a cowl vent to allow air ingress. The timber around the engine gets warm but not excessively so.

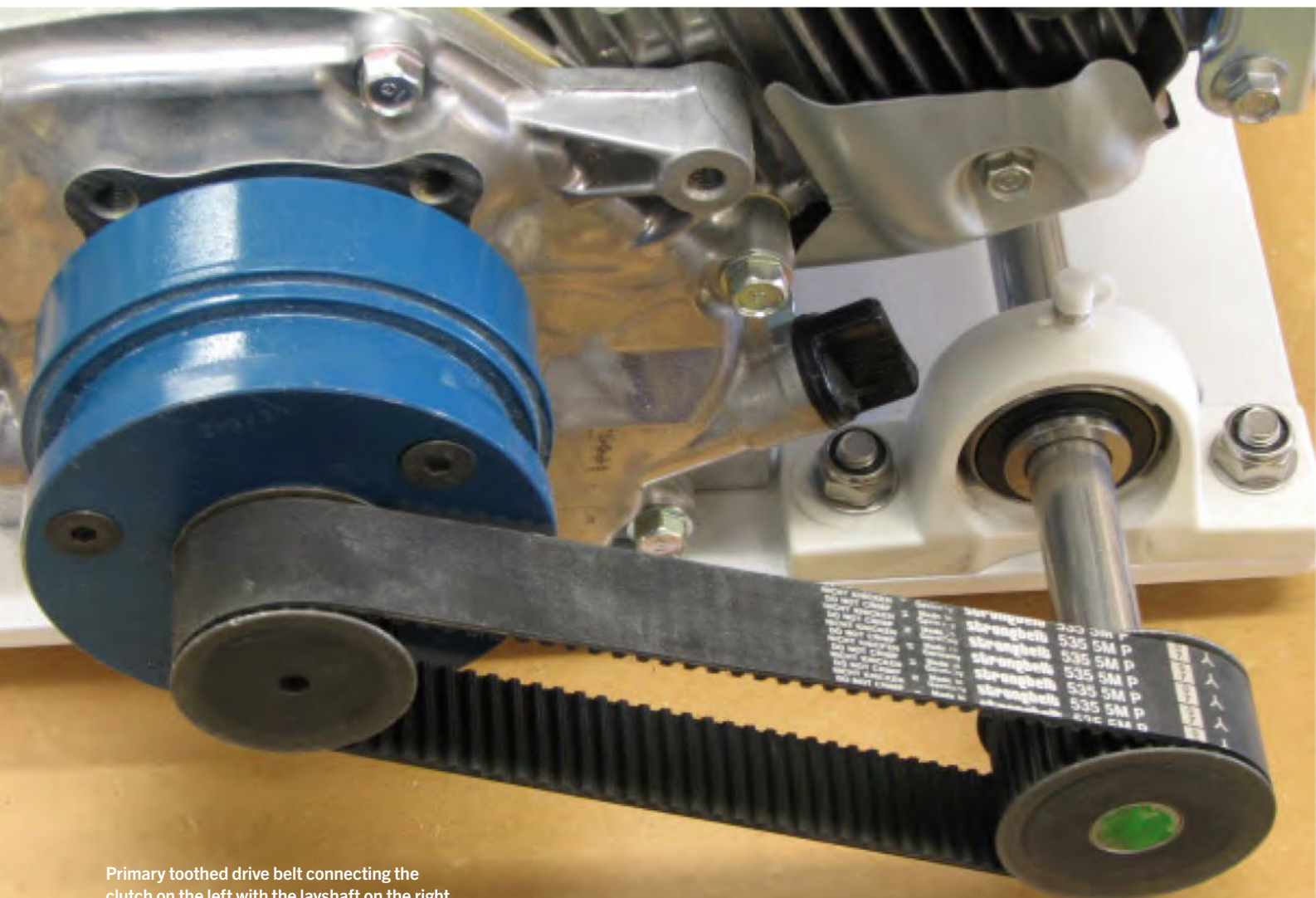
So, how does it perform?

With the benefit of 10 years' experience, I can summarise as follows: a displacement boat will only travel at 'hull speed', which is a factor of the waterline length (about 1.3 times the

square root of same). We reach this at about 2000rpm, and more revs only generate more noise. According to Honda that's about 4.7hp. I suspect our installation would work well enough with quite a bit less power.

On the upside, it is amazingly economical. A five-litre fuel tank suffices for a summer of boating; we normally run the motor only to navigate to and from the ramp, and get the sails up at the earliest opportunity. A couple of times, we have motored for an hour or so, either because of a complete lack of wind or to explore up a river. This uses about a litre and a half of fuel. The main downside, I suppose, is that an aluminium air-cooled motor is always going to generate some noise. This is mechanical rather than exhaust noise, and, while the motor isn't especially annoying, it's always a pleasure to raise the sails and kill the motor. ►

On the upside, it is amazingly economical. A five-litre fuel tank suffices for a summer of boating

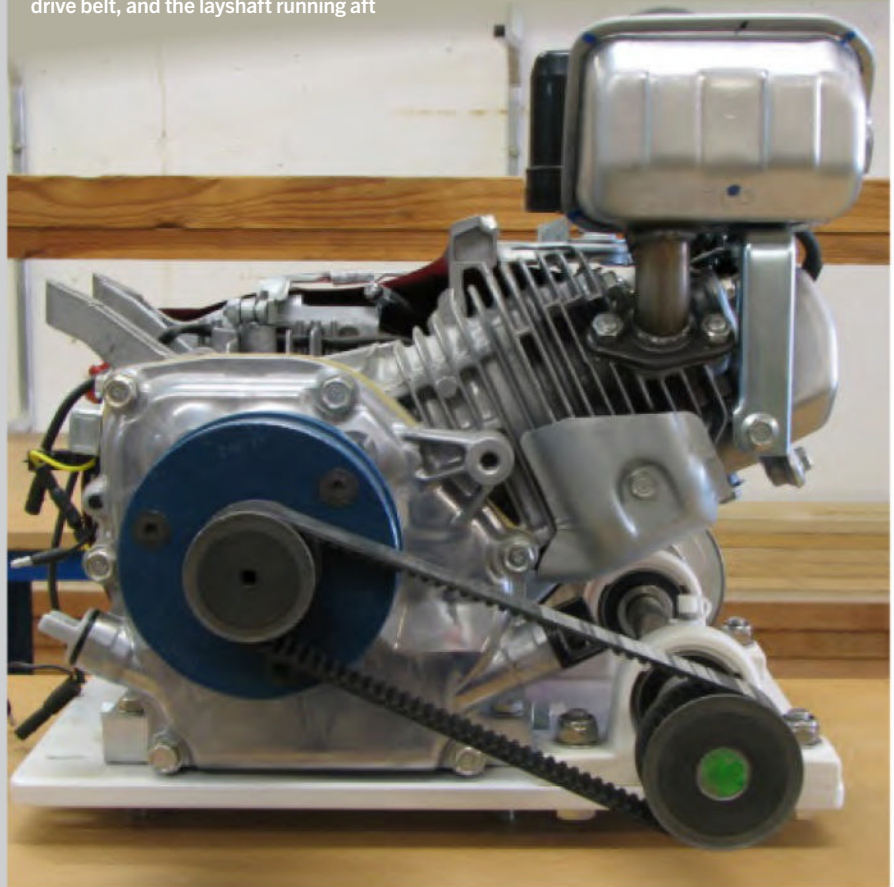


Primary toothed drive belt connecting the clutch on the left with the layshaft on the right

The costs (in 2011–'12 prices excl. GST)

Honda GX-200 motor	\$890
19mm x 2m stainless shaft	\$85
Stern tube and cutlass bearing	\$437
Dripless shaft seal	\$320
Pillar blocks and bearings	\$169
Clutch	\$334
Primary drive pulleys and belt	\$169
Secondary drive pulleys and belt	\$351
Aluminium mounting plate	\$43
Muffler	\$81
Cowl ventilator	\$25
Engine hour meter / rev counter	\$62
Sundry mounting hardware, including petrol tap, water-cooling scoop for shaft seal, connectors, clamps, remote ignition switch, etc.	\$318
Machine prop shaft for propeller, cut shaft and pulley keyways, drill and tap pulleys for grub screws, mount primary drive pulley to clutch	\$315
TOTAL	\$3642

The front of the Honda motor showing the blue-coloured clutch, the toothed drive belt, and the layshaft running aft



Exhaust exiting the bridge deck

The electric option

The motor has been very reliable and normally starts at the first pull of the ripcord, even after six months' sitting idle through the winter.

The easiest way to service the motor is to take it out, which is a fairly quick and easy job. Last year, I changed out all the engine fastenings from the original bright zinc steel, which was corroding, to stainless steel, and repainted the engine cowling with epoxy paint.

If I were completing the same installation today, I would reconsider electric power. A 3kW brushless DC motor can be had on AliExpress for under \$200 delivered to New Zealand. While that still requires a battery, controller, and charger, a bit of lateral thinking can probably source these for a combined total far below that of an electric outboard.

Using a lithium battery would be a lightweight option, and it could be charged off the boat. I reckon that for our type of operation a one-hour battery life would be workable. Electric bike and electric scooter hardware might

be a likely and cost-effective source of components.

The facts

Now comes the hard bit. I'm afraid I have to dispel your kind reader's notion of simple and cheap (Dave Robbie, Letters to the Editor, *The Shed* Issue No. 109, June–July 2023).

Bear in mind that this boat was a new build, with the best of materials and 1000 hours of my time invested, and my focus was on getting the boat finished, so I wasn't about to compromise the auxiliary power plant too much. The costs table tells the tale.

Conclusion

So, a simple and cheap Honda industrial engine, which works very well and is reliable and economical, becomes \$3642 fully installed. The devil, as they say, is in the detail.

While I'm sure this could all be achieved at a fraction of the cost using second-hand components, the engine is probably always going to be the smaller part of the equation. 📦



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FINAL TOUCHES

Guidelines for the perfect shed – safety, security, and ease of operation

*By Des Bromilow
Photographs: Des Bromilow*





Photo 31 – Handrails painted in the requisite traditional high-visibility colour

The mezzanines in my shed build could present a real danger for people accessing them. The height of the mezzanine level exceeds 2m – all too regularly, fatalities occur in falls less than that within the building industry and other industries. All countries have standards for handrails, and I applied the relevant one for my jurisdiction. The handrails are required to withstand a lateral force of 30kg and meet a minimum height. The handrails that I built and fitted to the mezzanines meet those standards. During the design, it was decided to place only a single access point for each mezzanine. This meant that each opening would need a gate (or door) and all other parts of the mezzanines could be barricaded properly. The handrails were welded up and fitted to the mezzanines, and painted in the requisite traditional high-visibility colour (Photo 31).

Access to the mezzanines

Access to the mezzanines is accomplished through a portable ladder. This ladder was designed and built to provide access for people and materials. The ladder is moved from one position to another via a pallet jack. Materials are moved from one level to the next using the ladder, or a lifting arrangement. To aid in this, one section of mezzanine handrail in each of the main workshop sides was made removable. A stiffener was designed and fitted to the roof structure to aid in lifting the handrail section away when removed, and to aid with lifting items up to the mezzanine level. A small mains-powered winch

(100kg) is used for this purpose, and for supporting the lift-out handrail during removal/reinstatement.

The various benches

Standing desk in the office

The office needs a bench capable of supporting a number of computers and electronics development boards. While I have only one computer in there, I often find myself fixing other computers for various people or causes. I have found that you can never have too much desk space when doing this. For this reason, I've made this bench

with a top measuring 3200x800mm.

The desk has a raised lip across the sides and back to stop things rolling off, and an enforced gap at the back for power cables to enter and exit (Photo 32).

The desk height was based on a standing posture in an effort to make usage easy for standing tasks and brief jobs such as looking up information. When I need extended time at the desk – soldering, for example – I sit on a stool.

The construction of this bench is a set of steel legs welded up and screwed to a subframe constructed of MGP10 structural timber (pine studs used in house framing).

A single layer of particle board is screwed to that subframe, and the raised lips on the back and sides are attached to the subframe. The legs have been made as removable pieces so that the bench can be dismantled for ease of getting it through doorways if it is ever moved – although 'ease' is a relative term, since it takes two people to stand the desk up once the legs are screwed on. ►

The legs have been made as removable pieces so that the bench can be dismantled for ease of getting it through doorways

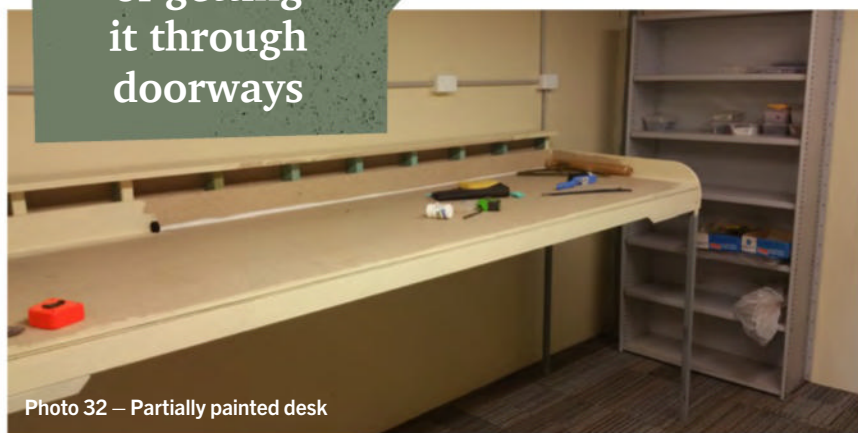


Photo 32 – Partially painted desk



Photo 33 – Welding table with the removable sections in the middle of the top surface

The other sides of the bench have no obstacles underneath, to make clamping easier

Welding bench

The welding bench is a variation on the welding table concepts used in most boilermaking establishments, adapted to suit my constraints of space, weight, and cost.

The bench comprises a steel plate top – sufficiently thick to be used as a jig plate and to avoid distorting due to heat or other fabrication activities. The frame under the top is also steel, and is electrically connected to the top via welds. This allows the ground lead of the welder to connect to the bench, and anything placed on the bench is automatically part of the welding circuit.

The top was fabricated from a series of 12mm plate pieces purchased second hand.

Two sections in the middle are removable, allowing a high degree of flexibility in pieces being handled on the table (Photo 33).

Unistrut sections are included in the tabletop design to allow clamping at various locations. Angle iron is welded along the underside of one edge as a clamping surface for 90-degree angles, and another piece of angle iron is affixed to one leg for longer sections being clamped at right angles to the top and edges.

The other sides of the bench have no obstacles underneath, to make

clamping easier. The height of this bench was based on the use of tables for ergonomic studies and trials at a variety of workbenches. The height chosen was 915mm, and is suitable for me to mount vices and other work-holding fixtures while still providing the optimum ‘elbow v. vice jaws height’ used for filing and other tasks.

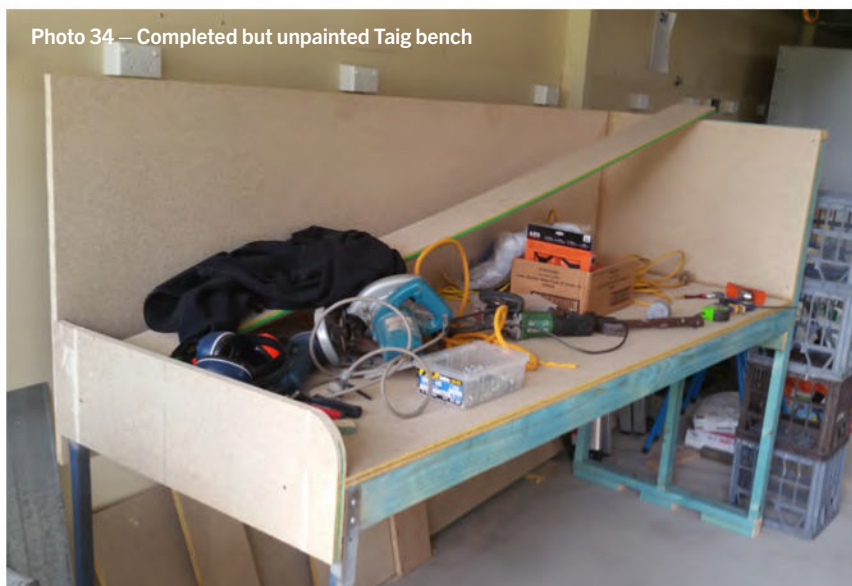
Taig bench

I have two desktop machines – a Taig (aka Peatol) lathe and a Taig mill – which are used in a number of my projects.

A purpose-built bench was made to support these machines, with a partition wall to keep grinding dust – from the adjacent grinding station – away from their slides. The bench follows the pattern of most of the other benches built for this shed: a set of steel legs supporting a wooden subframe, topped with a particle-board top.

The splashback at the back and on one side was mounted in a similar way to that of the stand-up bench in the office. The rear splashback is quite high, and the section of timber performs double duty: it acts as a stiffener for the bench, and it prevents items from falling behind the bench from the raised mill table, or headstock. The remaining side wall is an independent frame (pine studs), which not only creates the

Photo 34 – Completed but unpainted Taig bench



legs for that side of the bench but also supports a particle-board partition to prevent grinding dust from the grinders located to the right of the Taig machines getting on the machine slides. The finished height of this bench is the same 915mm as the welding table, allowing the gap underneath to accommodate one of the toolboxes that I use for storing infrequently used tools (Photo 34).

General-purpose benches

The general-purpose (GP) benches are set to the same finished height of 915mm as the welding and Taig benches. This permits them to be used to help support larger items than the

welding benchtop permits. The GP benches are not electrically connected to the welding circuit. The GP benchtops were sized to be manageable and able to be moved easily within the workshop using the pallet jack. Both benches are the same size and rectangle in shape. I originally planned on making the GP benchtops out of a full sheet of particle board (3600x800mm), but on reflection I determined that it would be more flexible to have the benchtop smaller – say 1600x1200mm – and have two benches that could be arranged in various configurations (Photo 35).

My decision to make the benches with a top of 1800x800mm was based

on the simple joinery of cutting a sheet of particle-board flooring in half lengthwise – plus, narrow benches take up less room in the shed.

These benches need to be fairly heavy duty. I constructed a timber subframe (more pine studs) and covered it with a top made of two thicknesses of particle board. These benches are made with removable legs, which are affixed flush with the edges of the benchtop to provide a clamping surface if required.

A sacrificial top made of Masonite is used to protect the actual benchtop – the thickness of this Masonite sheet is factored into the finished height of the bench. ►

A sacrificial top made of Masonite is used to protect the actual benchtop

Photo 35 – The GP benches can be arranged in various configurations





Photo 36 – The stands can be configured to allow the jack to lift any bench easily

Moving the benches

While some of the aforementioned benches will be placed and rarely moved, the welding table and GP benches may need to be moved from time to time to suit a particular task.

To facilitate this, I purchased a second-hand pallet jack – also used to move the access ladder between the various mezzanine access points as required

– and constructed a set of stands that could be configured to allow the jack to lift any bench easily (Photo 36).

Prior to building this stack, I had to resort to a collection of milk crates, timber, and even a spare tyre to move a bench (Photo 37).

Most pallet jacks are rated for 2T at minimum, whereas wheels to move an access platform, bench,

or toolbox can run into several hundred dollars once fitted to a few items. By using a pallet jack, I get the consistent manoeuvrability of the jack; I have only one set of wheels to maintain; and pallet jacks are quite inexpensive, even if purchased new, but are commonly available second hand at a reasonable price.

The other sides of the bench have no obstacles underneath, to make clamping easier

Photo 37 – In the past, the writer had to use his ingenuity and items at hand to move a bench



Storage concepts

I have a few toolboxes of various breeds and types, and find that tools, materials, and 'useful junk' fill them quite quickly, not to mention reference materials, etc.

The north mezzanine contains a series of shelving units fabricated from angle iron and the leftover particle board from the shed lining. Each shelving unit holds 12 plastic crates (600mm wide, 400mm deep, 230mm high) in two vertical rows. These crates, along with their shelving-bay number, allow an index of materials to be established and maintained – for

instance, brass plumbing fittings: bay 3, crates 3 and 4 (Photo 38).

The south mezzanine is still being fitted out, and currently contains a mixture of odd lockers, shelving units, and leftover bits from my previous work areas.

The main tool storage strategy is based on a Compactus unit that I purchased online. It arrived as a 7x2 bay unit. After being partially dismantled and reconfigured, it is now an 8x1 bay unit. The remaining parts have been used to form some bookcase shelving units for the office (Photo 39).

The reconfiguration included the manufacture of some risers to lift the bottom of the bookshelf unit from the ground and distribute the weight over a broader footprint, instead of the knife edge caused by the sheet-metal edge.

A similar base was fabricated to support the modified eighth bay so that it was at the same finished height as the other bays, which were located on wheelbases. This same fabricated base also ties the tracks to this last bay so that the track is restrained (Photo 40). ►



Photo 38 – The crates installed in the shelving units on the mezzanine floor



Photo 39 – The Compactus unit

Compared with the cost of toolboxes and shelves, it represents good value

Good value

A Compactus – mobile shelving, mobile aisle shelving, or rolling stack storage – is an extravagance, but, compared with the cost of toolboxes and shelves, it represents good value, and has the advantage of being a very efficient use of precious floor space.

I can use the bays of the Compactus to store tools, projects, and other things as necessary. The Compactus is as effective as a toolbox for keeping dust off tools,

and the variable-height shelf spacing means that I can store tools in boxes, cases, or bags if required.

My current wheeled toolbox will be rebuilt at a future time and dedicated to tooling storage for the lathes. Rebuilding of that will be an undertaking in its own right, since the wheels and base are not adequate for anything more than a few screwdrivers, and the pressed-metal drawer slides are quite flimsy and cantankerous.

Storing ladders

Like most shed owners, I have a ladder or two to be stored. Ladders are usually leaned against a wall somewhere, but that restricts access to the wall and represents a hazard of tipping over. Due to the shortage of floor space in a number of my previous sheds, I've often found ways to hang the ladders from the roof to get them up out of the way. Since the roof in this shed is so high up, I looked for an alternative storage solution.

The device I have designed and built stores four ladders, including an industrial extension ladder that is 3.6m in length when closed (Photos 41 ►



Photo 40 – A fabricated base ties the tracks to the last bay so that the track is restrained

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Photo 41



Photo 42

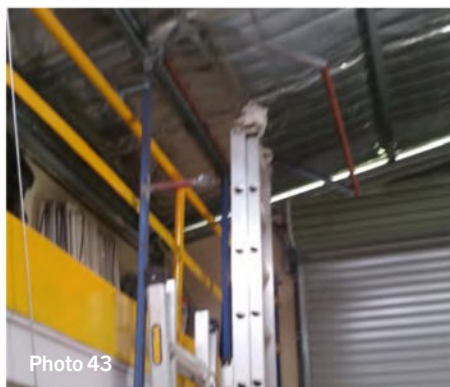


Photo 43



Photo 44

Photos 41 to 44 – The ladder-storage device designed and built by the writer. A locked gate bar stops the taller ladders falling outwards. The gate is activated and locked from a ground-level lever, which itself is locked with a chain.

and 42). The ladders are loaded into the storage rack and restrained at waist level with a short length of rope. A section of mesh is welded in as part of the rack so that there is a range of anchoring points for the ropes. The ropes serve to stop the ladders resting on the ground at the lowered position; the rack restrains the ladders in every other orientation.

The rack is designed to pivot and store

the ladders parallel to the mezzanine, and therefore keep the floor uncluttered. It uses a set of pegs, which support the ladders when in the rotated position. The longer ladders have the additional security of a locked gate bar, which restrains the top of the ladders from falling outwards from the rack. The gate is activated and locked in the two positions from a lever located at the ground level when in the load/unload

position. The lever is locked in both positions with a short length of chain (Photos 43 and 44).

The entire device pivots on a stub axle mounted to the mezzanine floor joist. This pivot has plates that stiffen the structural beam and prevent rotation forces acting on the plates (Photos 45 and 46). When the rack is in the 'up' position, a set of catch hooks and a safety chain are used to supplement the pivot.



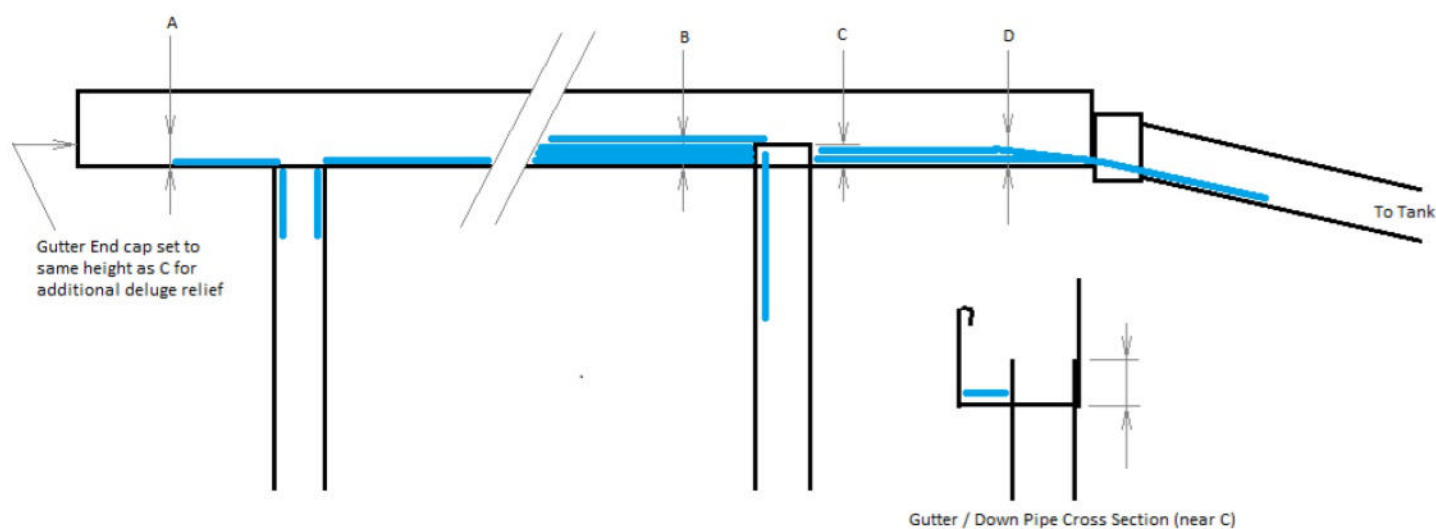
Photo 45 – The ladder storage unit pivot, with one stiffening plate visible on the front surface of the joist

The rack is designed to pivot and store the ladders parallel to the mezzanine



Photo 46 — The pivot for the ladder storage, and one of the pegs supporting the stored ladder

Sketch 1 – Gutter design



The first step to managing the 120 kilolitres of rain the roof would collect was to size the drains to handle it”

Drainage, water tank, etc.

We have a nine-kilolitre rainwater tank, and the roof of this shed covers an area of 108m², which means that, based on the capacity of the rainwater tank, it would overflow by more than 10 times over our annual rainfall.

The first step to managing the 120 kilolitre of rain that the roof would collect was to size the drains to handle it. The rainwater tank is used to collect the water from 36m² of the roof, and it has an overflow built into the guttering to handle high-volume deluge events.

The gutter design is outlined in Sketch 1. Typical gutters are set up with the downpipes level with the bottom of the gutter as shown near ‘A’, which prevents water pooling and lying in the gutter. This is needed to stop the gutters rusting and to prevent mosquitoes breeding in the standing water. This strategy works to prevent standing water but means that all water goes where the downpipes lead.

A combined strategy

The strategy I employed in the front gutter of the shed is a combination of ‘A’ and ‘C’. ►



Photo 47 – The level indicator is pointing out the sediment trap

**I've never
heard
someone
complain
about too
many places
to plug in**

At 'C', the downpipe top is extended above the level of the bottom of the gutter, so water in the gutter has to exceed the height 'B' before it will flow into the downpipe. Because the water can flow around the downpipe entry – shown in the cross-section – the water will follow the incline of the gutter to the tank discharge point at the end of the gutter, thereby preventing standing water.

If there is a major rain event, the water in the gutter will exceed the height 'B' and discharge to the stormwater pipes via the downpipes. The end cap to the non-tank discharge end is closed with a weir-style cap that matches the height 'B', so the deluge can overflow there as well.

These steps are all used together to collect water off the roof, while ensuring that deluges will not overflow the gutters, with the consequent risk of water entering the shed from under the roof.

Water-tank connection

The rainwater tank is connected to the gutter discharge via a 90mm pipe containing a gravity trap – an inline 'T' section with the upright of the 'T' plugged with a screw cap – so any sediment off the roof can accumulate and be periodically dumped.

The water entry to the tank is via a

filter screen to allow for any floating debris to be caught. These steps – sediment trap and filter – are needed because of the number of leaves that blow onto my roof from my neighbours' trees. The level indicator in Photo 47 is pointing out the sediment trap.

The water level is displayed on the side of the tank via a level gauge (see Sketch 2), which is made of some soft-drink bottles and some 3mm 7x19 316 stainless cable.

The design of level gauge shown in Sketch 2 allows the level to be read in the correct orientation, whereas the designs without the lower pulley display water levels in an inverted scheme. The lower pulley is actually a nylon tube, which acts as a cable guide around the waist of a weighted soft-drink bottle. As shown in Photo 47, the pointer is quite intuitive in use, with the finger pointing to the level of the water in the tank.

All water that is discharged from the gutters away from the tank is directed to the existing street stormwater pipes via 90mm PVC pipes. The installation and connection of these pipes was done in accordance with the local council guidelines.

Hot works area

The paved area (hot works) has a slope on it to conduct surface water away from the shed area onto the lawn of



The tank stand is closed in as a small, detached shed for storing dangerous materials

the backyard. The adjacent area has a floor drain installed in the paving, since that area does not have lawn to discharge to.

This area is used as a minor overflow for hot works, and is also utilised as a wash-up/quench area. An extension to the house water supply is fed to a tap in this area, and the floor drain is located nearby so that a portable tub can be positioned between the tap and drain. This tub is a repurposed laundry cabinet tub, built onto a steel frame to permit portability and levelling. The tub is used whenever water is needed – quenching hot objects, cleaning items and hands, and washing out paintbrushes. Once emptied, the tub is moved around using a standard goods trolley (Photo 48). ►

Sketch 2 – Water-tank level indication design

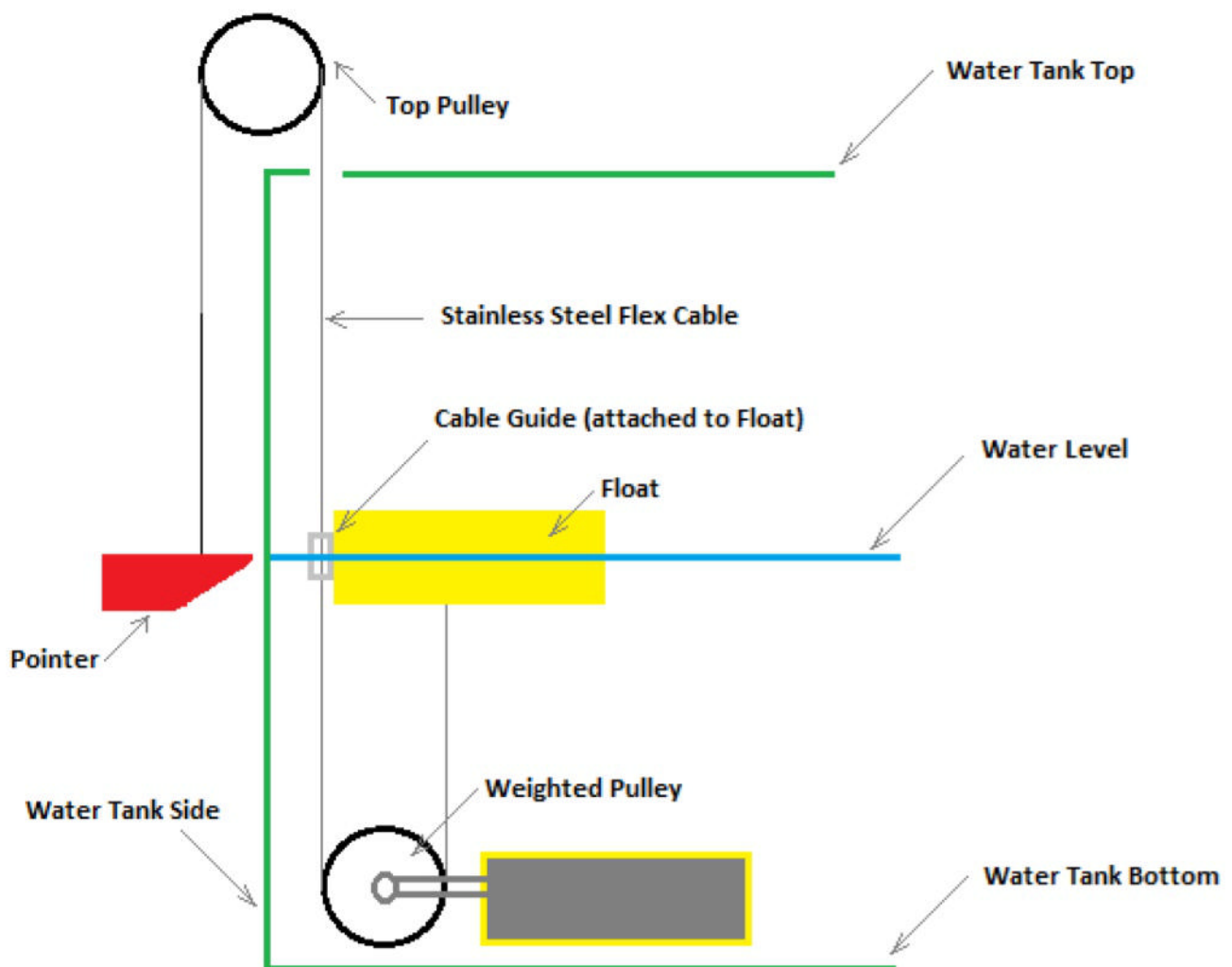




Photo 48 — A repurposed laundry cabinet tub has been built onto a steel frame to permit portability and levelling

The floor drain in the paved area is visible under the portable tub

The design was thought out many times as a series of thought experiments, graduating to paper models and basic trigonometry to check various elements

equipment over the next couple of years, but I also have other projects that need to be completed, so each project will be completed as time and priority dictate. 📁

My journey

The shed has been a journey that commenced more than five years ago, and involved, as you will have discovered, as much planning I could undertake as possible.

The design was thought out many times as a series of thought experiments, graduating to paper models and basic trigonometry to check various elements. Since the shed represents a large investment for me, I wanted everything optimised for my current and future needs. The constraints of land and money were factors in a number of decisions, but I believe what I have outlined in this article is something that I will continue to enjoy for many years. The fit out of the shed with the various lathes, milling machines, etc., will be the subject of other articles.

A number of enhancements will be made to various parts of the shed



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METAL MAGICIANS

Whether you are 8 or 80, it seems that the desire to create your own masterpiece never loses its appeal

By Murray Grimwood

Photographs: Murray Grimwood and Daryl Anderson

John Stark's amazing French
knitting machine; luckily no
Luddites attended the exhibition

Kevin Downie explaining to my better half
that I need more Meccano



Fairground models are always popular; David Littlefair's
waltzer requires a very high-torque motor to get it started

Of course, the ticket dispenser is Meccano too ...



Quite by chance, I found out that the New Zealand Federation of Meccano Modellers (NZFMM) was going to hold its biennial exhibition on 22–24 April in Tinwald – just up the road, in relative terms.

An added interest was that the host club, the Christchurch Meccano Club, claims to be the longest-running club on the planet. It sounded like *The Shed* territory to me, and so it was – in spades.

Hereabouts, we tend to make trips to do more than one job; we did this one

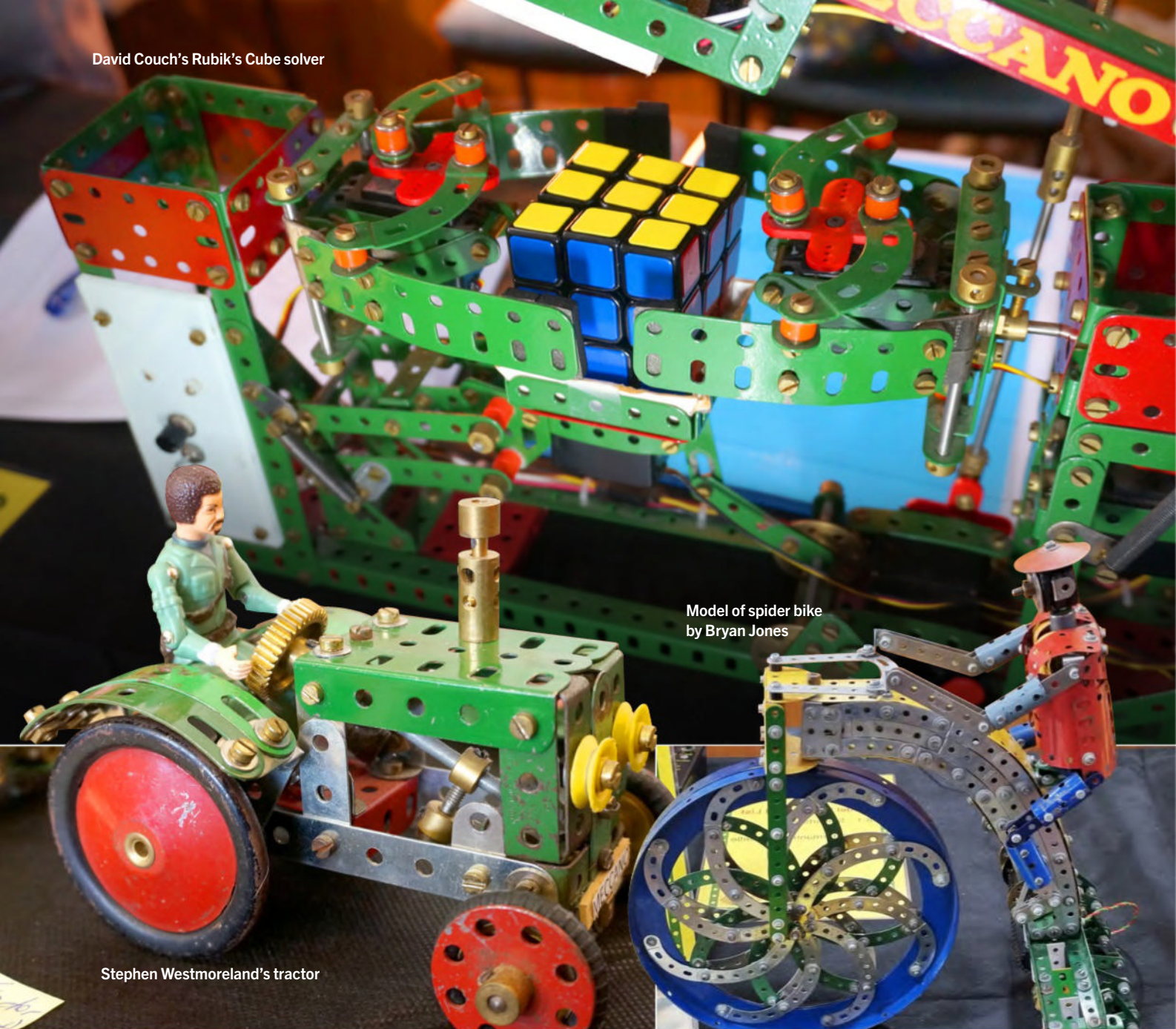
with an aluminium ladder lashed to the roof racks to splint a mast much longer than the car that was waiting for me in Christchurch. While we were at it, we did the usual second hand-shop perusals, cased the amazing Chertsey bookshop, shopped for the grandkids, and checked out The Plains Railway and Historical Museum – on one of its ‘working days’. The highlight of the weekend, though, was the exhibition; these folks leave me in awe – the same way that model engineering clubs do. ►

Grandfather Countwheel Striking Clock; an imposing offering by John Stark



Linda Woermann's Eiffel Tower, London Bridge, and Big Ben models

David Couch's Rubik's Cube solver

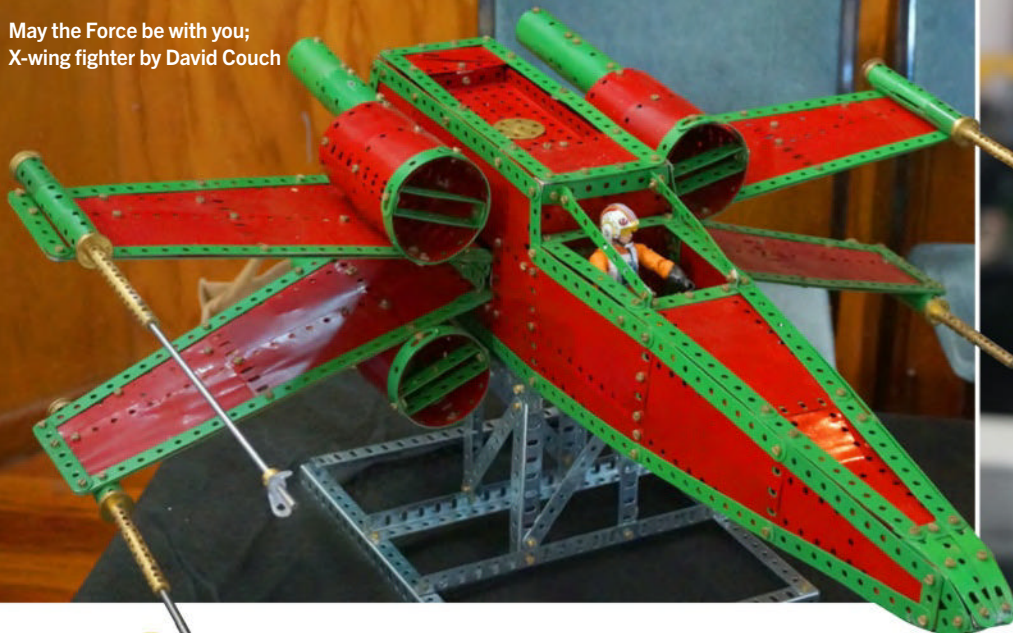


Model of spider bike
by Bryan Jones

Stephen Westmoreland's tractor

The Millenium Falcon and an airboat,
both by Stephen Styles





Woody Woodpecker chatters his way down the 'tree'; simple but effective.

Items can be
assembled,
disassembled,
and
reassembled

Different strokes

'Making' is something I contemplate a lot.

At one end of the spectrum, there are folk who build things – from models to the full-size article – from scratch. At the other, folk who buy a kit – a plastic battleship, for example – where 99 per cent of the 'making' has been already done. I've learned to appreciate the skills involved at both ends, and long ago came

to the conclusion that it is all legitimate if it floats your boat – so to speak.

However, somewhere in the middle is a format all on its own: premade material out of which items can be assembled, disassembled, and reassembled. Lego/Duplo/Technics, K'Nex, Polydron, old-school wooden building sets – they all fit into that category, but the standout is Meccano. ▶

Peter Slatterthwaite's
glorious tank locomotive, and
Stephen Style's clever Kiwi





New Zealand Meccano clubs

"There are five active Meccano clubs in New Zealand," writes NZFMM president Reg Barlow, "Auckland, Waikato, Manawatu/Taranaki, Wellington, and Christchurch. The clubs are autonomous, running their own meetings, public displays, get-togethers, and so on.

"In 1979, it was decided to have a national organisation, called the New Zealand Federation of Meccano Modellers. Our association subscriptions enable the publishing of a club magazine four times a year. The magazine has club reports, model plans, helpful hints, etc., and is a great way to keep us all informed on the local Meccano scene. We have a biennial convention and public display, [with] clubs taking turns to organise it.

"There are approximately 100 members

around New Zealand, which is a good number to ensure our clubs will keep surviving, even with the onslaught of Lego and the ageing of our members.

"I would hazard a guess that our members all started with Meccano in their youth, back in the '50s and '60s, when all we wanted for Christmas was more Meccano under the Christmas tree. As time progressed, our Meccano passions took a lower priority, as mortgages and family took precedence, but we all came back to it, when families were grown up and we all had that little extra cash to purchase ... more Meccano!

"There is a saying amongst us devout Meccano fans that we can never have enough Meccano. Parts and sets often appear on online auction sites, with the

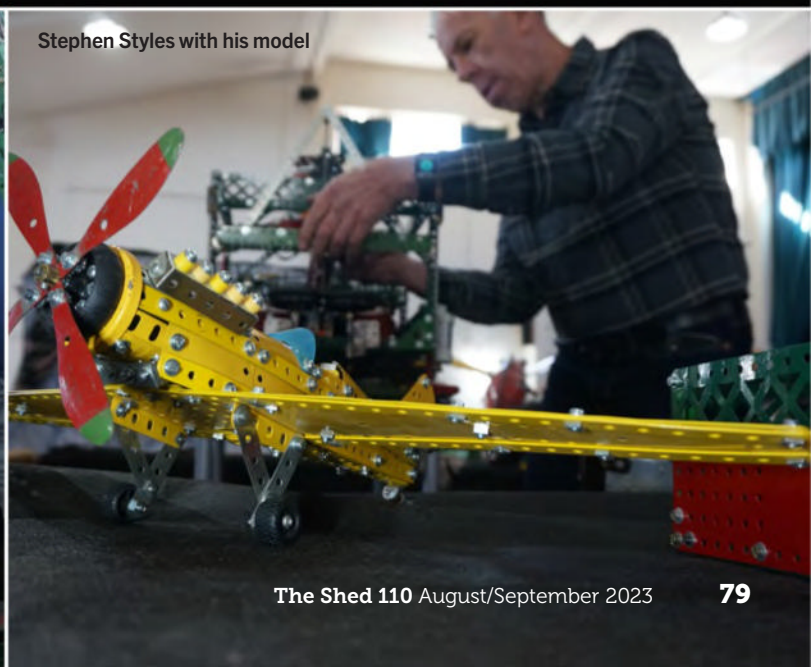
vendors thinking that the parts are valuable because of their age, and they often have to be let down not to expect a high dollar return. Our steady supply of parts comes from these websites, also repro. Parts can now be purchased, [and] are just as good as, if not better than, the original. Plastic is starting to rear its head as well; this can be useful due to 3D printing, so we will never be short of parts.

"Meccano teaches basic engineering skills, logical thinking, and the satisfaction of seeing a project to a successful conclusion. If it doesn't work, tweak it till it does. Then you can pull it apart and start on another project. The only limitation with Meccano is your own imagination."

Contact: nzfmm.co.nz/.



One end of Alan Bensley's segmented bridge-launching machine



Stephen Styles with his model



Peter Slatterthwaite
fine-tuning his
breakdown crane

Meccano wins

I'd sometimes wondered whether Lego had cornered the automation/robotic angle, but this exhibition proved that isn't the case; there was a Rubik's Cube solver, a Connect 4 player, and several printers/plotters.

Straight-out mechanically, I've never rated anything as being better than Meccano – and here we saw everything from a paper-dart folder to

a walking piece of steampunkery, from knitting machines to working clocks, plus spirographs and myriad other actuations. Back in the day, Meccano was even used to build 'differential analysers' to solve equations – last I checked, Motat had one. The format might be more than 120 years old, but it's still as valid as ever; as the host club's card claims, it is "more than just a toy". ►

**I've never
rated
anything as
being better
than
Meccano**



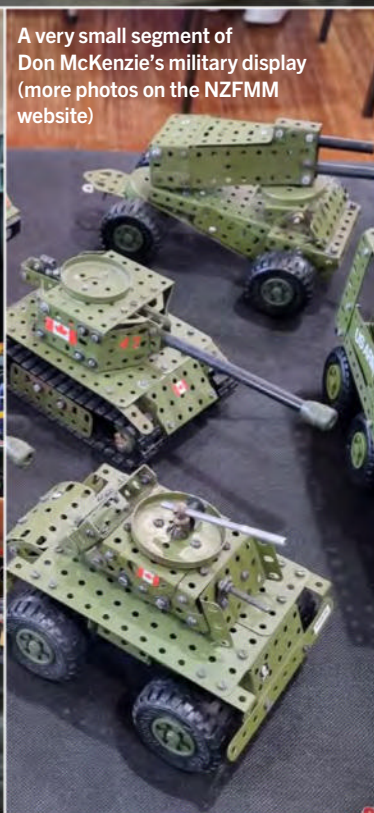
Early morning on Villeseneux airfield, 1917?
So little material, such an evocative statement



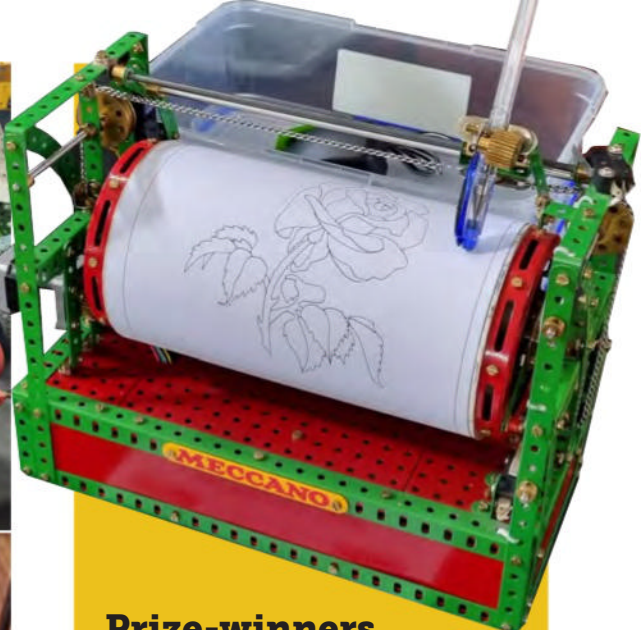
This display by Kevin Downie



Just add water: Team New Zealand AC75 by Stephen Styles



A very small segment of Don McKenzie's military display (more photos on the NZFMM website)



Prize-winners

1st Senior Exhibitor, and recipient of the NZFMM Senior Trophy: Stephen Westmoreland, for 'Clucky the hen'

2nd Senior Exhibitor: David Couch, for his 'Meccano artist', which drew pictures all day

3rd Senior Exhibitor: Stephen Styles, for 'Team NZ AC75 racing yacht'

1st Senior Public, and recipient of the Peter Hancock People's Choice trophy: David Couch, for his Connect 4 player.

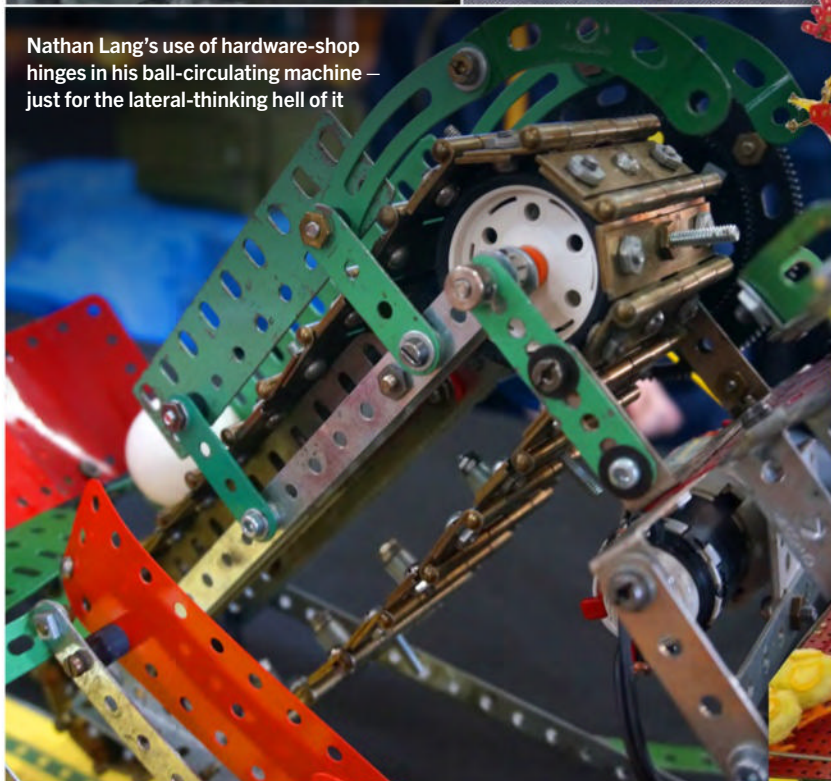
2nd Senior Public: Stephen Styles, for his amazing ping-pong ball machine.

3rd Senior Public: John Stark, for his French knitting machine

1st Junior Exhibitor: Alex Lang, for his construction site

2nd Junior Exhibitor: Sam Lang, for 'Big Bad Triker'

3rd Junior Exhibitor: Thomas Woermann, for his vehicle display



Nathan Lang's use of hardware-shop hinges in his ball-circulating machine – just for the lateral-thinking hell of it





Kevin Downie's classic block crane; the one every Meccano kid dreams of building

Below: Steampunk boat built from the Crazy Inventors series kit by Reg Barlow

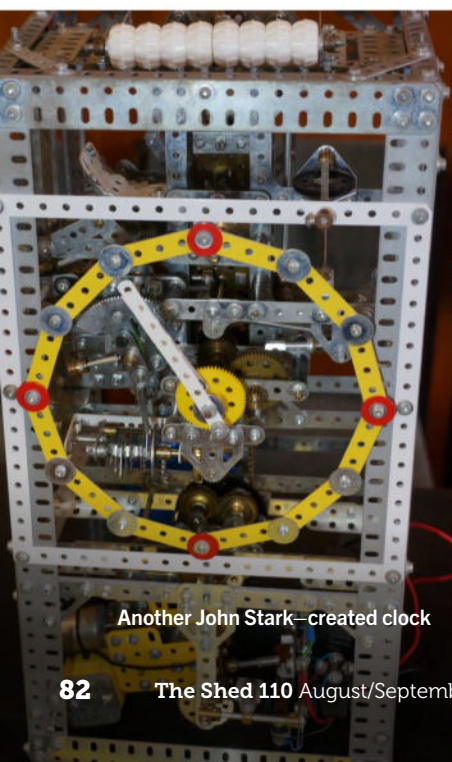
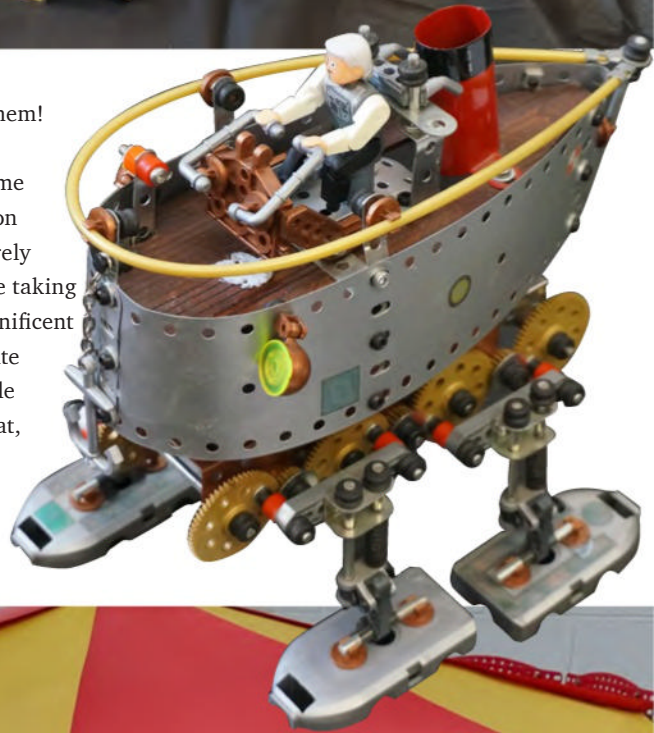
Original creations

I liked the subtle addition of non-Meccano items in some exhibits; sometimes because what was needed didn't exist in the catalogue, sometimes – as in Nathan Lang's use of hardware-shop hinges in his ball-circulating machine – just for the lateral-thinking hell of it.

Easily recognisable were some of the standard designs from the old magazines and handbooks, but many constructions seemed to have originated in the minds

of their creators – all power to them!

When writing a story such as this, the temptation is to find some personal back story, something on which to hang the narrative. Surely there were those – Kevin Downie taking seven years to assemble his magnificent block crane and promising his late wife that he wouldn't disassemble it, for instance – but I figured that, this time, the pictures paint the thousand words. So here they are – enjoy! 📁



Another John Stark-created clock

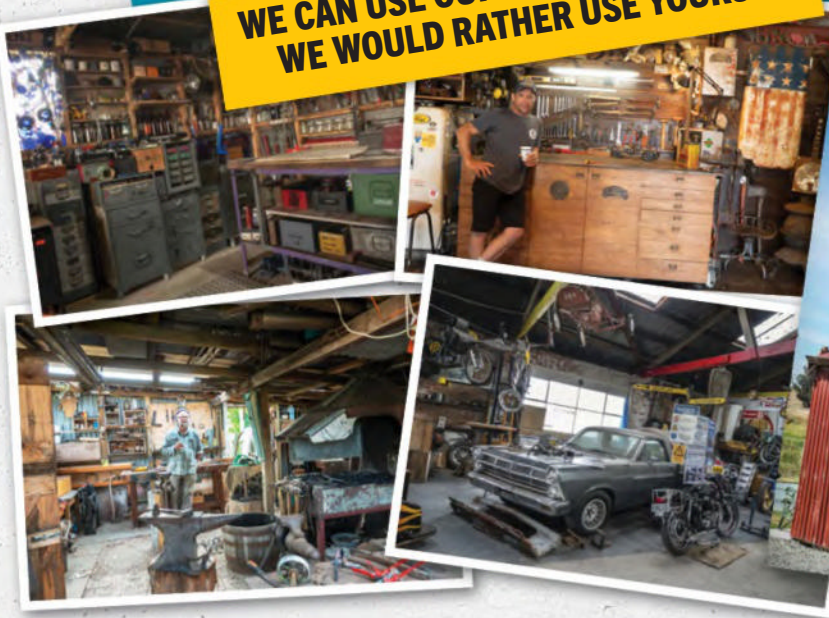


David Littlefair's Galloping Horses merry-go-round

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GHENT MAKER FAIRE

PART 1

Power-tool racing is just one of the imaginative conceptions at this maker faire

By Enrico Miglino
Photographs: Enrico Miglino

In this issue of *The Shed*, I have deviated from my series of articles dedicated to electronic projects to instead showcase the recent Ghent Maker Faire and its passionate electronics makers. This annual event took place in April in the city of Ghent in Belgium.

Compared with other more famous maker Faire events across Europe – Brussels, Rome, Hanover, to mention just the most renowned – the Ghent Maker Faire is considered a minor

event. However, it still played host to thousands of visitors and is well worth attending because of its very special character.

As you may have already read in the News section of *The Shed* Issue No. 109, the faire hosted the first European power-tool racing along the lines of New Zealand and US competitions. It was organised by the effervescent Henk Ryckaert, who was also the man behind the scenes for the power-tool racing on the first day.





These faire's
are the
ideal place
to present
innovations,
new boards,
commercial
projects, and
more

Handmade projects

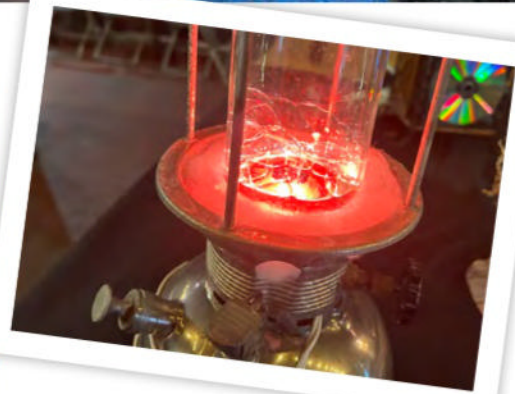
When visiting large makers' events, I expect a mix of commercial and non-commercial stands. These faire's are the ideal place to present innovations, new boards, commercial projects, and more.

Instead, the Ghent faire was dominated by an incredible number of handmade projects. Visitors could

see, experiment, ask, and be inspired by makers and hobbyists displaying their own projects. They could get a glimpse into the huge number of great ideas that can become a reality inside a maker's shed.

Many other characters and curiosities will be covered in the next edition of *The Shed* – Issue No. 111. ►





The success of the Ghent Maker Faire depends mostly on the opportunity for visitors to play with the tools and buildings, largely without any limitations. It was a joy just to walk around the stands and experiment in makers' labs.

Experiences ranged from playing with handmade games to seeing how tools and appliances work.

One of the more interesting and engaging aspects of this two-day event was the great attention paid to the educational aspects of the creations, not only for kids but also for makers, hobbyists, and engineers.

The variety of projects at the event was incredible: electronics, pneumatics, mechanics, art, music, and design were just some that attendees had the opportunity to experience



A highly skilled maker who creates appliances and games with microcontrollers, laser cutting, and 3D printing



Ardlab is the 'creature' of Hans (ardlab.gent), a highly skilled maker who creates appliances and games with microcontrollers, laser cutting, and 3D printing. A particular characteristic of his creations, which he develops using the principles of physics, is their educational value.

Ardlab is a member of the Flemish STEM (Science, Technology, Engineering, Mathematics) academy network; he teaches Arduino, the internet of things, and electronics, organising workshops for young people and adults in the Ingegno Maker Space (ingegno.be) ▶

Break-in-boxes (@break_in_boxes on Instagram) is a small group of makers that creates fascinating games: boxes with enigmas that resemble small, themed escape rooms. These are a mix of brain teasers and educational games, showcasing original methods of escape





Hobbyist makers Koen and Bert created this cycloid drawing machine. It can be used to simulate many kinds of mathematical curves, acting on gears of different sizes. The engine, which can be operated manually or with motors, is a lot of fun for children fascinated by the beautiful engineering behind the drawing.

The machine is the physical version of the cycloid drawing program simulation that can be found at cdms.be ►

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Mario 'il professore' started his STEM educational work by teaching activities for young makers in the school where he works; his first activities were focused on using 3D printing technology. Nowadays, working with the technical support of Ingegno Maker Space, he has created a dedicated maker space inside the school. The result is a growing group of enthusiastic children, aged 8 to 12 years, focused on designing, projecting, and prototyping any kind of digital machine



A project that invests in making digital fabrication accessible to anybody of any age

This stand promotes MaakBib, a network of maker spaces hosted in Belgian libraries. In Belgium, libraries promote creation activities for children to foster their STEM skills and knowledge — a project that invests in making digital fabrication accessible to anybody of any age 📖

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NORTHBROOK MUSEUM

This is a story about a man and his museum. It's a large museum with thousands of objects being exhibited in very large, purpose-built, connected buildings; a single article doesn't really do it justice. This, then, is more like an introduction, a taster if you like, to Richard Spark's Rossburn Receptions at Northbrook Museum, in Spark Lane, Rangiora

By Ritchie Wilson

Photographs: Ritchie Wilson



Rossburn Receptions chapel on the left, dining area to the right, Northbrook Museum hidden behind

Richard ran his family's dairy farm in partnership with his brothers John and Bob from when he left school until he retired 42 years later. Given his time over, he would do it all again. He can recall the names of long-dead cows and their milking shed stall numbers. He says that he inherited his love of cows from his mother. Margaret Spark agreed to move from Blenheim to Canterbury with her husband on condition that she could bring her dairy herd with her. This involved Richard's father, Charlie, and a mate, with a horse and dray, driving a herd of 28 cows and a goat, without dogs, from Riverlands on the outskirts of Blenheim to Sheffield in inland Canterbury, a distance of 270km. It took three weeks, averaging about 20km per day.

1930s messages delivered by bus

The men camped on the roadside or in a farmer's barn at night; the cows grazed on the grass roadside verges. This happened in the middle of winter, when the cows weren't producing milk. This period is called 'the dry' in dairying circles. The roads were nearly empty. Messages were sent back and forth between Charlie and Margaret, back in Blenheim with a baby, by the daily Newmans bus. The family rode out the Depression of the 1930s on leased land before moving to Rangiora in 1942.

They bought, for £2K, a 45-acre dairy farm called Rossburn, which lies close to what is now a wetlands reserve between the North Brook and South Brook streams on the edge of Rangiora. This is ideal

dairying country, but the main industry in the early days of European settlement was flax harvesting, with five flax-mills operating in the immediate area.

Like cutting sugar cane but without the snakes

The mills used waterwheels to drive machinery that stripped the fibres from the flax, which was then dried and pressed into bales. The bales of flax fibre were exported to Britain to be turned into rope for sailing vessels.

The harvesting of the flax, which then commonly grew in swamps, was done with a curved-blade knife, like a small, short-handled scythe. This work, often done in thigh-high cold water, was reputed to be as hard as cutting sugar cane, although without the snakes. ►



An AJS motorcycle that Richard has owned for 40 years, from the days when "nobody wanted them". Allis-Chalmers tractors lined up behind



Wooden waterskis



The original European owners were the Ross family, hence the farm's name. The Rosses planted an extensive orchard and some of their pear trees, brought from Scotland as seedlings, are still bearing fruit.

Richard's brother John Spark, like any good farmer, liked tractors, particularly the Allis-Chalmers brand, and began collecting them. The other brothers were involved in this, but Richard wanted to have an area of collecting that was unique to him. Being in the dairy industry, he decided to start collecting glass milk bottles.

Names cast in glass

At one time, there were hundreds of different dairy companies in

New Zealand that collected milk from farms in their area, processed and treated the milk, and bottled it in bottles that had the dairy company's name cast on the glass. A company would typically offer milk in one-quarter, one-half, one-, and two-pint bottles.

A 'pint', or 20 fluid ounces, is the imperial measure that equals about a litre. Two pints were called a 'quart'. There were many different milk bottles to collect. Richard joined the Christchurch Antique Bottle and Collectables Club and swapped bottles with other collectors.

He also went to garage sales on Saturday mornings, hunting for different milk bottles. Occasionally he would spot interesting items, some relating to dairying or farming, but often not,

and, having money in his pocket, he would buy whatever it was – if it wasn't too expensive.

At first, he would keep his bottles on the top of the family's piano; later, he displayed them on shelves that he built around the interior of the farm's original, disused dairy. At the time, he was confident that this would give him enough room to display all the bottles he was likely to collect, but after only three years, the various collections had filled the space.

Time for a new shed

Richard was experienced in erecting buildings on the farm and had bought a large number of old Australian hardwood telegraph poles, which he used in the construction of a new, large building.

Farm buildings have some similarities with museum buildings. They both have a high stud, a floor area as large as possible, and few – if any – windows. On most farm buildings, windows are an unnecessary expense. In a museum, they are a liability because they reduce security and, worse, let in light. Light accelerates the degradation of many old objects, particularly printed paper or cardboard. Much of the stuff Richard was collecting was in its original packaging, which greatly added to its appeal. This packaging would age rapidly in sunlight.

Time for a museum

Because Richard kept on collecting, it was only five years before a new, similar

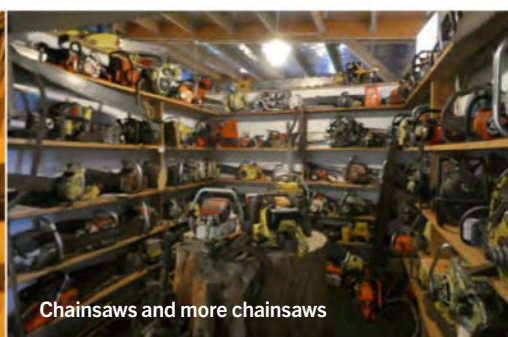
At one time, there were hundreds of different dairy companies in New Zealand that collected milk from farms in their area

Some of Richard Spark's original milk bottle collection, showing different bottle sizes and dairy company names





Old oilstone in its original box; carpenter's tools in the background



Chainsaws and more chainsaws



Tinned goods from the early years of last century

building was needed. Richard wanted his collections to be seen and the museum increasingly attracted visitors, who paid a small admission fee to view the relentlessly growing number of artefacts of our social history on display. These visitors often wanted a cup of tea or coffee and a snack. Richard and his wife Dawn used a small office in the building to brew tea and butter the scones that Dawn baked for the patrons.

A third voluminous attached space was completed in 2000.

By now, large groups of history buffs were regularly making lengthy visits and it was obvious that a large kitchen and dining room were needed to cater for as many as 200 hungry folk. The present reception area was completed in 2002, and made a significant difference to Richard and Dawn's life.

Time for a reception centre

One day, a neighbour asked if she could hire the dining room for her mother's post-funeral snacks. The Sparks didn't have long to think about this but said "Why not?" Rossburn Receptions has now catered for more than 1000 funerals – and 400 weddings. A local funeral home suggested a few years later that it was prepared to enter into a partnership with the Sparks to build a funeral chapel next to the reception centre. In fact, Richard and Dawn had been unsuccessfully looking for a small church suitable for relocation to their property for some time.

It was agreed that a chapel would be built by Richard and a builder friend to a

By now, large groups of history buffs were regularly making lengthy visits

design by the father-in-law of one of their daughters. The heavy gothic doors of the chapel were salvaged from the church in Blenheim where Charles Spark married Margaret. The chapel, now 100 per cent owned by Richard, is used for both funerals and weddings. Sadly, Dawn died two years ago.

An absolutely magic experience

When Richard travelled to the UK recently, his daughter Sarah – his second in charge at the reception centre – was left in charge.

Richard took two of his other daughters (he has four) to visit elderly relatives in England. A highlight of the visit was attending a performance of Giuseppe Verdi's *Aida*, produced by Robert Carsen and conducted by Mark Elder, at London's Royal Opera House, Covent Garden.

Richard thought that the opera, first performed in 1871 in Cairo, was wonderful – "an absolutely magic experience" – and well worth the \$460 admission fee. Yes, \$460! He was only four rows back from the stage and could see the whites of the performers' eyes.

In the final scene, when more than 100 singers were on stage, he was almost overwhelmed by the power of

the singing. He says that he gets a bit emotional just recalling the experience.

Pride of place

While in Britain, Richard, of course, kept a lookout for street markets and managed to buy a few interesting items, conscious that they had to be small enough to fit into his luggage. An interesting five-foot bifold wooden rule managed to fit into the bag of one of his daughters. Other objects purchased were a bronze thimble, a tiny boxed model of a horse pulling a tumbril from the 1930s, a set of antique darts, and a bone needle. The needle was particularly appealing because it may well be many centuries old. The whole collection was packed into a pre-war tin that originally, so the label said, contained 100 cigarettes.

The tin caused slight problems with airport security but not as much as a surveyor's chain, which is now displayed at the museum. This is one of the most significant objects Richard has. It is housed in a glass-topped cabinet, one of many that Richard has built using timber from trees grown on his property and particle board sourced from the nearby Canterbury Timber Products factory.

That surveyor's chain

The chain was originally owned by Arthur Dobson (always called Arthur



Richard Spark examining one of his recent purchases, a set of old darts in its wooden box, bought from a market stall in England

Dudley Dobson in Canterbury), after who Arthur's Pass, between Canterbury and Westland, is named.

Dobson used the chain during his 1863 survey of the South Island's West Coast. His book, *Reminiscences: 1841–1930*, tells of the difficulties he encountered. As he wrote, "The West Coast rivers were at all times very dangerous." Many, many early European travellers drowned crossing these rivers.

It is obvious that Dobson would have found it impossible to complete this first survey without the help of local Māori he employed – "They could light fires and pitch tents under any conditions" – and the goodwill of Terapuhi, "the most important chief on the West Coast in the 'sixties".

Dawn Spark bought the chain from a direct descendent of the great man, intending to give it to Richard as a Christmas present. A complication was that they would be holidaying in London on the big day, so Dawn had to smuggle the chain to England in her luggage. This she managed to do, and on Christmas

Surveyors' chains

Before the satellite-based Global Positioning System (GPS) was developed, land surveys were done using a chain of accurately known length. This was called a 'surveyor's' chain', or 'Gunter's chain', and was the brainchild of Edmund Gunter (1581–1626). Gunter made the 100-link chain four rods long. The 'rod' is a unit of length dating back to feudal times in England and is nowadays standardised at 5.03m. A chain is then 20.1m (or 66 feet) long and a link is 201mm.

A principal use of the chain was for measuring land area, which, before decimalisation, was designated in acres. One acre was originally 4 rods by 40 rods, or 1 chain by 10 chains, or 10 square chains; 40 rods was also called a 'furlong', a term derived from the words for 'furrow' and 'length'. This was the length of a furrow that a team of medieval oxen could plough before having to take a rest. An acre, then, is an area of ground one furlong in length by one chain in width. Ploughing an acre is a day's work for a ploughman and a team of oxen.

Some of these terms are still in use today. A cricket pitch is one chain long, and distances in horse racing are still designated in furlongs and miles. As every racegoer knows, one mile is eight furlongs (or 80 chains, or 320 rods).

New Zealand country roads were usually made to be one chain in width. The area alongside many waterways that is owned by the government is known as 'the King's chain', and we all look back nostalgically to the days when suburban building sections were a quarter acre (2.5 square chains).

The feature of the chain that led to its universal adoption was that it was remarkably accurate and practically indestructible. Arthur Dobson and his Māori chainmen would have dragged his chain through muddy flax swamps, across streams, and along beaches without fear of damaging it. Getting a new chain in 1863, on the South Island's West Coast, would have been a Herculean task.





Outboard motors

Few would twig that it is a device for drilling a well

day gave it to her husband. He was, as you would expect, very pleased. He soon discovered, however, that a surveyor's chain is a considerable weight. It was also, rather embarrassingly, detected by Customs officers, who had not the slightest idea what it was.

What is that?

Richard has a distinct liking for objects with a bit of age that don't have an immediately obvious use – especially if they are related to farming. He pointed out many objects that would baffle the lay person; for instance, steel shoes, which used to be fitted under the wheels of heavily laden wagons, pulled by bullocks, when they were travelling down a steep road. The shoes were linked to the wagon by chains and sat under the rear wheels, sliding along the

road as the wagon slowly descended the gradient. The friction between the shoes and the road acted as a powerful brake.

Another unusual object – Richard actually has two of them – is a steel rod, about 20mm in diameter and 2m long, with a very heavy iron weight attached to one end. Few would twig that it is a device for drilling a well. The weight forces the rod into the ground until it reaches the aquifer, which around Rangiora is very near the surface. The rod is pulled out and there, amazingly, is a well.

A third mystery object is a small cylinder with a magnifying lens at the top. Its purpose is to assist the removal of thorns from the fingers of shearers. The afflicted finger is inserted into a hole in the side of the cylinder and the thorn observed through the lens. A needle is used to dig out the magnified object. Who knew that such a thing existed?

No Rangiora butter churn – yet

There are many butter churns on display. Butter churns were made all

around New Zealand including, rumour has it, in Rangiora. The maker's name and address are proudly stencilled on many. Richard has been looking for many years for a locally made one – so far unsuccessfully.

The process was that the cream in the milk from the cows was separated (in a separator) from the milk and put into a churn. The churn's handle was turned for a significant time until the fatty and watery parts of the cream separated and the fatty part transformed into butter. The liquid part was called 'buttermilk'. That's not the end of the story, because the butter was then refined in a butter conditioner, which worked the butter further to wring out the last vestiges of buttermilk. All this was hard work, often performed by the farmer's wife or child. Several separators and butter conditioners are displayed.

Themed areas

The museum's huge space is divided into many bays, each with a particular theme. There are collections of



Just a few of the large number of butter churns on display. An American example is in the centre of the picture. The number plates above date from the days when a new plate was issued when a vehicle's registration was renewed; different colours for different years



A hand-operated separator for separating cream from milk. The yellow tin on top contains ointment for rubbing on cows' teats



A butter churn made in Christchurch

chemists' products; kerosene and petrol tins; chainsaws; children's toys; magic lanterns; Victorian dresses; paint; dentists' equipment; water skis; telephones; books; outboard motors; and much, much more. Many hours could be spent looking at this fascinating stuff, these relics of our past.

One rather horrifying object was donated by a Rangiora local whose father worked at Paparua Prison many years ago. It is a cat-o'-nine-tails, probably made in England. Flogging with the cat-o'-nine-tails was inflicted on young men in New Zealand as a judicial punishment from 1867 until 1935 for offences such as theft. This would be a similar punishment to that meted out at one time to Royal Navy sailors under the age of 18. Interestingly, the Navy stopped punishing young ratings with the cat and began using the birch from about 1865.

The cat-o'-nine-tails was also used from the mid 1890s in New Zealand on adult men as a punishment for, mainly, sexual offences. They received from 10 to 15 strokes from the device.

Bring back the birch

In the 1970s, in Australia and New Zealand, there were calls to reintroduce

corporal punishment, using the slogan "Birch the bashers", the 'bashers' being violent street criminals and the 'birch' being a bundle of five or so thinnish twigs, not necessarily from the birch tree. The birch may have been a more severe punishment than the cat. Richard has read that a doctor was required to be present when a flogging was inflicted.

It is a great pleasure to be accompanied by Richard while looking around his museum; he has something interesting to say about any object that is brought to his attention. He pointed out how carefully, almost beautifully, this nasty object is made.

One aspect of having a large collection accessible to the public is that people will give you things that they think are suitable for display so that, almost by inertia, the number of objects in the museum increases.

Blacksmith's forge

Prominent near the museum's entrance is a blacksmith's forge, originally located in Blenheim. Richard dismantled the brickwork, shipped the bricks to Rangiora, and rebuilt the forge in its present location. It has all the different tongs and hammers used for holding and shaping hot steel. The very large anvil became available some years later when it was sold in a farm's clearing sale.

There are hand-operated blacksmiths' drills and a gas-welding plant.

Just adjacent is a collection of water

Right: A flax press used for compressing the bundles of flax fibres into the smallest possible volume. The man in the picture was the manager of the operation

Flogging with the cat-o'-nine-tails was inflicted on young men in New Zealand as a judicial punishment from 1867 until 1935

rams of different sizes. These were very common in Christchurch last century. They amplified the slight pressure of water flowing through the aquifers beneath Christchurch to lift water from the aquifer to an elevated water tank and so supply a household with water. On quiet nights, the staccato banging of the water rams could be heard, especially in western parts of the city, which for a long time didn't have a reticulated water supply.

Stanley's best plane

In the original part of the museum is a large collection of woodworking tools: planes of many kinds, routers, braces of antique design, saws, and drills. Some of the planes are rare and valuable. Particularly intriguing was a cardboard box, sadly empty, for a Stanley 604 Bedrock smoothing plane. This is arguably Stanley's best and most useful plane, only made between 1900 and 1943, and so not very common and rather expensive to buy today.

The striking thing was the immaculate condition of the box. It could have been brand new. It is unusual to find oldish Stanley plane boxes in even

passable condition in New Zealand.

Tools have always been relatively expensive in this country and tradesmen pre World War II would have bought only tools that were essential to the jobs they were doing. Useful tools, such as a smoothing plane, would have been in continuous use and their boxes would soon have fallen apart and been discarded. This box must have sat on a shelf, in the dark, undisturbed, for many years before surfacing in Richard's museum.

Millstones and more

Outdoors, in front of the reception centre, are some very heavy objects, impervious to the weather and of considerable historic interest.

One is a circular millstone, about a metre in diameter, made up of pieces of some quartz-like stone. The surface has been flattened and then incised with shallow channels (called 'furrows') in a distinctive pattern.

The pieces of stone are held together by a band of iron around the millstone's circumference. In a flour-mill, one millstone is rotated on top of another stationary one called a 'bed stone'. ►



The flax press

Perhaps the largest object displayed – certainly the tallest – is a flax press.

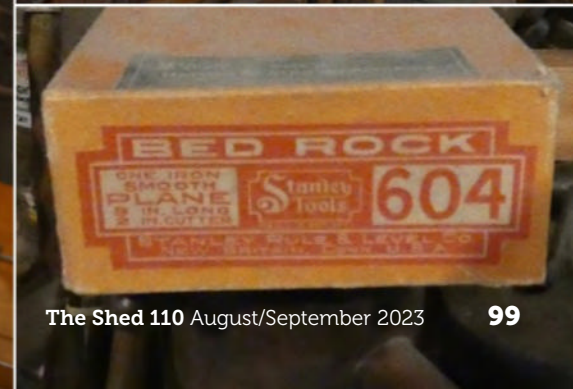
This is a timber cage with a central screw, turned by a lever, that compressed dried flax fibres into bales. The idea was that the compressed flax would take up less room in the hold of a ship and so cost less to be shipped to Britain's rope-works. When Richard first saw the device, it was in a building that had had part of its ceiling removed to accommodate the press's great height. Turning the screw to lower the board that pressed on the flax must have been a tough job. The compressed flax bale was bound by ropes to keep it small. Richard thought that the rope, rather rough in appearance, was probably made by the flax-mill for this purpose.



Very large anvil with the rebuilt forge from Blenheim in the background



Carpenter's corner at Northbrook Museum



The Shed 110 August/September 2023



The doorstep from Rangiora's Red Lion Hotel public bar. The top surface was originally flat. To the left is a millstone from the Southbrook Flour Mill

It is made of a hard limestone, much harder than Oamaru stone

Grain is fed into the small gap between the millstones from the centre, and flour exits from around the edge.

The gap between the two millstones is changed, depending on the speed of rotation and the type of grain being milled.

The stone came from the Southbrook Flour Mill, which was powered, like the region's flax-mills, by an undershot waterwheel. An undershot wheel just dips into the moving water of a stream. Some of the stream's kinetic energy is transferred to the wheel and turns it. These are less efficient than overshot wheels, where the weight of falling water in the wheel's buckets provides the energy. On the flat Canterbury plains, there isn't a sufficient fall of water in most streams for overshot wheels to be possible.

A grindstone wheel

The second, quite similar-looking survivor from the past is a grindstone wheel. This is also circular, although not quite as large, and has been made from a single piece of coarse sandstone, possibly originating from the UK or even the Middle East. It is just possible it is made from a local stone.

The wheel would have been turned using a crank handle, and its wetted, rapidly moving circumference would have been used to sharpen axes, knives, sickles, and scythes – anything with a cutting edge, really. The turning of the grindstone's handle would have been another arduous task for a child of a farming family. Millstones are

also called 'grindstones' in Britain, and 'whetstone' is another name for a grindstone.

The pub doorstep

There is also another lump of stone that was originally flat but has been given a curved top by generations of hobnailed boots. It is made of a hard limestone, much harder than Oamaru stone, and formed the doorstep of the public bar of Rangiora's Red Lion Hotel.

Richard salvaged the doorstep along with its companion from the private bar while the hotel was being demolished. He has regularly stepped in and saved interesting, even historically important, stuff destined for landfill.

Richard was tickled that the wear on the private bar doorstep, which is now

in another Rangiora museum, was so much less than that on the public bar one. The more well-off patrons' shoes were obviously less abrasive than the workers' boots.

Our history on show

The overall impression of Richard's museum is that it is a very extensive collection of objects that were once commonplace in ordinary folk's houses and workplaces but that have now disappeared; tangible artefacts of our shared social history.

What of John Spark's tractors, which started Richard's collecting journey? A space has been found for them too, in Rossburn Reception's Northbrook Museum; a whole building in fact. 📷



Whiteware from the days before it was white. From left: electric stove, refrigerator, another stove, and a wringer washing machine

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BUILDING A WATTLE GARDEN SHELTER

Ancient methods still have their place in modern buildings

By Bob Van Putten

Photographs: Bob Van Putten

I needed to build a new shed and it was already late fall. In my defence, I'm pretty sure most homesteaders in areas with heavy winters have a mad scramble every fall, finishing all the things that have been put off to the last minute before snow flies. However, there was no way the old shed was going to survive another winter; it was already being held up with props.

Demo time

The old shed had been a rabbit hutch at one time and I hadn't bothered to tear it down once the rabbits were gone. It then filled up with stuff, as sheds do. The replacement was going in the same spot, so first I had to empty and tear down the old one. I got to sorting through the junk and got rid of most of it. The only real reason I need that shed



The logged area gleaned for poles

is to house a generator to power tools in my nearby shop. Nevertheless, I figured I'd make the new shed 8x11 feet (approx. 2.4x3.3m), which was somewhat bigger than the old one, with a higher roof – they always fill up.

Up here in Washington State, US, lumber prices have truly skyrocketed recently. We've still got plenty of trees, and loggers to chop 'em down, so it isn't scarcity driving up prices. Whatever the reason is, prices have tripled or more in the past year. That's a good reason to find something else to build with.

An opportunity

Using recycled and natural materials takes longer than a trip to the lumber yard but, like most woodland denizens with no visible means of support, I'd rather spend time than money. Besides, I had a shortcut. Two years ago, a section of forest near me was logged and we had permission to glean the area for firewood.

When a forest is logged, everything is cut except for a few trees to reseed the area. All the young trees, saplings, bushes, and trees unsuited for lumber are flattened, run over by harvesting

machines and skidders, or cut to make room for them. Then the whole area is often bulldozed, piling up debris into huge mounds that are left to dry and are burned during the winter a year or two later. The devastation is terrible, but an endless supply of firewood and poles is left behind. Whole stands of tall, young cedar and larch trees up to six inches in diameter were simply knocked over and left. Perfect building material, don't you think? Gathering the poles didn't take long. I got 20 in all: six cedar uprights, 12 larch rafter poles, and two big top-plate logs. ►



We preserved the ends of the uprights by charring them well in a fire

Whatever the reason is, prices have tripled or more in the past year



Peeling the bark from the logs



To cut the notches, I clamped the log to saw-horses so that it couldn't roll



Front and rear frames installed

Prepping the timber

The first step in turning logs into building material is to debark them. This is easiest to do when the log is cut in the spring when the sap is up. Then, with some species of trees, you can peel the bark off in one piece, and use the big sheets of bark to roof cabins or make canoes. A 'barking spud' is the tool for removing loose bark, and is often made by grinding the head of a shovel down to a small, sharp chisel or spoon shape. The long shovel handle lets you work standing up, basically walking down the log, scraping the bark off as you go.

If a log is cut later in the year or is just a cantankerous species, it can be rather more work to get the bark off. Then, the best way is to set the log on saw-horses at a comfortable working height and use a big, sharp draw knife. Big draw knives can be

Natural logs are never perfectly straight and smooth, and that can make this interesting

expensive and hard to find these days. I made mine decades ago from a good carbon-steel machete, grinding a chisel edge on the blade and welding on handles. It works very well, and I've peeled a great many logs with it.

Easy layout

Laying out a small shed is a snap. I put two straight two-by-fours on the ground and kicked them around, using a tape measure to check between them and between diagonal corners. When the measurements all match, the two-by-fours are parallel, and I set stakes along them to mark where the posts go.

The holes were dug, a big rock put in the bottom of each

hole for a little drainage, the post set in and well tamped, using a level to make sure to get it as vertical as possible. Natural logs are never perfectly straight and smooth, and that can make this interesting. If a pole curves, set the curve along the line of the beam above, not out of line.

Then the tops of the posts are all cut level. I made an arbitrary mark about 8½ feet (approx. 2.6m) up on a front corner pole, and transferred that mark to the other front poles with a tightly stretched cord and a level. The same was done with the back posts at 5½ feet (approx. 1.7m).

Cutting to height

Once marked, I sliced them off with the chainsaw while standing on a ladder. The only trick is holding the chainsaw blade horizontal while you cut. I think this is something that you get better at with practice, but be sure to wear hearing protection, goggles, and a broad-brimmed hat, because you are going to have your face rather close to that saw, and it's going to be spitting sawdust at you. Make sure of your balance and stance before cutting. If you fall off the ladder, remember to throw the running saw away from you – and don't blame me; I do it all the time.

The top-plate logs must have small flat spots chiselled into them where they rest on the posts. The plate log will have some taper, and any bend must go up



Use plenty of overhang on the rafters to keep the walls dry

or down, not out of line with the posts below. Notch the skinny end of the pole about ½-inch (12/13mm) deep, then measure how thick the fat end is and cut the notches as needed to keep the log as level as you can. You can stretch a string down the log to check for any bend, or just eyeball it.

Notches

To cut the notches, clamp the log to saw-horses so that it can't roll. Mark where the notches will go, taking your measurements from the top of the poles. Make horizontal saw cuts across the log a little less deep than the notch needs to be, and clean it out with a chisel. Holding the chisel upside down will keep it from digging in deeper. Put the top plate up and spike it in place. Don't try to hammer a spike all the way through the top plate; drill a pilot hole!

Cut a shallow notch at the small end of the top-plate log. Make the rest as deep as needed to keep the plate level. Drive long spikes through the plate into the posts.

Next, cut all the rafters to the same length. Put all the big ends of the rafters on the high side of the roof. Set the two outside rafters first, stretch a cord between them, and use this to line the rest up. Use plenty of overhang to keep the walls dry.

Ensuring a flat roof

Some folk notch every rafter pole to fit the plate; I only notch the ones needed to make the roof reasonably flat, and use spikes to hold them in place. Notch the rafters, not the top plate!

Measure the ends of the rafters, figure the minimum, and roughly notch the rafters as needed with a sharp hatchet as you put them in place. Drill a pilot hole through the rafter and nail it in place with a long nail. I set them about a foot centre to centre.

Then the project stalled. I had no

idea what to cover the shed with. I had enough old metal to cover the roof, but no timber or plywood. I always sheath roofs with plywood or boards over the rafters, then tar paper and roofing metal. I have seen many roofs of metal over purlins fail with heavy snow loads or age. ►



Weaving walls of little sticks has got to be the earliest way mankind made shelters





If you can't
stomp around
on a roof,
don't trust
it to protect
the building
below

The roofs that don't collapse leak like sieves. Down the road, the screws back out and rain leaks in, everything gets wet, and the purlins start to rot. Even when new and tight, bare-metal roofs will drip condensation, which also causes rot.

My pet peeve

Trees falling on roofs do terrible damage, and it's difficult to repair because the roof cannot be walked on. Sheath the roof over the rafters, put down a double layer of tar paper, then roofing metal.

When the fasteners back out, water leaking past them harmlessly rolls down the tar paper and out the eaves, and there is never any condensation. Trees have fallen on my roofs with no resulting leakage and only minimal damage. I admit this is a pet peeve of mine, but who would cover an expensive building with only a paper-thin steel 'tent'? If you can't stomp around on a roof, don't trust it to protect the building below.

Recycling joy

As it turned out, that week my wife asked me to build a wood shed for a retired lady who lives alone on a dilapidated farm. She had no money for the project but there was a collapsed barn we could pillage for materials. The barn had been built almost a century ago and the remains were in bad shape, but it was good enough for a shed. We dug through the wreckage and salvaged boards and timbers; we found several rolls of tar paper and a few boxes of nails.

For two days, the three of us worked like crazy scavenging and hammering out a sturdy shed from the remains of the barn, about the size and shape of the one here. Then we spent a day stacking it full of firewood for the coming winter. This shed didn't cost a penny and no time was wasted driving to town for stuff. From this project, we took home tar paper and enough one-inch-thick (25mm) rough-cut barn boards to roof our shed!



The sunlight filters through the walls with a beautiful effect

Starting the walls

What about the walls? Lacking 'real' lumber, I framed the side walls with sticks. Cedar bottom plates were cut, pounded in place just above the ground, and toe-nailed in with galvanised nails.

Then smaller, upright studs were set in, about two feet apart, and nailed. These framing poles are not notched into place but rather cut a little long and pounded in place with a heavy hammer, which compresses the end grain, making a very tight fit, then toe-nailed. This works especially well with green sticks, as the end grain compresses well.

Looking around the homestead for something to cover the walls with, I saw a big pile of cedar branches. They were left over from when I built a split rail fence and were waiting to be burned. Inspiration struck! I'd already cut up the bigger limbs for firewood, and only small branches were left. Could these be used? Talk about using every part of a tree!

As old as man

Weaving walls of little sticks has got to be the earliest way mankind made shelters. The method was used by nearly every early culture on the planet.

In England, it's called 'wattle'. I gathered a faggot and set to work. My efforts looked crude, and the dry cedar branches took considerable force to weave. I was worried that I was going to spring a stud out of the wall, but the alternating weave evens the thrust on each side of the studs, locking them firmly in place. It makes a stout wall. The work gets better with practice, producing a tighter weave, but it's one of those things that looks better from a distance!

Eventually, we ran out of cedar branches and started cutting alder saplings, which we have growing in abundance by our pond. Alder is a small, fast-growing softwood that usually isn't considered good for much of anything, but alder charcoal is great for smoking meat, makes excellent gunpowder, and the saplings are very easy to cut and work. They proved to be ideal for wattle – much easier to weave than stubborn cedar. ►

The best way is to lay the posts down in a trough of oil and soak them for several months, saturating them completely



Making wooden posts last

Some species of cedar, redwood, locust, cypress, and so forth will easily withstand 20 years or more of contact with the soil. Other types of wood will rot out in five years, and then there are termites and carpenter ants to consider.

Pentachlorophenol (penta) is probably the best wood preservative known to mankind, but it's such nasty stuff that it's been outlawed in many places for some time now. Creosote is another good preservative that has been used for more than 100 years, but is also now mostly banned. These days, various copper and arsenic compounds are sold but they do little good when only painted on the surface of wood. Commercially available pressure-treated wood has these compounds injected to saturate the fibres.

Charring posts is another traditional way to help preserve them. Charring hardens the wood, makes a charcoal layer that most critters do not care to eat, and might even deposit some creosote. Charring can double the life of a post.

Another old-time method of preserving wooden posts is to soak them in used motor oil. I imagine this method was developed in America shortly after Henry Ford started cranking out automobiles that ordinary folk could afford and used motor oil started collecting on homesteads everywhere. What to do with the stuff?

Of course, a frugal homesteader wouldn't simply throw it away, but it can't be used in lamps and you can't cook with it or feed it to the pigs, so what's it good for? Posts soaked in used motor oil last quite well. I've seen folk set posts upright in steel drums to soak the butts in oil for weeks or months, but every time the result was a royal mess because the drum fell over, or got filled with rainwater, overflowing the oil.

The best way is to lay the posts down in a trough of oil and soak the whole lot for several months, saturating them completely. The trough is usually welded up from several steel drums and set in the back of a barn somewhere. Above the trough are racks to hold the posts. After soaking, the posts are placed in the racks to drip dry and for storage. Framers would cut posts as little as three inches (76mm) in diameter, peel the bark, and toss 'em in the oil. Six months later, the posts were moved to the racks to dry for eventual use. Wooden fence posts treated this way are said to last at least 100 years!

Of course, this method takes time, and fence posts are only eight feet (2.4m) long. A 10-foot (3m) post for a building isn't going to fit in the oil trough. The method I evolved is to char the posts well, then saturate the butts as best I can with used motor oil. I've been doing this for 20 years now; so far so good. I've also charred posts and slathered them with hot tar, which works very well.

A small toolkit

Not too many tools were needed for this project. My trusty chainsaw, draw knife, shovel, tape measure, level, chisel, a hatchet, and a hammer made the frame. For the wattle work, a long-handled lopper and a good heavy bowie knife were the most useful. If necessary, the whole thing could probably be done with just a machete.

In England, wattle was used to fence in animals. Buildings were often framed with timbers and wattle was used to fill in the gaps between the posts and beams. It was then covered with lime plaster known as 'daub'.

I'm sure wattle was widely used in England because of the scarcity of timber. Wall panels and fences could be made of fast-growing saplings, saving big timbers for other things. The very first buildings made in colonial America were half-timbered dwellings with thatched roofs, just like in England, but wood was so abundant that folks immediately started building everything with logs and squared timbers.

Not a bad result

For now, we left the walls the way they are. Sunlight filters through them with a beautiful effect, and I figured that if snow blew through and piled up inside we could 'daub my wattle' next year. My wife said that sounded like something that shouldn't be said in polite company. The walls could be slathered with clay-rich mud, gypsum plaster, cement-based stucco, or even lime plaster as in the days of yore, but it strikes me as a rather labour-intensive way to make a wall.

I'm happy to report that this garden shed has withstood four feet (1.2m) of snow and has held up fine. Not bad, considering it didn't cost me a single cent or a single trip to the store. All the spikes and nails were found at yard sales over the years for almost nothing.



Eventually, we ran out of cedar branches and started cutting alder saplings

I think it's beautiful in a rustic sort of way – much nicer and more interesting to look at than the typical utility shed. I bet wattle would make a heck of a gazebo, or a fun lean-to for the kids to camp out in the backyard, not to mention a good project for them to build. It seems the oldest of building materials can still be useful! 🛠️

If necessary,
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be done with
just a machete



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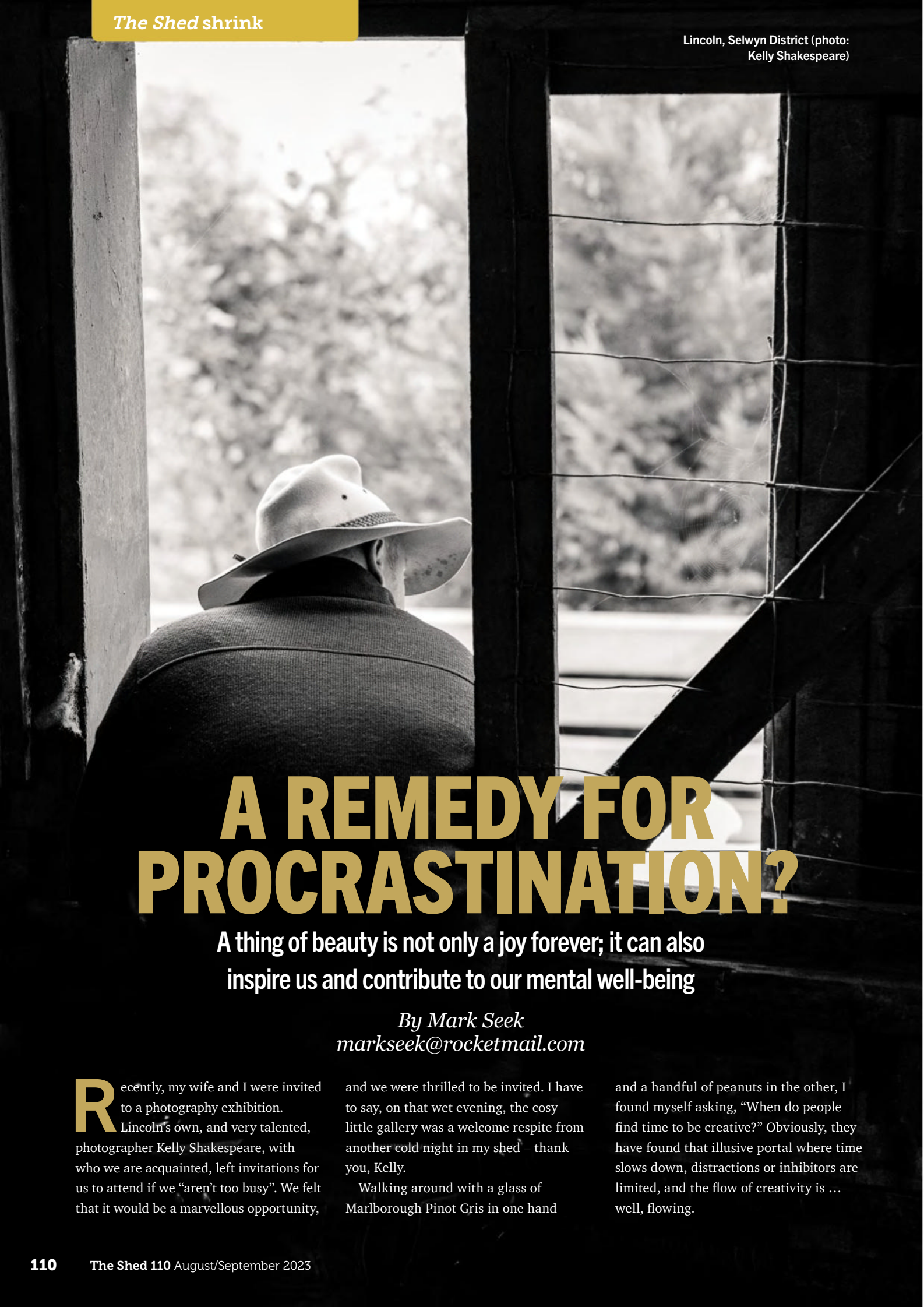
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A REMEDY FOR PROCRASTINATION?

A thing of beauty is not only a joy forever; it can also inspire us and contribute to our mental well-being

By Mark Seek
markseek@rocketmail.com

Recently, my wife and I were invited to a photography exhibition. Lincoln's own, and very talented, photographer Kelly Shakespeare, with whom we are acquainted, left invitations for us to attend if we "aren't too busy". We felt that it would be a marvellous opportunity,

and we were thrilled to be invited. I have to say, on that wet evening, the cosy little gallery was a welcome respite from another cold night in my shed – thank you, Kelly.

Walking around with a glass of Marlborough Pinot Gris in one hand

and a handful of peanuts in the other, I found myself asking, "When do people find time to be creative?" Obviously, they have found that illusive portal where time slows down, distractions or inhibitors are limited, and the flow of creativity is ... well, flowing.

Spiritual well-being

Over the years, there have been many artists that I've had a penchant for, most of who have prompted me to look at life and appreciate how others view it. My appreciation for art provides a new energy for my own 'ongoing projects'. This allows me to move in a positive direction and overcome – dare I say the word! – procrastination.

Early in my teens, I was given a book of drawings by Rei Hamon. His work left an impression on me; even to this day, I find it incredibly moving and somehow spiritual. I was lucky enough to purchase a signed print of the magnificent stag work that the artist famously sold for \$20K.

In early life, Rei was a humble bushman working in the kauri forests, cutting his teeth on the big double-ended saw. Years later, he was thrown off a horse and bedridden. Unable to work, he began drawing images of the bush from memory. These wonderful expressive images came to life on paper with his simple method of strategically placed dots – how extraordinary!

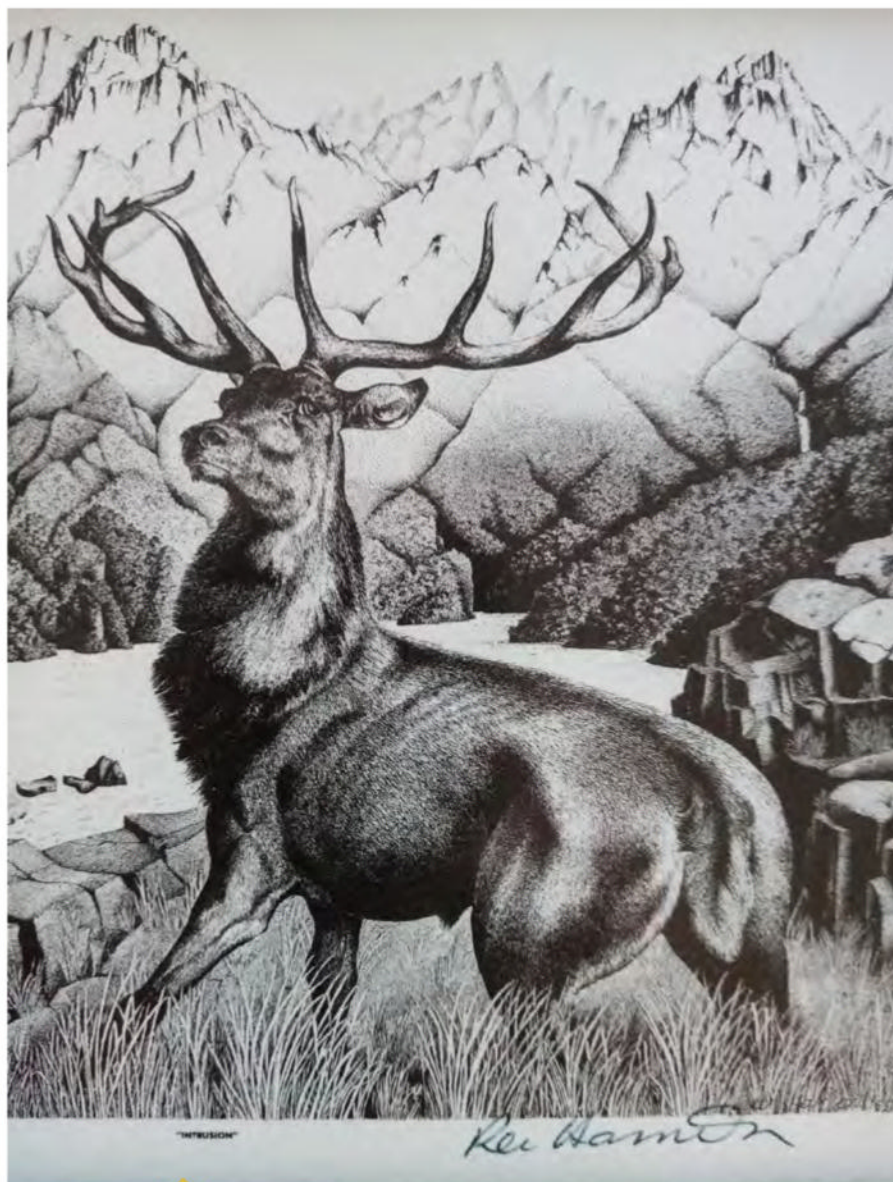
Another familiar artist – and coincidentally my intermediate school art teacher – was Val Raymond, who resided at the volcanic plateau of Taupō. Val could often be seen on the lake-shore with her easel and watercolours. I will always cherish her renditions of the Blue Lake where I grew up, because those scenes were my everyday backdrop.

My recent art purchase came from South Brighton here in Christchurch. The artist took his inspiration from street art. Clint Parks, aka PORTA – a painter and decorator by trade – has become a master of stencil art.

Art as therapy

In recent years I have incorporated art as a method of therapy, and the results have been truly remarkable.

More recently, in a prison setting, I offered inmates the opportunity to engage in an art programme aimed at reducing the mindset of addiction and behaviours associated with this disease. With the approval of the New Zealand Department of Corrections, I established



Unable to work, he began drawing images of the bush from memory

a successful therapeutic programme, creating healthier thinking and potentially reducing mental unwellness.

I would encourage *The Shed* readers to go out and buy a simple sketch pad and a box of pencils and spend some time doodling/sketching – perhaps take the grandkids with you. Alternatively, you could take a camera/phone on a walk.

There are some marvellous art or photography groups you can join.

Some experts suggest that capturing these memories can be helpful for us when we are not having such a wonderful day. I have found that inspiration from others can be a real encouragement — I was going to say

“a gentle kick up the bum”, but I don't think we are allowed to use such terms any more – to get my dusty, half-finished projects completed. The challenge is yours, fellow sheddies. 📁

More info and resources

Here is an up-to-date list of contacts/resources to support men's health and well-being: <https://docs.google.com/spreadsheets/d/1UHW4cqS8fTjEIDKk2G8FET05FGTYq0bP/edit#gid=109966448>.

JUNKYARD GENIUS

“Creativity is seeing what others see and thinking what no one else ever thought” – Albert Einstein

By Chris Hegan

Photographs: Brian High and Martin Horspool



It is generally regarded as wisdom to ‘leave well enough alone’, but Martin Horspool is not having a bar of that.

Here is a man who considers nothing worth having, using, or wearing until he has either found a novel use for it or transformed it utterly. Nothing is spared – not his Honda 50 step-through, not the lamp over his desk, not the desk itself, not even his own hair, a white mane that stands straight up like bristles on a yard broom.

Everything around Martin bears his original and always stylish stamp. For the past 16 years, this odd bent has provided the former printer with a nice supplementary income, but,

as of August last year, this is his new career: the Buggyrobot guy of Oamaru – Steampunk Town.

Steampunk city

In his converted granary studio in the heart of the town’s Victorian precinct, Martin carefully designs and fashions ingenious model robots, using a painstakingly accumulated and meticulously categorised hoard of engineering junk, most of it harking back to the days when having ‘Made in England’ stamped on something marked it out as being the best you could get.

Half the pleasure of viewing one of the many robots surrounding their tireless creator is in trying to work out what ►

Nothing is spared – not his Honda 50 step-through, not the lamp over his desk



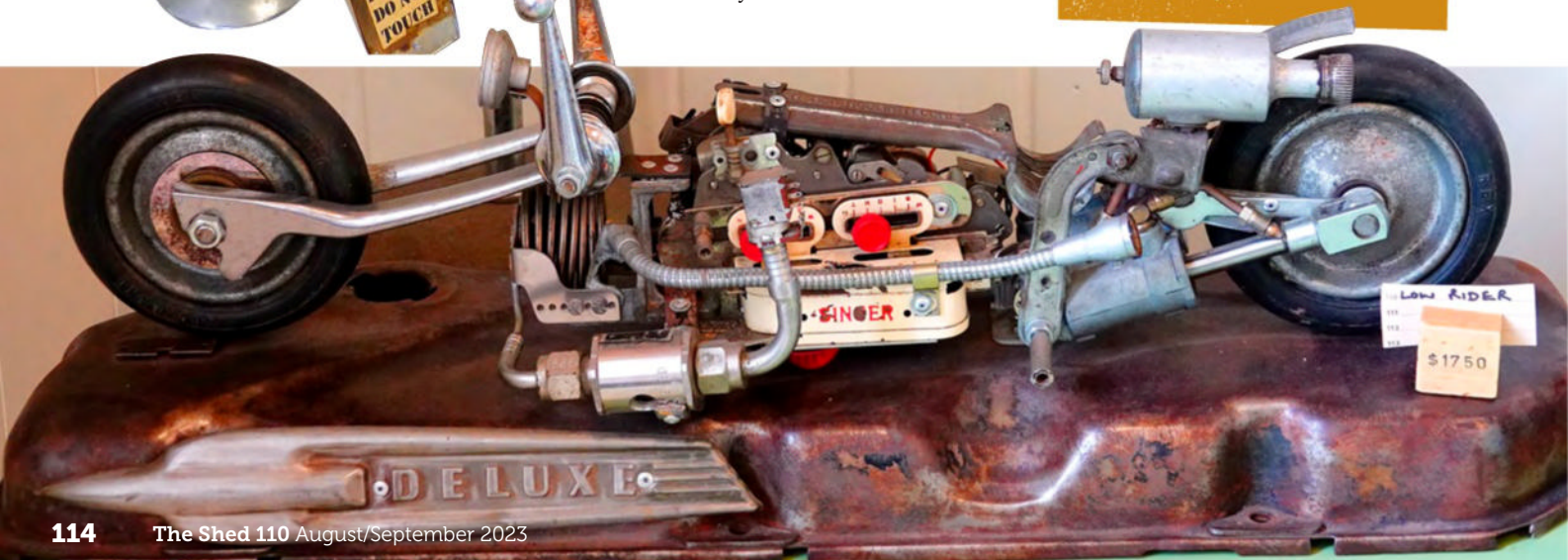
Happy in his work:
Mr Buggyrobot

The showroom of a man of many talents

A man's workshop filled with his creations. In the foreground, a large, green, cylindrical robot with a red head and multiple eyes stands on a green table. Behind it, a television screen displays a photo of the man. The walls are covered with various items, including a large set of antlers, a golf club, a metal lamp, and several signs, including one that says "EMO". On the table, there is a small motorcycle, a robot, and other mechanical projects. The man is standing in the background, smiling.

A large, industrial-looking device with two vertical, ribbed columns and a circular frame. A sign at the bottom right of the device reads "PLEASE DO NOT TOUCH". The device is labeled "Mrs Splorebot".

Martin's subjects were always mechanical. Hot rods were a favourite; anything machinery related



It all began in the valleys

It all started with drawing, back when Martin was a schoolboy in Llangollen in the Welsh valleys. That is how it is spelled, but when Martin says it, we hear no 'Ls'; rather, we hear noises that have no equivalent in the English alphabet – the Arabic, possibly. He has been gone from Wales for 25 years but the lilt still shows through.

Martin's subjects were always mechanical. Hot rods were a favourite; anything machinery related. He still draws, but even his cartoon figures are constructed like engineering designs. He makes no secret of his influences.

"Wallace and Gromit, obviously; '60s horror movies – *Dracula*, *The Wolfman*; David Bowie; anything industrial, particularly British industrial design from the '50s and '60s — I love that stuff. I don't know – I'm all over the shop in my head," he says.

Martin enrolled in art school but, perhaps characteristically, chose the wrong courses.

"I should have done industrial

design. [The course] did involve a bit of printing, and I was young, wanted money in my pocket, so I signed on as an apprentice at the town's main industry, a big printing plant," he says.

He soon had enough money to buy his first machine: a '67 BSA 250cc bike.

The land of the long white cloud

Martin settled down to life as a printer in his hometown, and met his partner Wendy, but, as the century drew to a close, he decided that he wanted a different life story.

"Llangollen is a beautiful place – almost nobody leaves – but I had always been attracted to New Zealand," he says. "I was a mad paraglider. I even kept on after a close encounter with some power lines very nearly killed me; a couple more inches and I wouldn't be here. New Zealand always featured in the paragliding magazines. ►

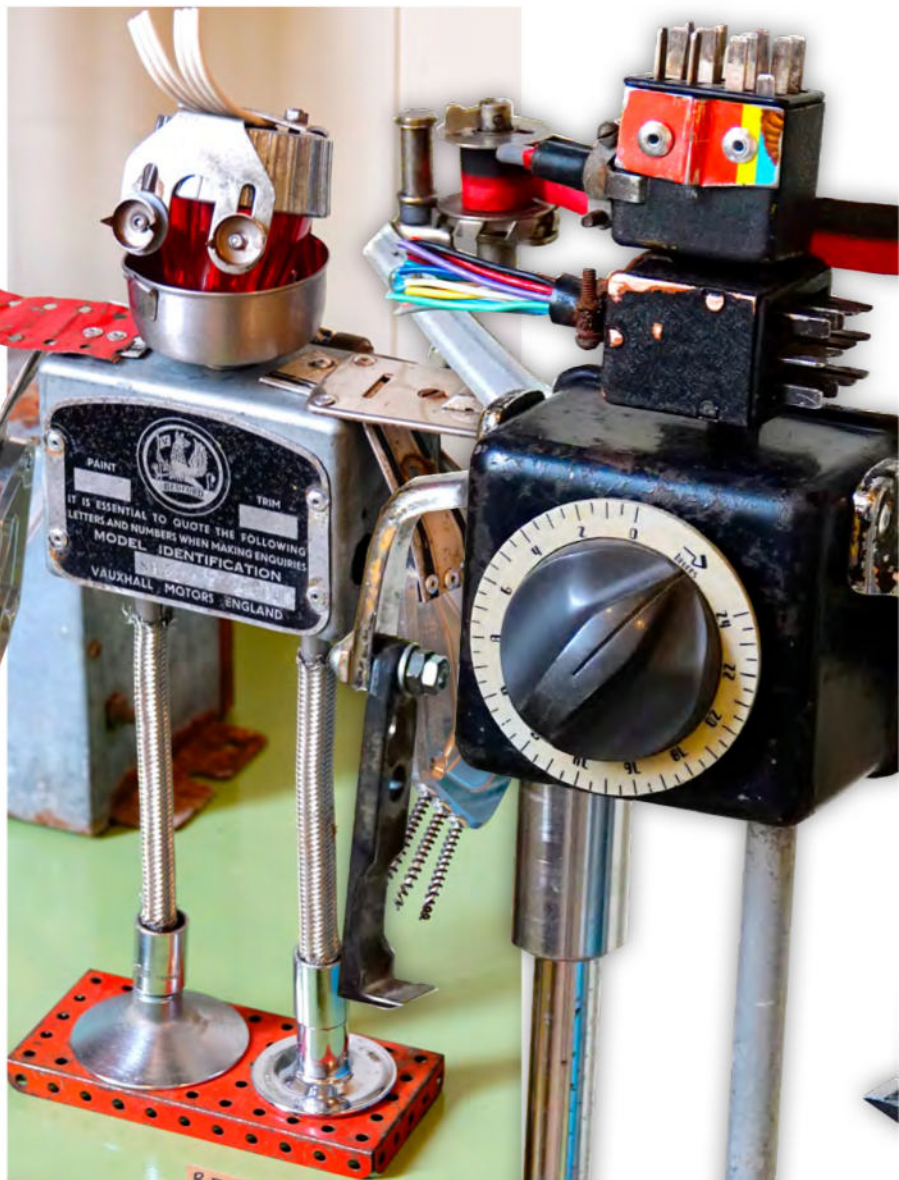
Edward
Spannerhands



A dog ... flies out the door



Ruby – all
sweetness and
lightshade



Beautiful mountains. Volcanos. It was easy to move. An agency lined me up with a job before we left.”

The couple settled in Auckland, ending up in Titirangi. Martin moved jobs a couple of times but mostly stayed where he was, just being a printer who liked to draw. However, the artistic urge kept niggling away, and 16 years ago he started experimenting with turning his imagination to making real objects, starting by using stuff he had lying around.

“I was showing a couple of photos in an art gallery [and] mentioned to the owner that I was working in metal,” he recalls. “She looked at my work – I had made robots but I was mostly making insects at that time. The exhibition went well, but from the start it was obvious that people weren’t keen on having an insect on the mantelpiece – offer them a dog and it flies out the door.”

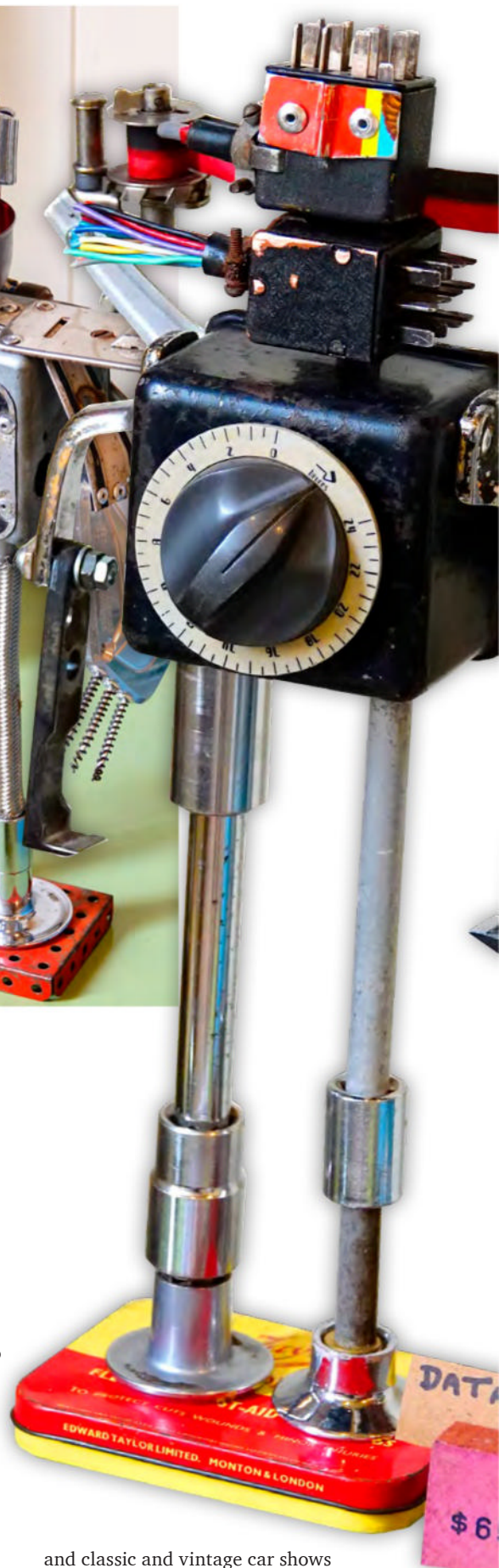
We are the robots

The next year, he came back for another exhibition. The robots were an instant hit.

He laughs. “That was when Wendy went from, ‘Oh, Martin’s playing with his toys again,’ to ‘Well, this is all right!’”

Along the way, Martin broke his leg and gave up paragliding for good, much to his mother’s relief – not hard to understand, considering he has former paragliding companions who will spend the rest of their lives in wheelchairs. It did not stop him doing a bungee jump and a tandem skydive, which he seems to rate as safe alternatives. Opinions may differ.

In any case, Martin no longer had time for the winds. His increasing output demanded raw materials and they weren’t making them any more. Now, he was haunting hot rod shows



and classic and vintage car shows where there was always a brisk sale of spare parts; junk shops, estate sales, anywhere that there was likely to be old machinery either whole or in parts. He has a large suitcase filled with car



All shapes and sizes

badges, but now, with the studio open seven days a week, the colours for his mechanical palette are becoming a concern.

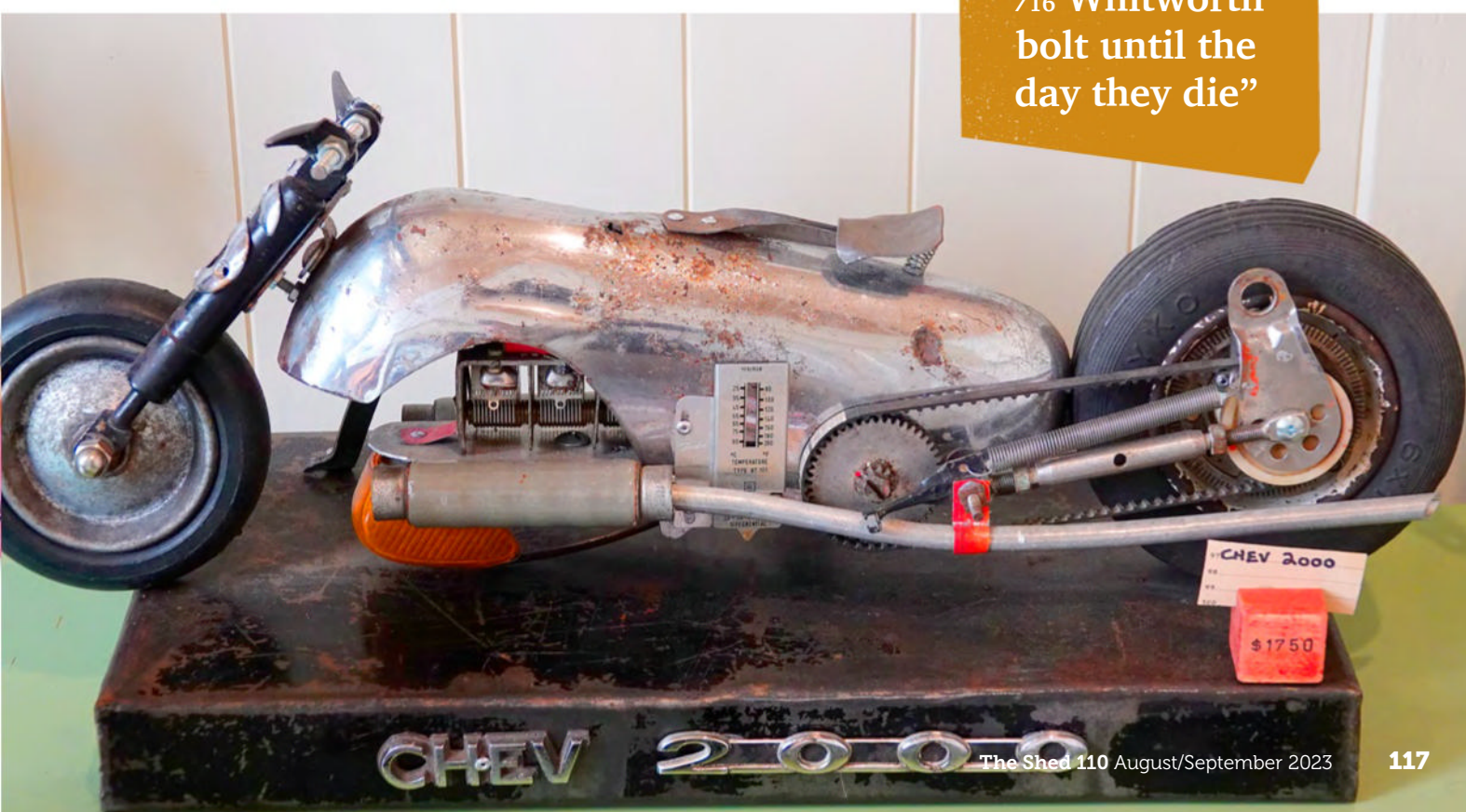
"They're hard to locate," he says. "There are lots of old guys with sheds full of stuff, but typically they won't part with that $\frac{3}{16}$ Whitworth bolt until the day they die."

Even that, though, has turned into a profitable and fulfilling branch of Martin's robot industry.

OK, let's do it

Through the years of having successful exhibitions and even getting commissions from overseas, working all weekend on his art, Martin kept the day job as a printer until finally, in August last year, he decided that he had had enough. ►

"There are lots of old guys with sheds full of stuff, but typically they won't part with that $\frac{3}{16}$ Whitworth bolt until the day they die"





“I was tired of seeing the same group of colleagues year in year out, people always talking about their golf swing, that sort of thing”

“I was tired of seeing the same group of colleagues year in year out, people always talking about their golf swing, that sort of thing. The robots always sold well so we took the plunge,” he says.

The timing was right for both of them. Wendy was a retail regional manager, running 14 stores, when the business was sold to an Australian concern. They merged two jobs into one, and Wendy was happy to take the redundancy.



The Mainland calls

They plumped for Oamaru: “It’s a lovely town and the robots are a good fit with the steampunk thing. They’re not actually steampunk but it’s kind of in the same vein. The Victorian precinct is a tourist attraction, so there are always people coming through.”

Martin thinks it is important that potential customers are able to see him at work, and even have a chat: “I’ve always got to be here doing what I’m doing. I like talking to people, especially people from overseas. They like seeing something that hasn’t been mass-produced in China. I have to manage a balance because I can’t multitask. When I open my mouth, my hands stop working.”

Customers

Buggyrobot has two rooms in the building, across the corridor from each other. One is the showroom, the other is Martin’s studio. Wendy comes in three days a week, giving Martin time to catch up with the work.

“When they come through the door, 90 per cent turn left and go into the gallery but 10 per cent walk into the studio,” Martin says.

Reactions vary.

“Old guys will come in and start rummaging through the drawers, asking if I have a window handle for a Morris Minor. Sometimes they’re a bit reluctant to hear that the stuff is not for sale. I have told the odd one to buggar off. I draw the line at groups of kids. That’s when the velvet rope and the ‘No Entry’ sign go up,” he says.

It is easy to see why Martin would resist having a dozen or more little hands let loose in his studio. Although it looks like a junk store, Horspool’s studio is immaculate and meticulously ►



Buggyrobot memorials

Four or five times now, people have come to Martin and asked, "Can you make something that represents Granddad?"

The grandfathers in question have invariably been beloved family members who spent all their spare time in their sheds.

"One of them was a guy who had died ages ago," Martin says. "He had a big house in Herne Bay in Auckland. When his wife died, the shed had stood untouched for 25 years."

His family came and asked Martin to make not one but three 'Toms', for his daughter and her two kids.

"So I asked, 'What was he like?'"

"We don't really know. We never saw much of him because he spent all his time in that shed, messing around and working on his Holden."

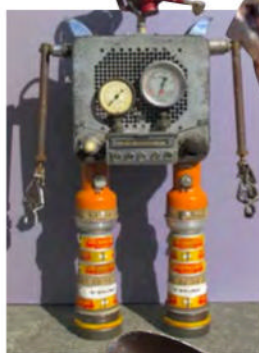
"It took ages," says Martin. "I didn't want to get it wrong, end up with a runty look. One good clue was the stacks of Erinmore pipe tobacco tins. They were useful, and every 'Tom' had a pipe."

He finally came up with three 'Toms' that he was satisfied with.

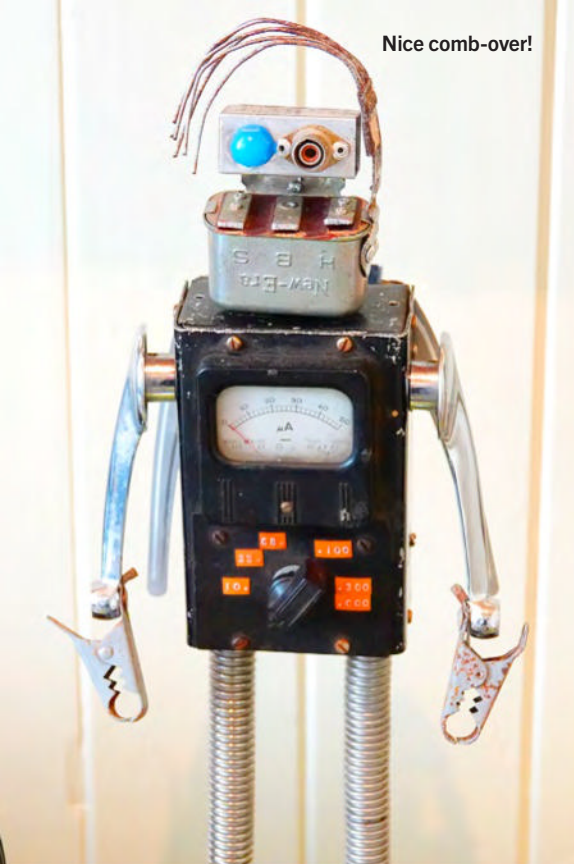
"The family came around one Sunday afternoon for the handover," says Martin. "It got very emotional, actually. We were all sitting around the kitchen table crying. I must have got something right."

"I also made a repro of a friend's late cat. Angus is an ex-pat Kiwi who lives in New York, a successful guy who likes to torture me with difficult stuff. He had the cat cremated and wanted something for the ashes. First, he liked the head but not the body. When I got the body right, he didn't like the head any more. I used a '60s electric kettle for the body. I think he liked it in the end."

Martin's most challenging Angus commission was the Evil Head: "He [Angus] is as bald as an egg and wanted a robot with his bald head as a kind of Dr Evil. He had his head scanned and 3D printed and sent it to me in New Zealand, hand delivered by his niece, then he told me to make a robot with it. I managed to put it inside one of those old glass-domed parking meters, which I thought was pretty good. But not good enough — he wanted it lit up in red LEDs. I'm not really an electrical guy but I got it done somehow. He picked it up when he came to visit his mum. He seemed pretty happy."



The Toms and the cats, all late



Nice comb-over!



organised, the embodiment of an artist with an intense focus on detail and organisation.

He attributes this partly to the discipline of the printer – “There are tidy printers and very tidy printers” – but also suspects he has a touch of OCD. “I can’t just take any two eggs from a carton. The rest have to look good when they’re gone. Like, if it’s a full dozen, I’ll always take the end two. I like symmetry, which helps with the work.”

Online marketing

Martin does not rely on walk-ins to the gallery. Buggyrobot.com, his web shop, is impressive – stylish and efficient, showing off his range as a multimedia artist. There are the robots, the ironic game-hunters’ trophies, the racing bikes – the closest that he gets to proper steampunk – his photos, three designs of T-shirts, and videos.

He had a successful exhibition in New York seven years ago and still

gets commissions off that show. His most challenging, and perhaps most artistically impressive, commission was to put together Viktor the Lonely Robot for Kiwi band Dukes’ music video for its hit, Secrets.

The inspired twist on the ‘going to pieces after a break-up’ theme has, well – see it for yourself, just look for ‘Dukes Secrets’ on YouTube.

It is world class, something Aardman would be proud to have made. Viktor goes through his trauma using stop-motion animation, which involves moving a part, taking a single shot, moving it slightly again, another shot, and assembling that into a movie.

“I was there but I gave up after two days. It was unbelievably boring work,” Martin says.

He tried China but it didn’t work out.

“We booked a cubic metre in a container for China but they wouldn’t let it in. They have banned all foreign recycling, and all they could see was a bunch of junk to be recycled. The agent and I had a mutual friend in Hong Kong who eventually smuggled them across the border in two big suitcases. I went there for the show and had a great time. They love haggling, always looking for a bargain. Theoretically, I still have an agent in Guangzhou, but it’s just not a workable business model.” ►



“Made in England” – nothing but the best



"Though this be madness, yet there is method in 't"

The method

As with everything else Martin does, he has a system for starting a new model.

"First I put together a collection of bits that I think might look good together," he explains. "I lay them out flat on the bench and try them out, sometimes replacing bits until they all work. Then I start from the feet up, attaching the feet to the legs, sticking them together as I go."

His favourite tool is a 3.2mm double-ended drill bit, to drill the holes for the pop rivets: "It's a special bit — it won't snap. Ordinary drill bits snap if you lean on them too hard at the wrong angle. Working the way I do, that usually means the stub end goes into my thumb. So I'm pretty keen on that drill bit."

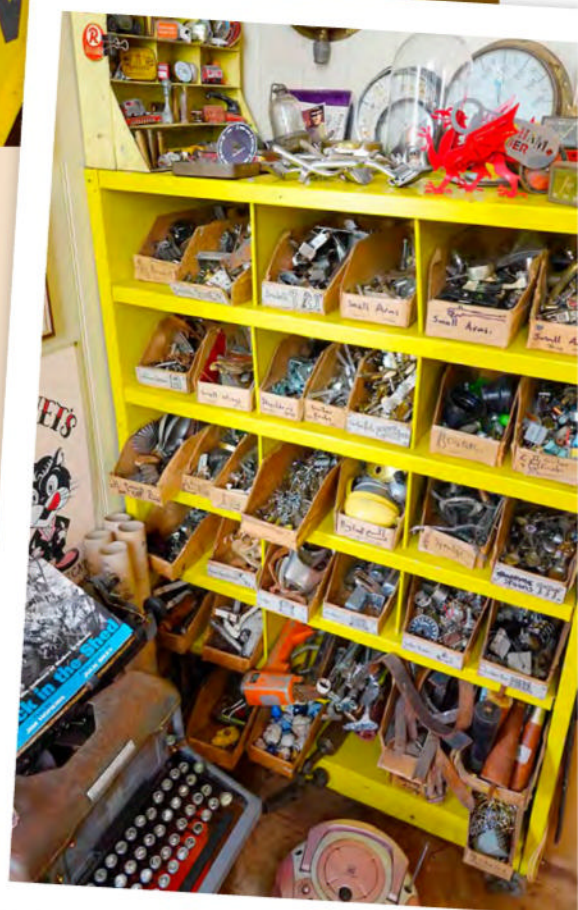
He is also fond of a small ball-peen hammer, saying, "If a bit of metal is too

shiny, it might need tenderising — add a bit of a patina. The hammer's good for that."

We notice that the robots always stand on a pedestal.

"Well, they have to," Martin says. "They're almost always top heavy. The pedestal keeps them upright. That's important."

On average, a full-size robot takes about 12 hours' work, and that is just the construction. Add the time to locate and select the parts, then factor in the overheads, and it's obvious that Martin Horspool will never be known as the 'Buggyrobot millionaire'. However, he is finally making a living doing what he loves, and that is priceless.





He has just
acquired a 1969
Triumph Herald

Got any old engineering stuff?

The Buggyrobot business model is a work in progress right now. The commitment to be there seven days a week means that Martin doesn't have time to keep replenishing his stock, which is still healthy but not bottomless. He has just acquired a 1969 Triumph Herald, which will inevitably acquire the Horspool trademark. So, to any reader with a shed full of old engineering stuff, the Buggyrobot guy of Steampunk Town would be very happy to hear from you. Let's be honest: you're probably never going to need that $\frac{3}{16}$ Whitworth bolt. 🛠️



And now for the Herald ...



Craftwork Brewery
Photo: Neat Places



Hub and Sprocket Cycles
Photo: Neat Places



**Harbour Street,
Ōamaru**



Sublime Studios
Photo: Neat Places



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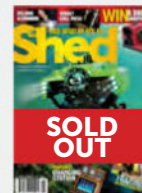
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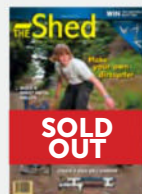
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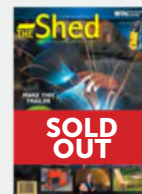
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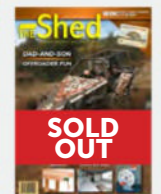
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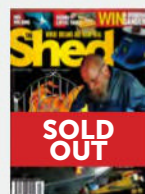
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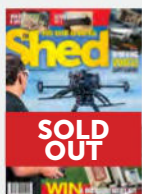
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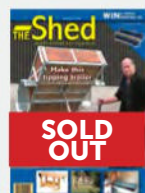
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**THE MEN'S SHED MOVEMENT IS ABOUT
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A shed brings men together in one community space to share their skills, have a laugh, and work on personal projects or within a group for the shed or community.

Sheds and their members decide the projects to undertake. However most sheds throughout New Zealand take on some community projects, examples include repairing toy library stock, building playgrounds for early learning centres,

repairing old bikes for community distribution, building planter boxes for the main street of the local central business district, the list goes on.

The shed is a great place for blokes to learn new skills. We see builders teaching

engineers some of their skills and vice versa.

Sheds have been operating in New Zealand since 2008. The last decade has seen the number of sheds across both urban and rural areas increase to 140.

We have a team of Regional Reps who attend to sheds and public inquiries:

Northland, Auckland - David Broadhead 021 324 762 regrep1@menzshed.nz
Waikato, Bay of Plenty, Gisborne - Keith Dickson 025 025 96454 regrep2@menzshed.nz
Lower North Is - Murray Campbell 021 070 2258 regrep3@menzshed.nz
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Men's Shed Warkworth
Hibiscus Mens Shed Trust
Settlers Blokes Shed Albany
Men's Shed North Shore
Devonport Community Workshop
Massey Community Men's Shed
Auckland Central Community Shed
Mens Shed Auckland East
Howick Community MenzShed Inc
Boomer Shed (Manurewa)
Waiuku Community Workshop
Whitianga Community Menz Shed Trust
Pauanui Community Menz Shed
Thames Community Menz Shed
Whangamata Community Menzshed
Paeroa Community MenzShed Trust
Waihi Beach Menz Shed
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Temuka Men's Shed
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GETTING OFF THE GROUND

Should it be a sheddie mantra? If something can go wrong ...

By Jude Woodside

As I write this, I have that satisfying tiredness that accompanies a vexing job completed.

The job in question was the erection of my shed portals.

I've been waiting for over a year to get to this stage and it's been a harrowing journey; a combination of ill luck, poor judgement, and bad weather. However, at last, nearly two months after the slab was poured, I have been able to get the portals erected and stabilised.

I had pre-built the portals on the slab – really not too dissimilar to creating a giant Meccano set. The elements were delivered pre-drilled and the assembly process was fairly straightforward, albeit the instructions were a little vague at times.

In fact, the instructions that accompanied the plans were both illuminating and somewhat mystifying, leading to my biggest mistake in the whole process: erecting the first portal back to front.

Thank heaven that's over

My bad; a closer reading of the plans would have made that obvious, but a plain instruction to determine which side to orient the portal would have been better. I am just relieved that the most nerve-racking part is over, thanks to my two resourceful friends helping out.

At first, I assumed that the erection would be easy; what could possibly go wrong? The portals didn't look too intimidating on the ground, but at 5m in the air, the real scale became apparent. I hired a scissor lift, hoping that we could use it to raise the portal frames, to manhandle them into position, and then to attach the purlins for stability. After the first day, when we experienced all the ways that the plan could go wrong and spent the day



I've been waiting for over a year to get to this stage and it's been a harrowing journey

erecting just two of the five portals, we regrouped and, with the benefit of hindsight, had the rest up in about half the time.

I'm pretty sure that hire firms don't recommend my method, with good reason. In hindsight, a forklift would have been far quicker.

Sheddies don't bounce

As I get older, I find myself less and less keen on working at height. The ground looks so much further away and I don't bounce.

Fortunately, one of my helpers was accustomed to working on scissor lifts in awkward places like steep Wellington streets, so he took control of the machine and handled it as if born to it. I am now ready to finish the frame, attaching the purlins, girts, cladding, doors, and whatnot, and that, though daunting, is an exciting prospect after all this time of being bereft of a shed.

There are still challenges. I don't plan to tackle the roof myself – in the immortal words of Dirty Harry, "A man has to know his limitations" – but I will rest well tonight knowing that the biggest hurdle has been overcome. 🏠

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