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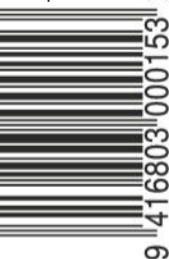
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PROGRESS

It's one of those things you just have to learn to live with – even if it sometimes drives you crazy; you can't stop it.

Change can be hard to take as you get older (well, it often is for me anyway). Wonderful buildings get torn down and sometimes a monstrosity takes their place. More houses, more traffic; busy, busy, busy. Even tools and building materials can change for no apparent reason, and you begin to wonder if there is a deliberate plan to mess with you. I mean, even paranoids have enemies, right?

However, when you give in to the inevitable and accept it, reminding yourself of the saying, 'You can't stop progress', it can have a calming effect and your blood pressure drops.

In my travels, I have spent a fair bit of time in Dunedin and got to know the city really well. We have often stayed near the New Zealand Railways workshop in Carisbrook in South Dunedin, and I can recall being horrified when 'progress' brought about the closing down of that talented set-up with the loss of hundreds of jobs and decades' worth of engineering skills. It seemed so daft to allow all that skill and talent just to dissolve. The thinking was: "Well, we buy everything offshore now, so what's the point?"

As we know, times and conditions change; who wants to be at the mercy of international whims and fancies when the companies that are building train carriages today are all into creating Xbox games tomorrow? Sure, things are never

that simple, but the saying about babies and bath-water needs to be considered more often, I reckon.

Once skills that have passed through generations have gone, it's almost impossible to get them back. I notice quite a few European countries, such as Spain and Italy, retain heavy industries of this type and appreciate them.

I must say that I was cheered up when the railway workshops opened up again after some years – albeit with a smaller staff. I thought, *Thank heavens someone has seen sense.*

So, our main feature this month focuses on Austins, a foundry that operated successfully in Timaru for more than 90 years. Now, progress has forced its closure. That is progress 101.

Several supplies essential to Austins' work – such as scrap iron from wrecked vehicles – had become difficult to source. The coke that Austins used was imported from China, and its price doubled. To upgrade would have required a \$2M electric furnace. The foundry's buildings are now 100 years old and need upgrading. Who wouldn't close down faced with all that?!

Still, we celebrate Austins and have showcased its workings, staff, and talents here in *The Shed*, as we are unlikely ever to see these skills again in our fair land. It's progress, and there's not a lot we can do about it. 📁

Greg Vincent

editor@the-shed.nz



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Headwinds in the foundry

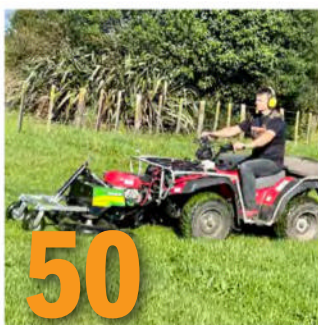
Austins Foundry is a family firm that has provided a good living for at least two generations; however, the winds of change are blowing



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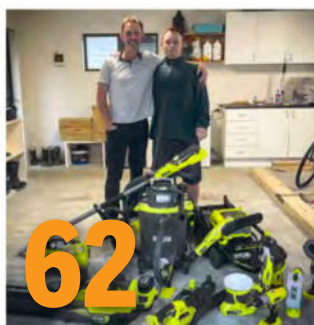
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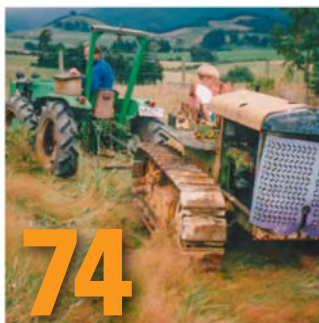
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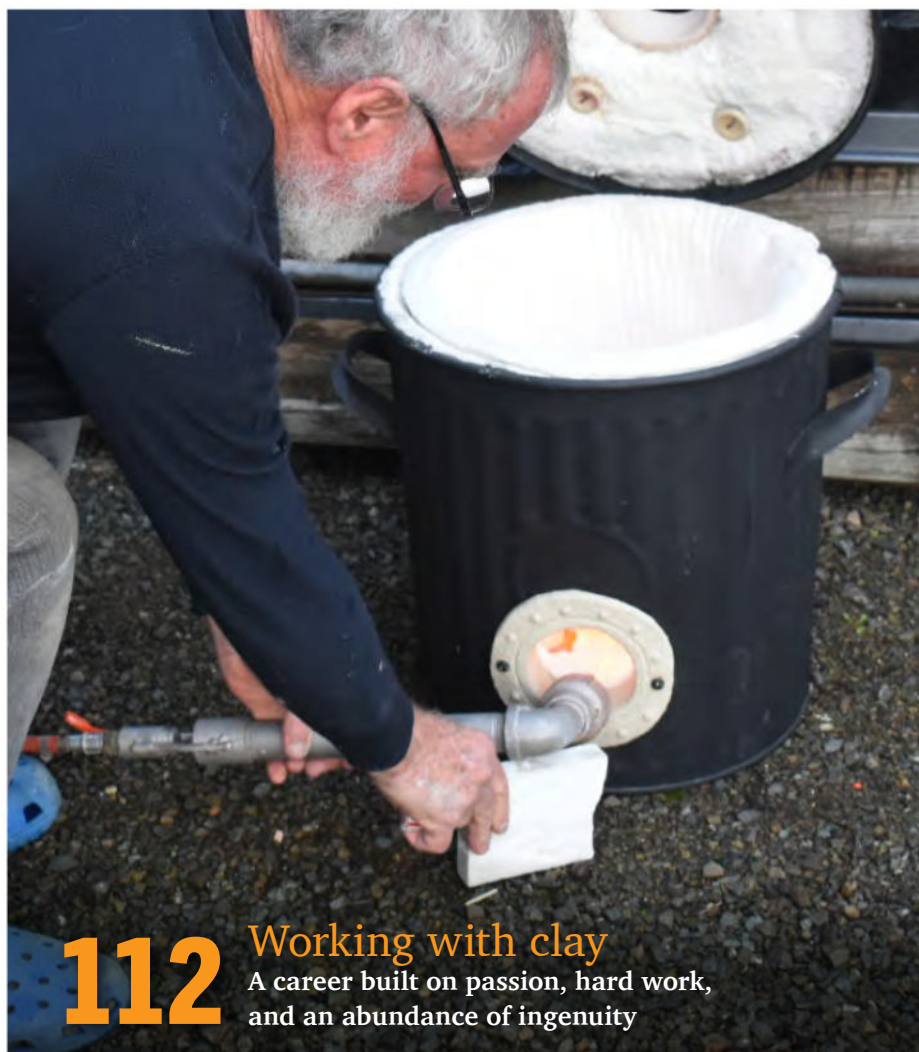
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HEADWINDS IN THE FOUNDRY

This is a story about a family firm that provided a good living for at least two generations, building up an impressive skill base while manufacturing essential farm machinery for more than 90 years. The owners tested the winds of change and decided to close down

By Ritchie Wilson

Photographs: Brian High and Ritchie Wilson

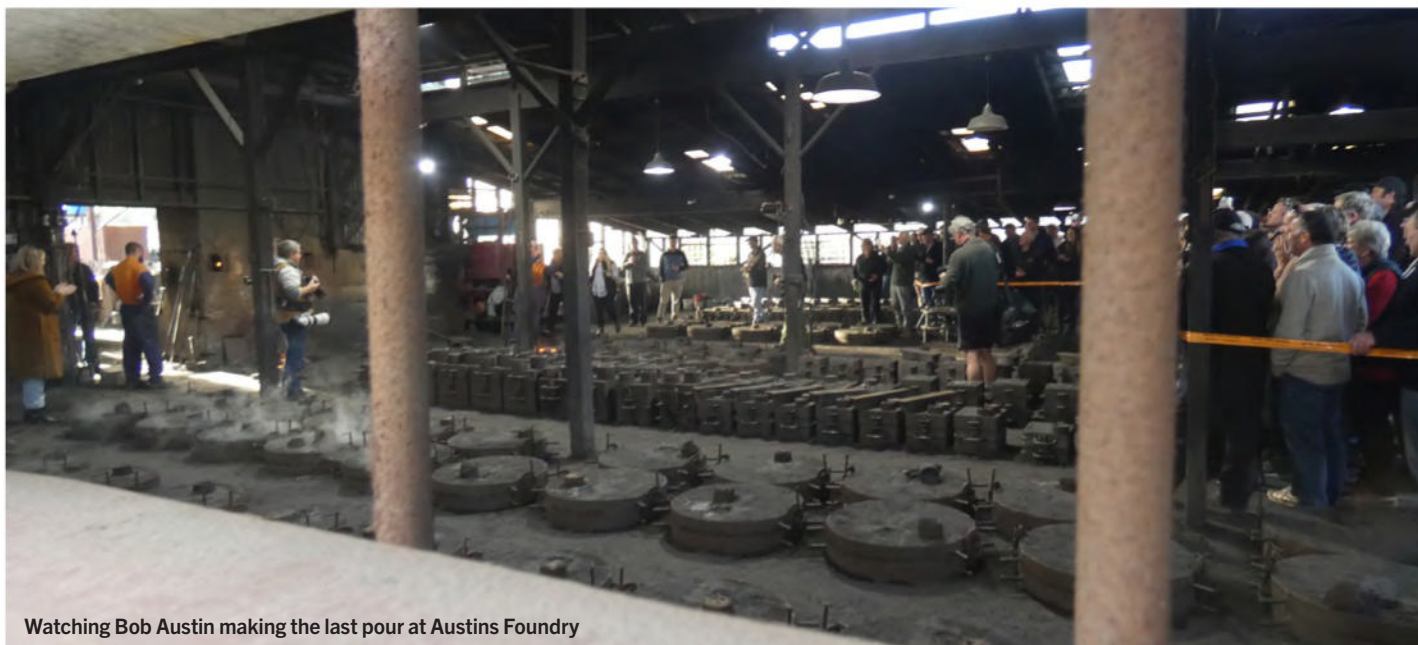


AUSTINS FOUNDRY
1930 - 2023
THE LAST OF THOUSANDS
POURED BY
BOB AUSTIN
AGE 96
JUNE 30TH 2023

A special roller ring cast to commemorate the last pour at Austins Foundry; the pattern for the text was printed in plastic by an Auckland company



Drama in the core-making workshop as a resin layer on the outside of a core is fired to leave a graphite residue on the core's surface



Watching Bob Austin making the last pour at Austins Foundry

The Austin family has run a foundry in Timaru for 93 years. Ken Austin, grandson of the founder, says that the business has faced increasing headwinds since the Covid-19 pandemic, so he decided the time had come to shut up shop. To thank his customers and staff – and to celebrate nearly a century of producing castings of all types on the same site – he decided to throw a party.

More than 100 guests gathered to watch the family's 96-year-old patriarch, Bob Austin, pour the last batch of molten iron into a sand mould. In his speech, Ken said how much he appreciated his loyal staff. He also mentioned how much he enjoyed working with farmers, and added that he had never had a bad debt from a farmer.

Headwinds

There were various reasons the foundry faced increasing difficulties, some predictable, some unexpected. Several essential supplies had become difficult to source. For example, Austins melted scrap iron, largely from wrecked vehicles, for its moulds. However, most engines are now made from aluminium rather than cast iron. The coke that fuelled the company's furnaces was imported from China; it doubled in price from one shipment to the next.

There are, of course, other ways to melt cast-iron scrap. Austins could have installed an electric furnace, but that might have cost \$2M. The buildings that housed the foundry were 100 years old, mostly made of corrugated iron, and arguably at the end of their lives. Rebuilding would be another major expense. ►

Most engines are now made from aluminium rather than cast iron



The party-goers crammed into the foundry to witness the last pour



Ken Austin speaking. From left: Simon Stewart, Ken Austin, Bob Austin, Angela Austin, and daughters Bridget and Sarah



From left: Laurie Chandler, Simon Stewart, Craig Manchester, Andrew Muir, and foundry owner/manager Ken Austin



Stockpiled roller rings – Austins has been making the rings for three generations

Perhaps most importantly, Ken's phone had stopped ringing.

Changing times

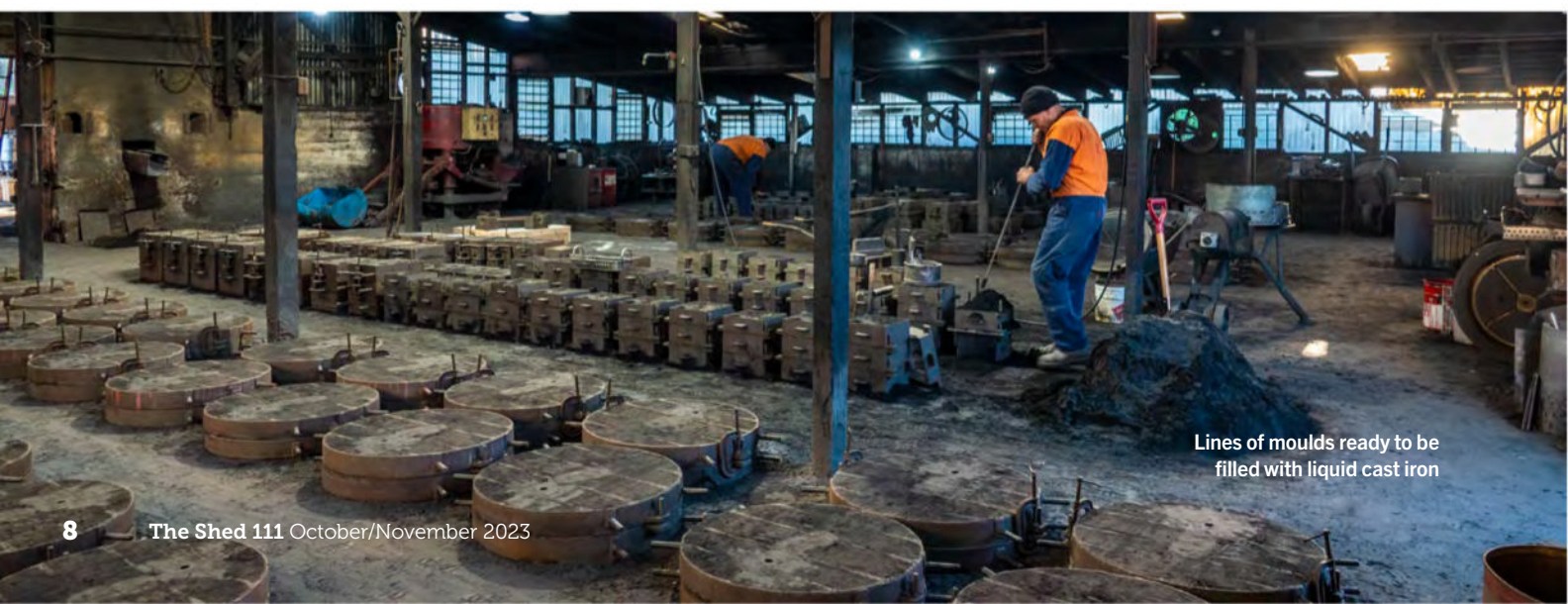
Farmers were the customers of the company's main product, agricultural rollers, but they stopped buying. The way Ken tells it, the average farmer barely makes a profit these days; the only money that farmers make is capital gains on their land – and that only when they sell. He paints a picture of farmers who can hardly keep their children in shoes, let alone purchase expensive items of machinery.

Ken had two other factors to consider: he was 67 and "slowing down", and the business sat on 2ha of prime industrial land, not far from the centre of Timaru, on the main road south out of town.

Loyal staff

Ken consulted his workers. Several of the foundry's workers had worked there from leaving school at 15 until retirement; 50 years in the same heavy, dirty, demanding job. The consensus was that the staff would like to keep their jobs for a bit longer. Another 20-tonne container of coke was purchased from China, enough to last another year, and it was decided to stockpile castings to provide a few years' supply of spares for roller owners.

The year was up in June. Ken thinks that the roller manufacturing operation will find a buyer, perhaps an owner-operator, but the cast-iron roller rings will most likely be imported from overseas, probably from India.



Lines of moulds ready to be filled with liquid cast iron

History

In the middle of World War II, Charlie Austin, the owner of C A Austin, Iron and Brass Founders, died suddenly. One son, Ray, was overseas serving in the New Zealand armed forces; Bob, the other son, was in his mid teens. Bob had never attended high school. Instead, he started working at the foundry, which was desperately short of labour because of the war. The firm had a debt of £550, which had to be paid before the foundry could be reopened. Bob went to work for another Timaru company, J Storrier & Co., to keep the family afloat.

Three years later, in 1946, Ray and Bob had saved enough money to repay the debt and the foundry reopened. The company started trading as

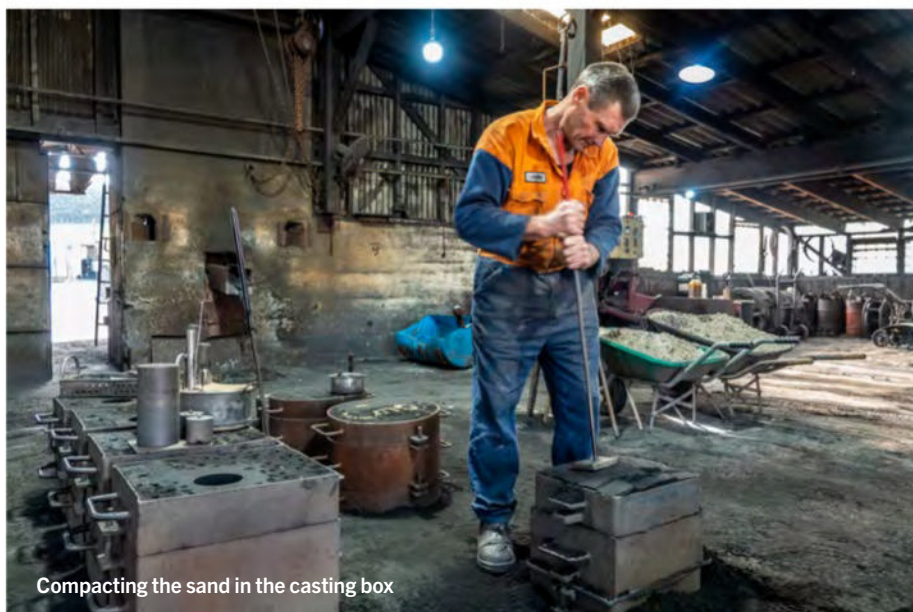
Austin Brothers. It produced castings for Timaru engineering companies and manhole covers for the Timaru council. Bob and the council carpenters designed a wooden pattern and, over the years, Austin Brothers made thousands of the covers.

Bob was always interested in the challenging casting jobs. He can't say which was the most unusual thing he had to cast, but says that he made many castings for model steam locomotives and vintage cars.

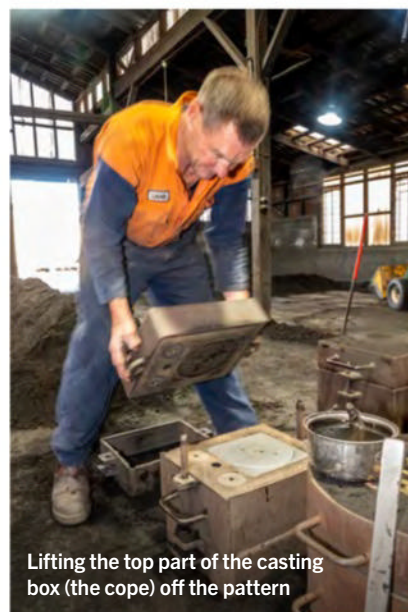
Unique tooling

In 1970, Bob bought Ray out. From then, the business was known as 'Austins Foundry Ltd'. Bob's four sons all worked at the foundry at one ►

He made many castings for model steam locomotives and vintage cars



Compacting the sand in the casting box



Lifting the top part of the casting box (the cope) off the pattern



Removing the pattern from the sand





Lifting a pattern from the casting box



Complex castings sometimes require interior spaces. These are created by carefully placing solid shapes called 'cores' in the mould. The molten metal solidifies around the core. The core is then fragmented leaving a space. The photograph shows a core being made

time or another. Ken began working there in 1974 as a 15-year-old school leaver. Trev trained as a fitter and welder. He built a machine to break up the cast-iron scrap before it was melted, previously an exhausting job with a sledgehammer. The machine incorporates a repurposed Hiab arm to smash the larger scrap castings into fist-sized chunks, which melt more quickly. Trev also built a sand mill to stir the moulding sand, saving the foundry workers another tiring job.

Cleaning the smoke

Ken knew that the smoke coming from the furnace's chimney would become more and more of a problem, so it was decided to remove particles in the combustion products completely by installing a water scrubber in the furnace's flue. This was made by his brother Glen. The present flue is the third as they gradually rust away – the combination of water and heat make ideal corrosion conditions.

Since Charlie Austin's day, the foundry has made Cambridge rollers, an agricultural roller whereby the rolling is done by 30 or so heavy cast-iron roller rings. These turn independently on a beefy steel axle as the roller is pulled along – by a team of horses in the early days or by very powerful tractors today. ►

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Rollers become an export winner

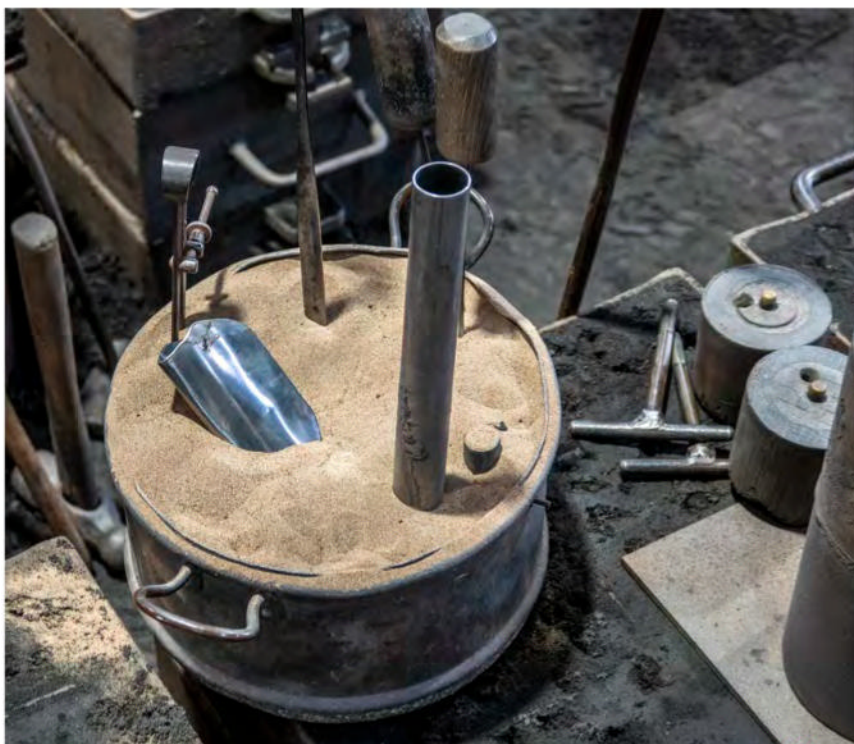
Originally, the frame of the Austins rollers was made of Australian hardwood. Then, in the early days of electric welding, they were made of welded angle iron. The equipment was primitive, and steel was hard to come by due to post-war shortages. When box-section steel became available in about 1980, this was used to make the frames.

Before the deregulations of the 1970s, there were export incentives to sell New Zealand's manufactured products overseas. Austins took advantage of these to sell rollers to Australia and the US.

The roller rings have a protuberance cast around their circumference that rolls a small furrow into the compacted soil surface. This small depression is an ideal environment for the germination of seeds, as rainwater tends to travel into the grooves, while the compaction of the soil breaks up clods left after ploughing and generally levels the ground. The rollers need a bit of maintenance, but, if looked after, Austins says, they will last a lifetime. A roller is 3–4m in width. They can't be made much wider because they need to pass through farm gates.

The folding roller

Glen designed a folding roller, split into three sections. This can be up to 10.5m



When a Methven farmer visited the foundry and bought the not-quite-finished prototype on the spot, Ken saw the light

wide. Hydraulic rams are used to lift the two outer sections at right angles to the ground so the combination can pass through a normal gateway. The advantage, of course, is that the wider the roller, the faster a paddock can be rolled, saving money and time.

At first, Ken was not enthusiastic about the device. If farmers had trouble finding \$2K for a single Cambridge

roller, how would they find \$15K for the folding variety? However, when a Methven farmer visited the foundry and bought the not-quite-finished prototype on the spot, Ken saw the light. The company sold hundreds of these rollers. Ken says that a buyer paid a cool \$85,500 for the extra-heavy folding roller on display at the foundry's frontage.

Cambridge rollers



Austins' sand casting

If a depression in compressed sand is filled with molten metal, the metal, as it cools and solidifies, takes on the shape of the depression. The metal shape is called a 'casting' – as is the process.

It all starts with a pattern, traditionally made from wood. The pattern has almost the exact shape of the casting it is used to produce. 'Almost', because the molten metal that fills the mould shrinks as it cools and solidifies, so the casting is slightly smaller than the pattern. For many years, Austins used cast aluminium patterns, which have a much longer life than wooden ones.

In the green sand-casting process



Laurie Chandler removes a core from its mould. Injecting CO₂ gas causes the mixture of sand, clay, and sodium hydroxide to solidify

Green steel

Steel-making produces eight per cent of the world's CO₂ emissions. If the amount of CO₂ in the atmosphere is to be stabilised, steel must be made using some other method than coal-fired blast furnaces. Steel produced without making CO₂ is called 'green steel'.

Hydrogen is the obvious replacement for coal in making green steel. Hydrogen is easily made by splitting water into hydrogen and oxygen gases using electricity, a process called 'electrolysis'. If there was enough electricity, there would be no problem.



used by Austins, the same sand is reused many times. The sand is very slightly wet so that it holds together as it is tamped around the pattern.

Complex castings

Many of the castings are a complex shape, with no flat surfaces. This means that two lots of casting sand are needed, one for each side. Each lot of sand is contained in a steel collar, called a 'moulding box'.

The casting's shape has been split exactly in two, with the two halves attached to each side of a flat surface a bit larger than the moulding box. This flat piece of aluminium with half of the casting on each side is the pattern.

To start with, a sandwich of two boxes, with the pattern in the middle, is assembled. Pins at each end of the sandwich make sure the three components don't move relative to each other and, most importantly, that the two boxes can be separated and then reassembled in exactly the same relative positions.

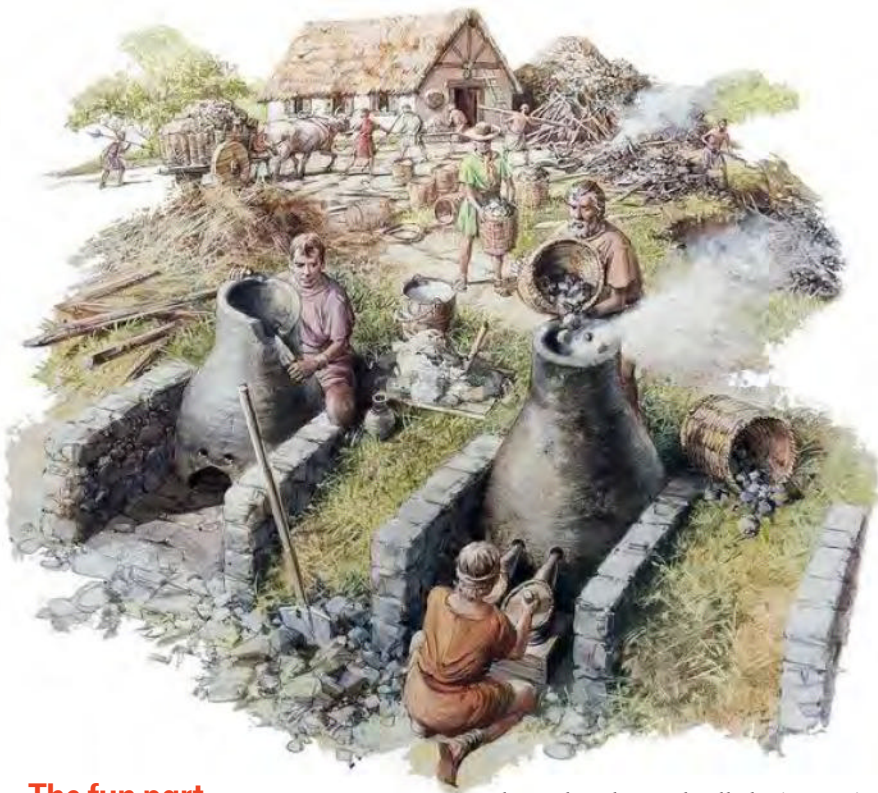
Sieved sand is compacted around the pattern and smoothed off. The sandwich is then turned over so that the sand is supported by the concrete floor. This is a two-person job.

The difficult part

The box, now at the top of the sandwich, called a 'cope', is filled with compressed sand, just as with the first one, except that various holes are made in the sand connecting parts of the pattern with the sand's surface. These are to let the molten cast iron in, and gases and excess iron out.

The cope is then (carefully) lifted off the pattern. The pattern is (carefully) lifted off the bottom box, called a 'drag', and placed to one side. The cope is replaced on the drag, the end pins ensuring that the two boxes fit together exactly as they were when the pattern was between them, forming the mould.

It's all a bit tricky, as any sand adhering to the pattern will cause a lump in the casting, and any bits of sand falling into the cavity will cause a depression in the casting's surface. ►



The fun part

Finally, there is the fun part – with molten metal, sparks, and drama.

The lumps of cast iron and coke are placed in the furnace and fired up. As the coke burns and the temperature increases, the cast iron melts and sinks to the bottom. The furnace operator removes a plug in the wall of the furnace (with an appropriately long bar) and the liquid metal streams into the 'buggy ladle', which carries the molten iron to the mould. This was designed in 1956 by Bob Austin. Rotation of the ladle's handle pours the metal into the casting cavity through a

channel in the sand called a 'runner' or 'downsprue'. When metal appears at the vent holes, the pour is stopped.

Heat from the molten metal is lost to the sand and to the air; the metal's temperature gradually decreases. When the temperature reaches the cast iron's melting point, it begins to solidify, or 'cure'.

The next day, when everything has cooled off, the mould is dismantled and the casting freed from the surrounding sand. This is where the word 'shake-out' comes from: the sand is shaken off the solidified casting and the quality of the casting can be seen.

The magic of coke

Only a few metals are found as metals. Gold is one example. Most are combined with other elements, such as sulphur or oxygen. Almost all metal compounds need a reducer to change them into the metal. For instance, aluminium oxide is melted and then reduced to aluminium by electricity.

When wood is heated in the absence of air, it turns into charcoal. This is almost pure carbon, and carbon is a reducer. It can convert some metal oxides to metals, while being itself transformed into CO_2 . Copper oxide, when heated with charcoal, is reduced to copper metal. This is how the ancient Egyptians made copper for tools, weapons, and jewellery. The iron age began when people discovered how to get a high enough temperature to allow charcoal to reduce iron oxide (usually the mineral haematite) into pig iron.

Pig iron contains a small percentage of carbon, which makes it brittle; some of the carbon has to be removed to turn the pig iron into steel – a tricky process. Steel, which contains a bit less than two per cent carbon, is strong enough to make tools and weapons from. Cast iron has slightly more carbon than steel, is consequently more brittle, but has a lower melting point, making it easier to make castings from.

Tapping the furnace to allow the molten metal to flow into the ladle





In the core-making workshop at Austins Foundry Laurie Chandler injects CO₂ gas into the core sand to help it solidify

End of an era

A roller ring casting has projections sticking out from one side, where the runner and vent holes were. These projections are sawn off and the scars cleaned up.

Casting defects are such a constant problem in sand casting that there is a lexicon of terms for them, from 'cold shuts' to 'swells'. Bob Austin says that, over the past few years, the team has produced castings with a less than five per cent rejection rate. He predicted that 100 per cent of the roller rings from the foundry's last pour would be usable.

The hard-won individual skills of Austins' employees and the teamwork they developed over the years will no longer be utilised in producing these quality castings. This nation's capacity to make the things we use will have been diminished.

Coal to the rescue

In the very old days, if you made a lot of iron, you needed a lot of wood. The industrial revolution of the early 1800s would not have been possible if we had

relied on charcoal as a reducer. There just weren't sufficient trees in Europe.

It was the use of coal, a fossil fuel consisting mainly of carbon, that made possible the production of the large amounts of iron and steel needed for the new machinery of industrialisation. It is estimated that, today, there are four tonnes of steel in use for each person on earth.

There are other reducers that convert iron oxide to iron, but they are much more expensive. Until now, the only cost of coal production has been that of digging it out of the ground.

Coal gas

From about 1800, steam-powered pumps, made of iron and fuelled by coal, made coal mining at greater depths possible, so much more coal was able to be extracted. It was found that heating coal – again, in the absence of air – produced coal gas and a plethora of other chemicals. Some of these chemicals were the foundation of the modern synthetic ►



Cleaning out cold slag from the coke-fired furnace



Molten iron being poured into a mould

The coke used to melt the cast iron



dye industry. The grey solid left behind was called 'coke'. It turned out that coke burnt hotter than coal, as well as very cleanly.

Coal gas replaced expensive candles, whale oil lamps, and dangerous kerosene lanterns. Gas lighting was installed in London's Pall Mall in 1807. Gas was used for cooking and water heating in most UK homes, only being displaced by the discovery of natural gas under the North Sea. Most New Zealand cities once had gas companies, which supplied coal gas to homes and businesses by underground pipes.

Gas was also very dangerous, with carbon monoxide poisoning being a serious hazard and gas leaks being liable to cause explosions.

Coke suppliers

Austins Foundry sourced the coke it used from different places over the years. The New Zealand Shipping Company used coke to fuel the boilers of some of its older steamers. The shipping company converted West Coast coal to coke at its plant in Christchurch, and Austins bought coke from it.

When the plant closed down, Austins sourced coke from the Christchurch Gas Company and then the Dunedin Gas Company. These operations were optimised to make coal gas, so the coke, a side product, wasn't as good.

Later, coke was imported from Australia, and, most recently, it was imported from China.

Casting sand being sieved into a casting box





Casting gear awaiting use



Scrap cast iron awaiting the furnace



Bob Austin's buggy ladle being used to pour metal into a mould

Hydroelectricity to make hydrogen

Two countries that are doing research into hydrogen-produced steel are Sweden and New Zealand. Sweden is a long, thin country with hydroelectric dams in the north, far from the major population centres in the south but near to iron ore mines. Sweden is planning to produce commercial quantities of green steel using hydrogen gas produced from this hydroelectricity. The economic motivation for this is that the European Union (EU) is to introduce cross-border tariffs on materials whose production releases carbon dioxide (CO₂). Sweden's green steel will be able to be sold in the EU without attracting the tariff.

New Zealand is a long, thin country with hydroelectric dams in the south, far from major population centres. There are serious transmission losses when electricity is sent from one end

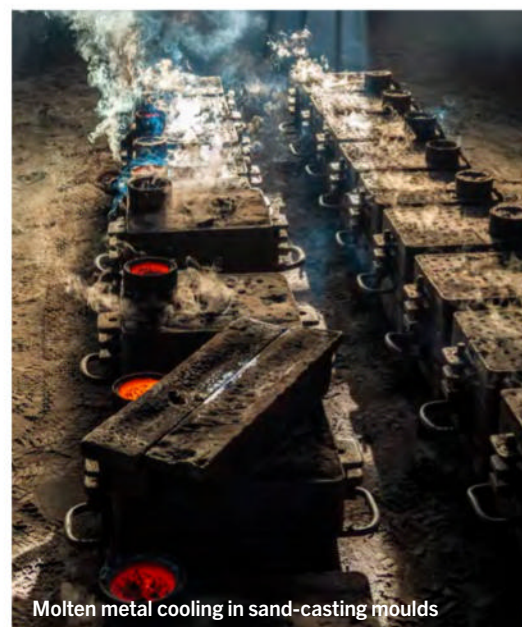
of the country to the other. However, if the iron-rich iron sand from the North Island's west coast were shipped to Bluff, it could be reduced into high-purity iron using locally generated hydrogen.

Iron sands

Professor Chris Bumby leads a research team at Victoria University's Robinson Research Institute. They are investigating techniques for transforming the iron oxides of the iron sands into direct reduced iron (DRI). The presence of small amounts of titanium dioxide in the iron sand prevents it from being used in a blast furnace, because of the titanium dioxide's very high melting point. However, that is beneficial in the fluidised bed reactor used in the institute's hydrogen iron-making process.

Professor Bumby says that it would take only a fraction of the electricity used

by the Tiwai Point aluminium smelter to make enough DRI to meet all of New Zealand's steel needs. He also points out that a green economy will need more steel – for wind turbines, rail lines, electricity pylons – rather than less. ►



Molten metal cooling in sand-casting moulds



The very last roller frame, which has just been welded up



Bob Austin, and son Ken Austin, of Austins Foundry in Timaru. The rollers on the machine they are pictured with were all produced by the business



Furnace slag being removed from the foundry, Ken Austin in the driver's seat

Steel is essential

Ken Austin makes exactly the same point: steel is essential for farming, for the production of our food. He went a bit further when he said that fossil fuels will, in his opinion, always be needed for steel-making and hence for food production.

What both Ken and Chris Bumby agree on is that calling steel made from scrap steel melted in an electric furnace, such as that planned for the Glenbrook Steel Mill in Auckland, 'green' steel, is a bit of a misnomer. Not that the idea is bad. The scrap used would have originally been made in a blast furnace, using coal and producing CO₂. Chris points out that the only country with enough scrap steel to rely completely on recycled steel is the US and that newly made, high-purity iron will always be needed to stop the amount of contaminants in the steel from getting too great, as it is recycled again and again.

Coking coal is scarce

When discussing the future of steel-making, Professor Bumby raised the issue of the availability of coking coal. It is scarce and, as coal mines close, it is getting scarcer. Coking coal is about four times more expensive than ordinary coal. The world's largest producer of steel, China, has built scores of blast furnaces in the past 15 or so years, all requiring metallurgic coal (coke).

The economic life of a blast furnace is about 50 years. How many years will it be before the cost of green steel, produced using renewable energy sources, is lower than that of steel made in blast furnaces?

Metallurgic coal was the type of coal that the Pike River coal mine was developed to extract, the high value of the coal justifying the mine's expensive; elaborate; unusual; and, as it turned out, dangerous design. 🚫

The 100-year-old Austins Foundry building is located on 2ha of prime industrial land





Before



After

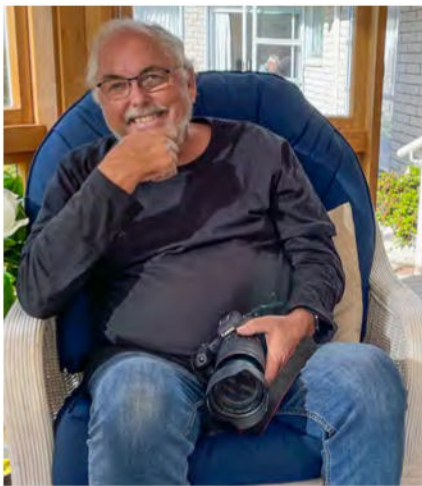
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OBITUARY: ROB TUCKER

The Shed lost a top photographer and good guy in June with the demise of Rob Tucker, whose excellent photos graced the pages of *The Shed* for 15 years.

Rob was a talented fellow who had a very diverse career behind the lens. He met the Queen, flew spying missions for Team New Zealand, and had a massive portfolio. He was even snapping away on the Radio Hauraki pirate ship on its last day of broadcasting at sea in the early 1970s.

I met Rob in 1965 when we both started work on the *Taranaki Herald*, Rob as a cadet photographer and me as a cadet reporter – young lads just out of school entering a world of deadlines, offices thick with cigarette smoke, and a few beers after the paper was put to bed.

We reunited donkey's years later as a team for *The Shed* and thoroughly enjoyed the wide range of Kiwi sheddies, inventors, and collectors we covered.

In his final months, while in the last stages of terminal cancer, Rob raised \$150K for Hospice Taranaki by setting up an auction of iconic New Zealand photographs. He had the support of photographers from all over the world.

Rob was the consummate professional, with a great eye for a good pic.

Goodbye, Rob. We'll all miss your happy smile and creativity.

A great loss for his family and wife Bonnie.

Ray Cleaver



The Weka Pass Railway's 1909 ex-NZR A-class steam locomotive pausing for photographs. The wagon between the locomotive and the red observation car is the 'tender', which carries both coal and water

STEAMING ON THE WEKA PASS RAILWAY

... perhaps for the last time

By Ritchie Wilson Photographs: Ritchie Wilson

The Weka Pass Railway runs between the North Canterbury villages of Waipara and Waikari. This section of line, built in the 1880s, was originally going to form part of the South Island Main Trunk line, before it was decided that a coastal route would be more practical because it wouldn't involve such steep gradients.

There was always political pressure, in many parts of New Zealand, for branch lines to be built irrespective of

their economic prospects, and in the early years of the 20th century, the line was extended to Waiau, making a total distance of 65km. The branch was closed in 1978, when the deregulation of the trucking industry made it uneconomic. Union pressure stopped the track from being lifted immediately, and in 1982 the Weka Pass Railway bought the 13km section from Waipara to Waikari, which incorporated the scenic Weka Pass with its famous limestone formations.



Octavia (here with daughter Kanoa) booked the author's family on the excursion through the Weka Pass, the last run of A 428 before it was taken out of service for a very expensive boiler inspection. The railway's carriages are in perfect condition and will continue to be used with diesel locomotives



Three generations of Wilsons arriving at Waikari, the terminus of the Weka Pass Railway. A 428 pulled the train back through the Pass tender first



The 114-year-old steam locomotive A 428 ready to leave on, perhaps, its last run through the Weka Pass

Costly boiler repairs

The railway owns a 1909 former New Zealand Railways (NZR) 4-6-2 A-class steam locomotive, one of 50 made in Thames by A & G Price.

At the end of July this year, the locomotive made its last couple of trips on the line before it was taken out of service to undergo a 10-yearly boiler inspection. There is some worry that the cost of the repairs needed may be very substantial and that this may have been A 428's last time in steam.

My daughter had booked seats for four adults and two children on this significant day, so, on a brilliantly sunny winter Sunday morning, we made the return trip through the Weka Pass along with 120 other passengers and six crew.

Steam trains are a magnet for photographers, and there were perhaps 20 or more who raced the train in cars, stopping at auspicious spots to photograph its progress.

Final photo shoot

Just before the pass, the train stopped at a grass terrace and the passengers were ushered off. The train backed out of sight around a bend and then, in a symphony of smoke and steam, came thundering into view, racing past as scores of phones recorded the action.

We ate our picnic lunch in a roadside reserve in Waikari township. On the return trip, we had an interesting chat with one of the guards on the potential challenges of running a steam locomotive in an era of carbon credits.

It was an excellent day out. We were very lucky with the weather, the carriages were immaculate, decorated with ancient baggage, the staff cheerful, and A 428 – one of two survivors of a large class designed for express work on the newly opened North Island Main Trunk – performed faultlessly.

It would be a great pity if it doesn't return to the Weka Pass Railway, puffing along as the cameras click.

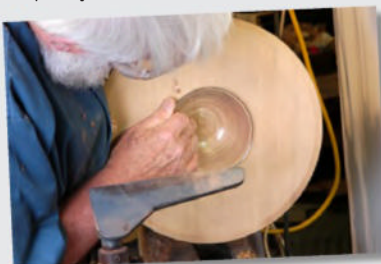
THE SHED ONLINE

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:

Make a chip and dip bowl for the Rugby World Cup games

<https://the-shed.nz/chips-and-dip-anyone/>



A Taranaki shed that's full of classic cars and motorbikes

<https://the-shed.nz/a-king-sized-country-shed-for-an-ex-city-boy/>



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LETTER OF THE MONTH

A MILESTONE IS REACHED

Hi Greg,

The Hamilton Community Men's Shed has just recently achieved 15 years of involvement in the Menzshed New Zealand movement. We were 15 in March, but, with all that was going on, we only got to celebrate it in July. A huge milestone for us, and [we're] proud as, as we think we were the first men's shed to open in New Zealand, after one of our founding members had come back from Australia after seeing the movement there. We are a group of approx. 80 members, both ladies and men, and are open six days a week as well as one night.

We hold a disabled members day, which is overseen by supervisors, a ladies day, and every year we have a Salvation Army Xmas toy evening, where we hand over all the toys we have made for it during the year.

Cheers,

Brian Thompson

Editor, Hamilton Community Men's Shed newsletter



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.

Letters should be emailed to editor@the-shed.nz, or posted to Editor, The Shed, PO Box 46194, Herne Bay, Auckland 1147.





SOMETHING TO BE WARY OF

Hi *Shed*,

Great article about the fridge restoration. I do not wish to detract from the restorer's skill and enthusiasm, but these old fridges do have a dark side.

From the 1950s to the 1980s, as [fridges] began to be replaced or wear out, many were relegated to the yard or garage as beer fridges. They then began to fall into disuse. In many cases, they then became the playthings of children. The trouble was that most models could not be opened from

the inside and over the years many children were asphyxiated, including some in New Zealand. The most recent occurrence of this I could find on the 'net was in England in 2018.

If he is not already doing so, Mr Bedford should be replacing the original door catches with modern magnetic equivalents. Otherwise, it is only a matter of time before a tragedy with Grandad's pride and joy display fridge occurs somewhere in NZ.

Cheers,

Murray Stapp



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While Resene testpots might usually be used for testing colours, they can also be very handy for small shed projects.

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2 Paint outlines for tools on a hanging board so that every tool ends up back where it should.

3 Resene testpots are handy to touch up small paint jobs when you only need a small amount of paint.

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Test fitting back stay

WELDING CHROME MOLYBDENUM

Roll cages are made strong with good welding and chromoly construction

By Frank Wigg

Photographs: Steve King and Terry Snow



The chromoly roll cage

Welding pipe and welding chrome molybdenum (chrome moly or chromoly) are two essentials in making a roll cage in a race car. Frank Wigg at Race FX in West Auckland (known now as 'Wigg Motorsport') likes working with chromoly and says that it is not that hard to weld.

An experienced welder in the motorsport world, Frank estimates that he has made more than 100 roll cages. He recalls a stint when the Series 9 BMW E30 came out and a group of cars were put in to have roll cages installed with racing deadlines in mind. He worked through creating nine roll cages straight and says that his arm nearly dropped off.



Checking pipe-bending angle

“If you follow the MotorSport New Zealand regulations for roll cages, you can’t go too far wrong”

me what they would like and we say why we recommend what to do. For safety, sometimes I refuse to do what they ask for because of basic engineering rules.

“Take this Formula 5000 car we are building – it can be a dangerous car at speed and everything is being built from the ground up. The suspension and safety sections must be strong and right for the job.

“If you follow the MotorSport New Zealand regulations for roll cages, you can’t go too far wrong.” ►

Here, Frank discusses the characteristics requirements of chromoly welding and the things to watch for when making a roll cage:

“What I am working on at the moment is a basic cage for a Subaru. The car is to be used for circuit, club stuff, and drifting. Depending on what the car is used for is how we design and weld the roll cage.”

Roll cage replaces removed strength

“There is the safety demand from MotorSport New Zealand and from the handling point of view; a race car has a lot cut out of the body to reduce the weight, so the strength is replaced with the roll cage.”

Do drivers know what they want with a roll cage?

“Most customers say ‘Just do it’ and let us get on with it. Others with fixed ideas tell



Checking square and level



Cutting pipe at an angle

“I have seen a crash on the racing circuit where the car was almost destroyed but the roll cage held. That was all that was holding the car together”

Not if but when

“In my years of racing, I have seen that everybody crashes at some time. If you have a car on the road with an approved roll cage, you can feel reassured. The roll cage, once approved, can’t be

altered or added to without further inspection. The New Zealand Drag Racing Association has similar rules for drag racers but they are stricter.”

What about heat-treating?

“Yes, for the ultimate strength you would heat-treat the welding and roll cage, but how practical is that? Once the roll cage is all welded, it’s in the car. Some people are pedantic about it, but it’s not practical.

“I have seen a crash on the racing circuit where the car was almost destroyed but the roll cage held. That was all that was holding the car together.

“We use chrome molybdenum for roll cages and it’s near perfect. I’ve never had a failed roll cage yet, thanks to good welding and chrome molybdenum. It’s like a big spring. Its great characteristic is that it flexes and springs back. The roll cage is very strong and, if it twists, the chrome molybdenum bars will come back into shape provided they don’t go past the distortion breaking point.

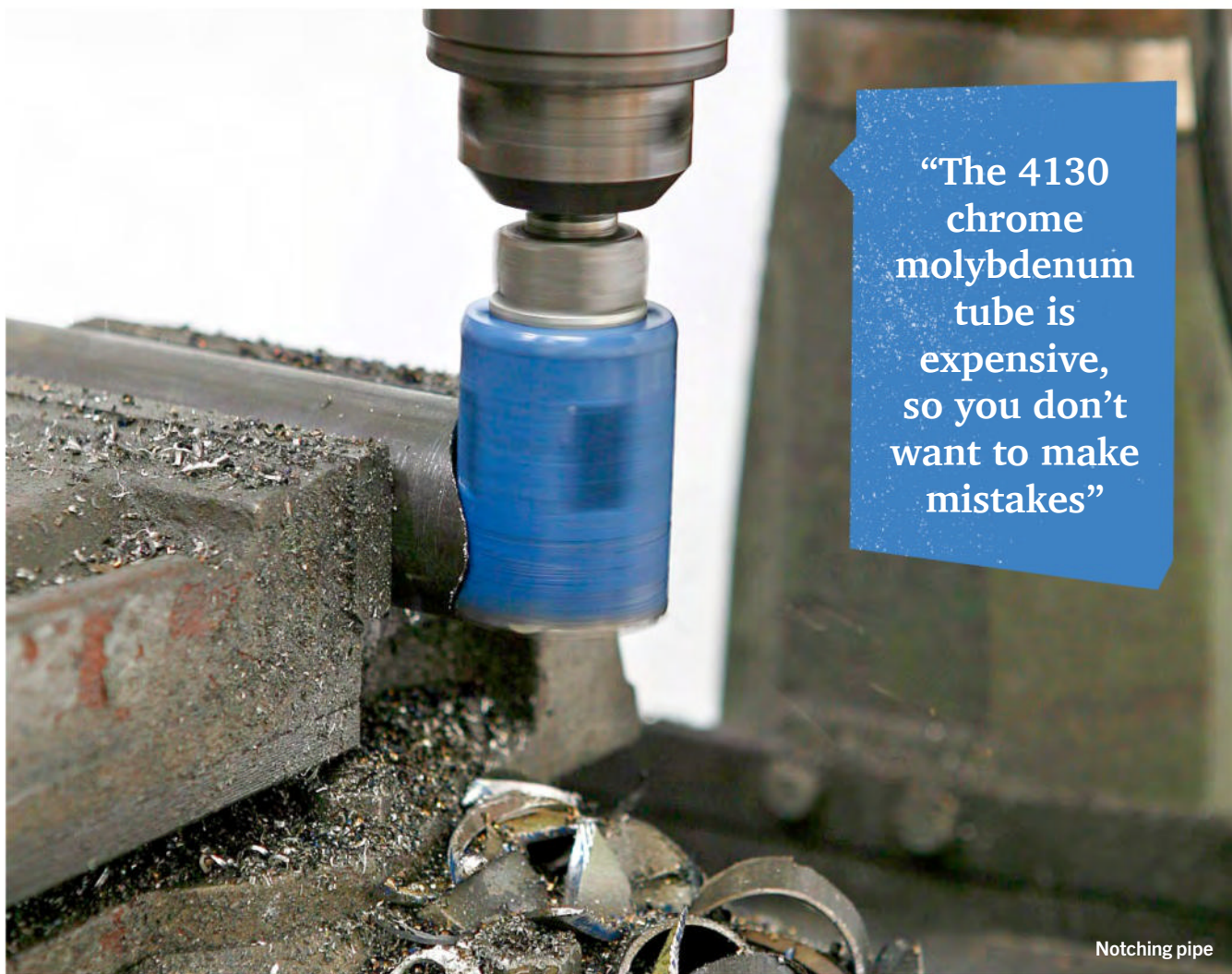
“They use chrome moly for the chassis in midget cars and you see them bounce and roll at the speedway, but the car comes back into shape.”



Tack welding main hoop



Progress



Notching pipe

Experimented with mild steel

"A few years ago I was into mild steel, where weight can be a factor, but it is not as strong as chromoly. The main benefit is that a chrome molybdenum roll cage will twist back, while mild steel retains the distortion.

"The footings for the roll cage are 3mm steel plate, MIG welded to the floor of the car body. I then MIG weld the main hoop to the footings. There are a lot of joins in a roll cage, but TIG welding is the way to go there.

"MIG welding is OK at a few points where a notched tube will fit over the weld. You don't have to grind off the MIG weld at this point because another tube will slot over the lot and be TIG welded on.

"The 4130 chrome molybdenum tube is expensive, so you don't want to make mistakes. The tube is 1½ inches across [approximately 38mm] with an 83 thou wall [83 thousandths of an inch = approximately 2mm]." [See the Chemistry Data subsection of the Chrome Molybdenum side panel.]

Welding tips

"Make sure you have plenty of gas flow when welding chrome moly so there are no bubbles or porosity in the weld. Good gas assists good penetration. You are actually melting both tubes and they are fusing together. They should be just about able to fuse without filler

rod. If they do that and you add filler rod as well, this will give you maximum penetration. You know it's a good weld if you make it clean and tidy and right around the pipe. If it's just sitting on top then it's not a good weld. Chrome molybdenum welds beautifully, and I prefer to weld this any day." ►

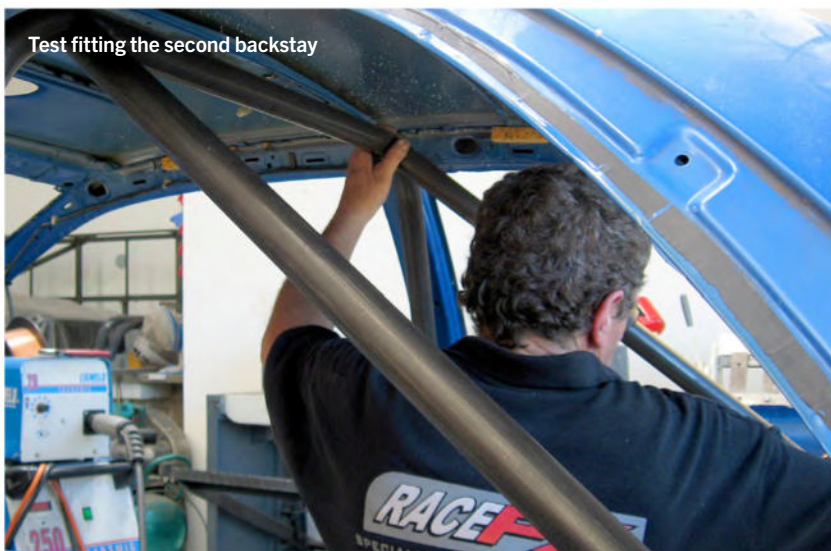


Notched pipe for backstay

Double-notched pipe TIG welded



Test fitting the second backstay



Rods

"For this welding, you could use stainless-steel rod or copper-coated, high-tensile steel rods. Stainless-steel rods have more chrome in them and make a strong weld. A 1mm stainless-steel rod is for fine welding. If you want a more substantial weld, you could use a 1.6mm copper-coated TIG wire, which I am using. Chrome molybdenum is simple to weld. When the weld fuses, taking the components and mixing them, the weld itself becomes like a piece of chrome molybdenum.

"Things like the fit must be good too. Where you have pipes notched and

butting up to each other, if the fit is good, the weld is good.

"With tube or pipe welding, you have to be aware of the pressure build-up in the sealed cavity. It's not so bad with long tubes, but if you are working on a short tube or sealed pipe then you should have a pinhole in the pipe to relieve the pressure that builds up. Otherwise it would blow out the end.

"There are stress points in the roll cage, so we put gussets and braces across to spread the load. If you had just the two tubes joined, the tubes would become like a hinge and could break. With a gusset welded across the tubes, they no longer act as a hinge."

Chrome molybdenum

AISI 4130 is a low-alloy steel containing molybdenum and chromium as strengthening agents.

The carbon content is nominally 0.30 per cent. With this relatively low carbon content, the alloy is excellent from the fusion weldability standpoint. The alloy can be hardened by heat treatment.

Typical applications for 4130 low-alloy steel include structural use such as aircraft engine mounts and welded tubing applications.

CHEMISTRY DATA (PER CENT)

Carbon	0.28–0.33
Chromium	0.8–1.1
Manganese	0.7–0.9
Molybdenum	0.15–0.25
Phosphorus	0.035 max.
Silicon	0.15–0.35
Sulphur	0.04 max.



Backstay tack welded to footing



Diagonal from main hoop to back crossbar while welding



Diagonal crossbar and backstay joint

“There are stress points in the roll cage, so we put gussets and braces across to spread the load”

Main hoop

“The roll cage starts with the outer main hoop across the centre of the car. Only four bends are allowed in this hoop, according to MotorSport New Zealand rules – at the top corners on each side of the roof and at the hips of the car.

“From the drawing I have done for this car, the main hoop is 355mm across the top between the bends, 1280mm across bottom, 1130mm from the car floor to the hoop parallel with the roof, and the whole frame is 3300mm long. Each car will have its own dimensions. The backstays cannot be outside the line of the shock absorbers, as the roll cage is intended to leave a small crush zone at the front and the back of the car.

“I use a pipe bender to get this shape to the correct angle. I guess from experience I know where to start the bends. I bend the hoop 25 degrees off vertical and then bring the top up so that it's square to the side. The main hoop has to be square with the car. It's a visual thing, because a level roll cage looks good.” ►



Backstay taking diagonal and crossbar and welded to footing



Tack welding frontstay to footing



TIG-welded joint

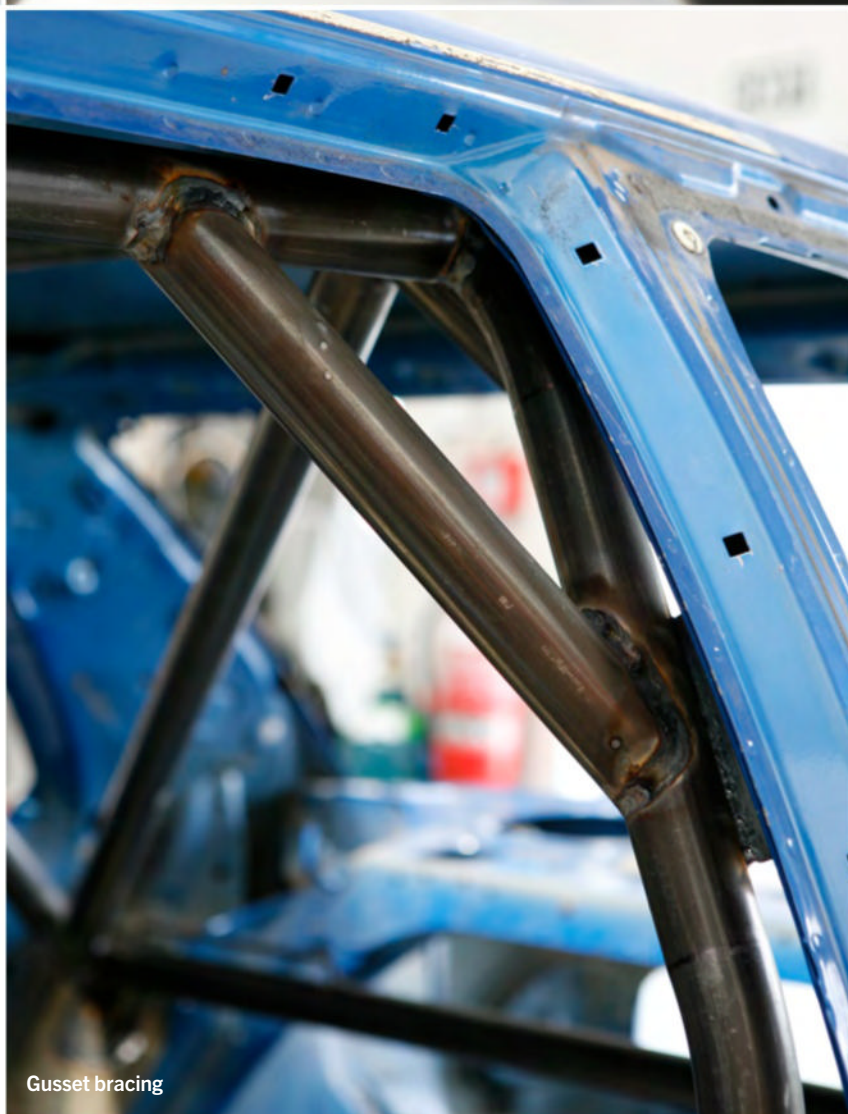
Ensure square

“At first, leave the excess on the ends of the main hoop. Put it on the floor upside down, check that the car body is vertical, line up the hoop, and make sure everything is all square. Modern cars are usually pretty good. Trim off the hoop so it fits in the floor-to-roof car measurement less 50mm (a MotorSport rule for head clearance). Drivers sit a bit low in these cars so it’s OK. The roll cage has to be fully welded around the top, so I work it out so there’s enough room for me to get in there as well.

“Tack weld the main hoop in first, before moving onto the backstays. I use a normal MIG weld for the main hoop to the steel-plate footings on the car body.

“Measure and cut the same-dimension pipe from the backstays using a notch saw to make the curved hole in the pipe. Grind it out to fit and then test fit the backstay between the main hoop and the rear foot fastening in the back of the car. There could be a bit of trial and error in this.

“When you have the angle between the main hoop with the backstay correct, tack weld it in. Once you have got the backstay in, it’s not too bad; it holds itself in when you do other ►



Gusset bracing



Frontstay joints attached to footing

Rules for roll cages

MotorSport New Zealand (MSNZ) has strict rules for roll cages because of the safety that these essential structures provide in a racing car. It states that the primary function of roll protection is to achieve substantial reduction in body shell deformation and hence reduce the risk of serious injury during competition. The ability of a roll-protection structure to provide protection is dependent on the quality of design and construction. A secondary benefit from the installation of roll protection is improved chassis rigidity.

The document outlining these requirements is very detailed. A roll cage, for example, has a clearly listed number of bars as a minimum requirement for safety.

A roll cage is defined as a “principal structure” being the structural framework of a main roll bar plus a front roll bar (or two lateral roll bars), their connecting members, two backstays, one diagonal member, and mounting points.

The ‘main roll bar’ is a near-vertical frame or hoop located across the vehicle just behind the front seats. The ‘front roll bar’ is similar to a main roll bar but its shape follows the windscreen pillars and top screen edge.

The ‘lateral roll bar’ refers to a structure consisting of a near-vertical frame or hoop located along the right and left side of the vehicle. The front leg follows the interior profile of the A-post, following the

side of the vehicle to finish at the main roll bar junction, or to continue, following the B-post down to a mounting point. Longitudinal and diagonal members are also described.

MSNZ states that roll-protection homologation (approval for racing) by MSNZ is mandatory, and all vehicles fitted with roll protection have to have a MSNZ approval certificate contained within the vehicle’s logbook.

MSNZ points out the essential design criteria and features that have to be incorporated:

(a) longitudinally, the structure must be entirely contained within the confines of the front and rear axle centre lines, and

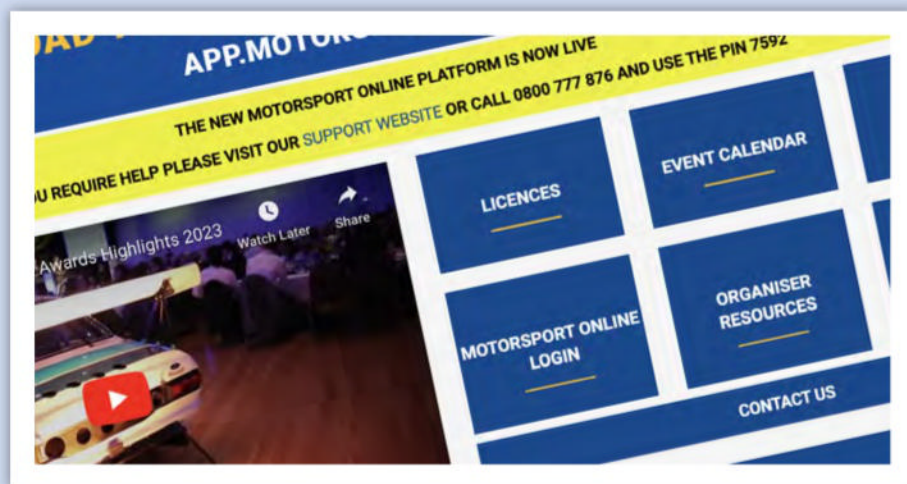
(b) the structure must be as close fitting to the interior profile of the body shell as practical, and include adequate mounting points, and

(c) members of the structure must not unduly impede the entry or exit, or access to, the occupant/s of the vehicle, and

(d) the structure must be designed to suit the particular vehicle application.

Note: Before commencing building a roll cage for your vehicle, we strongly recommend contacting MSNZ. MSNZ rules for safety cages may have changed since this article’s original publication in *The Shed*.

Contact: technical@motorsport.org.nz





Intrusion bars by door for side impact

**“I have ...
seen guys
drop over a
cliff off the
road but the
car was held
together by
the roll cage”**



Cross and intrusion bars
attached to main hoop

tubes. One tube comes in on top of the other, so you have to do the welding in place, and it can be very difficult to weld in all positions inside the car body. Do as much as possible before you break the tacks to do the TIG welding.

“As you are going to complete the back section first, next, measure, cut, and fit in the diagonals from the hoop to the back, then the cross-piece that ties with the back and the bar across the back, which also takes the seat harness.”

Front section

“For the front section, there are the bars from the main hoop down to the front footings and the two sets of diagonals low down across each door space. For a stronger roll cage, you will put more bars in. I have been on the Targa rally a few times and seen guys drop over a cliff off the road but the car was held together by the roll cage.

“Strong roll cages are crucial – I have a Nissan Skyline drag car with a 1500–2000bhp engine for which I did the roll cage. My son drives it, and if the car turned pear-shaped, I would want to know that he was protected by a very strong roll cage.” 📄



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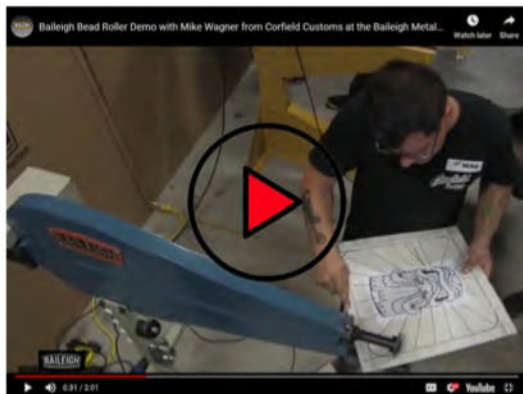


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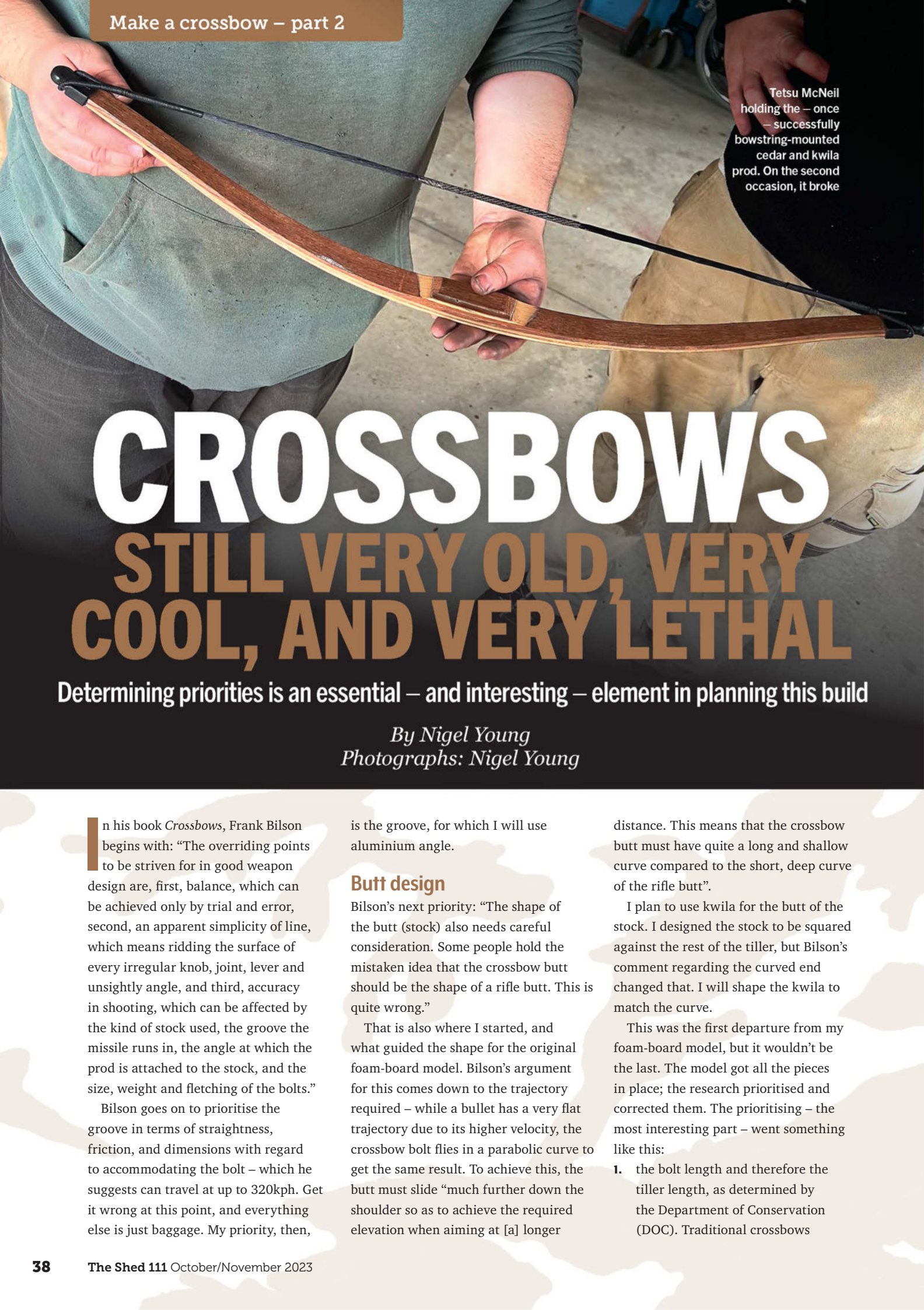
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Tetsu McNeil holding the – once – successfully bowstring-mounted cedar and kwila prod. On the second occasion, it broke

CROSSBOWS

STILL VERY OLD, VERY COOL, AND VERY LETHAL

Determining priorities is an essential – and interesting – element in planning this build

By Nigel Young
Photographs: Nigel Young

In his book *Crossbows*, Frank Bilson begins with: “The overriding points to be striven for in good weapon design are, first, balance, which can be achieved only by trial and error, second, an apparent simplicity of line, which means ridding the surface of every irregular knob, joint, lever and unsightly angle, and third, accuracy in shooting, which can be affected by the kind of stock used, the groove the missile runs in, the angle at which the prod is attached to the stock, and the size, weight and fletching of the bolts.”

Bilson goes on to prioritise the groove in terms of straightness, friction, and dimensions with regard to accommodating the bolt – which he suggests can travel at up to 320kph. Get it wrong at this point, and everything else is just baggage. My priority, then,

is the groove, for which I will use aluminium angle.

Butt design

Bilson’s next priority: “The shape of the butt (stock) also needs careful consideration. Some people hold the mistaken idea that the crossbow butt should be the shape of a rifle butt. This is quite wrong.”

That is also where I started, and what guided the shape for the original foam-board model. Bilson’s argument for this comes down to the trajectory required – while a bullet has a very flat trajectory due to its higher velocity, the crossbow bolt flies in a parabolic curve to get the same result. To achieve this, the butt must slide “much further down the shoulder so as to achieve the required elevation when aiming at [a] longer

distance. This means that the crossbow butt must have quite a long and shallow curve compared to the short, deep curve of the rifle butt”.

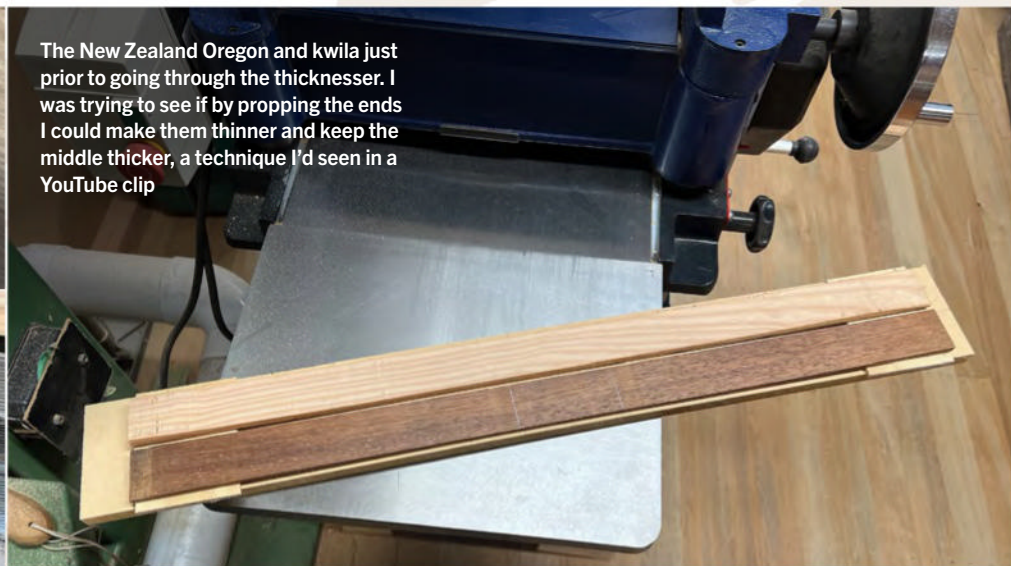
I plan to use kwila for the butt of the stock. I designed the stock to be squared against the rest of the tiller, but Bilson’s comment regarding the curved end changed that. I will shape the kwila to match the curve.

This was the first departure from my foam-board model, but it wouldn’t be the last. The model got all the pieces in place; the research prioritised and corrected them. The prioritising – the most interesting part – went something like this:

1. the bolt length and therefore the tiller length, as determined by the Department of Conservation (DOC). Traditional crossbows



The original length of New Zealand Oregon, and a piece of kwila after cleaning up a length of old decking as shown below



The New Zealand Oregon and kwila just prior to going through the thicknesser. I was trying to see if by propping the ends I could make them thinner and keep the middle thicker, a technique I'd seen in a YouTube clip

used much shorter bolts. In his book *The Crossbow*, Sir Ralph Payne-Gallwey outlines bolt construction as being a total length of 12½ inches (31.75cm) and 2½ ounces (70.8g). A traditional medieval crossbow could not be used on DOC land

2. the rails that supply the groove for the bolt, and the accuracy of the bolt once released
3. the nature and position of the prod. This needs to be sloping slightly

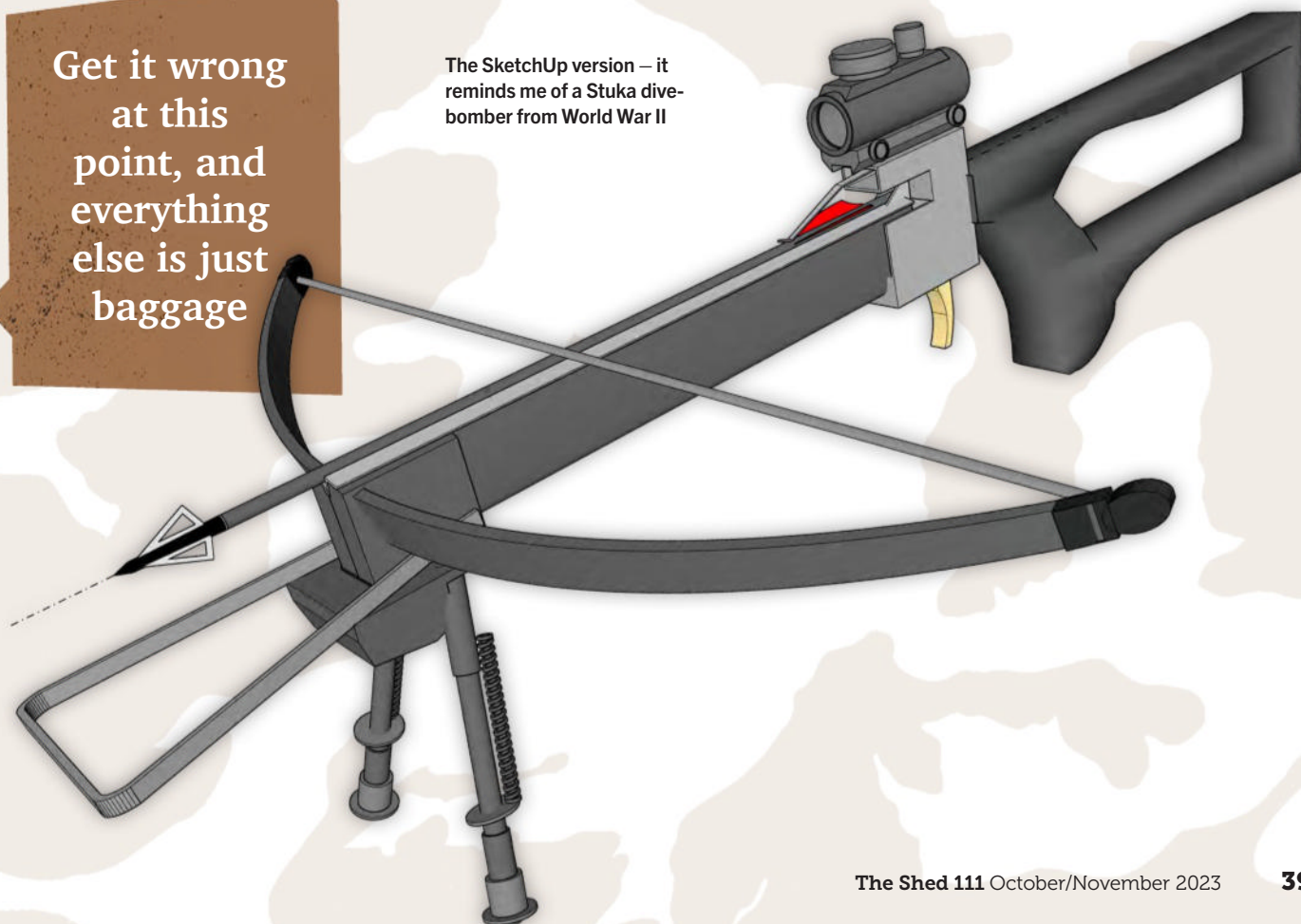
upwards, thereby reducing the friction between the bowstring and the rails. Alongside this is the matter of the position of the bipod (a support or rest for the crossbow). I want it as near as possible to the prod to give the bolt maximum support and stability at the moment it leaves the crossbow. I have bought the bipod

4. the trigger mechanism and its action – I am still unsure whether the one I have is suitable

5. the shape and depth of the stock – I have to allow for both the curve into the shoulder and the depth of the bowstring draw mechanism. I had been considering geared fishing reels, before wondering whether I could get a small winch to fit within the depth of the stock without compromising it
6. putting all this together without compromising its strength – particularly the perceived weak point around the trigger mechanism. ►

Get it wrong at this point, and everything else is just baggage

The SketchUp version – it reminds me of a Stuka dive-bomber from World War II





The former and kwila and New Zealand Oregon strips prior to fibreglassing

Other considerations

Bilson cites fingers being damaged by the immediate and fast release of the bowstring or by being hit by the released bolt as it accelerates down the rails. I have decided to provide a warning that a user's fingers are getting too close to the rails by creating a ridge between them and the tiller. I also need to provide for a scope, the trigger design, a guard to prevent accidental firing, and a mechanism to pull back and lock the bowstring prior to release.

Tiller, prod, and lock (sounds like a law firm)

Having established his criteria, Bilson begins with the design of the 'prod' – the correct term for the bow. He does not

recommend steel because of the risk of it breaking due to metal fatigue.

He comments: "To lessen the friction of the string on the sides of the channel the prod was set at a slight angle, so that when it was fully drawn the limbs came above the level of the channel ... The angle at which the prod is fitted to the stock must be a compromise between the vertical and 10° but the exact angle between those two must be carefully worked out according to the length of the draw. In a crossbow having a draw length of about 14" [35.5cm] the prod must be fitted into a slot cut about 5° from the perpendicular."

My planned draw length is six-eight inches (15–20cm); Bilson has now given me a guide. I have several

This detail is crucial; if the bowstring broke while under full tension, the result would be catastrophic

questions concerning the prod that can't be answered until I start to build the crossbow. They centre on the length, its fixing to the tiller, and the configuration of the prod tips to accommodate the bowstring. This detail is crucial; if the bowstring broke while under full tension, the result would be catastrophic.

Tiller material

The tiller is like a chassis – any movement would be compounded throughout the whole device. It will need a core around which the rest will be fixed. Not only will it form the shape of the crossbow, but it will also form the gap for the bolt to be mounted and released. I considered steel, aluminium, and fibreglass.

The bolt will also need to be placed upside down, in that one fletch will go down into the groove, while the other two will be just above the rails. This is to allow for the bolt retention



The €31.95 trigger I found online – it would have blown the budget and turned this into a parts assembly project.

spring that holds the bolt in place prior to release. This one component will be the key to the rest of the crossbow and therefore must be stiff, thin, long enough to go the entire length of the crossbow, and deep enough to provide support to every aspect – the way a car chassis does. I tested a piece of rimu; try as I might, it would not flex – it should do the trick.

A straight groove is essential

Bilson writes: “the essential factor for accuracy in a crossbow is that the stock, especially the bolt groove, should be straight. This is very difficult to ensure if you are using a solid piece of wood of say 1 $\frac{3}{16}$ ” [3cm] because of the possibility of warping. I therefore suggest that three $\frac{3}{8}$ ” [1cm] boards be used”.

I had always perceived the tiller as being laminated. I used four pieces of 5mm foam board for the model, giving me a total thickness of 20mm. That was too thin – I was looking to finish at around 4–5cm – but working with individual templated pieces makes a lot of sense. It would make the trigger easier to install and keep it from catching or being impeded. It would also make it easier to build the rest once the trigger had been pulled and the bolt released.

Balance

With the rimu core sorted, I could concentrate on the rest of the crossbow. My plan was 18mm ply with M6 bolts and fibre washers, giving an overall width of 48mm. It also needed to provide a decent grip for the user. I considered the Thompson



The fibreglass resin we used



Des Thonson cutting the fibreglass strips prior to putting it all together

submachine gun forward-grip style, wondering if I could use it as the bowstring pullback mechanism. I was using less than 50mm in materials, while building it in a way that would allow for the balance that Bilson had mentioned. The chassis would also need to take the bipod and, potentially, a ‘cocking stirrup’ – the bit on the front you put your foot in when pulling the bowstring

back. I wasn’t sure if I would need one – it would depend on how I managed the bowstring pull mechanism.

Bring in the experts

At this point I went to see Tetsu McNeil, bow maker, sword maker, armour maker, costume maker, artist, and writer. I had many questions, particularly around the construction of the prod – about materials, laminating, fixing, and removing for convenience; in two parts or one; length, breadth, and height?

“That’s a stone-throwing trigger you have there,” was McNeil’s first comment when he saw what I’d brought with me.

“Oh, can I still use it?” – were my doubts about the trigger being confirmed?

“Possibly; let’s see the rest of it first.”

He looked over my model, my sketches, and my rimu chassis.

“Good idea to use foam board for the model, but I think you need a proper trigger,” he said. ►

“That’s a stone-throwing trigger you have there,” was McNeil’s first comment when he saw what I’d brought with me

The top of the former removed after a week





The former in place and left for a week. In hindsight, I would use screw clamps rather than friction ones

He proceeded to show me a model of one that he had made for a small rubber-band gun; he had built it out of MDF to figure out a simple safety mechanism.

McNeil approved of my approach, but became adamant that my trigger had to go. He also confirmed my suspicion about the weak point at the trigger. It seemed that the overall profile was fine, but, in trying to keep the weight down, I had made it too small – in cross-section that is, not length.

“There’s some good ideas here,” said McNeil. “The question is: can we make them work? Have you ever used a crossbow before?”

“Not really ...”

“Then you don’t know what questions to ask, and I can’t ask them for you as you don’t know what questions I should be answering.”

Shades of *Yes, Minister* here, with Bernard Woolley’s famous “I don’t know what you don’t know, Prime Minister” echoing in the background. It appears that all my ignorance hurdles have arrived at once.

Avoiding steel

We discussed the materials for the prod, with steel and car springs being the starting point. I had sketched the two

arms of the prod with fixing holes at the ends, and McNeil mentioned that some car springs had been manufactured with them already. I explained that I was trying to avoid steel, as it would be awkward for some readers to work with, and I was trying to keep it simple.

The best alternative was bamboo, possibly laminated with heart rimu. Yew and American oak are traditional woods for the prod, but not easy to get. Bamboo is a superb material because it rarely breaks – not in the context of a crossbow, anyway. This was good news from a safety aspect, as the last thing I want is someone building a crossbow getting hurt when the prod snaps next to their face while under serious tension. Bamboo isn’t cheap, however, and must be used in a specific manner.

Tempered like steel

McNeil explained, “Bamboo is the only wood that can be tempered like steel. It can be bent very tightly, then tempered to stay in that shape.”

At this point, he was demonstrating the recurve you see at the tips of some longbows.

“You must use dry heat – a heat gun would be fine. Once it’s tempered, it’s set – that shape can’t be untempered or changed.”

McNeil approved of my approach, but became adamant that my trigger had to go

When in doubt, speak to the experts!

The revelation around tempering bamboo alone was worth the trip across town to see McNeil. I ended up coming home with an 1800x27mm length of bamboo straight from the cane, and a 2000x85mm length of leftover bamboo flooring to experiment with.

In the end, I didn’t use the bamboo, as it would have been a one-piece prod and I was looking to make a laminated one with several layers fibreglassed together. To this end, I experimented with New Zealand Oregon and kwila, and with cedar and kwila.

Tension and compression working together

The Oregon was excellent in that its grain was very straight – almost perfectly in line along the length of each piece; the tighter and more complex grain of the kwila in the other direction would be a great match. The issue here was that of tension and compression working together. The Oregon – mounted at the front of the prod – would supply the tension and, by extension, most of the power, while the kwila at the back would be compressed and therefore prevent the Oregon from breaking, while assisting the Oregon to return to its original position. I used double-sided tape to bind together four strips that I had formed – two of Oregon and two of kwila – to model the shape. The kwila proved to be too short, but the idea seemed OK.

A cedar/kwila combination

I cut further pieces of the Oregon and kwila and mounted them with double-sided tape onto a piece of MDF. This was to achieve a minimum depth for the thickener to get them all the same. When I was removing them from the MDF, the Oregon split. If it couldn't stand up to being separated from some

double-sided tape, it certainly wasn't going to survive in a crossbow prod.

I moved on to the cedar. Again, the grain was perfectly in line along its length, but it was much tighter. I had three attempts at making the prod from the cedar/kwila combination, the first two using fibreglass between each layer, and the third using a contact adhesive that had 'flexible' written on the label – you can probably guess that the 'flexible' didn't work. In the end, my second attempt at the fibreglass-layered method was the more successful one.

"You could use that for a Morgan car spring!" was McNeil's comment when he saw it prior to its being shaped.

We managed to get the bowstring on once, then removed it to sand the bow

and get it ready for finishing. The second attempt at putting the bowstring on resulted in the prod breaking.

Would a blind work?

I made another attempt, using the cedar/kwila combination again. This time, I used thin 2mm strips from an old Venetian blind. I used the flexible contact glue, which also required that each surface be prepared with a separate solvent. Once that was done, the contact glue was applied to each surface. Once dry, the two surfaces were brought together over a curved former. This could be achieved by using small pieces of timber as spacers between the two surfaces, providing they had no adhesive. Once they were in contact, I clamped



I had a budget; if I went too far over it, I should consider buying a new crossbow off the shelf

them over the former and left them for a while. Even though the bond was supposed to be instant, I left them for an hour or so. It partly worked, but most of it just peeled away and the cedar-to-kwila surfaces didn't bond at all.

I decided to consider a length of fibreglass and a car spring – more about that in the next article.

You can buy a range of prods from AliExpress, but that would mean this would become an exercise in how to assemble rather than in how to build. The best I could find was a 140-pound (63.5kg) carbon-fibre bow for around \$105, including shipping. However, it would not comply for DOC land, whereas the Ek Jag 1, at \$449 with a 175-pound (79kg) rating, would comply.

Trigger time

The situation regarding the trigger mechanism was similar – I had discarded my 'stone thrower'.

We thought about cutting it down with a grinder to salvage the body and trigger, but that meant assuming someone else wanting to make a crossbow would buy

the same trigger from AliExpress, only to do likewise. We needed a new trigger completely. I came across one online for €31.95 – about \$58. With hindsight, I would have definitely considered it. However, I had a budget; if I went too far over it, I should consider buying a new crossbow off the shelf.

The Ek Jag 1 I've mentioned is only half again of what I've already spent, with real differences in terms of performance, build quality, and research and development. I spent a third of my budget just on the bipod. The Jag 1 doesn't have one of those, but it makes up for that in other ways – the trigger mechanism has four separate operations: the trigger, the safety, the release, and the return.

Double complications

A further complication is that the release component must operate in two different directions. It must be able to roll back easily as the bowstring is dragged over it, and then return to its cocking position in order to hold the bowstring. It is then ready to place the bolt and prepare to fire and will roll forward under the ►



Cleaning up the – at this point – successful laminated prod. It broke on the second attempt to string it

A reader's crossbow

Owen Kriletich from the Far North wrote to us about a crossbow he built 41 years ago, and is still using:

"It started back in 1978, when I got interested in antique-style weapons.

"I purchased a kitset 0.75-inch-calibre Brown Bess flintlock musket and, over several months, put it together. The kit came rough cast, so a lot of filing and sanding was required to achieve the final article. It worked rather well but it had a kick when you pulled the trigger.

"So, after a couple of years having fun with Bessy, I started thinking about other styles of weapons and how they worked – bows and arrows, match lock, wheel lock muskets, etc. I decided to make my own flintlock musket from raw materials. I proof-tested the barrel to four times its normal loading so I knew it wouldn't blow up in my face when I fired it.

"Alas that musket was short lived as, whilst I was chiselling out the final stage of fitting the lock to the side of the gun, the worst thing happened: it fell out of the vice and onto the concrete floor, bending the barrel – and that was it. All for nought, beyond repair!"

TIME TO TRY A CROSSBOW

"A while later I started thinking back to bows and arrows, and decided to build a crossbow just for the hell of it.

"I drew a few ideas on paper as to how I thought the cocking mechanism would work, and started making the parts out of steel. [By] trial and error, I finally found a way to get the tricky thing to work without jamming or binding. It has got only three moving parts and a spring.

"The 'claw', as I call it, that holds the bowstring tumbles on a pivot that the trigger catches as it rotates into the cocked position; a small lever is rotated and puts a stop behind the trigger lever to act as a safety catch so you can't pull the trigger and fire the weapon accidentally. So, when you cock the bow, you have to give the string a sharp yank to flick the claw over to lock it in position. Simple, but effective and reliable. I have never had a misfire, and the bow is now over 40 years old.

"I made the main stock and butt out of one piece of timber, and hand carved it to the right shape. The bow or prod is made from a Morris Minor single-leaf rear suspension spring – a bit on the heavy side but it's all I had; it works fine. I had a spare old 303 peep sight which I mounted as the rear sight, and made a bridge on the front of the bow to hold a bead front sight.

"I think the bow has a pressure of approx. 90–120 pounds (40.8–54.4kg) – not been tested.

"My crossbow is not quiet; when you pull the trigger, it goes off and kicks almost like a 303, and as loud as a 22 Magnum, so, if hunting, you have probably got only one go at it."

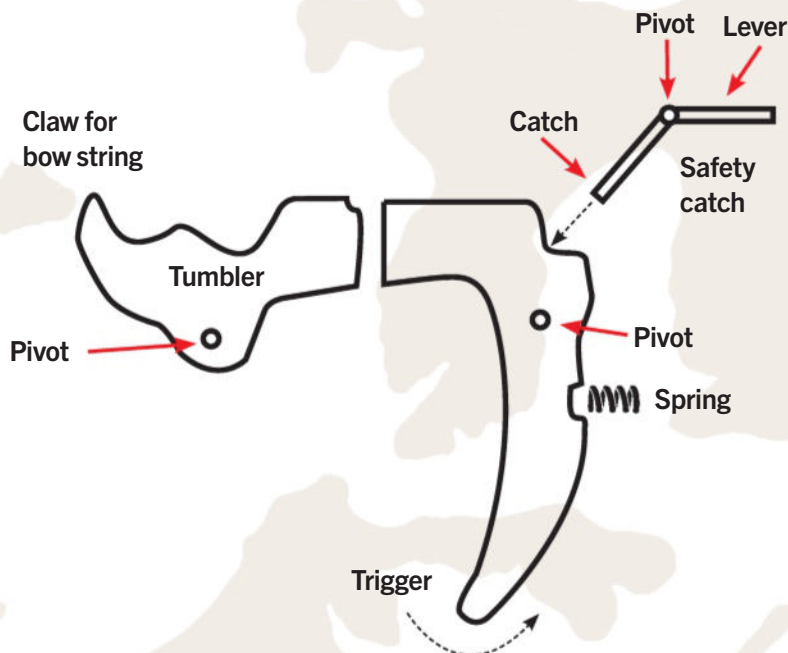
Owen Kriletich
Kaeo



The crossbow made by *The Shed* reader Owen Kriletich about 41 years ago

Basic picture of trigger mechanism

(three moving parts)





The crossbow in the raw – showing the core components at various stages for final cutting, shaping, and assembly. Probably my biggest ignorance hurdle yet. The yellow strip is fibreglass for an alternative prod and the length of aluminium will be the bolt guides. The flat piece of rimu will form the core

pressure of the bowstring. The first operation requires a spring to return it to its cocked position. The second operation also requires a spring to take it back ready for the next shot. For the crossbow to be allowed on DOC land, we must introduce a safety mechanism into that mix.

Then there is the matter of the weight of the pull – should it be light with an immediate response, or heavy with a more deliberate one? The downside of the first is that it may release prematurely; the downside of the second is that too deliberate a pull may cause it to release in a more clumsy/clunky manner. In both cases, there is a detrimental effect on accuracy.

In the picture of the mechanism from Europe, you'll notice that the trigger is very

close to the release mechanism, making this an example of the heavier and more deliberate trigger. In the picture of the camo-finished crossbow trigger and sight configuration, you'll notice that the trigger is further forward by a good 100mm or so. The first mechanism is more direct and simple, with just the necessary parts. The second is more complex, as it involves linkages to connect the trigger from its forward position to the release mechanism set back under the sight. It is this that changes the weight from heavy to light, as the linkage reduces the leverage required to release the bowstring.

More experts

A chance visit to a small sporting shop in Reefton supplied me with both

Then there is the matter of the weight of the pull – should it be light with an immediate response, or heavy with a more deliberate one?



A simple way of forming the curve from which I cut the MDF former.



The trigger from the 3D printer assembled and showing where the spring will go. At this point it hasn't got a safety catch showing – this will go directly behind the trigger. The 'groove' at the top will hold the bolt retention spring.

knowledge and parts, and I came away with a 20-inch bolt, with both a practice tip and a multi-bladed one, a bipod, and holding points for a sling. The bolt was longer than the 16 inches I had expected to work with, but apparently is the standard size in crossbow circles. This was good to know, because I had been oscillating between the DOC minimum of 16 inches and the maximum length of 24 inches, with all the implications for length, balance, and overall handling.

I learned a number of things from having a bolt. Unlike a longbow arrow, it doesn't have a notch for the bowstring. It needs to be able to be placed flight down onto the rails, slid up to the 'lock' (firing mechanism), and locked into position, with the crossbow's safety catch on, all set for aiming and release. I also learned how to pull the bowstring back with a simple rope with two hooks and handles that wraps around the back of the stock for leverage, also using the foot stirrup at the front. Was I trying to be too clever with my in-stock winch/fishing reel idea? Too soon to tell.

Most importantly, I came away with an explanation as to why the DOC had the 16-inch (40.6cm) and 150-pound (68kg) minimum requirements – it's because the smaller crossbows, with 12-inch (30.4cm) bolts or less, are compared to the use of a pistol for hunting, with the likely outcomes being

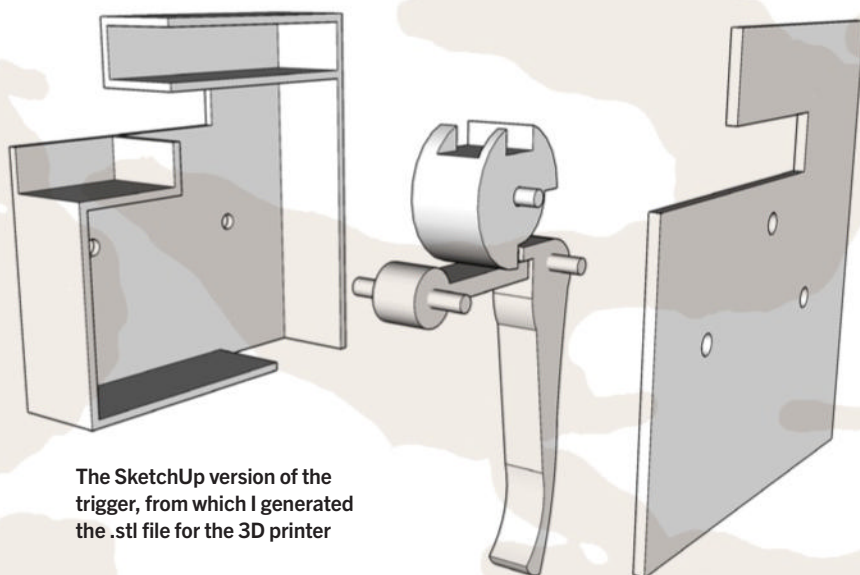
an animal maimed and traumatised rather than a clean kill. Given the stringent laws around handguns here in Aotearoa New Zealand, the use of one – even just carrying it other than to or from a gun club – is illegal.

Applied design

Having a bolt to work with changed things – my sketches were no longer hypothetical; I now had dimensions, and could better understand the relationship between the bolt and my (still under a cloud) trigger mechanism. When I realised that the 8mm diameter of the bolt could slip between the two barrel pins of the trigger, I thought for a moment I was vindicated. It was, however, a moment of premature exclamation, as I still didn't quite have it right.

One thing it did do, however, was free me from having to have the bowstring pulled back through the barrel pins as had been my working hypothesis until now. That departure was to be pivotal in how the lock would work, and enabled me to establish an operating sequence:

1. Pull the bowstring back and lock it in place.
2. Place a bolt with the white flight down into the groove.
3. Pull the bolt back until it stops against the prod string.
4. Aim, unlock, release – the trigger can't be pulled until the unlock happens. This would be a combination affair, using the thumb to release the lock just prior to using the index finger to release the bolt. ►



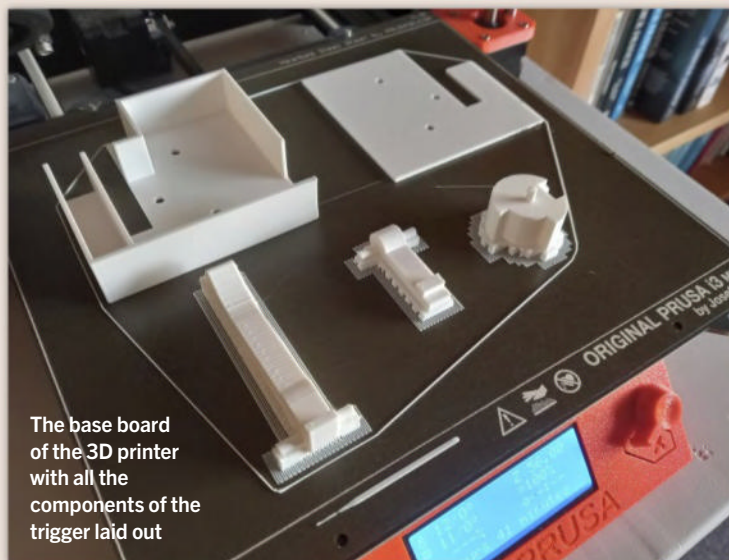
The SketchUp version of the trigger, from which I generated the .stl file for the 3D printer

Exporting SketchUp files

I mentioned that I saved the file as an .stl and sent it off to Des Thomson to be 3D printed.

I need to expand on that for those who are new to this. The trigger had five separate components: the casing, the casing cover, and the three internal trigger parts. To achieve a printed model of the trigger, I had to export five separate files – one for each of the components – as they would be set up separately, while all being printed at the same time.

Exporting SketchUp files to .stl files requires that there be no other layer – or 'Tags', as SketchUp calls them – in the file, and that the drawn component therefore be on the Untagged layer.



The base board of the 3D printer with all the components of the trigger laid out



My workshop showing the various attempts at making the laminated prod

Take two

Time clearly, to re-examine the trigger mechanism. Could I make my stone-throwing one work (it was listed as suitable for a crossbow when I bought it) or should I put it aside and start again?

More sketches; in the end I modelled one in SketchUp, where I could not only see it as a 3D mechanism but also rotate the rotor in a before and after sequence. I also wanted to add a spring to assist with the rotor return to a cocking position ready for the next bolt. I saved the file as an .stl and sent it off to Des Thomson to be 3D printed. This allowed us to see not only the relationship between each component but also the best way to make it from mild steel. We didn't include the spring in the 3D printing; it was easier just to use a small one on hand to figure out the best place to put it in terms of the overall performance. Neither did we incorporate a safety catch – it was easier to determine where it should go once the action of the trigger had been modelled.

The final point here was to also determine how the trigger mechanism – which was enclosed on two sides with provision for the bolt retention spring to be mounted at the top – would be fixed to the stock and lock.

Conclusion

It was time for another sheet of foam board – a bigger one – plus, I finally knew the right questions to ask.

My budget for this project is around \$300, and I've spent two-thirds of it. The only other items I need are the bowstring, a small scope to mount above the trigger mechanism, and the fixings and washers to assemble it all. The shutter mechanism I drew up in SketchUp, the foot stirrup, and the prod fixings will all need to be fabricated, and I'll need assistance with those.

Disclaimer

As with the previous and subsequent articles, this is about my experience in researching and designing a crossbow. I am sharing it as a writer for *The Shed* magazine, for the benefit of its readers.

If anyone makes one on the basis of this article, I'd like to hear about your attempt and its outcomes, but I cannot be held responsible for any failures, mishaps, or consequences arising from your efforts and experience in making one. That rests solely with you.

Correction

Due to a conversion error from millimetres to centimetres, the following figures from the previous article in *The Shed* August/September 2023 issue, No. 110 need to be noted:

On page 38:

"7.6cm to 9.85cm" should read "76cm to 98.5cm".

On page 39:

"4–4.5cm" should read "40–45cm".

On page 41:

"9.85cm" should read "98.5cm".

My costs now were:

Previous foam board and trigger	\$26.95
20-inch bolt	\$16.50
Multi-bladed tip	\$10
Bipod	\$100
Sling holding points	\$32
Foam board (32x40 inches)	\$17.99
Total to this point	\$203.44

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CREATIVE MECHANICAL ENGINEERING

'The farmer's way' – 21st-century style

*By Alex van Dijk
Photographs: Alex van Dijk*



A front-mounted system would make it easier to get closer to our fences without damaging them

For us, owning and living on a lifestyle block is an incredible privilege. My wife, Anke, and I have relished this lifestyle since we were married, and we wouldn't want it to be any different! Living on the outskirts of Auckland, we are close enough to the city to enjoy its events, restaurants, and beaches, yet far enough to enjoy the peace and connection of our rural community.

For our family – we have two teenage daughters – owning a lifestyle block has been the pinnacle of the Kiwi dream. Over the years, we've raised many different animals, created a pond and nature reserve, planted lovely gardens, and set up a successful farm-stay B & B. Oh yes, there was still plenty of room to build my shed!

Owning a lifestyle block comes with many jobs and responsibilities; however, with the odd notable exception, such as dealing with the occasional flyblown sheep, for us the work is enjoyable. For all the amazing times that we have enjoyed along the way, the effort has definitely been well worth it.

No ride-on for us

Unlike many lifestyle-block owners, I have, to date, refused to buy a ride-on lawn-mower, despite our very large lawns. This is because I have always valued the exercise gained from pushing a manual mower rather

Owning a lifestyle block was the only excuse I needed to be able to buy and tinker with an old tractor

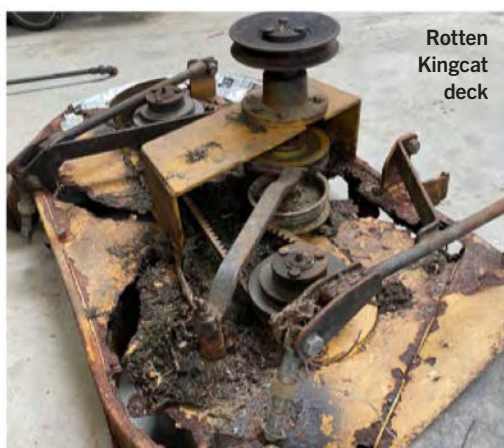
than sitting on a ride-on. As for the paddocks, Anke's amazing stock management has meant that it is only in the late spring and early summer months that we occasionally need the help of a paddock mower to keep the grass under control.

Shortly after gaining ownership of our lifestyle block, we purchased a Fergie 28 tractor and pto-driven topper (mower). After all, I'm a true sheddie at heart, so owning a lifestyle block was the only excuse I needed to be able to buy and tinker with an old tractor. This enabled us to mow the paddocks once or twice a year when the grass grew out of control. Eventually, though, we sold the Fergie, as it was not the most reliable machine and not overly safe for Anke and the kids to drive. We replaced it with a Suzuki King Quad ATV bike, which was more reliable and far easier to start and use.

For a few years, we did without a paddock mower, and more or less managed OK, occasionally borrowing the neighbour's topper. However, eventually the call to own a mowing solution became stronger, and I was again in need of another shed project. A quick look at pricing for a new or second-hand quad topper confirmed that making something was the way to go – new toppers typically cost \$4K–\$6K. I figured that I could probably put together a good one for around \$1K, plus my time. ►



Donor ride-on with good engine sourced from Trade Me



Rotten Kingcat deck

The concept

First of all, I needed to have a concept and a rough plan.

After YouTubing and Googling, I learnt that most toppers are towed behind the ATV, but some are pushed in front of it. The advantages of the front-mounted solution appealed to me, as that method seemed more manoeuvrable and compact, and you mow first before driving over the grass.

We intended to use it mostly to top the paddocks, but we knew it would

also be super handy if we could mow tighter spaces such as the roadside and nature reserve, and a front-mounted system would make it easier to get closer to the fences without damaging them.

The only thing I wasn't sure about was how the quad bike would handle the additional front weight and how it would steer and handle the topper. I decided to hope for the best in that regard; I could always make the mower towable if my concept failed.

Adjusting the height of the anti-scalp wheels



**As a paddock
topper that
just mulches
what it cuts,
it doesn't
matter which
way the
blades spin**

Now, maybe it's my Dutch heritage or just that ingenuity from my Kiwi upbringing, but I love upcycling and repurposing old stuff. Growing up, I was taught to make stuff by my dad in the farm workshop 'the farmer's way', just using whatever we could find or get hold of.

"It doesn't need to look pretty; it just needs to do a job," he used to say.

That was to be the theme for this topper project.

Sourcing parts

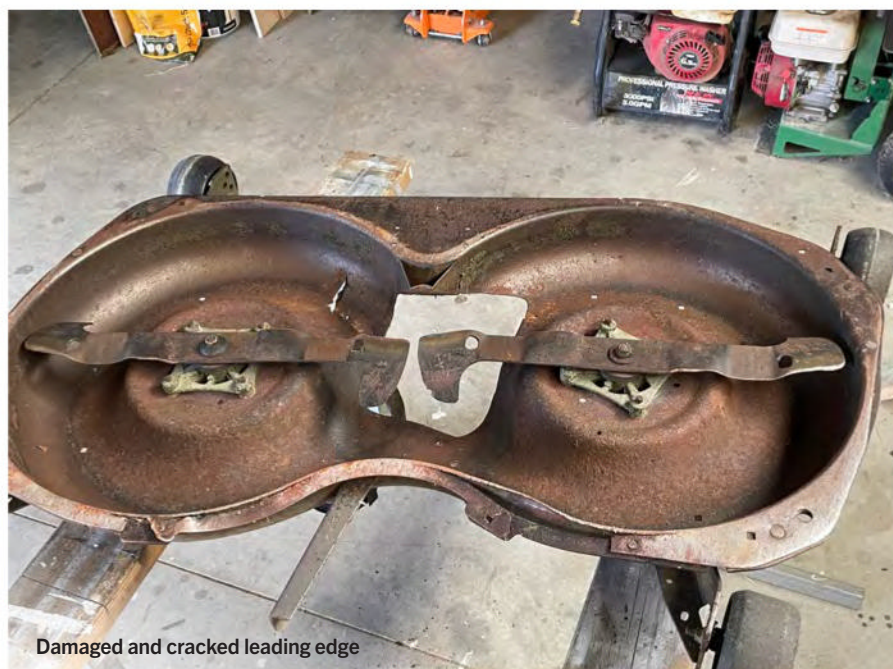
After searching online unsuccessfully for a cheap ride-on with a great motor and deck (apparently that trifecta doesn't exist!) I eventually decided to approach the local tractor centre to see if they had any

mower decks they were throwing out that I could fix up.

One box of beers later, I had a relatively good deck with no rust issues and only a broken mount from being driven into the edge of a concrete path. Later, I learned that this probably happened because the anti-scalp wheels were adjusted too high relative to the bottom of the deck and therefore could not protect the deck from scraping the ground. Consequently, the leading edge of the deck was also battered. It was a 42-inch, centre-chute, counter-rotating deck from a Husqvarna ride-on mower. I had had little experience with mowing set-ups but was confident that I could make a half-decent paddock topper from it. ►

Mowing close to fences in the race is a breeze with a front-mounted mower!





Damaged and cracked leading edge



Cracked mounting bracket

Next, I needed a strong motor. Actually, I still wanted to acquire a whole ride-on, even if it was broken, as that would give me a whole bunch of parts that I could repurpose. Items such as wheels, tensioner pulley arms, petrol tank, ignition key system, etc., would also be needed.

Via Facebook Marketplace, I found a Kingcat advertised for \$1K. The deck was pretty rotten, but it had a strong engine

and heaps of parts I could use. Not keen on spending \$1K, I thought I'd make a cheeky offer of \$600 after I saw that it hadn't sold for weeks. To my surprise, the seller had someone who was keen on purchasing just the hydrostatic transmission, so I made a deal to take the remainder, including the good engine. The engine was a twin-cylinder Honda GXV530 with an electric start, rated at 15.2hp.



Centre-chute opening welded in



Husqvarna deck cleaned for initial inspection



Left: Stripping the donor ride-on mower

Above: Arc (stick) welding – the best skill that Dad ever taught me!

It ended up looking a little *Mad Max*-ish – but, hey, whatever works, right?



Rust prevention

Preparing the cutting deck

With the Husqvarna deck and Kingcat mower (with engine) in my possession, work could begin.

First, the deck would need to be fixed up and configured for the project. After a quick water blast and the removal of connecting arms and other parts that weren't needed, I could see more clearly what I was working with. I removed the centre catch chute and creatively welded the hole with some strips of 40mm wide Duragal flat bar. It ended up looking a little *Mad Max*-ish – but, hey, whatever works, right? – and it sure would be strong. My dad would be proud!

I then cut off the cracked mountings and welded up the deck cracks. The bashed front was strengthened, and, most importantly, the anti-scalp wheels were adjusted lower to give the deck the protection that it should have had.

An assessment of the blade spindles revealed that one was showing signs of play. On this deck, the counter rotation is provided with a small reversing gearbox on that particular spindle, so, rather than source a replacement counter-rotating spindle, I opted to replace it with a standard spindle that I sourced via Trade Me. As a paddock topper that just mulches what it cuts, it doesn't matter which way the blades spin, as long as the blades match the spindle rotation, and the blades were in need of replacing anyway.

I then installed the belt and fabricated a tensioner, which was repurposed from the old Kingcat deck. To finish off the deck preparation, I gave it a quick once-over with a wire wheel where needed, and treated it with a rust converter and then rust-preventing fish oil. ►



Cutting apart the Kingcat frame



Clean-up and removal of surplus brackets



Initial positioning of the new chassis over the cutting deck



Adding wishbone and connecting arms to chassis

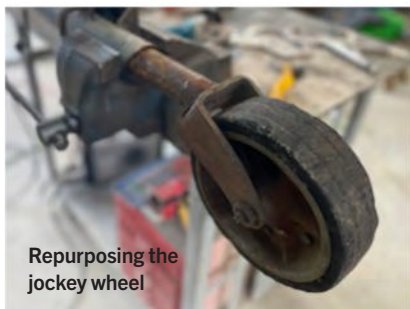
Preparing the chassis

Before removing the engine from the Kingcat, I made sure it started and ran OK. I then carefully labelled the wiring loom connections to help me connect them correctly later on.

Whilst doing this, I discovered the ride-on mower had an electric clutch. A bonus, I thought, as it would be handy on the mower, and would allow me to start and stop the blades on command without stopping the engine.

With the engine removed, I began to brainstorm ideas on how to connect the engine to the cutting deck with some sort of connecting chassis, and, at the same time, provide a method for the deck to be height adjustable. It occurred to me that a good starting point would be to use the rear section of the Kingcat chassis, and reuse the engine and fuel tank mounting set-up. This would also allow me to mount the Kingcat fuel tank safely in front of the engine, with adequate protection and the engine on adjustment slots.

Kingcat began manufacturing mowers in Katikati more than 25 years ago. The mowers are extremely well built, with impressively strong chassis. So, concept in mind, I went about cutting the Kingcat chassis in half and cutting off all the unwanted brackets and gear.



Repurposing the jockey wheel

“To adjust the height of the wheels, I repurposed an old horse-float jockey wheel from the ‘I’ll use that someday’ pile”

Once it was cleaned up, I positioned the newly created backbone over the cutting deck to see how I could connect the two assemblies. It was quite fiddly trying to get them correctly aligned, but I achieved it eventually. I then welded 40mm angle-iron upstands to the deck with connecting bolt holes so that the upper chassis could be bolted to the deck via the four upstands.

Cutting-height adjustment

To help support the weight of the topper and provide the deck with a height-adjustment mechanism, I decided to create a separate wheel frame to be attached to the front of the mower body via a hinge connection. Pivoting this frame downwards would have the effect of raising the mower higher off the ground.

I sourced two heavy-duty pneumatic castor wheels via Trade Me, and welded them to the Duragal box-section frame. I then fabricated the hinge connections ‘farm cocky’ style, using bolts through galvanised pipe welded to the frame. The bolts were attached to lugs welded to the mower body – a simple method but still strong and cheap.

To adjust the height of the wheels, I repurposed an old horse-float jockey wheel from the ‘I’ll use that someday’ pile. The wheel was cut off and the screw jack strut mounted between the wheel frame and the mower body, thus creating a simple and easy-to-adjust cutting-height system. I created a bridle frame over the body of the mower to attach to the top of the jockey wheel strut to give the mower frame the rigidity that it needed to support the weight of the motor and deck. ►



Adding the front castor wheel frame



Repurposed jockey wheel in position to adjust the cutting height



Making the quad bike attachment brackets for the linchpin connections



Finished connection

ATV connection

The attachment to the quad bike needed to be rigid in the lateral direction so that the mower and bike could move as one. However, it also needed to be free to pivot vertically so that the mower could follow the contour of the land.

Our Suzuki King Quad already had a bull-bar kit, which made it easier for me to create a rigid mounting. I welded receiver channels to the bike, with holes drilled at various heights to accept tractor implement pins. These holes would allow additional height adjustment at the rear of the mower.

For the mower connection, I welded steel bushes to short struts. I could have used weld-on top link ends but I was keen to keep the weight down and wanted a compact connection. I was confident that the connection I had created would be strong enough. I would connect the mower to the quad by offering up the struts to the receiver channels on the bike and fitting an implement pin on each side, secured with linchpins.



Welding the connector brackets onto the bull bars

To avoid overcharging the quad bike battery, I permanently disconnected the charge regulator on the mower

Assembly and wiring

After slapping some zinc-rich paint on the welds and some enamel metal paint on the deck and the body, it was time to put all the parts together.

First, I bolted in the fuel tank and charge regulator. Next, I bolted the body onto the mower deck, pre-fitting the drive belt in between. Before mounting the engine, I gave it a service, changing oil and filters. I then installed the clutch and engine. The original Kingcat throttle lever was adapted and fixed to the side of the body, and the connecting throttle cable was shortened and attached. I also fitted new cutting blades to the deck as well as a bracket for the hour meter.

The final task was sorting the wiring and electrics. Instead of mounting (and

maintaining) a separate battery for the mower, I decided to start and run the mower from the quad bike battery via an Anderson plug connection. The Anderson plug and cable were sourced from AliExpress and included an inline 50A fuse. To avoid overcharging the quad bike battery, I permanently disconnected the charge regulator on the mower so that only the quad bike engine would charge the battery.

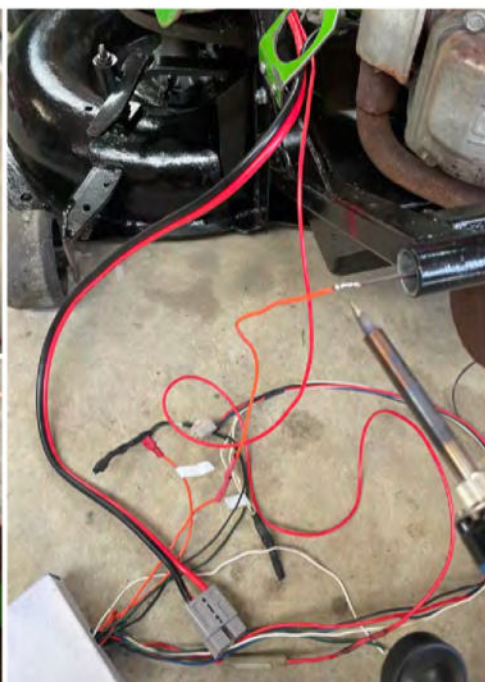
Having labelled all the wires before I removed the engine from the Kingcat made it easier to rewire everything at the end. I reconfigured the wiring loom with an umbilical cord to a remote-control box for the start key and clutch switch. In this way, I would be able to control the mower from the quad bike. ►



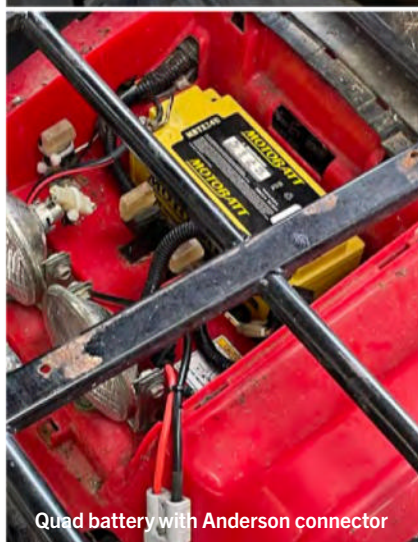
Control box for start key and clutch switch



Hour meter



Wiring it all back up



Quad battery with Anderson connector



Throttle lever



The finished mower, ready for testing!



Installing the clutch

First test

After all the tinkering in the shed was finished, I was so excited to try out my new project that I could have easily mown every blade of grass on the property! However, to my surprise and disappointment, Anke proclaimed that we were in fact getting short on grass and I was under no circumstances to mow any of our paddocks! Autumn was well under way, and with winter approaching, we would need the extra grass. All I was allowed to mow was the small bit of grass on the roadside and our nature reserve. Normally this job would have been easily managed with the weed eater or the push mower, but I was determined to use the quad and my new topper!

The verdict?

I am super pleased at how the mower performs. Steering is heavy when the machine is stationary, as I expected,

but when it is under way it steers easily and handles well. It does a great job of cutting and mulching. It's a powerful set-up that chews through thick, tall grass with ease. It's so convenient to be able to start and stop the mower engine and blade cutting from the control box on the bike. The cutting-height adjustment is super convenient, too.

All up, the project has cost just over \$1100 plus a box of beers. This included a full service of the engine and clutch, new blades, and one new spindle. So, while not a new mower, it's certainly a fully rebuilt one with a reliable Honda engine that should give problem-free mowing for years. I even managed to sell the remaining unused Kingcat frame and parts on Trade Me for \$200, so, really, the total cost reduces to \$900. I'm pretty happy with that.

Now all I need is for the rain to stop and the grass to start growing again! 🌱

First test ... but don't cut too much grass!





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MAX AND HIS DAD ARE BUILDING A SHED

Max's philosophy: "do the mahi, get the treats"

*By Geoff Cussell
Photographs: Geoff Cussell*

G'day! I'm Max. I came into the world of my mum and dad (Helen and Geoff) in 1995, as their lucky number two.

Fun fact about me is I was born with Down Syndrome, or Trisomy 21, as it is called in France, where I was born. When I was about 6 months old, Mum and Dad decided to wrap up their extended OE and trot back to New Zealand, where Mum is from.

My parents met in England. Maybe it was Dad's DIY attitude that won Mum over, because he's good at woodwork and metalwork, which he learnt at school and repairing golf clubs with his golf-pro dad at courses in Australia. My Down Syndrome means that, like Johnny B Goode, I don't read or write well, so Dad is helping put finger to the keyboard to tell you what we've been up to.

A busy Max

Mum and Dad do their best to keep me busy and learning, so my days are filled with activities such as painting classes, Special Olympics swimming practice, house cleaning, lawn-mowing, and making planter boxes. Dad has designed a planter box made from fence palings, and he cuts kits for me to put together. He has made an aluminium jig for me to use so I pre-drill and hammer the



Frames constructed in the garage. Second-hand windows at top left

nails in the right places. Then I paint the boxes, fill them with soil, and plant them with herbs or annual flowers. I have sold about 70 planter boxes to date, and, while they don't make a great profit once the time and materials are added, assembling each one grows my woodworking skills and keeps me off the streets.

The dream set-up

Until early last year, Mum and Dad lived in rural Whitford and I could build my planter boxes in Dad's shed – the dream set-up – but, as with every dream, eventually you wake up. So, seeing as my parents aren't getting any younger, they decided, after more than

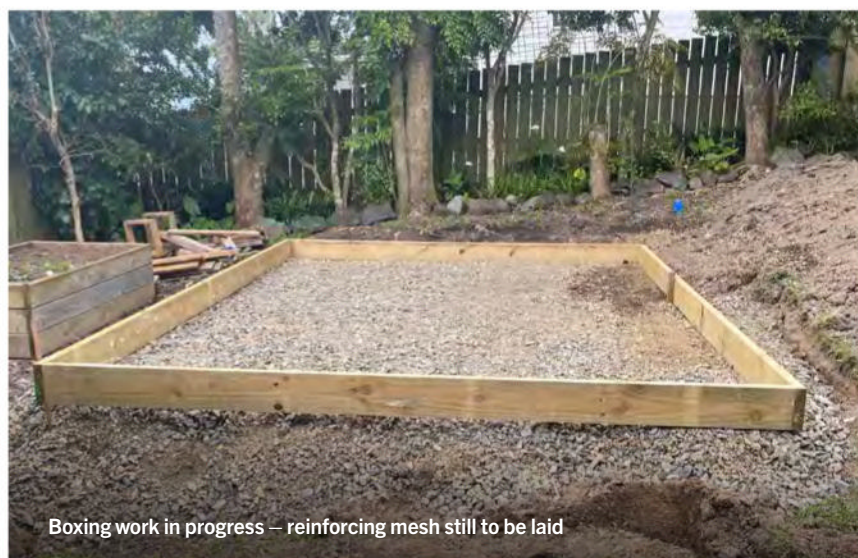
20 years of looking after a 2.5-acre lifestyle block – home to sheep, pigs, and chickens, not to mention me – that moving back to the 'burbs was the most sensible step.

As much as I loved farm life, living in the suburbs means I'm closer to public transport and places to work, socialise, and learn, which is a real upside. However, every silver lining has a cloud and our new home doesn't have a shed, so, until now, I have assembled the planter boxes in a covered patio space.

Time for a new shed

This year, Dad has been working to change that so we can again have a base for our projects. ►

Dad has designed a planter box made from fence palings, and he cuts kits for me to put together



Boxing work in progress – reinforcing mesh still to be laid

Max's Planter Boxes
 ph: 0274309131
 email: bistorque@xtra.co.nz

Painted in black, green or grey
 Planted with herbs or annual flowers
 \$55

Painted black, green or grey, \$45

Unpainted, \$35

Measurements 24cm wide by 52 cm long by 20 cm deep



Boxing timber being straightened on pad before being recycled as planter box legs. Power conduit in lower right picture

Step one was choosing the spot on the section where a shed would work

Step one was choosing the spot on the section where a shed would work. Next, Dad measured out the floor area that could be used within the rules for unconsented sheds in the Auckland suburbs. He cleared and levelled the area, which meant removing a large playhouse, which he sold on Trade Me as a chicken coop because it had done its dash as a playhouse.

Meanwhile, he designed the shed. He knew we would need a ranch slider and some windows but that having them made specifically would eat into the budget. Instead, he searched Trade Me and found three windows and a ranch slider that fitted the bill at a demolition yard. “On ya, Dad.”

Pouring the pad

When the floor area was flat, Dad prepped the boxing, mesh reinforcing, and conduit for power cabling and employed the services of Pioneer Concrete Pumps to pour the concrete pad. He hired a concrete grinder to cut the top few millimetres off the surface and bring out the texture. We then painted it with a clear concrete sealer.

That was back in November last year. Since then, Dad has sourced quotes to build the shed but decided to save money and put himself to work by building it himself – with my help, of course.

We have been building frames during weekends and at week nights when Dad finishes work. Sure, we’re burning the candle at both ends – but do the mahi, get the treats.

Walls are coming

Soon, the four wall frames will be ready to be carried out of the garage and installed on the pad. Dad squared and drilled the lower rails of the frames before they were built to make sure they were square and true before being erected and bolted in.

For the roof structure, the ridge beam and rafters were specified and manufactured by Prolam in Motueka. Now, we’re waiting for the grooved ply for the ceiling, the Bevelback metal cladding folded in a profile to match the weatherboards on our house, and the corrugated iron for the roof.

Dad hopes to get the shed erected and the roof installed during a dry weekend soon – in Auckland, we might be waiting a while.

Once the cladding is on and the windows installed, we’ll insulate the walls and line them with high-durability and noise-insulating Gib board. Then we’ll gib-stop the walls and paint them. Once all that is done, we’ll install the workbenches and machinery, and maybe a dart board and a fridge. Then we’ll celebrate with a beer – over to you, sponsors. 🍺

On the tools – sans a lot of my safety gear



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ALIBRE 101

With the foundation skills mastered, you can let your imagination run wild

By Bob Hulme
Photographs: Bob Hulme

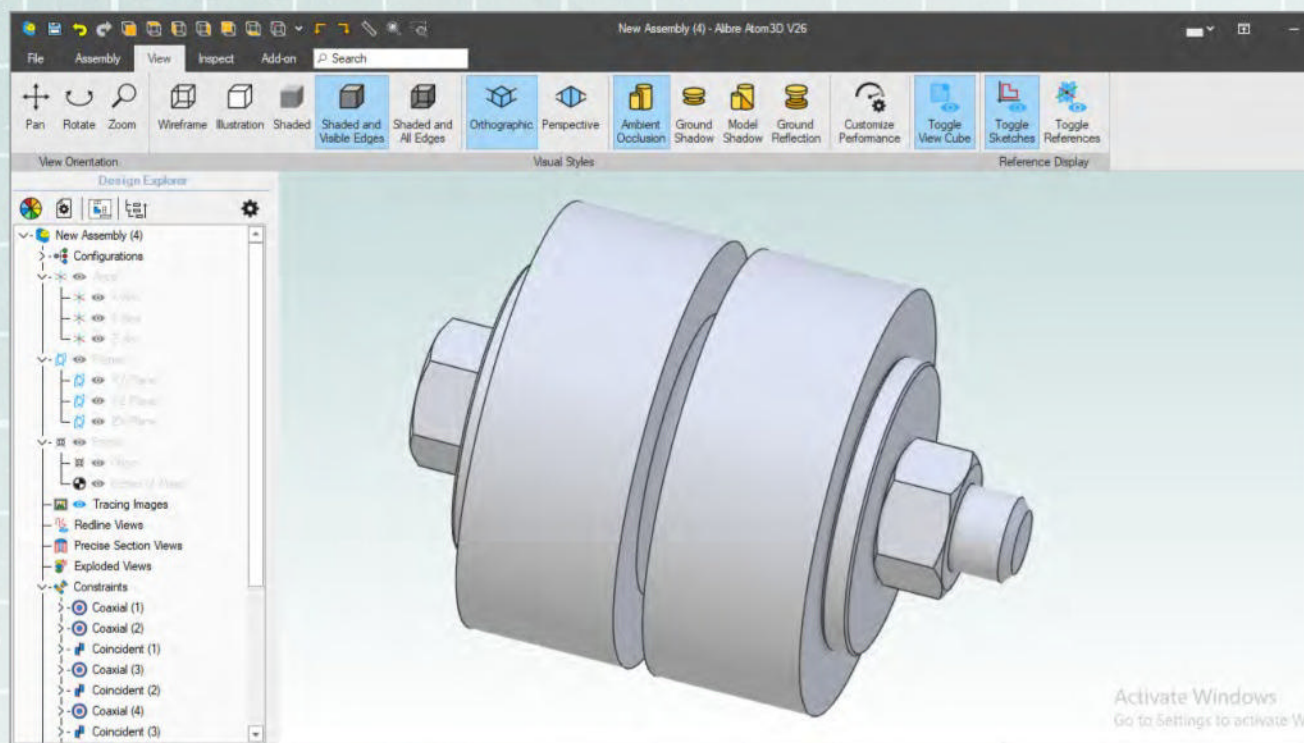


Fig. 1. Assembly created in Part 7

In the previous issue of *The Shed*, August/September, Issue No. 110 (and Part 7 of this series). I described how to create assemblies.

I was left wondering how many imaginative readers figured out that they could create a Lego block in the Alibre Atom 3D program and, using the assemblies capability, create their own virtual Lego models.

There are advantages. First, you do not have to purchase any blocks, so it is cheaper and, secondly, there will not be any chance encounters between stray blocks and your bare feet!

Joking aside, it is possible to do exactly as I have mentioned. In this article, we will look more closely at what can be done with

assemblies, as well as have a quick look at the Shell function and how to get fancy with lettering.

Blowing things up

Who does not like the odd explosion? Everyone does, right? Exploded views can be fun even though they do not make any noise. These are the views that can explain how something works or how it goes back together. It is easy to create an exploded view from an assembly done in Alibre.

Open the assembly file of the Dimpling tool that we created in Part 7 (see Fig. 1). In the Assembly tool ribbon, click on the Exploded View icon. A new tool ribbon will appear. Click on the Auto Explode icon.

Now, if the exploded view that appears

These are the views that can explain how something works or how it goes back together

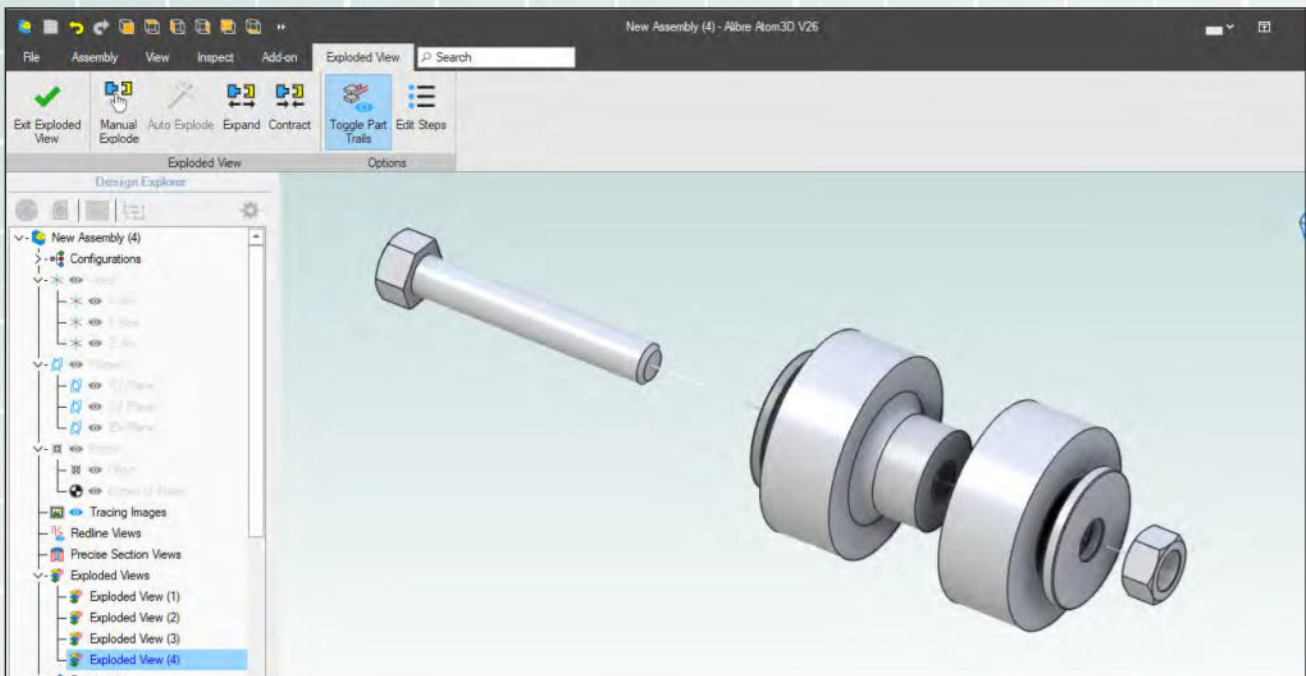


Fig. 2. The exploded view

is similar to the one that I experienced, the component parts will have moved apart along their shared centreline (or axis). However, the bolt has rocketed off into the outfield. Not to worry. Can we fix it? Yes, we can.

The degree of separation (or the severity of the explosion) can be changed. In the Exploded View tool ribbon are tools for expanding and contracting the separation. Each time you click on one of these, the parts move either closer or further away from each other. Have a go at doing this until your view looks something like that in Fig. 2. When you click on Exit Exploded View at the left-hand end

of the tool ribbon, the view returns to the fully assembled view.

The exploded view is added to the list of steps performed in the Design Explorer table. This means that you can call it up at any time.

Getting sectioned

Creating an exploded view was easy enough, but creating a sectioned view is even easier.

Click on Inspect, just above the tool ribbon. A new tool ribbon will appear with Precise Section as one of the options. Click on that and a dialogue box will appear asking what parts you would like to cut ►

Creating an exploded view was easy enough, but creating a sectioned view is even easier

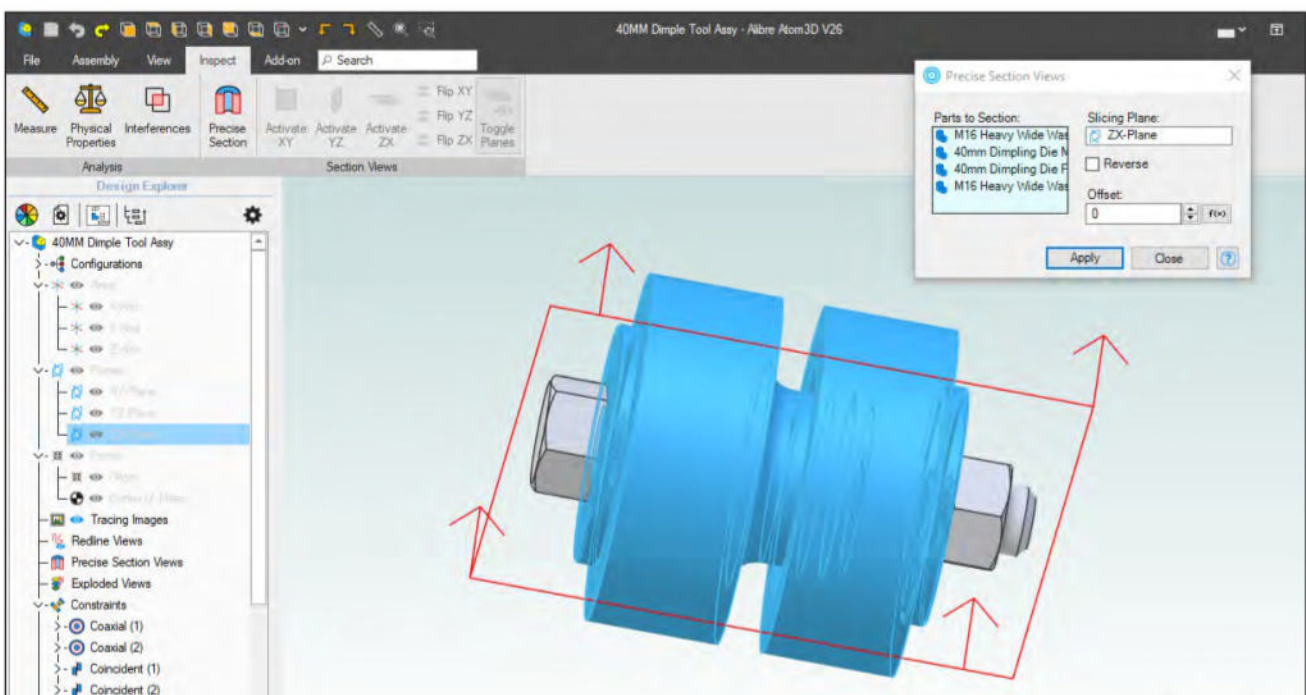


Fig. 3. Telling the section tool which parts to cut

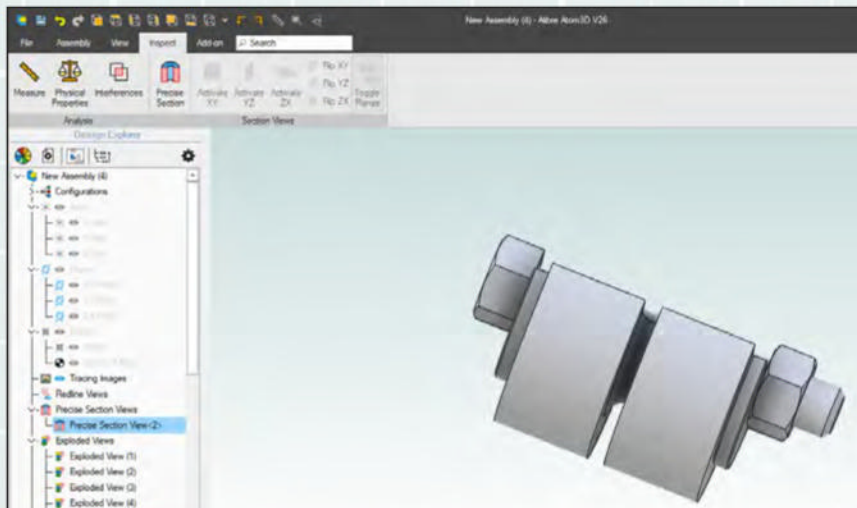


Fig. 4. Not easy to see this way around

in half (or section) (Fig. 3).

Click on each part except for the nut and bolt. In section views, these are typically left whole for clarity. Click Apply, then Close. Your section view might look a bit odd, depending on which plane the cut was made on. If it looks like that in Fig. 4, do not worry. Just move the view around by holding both mouse buttons down while moving the mouse until you see a view similar to that in Fig. 5. This type of view certainly shows more clearly how it works and what it does – told you it was easy.

Save the sectioned view as '40mm Dimpling Tool Sectioned'. Then click on the close X at the top right-hand corner. When asked to save changes, click Discard. By following those moves, you will still have the original assembled Dimpling tool as well as a separate sectioned version. If you had saved the work done, then each time you recalled the file of the assembly, it would appear as a sectioned image. To see it complete again would require referring to the Design Explorer list and going back to before the sectioning was done. That can be tedious.

Shelling

This has nothing to do with what is going on in the Ukraine at the time of writing. It has everything to do with creating a solid object though, by using the clever Shell tool, turning it into a mere shell of itself. Let's look at an example to explain.

Suppose we have created two intersecting cylinders as in Fig. 6. By

applying the skills of the Shell tool we can end up with intersecting pipes.

With the intersecting solids already created, click on the Shell tool in the tool ribbon. A dialogue box will appear asking you for some information. The first thing to think about is open faces or ends. This is pipework that we want to create, so all of the ends need to be open.

Click each end of the cylinders to select them. They will turn blue when ready to be selected when you hover the cursor over them. Each one you click will be identified in the table in the dialogue box. Next you will need to tell the Shell tool what wall thickness you want the pipe to be. I used 1mm as

a random thickness. There is also a box that can be clicked to show which way you want the wall thickness to be – that is, inwards or outwards.

When I created the cylinders, I gave them a size of 50mm diameter. As it happens, I would like the outside diameter of the pipe to be 50mm diameter and the wall thickness to be inwards. This is the default direction. However, if I had good reason to want the inside diameter of the pipe to be 50mm so that it fitted snugly over another fitting, for example, then I would apply the thickness outwardly by ticking the Shell Outward box. The outside diameter would then be 50mm plus twice whatever wall thickness is chosen.

The image in the workspace will be already displaying how the pipework will look (Fig. 7) so that you have confidence to click on Apply in the dialogue box. If it looks right, click Apply, then Close. Notice how the Shell tool has made a tidy job of the actual join between the two pipes. It has effectively treated the created part as a whole. A tee fitting, rather than two pieces of pipe (Fig. 8).

Alternatively, we could have drawn the pipe sketch as inner and outer circles from the beginning, but using the Shell tool is quicker – especially for more complicated pipework. ►

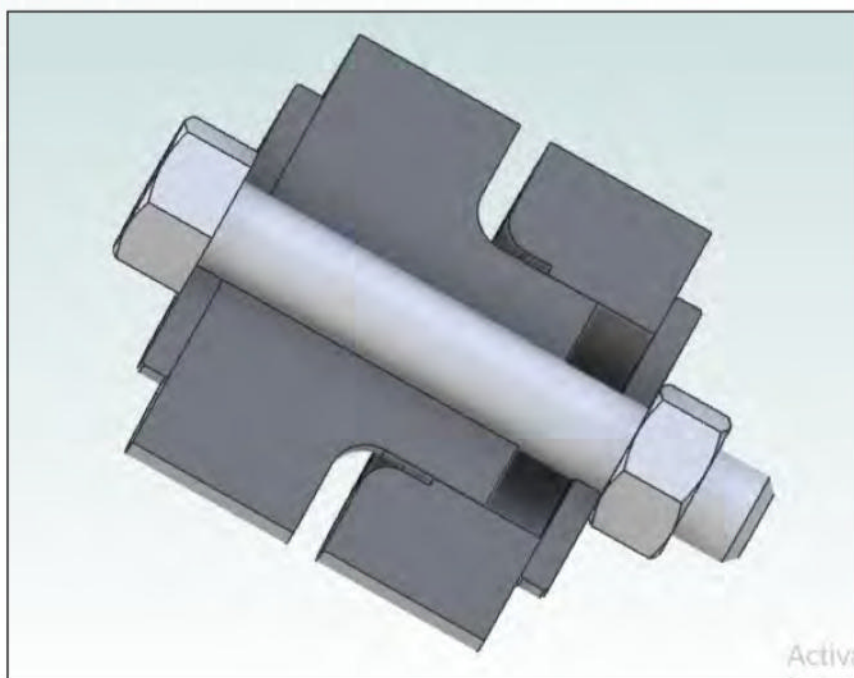


Fig. 5. Now we can see what is inside

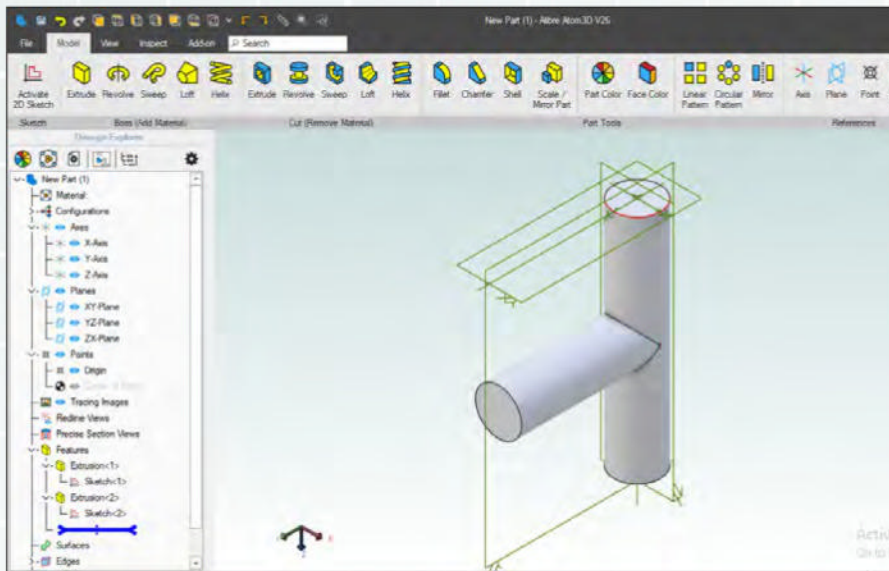


Fig. 6. The two intersecting cylinders

This type of view certainly shows more clearly how it works and what it does – told you it was easy

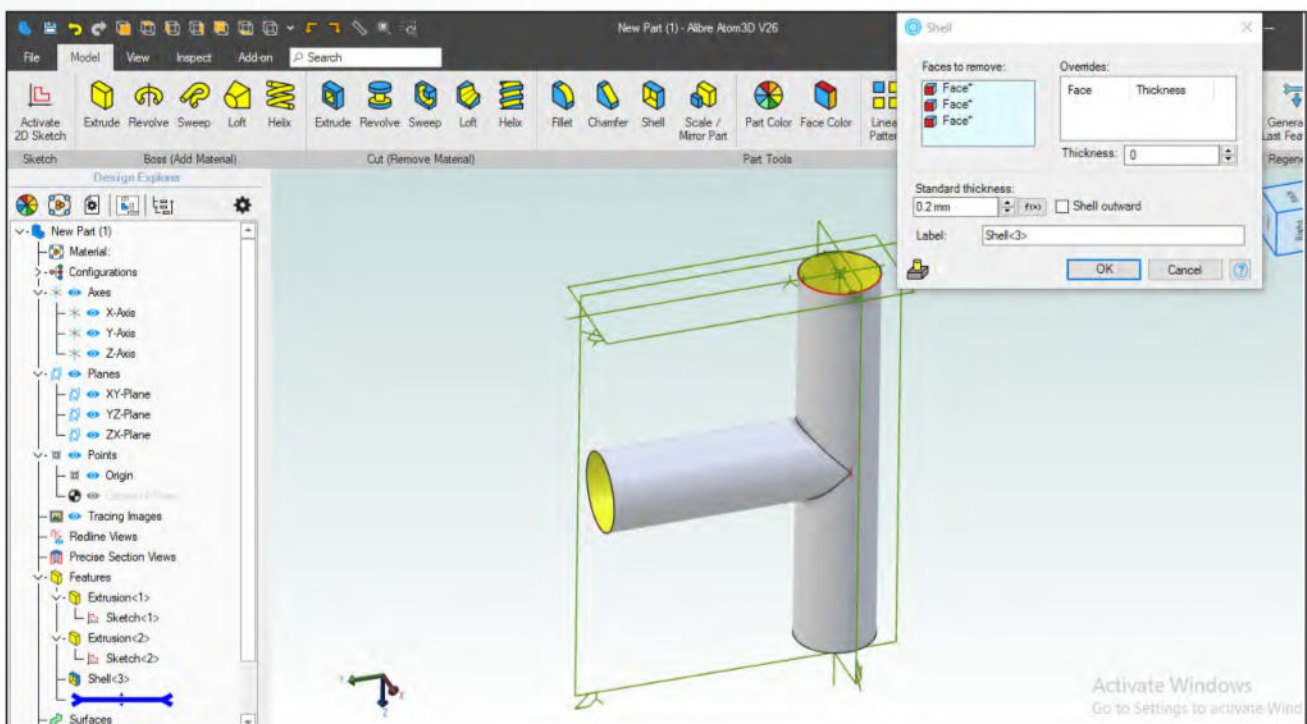


Fig. 7. The Shell tool dialogue box appears

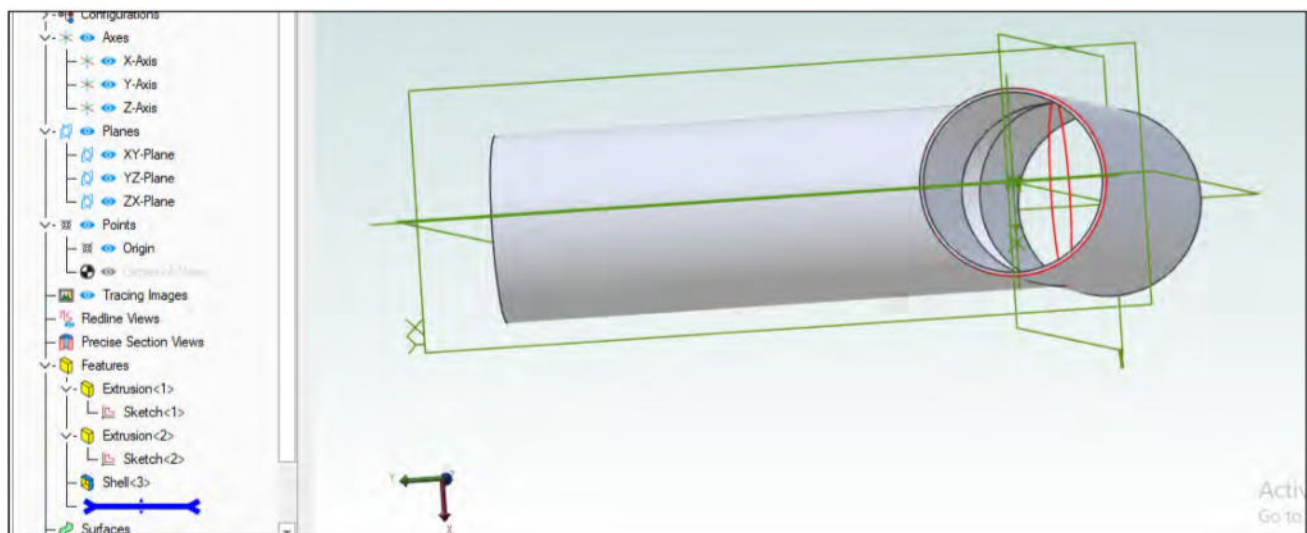


Fig. 8. The finished tee fitting

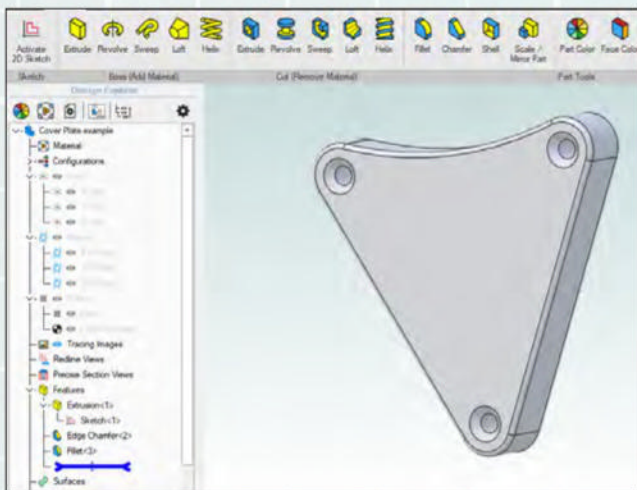


Fig. 9. The cover plate created as a solid piece

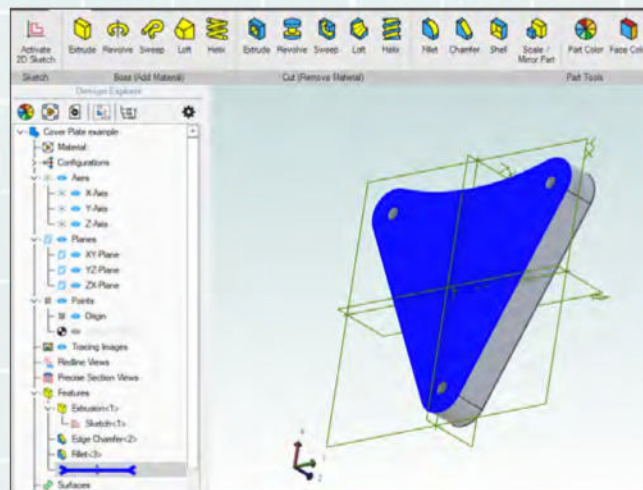


Fig. 10. The bottom face is selected to be open

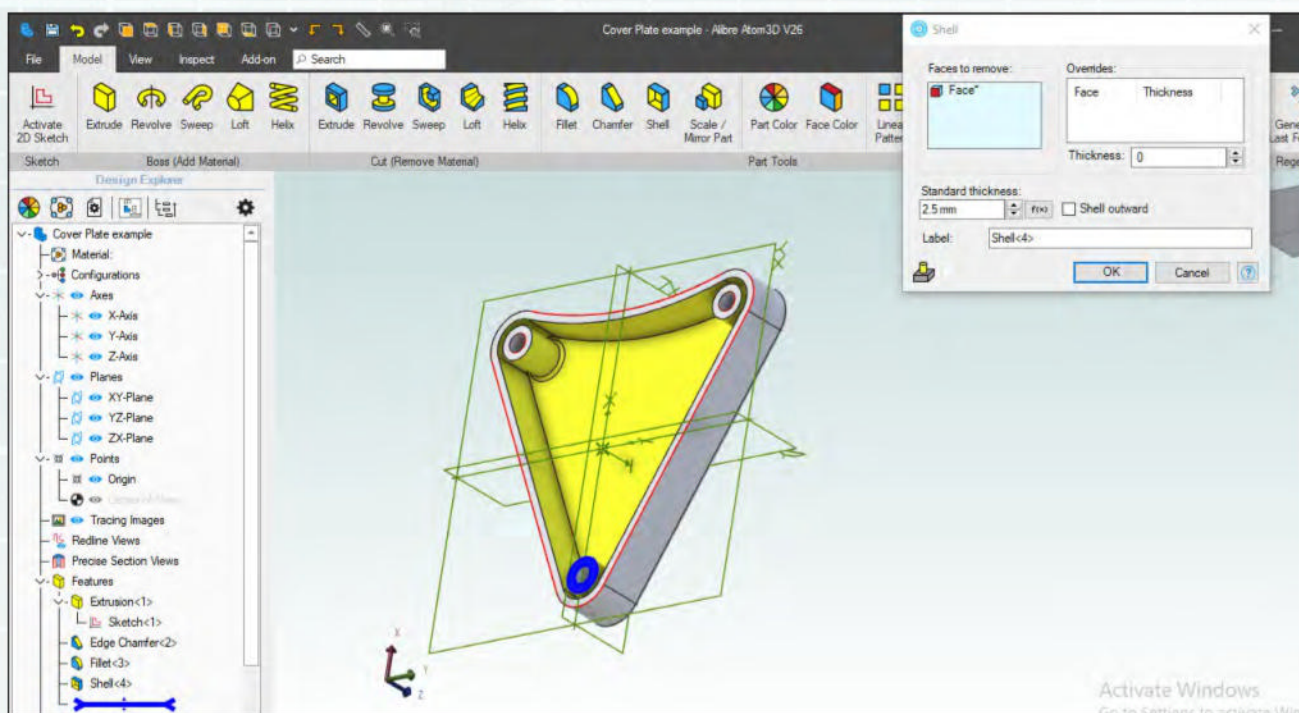


Fig. 11. The Shell tool doing its job

If the screws were overtightened and the upstands were not there, the cover plate could distort or even break

Not just pipes

The Shell tool really starts to show off when applied to other objects. In this next example, a cover plate is needed for a machine. Access is difficult, so the cover plate has to be a particular shape so it can clear other parts of the machine. Fig. 9 shows the design work so far.

A sketch has been done to put the screw holes in the right places and define the outside shape of the cover plate. It has then been extruded to the thickness it needs to be. A radius has been applied to the upper edge and a chamfer added to the holes where countersunk screws will be used. That establishes which way up the cover goes. Now we need to hollow it out. This is where the Shell tool comes into play.

Click on the Shell tool in the tool

ribbon. A dialogue box will appear. As we did with the pipework, we need to identify which face will be open. (Of course, it is possible to leave this blank and no face would be specified. The Shell tool would then make the part closed with a hollow inside.) Select the back face as shown in Fig. 10.

Next, enter the wall thickness that you want into the dialogue box. In this case, we want 2.5mm. Click OK and it is done.

Notice how the Shell tool has followed the shape faithfully with even a hint of the countersunk part of the holes showing underneath (Fig. 11). The screw holes even have upstands around them, which is better than just having a hole in the top surface. If the screws were overtightened and the upstands were not there, the cover plate could distort or even break.

Texting

In the case of our cover plate, we need to make it clear that it is suitable only for the left-hand end of the machine that it fits onto. So, rather than just applying a sticker – which would probably not be permanent – we can make it an integral feature of the cover. To do this, we will create a sketch on the top face of the cover.

Click on Create 2D Sketch at the far left end of the tool ribbon, then select the top face of the cover plate by clicking on it when it turns blue with the cursor over it. Next, click the Lettering tool in the tool ribbon (Fig. 12). The dialogue box will appear, asking for details such as font style and lettering size (Fig. 13). Once you have sorted out those details, and before you click on Apply, you need to position the lettering. The image of the lettering will follow the cursor around the workspace. Once you are happy with the placement, simply left click to fix the position. Now you can click on Apply.

The image on screen might look a bit strange at this point, with the letters only shown as rectangles. Don't worry; it will be fine when we extrude the letters.

That's what we do next. Click on ►

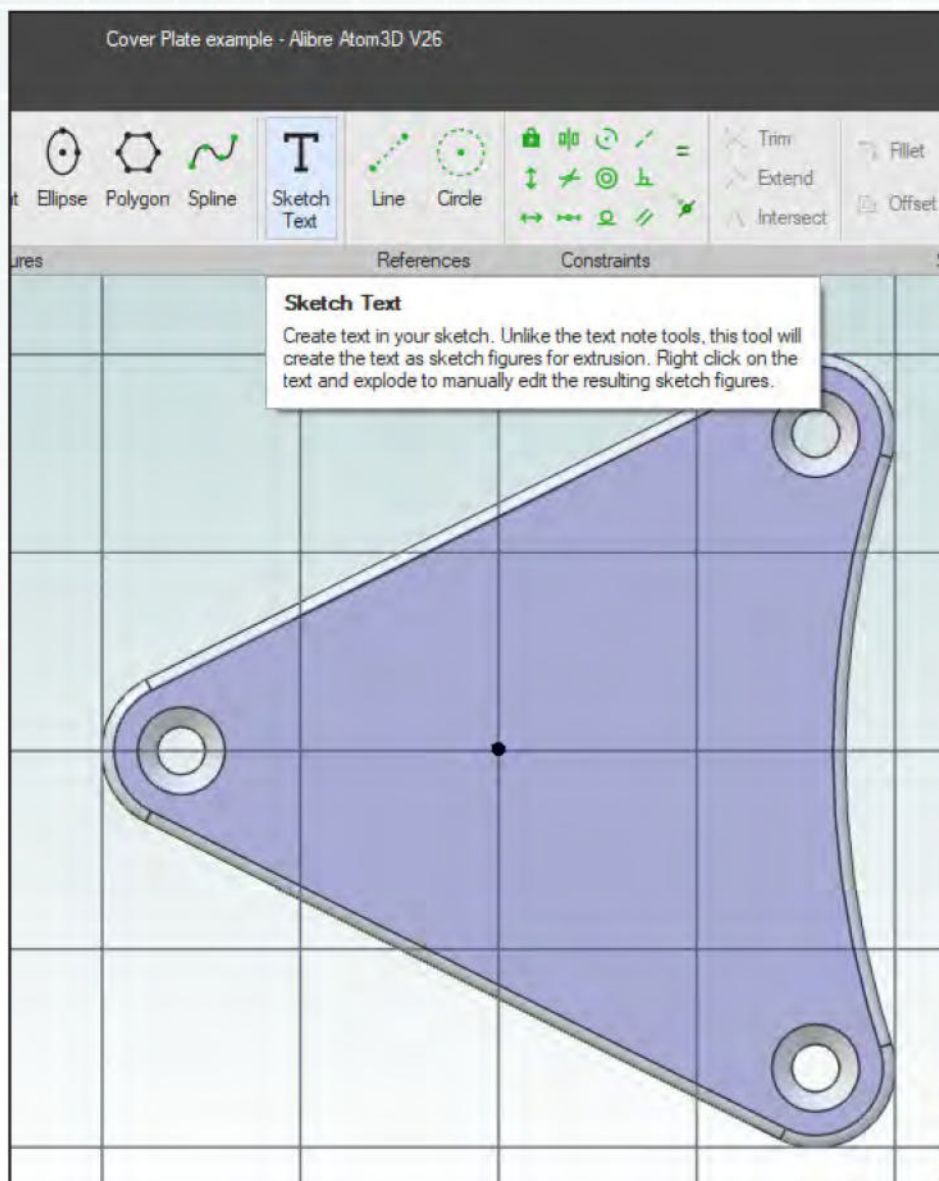


Fig. 12. The Text tool in the tool ribbon

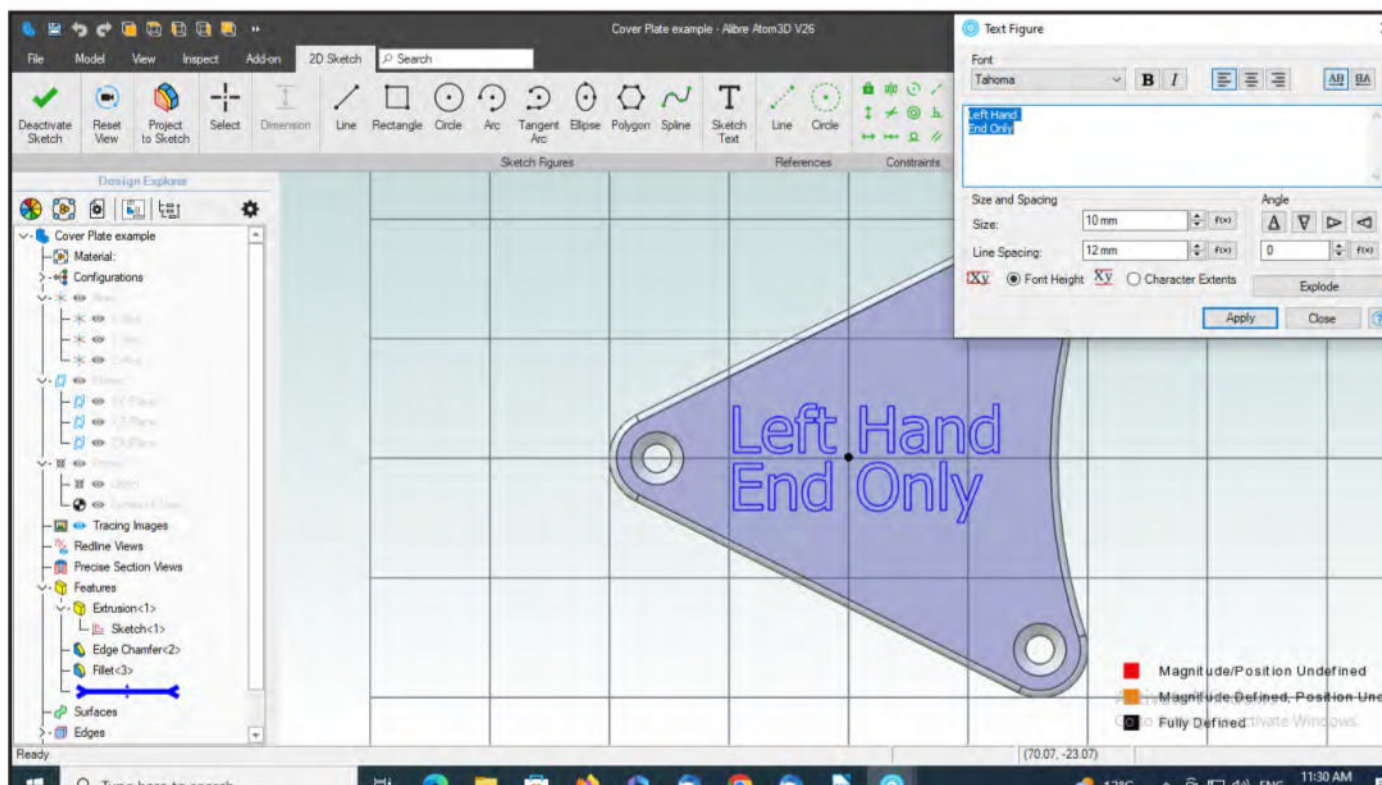


Fig. 13. The Text tool dialogue box

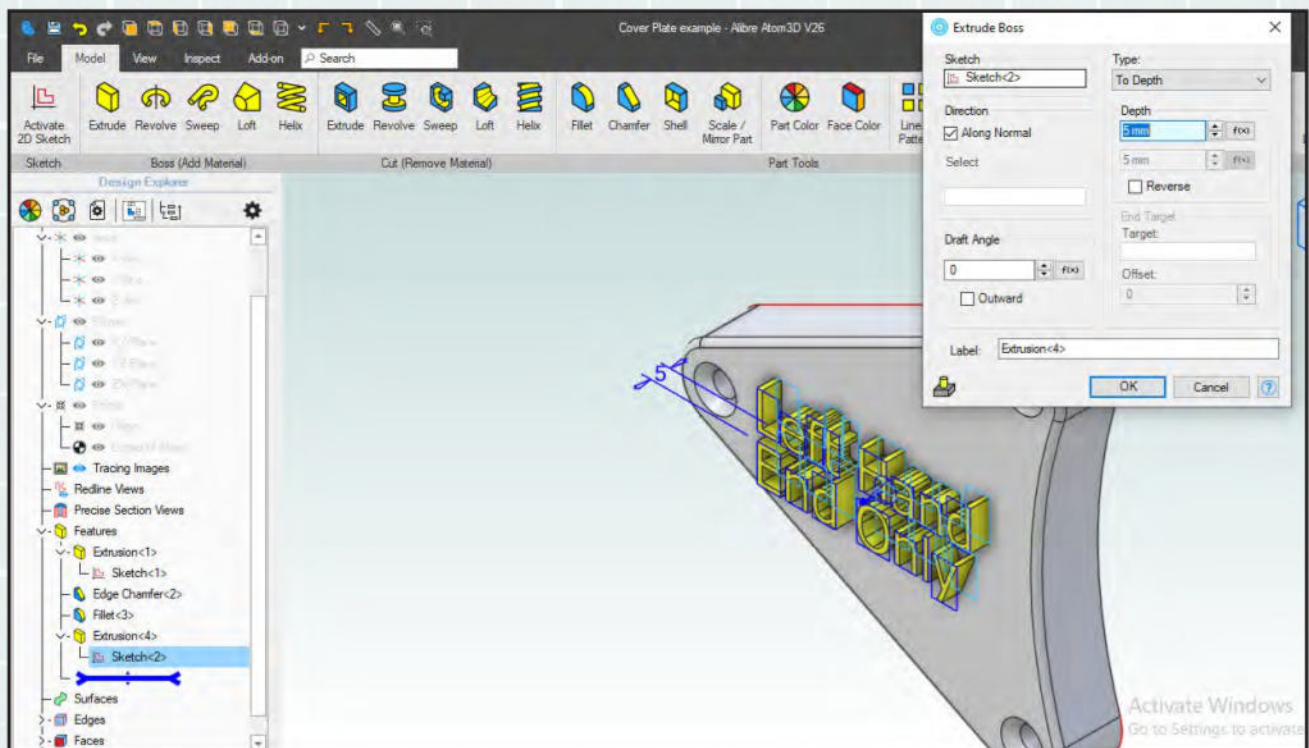


Fig. 14. The Extrude dialogue box for deciding how the text should be applied

Surely it
does not get
more thrilling
than that

the Extrude tool in the Add Material section of the tool ribbon. The dialogue box that appears will want to know how high the letters need to be (Fig. 14). I selected 1mm as being high enough for the purpose. Check that the image on screen shows the extrude is in the right

direction and is giving raised letters on the top face of the cover.

Of course, we could have engraved the writing into the top face if we had clicked the Extrude tool in the Remove Material section of the tool ribbon. The result would have looked like Fig. 15. The question of raised versus engraved letters comes back to the volume of these parts needed, and therefore how they will be manufactured. For low volume, when these parts would be machined from a solid piece of metal, it is quicker to cut the letters into the surface of the cover. However, if the production volume is high, the letters are easily cut into the cavity of a moulding die, therefore creating raised letters on the cover plate.

Where to now?

Congratulations. You have now completed the Alibre Atom 3D 101 course and have the foundation skills to be able to design things using this software.

As you use the software more and more, you will discover extra possibilities. There are some add-ons available to stretch the abilities of Alibre. One of these is MeshCAM Pro. What this does is produce CNC programs so your designed items can be machined on a CNC milling machine, CNC router, or even created in a 3D printer. Surely it does not get more thrilling than that. 📁

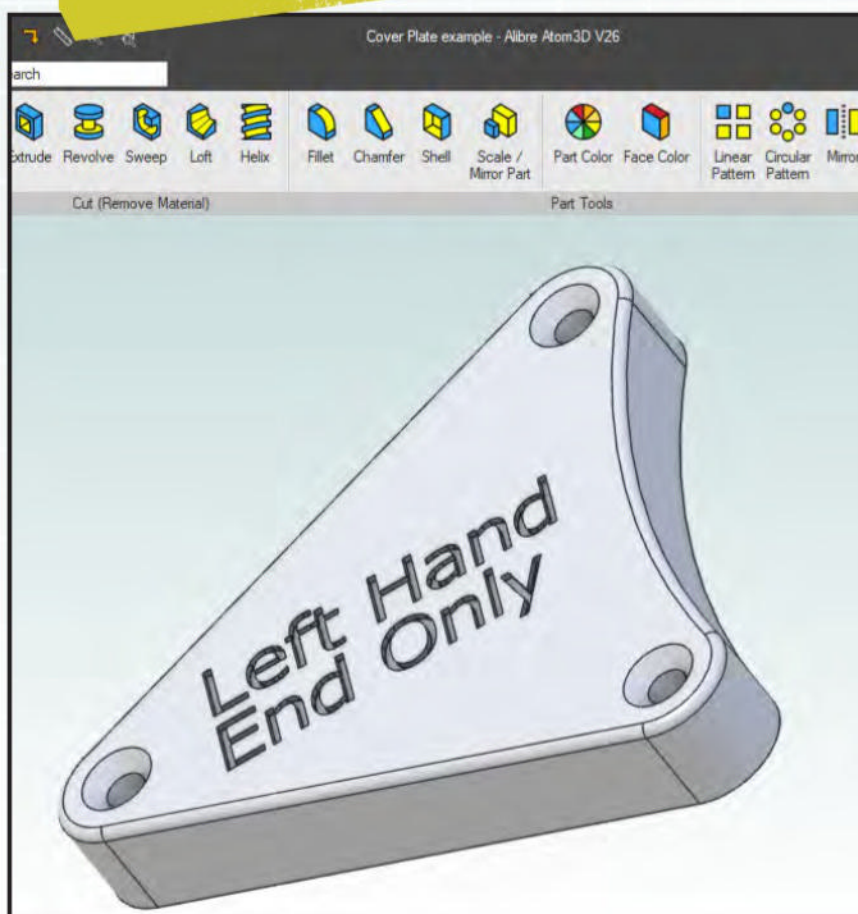


Fig. 15. How the letters appear when engraved into the surface

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12/2021



FIVE WAYS FOR SHEDDIES TO ADDRESS THE FUTURE

The effects of climate change – changing weather patterns that are causing an increasing number of floods, landslides, droughts, and wildfires – point to a need for us to build up our resilience, conserve what we have, and search for less harmful ways to harness energy

*By Murray Grimwood
Photographs: Murray Grimwood*

In response to Greg's editorial in Issue No. 110 of *The Shed* lamenting our lack of global climate action, I offered to compile a useful sheddie to-do list.

Then I thought some more. Our predicament is a multi-headed beast; in addressing climate only, we run the risk of making other matters worse. Discussing the whole, though, takes more than one article, so here's a 'once over lightly' before we get on with the to-do list. I've also suggested some further reading in a side panel.

The predicament, briefly

There are many reasons society clings to the concentrated carbon energy from fossilised sunlight, which we call 'fossil fuels'. We are carbon-energy life forms; we decay – or die – without enough of it, as do our constructs. Our energy progression has been towards the more convenient / more compact: from firewood to coal to oil. In a way, gas can be seen as our first step backwards from oil. In all cases, we have burnt the best first, so diminishing quality is a contributing factor. By default, we will end up using so-called renewable energy, better defined as 'rebuildable'. That is because fossil fuels are a finite resource and we're roughly halfway through them; they are leaving us, regardless of climate.

Fossil dependent

Worse, we built our fossil-dependent collection empirically over 120 years and have much less time to effect the replacement – so Greg is right to be worried about our tardiness.

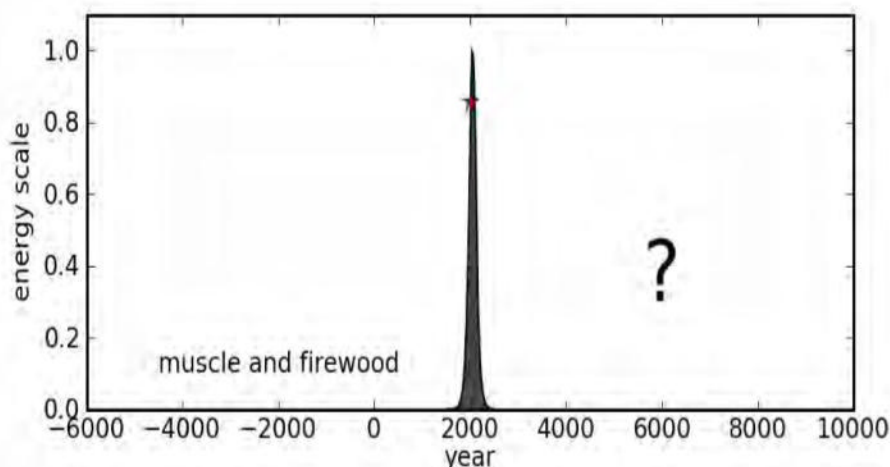
One reason that we haven't 'gone there' is that renewables don't pack the punch of fossil energy in many applications. For example, oxygen – the other part of fossil combustion – is everywhere, so doesn't need to be transported, plus which, we can arrive at journey's end with an empty tank, whereas a flat battery weighs the same as a fully charged one.

A second reason is that we made the mistake of applying fossil energy to food

Fossil fuels are a finite resource and we're roughly halfway through them; they are leaving us, regardless of climate

production – it currently takes several calories of oil to produce one calorie of food – and that's a hard one to unravel.

Atop those are societal assumptions that are varying degrees of incorrect. One is the belief that if we can just be optimistic enough, some yet-to-be-proven technology will always appear, even if it requires circumventing the laws of physics.



Money

Our biggest misconception relates to money: as individuals, we are conditioned to think that if we have money we can buy stuff, and that, if we have more money than others, we can outbid them. That works until it doesn't; we can print (or keystroke) money indefinitely, but if there's nothing in the shops, what is that money worth? In addition, everything in those shops is a processed part of the planet, brought to you by work having been done – meaning that it represents energy having been used. Past thinkers have nailed this 'energy is the true wealth' thing; my favourite example is *Wealth, Virtual Wealth and Debt*, written in 1926 by Frederick Soddy, a winner of the Nobel Prize in Chemistry. It is a pity that most economists are still energy-blind.

A store of wealth

If we are going to be doing less to less while competing with ever more bidders, we can expect money to be worth less. We can thus understand why the trend to ever-cheaper stuff seems to have run its course, meaning that money will buy less in the future.

The lesson is that money is not a store of wealth; it is merely a betting-slip – betting that there will be future energy to do future work to produce future stuff. The antidote is obvious: if you expect to purchase a non-perishable item in the future and you have the money now, swap the proxy for the real thing now!

Five things we can do

1. Think in energy terms

Energy is the real wealth. In 1946, *Scientific American* magazine proposed uranium as a gold replacement: "Under such a scheme, atomic energy would be the basis of a reasonable currency whose value would be keyed to available energy, upon which depends production, the true measure of wealth". Pity it didn't happen ...

Typically, the less processed that things are, the less energy has been expended – and the cheaper they should be. We used site-grown macrocarpa poles for our house structure, a little

chainsaw fuel, a few hours' pulling a draw knife – cost essentially nil (reminiscent of Bob Van Putten's approach – see page 102 of *The Shed* Issue No. 110).

Too often I hear 'cheap' rather than 'efficient' being used as a metric. If we think in money terms, we may save today but still have to spend tomorrow; if we create – or indulge in – energy efficiency, we save forever.

Life at our place has been, and is, a series of energy choices. We work on the basis that all energy originates from the sun, and that the earlier we capture it, in growing food or passively heating the house, the better. The washing is turned on only when the photovoltaic panels have sun on them. I time my use of workshop power tools for the same reason. West curtains are opened at lunchtime and east curtains are often closed then. The outdoor direct-solar shower saves chainsawing firewood over the summer months. Where possible, we use hand-tools and try to stick to fixable

technologies – not always possible, but a good goal.

2. Think resilience

My old man taught me to be comfortable buying second hand, but to buy something that was of good quality new, and to get a complete spare when one came along. Thus, at 16, I wrecked a 1950 Humber Super Snipe and stored the bits as spares for our good one. I still do that with everything I can, plus accumulating replacements for almost every tool, blade, and bit. Even this late in life, I never miss a chance to add to the collection. (There is one downside to that complete-spare approach; if something has a weak component – third gear, say – chances are you'll blow two of it, and never use the rest of the spares!)

Thinking resilience, we recently split our off-griddery into three separate 300W set-ups. Two of them feed the house, and in the hallway we have a knife switch to swap between them without having to go outside. The third system feeds the ►

My old man taught me to be comfortable buying second hand, but to buy something that was of good quality new

Where possible, we use hand-tools. Here my better-half and I are screwing down the mezzanine floor, using braces and square-drive bits. Slow, but perfect control and they never wear out, never die



Pulling Charlie the spare Cletrac off the truck as my old man looks on approvingly



A couple of getting-resilient stories

When we bought our land, my thoughts ran to some kind of tractor. I remembered an old crawler – a 1936 Cletrac AG6 – which I'd once taught my Work Skills Development teams to drive. It was now abandoned and mildly vandalised. A donation to the Sally Army and the sorry-looking wreck became ours; no distributor cap, punctured radiator, rattly donk. The forklifts at Port Otago had the same Continental motor, one of which was reconditioned. After 150 hours, it developed a tic and was replaced with an Isuzu diesel; we could have the old motor free if we wanted. Turned out that the tic was a flawed piston casting, straight up, across, and down No. 6 – no bore damage and rings still intact. A piston and a head gasket later, the 1974 crank accepted the 1936 flywheel perfectly and we slipped the motor in. I produced a spare Holden dissy cap, Dad turned up a water-pipe spacer, we adapted a Mk10 Jaguar starter motor, and we were in bizzo.

But what if we blew a transmission gear? Or? So we found an AG6 with a thrown track that had been dragged out of the bush 18 years earlier, dragged it off the truck, used its better radiator and its PTO, and stored the rest. Clack – named for the noise her grousers make – served us well for

many years. Nowadays, we use a Toyota Surf as our tractor – more economical and with a wider usefulness envelope. (The Surf hadn't even been created when we did up the crawler.) We use the Surf so little that I doubt it will ever need spares, and at a pinch we could run it on biodiesel.

The other tale is of a breast drill that I recently spied at a recycling depot a long way from home. I thought it was going to provide spares for the one I use at home – not that breast drills need parts often.

Got it home, laid them alongside each

other – and they're not the same animal; nothing in common at all. Both are two-speed, but one slides between gears and the other undoes and refastens. One was made by Millers Falls Co. at its Shelburne (Massachusetts) plant; the other ... wasn't. Both were built with spare capacitance – stronger than they needed to be – and I love them both. However, what we have there is a spare tool, not spare parts for one. It's still resilience, though; long after every battery drill has become a stranded asset, these will still be performing as they did when new.





Having written about it, I went and did it. Stretch curtain wire, a few hooks, too simple. Alpine Fault? Bring it on ...

Those recent floods had a lot of folk thinking hard about resilience: the capacity to withstand

workshop but can also be fed to the house – we are incapable of having a power cut.

All services – power and water – are accessible; nothing is hidden under plasterboard. A mate went one better and created a plywood dado wall all around his main rooms, 100mm out from the wall with a 150mm shelf capping it; all services are enclosed therein and accessible by unscrewing the ply.

Those recent floods had a lot of folk thinking hard about resilience: the capacity to withstand. We had perhaps got a bit too cocky and forgotten that allowing for negative events is a wise thing to do, although it's hard to be bothered preparing for something that might not happen. I often look at all the glass containers on the open shelves in our kitchen – goners all, if the Alpine Fault does its thing, which it will. The antidote – stretching lengths of that springy curtain wire across each section – seems like too much palaver. Until ...

3. Tools

People are still throwing away perfectly good tools – particularly hand-tools. The assumption, presumably, is based on that other assumption about money: that there will always be replacements on the shelves. I think that we'll see compromised supply lines, less-open

borders, more competition – and I overlay that with the thought that, if it has to be a power tool, I'd rather have something dismantlable and fixable. I bought two sets of bearings and two drive belts when I was doing up my venerable Holzher planer in preparation for our 2004-'5 house build; that second set will go in shortly.

Long after cordless tools have outlived their replacement batteries, hand-tools will still be performing as new and tools like my Holzher will still be shedding shavings enthusiastically. Collect these tools. Restore them, give them a new handle, or at least linseed the old one – I oil all our gardening handles once a year. Give them new bearings, blades, and belts, paint them, whatever it takes; there's something satisfying in knowing what goes on inside and that we have improved their performance or extended their lifetime. Start a tool library (if the local Menzshed hasn't already).

4. Skills

Skills are as important as tools. There is no reason ever to stop learning, but we all have fortes and not-so fortes; things to do ourselves and things to ask others to do. In my case, I'll back myself against anyone on a chainsaw (joinery included) and with a draw knife. I'm a slow but

adequate mechanic and a fair turner but a sub-par welder, so I farm welding out to friends in some form of contra. I'm a slow but adequate carpenter, but I'm a less than superb joiner even at snail's pace; again, I look to others.

The human camaraderie of such skill exchanges can be a priceless bonus, but there can be other advantages. When the earthquake hit Lyttleton, they had a time-bank group (a collective work-swapping / bartering arrangement) that had an up-to-date list of skills and contact details – talk about community resilience.

5. Triage

It is reasonable to assume that many items dependent on fossil energy will become 'stranded assets'. Sure, we can manage limited biodiesel and (lower tech, at least) tractors will still be operable – but the rest?

Given that all pipework is made from fossil-fuel feedstock, I suspect 3Waters will be history; we'll be patching local systems locally.

What about roads, which are made of, and by, fossil fuels? Paints? Adhesives?

Already-produced items represent

already expended energy, and energy is likely to be at a premium. That in turn suggests that their desirability will be above our current idea of 'scrap value', which implies that we should be collecting now what we might need ahead.

It is also reasonable to predict that we will be both late and under-supplied in terms of replacement infrastructure. The knock-on is a no-brainer: we'll be triaging (prioritising) stuff, cannibalising stuff, adapting stuff. That process might go on for a century; long enough for the adapting of obsolete stuff to become a unique multi-generational skill set. ►



My venerable, easily serviced Holzher planer. That second set of bearings and belt will go in shortly

Long after
cordless
tools have
outlived their
replacement
batteries,
hand-tools
will still be
performing
as new

I oil all our gardening handles once a year...





For perhaps a century, there will be existing stuff to work with, adapt, triage; the skills to do so will be at a premium. Our crawler as it arrived on site (it's the one doing the pulling on P77)

Personally,
I prefer
the word
'capacitance':
the capacity
to withstand

Prepping?

'Prepping' is a word with connotations, but preparing for an uncertain future is, logically, different from preparing for a continuation of the past. Interestingly, since the floods, prepping and resilience have both appeared in the mainstream media; the discussion is moving on. Personally, I prefer the word 'capacitance': the capacity to withstand. It means having redundant capacity in infrastructure systems – carrying spares, having spare hospital beds. We need to put back every capacitance that just-in-time economic thinking has pared back; in hindsight, an energy/physics paper should have been a required part of every economics degree.

I'm guessing that those of us with maker skills – especially the lateral-thinking / adaptive / No. 8 types – will be in demand, as will our tools and workshops. 🛠️

If you are interested in delving further:

A search for *The Great Simplification* podcast (thegreatsimplification.com) is a good start. Maybe navigate to Animated Series, and start with the right-hand one: *The Great Simplification*. Some of the interviews are priceless – pick your topic. The Kate Raworth one is a goodie, so too is the Simon Michaux one. Hagens is a former Wall Street banker who had an epiphany, a sometime editor of *The Oil Drum*, and now an adjunct professor teaching systems and ecology.

If you're of a more technical/physics bent, the free textbook *Energy and Human Ambitions on a Finite Planet* from UC San Diego physics professor Tom Murphy – <https://open.umn.edu/opentextbooks/textbooks/980> – is compelling reading.

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Mason and his
'marvellous machine'

THERE'S A NEW RUMBLE IN CHRISTCHURCH

"Words are from the lips, actions are from the heart" – Rashida Costa

By Mark Seek
markseek@rocketmail.com

In a world of self-absorbed people, it is refreshing to meet a young chap who thinks of others and puts it into action: meet Mason. Chances are that that annoying boy racer two doors down or the 30-something couple who walk their little pooch past your letterbox will recognise him.

Mason has an online presence. Yes, I know; it's a different world out there! Tell me about it! If you Google 'Tom Cruise', you know you're going to get the same predictable 'I do my own stunts' hype. Google 'Prince Harry' – same old tabloid fodder. However, look

up 'Mason "Rumble" Simpson' – he's all over social media platforms – and you'll find a young bloke who took the initiative to do something never done before by way of an extraordinary road trip in a 50cc powered three-wheeler (tuk-tuk) to raise much-needed funds for Gumboot Friday and Mr King's I AM HOPE foundation.

A tough task

Mason describes his journey as a personal one and admits that some days were gruelling away from the spotlight. Spending 13 hours on the lonely roads

with only his own company in that little cabin meant that he had to be in the right head space.

Mason freely admits that he's an old soul and has often had friends his own age who are struggling with mental illness come to him for advice.

"We can all be affected by it," says Mason. "I wanted to raise awareness using my passion for small-capacity motorcycles, in particular."

Mason seems to have the ability to capture people's hearts, as he says his 1200km roadie fundraiser raised \$12K in donations.

Humbled by others' struggles

Mason began his journey in Auckland, with his sights set on his hometown of Christchurch. The 12-day solo trip gave him the opportunity to visit rest homes; skateparks; shopping malls; and, in particular, schools. He says that he felt humbled by others' stories of struggles and hardship.

Mason spent long hours behind the handlebars during the day, but the evenings could be equally long, spent talking to complete strangers who had been following his travelling show on TikTok, etc.

Mason reflects on this with me as we sit in his shed. He openly acknowledges being a bit overwhelmed by the past few months but is considering another adventure later in the New Zealand summer.

Inspirational shed

I look over at Mason's shed door and enquire about a poignant quote written there: "It's your road; others can ride it with you, but nobody can ride it for you."

Mason admits that he gets his inspiration from his shed. We are surrounded by his favourite machines. He says riding them breathes life into him, and this takes him to a place of happiness and contentment. These small-capacity machines, mostly '70s vintage, have been found in various states of repair and dilapidated condition, but Mason refurbishes them and often gifts them to those who need a ride.

Mason's generosity and big-heartedness come through even though this young guy didn't have the best of starts himself. He uses his bikes to encourage his mates by taking a bunch of them out to the hills to have a good blast and blow out the cobwebs. They talk about stuff, and hopefully everyone feels they've filled up the bucket and are in a better frame of mind. How practical is that? Good on ya, Mason.

If you feel so inclined and want to support a worthy cause, you can visit the I Am Hope website below. 📄

iamhope.org.nz/.

Mason and his well-travelled gumboot



A young bloke who took the initiative to do something never done before by way of an extraordinary road trip in a 50cc powered three-wheeler (tuk-tuk)

Extraordinary road trip with a purpose



Fitting the frame to support the router base

BUILDING A ROUTER TABLE FOR A PLUNGE ROUTER

Good tools are not cheap, so it can be important that they are versatile

*By Coen Smit
Photographs: Coen Smit*

One of the predispositions that drives me as a sheddie is the belief that the more versatile I can make the tools I own, the better. I have owned a Makita plunge router

for quite a few years, making use of it now and then. However, given the cost of buying it, the use I have made of it hasn't really justified the outlay. It's just been one of those tools that is good to have if

you like woodwork. I also have a smaller router that is less cumbersome and is therefore called upon more often, further reducing the use the Makita is put to. To remedy this, I decided to build

a plate for the plunge router that can be clamped on my Black and Decker workbench. The plate is a section of Formply left over from a box trailer refurbishment. It has a nice smooth surface, is robust, and will not warp or twist.

Routers can be dangerous

However, there are a few problems to solve in fitting and operating the router safely in this new configuration. In my opinion, all routers have the potential to inflict some very nasty injuries if not treated with a great deal of care and attention. My router spins at around 23,000rpm, hence any carelessness in using it can have rather nasty consequences.

Considerations such as these made me choose carefully how best to proceed.

The plunge router is meant to be hand activated, something that is not easy if the

device is hanging upside down under a table. The trigger does have a lock button, but it is essential that the router should be able to be started and stopped without the user having to bend down to do so.

Controlling the power supply

In a previous article in *The Shed*, I outlined how to build a foot-operated switch that can be plugged into any 240V tool to cut its power supply remotely – it was uniquely named ‘a dead man’s switch’.

The switch requires you to hold your foot in place to activate the circuit. This can be used as is, or upgraded with a switch on, switch off capability that allows you to remove your foot while routing. Alternatively, building a small box with a power point on the side of the table and a permanent lead allows the router to be turned on and off from a standing position. ►

It is essential that the router should be able to be started and stopped without the user having to bend down to do so



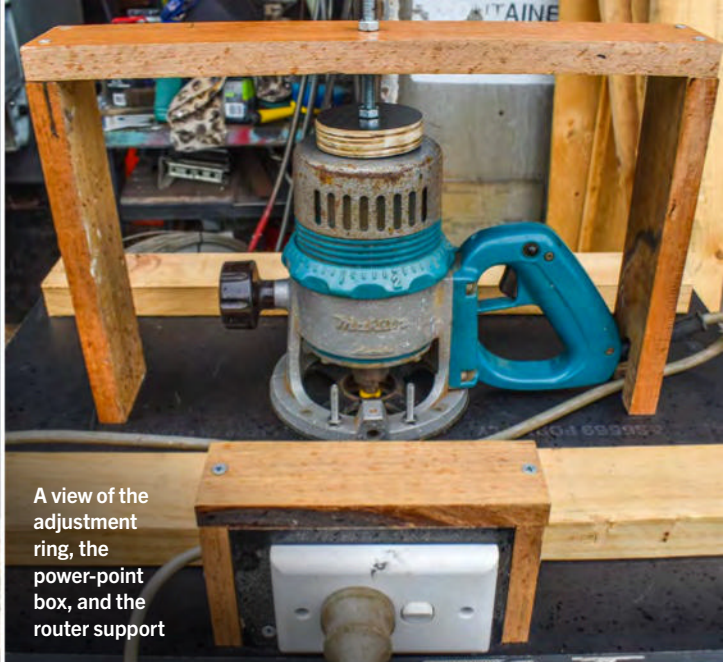
The completed table and fence viewed from the working end of the table



The completed table ready to be connected to an extension cord



The completed table without fence, ready for careful free-hand routing



A view of the adjustment ring, the power-point box, and the router support

The router is now more useful, and has the added advantage of allowing me to make more accurate cuts

Clamping

Fixing the router plate temporarily to the workbench was the next obstacle. A couple of clamps were the obvious solution, but they can be an obstruction when routing large pieces of timber. The Black and Decker bench comes standard with several holes in the clamping surfaces. First, I inverted the bench on top of the router plate at its widest setting; then, using a hole saw, I cut four circles from some scrap Formply to fit the holes and screwed these in place. Simply by closing the workbench jaws slightly, it grips the router plate and leaves its working surface free from obstructions.

Depth settings

The Makita router has a large, knurled plastic ring around the body to accurately set the depth of the router bits. This is combined with a locking knob/handle to lock the router at the desired depth setting. It is meant to be used in the face-down position, not face up where the locking knob is the only way to stop the router's body sliding down out of adjustment. I built a simple cage that supports the base of the router with a section of threaded rod to enable different depth settings for the router bit.

The router baseplate is held in place on the table by four bolts sunk into the table. If I need to use the router as a handheld at any time, I can simply unscrew these bolts to return it to its original configuration.

Now more useful

To complete the project, I constructed a simple fence that I can clamp to the table with two Quick Grip clamps. As these grip the fence on the back side, they do not obstruct the working side of the router.

Making sure that the router cut is parallel to the work is achieved by using the fence. The width of the router cut is measured by the positioning of the router fence respective to the bit; this can be done with a set of callipers or by eye.

The router is now more useful, and has the added advantage of allowing me to make more accurate cuts than was possible when it was a handheld unit. 📌



The upside-down view of the router table

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From left to right: Vera, Maria-Cristina, Henk (the main organiser of the fair), and Lennard, 'making' a happy scream in the Ingegno area. The exhibition's top floor has a large area dedicated to the STEM initiatives coordinated by Maria-Cristina Ciocci and her team; both children and adults played with the tools and discovered the wide range of possibilities offered by the Ingegno STEM programmes

GHENT MAKER FAIR

PART 2

Inspiring passion through education and hands-on experience

By Enrico Miglino
Photographs: Enrico Miglino

In this second part of the article on the Ghent Maker Fair, I will introduce another series of stands. These represent the real soul of the event and some notable groups that have elevated the 'art of making' to a fascinating professional activity.

Thanks to organisations such as the Ingegno Maker Space (<https://ingegno.be/>),

De Creatieve STEM (<https://decreatievestem.be/>), the MaakBib initiative, and other science, technology, engineering, mathematics (STEM)–supportive projects in Belgium, making has become an essential aspect of the educational process.

At the fair, visitors of any age could test, personally experience, and discover what educational and training experience fitted

their interests. This active participation was available free.

Most of the proposed activity projects – workshops, maker camps, events, and open labs, to mention just some of them – are harmonised with the traditional educational paths; the STEM educational projects extend to public schools, libraries, and some universities throughout the whole country. ►

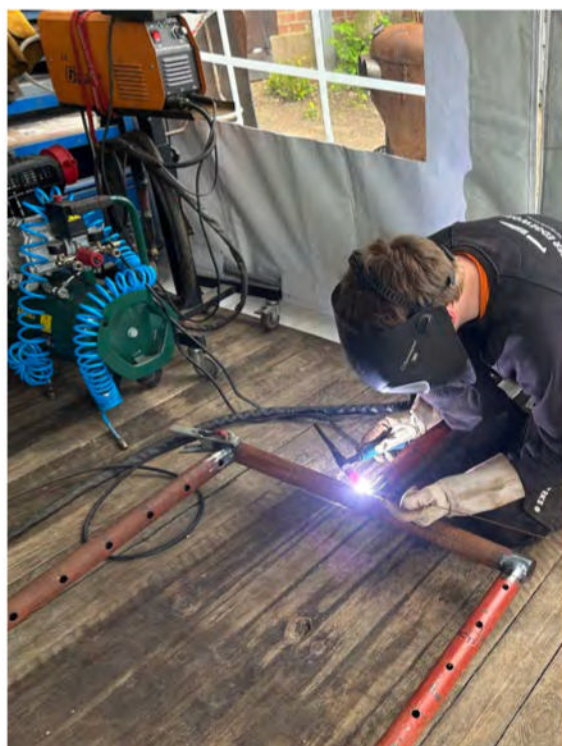


Belgians love biking, but what about this 'smoothie bike'? It is a successful smoothie-making machine created by some youngsters supported and guided by Lennard. If you want a fresh smoothie, just pedal and it is done: a fully human-powered engine – no electricity required

Experimental music teaches us that virtually any object can – in opportune conditions – produce mesmerising sounds. On this stand, visitors had the opportunity for a practical experience in how it is possible to create music with handmade – and sometimes from only recycled components – quality musical instruments. Of course, apprentice makers could go even further and learn how to make these instruments for their own personal orchestra



Does anyone recognise these projects? Both have been presented in past issues of *The Shed*; most of my projects were done in the Ingegno labs and exhibited at the fair on The Sand Machine stand



Manual metalworking, especially using ancient technologies, is a topic that has always fascinated me. Tabula Welda ([facebook.com/tabula.welda/](https://www.facebook.com/tabula.welda/)) produces incredible metalworking artefacts but also understands modern welding techniques. It is not only continuing the tradition of metalworking; it also offers a wide range of workshops where others can learn the techniques, furthering their passion and/or improving their knowledge







This STEM project is run by Ingegno Maker Space and consists of taking care of the environment through education projects involving children and students. The recycling project shown in these images is developed in two phases. First, the participants are invited to collect the plastic bottle caps everywhere, encouraging their friends and classmates to join in the exercise. The caps are then sorted and divided by colour. In the second phase, the activity moves to the Ingegno lab, where, with a couple of handmade tools, the plastic is ground into small pieces – a process very similar to that used by industrial plastic recycling plants. This new material is used to mould objects, for example, with which it is possible to explore several more techniques. 🛠️



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A REPOWERED TRIUMPH GT6

In issue 389, September/October 2023, we discover there's much more to this cute 1973 Triumph GT6 British sports car than meets the eye. John Burke of Paremata is the owner of our stunning cover car but felt it was somewhat underpowered and that annoyed him. So he took this pristine example of a 1973 Triumph GT6 and installed a V8 engine from Triumph's sister manufacturer, Rover. The result is a restomod that really ticks the boxes.

Also featured in this issue is Jim and Daphne Ledgerwood's 1940 Ford V8 $\frac{1}{2}$ ton pickup. Securing this Ford for their collection took a bit of chasing and a bit of luck but it was worth all the effort.

You can also read about a 1957 MGA, a Chevy luxury panel van, a now-rare Citroën 2CV Charleston, and so much more.

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AN INNOVATIVE SOLUTION

Brain wins over brawn when it comes to tackling heavy-duty lifting

By Bryce Clifford
Photographs: Bryce Clifford

‘Hybrid’ seems such an overworked word these days but I thought, *Mhhhh, I can butcher it some more.*

As I haven’t submitted an article for quite a while, I thought that I had better contribute something so that my fan club realises I am still very much alive and rumours of me going to live in Bolivia are totally incorrect.

Those that follow me on backface, ninja gasbag, and all the other social media platforms that everyone uses these days will, I’m sure, appreciate some basic down-to-earth engineering from a grossly underfunded and primitive workshop, deep in the heart of Palmerston North suburbia. I jest you not.

The problem

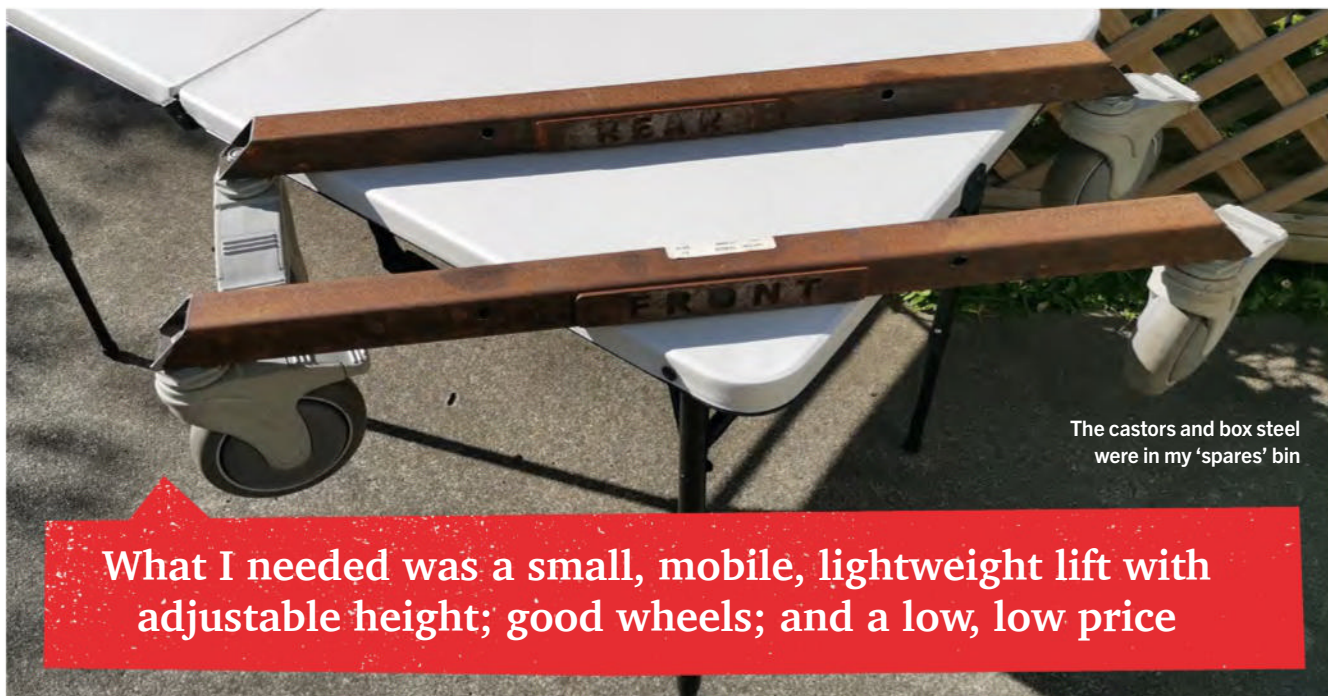
Now that I am getting a little long in the tooth, and several parts of my ageing anatomy are feeling the effects of a life well spent, it has dawned on me that I shouldn’t be lifting and lugging heavy machinery as often as I do. I found recently that this exertion is very hard on my complexion.

This frailty was recently reinforced when a friend who lives out of the city requested a hand to restore her heavy, ageing Ransomes reel mower to working condition.

“Sure,” I replied. “Shall come over with the trailer and collect it?”

Bad idea – but I did, as it was 50km away. The machine had to be lifted and

It has dawned on me that I shouldn’t be lifting and lugging heavy machinery as often as I do



The castors and box steel were in my 'spares' bin

What I needed was a small, mobile, lightweight lift with adjustable height; good wheels; and a low, low price

then manhandled onto a trailer. A ramp was cobbled together, and it was duly dragged up the incline. I was a tired camper at the completion of this unwanted exercise, I can tell you. Heavy, this old English iron, made of stuff

called 'cast iron' – unknown in the Asian area of manufacture due to those places only making stuff with the strength of popsicle sticks and the corrosion resistance of last week's porridge. After a night spent bending up and

down and working on the mower, my undercarriage suffered terribly and I wasn't my normal chirpy self for some days after. Some would even say that I was a little irritable and grumpy. Hard to believe, I know.

This is the second-hand dirt bike lift as purchased



The solution

What I needed was a small, mobile, lightweight lift with adjustable height; good wheels; and a low, low price.

I have several lifts in my tiny workshop, but alas they are long, heavy, depleted of wheels, and always have small English two-stroke motorcycles sitting on them, which makes them all somewhat redundant. A better plan was needed – and quickly.

Here is the result of that better plan, and it seems to be working very well. I hope readers will forgive the unpainted metal bits and pieces – this is still a work in progress, and the design is being honed and modifications are still to be done. This is what the admen and inventors say is 'conceptual' or 'proof of concept'.

While grazing the pages online a few nights after my momentous decision, a dirt bike lift came into my horizon. *This could be just the ticket*, methinks. The 'Buy Now' was hit, and a few days later two parcels arrived on my front doorstep.

Note: See the photo of the assembled unit prior to my modifications. ►



The box section cut at 45 degrees to allow a ring spanner easy access

The castor wheels were rated at 125kg per wheel

That will do

I felt that the platform was a little small, and it was immobile. No matter;

I had some very well-made heavy-duty castors and some square 40x40 box section so, with a little drilling and measuring to elevate the feet of the lift off terra firma by 15mm, all seemed to be proceeding well.

Four robust bolts, 10mm in diameter – $\frac{3}{8}$ -inch in the old money – attached the

outriggers to the body of the lift. I cut the box section at 45 degrees to allow a ring spanner easy access to the castor bolts, which made it easier to snug them all up tight.

I have taken a few photos showing some of the design aspects simply for clarity. It was very much a design-as-you-go project. This is often the best kind, as you can plan to perfection – although Murphy and other gremlins will always have other ideas.

Castors get speed wobbles

Some packing of the box section was needed to ensure that the wheels were operating at 90 degrees to terra firma; otherwise, the castors tended to get the speed wobbles.

The bonus was that these wheels were braked and 150mm in diameter, so they

The bonus was that these wheels were braked and 150mm in diameter, so they rolled very well



The lifter can also be precisely raised or lowered using the foot pump



In its lowered position to be elevated to a trailer or boot

rolled very well. They are also rated at 125kg per wheel, but I expect that my maximum lift weight will be only 100kg, so the wheels will easily take that loading.

The unit locks up quite solidly when against a ute or trailer deck. It can also be precisely raised or lowered using the foot pump on its end. I intend to extend these controls and bring them up higher to assist in controlling the table.

The deck

I had a couple of spare panels of 18mm MDF lying in the workshop. They had a nice, grey wipe-down surface on one side. I think I had acquired them as throw-outs from some office furniture project. I cut a piece about 700x600mm, and drilled and bolted it to the steel top of the unit – an ideal work surface.

I lowered the lift to its lowest position – about 350mm above terra firma – and, ►

I also installed a couple of timber strips, or cleats, to make sure a load cannot roll off



A very robust unit that holds heavy articles with ease

using a chain block, lifted the Ransomes mower onto the table. I could have made a ramp, but the chain block was overhead already so I elected to use it.

It lifts this mower with ease and, when lowered, the unit can easily be rolled about the shop or down the driveway to a waiting trailer or other conveyance. I also installed a couple of timber strips, or cleats, to make sure a load cannot roll off. I prefer to use a tie-down as well, to make doubly sure the load cannot shift.

I still also used the locking pin that

came with the unit to lock the scissors, as you should never rely on anything in case of a hydraulic failure – also, don't be dumb and put your fingers or hands anywhere near such an arrangement; otherwise, someone else will need to spoon-feed you your yoghurt. Common sense, it's called.

A design fault?

While stripping the mower looking for a defective ignition coil, a fault with my design came to mind.

I soon found that there wasn't much room on the worktop for any parts

I would recommend this unit as a handy bit of kit to lift drill presses and any other machinery off benches

removed or, indeed, tools. This was solved after a night of heavy drinking – strong tea, I can assure you – when I realised that I could easily install a recessed drawer. I fabricated it under one end of the work surface (right-hand end because the other end has the foot pump).

I also had a couple of spare heavy drawer slides. These enable the drawer to become an extension of the work surface and add another 200mm to the right-hand end. They can be easily wiped out and cleaned after use then slid back to ease the storage footprint. Great to store spanners, sockets, or the like, as they are heavy-duty aluminium models.

Recommended uses

I would recommend this unit as a handy bit of kit to lift drill presses and any other machinery off benches and to assist with unloading trailers of gardening supplies, kennels, etc. In fact, it is a most useful arrangement that didn't cost a lot and used up many of the bits lying around my workshop.

I hope others will have a go at making one of these, as no electronics or 3D printing will be needed, nor a degree in quantum physics or molecular biology. The unit should have a life of at least 40 years, and you can tell the grandkids, "Yes, I made that myself." 🛠️



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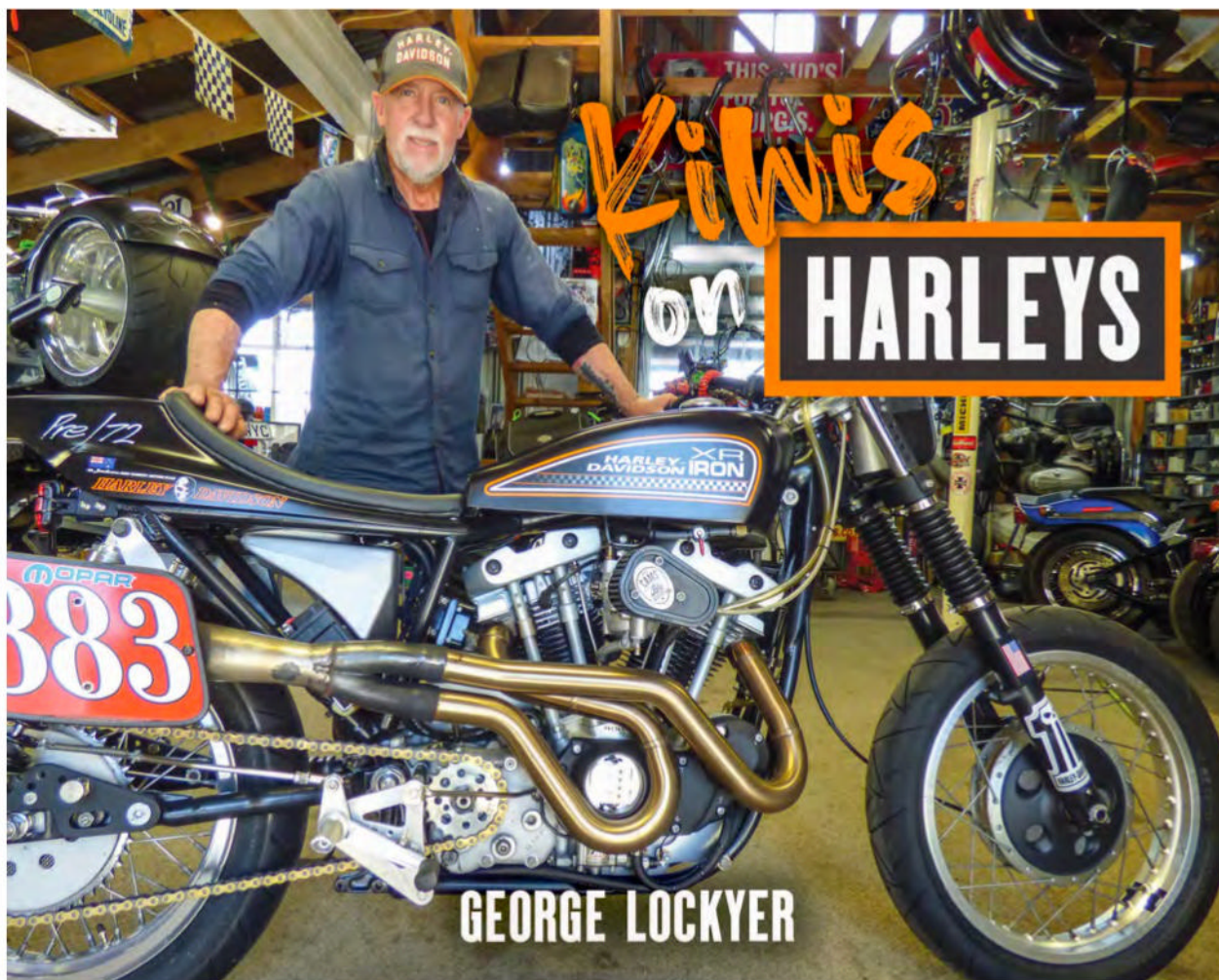
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KIWIS ON HARLEYS

Flawed, but the Harley-Davidson magic wins out

By George Lockyer

Review by Chris Hegan

My son Bodhi would do anything for me. Anything except hand me the key to one of his three Harley-Davidsons, even though I've owned a few bikes in my time. That was how it was until, one day, to my astonishment and delight, it wasn't.

My first Harley ride was equal parts thrilling and terrifying. Bodhi's '74 Sportster is pre-rubber mounting, and the massive machine between my legs shook like a bull about to charge. The weight of the thing! I could feel every perilous ounce. The roar bouncing off the buildings that I whizzed past turned heads. And of course that acceleration – common to all powerful motorcycles, but not like the Yamaha RD250 I once owned, so nippy but so light that I once took off up a hill and flipped the thing on top of myself. The Harley was planted!

Why the Harley legend?

When I opened George Lockyer's *Kiwis on Harleys*, I expected a fair bit of that sort of story – the 'why' of the Harley-Davidson legend.

Not a bit of it. For a book about and full of such brilliant, desirable, and exciting things as Harley-Davidson motorcycles, this one is puzzlingly free of any such rhapsodising. Lockyer almost seems to have missed the whole point of having one. There are many, many pictures of stunning Harleys and gleaming parts of Harleys, but only four with a Harley doing what it is made for: being ridden – and one of those photos is of a bison.

The prose is equally flat. Lockyer, who occasionally brings his Dictaphone into the story, doesn't quite seem to grasp the difference between transcription and journalism. Lame and superfluous

My first
Harley
ride was
equal parts
thrilling and
terrifying

sentences and phrases abound, such as, “What kind of work do you do today, Bob?” and “Well, George, I was told ...” and “The riding there, as you know, is incredible” – the last making me want to yell, “Ask him why, for God’s sake!”

What are Harleys all about?

There it is. Lots of what; almost no why. ‘Freedom’ comes up occasionally, but what do they mean by that, I want to know? I think it’s about connection: the exposure, being in the air, the power to overtake, to outrun – so many things. George doesn’t ask. Hilariously, if you didn’t know what Harleys were about, by the end of the book you would think

There are plenty of great life stories captured here and a piled-high banquet of beautiful machines and parts of machines

people choose them for their comfortable seats and companionship.

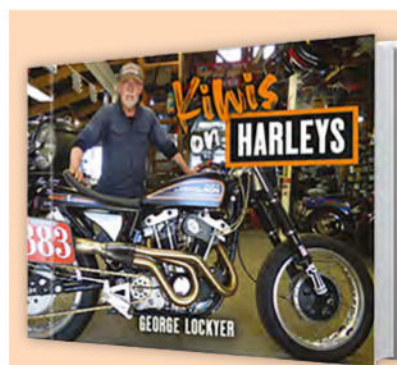
Why no photo captions? Again and again an interviewee refers to a particular model, a rare vintage bike perhaps, and I am looking at the pictures and wondering, *Which one?*

Finally: announcing the great diversity of Kiwi Harley owners and then presenting a not-quite-full deck of 26 white middle-aged and elderly folk is not showing us what most denizens of our great melting pot understand as diversity.

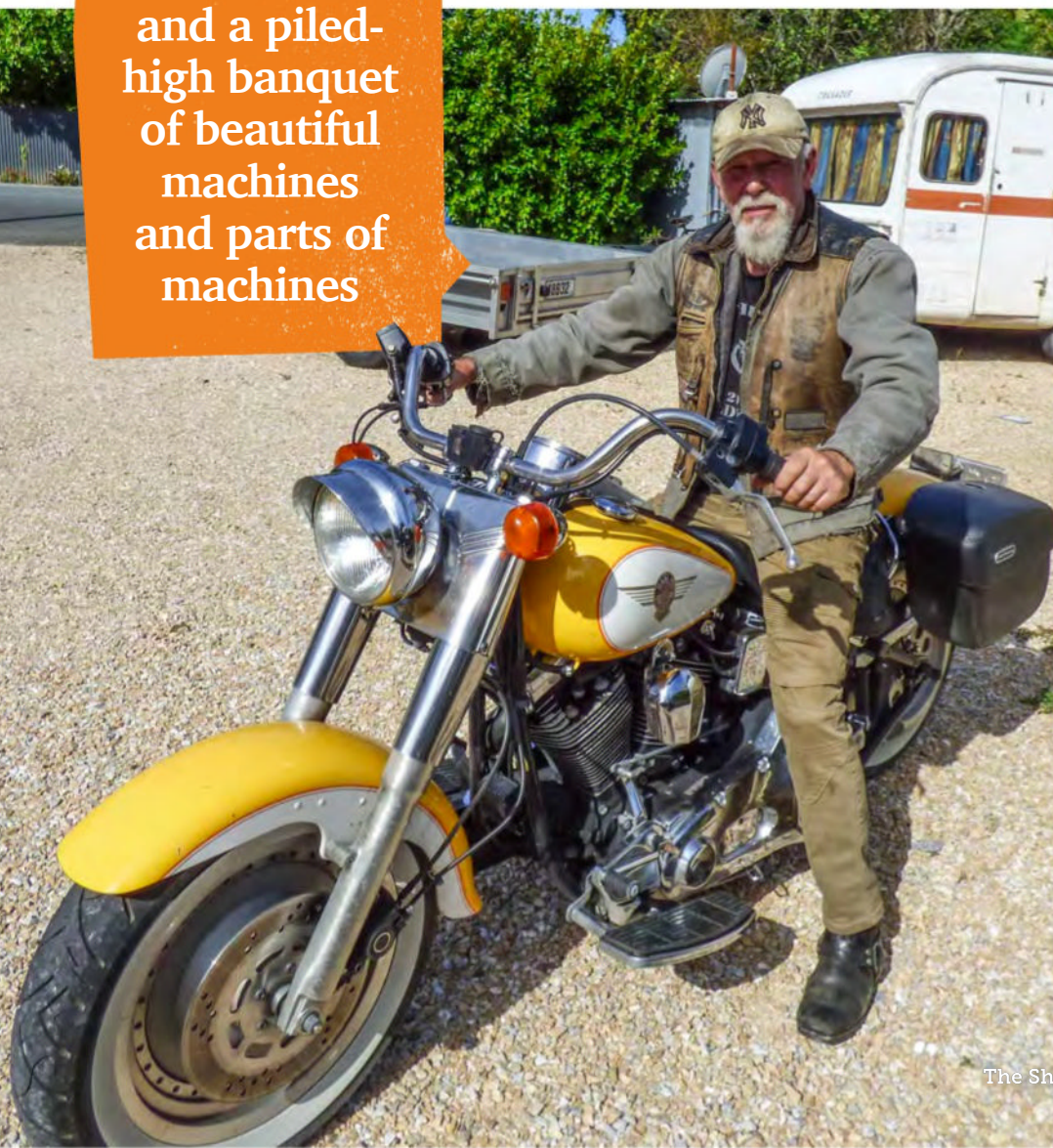
Then there is Ray – no last name, no head shots, no patch, but a member of a motorcycle ‘club’. The kind of ‘club’ that can be, as George obliquely shows us, tricky to leave. It’s not quite enough, but it’s something.

Yet ... there are plenty of great life stories captured here and a piled-high banquet of beautiful machines and parts of machines, many inexpertly photographed but still there to admire.

They get you past the shortcomings. The sheer aura of the subject matter prevails. By the time I turn the last page, I’m doing sums in my head. Maybe, if I got lucky with a doer-upper, with Bodhi’s tools and skills on hand ... 📷



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200 pages, full colour, hardback





FROM STEAMY TO STEAMPUNK

One man's passion provides a treasure trove for collectors

By Ritchie Wilson
Photographs: Ritchie Wilson

Warren Phillips was working as a camera technician when he started selling antique cameras, used magazines, and framed car advertisements at Christchurch's large Riccarton Market. The popular market is held on Sunday mornings at Riccarton Park Racecourse and is organised by the local Rotary Club.

Warren's source of car ads was magazines of the '60s and '70s, such as *Playboy* and *The Saturday Evening Post*, in which US automakers would regularly take full-page ads to announce new models. Australian magazines such as *Wheels* would have similar spreads featuring the latest Holden or Falcon.

At this time, one of the major players in the city's second-hand book and magazine market was Tommy Redden, who, under the 'Ringo's Book Exchange Shop' logo, ran a stable of ill-lit establishments where paperback novels and glossy girlie magazines were sold.

A huge appetite for print

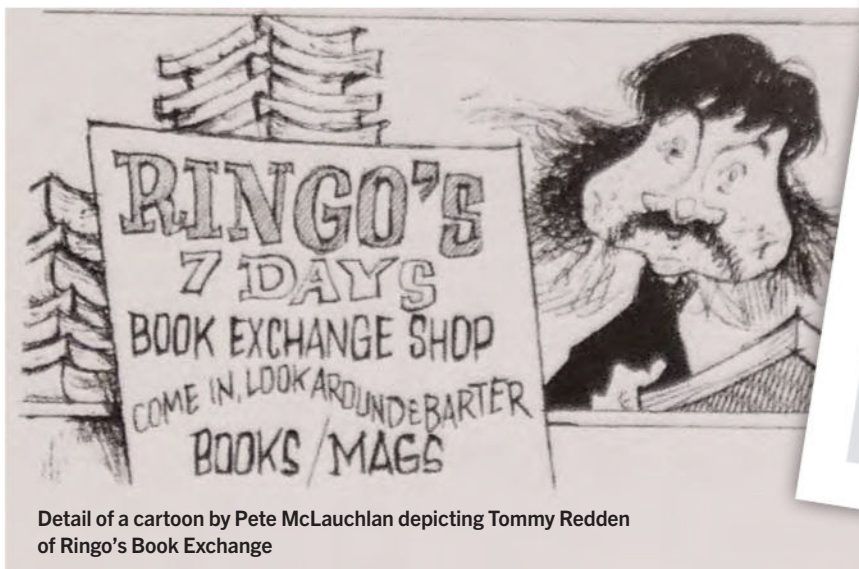
The shops, run by casual staff, made good money, but, equally important, they were a venue where Tommy bought stock. He bought, or swapped two-for-one, very large numbers of all types of books and magazines, anything printed, really – Ace Double books, and magazines such as

New Zealand Woman's Weekly, *The Listener*, *Penthouse*, *Health and Efficiency*, *Amazing Stories* science fiction, and, especially, *Playboy*. A 1974 article in Christchurch's *The Press* claims that Ringo's was turning over 300,000 books and magazines a year.

Tommy purchased inner-city properties within the four avenues – leaky, run-down, and prone to break-ins and fires, but remarkably cheap at the time – in which to store thousands of banana boxes of his bulky, battered merchandise. Inevitably, he died a rich man.

A deal is done

Warren Phillips used to visit Ringo's to make bulk purchases of magazines



Detail of a cartoon by Pete McLauchlan depicting Tommy Redden of Ringo's Book Exchange



Warren recognises that not keeping the later magazines was an error

to resell at the Riccarton Market, or to gut for car ads to frame and sell to car buffs.

Things changed in the Christchurch second-hand book and magazine market, as they did for most things, after the earthquakes. The cheap retail spaces that were the bedrock of the business were gone. Tommy was having increased difficulty with his hearing, and suffered from very bad arthritis in his hands. He offered to sell his entire accumulation of printed matter, by now crammed into a two-storey former factory in Phillipstown, to Warren.

The earthquakes had shifted the banana boxes, stacked 10 high, so access was difficult. The deal done, Warren began to sort through the contents of more than 10,000 boxes. He rented the

factory from Tommy and spent over a year winnowing the collection down to a manageable size.

With a couple of notable exceptions, the thousands of paperback novels and New Zealand magazines were taken to paper recycling businesses to be pulped. Glossy magazines later than about 1985 also got the chop; the cars advertised were too new to be of interest to petrolheads. As the years have gone by and aficionados have begun to take an interest in the cars of the '80s, '90s, and even the 2000s, Warren recognises that not keeping the later magazines was an error.

Some old New Zealand magazines have value. Ones with articles on Abba and glam-rock bands like The Sweet are sought after by overseas buyers and sell for reasonable amounts. ►



Warren Phillips's interests in cameras and guns are combined in this small ray gun. Note the impressive metallic finish of the Kodak box Brownie body



The raw material of part of Warren's market operation

Playboy is most popular

The basis of Warren's Riccarton Market operation is the *Playboy* magazines from 1965 – when they first went on sale in this country – until the early 1980s. *Playboy* was first published in the US in late 1953 but was only allowed to be sold here after the importers won a ground-breaking court case.

If in pristine condition, the magazines are sold at Warren's market stall. If the cover or centrefold is missing, the magazine is dismembered for the numerous car and motorcycle adverts, the 'Vargas Girl' drawings, and some of the more amusing full-page cartoons.

Recently, Warren was asked by a

customer to supply a mint copy of each of the 1960s *Playboy* mags that he holds. This made Warren realise that he was down to the last half dozen of the rarer issues. He theorises that some editions are scarce because its Vargas Girl is particularly sought after, so has often been removed. He thinks the November 1967 'Halloween' Vargas Girl is exceptionally popular, making that issue hard to find intact.

If a nice copy lacks the centrefold, Warren will skilfully replace it with one from another example of the same issue with, say, a ripped cover. He also has techniques to remove writing from covers to make the magazines more collectable.



A triple-barrelled imitation weapon fresh from the workshop. The aluminium-bodied drill body, gauge, thermo-electric valve, and attached orb are all repeated themes in Warren's work



The antique finger-jointed wooden instrument case is the base of a smaller steampunk weapon

Look at me

A couple of years ago, Warren noticed that increasing numbers of market visitors walked past his stall with their eyes firmly on their phones.

To attract their attention, he made a steampunk musket, incorporating a rifle stock, copper pipe, and parts of antique cameras. The gun was a felicitous combination of two of his great interests: military history and photography.

Warren's work as a camera technician and gunsmith had given him the metalworking skills that were essential for the construction of the interestingly complex imitation firearm. The gun attracted a gratifying amount of interest from the strolling punters and was, in short order, sold. He could see that he was onto something. More were made and sold. Some customers have bought more than one. Warren's stall now sells *Playboy* mags, cameras, classic car ads, Vargas Girl illustrations, cartoons, and steampunk ordinance.

Designing a steampunk gun

Warren says that the material available to make a gun plays a large part in the development of his designs. He buys suitable ancient objects at the market, and people give him stuff they think he can use. He modifies and rearranges found objects, combining them with new hardware and parts of old cameras, industrial lights, and firearms to produce a fascinatingly complex, unique artefact.

Light fittings are a good source of parts. They are usually made of top-quality materials, are easily disassembled, and often contain a large number of usable bits.

The finish of the gun is all important, and Warren has considerable expertise in the application of both metallic paint and plastic films. He uses Rust-Oleum brand metallic paint whose final appearance is indistinguishable from weathered copper. The Crafter's Choice brand adhesive film used has an extremely strong glue; when carefully applied, it looks exactly like brushed ►

combining them with new hardware and parts of old cameras, industrial lights, and firearms to produce a fascinatingly complex, unique artefact



Warren Phillips in front of one of the displays of interesting cameras at Ferrymead Historic Park. He has an encyclopaedic knowledge of cameras



Aluminium-bodied electric drills from the days before double-insulated-cord tools

Also in the rafters is Warren's collection of 1950s aluminium-bodied electric drills

stainless steel. Warren's work makes it apparent that there are modern materials and techniques that can, for instance, make PVC genuinely look like metal.

The steampunk workshop

Warren makes his guns in a single garage next to his home. Shelves along one side, crammed to overflowing, store the disparate materials that he incorporates into his designs. On the opposite side is his workbench, on which is mounted two vices – woodwork and engineering – as well

as a drop saw, a small drill press, and a slightly larger drill press. It also is home to tools, fastenings, paints, and adhesives. Completed guns are stored at one end of the workshop and hang from the roof.

Cameras that are having new, vibrantly coloured leatherette attached sit on the bench alongside faux pistols incorporating thermionic radio valves.

Also in the rafters is Warren's collection of 1950s aluminium-bodied electric drills. These range from the barely adequate (KBC) to the terrific (Wolf).

The steampunk look: round welder's goggles and futuristic energy weapon. The cap with the *Playboy* logo is slightly anachronistic



Warren Phillips discusses one of his creations: a combination of telescope, opera glasses, folding camera, and a fertile imagination

Below: A Kodak box Brownie in with new, bright red, leatherette covering replacing the original black. Kodak manufactured some of its camera ranges in a variety of fashionable colours



Interests arrive via employment

Warren worked for a government research establishment in Wellington when he left school. He became its photographic technician and gained wide experience of cameras and photographic processes. He then worked in the firearms department of an old, established sporting goods shop. The older gunsmiths at the shop worked on very expensive English shotguns and dealt with their wealthy owners, leaving Warren to deal with selling and repairing all the other guns. He learnt a lot in a short time.

He has always had an interest in military history and was most interested when an American short-barrelled shotgun, painted green, was brought into the shop. It was apparently a US Marine Corps weapon, most probably a relic of when the 1st Marine Division was in Wellington training in amphibious operations in preparation for the Solomon Islands campaign of World War II. ►



Vargas at work



The Vargas Girl

Between 1959 and 1975, towards the back of *Playboy* magazine (so we're told) was a full-page watercolour/airbrushed painting of a young woman draped in swaths of diaphanous fabric.

Special editions had versions that covered two pages. Called the 'Vargas Girl', the paintings were by Joaquin Alberto Vargas y Chávez (1896–1982), a Peruvian artist who had previously worked with *Playboy* editor Hugh Hefner at *Esquire* magazine. Vargas's paintings in *Esquire* were also on two pages and printed on special paper. They set the tone for the whole magazine and are today very collectable. The 'nose art' of American aircraft in World War II was often copied from *Esquire* Vargas paintings. Originals of the artist's paintings occasionally come up for auction and sell for impressive prices.





US warships in Wellington Harbour during World War II



US Marines: handsome, polite, high-quality uniforms, very well paid

They were seen
as protection
against an
invasion by
Japanese forces

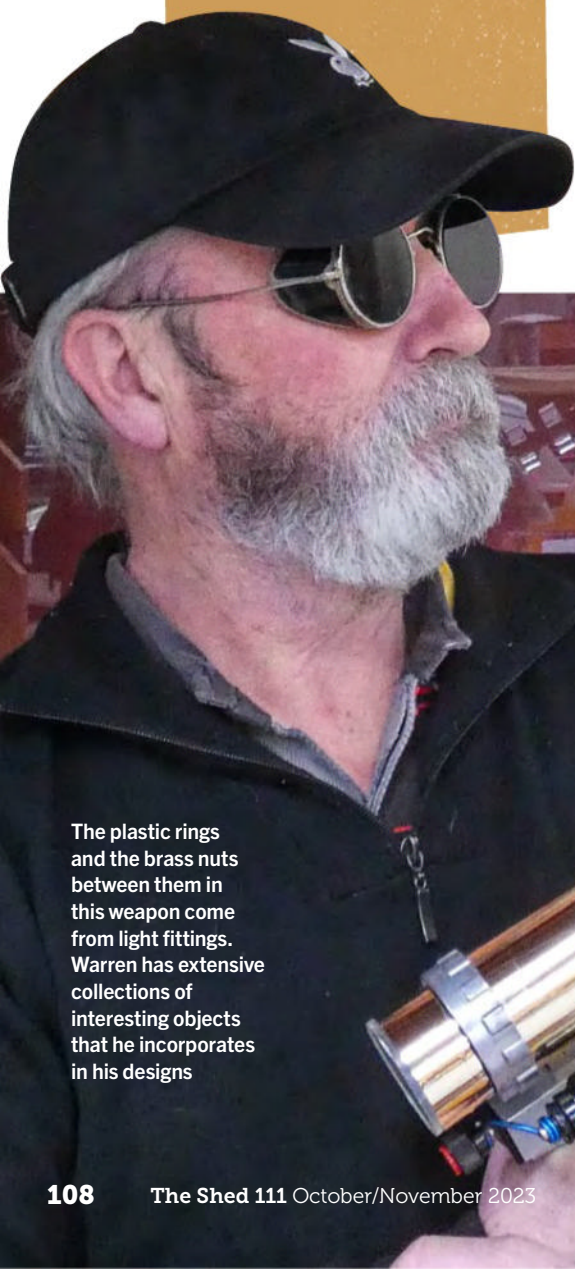
Marines in Wellington

On 14 June 1942, the American 1st Marine Division arrived in Wellington and set up a number of camps, mainly on the Kapiti Coast but also in the city. Between 1942 and the middle of 1944, there were, at times, as many as 45,000 American troops in New Zealand. They were seen as protection against an invasion by Japanese forces and were very popular with the civilian population due to their very good manners. They were also extraordinarily well paid. They were generally paid about the New Zealand average wage of the time, but didn't have any of the expenses of ordinary citizens. In wartime Wellington, there was little

for them to spend their money on.

They departed Wellington in late July, bound for the Solomon Islands. During the landing and pacification of Guadalcanal, 650 were killed and more than twice as many wounded.

Very few of the Marines would have had any battle experience, and their time in Wellington would have been taken up with rigorous training for opposed beach landings. They were equipped with M3 Stewart light tanks, and three of these, rumour has it, were swallowed by quicksand – as if in an *Indiana Jones* movie – as they practised transferring the tanks from landing craft to the Paekākāriki shore.



The plastic rings and the brass nuts between them in this weapon come from light fittings. Warren has extensive collections of interesting objects that he incorporates in his designs





A large and especially complex tripod-mounted steampunk weapon under construction



Warren in his workshop. Workbench on the left, storage at rear and on right

Tank rescue foiled

Warren Phillips and a group of military history buffs decided to unearth (unsand?) the tanks in time for a reunion visit to Wellington by Marine veterans.

They soon discovered that metal detectors wouldn't work through wet sand, and that probing with long metal rods on the soft sand was very dangerous, so the armoured vehicles were never discovered. A different technology will be needed to find them.

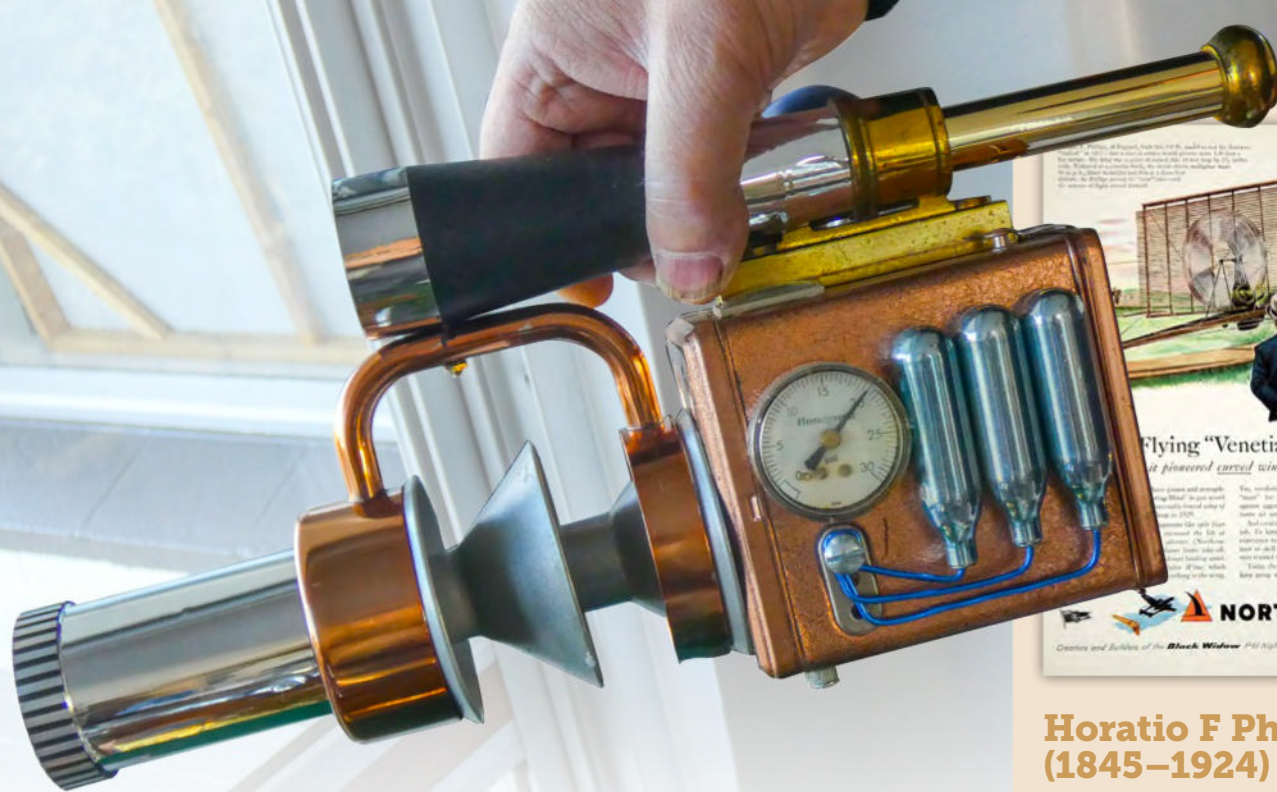
As a teenager, Warren fossicked on some sites used by the Americans and recovered a number of artefacts from their stay: bullets and casings; ammunition clips; and, from an incinerator site, glass Coca-Cola bottles of the period, some distorted by heat, some not. ►

Steampunk

The Walt Disney Studio's action movies of the 1960s, made for the huge young baby boomer audience, were sometimes set in Victorian times and incorporated steam-powered mechanical transport, especially airships. Lots of brass instruments, telescopes, and weapons featured. As baby boomers grew older, they read science fiction / fantasy novels that had similar settings, costumes, and mechanical contrivances.

Today, these ideas have morphed into an easily recognised 'look': tall hats, long coats, goggles or round sunglasses, leather garments, and jewellery made from wind-up clock mechanisms. These all hark back to a time when people were more optimistic about technical progress.





Horatio F Phillips (1845–1924)

The Phillips family tree contains many engineers. Both Warren's father and his grandfather were engineers, and he has discovered that one of his fairly remote relatives, Horatio Phillips, was an early experimenter in heavier-than-air flight. Like the better-known Wright brothers, he conducted experiments in aerofoil design using a wind tunnel. In 1884, he was granted a patent for a series of aerofoils and was, at that time, among the leaders in the race to achieve controlled flight. Aerofoils are still classified using the designations, called 'Phillips numbers', that Horatio Phillips described in his patent.

He went on to make aircraft that had a large number of wings – up to 50, like a Venetian blind. Unfortunately, he made them only 38mm wide, and this drastically limited the lift of the wings and the performance of the planes.

Problems with control meant that his approach proved – so far, anyway – a dead end.

The mechanical failure of one of his tall multi-wing structures, caught on film, is inevitably included in any documentary on the early days of flight.

During World War I, Horatio Phillips worked with Hiram Maxim, the inventor of the modern machine gun, on producing an interrupter mechanism, so that a machine gun could shoot between the blades of an aircraft's propeller without chopping the propeller's blade into pieces. Eventually, the German version, based on an example salvaged from a downed enemy fighter, was adopted.

The winter market

Christchurch winters aren't as bone-chillingly cold today as they used to be, but early mornings at the Riccarton Market are often frosty, and that keeps the punters away.

However, Warren has had a couple of big orders for whole-year runs of *Playboy*. He has never sorted his huge stock of the magazine – he thinks that he has the largest holding in Australasia – into separate months and years, so finding a particular issue can be time-consuming, requiring him to move and look through hundreds of boxes in his crammed lock-up. Some issues must have been very popular when they were originally sold; for instance, he has at least 80 copies of August 1974, some in pristine condition, looking as if they had just left the shop.

Warren is currently working on a large tripod-mounted version of his

steampunk ordinance. When that is completed, he plans to incorporate the components of a Kango hammer into a gun for particularly muscular steampunks. One of his customers has just bought his 10th gun from Warren.

For many years, Warren has been a leading light in the Canterbury Centre for Historic Photography and Film, an incorporated society dedicated to preserving photographs, cameras, and films, based at Ferrymead Heritage Park. The centre has just been offered a new source of funding, which may mean that it can, at last, have its own stand-alone building.

Warren is optimistic that the photographic society will grow, that warmer weather is coming, that a *Playboy* from the month and year of a man's birth will become a fashionable birthday present, and that customers will continue to be drawn to his fantastical steampunk firearms. 📷

High-quality workmanship, quirky found objects, and a focus on flawless finish are features of Warren's fantasy weapons



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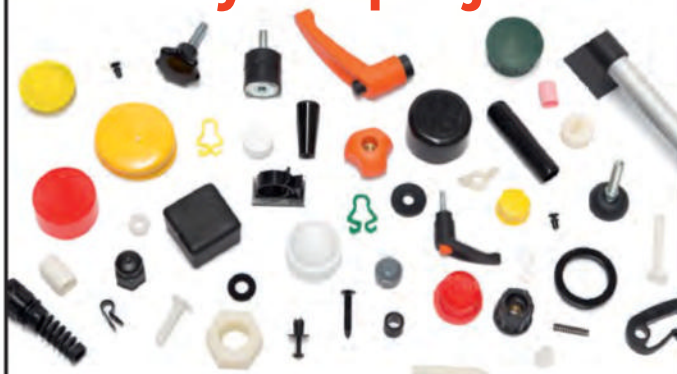
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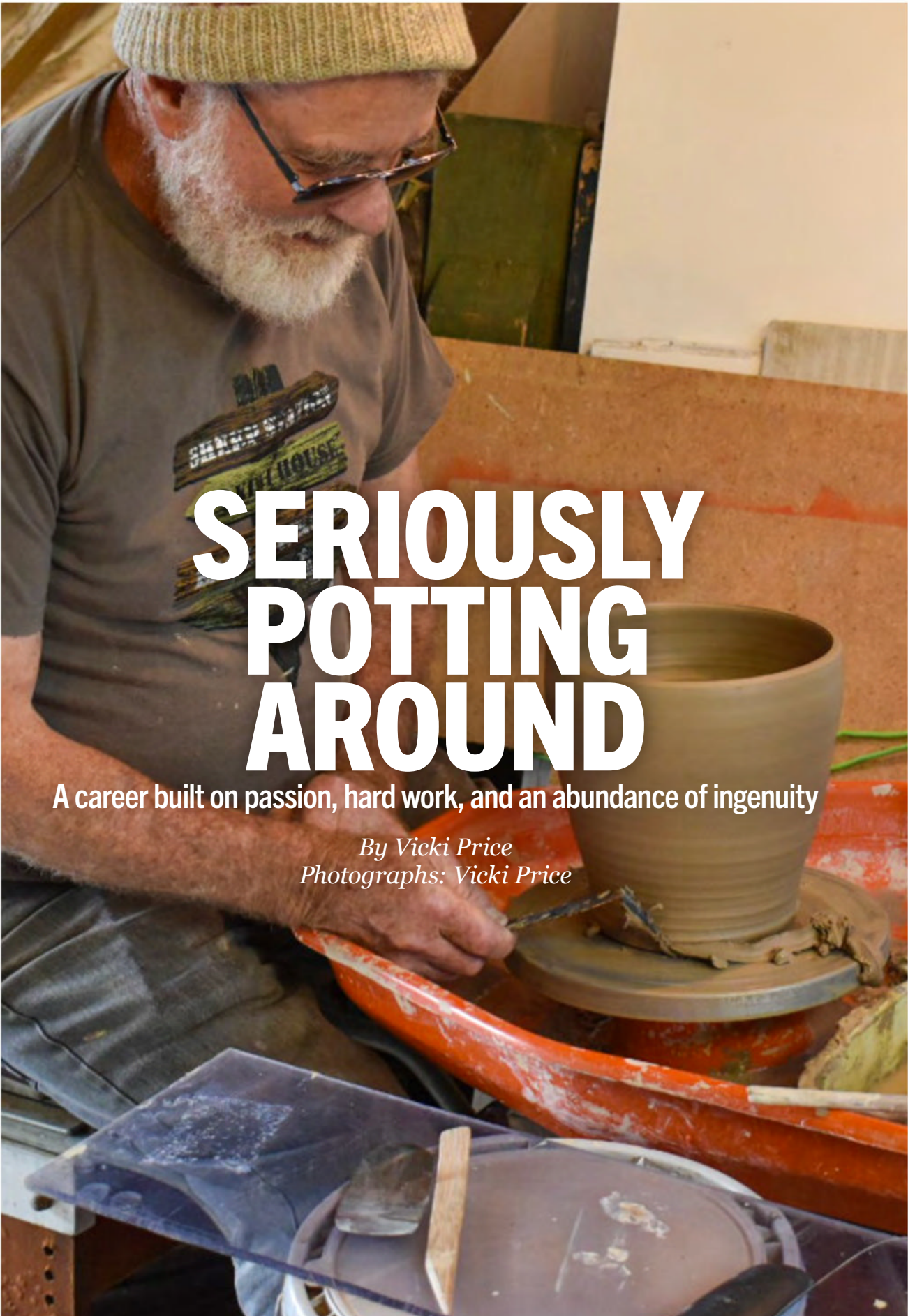
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SERIOUSLY POTTING AROUND

A career built on passion, hard work, and an abundance of ingenuity

*By Vicki Price
Photographs: Vicki Price*



Fired in a kiln that he made himself from a steel rubbish bin

There are Covid viruses in Trevor Wright's shed, 'mutations'.

Several large viruses lurk on a shelf in all their sinister, colourful glory. Thankfully, these viruses are made from clay and cooked at 1000°C – a temperature that would kill off most things.

Trevor's name will be familiar to many in pottery circles in New Zealand and around the world. He has enjoyed a long career making pots and ceramic art, beginning in Greymouth in the late 1970s. Now based in Waikanae, on the Kapiti Coast, he produces works of art fired in a kiln that he made himself from a steel rubbish bin.

Like a genie in a bottle, the bin-kiln turns clay into beautiful vessels; small items; and, lately, components to make korowai (cloaks). One of

these korowai hangs in New Zealand's Government House, a parting gift from Sir Jerry Mateparae when his time as our Governor General came to an end.

An early love

As a lad in Auckland, Trevor spent time visiting New Zealand Dutch artist Theo Schoon, who was a friend of his uncle.

"One time, we arrived and Theo was sitting on the end of his bed, grinding stones in a pestle and mortar. I was quite curious and asked, 'What are you doing?' Theo replied that he was grinding the stones up to make a glaze for his pottery," Trevor says.

After a visit to West Auckland's Crown Lynn to get some clay, Theo literally dragged a couple of apple boxes filled with the clay, wrapped in canvas, to his home, finally getting there around ►

A section of a beautiful cloak (korowai) made from clay, part of a current series being produced by Trevor

As they hogged the wheel, Trevor bought his own. He still has that wheel in his shed



Trevor still has his original wheel that he bought decades ago and he still throws pots on it



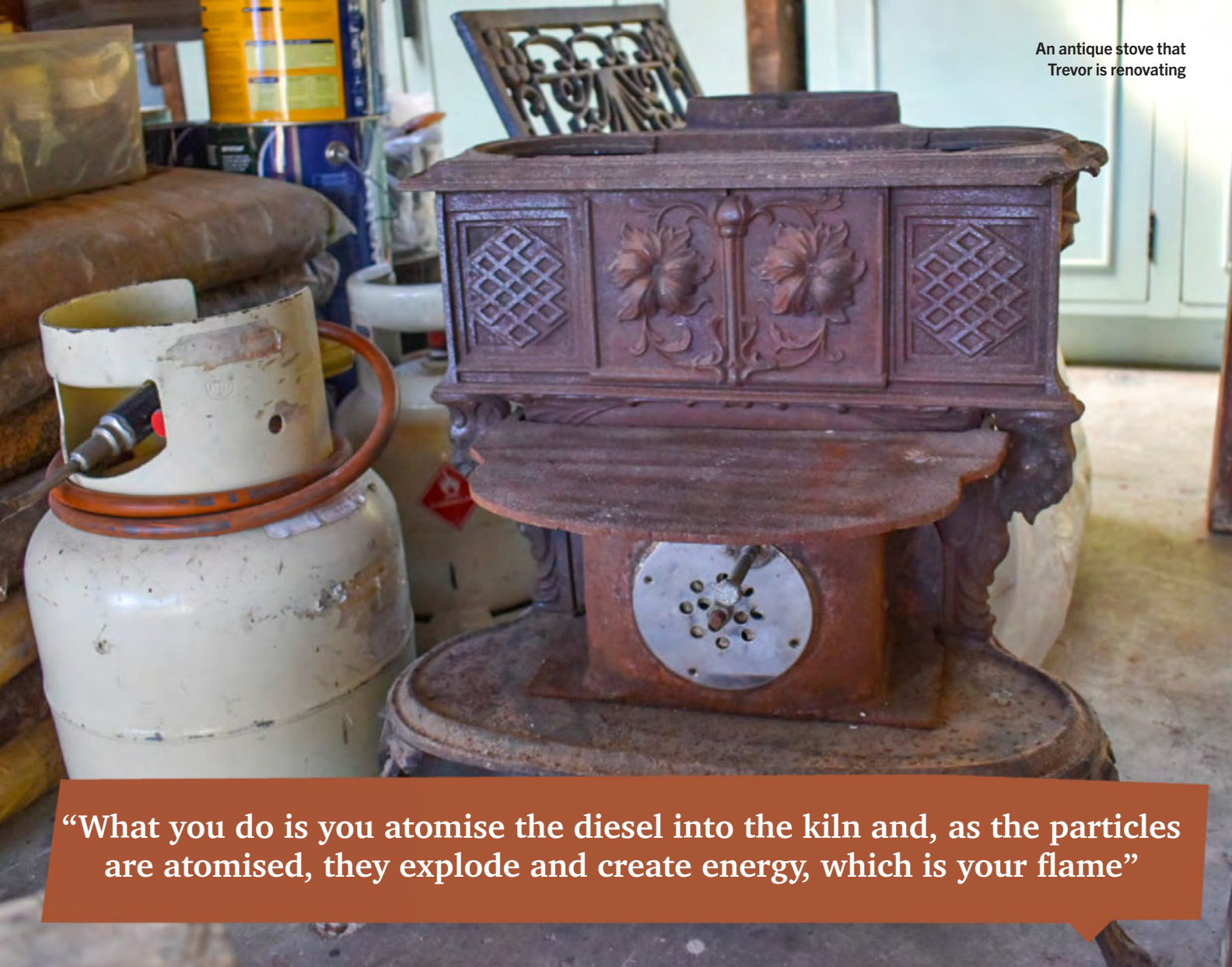
The rubbish-bin kiln made by Trevor is a well used piece of kit. The pot is one of his beautiful creations

11pm. When Trevor and his uncle visited the next day, Theo showed Trevor what you could do with it. He rolled up a ball of clay and, giving it to Trevor, said, "Here, have a play." That was Trevor's introduction to the stuff. He liked it, especially because you could do things with it.

Years later, in Greymouth, Trevor made a career choice between landscaping and pottery. He went to night classes to learn the craft. First-year students weren't allowed to use the wheel, but second years could. As they hogged the wheel, Trevor bought his own. He still has that wheel in his shed.

Pottery is a mix of mechanics and art, reflected in the tools and workspaces used by Trevor





“What you do is you atomise the diesel into the kiln and, as the particles are atomised, they explode and create energy, which is your flame”

Pots, pots, and more pots

Thereafter, Trevor spent a lot of time in his shed, throwing pots and continuing to learn from potter Justin Gardner. He moved to Palmerston North and built a 30 cubic foot kiln, run on natural gas. Unfortunately, no one had really learned how to use gas in a kiln. Trevor decided that it was a good idea to use the heat twice, so he bisque fired on one side of his pots and glaze fired on the other.

For the first eight firings, he didn't get a single piece out. The kiln simply didn't reach the right temperature.

“I had all the experts coming and helping me, offering advice, but nothing happened,” he explains.

In deciding not to let it beat him, Trevor did some research. The next firing, he got one piece out. Next time a third; then two-thirds; and, finally, the whole kiln full of works was successfully fired.

He learned that it was all about

draught and stacking inside the kiln. The flame goes into the most vacant space. With diesel, it's easy, he says: “What you do is you atomise the diesel into the kiln and, as the particles are atomised, they explode and create energy, which is your flame. So, if they have a problem, they just pour a bit more diesel in, and a bit more air pressure. They start exploding over here, because they can't all explode in one place, so problem solved.”

With natural gas you can't do that, explains Trevor, because when it starts exploding, it's instant burning, so you must suck the flame through the kiln. “It's a real art,” he says.

During the following years, Trevor was busy potting. He threw one-and-a-half tonnes of clay a year, churning out mostly domestic ware. Success led him to experiment and produce art pieces, and that has led to international exhibitions. ►



A storeroom contains a
stash of glorious creations
made and sometimes
exhibited by Trevor



The bin-kiln is lined with ceramic fibre, which handles 1000°C heat



The gas is lit and things are about to cook. Trevor mostly uses his kiln outside

Things heat up in the shed

The rubbish-tin kiln is lined with ‘ceramic fibre’, which is fibre spun from china clay. It can handle heat up to 1400°C.

“It’s a spin-off from the space age; it’s amazing stuff. It’s just like cotton wool,” says Trevor.

The beauty of the bin-kiln is that it’s portable. Trevor fires his bin-kiln outside on a nice day and quite often at night. He points out the damper, which is shed-made from a pipe – adding ironically, “The very commercial burner”.

“It takes 10 minutes to get from 0°C to 1000°C. That’s what happens in sheds; people are mad!” he laughs.

The bin-kiln is an ideal container, according to Trevor. Although he has another kiln made from a 44-gallon drum, he hardly uses it these days, as he’s enjoying making smaller items.

Record keeping

Much like a painter has a palette, Trevor has made a record of various clays and glazes, in the form of colourful blobs of clay on card. There are myriad types of clay mixes, heated at different temperatures to get different results in colour.

“Sometimes you chuck different clays in the bucket; that’s why it comes out in different colours,” he explains.

An earthenware clay is quite dark, and a bisque clay, heated to 950°C, is rather terracotta in appearance. Others on the card are stoneware, with subtle shade differences. One is almost green.

“I do a lot of testing,” explains Trevor. “I test all the time. I think you have to, because, especially today, they use what I call ‘paint by numbers’, where you buy pots of colour [ready-mixed].”

“It takes 10 minutes to get from 0°C to 1000°C. That’s what happens in sheds; people are mad!”

The “very commercial” burner, which Trevor made from a pipe, is placed in the base of the kiln



A brick of ceramic clay gives something for a pot to sit on while it’s fired. It’s amazing stuff, “a spin-off from the space age”





A pair of Trevor's prize-winning pots

A palette of clay tablets that Trevor refers to for glazes and grog combinations



The side entrance to the shed from the house



Trevor keeps excellent records of glazes on these numbered discs for ease of reference

Trevor applies clay and glaze decorations to his pots with a brush. He also uses oxides.

Trevor has made a series of clay discs of sorts that have different combinations of clay, glaze, and fired temperature. Each disc has dimples in it to hold the glaze. These are his go-to to decide which ingredients to use for a certain project.

"So, I can go into that box and I can pick out which one I want to use. They're all numbered, so I know exactly [what to use]. That's half the thing: to record really well," he says.

On some, he has put a dark glaze underneath and a white one on top

to see if he can get a double effect. Applying the glazes in this manner means that, as the item is fired, the bottom glaze bubbles up through the top glaze, making for interesting effects, including runs and melts down the vessel.

Trevor has developed an interesting process of working at his wheel. He smashes the first eight of whatever he's making.

"If I was throwing a series of mugs, I'd smash up the first eight and the last eight, because you haven't freed up," he explains. "Once you've freed up, you can throw some nice pieces. Then, when you start getting tired ..." ►



A stainless-steel electric kiln

He mainly uses stoneware clay, to which he adds extra grog

A shed full of grog

Trevor's shed is orderly and filled with jars and containers of powdered substances, glaze materials, and sacks of clay. He mainly uses stoneware clay, to which he adds extra grog.

'Grog' is the name given to the raw materials, such as sand, that are added to clay to give strength and texture to ceramics. Trevor smashes and grinds various materials to the texture of sand, to add to his clay. However, he explains that you can't just add anything.

"It depends; it's got to be 'refractory', which means it's like a fibre – it won't melt at 1300°C – so it gives it strength. It's quite [like] science; it's not actually science – a lot of it is actually common sense – but you've got to know what you're doing," he says.

One large piece in the shed has been pit fired – that is, in a firehole in the ground.

"If you do it right, you can end up with some amazing results," says the potter about this inexact but fascinating and effective way of firing pots.

Trevor has various tools at his disposal, depending on what he is making. He has an air compressor to spray some of his pots; he does all his own stick welding; and, as a fun distraction, he used to enjoy making insects from bits of scrap metal.



Orderly jars of powders for mixing into clay line the shed's shelves

Casseroles to fine art

It's mostly commissions that Trevor does these days. A large and beautiful bowl sits on the workbench, a work in progress. It is testament to the long experience Trevor has of throwing pots on the wheel.

"I used to get up to 23 casseroles and their lids in two hours," he says, "but there's people far better than me, far quicker than me."

Trevor's philosophy is this: "If people say something can't be done, I give it a go and see if it can. By doing that, I learn a terrific lot."

All Trevor's work has paid off, as he has enjoyed an international career as a ceramic artist. He has exhibited at the Expo in Vancouver, Canada (1986) and in Yugoslavia (1987). One of his pots travelled the world for eight months as

part of an exhibition that went to seven countries. Another piece was displayed in New Zealand House in London, as part of an exhibition in 1990. All this while Trevor was working full time at the Ministry of Agriculture.

Despite his success overseas, New Zealand accolades have escaped Trevor.

He has never had a piece accepted into a New Zealand Society of Potters national exhibition, although he has submitted an entry 19 times. ►



A beautiful blue glaze



A clay korowai laid out, ready for the rest of the process to bring it to life



Trevor's work has received recognition over the years, including in this newspaper article



Large urns made by Trevor decorate the shed



Trevor in his happy place — the shed

Trailer from trolleys

Trevor sometimes works with metal. He designed and made a trailer from two hand trolleys welded together, after looking at them and formulating a plan. He welded a drawbar down the centre and reattached the wheels to the side of his new trolley. He added a coupling to the drawbar, then bolted an angle frame on. He used a sheet of ply for the deck and sides. The gaps left in the railing are helpful when it comes to tying down loads. When you are as prolific as Trevor is in his shed, it's mighty handy to have a trailer such as this.



Kiwi as, a trolley-trailer



An angle frame bolted on for strength

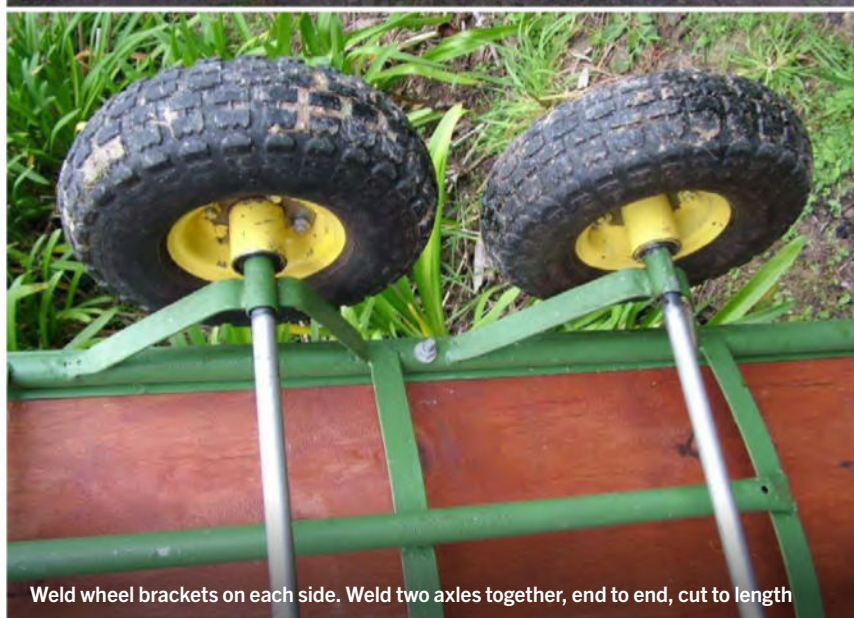
Garden trailer

Materials

- Two hand trolleys
- Pipe for drawbar
- One sheet of plywood
- Trailer coupling and ball
- Rod for axle (second axle)
- Bolts and screws to attach ply and frame together
- Frame – to attach ply to frame



Anything is possible in Trevor's shed – here is the useful trailer he made to tow behind his quad bike



Weld wheel brackets on each side. Weld two axles together, end to end, cut to length

Disintegration, a piece that nearly lived up to its name

Current work

A large work still in process is called *Disintegration*. A tall tubular piece, it has cracks all through it, made on purpose by Trevor as he formed it.

“You want to try putting cracks in something when you want them, to get them looking natural; it’s so hard,” he says.

He made the cracks as he shaped the clay and before firing, and filled the whole thing with foam to give it added strength. It is in two parts, and Trevor is creating a sleeve to go inside it, so it can be pulled apart, making it easier to transport.

Disintegration nearly lived up to its name one day, while Trevor was sorting it out after firing.

“I was just lifting it off the table

and an earthquake hit. I thought, ‘What do I do? Do I drop it and run, or do I put it on the table – no, I’ll stand and hold it.’”

Trevor explains why the piece is so named: “I believe that excessive individualism is destroying traditional Māori values, quicker than time.”

Trevor has a certificate in Māori and Indigenous art from a wānanga that he attended for a year in Palmerston North. As a child, he spent a lot of time with the kuia in his community, so he has some understanding of ‘the old ways’. A series Trevor is working on now is named *Ancient Relics*.

There is a lot of testing of glazes before he finds the one he wants. One method that he uses to get texture on a piece is ‘tape resist’. Tape is put on and then the item is sand-blasted. He enjoys learning new techniques or trying something that hasn’t been done before; once something is learned, he tries something new.

In the garden is a pizza oven that ►



Sacks of clay ready to be turned into masterpieces

It's amazing what productivity can come out of a shed



Trevor made this model of the house that he and his wife Nanette designed. Sadly, it was never built



In the garden is a pizza oven that Trevor built from bricks. It sports a tall terracotta chimney festooned with grapes

Trevor built from bricks. It sports a tall terracotta chimney festooned with grapes. A gargoyle in the fashion of European Gothic architecture sits guarding the benchtop beside the oven.

The home that wasn't

For Trevor, building his own home was a dream that became a 13-year nightmare with the

Kapiti Coast District Council, which argued there was a fault line on the land that he and his wife Nanette were planning to build on in the hills behind Waikanae. They eventually won their case, but by then building was out of reach for the couple. He does have a model that he made (with clay) of the house, though, as well as one of the studio he'd also hoped to build. 🏠

In the garden is the pizza oven made (and used) by Trevor



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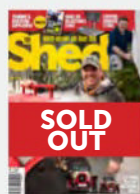
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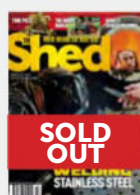
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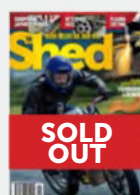
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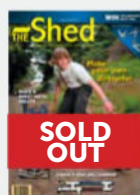
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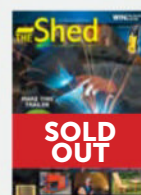
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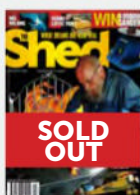
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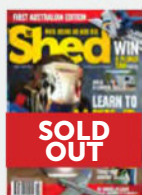
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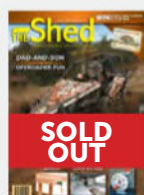
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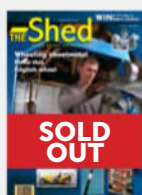
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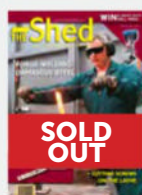
Issue 24
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MENZSHED[®] NEW ZEALAND

**THE MEN'S SHED MOVEMENT IS ABOUT
MAINTAINING MEN'S HEALTH AND WELL-BEING
IN AN ENVIRONMENT CATERING FOR THEIR INTERESTS**



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 021 025 96454 regrep2@menzshed.nz
Lower North Is - Murray Campbell 021 070 2258 regrep3@menzshed.nz
Tasman, Nelson, Marlborough - David Packer 021 022 82592 regrep6@menzshed.nz
Canterbury, West Coast - Trevor Scott 021 022 11199 regrep4@menzshed.nz
Otago, Southland - Ian Miller 027 485 1452 regrep5@menzshed.nz

NORTH ISLAND

MenzShed Kaitia Inc
Kerikeri Men's Shed
The Shed (Russell)
Hokianga Men's Shed Inc
Whangarei Men's Shed
Dargaville Menz Shed
MenzShed Waipu Inc
Mangawhai Shed Inc
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
Menzshed Huntly
Katikati MENZSHED
MENZSHED Omokoroa
Morrinsville Community MenzShed Inc
Mount Maunganui Menz Shed
Tauranga Men's Shed Inc
The Te Puke Community Menz Shed
Matamata Community Men's Shed
Hamilton Community Men's Shed
Whakatane Menz Shed
Te Awamutu Community Menz Shed
Otorohanga Menz Shed
Rotorua Community Menz Shed Trust
South Waikato Menzshed Inc
MenzShed Te Kuiti
Mangakino MENZSHED
Tairāwhiti Menzshed
Taupo Community Men's Shed
Taumarunui & Districts Menzshed
MenzShed Waitara
Menzshed Wairoa
New Plymouth MenzShed

Menzshed Napier Trust
Menzshed Hawera
Menzshed Hastings Trust
Mens Shed Wanganui Trust
CHB Community MenzShed (Waipukurau)
MenzShed Dannevirke Inc
Feilding Menzshed
Menzshed Manawatu
MenzShed Pahiatua
Menzshed Foxton
Levin Menz Shed
Eketahuna Menz Shed
Otaki MenzShed
MenzShed Kapiti Inc
Henley Mens Shed Inc
MenzShed Carterton
Greytown Menz Shed
Plimmerton Community Menzshed Inc
Featherston Menz Shed
Menzshed Upper Hutt
Porirua MenzShed Inc
Menzshed Tawa
Men's Shed Naenae
Martinborough Mens Shed
Eastbourne & Bays Menz Shed
Wellington City MenzShed

SOUTH ISLAND

Mohua MenzShed Inc
Motueka Menz Shed
Nelson Whakat Menzshed
Havelock Menz Shed
Picton Men's Community Shed
MENZSHED Waimea
Tapawera Men's Shed Inc
Renwick Menz Shed
Menz Shed Blenheim
Westport Menz Shed
Westland Industrial Heritage Park Inc
Kaikoura Community Shed
Hanmer Springs Men's Shed
Cheviot Community Men's Shed Trust
Hawarden Waikari Mens Shed
Amberley Menz Shed Inc
Rangiora Menz Shed
Oxford Community Men's Shed
Menzshed Pegasus/Woodend

Menz Shed of Kaiapoi
Christchurch Busmenz Shed
Darfield / Malvern Menzshed
New Brighton Menz Shed
Bishopdale Menzshed
St Albans Menzshed
Hornby Community Menzshed
Riccarrton Park Menzshed Trust
Linwood Menz Shed
St Martins Community Menzshed
Halswell Menzshed
Redcliffs Community Shed
Rolleston Men's Shed
Men's Shed of Lincoln
Akaroa Men's Shed
Ashburton Menz Shed Inc
Men's Shed Trust Geraldine
Temuka Men's Shed
Timaru Community Menzshed
Omarama Men's Shed
Glenorchy Menzshed
Arrowtown MenzShed Inc
Cromwell Menz Shed
Waitaki Menzshed Inc
Oamaru Menz Shed
Alexandra Men's Shed
East Otago Blokes Shed
North Dunedin Shed Society Inc
Taieri Blokes Shed
South Dunedin Blokes Shed
Mataura Menzshed
Riverton Menzshed Inc
Menz Shed Invercargill Inc

To learn more and to find a shed near you,
scan the QR code with your phone or
visit our website at www.menzshed.nz





SPRING HAS SPRUNG

A new season – a time to welcome new friends, farewell an old one, and tackle deferred tasks

By Jude Woodside

It's spring at last! The daffodils are poking their yellow periscopes above the earth, bringing some cheer after the ills of winter. On the hills, I see the lambs bouncing about. The mud is in danger of drying out. The days are longer; we are even getting whole days without rain.

I have acquired some new workers: three Black Orpington hens and a rooster – much to the annoyance of the incumbents. My incumbents are Hyelines and a Brown Shaver. They are very good egg producers but not good to eat, so I am hoping to start a breeding group to produce more pullets for laying and roosters for the pot. Orpingtons are useful as egg layers and they are big enough to fatten up for the table.

New friendships

The integration has gone relatively smoothly but the resentment from the Hyelines is palpable. Curiously, the old Brown Shaver is more laid back, and I even caught her sharing the roost with the young rooster.

I am still building my shed. It's a slow process doing it alone, and I spent most of the last week avoiding fixing a major stuff-up I made early on that has now come back to haunt me. I do that a lot; if procrastination were a sport, I'd be a professional. My excuse is usually that I'm not too sure what I'm doing so I want to go slowly, but actually I'm just avoiding doing it. Sometimes that works out – I come up with another option or someone turns up who knows

exactly what to do. Not in this case, though, and I can wait no longer, so tomorrow it is done.

I have been hampered more than a little by stuff-ups I made, mainly caused by misreading the plans. To be fair, the plans apparently haven't changed since 2008, and mine are not entirely specific to my build.

Time to insulate

At least most of the structure is there, and I am now considering the insulation. The shed's design is such that adding insulation after the cladding is on may be difficult. The insulation is imperative in the roof especially. Without it, the drips of condensation through winter will wreak havoc with machinery and projects.

If procrastination
were a sport,
I'd be a
professional

It's surprisingly hard to find here in New Zealand. In Australia, where the heat is more of an issue, insulation is taken for granted, but here, where we face both heat and extreme cold, it's not so readily available.

I looked at wall insulation products, but they would require an entire

framework of timber to work. I am hoping to find blanket-type insulation to cover the walls and roof all at once.

Cheerio to a good mate

On a more sombre note, we recently lost a good friend of *The Shed* and a personal friend of mine.

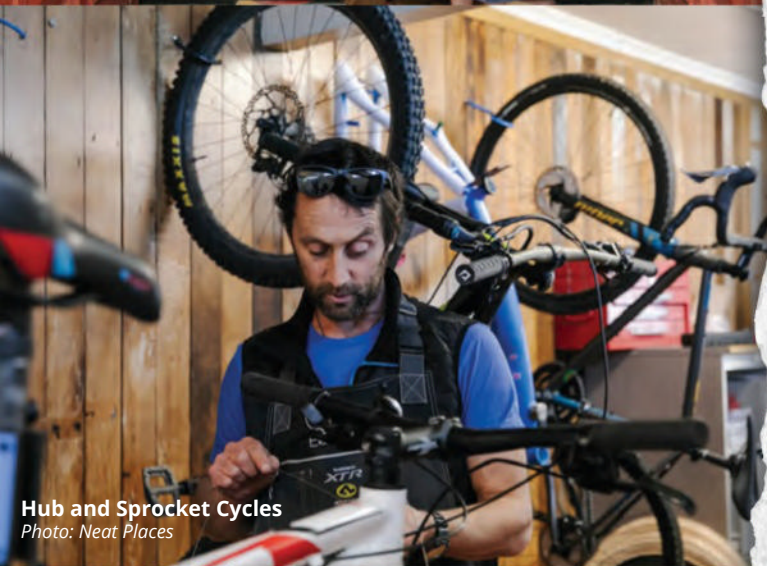
Rob Tucker was one of the best-known press photographers in New Zealand, with a long career at the top of his game. I first met him back in 1992, when I returned from Australia as a film and video cameraman looking for work. I stumbled across him through a mutual friend, who was producing a corporate video for a boatbuilding company in Auckland. He needed both stills and video to help sell the boats to offshore markets.

To get some aerial performance shots, Rob and I shared a helicopter – me sitting on the floor with my feet on the skids shooting video and him shooting stills over my shoulder. On one memorable occasion, we had swooped low behind the boat – a 50-foot launch showing off just off Takapuna Beach – when it did a particularly tight turn, creating a huge rooster tail that ultimately drenched both us and our camera gear.

Rob was responsible for many cover shots, and many great stories in partnership with Ray Cleaver. One of the pleasures of my time at *The Shed* was the chance to work with talented and passionate people, and Rob was certainly passionate about his work and very talented. 📷



Craftwork Brewery
Photo: Neat Places



Hub and Sprocket Cycles
Photo: Neat Places



Harbour Street, Oamaru



Sublime Studios
Photo: Neat Places



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