

BENCH SEAT MADE EASY • RACING STAR'S FAVE BIKES • CABINET SORTED

THE **Shed**

WHERE DREAMS ARE MADE REAL

MAY-JUNE 2017

ISSUE 72



**GOING
GLAMPING**
CUSTOMIZED
CARAVAN

FLYING HIGH
MODEL PLANES

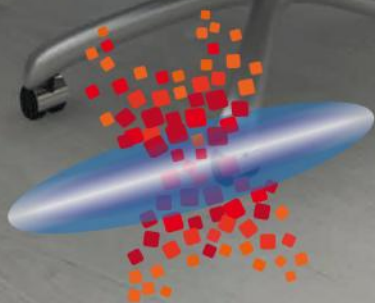
SCULPTING
steel

ELECTRONICS

GETTING TO GRIPS WITH CAMERA DOLLIES

NZ \$14.95
incl. GST
theshedmag.co.nz





HERSCHEL[®]
the future of heating – today

HERSCHEL IS FAR INFRARED HEATING

Far Infrared is radiant heat, it's the same feeling of warmth as the winter sun on your face and the heat from a coal fire. It is even the same form of heat emitted by your own body.

It is the most basic form of heating known to man. Used by cavemen to heat themselves by fires, by Romans in their hypocausts, by log burners and tile stoves. Favoured for millennia because it heats objects, which then radiate back and keep the environment warm around you. Radiant heat does not heat air, which itself holds little heat.

Herschel Infrared represents the future of heating. Energy efficient, highly controllable, stylish and discreet, comfortable and sustainable heating when you want it, where you want it.

Easy to install, no maintenance and easy to control. Because the system heats the building and objects, and not the air, it reduces damp and condensation in the environment, an important factor for healthy living and reduced building maintenance.

The system combines with **solar** to give **FREE heating** and **zero CO²** emissions.

Herschel Infrared is low energy electric heating, up to **60% more efficient** than traditional electric heating with the benefits of **increased comfort** levels.

It has many advantages over other heating systems such as heat pumps and other convection heaters due to reduced operating times, **low cost** of installation, **zero maintenance** and unprecedented ability to **zone and control**. Not moving air reduces dust and particle movement, an advantage to allergy sufferers and for densely populated areas like offices.



Delivers up to 60% savings on energy usage over other forms of electric heating.

Our range of Far Infrared heating systems is the most comprehensive in the world. We have heaters to suit any application, from **Domestic** through to **Commercial, Industrial and Outdoor heating**.

Herschel has an unrivalled track record of the widest range of Far Infrared applications.

- Homes
- Office walls and ceilings
- Outdoor patio heaters
- Conservatories
- Shops and salons
- Warehouses and industrial units
- Hotels, restaurants and cafes
- Public spaces
- Garage heating
- Schools
- Churches
- Flood Recovery

the future
is electric 

Enjoy a luxuriously warm, dry environment this winter with Herschel Infrared.

Visit herschel-infrared.co.nz for more information, or call us on (09) 947 5166 to discuss your requirements and find a local installer.





Selleys® **Sil-X™** ADVANCED POLYMER technology

As a world leader in innovation, Selleys has changed the landscape of the sealant and adhesive market with new Selleys® Sil-X™ Advanced Polymer technology.

Sil-X Advanced Polymer technology delivers superior performance in durability, strength and flexibility.

Formulated for tough New Zealand conditions, Sil-X technology has been proven to withstand harsh UV and extreme weather. Its unique formulation means that Sil-X outperforms conventional products on all substrates, including application on wet or damp surfaces, with no need to prime first.

The versatility and adaptability of Sil-X technology has placed it as the technology cornerstone of new Selleys products across the sealant and adhesive range.

SELLEYS NEW GAME-CHANGING TECHNOLOGY PERFORMS WHERE CONVENTIONAL PRODUCTS FAIL.

Selleys Sil-X Advanced Polymer technology:

- ☑ **Superior UV and weather resistance**
- ☑ **No primer required**
- ☑ **Adhesion to wet surfaces**
- ☑ **Non-bubbling**
- ☑ **Better curing at low temperatures**
- ☑ **Better extrudability at low temperatures**
- ☑ **Low VOC**

SELLEYS®

IF IT'S SELLEYS IT WORKS®

Selleys® STORM™ Sealant with **Sil-X** ADVANCED POLYMER Advanced Polymer technology

Introducing new Selleys Storm Sealant that delivers an immediate waterproof seal on any building substrate, wet or dry, indoor or outdoor. It can even be applied in the rain to stop leaks in an instant.

Superior Sil-X advanced Polymer technology gives Selleys Storm Sealant the edge where conventional products fail. Developed to withstand tough New Zealand conditions, it comes in clear or black for a professional finish next to light or dark colours.

Selleys Storm Sealant gets the job done right the first time, a fail- safe and fast performing product.



Features and Benefits:

- ✓ **Good adhesion on any surface when applied in the rain**
- ✓ **Indoor or outdoor**
- ✓ **Excellent UV and weather resistance**
- ✓ **Long lasting flexibility**
- ✓ **Paintable**
- ✓ **Available in Clear and Black**

1.  Ensure surface is clean and free from grease or loose particles.
2.  Cut cartridge tip, fit nozzle and cut to size (5mm), then insert into caulking gun.
3.  Apply with the caulking gun, pushing sealant into joint or gaps.
4.  Smooth off using a spatula dipped in turps, within 5 minutes of applying. If painting, paint with two coats of a quality water-based exterior paint.

ON THE COVER

SCULPTING steel

ISSUE 72
MAY-JUNE 2017

Contents

FEATURES

14 Going glamping

A customized caravan is the perfect mate for a Mini Cooper S.



24 Size matters

Building a new shed was a case of thinking on a grand scale.



44 Steely eye

A fitter-welder uses his technical know-how to create works of art.



56 Life in the fast lane

A former motorcycle-racing star is still championing his favourite bikes.



84 Flying high

Making and flying model planes gets the adrenaline going.



PROJECTS

32 Getting sorted
A laundry cupboard solves storage issues.

68 Doing the business

A Kiwi's design is shortlisted for the semi-finals of a space challenge.



74 Sitting pretty
Building an outdoor bench seat.

92 In the frame

Getting to grips with travelling dollies.



REGULARS

6 Editorial

8 Letters to the editor

10 News

Round and about the world of *The Shed*.



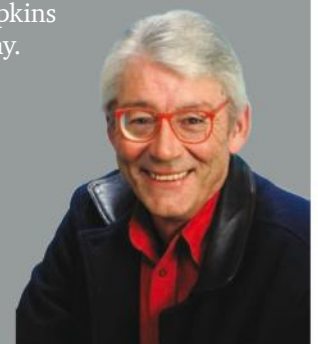
12 Forum
Readers do their stuff.



104
New tools

112 Back o' *The Shed*

Jim Hopkins has a say.





This April/May No. 72 issue of *The Shed* is the first edition since its launch in 2005 to have a publisher other than the magazine's creator, Jude Woodside.

Parkside Media is the proud new owner and publisher of *The Shed* and couldn't be happier or more excited to be involved in this great Kiwi publication. Parkside has been publishing magazines since 1990 — for 27 years — and many of you will know of, and hopefully be readers of, our magazines.

Our magazine titles and websites have always been about guy stuff like cars and technology. The reason for this is simple: this is the content that excites us and what we want to spend our days absorbed in and enjoying. It's what we do in our leisure time anyway, and we are just lucky that this is our job. That's why we are so pleased to now have *The Shed* as part of our daily routine along with *New Zealand Classic Car*, *NZV8*, *NZ Performance Car*, and *D-Photo*. We have spent 27 years showcasing and applauding clever Kiwis doing clever things in their sheds and garages and look forward to sharing hundreds more of them with you in this magazine.

Funnily enough, we started our business in a shed in Grey Lynn, Auckland, in 1989. It is pictured on this page. The story goes that it was built as a coffin factory. I have always surmised that this must have been

for the Spanish 'flu epidemic of 1918 but I'm only guessing. That's the only reason I can think for there being such a demand for coffins in an Auckland suburb. Might not be of course, but it works for me. Many a chilly night was spent in that shed creating *New Zealand Classic Car* on a Macintosh computer that was cutting edge in its day. There were holes in the floor below and the odd leak when it rained. It's probably a \$3M luxury home now.

So our plans for *The Shed* are 'if it ain't broke don't fix it' and you will be pleased to learn that ex-publisher Jude is staying on to write for us and be technical editor, and we will be still be commissioning stories from all your favourite writers on the editorial team. No changes there.

Where we can, we will improve the magazine and hopefully put in more pages, even more useful advice, and you will note that we are moving to a numbering of issues as well as titling by date.

For our motoring titles, we have hugely popular Facebook pages and one of the leading motoring websites in the country (themotorhood.com) so we hope to provide you with even more online entertainment than you are currently getting. We are building a new *The Shed* website so keep an eye out for that with even more video and editorial content.

For subscribers we will have the chance to win more prizes and receive gifts, so you not only save more than \$30 when you subscribe but also get free stuff too. See our subscription offer this month on page 22.

Finally, talk to us. There are many ways you can and we enjoy all feedback, bouquets, and brickbats — we are big boys, we can take it. Tell us what you want and what you don't want. We may own the magazine but really it belongs to you, our readers.

Enjoy.

Greg Vincent
Publisher

www.theshedmag.co.nz | Find us on Facebook  | Subscribe  **MAGSTORE.NZ**

DISCLAIMER

No responsibility is accepted by Parkside Media for the accuracy of the instructions or information in *The Shed* magazine. The information or instructions are provided as a general guideline only. No warranty expressed or implied is given regarding the results or effects of applying the information or instructions and any person relying upon them does so entirely at their own risk. The articles are provided in good faith and based, where appropriate, on the best technical knowledge available at the time. Guards and safety protections are sometimes shown removed for clarity of illustration when a photograph is taken. Using tools or products improperly is dangerous so always follow the manufacturer's safety instructions.

THE WHERE DREAMS ARE MADE REAL
Shed

EDITOR

Sarah Beresford, editor@theshedmag.co.nz

EDITORIAL TEAM

Jude Woodside, Jaden Martin, Connal Grace

PROOFREADER

Odelia Schaare

SENIOR DESIGNER

Mark Tate

STAFF PHOTOGRAPHER

Adam Croy

CLIENT SERVICES MANAGER

Rebecca Frogley

ADVERTISING COORDINATOR

Tom Offenberger

CONTRIBUTORS

Jon Addison, Sue Allison, Mark Beckett, Ray Cleaver, Jim Hopkins, Rod Kaine, Hugh McCarroll

IMAGES

Mark Beckett, Adam Croy, Hugh McCarroll, Juliet Nicholas, Geoff Osborne, Rob Tucker

SUBSCRIBE

ONLINE: Magstore.nz

PHONE: 0800 PARKSIDE (727 574)

MAIL: Freepost Parkside Media Subs

PO Box 46,020, Herne Bay, Auckland 1147

EMAIL: subs@parkside.co.nz

CONTACT US

parkside media

magazines television internet events

PHONE: 09 302 3172

MAIL: PO Box 46,020, Herne Bay, Auckland 1147

EMAIL: info@parkside.co.nz

PUBLISHER

Greg Vincent, gvincent@parkside.co.nz

GENERAL MANAGER, BUSINESS DEVELOPMENT

Michael White, mwhite@parkside.co.nz

GENERAL MANAGER, OPERATIONS

Simon Holloway, sholloway@parkside.co.nz

PRINTING

PMP Maxum

DISTRIBUTION

Gordon & Gotch

PHONE: 09 928 4200

NOTICE TO ADVERTISERS

Parkside Media uses due care and diligence in the preparation of this magazine but is not responsible or liable for any mistakes, misprints, omissions, or typographical errors. Parkside Media prints advertisements provided to the publisher but gives no warranty and makes no representation to the truth, accuracy, or sufficiency of any description, photograph, or statement. Parkside Media accepts no liability for any loss which may be suffered by any person who relies either wholly or in part upon any description, photograph, or statement contained herein. Parkside Media reserves the right to refuse any advertisement for any reason. The views expressed in this magazine are not necessarily those of Parkside Media, the publisher, or the editor. All material published, gathered, or created for *The Shed* magazine is copyright of Parkside Media Limited. All rights reserved in all media. No part of this magazine may be reproduced in any form without the express written permission of the publisher.

YEAH, NAH!



When you finally realise you need to get into a new car.

AutoSelect has a full range of ex-lease SUVs,
Vans, and Utes no matter what the job.

Receive a FREE 2-year Autosure warranty

on every vehicle sold on or before 30th of June 2017 when you quote 'TheShed' at purchase.



Call AutoSelect NOW - 0800 227 725

WELLINGTON | AUCKLAND | CHRISTCHURCH

WWW.AUTOSELECT.CO.NZ

Rocking chair

I have recently finished making this chair from a single sheet of 18mm European birch plywood. I had no plans, as such, and pretty much made it up as I went along, although I did make a couple of templates.

The only power tools used were a jigsaw and a small rotary cutter fitted into an electric drill. And some curved planing tools I made myself.

Len Helms, via email



Awesome

Ray Cleaver in your December/January 2017 edition of *The Shed* wrote an article on Barry Read of Inglewood and his ride-on-mower conversions. Bloody awesome is really all I can say.

I have a mower I would like Barry to convert. It would be a Rescue Fire Tender for our aerodrome. What a good practical use for a mower that I have.

Nick Furmage, via email

Letter of the month

The letter of the month receives an LED155 Multi Tool packed with 13 tools that can help you master any task or job. Featuring two built-in LEDs, the multitool includes spring-loaded pliers with wire cutter, a 75mm blade, scissors, a Phillips and three Flathead tips, a bottle opener, a wire stripper, a can opener, and two CR1616 batteries. It is a must-have on your belt or in your toolbox. The winner this month is

Len Helms.



Letters should be emailed to sarah.beresford@parksidemedia.co.nz, or posted to Editor, *The Shed* magazine, PO Box 46020, Herne Bay, Auckland 1147. Letters under 200 words are preferred. Letters, including emails, must include full residential address (not for publication) with full name and phone number. The editor may edit, abridge, or decline letters without explanation.



Help, please

I am wanting to install a DRO [digital readout] as outlined in the February/March 2017 issue of *The Shed*. I wonder if Geoff Merryweather could give me more details as to how he actually purchased the system from Shenzhen Hengxingxing Precision Instrument Co. in China. I have tried on the internet and found it impossible. Many thanks.

Ian Watson, via email

My DROs came from: aliexpress.com/store/1021179?spm=2114.10010108.0.0.PzjmEH.

I recommend Wilson Huang who I was dealing with — the service is excellent.

Delivery was by DHL and took around seven days. It's best to keep your order

under \$NZ400 to avoid GST plus \$70 MAF and clearance charges.

It's important to consider what you are fitting it on before ordering. Some displays have different functions for milling and lathes, which are set in the programming. Mainly radius/diameter measurement of the cross-slide, although there are workarounds.

They have a lot of other features you are unlikely to use, such as using rotary encoders on rotary tables, or die sinking on an electronic discharge machine (EDM).

You will need to either rewire the three-pin plug on the power cord, or spend \$10 at a computer shop to get an IEC power cord (as used on almost all desktop computers).

— Geoff Merryweather, contributor

SHEDDIE

© CHRIS SLANE



WHAT SOCIETY
THINKS I DO.



WHAT THE NEIGHBOURS
THINK I DO.



WHAT MY FRIENDS
THINK I DO.



WHAT MY PARTNER
THINKS I DO.



WHAT I THINK I DO.



WHAT I ACTUALLY DO.

Inspirational

I have recently been on a holiday staying with relatives down country. They had a stack of *The Shed* magazine in the shed and they proved to be the perfect excuse to while away a few hours in the early evening with a beer in hand.

I called it project research. I was not lounging but actively evaluating what I would next embark on when I returned home.

Issues of the magazine were so full of sheddies doing inspired things that I got to thinking how jam-packed our

great little country is with diligent souls making the most of their ingenuity and practical skills.

No sign of a couch potato anywhere in the pages of *The Shed*.

I particularly appreciated Owen Bennett's love of steam machines, to the point he has engineered a steam-powered pushbike (*The Shed*, February/March). Lateral thinking on a grand scale and what a lot of fun it is to share his achievement.

Keep up the good work.

B Symes, via email



Keep safe

Firstly let me compliment you on the magazine and the variety of articles. There is a very good article in the February/March 2017 edition on the hazards of improper work on electrical equipment. However, I have a major issue with another article that is featured.

On the first page of a woodwork article a photograph shows clearly a gentleman standing next to a circular saw, without hood guard or riving knife. As a joiner

with over 50 years' experience, I can attest to the fact that this is not only illegal, but highly dangerous.

Many years ago, I was making just one cut with a saw in the same condition and was hit in the face with a small piece of timber and almost lost my eye. I still have problems with that eye today. There is also a high risk of one cutting oneself with an unguarded machine.

I feel disappointed that this was overlooked, as people who are not

trained in the trade could very well think that the photo shows what is normal and acceptable.

All saw benches have removable guards, however, it is totally illegal to remove them except for [when] changing the blade or servicing even if they are not in use.

Graham Hall, Tuakau

Thanks for the feedback. We place a lot of importance on promoting safety in the workshop. — Editor



On the job

A SPECIAL PROGRAMME GIVES STUDENTS A HEAD START

By Sarah Beresford

It doesn't look like a classroom but a corner building site is the place a group of high-school students spend 12 hours a week attending 'lessons' and they are just embarking on their big project of the year — building a house. The site has already been prepared and the foundations laid.

Onehunga High School has been offering the opportunity for students to take part in the special construction-school course for the past 12 years — long enough for some of the first students to now lend a helping hand to present participants.

"One of our students who took part in the first year of the building school now has his own construction business," says David Eastwood, who is head of the school's technology department and runs the course. "Last year he came and helped with some of the work on site and has taken on two of the students who have now been accepted for apprenticeships with him."

David says that some students who don't thrive in a standard classroom environment get great results on the course: "They have to apply to be part of the group. We only have nine students

taking part. Last year two students in the group were bright but not good in the classroom and had poor attendance records. They were chosen for the construction school and the change in their attitude and performance was dramatic."

The course runs in conjunction with the maths and English departments. "We'll explain what we're going to do theoretically on a white board and often students will find it hard to understand the concept. But when they get out and practically apply the theory the penny drops," he says.



Kushal Kumar (left) and Damien Small digging post holes



Hard at work in the classroom. Ernie Meyer is in the foreground

“We want to sow the seed for those who may be interested in moving into the trades”

“It’s the same with the English component. Writing an essay about one of Shakespeare’s plays may be a struggle, but writing about what they have been doing on site or some of the issues involved in construction will be more relevant.”

Basic skills

David, who originally worked as a cabinetmaker, says the course aims to make students familiar with basic skills and using various tools. “Often students start the course not knowing how to use a hammer properly. By the end of it they’re comfortable using a spirit level and don’t think twice about running a string line. We want to sow the seed for those who may be interested in moving into the trades,” he explains.

Students assist or work alongside qualified tradesmen who come to work on the project: “We have plumbers, electricians, people working on the roofing and scaffolding so they build up a basic knowledge of the whole

construction process. We have a licensed builder who comes on site to inspect all the work that’s done so we have the appropriate documentation needed for building-consent approval.”

The project has enjoyed a lot of community support. Ernie Meyer is a case in point. A retired builder in his early 80s, he is the project manager of the build. A member of the Onehunga / One Tree Hill Rotary Club, he became involved with the construction school four years ago. “We had rotary members who were retired builders and it seemed like a good way to help with the project,” Ernie says. “I’ve had a long connection with the school — three of my kids were students here and I was on the board of governors for a few years.”

Ernie enjoys seeing the students’ confidence grow as they progress through the process of building the 114m² three-bedroom house. Facilities include an ensuite, family bathroom, separate toilet, and laundry. The home’s walls are weatherboard, with a plywood floor, Gib lining, and a Colorsteel roof. Once it’s been moved to its permanent site the walls will be stopped and the fittings and finishings installed.

Local support

A number of sponsors help out with the project. “If you explain what we’re doing, the community is usually very forthcoming even if they can only commit for a year. We have a plumber who donates his time

helping on the project who is an ex-pupil of the school,” says David.

The school had teamed with Habitat for Humanity for the past four years, but the organization is no longer working on projects in the area because of the skyrocketing Auckland property market. This year the school is running the project and is building the house based on a design that a member of the charitable trust that administers the project found online. After a few hiccups getting building consent through the council they are off and running.

“We have had feedback from builders who have taken on our construction-school students and they say they are at least six-months ahead of other apprentices,” says David. “The opportunity to take part often makes a massive difference to the students’ future and connection with positive role models they meet during the build is an important part of that.”



Project students Lydia Hall (left) and Sophie Gavin get a taste of the trades



Club members with the wig stands they have made

A WOODWORKING GROUP ENJOYS DOING A GOOD TURN *By Sarah Beresford*

There doesn't seem to be an obvious symbiosis between a woodworkers guild and wigs but it just happens that they make perfect partners. Members of the Geyserland Guild of Woodworkers use their skills to make wig stands, which are then presented to the local branch of the Cancer Society NZ.

The 30-odd members of the guild are always working on individual projects in the local Scouts hall, which they lease for their workshop. But every year members commit to one big civil project.

"We have always worked on a major community project," says the guild's secretary, Jon Parker. "We have made things like double decker bus bunks for St Chads Community Centre, but the wig stands are something we have been making for the past five or six years.

"It came about through a personal contact with a member of our guild and we realized that this was a way we could use our members' skills to help out. Some years we make more than others but we generally sadly need to make about 14 wig stands a year."

The wig stands are given to the Rotorua Cancer Society and distributed to local women who have suffered hair loss as a result of chemotherapy treatment.

"The society has a specialist wig fitter who visits the women and the stands are part of the package," says Jon.

"We bounce ideas off each other about using different chisels, sanding, engraving, and using various lathe speeds"

Different techniques

Guild members enjoy the challenge of making the stands. "It's a great exercise for our local woodturners," says guild member John Lee. "We often work collaboratively, practising and experimenting with different techniques. We bounce ideas off each other about using different chisels, sanding, engraving, and using various lathe speeds to achieve the results we want. And we find this small token is well received by the ladies at a particularly hard time."

The members use wood that they have fossicked and collected to make the stands, and particularly like working with native hardwoods such as swamp kauri.

Many of the guild's members are skilled tradespeople who have worked as woodturners or cabinetmakers. They make everything from bowls, pens, and carved items to clocks, furniture, marquetry, and toys.

"A lot of our members have done apprenticeships and have had long careers. Many members have now retired. We've even got a few women members," says Jon. "We've got a fully equipped workshop with all the tools and lathes and we're very fortunate to have a permanent facility in the hall. There's no need to store things or set them up."

The workshop has 11 lathes: a relatively new Nova DVR (Digital Variable Reluctance), three Morgan mini lathes, one giant old copy lathe, six other lathes, and various lathe parts. There's also myriad bandsaws, table saws, thicknessers, planners, grinders, and sanders.

"The guild meets every second Thursday and the workshop is open on Saturday mornings," says Jon. "We do get a lot of work done, but it's very much a social club as well."



Putting the finishing touches on one of the spindles



Designed and manufactured in New Zealand, Ethos Woodfires represent the **evolution** of the wood fire as a **clean and efficient** heating solution.

visit **ethosfires.co.nz** to learn more

ETHIOS
WOODFIRES

GOING GLAMPING



A CUSTOMIZED CARAVAN IS THE PERFECT MATE FOR A MINI COOPER S

By Ray Cleaver

Photographs: Rob Tucker



What do you do if you want a caravan but drive a Mini? You make one to fit. That's just what Michael Wolfe of New Plymouth did — turning out a real dinky little teardrop-shaped caravan that matches his 2004 Cooper S and has all the mod cons for a decent holiday.

Michael saw pictures of little campers on the net and decided that that was what he wanted — a cross between a caravan and a tent.

"I got some ideas from little caravans online and decided to go a bit more

high-tech," he says.

He built it to have the same lines, wheels, and colour as his car and it looks just the part: "I never really planned it in detail. I sketched it out originally and a lot of the construction I worked out as I went along."

The chassis was welded together with Michael's trusty old MIG welder using 25x50mm galvanized box-section steel, with a floorpan of 2.4x1.2m.

The underneath is sealed with 3M rubberized undercoating. For the floor he used 19mm first-grade construction ply.



The chassis mounted on Mini wheels



The floorpan laid



All framed up ...

The caravan frame is 19x45mm dressed tanalized pine, with 19mm polystyrene glued into it for insulation. The inside lining is a special ply used in caravan construction, with a laminated coating on one side.

In a clever move to keep the weight down, the exterior cladding is the aluminium and plastic composite you find in modern signage, which is very light. It is called 'Signboard' and has a plastic centre with 0.3mm aluminium either side, baked with enamel paint.

The interior and joinery are American oak and all has been secured with stainless-steel screws. He imported the two side doors, with their piano hinges, from America.



... and ready for exterior cladding

Slide-out electric stove



The stove slides out on ball-bearing sliders used in kitchen drawers, which he modified for a longer extension

The wheel track is identical to that of the car and it “follows beautifully”. It does, too — sitting in the car, you aren’t even aware you are towing.

His Mini is a 1600cc supercharged model so he has no shortage of towing power.

Michael picked up the wheels from the wreckers, from a Mini of course, to match the car, and he put in Duratorque suspension.

Empty out the awning and the furniture and there’s a comfortable double bed that can also be converted into a comfortable seating area.

Bespoke kitchen

The rear door of the little caravan opens up to reveal a beautifully made little kitchen. At the push of a button a two-hob gas stove slides out. Very classy.



The nifty kitchen area

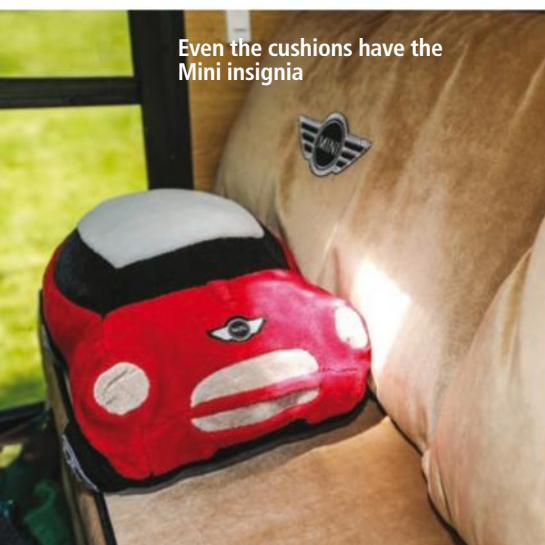


Set up for sitting ...



... and sleeping. Plenty of room. Michael Wolfe puts his feet up

“ He took apart a laptop, removed the screen, and mounted it above the bed in the caravan ”



Even the cushions have the Mini insignia

Michael used a 12V Volkswagen rear-window wiper motor to power the sliding stove system. He made up the mechanism with relays and microswitches. The stove slides out on ball-bearing sliders used in kitchen drawers, which he modified for a longer extension.

There is a built-in 12V/240V, 15-litre fridge. A hidden 4kg LPG bottle provides the gas needed. A workbench, sink, and cupboards are well planned and there's even lighting for night cooking.

The oak joinery is first class and the kitchen has 1960s Duraware plates and cups ready for use. Everything is secured with little brackets.

The project took Michael from February to Christmas last year, working in his spare time.

He is a mechanical design engineer who works as an auto restorer looking after a collection of classic cars owned by Bryce Barnett (see *The Shed* Issue No. 71, February/March 2017), so he had the skills to create almost every stage of the project.

Electronic technology

Electronically speaking, the little caravan has technology that's right up there. On the roof is mounted a curved 100W solar panel. This charges up a 12V deep-cycle house battery.



Extra storage in the front



The in-built screen, speakers and DVD player

The 100W solar panel follows the shape of the roof

There is a 240V inverter and the system handles 1200W. This powers a computer, television, lights, a DVD player, fridge, and radio. Michael has internet access and speakers are set into the wall.

His son Nickolai (17) is very computer savvy. He took apart a laptop, removed the screen, and mounted it above the

bed in the caravan. He removed the DVD player and mounted that below the monitor and made the keyboard wireless. There is also inside and outside lighting.

Self-contained

It's freedom camping all the way for Michael. The caravan





The finished caravan ...



... on an adventure

is even certified as self-contained. It carries 75 litres of drinking water and has a tank for a further 75 litres of grey waste water.

There is a chemical toilet and a shower with electric pump, and you stand in a tray in the awning for washing. There is a separate canvas cubicle for these ablutions.

A customized awning attaches to the side of the caravan and is 2x4m and 2m high.

The awning has room for two camp beds, a table, and four chairs. Michael can set up the awning in half an hour and everything stows away in the caravan for travel. The awning and the upholstery were made by John Reumers of Reumers Trim and Upholstery, in Waitara.

Michael tells us that the most difficult part of the job was the kitchen: "That was a very fiddly job — space was at a premium."



Dealing to the tow bar.



Finishing touches

For a finish, Michael painted the caravan with a two-pack paint, BMW Chilli Red, to match his car. On the back of the Mini is 'Cooper S' and on the back of the caravan, in the same lettering, is 'Camper S'.

It has a jockey wheel for parking, and Michael says putting a tow bar on the Mini was quite easy: "There was a nicely situated hole where the reverse light was."

The caravan cost Michael \$15K in materials and parts and he estimates that he spent 500 hours of labour on it.

"All up it would have cost me about \$25K but it was well worth it. I love it," he says.

Michael and a mate took the caravan on its maiden voyage last Christmas to the Coromandel.

"It all worked well; no problems," says Michael, who is looking forward to many holidays to come.



A Compact Tool when working in tight spaces

wiha 
Tools that work for you

New Product **Stubby Electric**



- The Ideal Screwdriver when in a restricted space.
- Compact handle – maximum power.
- Each tool individually tested at 10,000 V AC and approved for 1,000 V AC.



Compatible with the Wiha SlimBit range.



Order No. 41230

Available at leading electrical
wholesalers and industrial outlets

SUBSCRIBE OR RENEW

YOUR SUBSCRIPTION TO *THE SHED*
AND BE IN TO WIN

AN UP BOX 3D PRINTER



**WORTH
\$3700**

UP BOX+

Designed specifically for educators and professionals looking for fast, hassle-free 3D printing with exceptional quality. Has a HEPA filtration system to remove air-borne contaminants, making it a healthier option than open-chassis printers. A very quiet 3D printer that can easily print in the background. Everything about this 3D printer is geared towards creating high-standard 3D models in a professional manner.

Offer ends Sunday, June 11, 2017. Terms and conditions: 1. New Zealand billing addresses only. 2. Offer available on subscriptions purchased through Parkside Media only. 3. Prize sent to subscription recipient unless specified otherwise. 4. Prize draws with print subscriptions only. 5. Up Box 3D Printer worth \$3708 including GST. 6. See magstore.nz for full terms and conditions.

SUBSCRIBE TODAY —



MAGSTORE.NZ

THE WHERE DREAMS ARE MADE REAL Shed



YOU PAY
\$69
SAVE \$21

YOU PAY
\$119
SAVE \$61

OR 0800 727 574

NOW
DIGITAL
SUBSCRIPTIONS
DIGITAL & PRINT COMBO
SUBSCRIPTIONS

Online: magstore.nz
Phone: 0800 727 574
Fax: 09 360 1470
Email: subs@parkside.co.nz
Post: Parkside Media, Freepost 3721, PO Box 46,020, Herne Bay, Auckland 1147

SIZE *matters*

BUILDING A NEW SHED WAS
A CASE OF THINKING ON A
GRAND SCALE

By Rod Kaine

Photographs: Jude Woodside



Rod at work in his shed — the boat trailer can go in one side and out the other

Back in the carefree/careless days we took a drive up to Hokianga Harbour, mainly for a fish and chip meal at the legendary Omapere pub, and promptly fell in love with the place.

It's like New Zealand 50 years ago: clean, uncluttered with houses and people, and just plain beautiful on any given day. The harbour simply sparkles on a sunny day and the dunes on the north head are nothing short of spectacular. The views coming over the ridge from Waimamaku and Waipoua Forest are breath-taking. We still stop and try to take it all in.

Everything moves at a leisurely pace up at the 'Hoki'. It is still a hidden gem, but won't be for long I feel. We have a few celebs up there now and there are more and more serious homes going up, but it still has that laid-back feel to it. Opo the dolphin is the only thing that has happened to the area and that was 60 years ago. The shop was replaced when the old one burnt down — the new one is identical to the old one. We have a new Internet centre and cafe and the ice creams / fish and chips are still rock solid and fabulously delicious after all these years. The people are really friendly.

We decided to have a look for a suitable section and very quickly settled on a grassy block right on the water just out of Opononi.

It wasn't long before we built a shed down by the water, mainly for the obligatory boat, dinghies, tractor, and various other cheap but fun toys. It also served as a place to holiday and camp in; rough but comfy with generated power, kero lights, long drop, etc.



The location ... it's easy to fall in love with the Hoki

As time went by the boats/machinery got bigger and more numerous. It quickly became evident that just to open the back door on arrival to get the kids to the long drop took about an hour of work, starting old tractors and moving boats. By this time the need for the long drop had long since passed and we were more into change-of-clothes mode.

Everything we put into the place had to come from the discretionary spend, like most holiday properties, so everything was cast-offs from home or second-hand; nothing ritzy.

Then came the day I bought a new boat — nothing big or flash, but a seriously suitable fishing runabout, and to me it was the Royal Yacht *Britannia*. I called it *Tintonic*, very much after the famous film of the day and I hoped I wouldn't steer it to a similar fate, but the play on words appealed.

Priorities

Not long after that, we decided that the boat and all the old gear needed its own shed and if I was going to build a shed



Getting started

*All the old gear
needed its own shed
and if I was going
to build a shed then
it may as well be
something of decent
proportions*

then it may as well be something of decent proportions so I wouldn't be tempted to add to it. I decided on a size and floor plan then added a metre all round. There is something called 'economies of scale', which is really self-explanatory and it was a good excuse to get a bigger shed for

not a lot more money. I was ecstatic when the architect explained the principle to my dear but unconvinced wife. There's an 'economy of ganging-up in numbers' too. Well, it worked for me at the time but I doubt I would get away with that line a second time.

At that stage of our lives we were fully intent on looking at moving up to the Hokianga to live full time and building a bed-and-breakfast / farm-stay accommodation on the property, so any shed had to complement the main house design rather than clash with it. Since then we have gone off humans and cleaning toilets so the farm-stay residence was never built.



The finished shed dwarfs the bach on the foreshore



The concrete floor poured and the framing taking shape



The truss roof with no ceilings and dormer windows

The shed had to have extra stud height to take the boat with the rods in their holders and the canopy up, plus it had to have big doors front and back so that the tractor and boat could be driven in one end, parked up, and then driven straight out the other. It's called priorities and reversing was a no-no.

I wanted a truss roof with no ceilings as a feature to look at as well as provide depth, and dormer windows to light it all up. Being so close to the saltwater, the right building materials had to be used to prevent corrosion and to withstand the famous Hokianga sou'westerlies that blast in straight off the harbour in spectacular fashion like an angry mobile salt mine.

Last but not least it needed a workshop annex integrated into the design so that I could maintain everything when it needed repair and maintenance. Boats, tractors, and the like need a lot, especially old ones.

Effective design

As luck would have it, there was an excellent architect up at Hokianga with town-planning experience and he was quite happy to indulge my eccentricities. He quickly came up with a design that was simple, effective, and workable. It was also rather attractive and fitted in with the main residence plans, which he also produced at the same time.

What we ended up with was a shed

that would be roughly 18x10m with a 3m stud and have 12mm shadow-clad ply on the walls and asphalt shingles overlaying 15mm ply on the roof. All fixtures would be stainless steel and they'd need to be. The windows would all be aluminium framed and two big 5.4m, extra-strength sectional doors would finish it off.

It was important to us to engage as much local labour and materials as possible and, to a very large extent, we managed to do that. However, some of the local prices at the time couldn't match the Auckland prices and we had to import the roof, walls, and trusses from home.

Resource consent and a building permit were obtained with remarkably little fuss



Getting the roof shingles sorted ...



... and the job nearly finished



The finished shed with the tractor all ready to go

from the Far North District Council — the architect knew all the rules and it all went commendably well. I would hate to have to repeat this process in Auckland. Enough said.

It was a sloping site so quite a lot of material was shifted to take the large floor and its buffer areas. We engaged a brilliant local contractor for this and, once finished, my bro very kindly offered to come up and take on the laying of the floor and the retaining walls with my help.

It was a stinking hot summer when we did all this and I will never forget it. Builder's cracks looked more like hot cross buns but we got all the foundations dug, the steel in place, and the floor laid out.

*I think he might have
straightened out a few
of those switchback
corners in the
Waipoua Forest*

Big structure

Local contractors did the block work and poured the concrete floor after it was all inspected by the council. Once it was all laid it became very apparent that it was a pretty big structure and I did wonder if my imagination had, once more, overshot the mark a tad.

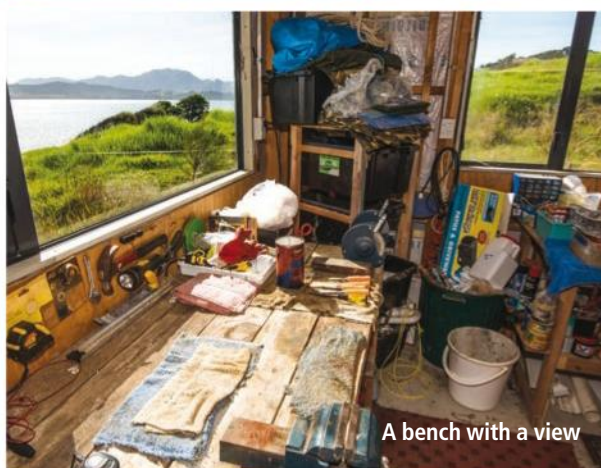
We engaged a local builder with a great reputation for competence and reliability and then the truck turned up from Auckland with all the building materials.

I have never seen anything like it in my life and I think they are still talking about it down at Opononi. A huge truck and trailer delivered right on time and in one massive load 10-metre-long trusses, the ply roof, asphalt shingles, all the framing, windows, cladding, building paper, and fittings. He did the return trip in a day. I was exhausted just thinking about it and I think he might have straightened out a few of those switchback corners in the Waipoua Forest, just quietly.

The builder set to with the sort of



At work on the drop saw



A bench with a view



Work space



enthusiasm that only other people have and after a typically laconic comment — “It’s a big shed, Rod” — he got stuck in and soon had the framing up. I arrived to help with the plywood roof base and laying out the building paper ready for the roof layers.

Roof challenge

The shingle roof was something I was going to do myself but it was huge and I could see myself stapling them on over a period of weeks and then stapling them back on again when they all blew off. There was no future in this so I hired a team of experienced young bucks to get them on in one day. I awoke at 5am to the sound of compressors and agile feet dancing over the roof, leaping from ridge to ridge. I was very pleased that they hadn’t seen me the day before on my hands and knees like a terrified pixie with a stapler in one hand and rosary beads in the other, even though I am absolutely not religious.

There is always something to repair, build, or modify at a holiday property and the workshop annex is a very pleasant sort of place in which to do all this. Just as well.

None of my tools are of commercial quality, just home-handyman stuff, then it’s affordable and you can have one of everything, or two when you can get away with it.

We like buying tools, don’t we?

In addition to a good range of woodworking and mechanic’s hand tools, I have things like a drop saw, bandsaw, table saw, chainsaw, skill saw, jigsaw, etc. There is a small arc welder plus various drills, multitools, a table drill, grinders, heat guns, planers, and that sort of thing. Everything gets used.

I have a couple of big, solid work benches with vices and overhead lights. It’s all very handy for all sorts of repairs and builds, everything from fixing broken furniture and making wooden beach trailers to welding up grilles for the incinerator and stripping down outboards.

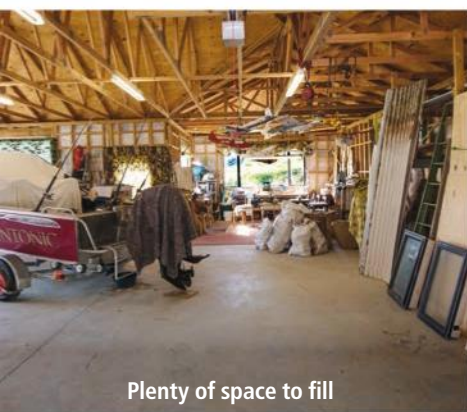
I also have a stock of various building materials in racks for tarding up the buildings as we can afford the time and resources to do it. It’s a long way to go for material supplies and if you have to go to town specifically for it, the job won’t get done. That could be a good tip for some guys. One of the most-used tools is a vac sealer, very cheap at about \$70.

Any fresh fish we (I say ‘we’ for the benefit of my mates but it’s a lie) catch and want to take home, gets filleted and vac sealed in meal-size portions.

In the freezer it lasts for many months and the texture/taste is like fresh fish when thawed.

Excess bait from a trip gets salted down over 24 hours, placed in a vac bag with half a cup of fish oil and then vac sealed. It doesn’t have to be refrigerated and can last for months like that, ready for use in the boat.

We find it makes better bait than fresh fish. It’s also excellent burley, leaving a very oily scent trail.



Plenty of space to fill



No need to reverse the boat

Flying high: These planes all have a smile on their faces as I am not flying them while they hang in the shed. The two electric Catalinas did not enjoy a sea-landing upside down and the Piper Cub had a landing in the only tree on the beach. The deserted beach makes a great landing strip; however, the harbour is not very tolerant of my flying abilities.

By 2pm it was done, the guys paid and on their way home, and the new roof looked magnificent. It had done a job on my wallet but it did look the part.

The builder sorted out the final bits and pieces and left with a smile on his face after the inspector had given the new shed his approval.

The builder had done a magnificent job, real old-fashioned craftsmanship, and you can still just see the light pencil lines he drew on the ply before carefully placing the stainless nails. Likewise the other contractors were great. I learned many years ago to pay on or before time if you really want to get a healthy relationship going with your subbies. Nobody had to wait: if it was a one-day job, they got paid that same day. It made no difference to me as it had to be paid anyway, but it did make a difference to them. I was a contractor myself for many years and I soon learned which clients to avoid.

This project cost about \$100K eight years ago, which I considered very reasonable at the time considering the size of it and the materials used.

*Nothing, and I mean
(almost) nothing,
beats standing in
your shed and looking
over the wide empty
spaces*

It's a quality unit and should stand the test of time. It will give others pleasure way beyond me.

The result

For those of you who have not had the pleasure of building your own shed, I would recommend this, if for no other reason than brain therapy — nothing, and I mean (almost) nothing, beats standing in your shed and looking over the wide empty spaces and up into the trusses. You can fill it with shelves and benches and boats and gear and never use any of it and for some strange reason

it makes you feel useful. You can't buy that. When you feel that you are getting hounded for not pulling your weight, you just go up to your shed. How good is that?

This shed is less than 100m from the water and that is about two minutes at top speed to the best fishing spots. We have security lights and alarms, of course, plus some wonderful ever-vigilant neighbours and we spend a sizeable amount of time up there ourselves. So far so good, but I guess part of the trick is to not have anything in a shed or bach of any real value, then you don't fret, and ours is no exception.

We give the shed a coat of linseed oil, turps, and kero once every couple of years and that takes about three hours and 40 litres with a five-litre garden sprayer. Easy as. Other than that, it is very low maintenance.

A decent shed is a thing of beauty and a joy forever. I would have married it but that sort of thing is against the law and, of course, familiarity breeds contempt and I didn't want that with my shed. 🏠

LUCAS MILL
PORTABLE SAWMILLS



CONTACT US
FOR YOUR
FREE
DVD PACK!

WORLD LEADING PORTABLE SAWMILL! OVER 16,500 SOLD WORLDWIDE!

Cost Effective | Sustainable | Versatile | Extremely Portable

Mill your own boards and slabs easily with a Lucas Portable Sawmill!

W: www.lucasmill.com

Australia Freecall: 0800 445 396 | E: admin@lucasmill.com.au

OMEGA METAL SUPPLIES

WWW.STEELCUTS.CO.NZ

**STEEL PRE-CUT OR CUT TO SIZE.
PRECUT, CUSTOM CUT OR OFFCUTS.
NO MINIMUM QUANTITY.**



• FLATS • ANGLES • ROUNDS • CHANNELS • BEAMS • PLATE
• BOX SECTION • SQUARE SECTION • BLACK & GALV PIPE

21 HILL ST, ONEHUNGA, AUCKLAND

CALL CRAIG 0274 901 543

EMAIL CENTRALIRON@XTRA.CO.NZ

SEE US ON TRADEME COMMUNITY "IRONMAIDEN4"

OPEN SAT 8-2PM

We've got you covered

No matter what you're planning to paint at your place, Resene has all the paint, primers, sealers, stains and coatings, plus all the colours and professional advice you need to get a quality finish on your projects.

Choose from an extensive range of Environmental Choice approved paints – easy to apply and easy to wash up in water.

free!

**Get started with
a free testpot!**



To help get you started bring this ad into any Resene owned ColorShop and we'll give you a Resene 60ml testpot FREE!

Offer valid until 31 July 2017. Limit one free testpot per voucher/customer, only while stocks last.

Resene

the paint the professionals use

www.resene.co.nz 0800 RESENE (737 363)



The finished cabinet

Getting sorted

A LAUNDRY CUPBOARD SOLVES STORAGE ISSUES

By Jude Woodside

Photographs: Adam Croy

I have recently refitted the laundry in my home and I left enough space for a cupboard for storing things like an ironing board and all the various mops and brushes that seem to accumulate there. I thought I would simply purchase an off-the-shelf kitset one.

But when I came to do so I found that what was available was either too narrow or too wide and none of them was sufficiently deep. So I reluctantly decided to build my own. I say 'reluctantly' because it is not possible to build one for the same price that you can buy one. However, building one means you get what you need.

I wanted a fairly deep cupboard at 600mm, and 500mm wide. I settled on melamine-veneered particleboard that I was lucky enough to find in 2400x600x16mm boards. It saved having to manipulate full sheets. Melamine-veneered sheets at this thickness are quite heavy, and without the benefit of a dimension saw, I find manipulating sheets in my small workshop is a nightmare.

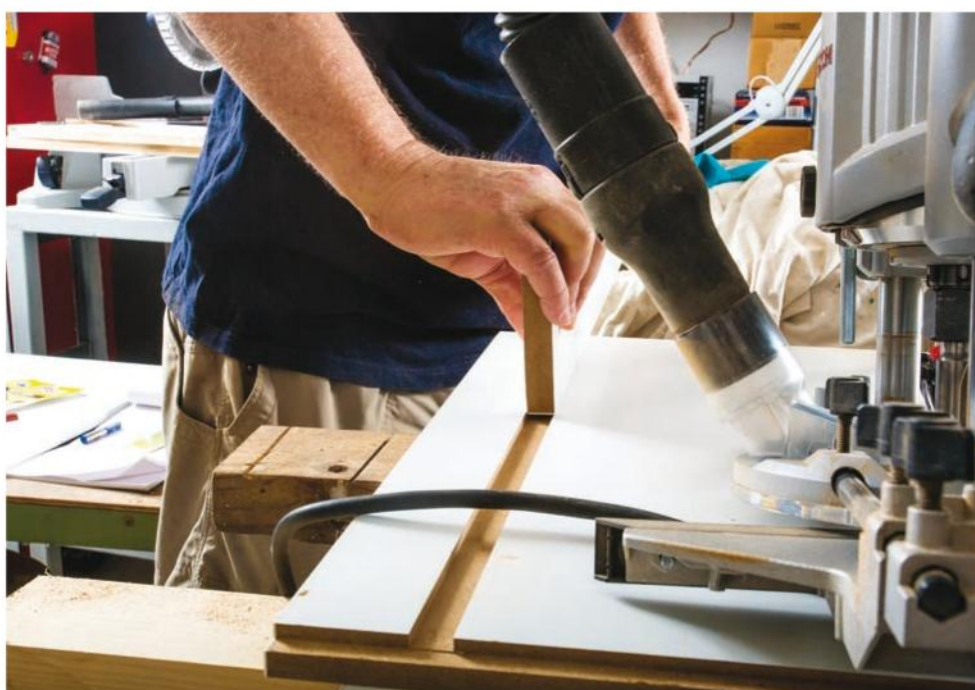
I do have a plunge saw that runs on a rail of course but, even so, breaking down full sheets in my constrained



Getting started routing the edge of the backboard



Routing the other side — the back is routed to a depth of 6mm and a width of 10mm



“The back actually ended up protruding 1mm at the rear — but no one will see it there”

Discovering that the panel was 17mm not 16mm after cutting the base rebate. It pays to check



Enlarging the groove by 1mm ...

space is awkward at best. The added benefit of smaller sheets was that I would need to do less edge-banding in the finished product.

I designed the cabinet to be 1800mm high given this is a fairly standard height for cabinets. Anything higher and it is impossible to reach the top. The first job was to cut the extra 600mm off the 2400mm sheets. The offcuts would be useful for the top and bottom and any fixed or floating shelves.

Next I cut the back to 488mm wide to represent the actual width of the cabinet (500 mm), less the depth of the rebate on each side (6mm). I also cut another piece to 500mm for the door. The door is only 1750mm high to allow for the 50mm height of the bottom shelf from the floor.

Checking size

I decided to rebate the back and sides in such a way that they would present the greatest possible area of contact for gluing and in fact lock themselves in place at right angles. This involved routing the edges of the back 10mm wide by 6mm deep and the side edges 10mm wide by 10mm deep.

I had purchased a 16mm straight router to make cutting the grooves for the shelves and the top and bottom pieces easier. However, I hadn't actually measured the thickness of the boards and it turned out to be more like 17mm thick, which caused some problems later. In general sheet goods are close to their nominated size but it pays to check before you plunge in.

Having cut all the pieces to length, I set up the router to cut the edges of the back piece. This piece has the most routing given that every edge is routed. I cut the edges to 10x6mm as mentioned and the end pieces I routed to 10mm deep and 16mm wide. I was able to recut the ends to 17mm once I realized that the shelves wouldn't fit. However, I forgot to adjust the edges, with the result that the back actually ended up protruding 1mm at the rear — but no one will see it there.

I cut the top and bottom rebates for the back and sides and I cut another rebate for a fixed shelf 250mm from the bottom of the top rebate. This rebate was cut using a clamped stop to prevent the router cutting too far and a guide clamped to the panel. I squared up the



... makes for a better fit

ends of the rebates in both sides and cut a shelf to fit. The shelf has a further rebate on the front end at each side to allow it to fit flush with the sides and cover the end of the rebate.

I relieved the bottom of the two sides to allow for feet — this ensured that the cabinet sits square, without rocking. To cut this, I set up a jig using my saw guide-rail. To make sure it didn't slip, I used two clamps to hold it to the board. I made the cut a bit deeper than I had originally

intended, mostly because I managed to botch the first cut when the clamp slipped so I had to cut both to match.

The back reaches all the way to the base, and in retrospect it would have been better to make it end at the bottom shelf at 1750mm. (Note to self: always print a plan.) It doesn't actually matter too much since the wooden feet have rubber strips glued to them to allow for the possibility of minor flooding; it is a laundry after all. Particleboard is very

The routed edge of the side and the top. Note that the top is rebated to 6mm deep and 17mm wide. I wanted to have plenty of meat to screw through



Routing the edge of the sides. Note this rebate is 10x10mm





Cutting out the rebate for the fixed shelf; note the stop clamped to the piece



Cutting the relief at the base of the side



The base cut-out



Marking out the hinges

I had previously purchased a Euro hinge jig but in practice it wasn't that much use

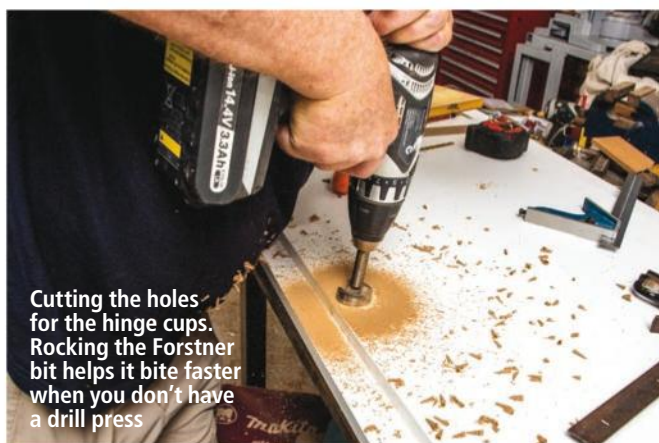
hydrophilic so it pays to seal off the ends if possible.

Full overlay

Hinges needed to be added to the door. There is a bewildering array of Euro hinges available so it pays to be clear about what you are looking for. In this case I wanted a hinge that would fit as a full overlay; that is, the door will cover the cabinet edge. You can also get half overlays, where the edge of the door covers only half the cabinet edge, or inset doors, where the door fits inside the cabinet edge. There are also variations that include various opening angles and soft-close varieties.

All these hinges have one thing in common: they require a 35mm diameter hole 11mm deep to fit the 'cup' that holds the hinge mechanism.

I had previously purchased a Euro hinge jig but in practice it wasn't that much use and I had to go online to check the manufacturer's instructions. For full overlay hinges in 17mm panels it recommended making a hole for the cup 4mm from the edge of the board, whereas the jig insisted it should be 11mm from the edge. Only one of them could be right and I opted for the manufacturer's instructions. Adding 17mm to the 4mm gave me the centre for the 35mm hole.



Cutting the holes for the hinge cups. Rocking the Forstner bit helps it bite faster when you don't have a drill press



Reaching the right depth (12.5mm)



Fitting the hinge



Setting out the holes for the hinge mount

Door weight

I had originally planned on using only two hinges but the weight of the door made me add another for safety. This didn't make for the best distribution; however, I would have preferred to have the outer hinges closer to the ends. The manufacturer suggested that an 1800mm door should have four hinges but this very much depends on the weight of the door. You would use more hinges if the door was thicker or carried a mirror.

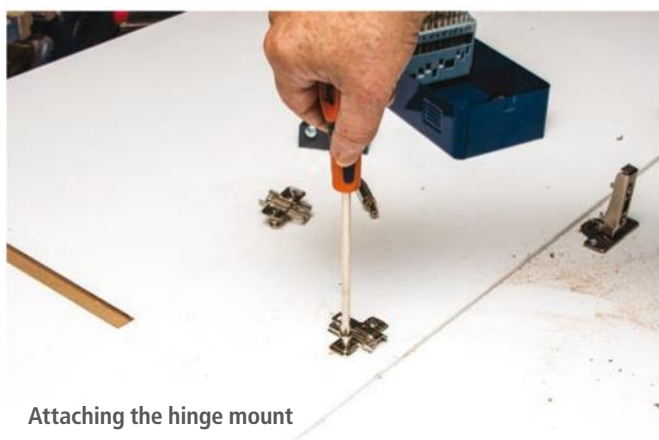
The hole for the cup was cut with a Forstner bit. A Forstner bit cuts a flat-bottomed hole. It should be used on a drill press but manipulating this size of panel on a drill press is a bit of an ask in my

workshop. I have used Forstner bits with a cordless drill many times. The trick is to move the bit around leaning on one side and then the other, so the internal blades can plane away the interior. It is usually deep enough when the top of the bit is level with the panel surface. Be careful that the tip of the bit doesn't penetrate the other side.

Once the cup was fitted, it was easy enough to use a Vix-Bit to find the holes for the fastening screws. A Vix-Bit is designed to centre-screw holes in predrilled fittings. It contains a drill, usually 3mm or 3.5mm, within a casing. The end of the casing is shaped to fit the countersunk hole and when the drill is



Cutting a rebate in the fixed shelf disguises the end of the rebate and makes the shelf look seamless



Attaching the hinge mount



Squaring the corner of the fixed shelf rebate

The holes had to be drilled very close to the edge to avoid missing the side panel altogether

pushed the casing retracts and the drill bores in the middle of the countersunk hole. It makes fitting hinges very easy.

I used the door with its hinges installed to mark where the hinge attached to the cabinet. The jig did come in handy here as the Euro system has standard spacing of holes for most components, which makes installation easier. I was then able to test that the door would actually open as planned.

Glue-ups

With all the sides cut and the shelves cut to size it was time to glue up. Glue-ups are my least favourite part of building.

This is the time you find all the things you forgot, like the fact that the back protrudes, and it's also the time when what can go wrong will. I like to keep a few clamps on hand to encourage things into place.

In this case things went relatively well. I had planned to glue and screw the back to the side, so that most of the fixing would be in the back and out of sight. However, the placement of the screws was compromised by the 6mm overlap, meaning the holes had to be drilled very close to the edge to avoid missing the side panel altogether. Screwing through the side and filling the holes later would



Ironing on the edge tape for the front face of the base. The top required the same treatment



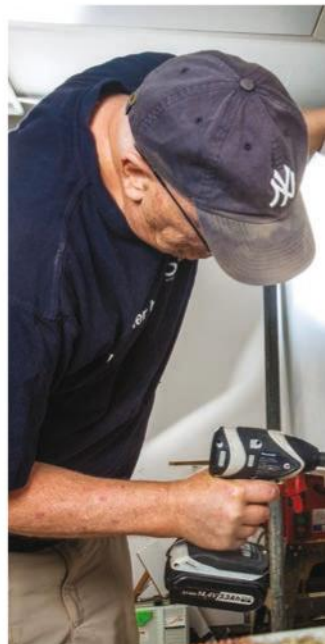
Trimming the edge tape. I usually start with a small plane ...



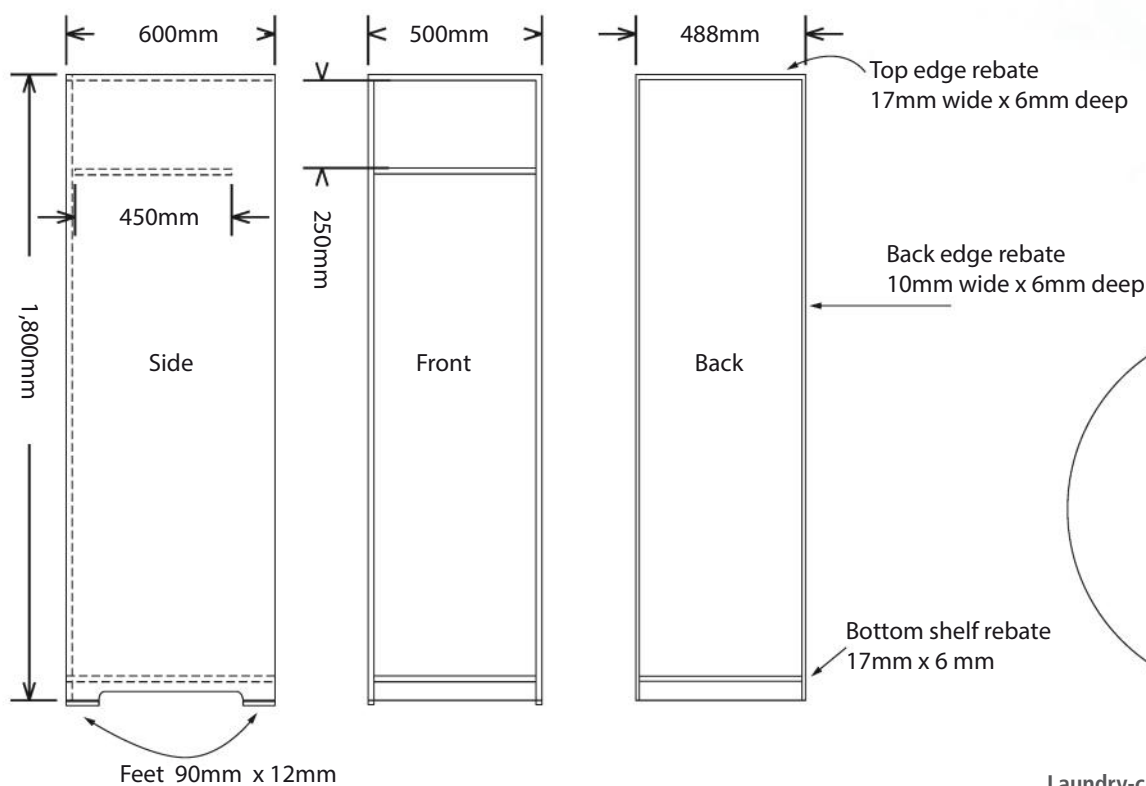
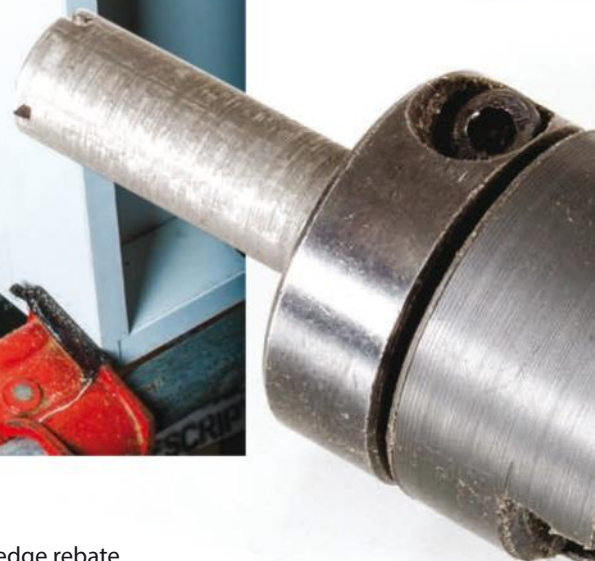
... and finish with a sharp chisel



Starting the assembly. Note the clamps to help pull it all together



Drilling through the side to secure the base



Laundry-cupboard dimensions

Drilling through the back to secure the sides



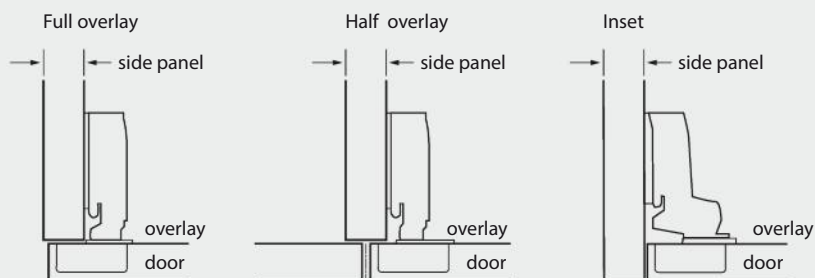
An adjustable countersink drill with a non-marring bearing for laminate



have avoided that problem. You can purchase end caps for the screws that match the melamine colour, although I use square drive or Robinson bits and I'm not sure if the cap manufacturers have a cap that fits square drive. Most of them are made for Phillips head.

I use a very clever countersink bit devised by Linbide that features a guide that runs on a bearing and so prevents damage to the melamine surface and also prevents you from countersinking the holes too deeply, which is easy to do if you drill first and countersink later. The drill depth can be adjusted for different-sized screws. In this case I used 32mm stainless screws.

Selecting hinges

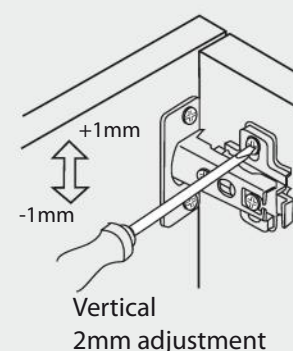
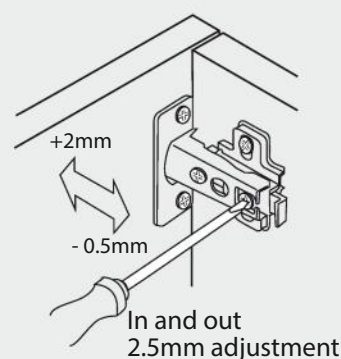
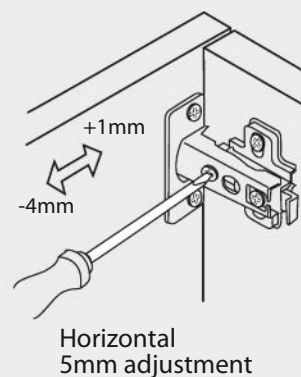


Euro hinges certainly make fitting doors easier. They come in a bewildering array of styles, opening angles, and options, so it pays to know what you are looking for before you start. Decide what angle you want the door to open to — you can get hinges for nearly every angle, soft close or normal, full overlay, half overlay or inset. The half-overlay style is particularly suited to cabinets that have several doors. The inset style is closer to the traditional cabinet-door style, where the door is fully enclosed by the cabinet.

Each hinge will vary in its fitting requirements as to how far from the edge it needs to be set and that will depend on what you want the hinge to do. The cabinet-side fitting dimensions are generally the same except for the inset style, which is why I could use the hinge-fitting jig to set out the holes for the hinge fitting on the cabinet side. The real benefit of this type of hinge is when it comes to adjustment after fitting. Being able to control the depth of overlay, distance from the cabinet, and the vertical orientation with a simple turn of a screw is very satisfying. No more fiddling with shims to level a door, as I have had to resort to in the past with more traditional hinges when my chisel work wasn't as accurate as it could have been. I am no expert woodworker so hardware that gives me some wiggle room is my best friend.

The other benefit of the Euro hinge is that detaching the door is so simple — just click the lever on the end and the hinge is disconnected so you can work on the door or the cabinet interior.

Pay attention to the weight and size of the door. There are usually tables with the installation instructions that come with the hinge to help you determine the number of hinges you need. Be aware that doors with mirrors attached are especially heavy.





Attaching the hinges

It's best to do the final adjustment when the cabinet is upright and the hinges are taking the full weight of the door



Adjusting the door — this screw adjusts the overlap

Wet area

With the cabinet glued it just remained to attach the feet. I wanted to add feet to the base primarily because it's a laundry and potentially a wet area. I had some 12mm rimu scraps and cut these to fit the feet. I used contact cement to attach them. I also added some rubber sheet that is usually meant as a non-slip strip for stairs but I repurposed it to wrap around the feet.

With the cabinet built it was only necessary to attach and align the door. The hinges clip on to the hinge bracket on the cabinet. It was only here that I could be sure that the hinges would work as I hoped. There is quite a bit of adjustment available in Euro hinges

— you can adjust the fittings up and down on the cabinet and screws on the hinge allow you to adjust the amount of overhang and the gap from the door to the cabinet when it's open. This is useful if you were not as proficient as you thought you were when you installed the hinges. That usually happens to me and this was no exception but fortunately my inaccuracies were within the adjustment range of the hinges.

It's best to do the final adjustment when the cabinet is upright and the hinges are taking the full weight of the door.

The door handle required me to build a jig. I have drilled these things freehand in the past and I have stuffed it up too. The jig removes the need for a lot of the

Drilling the holes for the handle. It's best to use a jig to keep the holes perpendicular and properly spaced



Handle in place



The finished cabinet



luck I seem to need to get these things placed. This handle is a 128mm one so it needed holes exactly 128mm apart. I measured out the jig and drilled the holes on the drill press for accuracy. It's worth adding a backing piece to the door too. Pressure-laminated melamine can easily tear out out when cutting or drilling through.

Finished at last, the final hurdle was getting it fitted into the laundry. The thing is a weighty beast but it does the job and contains all the various cleaning tools that used to migrate to various out-of-the-way spaces throughout the house. Now I know where they are whenever they are needed ... every six months or so. 📁



Brushing contact cement onto a foot ...



... then wrapping it in rubber

STEELY EYE

A FITTER-WELDER USES HIS
TECHNICAL KNOW-HOW AND
IMAGINATION TO CREATE
WORKS OF ART

By Sue Allison

Photographs: Juliet Nicholas



Allan in his outdoor workshop. The yellow columns are part of his car hoist, which enables him to have easy access to works in progress



Sculptures displayed in the garden



A corner of the workshop

A silver giant sits reading under the trees while a woman stoops to pick a flower and a thin man cycles past on a penny-farthing. Nearby, an enormous corkscrew dwarfs a shed filled with welding paraphernalia. One glance around Allan O'Loughlin's garden and it's clear that this is the home of someone with a vivid imagination and the creative skills to bring it to life.

Allan, a fitter-welder and self-taught sculptor, uses the skills learnt in his trade to create works of art in steel. More than 60 of them are scattered around the 9000m² property he shares with his partner, Andrea, in Mandeville, 25km north of Christchurch.

Unlike most artists working in the medium, Allan doesn't construct his sculptures by bolting or welding solid metal shapes together but relies on the



The starting point: welding the reinforcing steel pieces together to form the stick figure

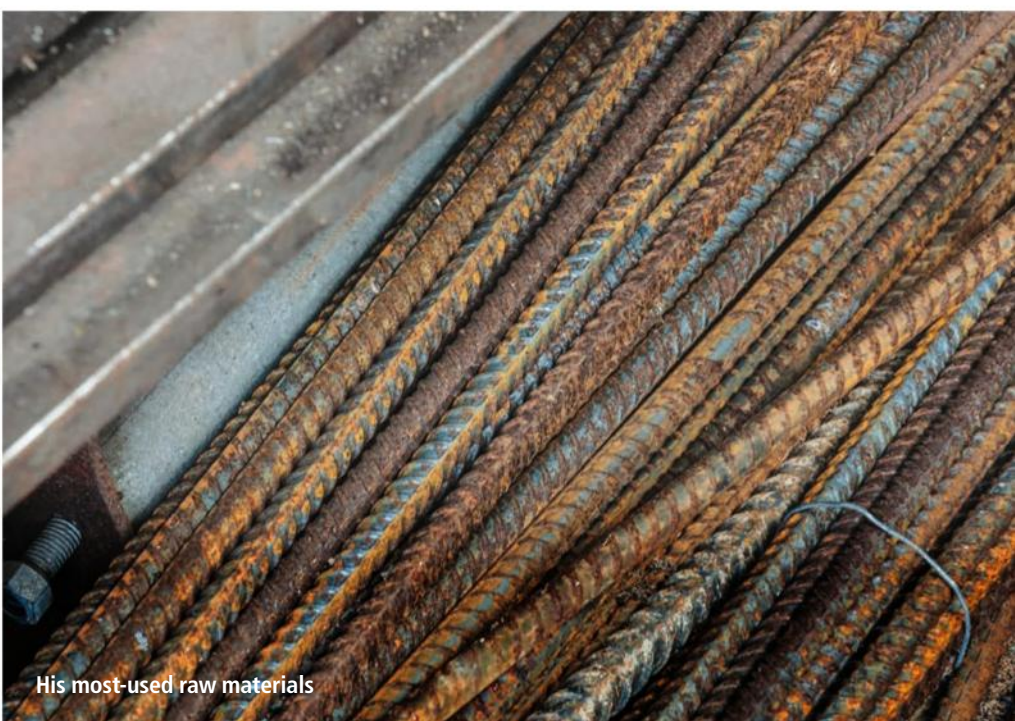
properties of molten steel to mould and fuse his forms.

His initial frameworks are simple structures made out of wire and builders' reinforcing rods, which he curves into shape using heat and a home-built metalformer.

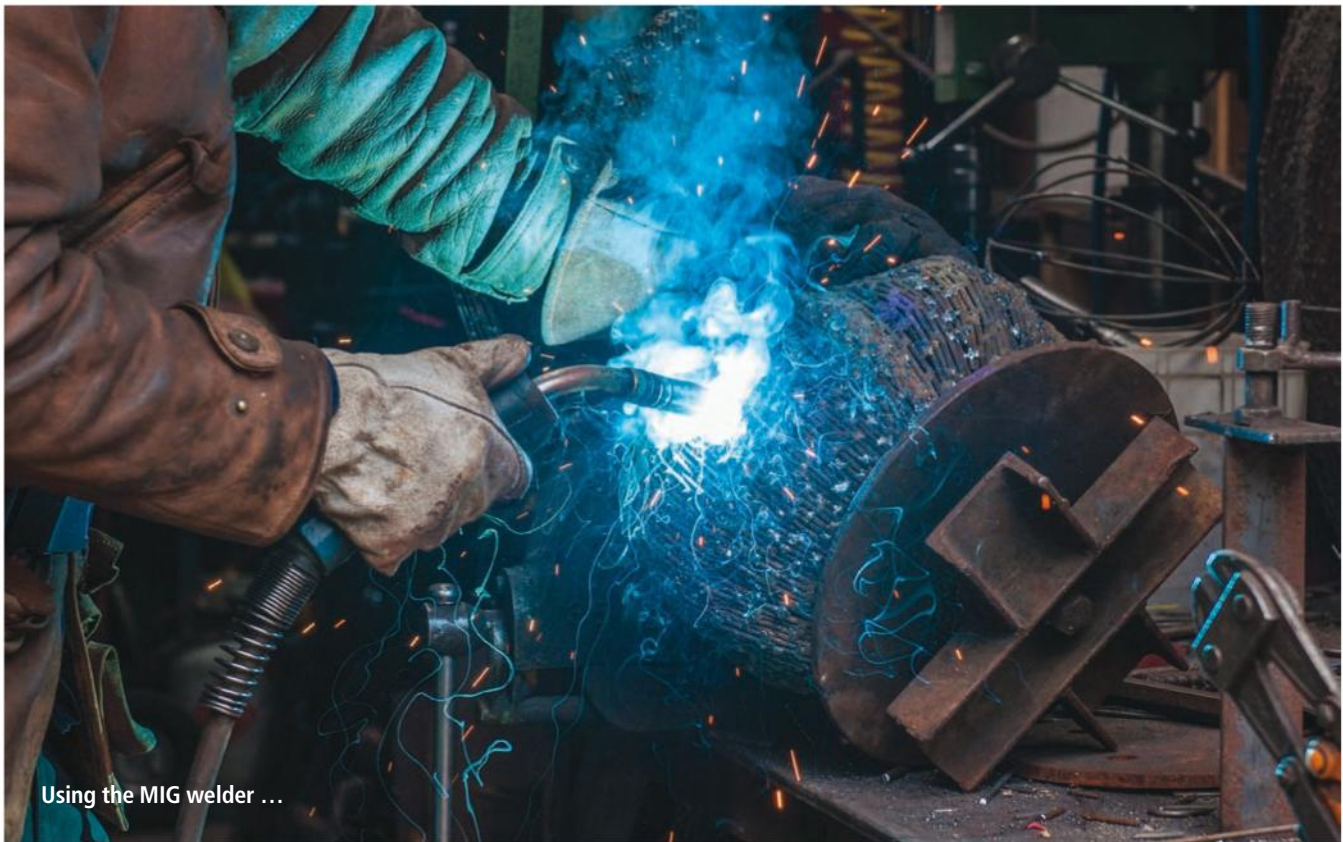
"They all start out looking like simple stick figures a kid would draw," he says. Wire is then tack-welded around the skeleton to create a mesh-like hollow form. With the "bones" in place, the fun begins and Allan sets to work fleshing them out with layers of molten metal.

Molten metal

Steel is dripped over the framework using a MIG torch welder, the "hot-glue gun" of welding — "You couldn't do this with an arc welder. It would take forever," he says. The gun is threaded



His most-used raw materials



Using the MIG welder ...

“Allan compares himself to a potter or glass-maker in that he transforms his material while it is in a malleable state”

with copper-coated steel wire to limit rusting and he runs it on CO₂ as a cheaper alternative to an argon shield.

Not one for making or following rules, Allan tends to improvise as he goes along. Sometimes he cuts out shapes in plate metal or incorporates scraps lying on his bench in the molten mix: “There might be sheet metal hiding in them, you just can’t tell. They’re all welded over.”

Some, such as the figure reading a book, have a scale-like finish, which he

creates by cutting sheet steel into small rectangular pieces and welding them as a skin over the surface.

Allan compares himself to a potter or glass-maker in that he transforms his material while it is in a malleable state. The process itself resembles making papier mâché in the way he builds up layers over the wire frame.

“The great thing about steel is that you can cut bits off and add to it,” he says. “Most things work in the end and, if they don’t, you can always rehash it.”



... to fill in the framework ...



... until a solid mass forms



A figure showing the built-up mass of wires and tack welding



A figure starts to take shape



For the birds



Allan, who loves birds, is happy to accommodate them in his garden. Old gas bottles are put to good use as high-rise condominiums for starlings. He made each unit by cutting a hole in the side of the bottle and "sticking a wee roof" on top, then mounted them

on a pole. "They used to nest in my shed but they don't come anywhere near it since I made that," he says. Nearer the house, a tall figure carries a cage on its shoulder. A piece of art in itself, it doubles as a safe feeding spot for small birds. Allan carefully

measured the gaps between the bars so little birds like wax-eyes could fit through, while larger ones, such as starlings and magpies, can only sit on top and watch in frustration. A door on the side lifts up so the feeding block can be replenished.

This sculpture
revolves on a base



*The rotisserie-style
spindle means he can
mechanically turn his
sculptures as he works
on them*

Alan often elongates the limbs and
exaggerates the human form

Zinc coating

He leaves some of his pieces to rust naturally and paints others with commercial rust-kill, which gives them a treacly, burnt brown finish. But most he takes down to one of the two big dipping baths in Christchurch to be galvanized, which leaves them with a striking silvery zinc coating.

Allan has built most things on the property himself, from sheds, and a cob cottage to the garden furniture, sculptures, and machinery needed to create them. His central piece of equipment, aside from his welding apparatus, is an old car hoist fitted with a crane-like device, which enables him to lift up his sculptures and work on them at a comfortable height. "I bought the

winch and track and made my own arm. It grunts and groans but does the job," he explains.

However, his favourite invention is his "spit". The rotisserie-style spindle means he can mechanically turn his sculptures as he works on them. It has a reduction gear box and is operated with a foot control, leaving his hands free to weld. Moreover, it is fitted with a locking pin. "There's a lot of weight in uneven pieces and the pin holds them so it doesn't spin out of control. I built my spit about three years ago and it's made my life so much easier."

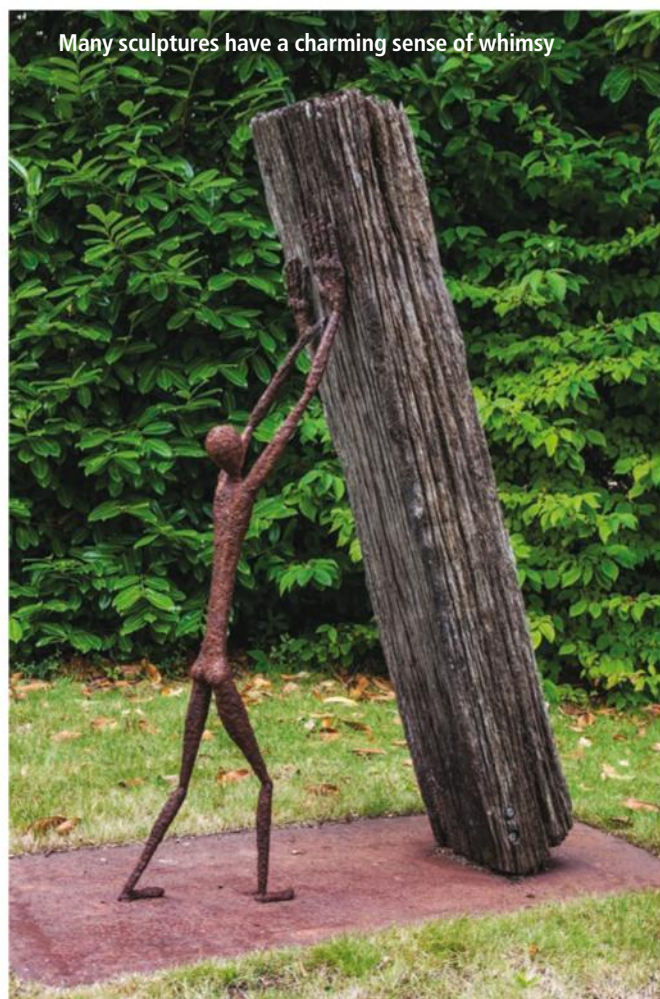
Inspirational

He has a ready supply of scrap metal: "I've got mates in engineering businesses so I get scrap steel from them. It's amazing what you can buy with beer and whisky.





Allan captures movement in his sculptures



Many sculptures have a charming sense of whimsy



The pitted texture of a koru sculpture



Allan's work in the garden includes the chandelier and chairs

I don't waste anything; I use every bit of steel I find lying around."

Allan was first inspired by a sculptural work he chanced upon 20 years ago in Sydney's Parramatta Square that depicted soldiers in the trenches in World War I. "It was metal but had this pinched clay look," he tells us. "I came home and thought, I can build something like that, and that was it."

His inspiration often comes from images, mainly of dance poses, downloaded from the internet. He often elongates the limbs and exaggerates the human form. Not only does he like the artistic effect, but he says it is easier than trying to make them look realistic. "Before I start I can pretty much see it in my head," says Allan, who sometimes makes a small maquette before tackling a

*"It's just for me.
Another kind of
man cave,
I suppose"*

big piece. He takes anywhere from a few weeks to several months to make each piece, often working on a couple at a time, explaining, "I'm one of these people who doesn't stick to a timetable."

Allan uses an air-fed helmet when welding and goes through a lot of fire-proof gloves. His eyes, he says, are his most valuable asset followed by his hands.

Allan, who says he is often covered in bruises from lugging his sculptures around the garden in a sack barrow, is in the process of setting up lighting in the garden. "It looks unbelievable at night with the shadows," he says. "I've lit a couple with fluorescent green lighting which is spectacular." Others have 240V motors, operated remotely, mounted in boxes underneath. A galvanized form resembling wavy buffalo horns seems almost fluid as it revolves slowly on its base.

Planned gallery

Allan has exhibited at several events, including the annual Art in the Garden at Flaxmere, and lends out sculptures for fund-raising garden tours. He sells his work privately and undertakes a few commissions, something he finds an art form in itself "trying to figure out what is in people's heads".

"But he doesn't push sales: "It would make it like a job," he says. Even the gallery he is planning to build on the property will not be a commercial venture: "It's just for me. Another kind of man cave, I suppose."

Allan's other passion is gardening, and when he isn't working with steel, he can usually be found tending the expansive property. "Sometimes I go out and do a bit of work to bring in some cash but otherwise it's weld, garden, weld, garden. That's my life. I love it," he says.

His "real job" involves installing conveyor systems, work that often takes him overseas. Wherever possible, he tags on trips to local art galleries, which he did recently: "I worked in England before Christmas and afterwards went straight to Paris and spent 10 days just going round the galleries." He doesn't regret having no formal training. "If you study somebody you become like them. I just build what I want to build," he says.

"I couldn't read or write when I left school. Art was the only thing I was ever good at.

"I was told I had about five disorders and back then they never really helped you. You just kind of fell in the dyslexic bin." But, he muses, looking round his wonderland of sculptures, "I don't know if I want to be normal."



REDBAND.CO.NZ

**SKELLERUP
REDBAND®
WORK BOOTS**

WORKING HARD FOR GENERATIONS

For generations, Kiwi farmers have trusted the classic Red Band gumboot to get the job done. Today, they also rely upon Red Band work boots, designed specifically for rural New Zealand. Available in lace-up, slip-on, safety and non-safety models, they're made tough – just like the Kiwis who wear them.

HCSKP1186_TS

YOUR COMPLETE METAL FINISHING SUPPLY HOUSE



PPS INDUSTRIES LIMITED

COMPREHENSIVE RANGE OF ENGINEERING SUPPLIES:

- Abrasive belts made to size
- Diamond grinding discs
- Wire brushes: brass and stainless steel
- Range of specific engineering oils, coolants and lubricants.
- Cutting and grinding discs
- Soft face hammers
- Pferd files

A ONE STOP SHOP FOR AUTO RESTORERS, KNIFEMAKERS, WELDERS, MACHINISTS, MODEL MAKERS AND WOODWORKERS.

86 Hugo Johnston Drive, Penrose, Auckland, New Zealand
6 Bandon Street, Frankton, Hamilton, New Zealand
34 Hayton Road, Stockburn, Christchurch, New Zealand

Email: sales@ppsindustries.co.nz
0800 657 894



LIFE IN THE FAST LANE

A FORMER
MOTORCYCLE-
RACING STAR IS STILL
CHAMPIONING HIS
FAVOURITE BIKES.

*By Jon Addison
Photographs: Geoff Osborne*



A replica Moriwaki Kawasaki (left) and a road-going Z900 set up for having its carbs balanced in the Crosby workshop



Graeme 'Crozz' Crosby fits the tank to a Kawasaki Z900 just about ready for delivery

He might describe himself as a “larrikin biker”, but former motorcycle-racing world champion Graeme ‘Crozz’ Crosby is really more of a modern Renaissance man.

Put simply, a ‘Renaissance man’ is defined as a very clever person who is good at many different things. So check the Croz record thus far: champion motorcycle racer, commercial pilot, successful author, businessman, house builder, skilled motorcycle mechanic, enthusiastic cook, raconteur — the list goes on. He can speak a little Japanese, bake a soufflé, and lace up a wire-spoked bike wheel. And even though he’ll turn 62 this year there’s still quite a bit of the larrikin left.

It almost goes without saying that Graeme has a shed. Well, it started out as a hobby shed, somewhere in which to tinker

with old bikes and other motorized toys. In typical Crosby fashion, though, it has become the headquarters for a thriving business restoring and exporting classic Japanese motorcycles. Graeme and his wife Helen bought a 12-acre (4.8ha) block in the picturesque Matakana countryside an hour north of Auckland more than eight years ago, built a spectacular house; the shed; and, across the road, Helen’s The Vivian art gallery.

The 230m² shed now houses Graeme’s office, from where he sources parts from around the world, tracks down donor bikes, and deals with an increasing customer base; a massive store of new and used motorcycle parts; an oddball collection of donor bikes; and two men working full-time rebuilding classics, mostly Kawasaki Z1 machines from the mid-1970s, building





A motley collection of donor bikes bought for parts



The bike frames are completely stripped before two-pot painting



An Italian Bimota is odd man out in the Crosby workshop, which specializes in Japanese bikes



Tim Stewart (foreground) and Gary Lawford building up a Suzuki 750 Water Bus

“The baby boomers grew up with the early Japanese stuff and now they have a bit of money and want to relive their youth”

replica Moriwaki Kawasaki racing superbikes, and fabricating the odd part that’s unobtainable or a one-off for a customization project. And in one corner there’s a commercial kitchen, although it’s mostly filled with bike parts.

Graeme’s customers are, like him, baby boomers. He explains: “The old British racing bikes are getting too hard to keep running and their owners are getting old. The baby boomers grew up with the early Japanese stuff and now they have a bit of money and want to relive their youth.”

He and his customers enjoy riding

40-year-old road bikes but are also into classic bike racing, in which the bikes are ‘silhouettes’ — they look like the factory models of their era but with some modifications to enhance performance and reliability. Components such as engine cases and cylinder heads have to be original and carburettor sizes can’t be changed.

“They are more human,” Graeme says. “Modern MotoGP racing has disenfranchised me as a former racer. You aren’t allowed into the pits so you only see the racing from a distance.



A four-cylinder Kawasaki crankcase being stripped to its bare bones



A classic racing Kawasaki beginning to take shape



A classic Kawasaki rear end ready for its wire-spoked wheel

Winning ways

Although Graeme Crosby won the hearts of motorcycle-racing fans around the world with his spectacular wheel-standing and wheel-spinning riding style, he was also remarkably successful during a career spanning just nine seasons. A brace of world Tourist Trophy Formula 1 (TTF1; precursor to the Superbike World Championship) titles and runner-up in the 1982 500cc World Championship (forerunner of today's MotoGP) ensure his place in the record books.

Highlights of his career include:

1974: Nine victories in New Zealand on a Kawasaki H2 and third place in the Castrol Six Hour race at Manfeild.

1975: Victory in the Castrol Six Hour on a Kawasaki Z1 900 and two open production-class races.

1976: Another win in the Castrol Six Hour and two victories at Sydney's Oran Park Raceway on the Ross Hannan Yoshimura Kawasaki Superbike.

1977: Another win in the Castrol Six Hour, on a Z1000, along with nine wins and three podiums in Australia on a production Kawasaki Z1B and the Hannan machine.

1978: Again winner of the Castrol race on a Kawasaki Z1R, with seven wins in Australia on the Hannan Yoshimura.



Graeme still needs his racing leathers to help customers to set up their classic racing bikes

1979: Four wins and a dozen podiums on a Moriwaki Z1000 Kawasaki, with second place in the British TTF1 and third in the World TTF1 Championships.

1980: Some 13 victories and half a dozen podiums on various Suzukis, claiming victory in the World TTF1 Championship along with runner-up in the British TTF1 and 500cc championships.

1981: A total of 18 wins and

13 podiums on various Suzukis, including winning the World TTF1, British TTF1, and British 500cc titles, along with fifth place in the 500cc World Championship.

1982: Won the Daytona 200, an international 200-mile race, on a Yamaha YZR750 and took six wins and five podiums on a Yamaha OW60 500cc Grand Prix bike, taking runner-up in the 500cc World Championship.

"With the classic bikes you're encouraged to come into the pits to see the gear close up and talk to the riders and mechanics," he adds.

Exciting machines

Although the Crosby team will build almost anything to meet a racing customer's requirements, easily the most exciting machines are replicas of the Moriwaki Z1000 Kawasaki

superbikes, which more than any other bike created the Croz reputation. Graeme raced for Mamoru Moriwaki in Japan and Europe in the late 1970s and on the sit-up wide-handlebar superbike, beat full-out racing machines in spectacular style, pulling wheelies and smoking the rear tyre, much to the delight of huge crowds.

The team in the Matakana shed is building a limited-edition run of 10 of the

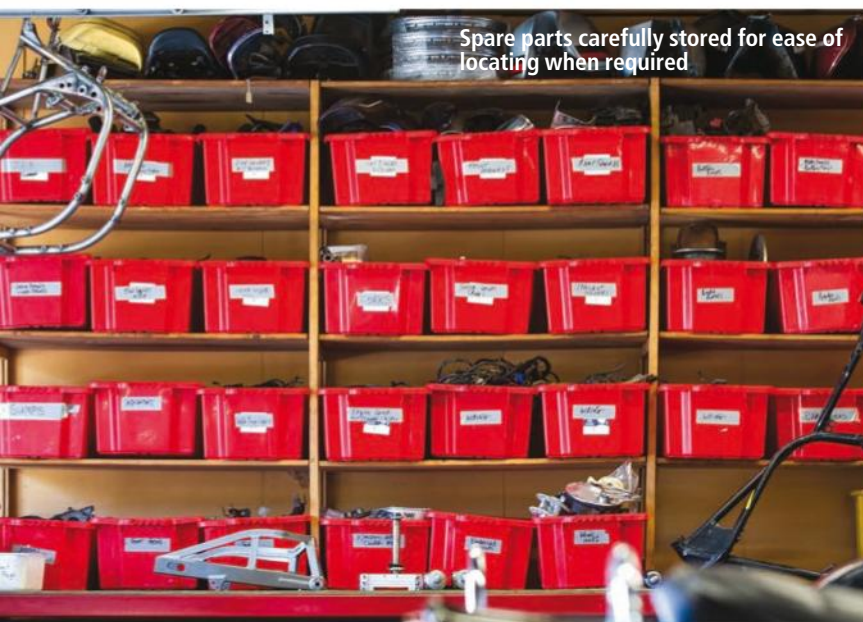
Moriwaki replicas, although oddly one has '11 of 10' on a small plaque on the top triple clamp. "A customer in Britain would only buy one of the bikes if we numbered it 11," Graeme laughs. "So we did."

During his racing career Graeme developed a close relationship with the two great Japanese performance tuning houses Moriwaki and Yoshimura, which explains his grasp of the difficult Japanese language. He still sources parts





A line-up of tool chests that any shed would be proud of



Spare parts carefully stored for ease of locating when required

The tiki has been used by Graeme since his racing days and now adorns a plaque on every bike recreation that leaves the workshop



“It’s a great circuit, highly technical and it turned out to be a great race,” he recalls. “After eight hours I won by just 12 seconds”

from them and visits Japan at least once a year. The two engineering companies are related, with company founder Mamoru Moriwaki marrying Namiko Yoshimura, the daughter of superbike pioneer Hideo ‘Pops’ Yoshimura.

Graeme’s visit this year will coincide with the 40th anniversary of the first Suzuka 8 Hours race, which he rates as “probably the highlight of my career, with a crowd of 160,000 people watching”.

His co-rider, American Wes Cooley, is a diabetic, and in the intense heat was able to complete just the minimum number of laps, leaving Croz to ride most of the race.

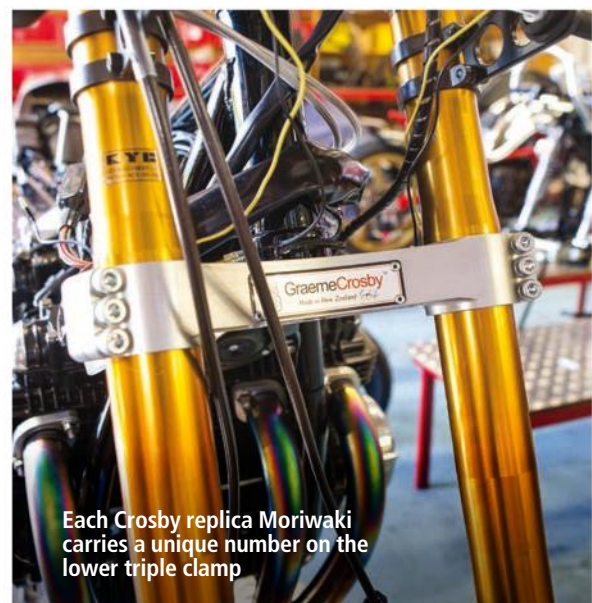
“It’s a great circuit, highly technical and it turned out to be a great race,” he recalls. “After eight hours I won by just 12 seconds with [American] Eddie Lawson and [Aussie] Gregg Hansford right on my hammer.”



The Crosby shed contains all the machinery needed to build a motorcycle



A replica Moriwiki Kawasaki nears completion



Each Crosby replica Moriwiki carries a unique number on the lower triple clamp

Building replicas

Much of the building of the Moriwiki replicas and Kawasaki Z-series recreations is done by Tim Stewart — in his own way another motorcycle-racing legend — who has been part of the Crosby team for the past five years. Tim worked on both the Britten and Buckley motorcycles so is probably the only person to have been intimately involved in the creation from scratch of two different racing motorcycle engines. He also crewed on the bikes and crewed for American racing legend Kenny Roberts in Europe.

The Crosby shed houses pretty much everything that would be required to build a new motorcycle — a lathe, milling machine, welding, and painting equipment — but the cost of a completely hand-made machine

would be prohibitive. A fair bit of machining work is out-sourced to local companies, including Warkworth-based Core Builders Composites Ltd, owned by the Oracle America's Cup team, where manager Tim Smyth takes a close interest in the bikes.

Many parts used on the Kawasaki road bikes are new because it's simply not worth trying to repair the originals: "For example, I bring in brand new fuel tanks from Japan, painted in the factory colours, because the originals will invariably have deteriorated badly on the inside," Graeme says. "Same thing with the wiring looms — the originals will all have been mucked around with at some stage so we put in complete new ones."

He's amused by the "anoraks" who believe every original part should be

restored or replaced by a new factory component. "Doing that would add \$15K–\$20K to the price of the bike. You have to be practical and pragmatic about it."

Performance boost

Besides, it wouldn't really be a Crosby recreation if everything was left bog-standard. In fact the Crosby Kawasakis are better than the originals in one important respect — they perform better.

"The original Z1 had about 82 horsepower, but we've upped that to around 130 horsepower," he explains. "We bring in better pistons from the US, raise the compression a bit, fit racing valve gear, do a bit of porting and polishing, put on new carbs and electronic ignition, and improve the exhaust systems. We



King of the road



His keyboard had a better throttle than brakes and he produced almost 50,000 words more than required

also fit AP brake calipers to make them stop a little better.”

Although the Crosby team (the third member is Gary Lawford) concentrates on the Kawasaki Z1, or Z900, along with the closely related Z1B and Z1000, it also recreates mid-1970s Kawasaki two-stroke 500cc and 750cc bikes. Other brands aren't always shown the door either, with iconic Suzuki 750cc 'Water Bus' and Honda CBX six-cylinder bikes being worked on when *The Shed* visited.

Each recreation leaving the Crosby shed is fitted with a small plaque featuring a tiki, which has inspired him for 35 years. “I was on a DC10 heading back to England in 1979 and thinking about what I could put on my helmet as everyone from New Zealand had a kiwi of some sort on theirs,” Graeme explains. “On the plane they were giving out little green plastic tiki and that decided me, but ironically I ended up with a kiwi as well, because I took out a contract with the Swiss helmet company that made Kiwi helmets. The Swiss had contracted a company to come up with a single

In the early 1970s the fastest production motorcycle in the world was Kawasaki's big Z1, which quickly earned the title 'King of the Road'.

Honda's launch of the CB750 at the 1968 Tokyo Motorcycle Show signalled the creation of the superbike and the demise of the dominant British motorcycle industry. Ironically, Kawasaki, which that year launched the notorious three-cylinder, two-stroke 500cc H1, known as the 'Widowmaker' for its propensity for spitting its riders off into the scenery, had already begun the design of the four-cylinder four-stroke 750. That project was put on hold as Kawasaki monitored the sales impact of the new motorcycle style and began conjuring up a machine to trump the Honda. The result was the 1972 launch of the astonishing Z1 with a 903cc engine rated at 82 horsepower — at the time, the most powerful bike engine ever produced in Japan, 22 per cent more powerful than the Honda. What's more, it sported twin chain-driven camshafts to out-do the Honda's single cam and proudly proclaimed the fact with double

overhead camshafts badges. Its 'square' 66 mm bore and stroke dimensions and four carburettors meant it pulled strongly yet revved willingly.

The Z1 was clocked at 212kph, making it the world's fastest production motorcycle from 1973 to 1975. That title had been held in an unbroken run from 1949 by British bikes such as Vincents, Nortons, BSAs, and Triumphs. No British bike has held the title since.

Around 85,000 Z1 bikes were made and sold around the world until 1975 when it was superseded by the similar Kawasaki Z1B, which boasted a little more power but better handling through a stiffer frame and better suspension components. The Z1000 followed two years later.

Kawasaki Heavy Industries is a huge diversified Japanese company that was founded as a shipyard in 1878. Along with interests in shipping, aircraft, and railways it began building motorcycles after World War II. The company is still a major player in the New Zealand market with a range of street bikes, farm bikes and utility vehicles, motocross bikes, and jet skis.



A classic racing Suzuki prepared in the Crosby workshop for America's Cup stalwart Grant Dalton

word that meant the same thing in every language and 'kiwi' was the result."

After finishing runner-up in the 1982 500cc World Championship (equivalent to today's MotoGP) on a Yamaha, Croz hung up his racing leathers and returned to New Zealand where he owned a motorcycle dealership, sold new Mercedes-Benz cars, and flew commercial aircraft for Northern Air. He also did a stint building houses in Fiji.

Biography

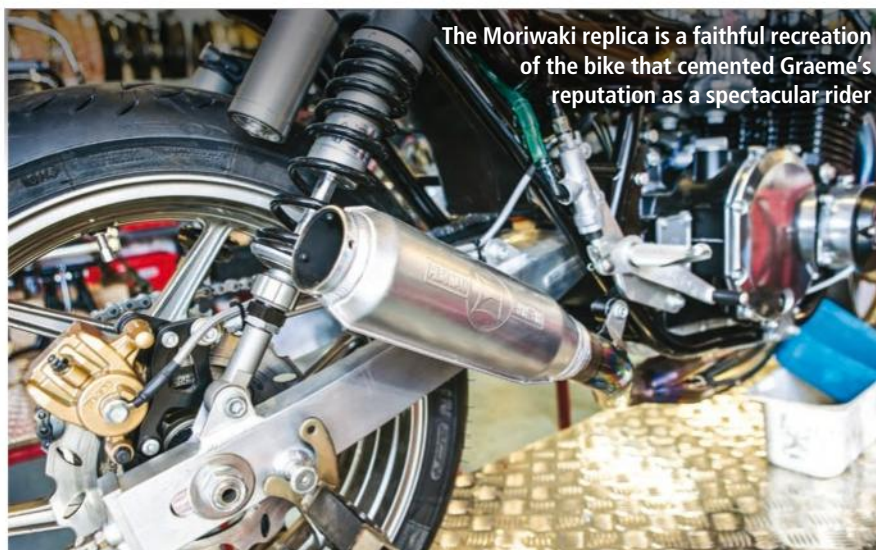
Along the way he was asked by HarperCollins to write a book on his career. A professional ghost writer prepared a few paragraphs and so did Graeme. The publisher preferred Graeme's writing and in typical Crosby fashion his keyboard had a better throttle than brakes and he produced almost 50,000 words more than required, so had to learn about editing. The result, *Croz: Larrikin Biker*, went on to become one of the most successful books about a New Zealand sportsman.

The Crosby culinary experiences

include serving horse-meat barbecues to fellow riders in Europe, but these days he belongs to an informal association of local men from all walks of life who enjoy cooking. Each month one of them arranges for a chef to teach them how to prepare different foods.

Outside the shed or the kitchen Graeme manages a bit of road riding on a 2007

Suzuki Isle of Man Anniversary GSX-R1000 or a Harley-Davidson Road King. He still rides competition bikes, but only in demonstrations. This year he will star at Eastern Creek in Australia, the Goodwood Festival in England, and the Sachsenring in Germany. "I still like to go quite fast, but not as much as I used to because I know my limits now," he says. 📄



The Moriwaki replica is a faithful recreation of the bike that cemented Graeme's reputation as a spectacular rider



BLACKROCK HOMEBREWING CRAFTED RELEASE

This Black Rock Crafted IPA has been brewed with a high proportion of specialty ale malt, balanced by plentiful bitterness from a selection of New Zealand hops, with Wakatu hops added for their citrus and subtle floral aromas.

AVAILABLE FROM YOUR NEAREST
BLACK ROCK STOCKIST.



WWW.BLACKROCK.CO.NZ



HC LI00242

Cheers!
cheers.org.nz



**CHAINSAW CHAPS
MAX RESIST**



PROFESSIONAL CHAINSAW CHAPS

Heavy duty oxford outer fabric with extremely high tear resistance. The internal chain arresting material is Fibreactive Chainstopper Technology, a mixture of Kevlar and high tenacity fibres. A florescent & reflective safety strip is on each leg.

Colour: Greenstone

Sizes as leg length: Short, Medium, Long
Certified to AS/NS 4453.3.1997

**CHAINSAW CHAPS
LIFESTYLE**



LIFESTYLE CHAINSAW CHAPS

The Lifestyle chaps have been developed for casual users, in a rural or domestic environment, where a chainsaw is being used occasionally. Materials and degree of safety is the same as for the Professional Chainsaw Chaps.

Colour: Greenstone

Sizes as leg length: Short, Medium, Long
Certified to AS/NS 4453.3.1997

Order online now at www.forestarmour.com
mention The Shed magazine and you will
receive a free chainsaw mitt
(offer valid until September 2017)



Made by Jaedon Enterprises Ltd
10 Ryan Place, Manukau City,
Auckland. 2104 New Zealand
Ph: 09 263 4566

FORESTER
FOREST ARMOUR

CHAINSAW PROTECTION



www.jaedon.co.nz
www.jaedon.com.au

JAEDON 081005



A full-page background image showing an astronaut's gloved hand and part of a spacesuit on the left, and a satellite or space station component on the right, set against the blue and white horizon of Earth from space.

DOING THE BUSINESS

A KIWI'S DESIGN IS SHORTLISTED FOR THE SEMI-FINALS OF A SPACE CHALLENGE

By Hugh McCarroll

I have always been a space and aviation buff, so when I saw a NASA link on the internet about something called the 'Space Poop Challenge', I clicked on it and was immediately engaged. The introduction video by astronaut Rick Mastrachi outlined the problem — NASA is planning trips beyond low earth orbit, and in an emergency such as loss of vehicle pressure, the astronauts might have to remain in their spacesuits for several days.

In an emergency in low earth orbit it is possible to get the crew back to earth in a few hours, but from the moon and beyond it takes days. Currently astronauts wear diapers in their spacesuits for take-off, landing, and during long-duration spacewalks. This is OK for up to 12 hours but is a health risk beyond that time. A breakthrough is required and that was the challenge to the world's inventors. Not the glamorous end of space travel but vitally important.

And there was US\$30K prize money up for grabs.

I couldn't get the challenge out of my mind, but was mindful that it was late November, submissions closed on December 20, and my wife was worried about how much we had to do before Christmas.

I'm a draughtsman and designer from way back and have been using SketchUp, powerful 3D-modelling software, originally from Google, for some years. So I cranked up my old laptop and started working on a design.

The website gave precise requirements for the challenge: one litre of urine and 75ml of "fecal mass" per day for six days and 80ml menstrual discharge over the six days. The waste material must be kept away from the astronaut's body. The website also outlined the criteria the judging panel would apply, complete with weighting.

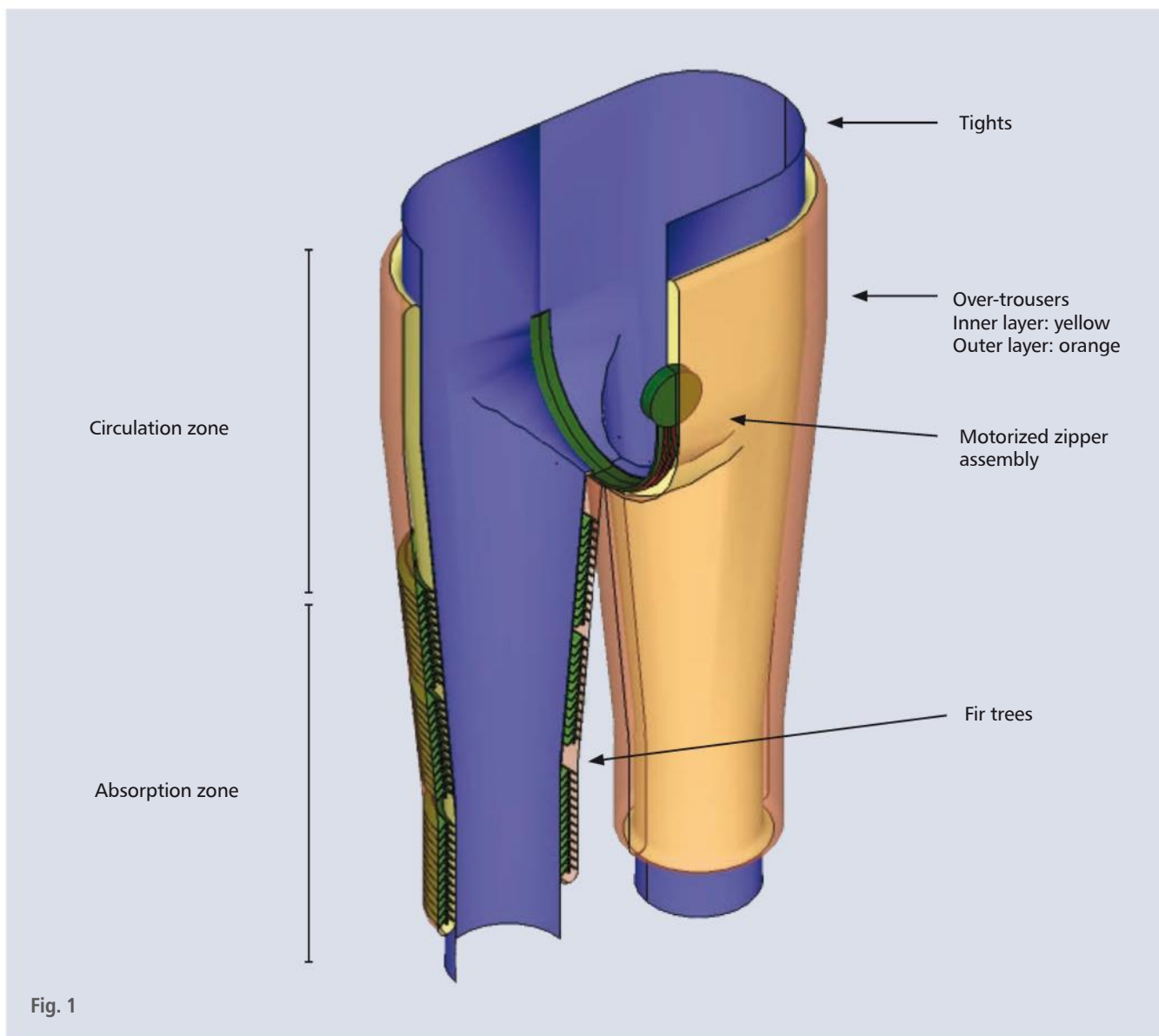


Fig. 1

Credible concept

My immediate idea was a pair of tights with a motorized zip in the crotch that the astronaut could open and close at the push of a button. They would do their business into a plastic bag in the shape of a pair of over-trousers outside the tights.

Domestic peace was a major consideration, so I could only work on the design late at night after my beloved had gone to sleep. I made progress over several nights and was getting more and more excited. I had what I thought was a credible concept that could work.

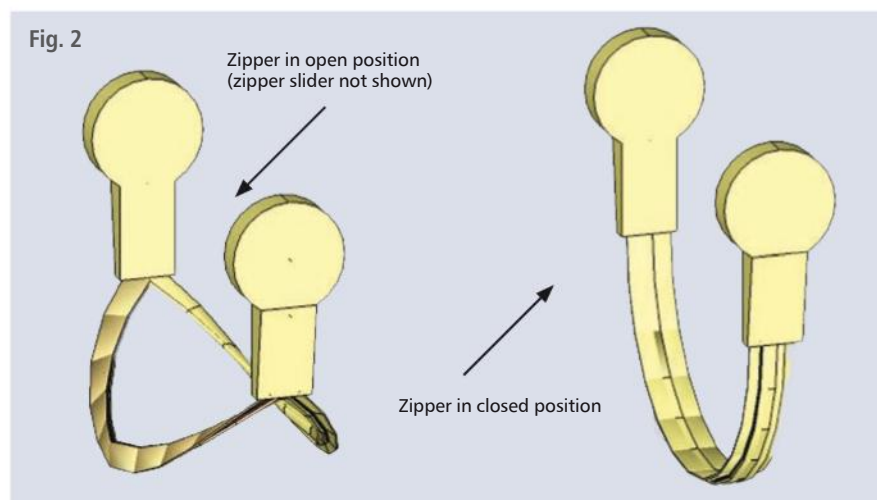
I didn't dare tell my wife as she would have reasonably responded that I didn't have time for such a diversion, so I kept it to myself and worked on the design each night.

I constructed a virtual torso (no bum or genitals, just two legs, a crotch, and a torso) and added each part of the garment I had in mind (Fig. 1).

The tights and over-trousers were straightforward, just the torso shape scaled up slightly, but modelling the zipper proved to be extremely difficult. The zipper I conceived was a press-seal type with a motorized slider. It would be 3D printed in nylon or a similar flexible material, held closed by the press seal, but

designed so it spread apart when open.

The zipper would form an arch from just below the navel to the base of the spine when closed, secured at the ends so it arched clear of the crotch and genitals, and would be opened and closed by the astronaut when he/she needed to relieve him-/herself (Fig. 2, 3 and 4).



Domestic peace was a major consideration, so I could only work on the design late at night

The two halves of the zipper would twist as they opened and press against the astronaut's inner thighs and bottom cheeks like a toilet seat. The zipper shape would change in three dimensions. Modelling it took ages and I was starting to run out of time. I could model the zipper in the closed and open positions, but not partly open, or showing the slider.

During the design process it occurred to me to include a bidet-type spray head in the zipper slider. Bidets are widely used in some cultures and provide a hygienic rinse of the nether regions, equivalent to using toilet paper (Fig. 4 and 5).

Zero gravity

It occurred to me that a spray would also be very useful as a means of separating the waste from the body. In zero gravity all the waste floats around, so a spray operating as the zipper closed would nudge the waste away from the body. I thought a spray of baby oil or similar would also be comfortable for the astronaut and protect them from chaffing.

The specification allowed for suit power up to 100mA at 28V. A battery pack to power the zipper motor and a bidet pump was included in my design. The motors could be quite powerful and the battery could provide the current required. The suit power could keep them at full charge. (Fig. 3.)

I considered a pressurized spray can of liquid for the bidet, but felt a pressure vessel inside the spacesuit would be more risky than a piston pump working only when the zipper was closing. A feature of my submission was the need for simplicity and reliability.

The space available between the astronaut and the inside of the spacesuit is 25mm, so I made the over-trousers about 20mm thick and a volume in the

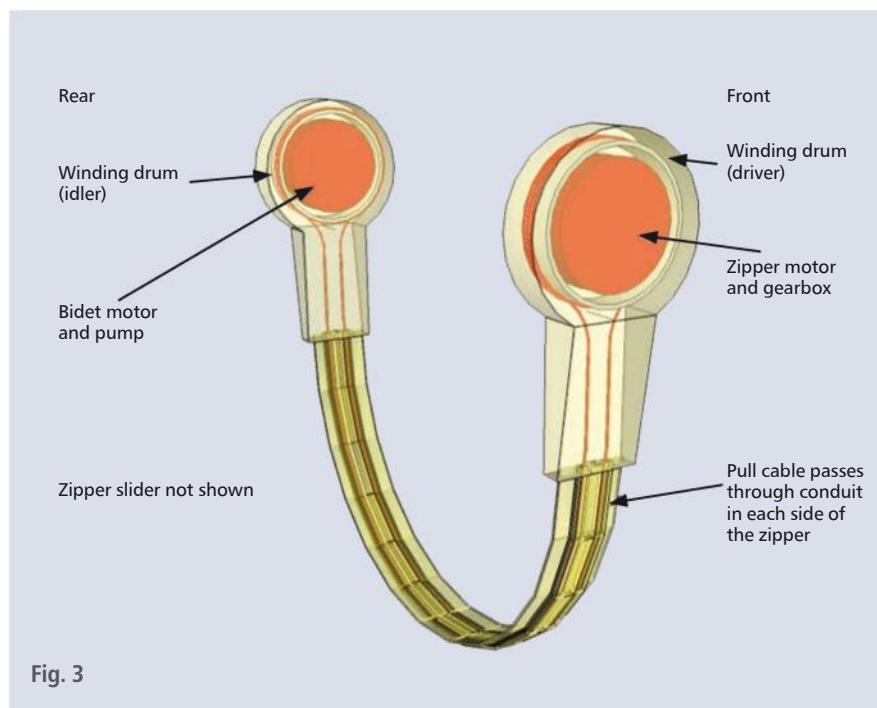


Fig. 3

order of 20 litres, well in excess of the six litres of urine and 500ml of other matter specified.

The stuff in the over-trousers will move about as the astronaut moves. Using this logic, I included multiple rings of material around the thighs and calves that would absorb the urine and restrict the movement of any slush. These were shaped like chevrons so that the material would slide past when the astronaut moved his/her legs but restrict backflow (Fig. 6). I called them 'fir trees'.

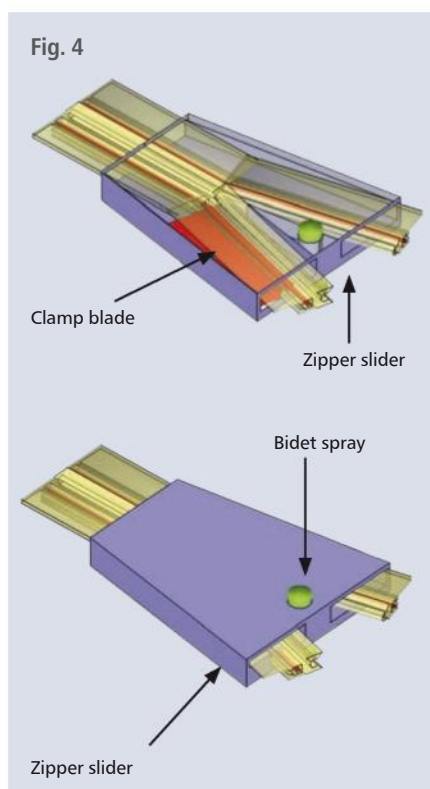


Fig. 4

The winning designs

The winning solution came from Thatcher Cardon, a US Air Force officer, family-practice physician, and flight surgeon. His design was inspired by minimally invasive surgical techniques — and a strong desire not to store the poop. He designed a small airlock at the crotch of the suit, with a variety of items, including inflatable bedpans and diapers, that could be passed through the small opening and then expanded. His design even allows an astronaut to change underwear while inside the spacesuit, through the same small opening.

Second place went to a trio from Houston — a physician, an engineering professor, and a dentist, who used an air-powered system to push waste away from the body to store it elsewhere in the suit. A product designer from the UK was third. Hugo Shelley's design is a form-fitting garment that is worn underneath the pressure suit. It features a new catheter design for extended use in microgravity, combined with a mechanism that compresses, seals, and sanitizes solid waste.

There is more information on the challenge on the HeroX website: herox.com/SpacePoop.

I told my wife and she was fine about it. She shook her head and said I was never boring

I wear merino tops, which are really comfortable, so I specified merino-blend stretch tights next to the skin. The zipper design included a flange where the tights and the inner lining of the over-trousers were sewn and sealed to the zipper.

Judging criteria

I wrote up my proposal, including the drawings reproduced in this article. I checked it against the judging criteria and was confident I had a good submission that would at least get past the first assessment.

That was the state of my design on December 19, 2016. I registered for the challenge and filled in my proposal online. It was a series of questions and answer boxes so I copied and pasted from my proposal into each box, attached a pdf of my proposal, and fired it off on December 20, about 12 hours before the competition closed.

I decided not to tell my wife what I had done. If nothing came of it I could quietly let it lapse or tell her at a later date. Christmas came and went and we prepared to host our Christchurch daughter and grandchildren in January.

But I couldn't get the challenge out of my head. I thought of changes I could have made to my proposal, realizing that I hadn't specified how I would secure the ends of the zipper in position. So I continued to work on the design as time allowed so I would be in a position to answer any questions that might come from the judging panel.

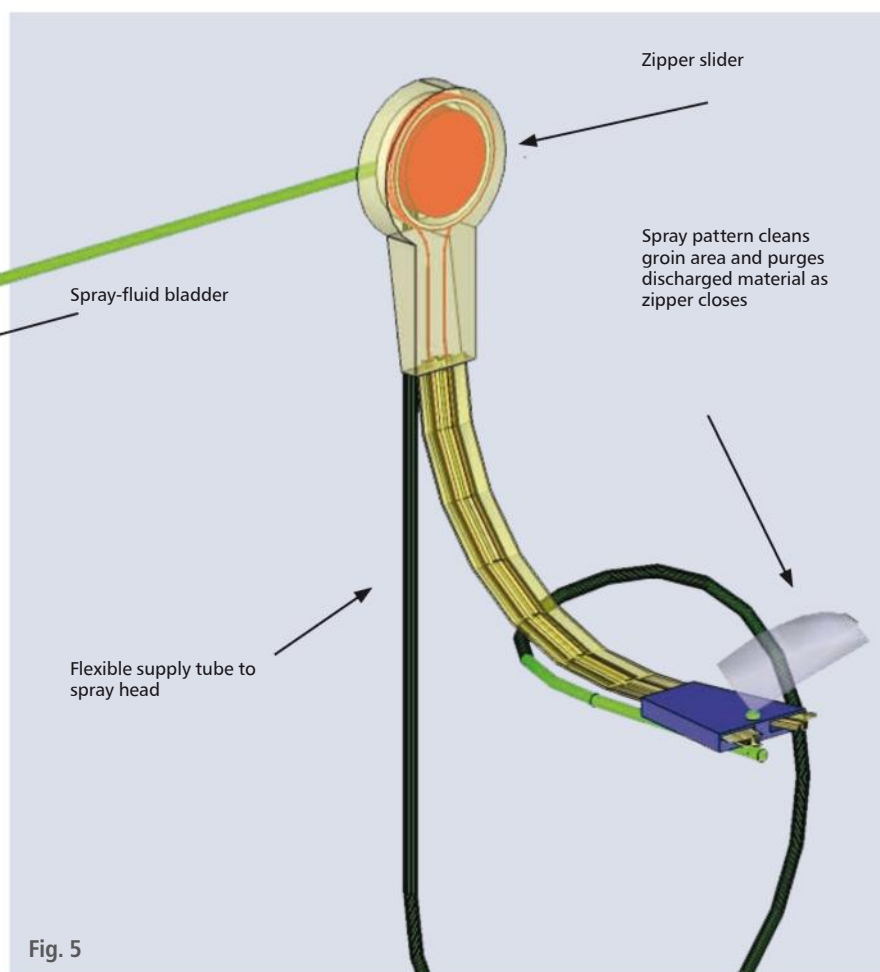


Fig. 5

We headed away in our motorhome on a long-planned holiday in late January. I took my laptop with me so I could continue to work on my design in the quiet times.

On January 25 I got an email saying I was a finalist. I was thrilled beyond measure. I told my wife and she was fine about it. She shook her head and said I was never boring. We decided not to tell anyone until the results were announced on February 15.

Semi-finalist

The next two weeks were an agony of suspense. I continued working on the design, anticipating possible questions, but none came. Then on February 14 came an email saying I was not one of the final three, but that my submission had been selected as one of 21 semi-finalists to be acknowledged. It was almost as good as winning — except no prize money.

We sent an email to our three daughters so they would hear it from us before it was made public. They were delighted and proud and didn't laugh at the idea at all. Everybody can relate to this challenge. It's only a joke until you're the one busting.

The Space Poop Challenge was an

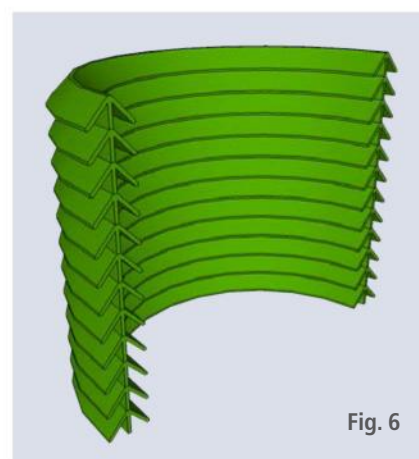


Fig. 6

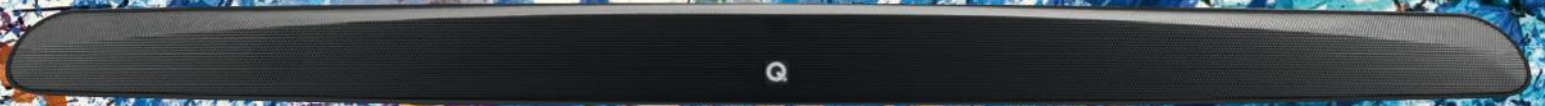
outstanding success for the NASA Tournament Lab and HeroX, the organization running the challenge. They had more than 5100 submissions from 130 countries and a total of 20,000 registered contestants. It broke records for the entire field of open-innovation competitions. As the HeroX website says: "Space Poop is the new standard for how to get sh*t done."

There was some local publicity; the *Waikato Times* picked up the story and I talked to Kim Hill on Radio New Zealand, which is a sort of prize in itself. She asked me if I was married and if not she would propose!



BRINGING LIFE TO SOUND

qacoustics.co.nz



The M3 Soundbar.

Simplicity redefined, where beautifully engineered sound meets beautiful design.

M3 is an elegant, compact soundbar, designed to bring life to your living room without the clutter of a full Hi-Fi system. Thanks to its built-in subwoofer, Intelligent Pre-Amplifier (IPA™), Bluetooth® aptX® wireless capability and seamless control via your own TV's remote, the M3 will fill your home with superbly detailed and dynamic audio reproduction.

Find Out More



**Built-In
Subwoofer**



**aptX®
Bluetooth**



**Ultra Wide
Sound Dispersion**



**MovEQ™
Enhanced Listening**

Search Q Acoustics M3



#hearingisbelieving

Sitting pretty

BUILDING AN OUTDOOR BENCH SEAT

*By Jude Woodside
Photography: Adam Croy
and Jude Woodside*



I discovered some 40mm square light-steel tube that I had purchased for another job that didn't go ahead and I thought it would make a good outdoor bench. I had considered making one out of the 3mm thick, 40mm square tube that I have used previously but I realized that it would be impossibly heavy and I wanted something that could be moved relatively easily.

At first I considered making it square at each end but as I developed the idea it tended to grow in sophistication, as these things tend to, and before long I was incorporating a back. I didn't want a bench with a straight back — it's not a church pew — which meant that I would have to extend the back leg to prevent it toppling over.

It took me some time to research the ideal dimensions. It appears that the ideal bench should have a back that inclines between 5° and 15° and a seat with an inclination of around 5°–12°. Height off the ground is also important for comfort.

You need to take cognisance of the popliteal height, which is the vertical distance from the floor to the underside of the knee where the tendon of the biceps femoris muscle inserts into the lower leg — essentially, the knee angle. For Western men this is around 440mm. I made mine around 460mm and with the seat planks in place it will be about 480mm, which is still within the acceptable region and suits me as a taller person.

Most of the dimensions of the bench I inferred by measuring some existing benches and checking designs online to find a happy medium. There is a distinct difference between a bench and chair. Chairs usually expect their occupants to be upright and engaged but benches are meant for relaxing so I went for a reasonable incline in the backrest; not so relaxed that you struggle to get up, but more of an angle than you would use for a dining chair.



Cutting the pieces to size



Bevelling the edges to create a 'V' helps ensure good penetration

Design considerations

Similarly, having spent unhappy hours on hard, flat seats, I wanted to incline the seat to provide a level of comfort for the nether regions and the spine too. This can vary anywhere from 3° to 12°. As it's not an easy chair, too great an angle can make it hard to get out of and can be unpleasant on the knees so I opted for the fairly modest but practical 5°.

To be fair, some of the dimensions do not strictly adhere to the suggested dimensions according to 'anthropometry' — the measurement of human dimensions that is often used in furniture design — but I built this to fit me. That can be a trap — I once built a rocking horse based on what I thought would be fine for a toddler and took measurements

It is very easy to cut the angles on the wrong face or the wrong way round



The corners of the front leg showing the V-groove

of myself squatting to approximate the seat height for the absent toddler. The poor child required a ladder to reach the thing but it taught me a valuable lesson: always measure first. It's a lesson that I seem to be taking a long time to absorb.

With the finalized design in hand I headed for the workshop. First I cut the parts to size. The two back stretchers were simply cut to 1200mm but nearly everything else was cut at an angle. The seat frame has two long pieces at 1200mm and the two side pieces at 460mm, with each end cut at 45°.

The front leg and the armrest meet at 45° but the backrest is set at 15° from level and the back leg at 75°. The end of the armrest where it meets the backrest will also be 15°. The real trick when cutting



Welding the corners of the seat frame

these angles is to remember which way each cut goes. It is very easy to cut the angles on the wrong face or the wrong way around so it's worth marking which way the bevels run.

Dry assembly

With everything cut to size do a dry assembly of each component and check that it does in fact fit. My welding table is a boon for setting up this kind of assembly, as it's easy to clamp pieces to the table and tack weld or even weld the joint without distortion.

I assembled the seat frame first because it was the bulkiest component. I discovered that I had cut one end a little too short.

I used a new Smootharc Elite



Welding the end of the front leg



Setting out the leg assembly

For virtual novices like me this is very handy. The machine makes me look like I know what I'm doing

Multiprocess 180 from BOC for the first time and I was surprised by how smoothly it ran. You set the metal thickness and the synergic programme does the rest. For virtual novices like me this is very handy. The machine makes me look like I know what I'm doing.

I used two different thickness of tube — one at 2mm and the other 1.9mm. It's not much of difference, I know, and I wouldn't have bothered to change

the setting in the past but there is a difference in the current and voltage for each size. The 1.9mm takes 85A and the 2mm version 100A, both at 17.5V. I am using 0.8 wire with 80 per cent Argon and 20 per cent CO₂ shielding gas. I have never been sure where to set the shielding-gas pressure but finally I have found a formula that works. Setting the gas flow to 11l/min x wire size gave me 8.8l/min.

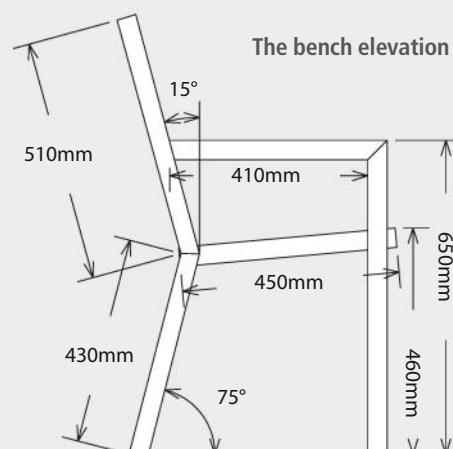


Welding the back leg



The completed leg assembly

Dimensions

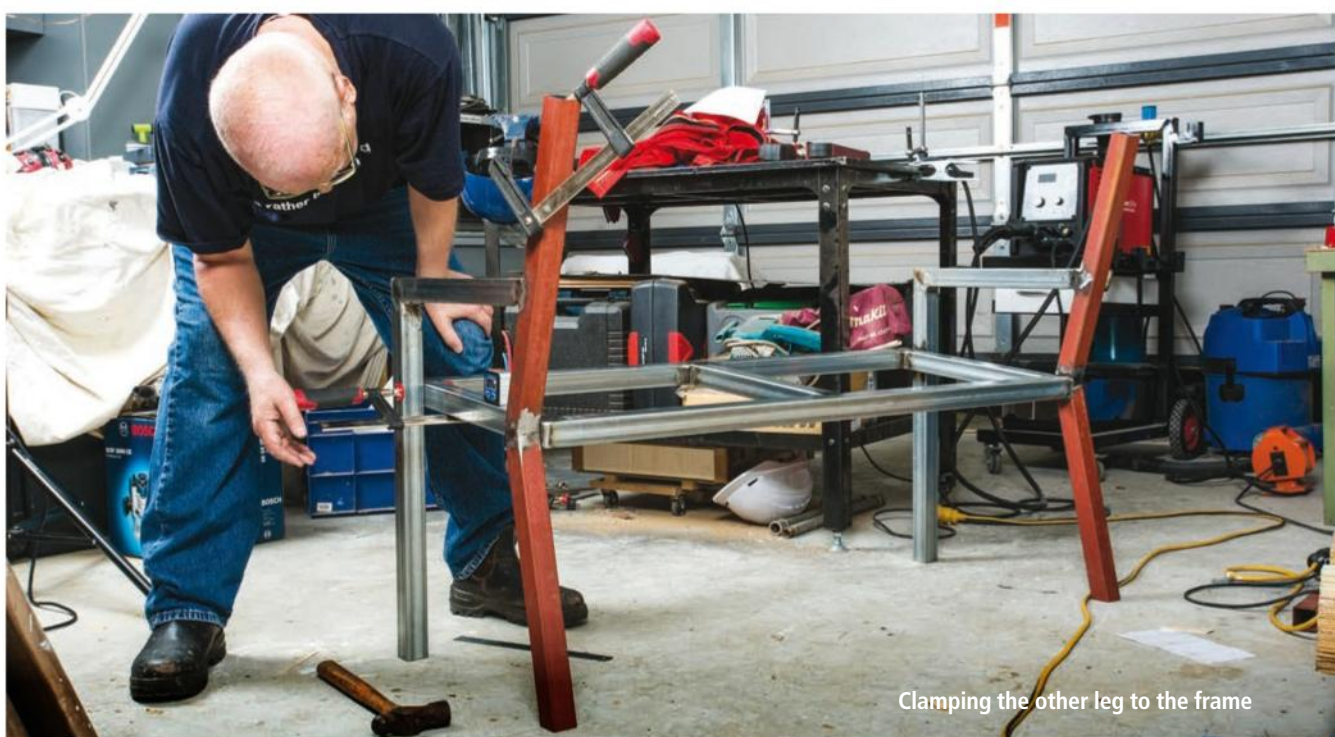




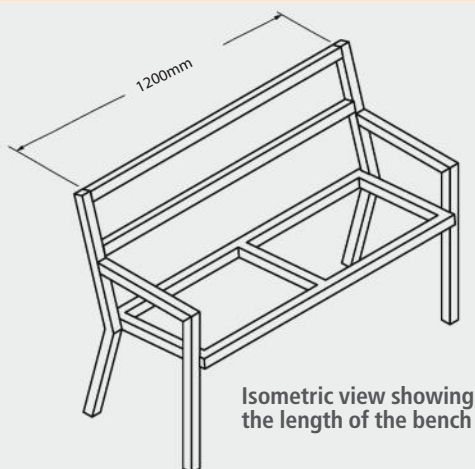
Setting the angle for the seat frame



Welding the seat frame to the leg



Clamping the other leg to the frame



Isometric view showing the length of the bench

Leg angles

With the seat frame welded, I welded the front leg and the armrest. These are straightforward at 90° to each other. Then I tackled the back leg. The back leg is at 75° to the horizontal, which means it is cut to a very convenient 15° , which by coincidence is the inclination of the backrest so it too is cut to 15° . Saved a lot of fiddly setting up on the bandsaw. With the back-leg assembly it is worth using the finished leg to check the set-up of the other just to ensure that they are both the same.

Although you have cut the angles as closely as possible there are still opportunities for things to go awry with

distortion, etc. Even though this is quite a small-gauge steel I still wanted to bevel the edges to create a 'V'-groove. It's not strictly necessary with this gauge and you could burn through if you have the current set too high but it does guarantee that you have good penetration.

I attached the front leg with the armrest to the backrest using a board clamped to the bench to make sure the ends of the legs were level. I considered all sorts of ways of assembling the seat frame and the legs and pondered setting up both legs and clamping the seat frame between them. If the seat frame had been any longer I might have had to do so, but in this instance I was able to use the table

**FROM FRESH
NEWSPAPERS TO
ALL NEW MUSIC RELEASES**

ONLY ON

AVXHOME.IN



**OUR SEARCH SITE HELPS
TO FIND ALL YOUR
FAVOURITE MAGAZINES**

SOEK.IN

JOIN US ON

FACEBOOK



Welding the underside of the frame

and attach and clamp the seat frame to one leg first. Measuring the seat angle was another matter and I took some time to check that the angle was right using the armrest as a reference; it's supposed to be level. I welded the frame to one leg assembly and the second one I set up on the floor.

Stable structure

I wanted to ensure that the legs were stable and that I didn't inadvertently create a wobble by being marginally out when I attached the other frame to the other leg. I checked and checked again and clamped the frame to the leg and spot-welded it in place. The



The finished frame

Steel is far stronger than wood and I think sometimes it is easy to over-engineer things



Welding the mid rail



The tack-welded frame

whole structure remained stable so I proceeded to weld the frame to the leg.

With the basic structure in place I added the top rail and the mid rail and the frame was complete. In earlier versions I had included a lower stretcher between the front and back legs tied together with another rail. In fact, I cut a stretcher for that purpose but with the frame complete I felt it didn't really need it. Steel is far stronger than wood and I think sometimes it is easy to over-engineer things. All the stretcher would have done is add more weight. If this had been a wooden structure, I would have included one to help tie the legs together.

For the seat slats I bought some 65mm kwila. Other hardwoods would do equally well — it just happened that my local timber yard gave me a good deal on these short lengths of kwila. The seat is 1200mm exactly and the back slightly more at 1280mm. One piece was marginally less than 1280mm so I adjusted all the pieces of the backrest slats to match so the back doesn't quite extend to the ends of the back frame.

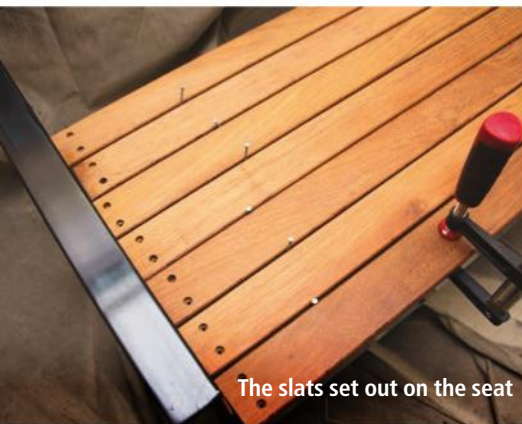
To fix them to the base I found some self-drilling and self-tapping screws. Kwila will split if you try to drive a screw through it close to the edge so I drilled each piece to fit two screws. I



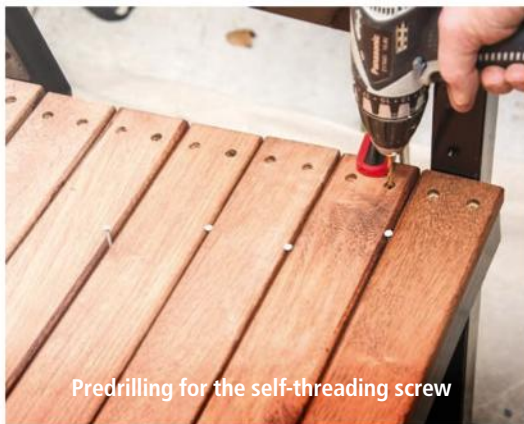
Drilling a 4mm hole for the screw



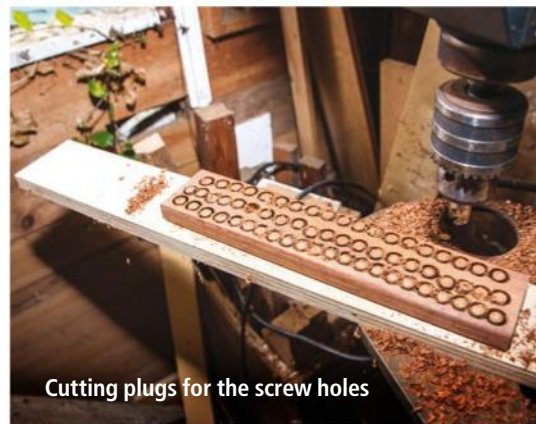
Drilling the 9.5mm countersink



The slats set out on the seat



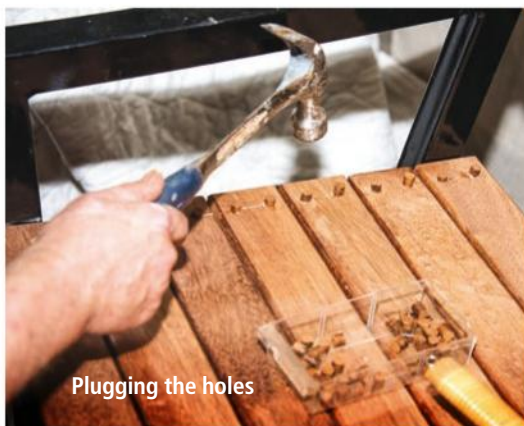
Predrilling for the self-threading screw



Cutting plugs for the screw holes



Releasing the plugs



Plugging the holes



Cutting the plugs flush

drilled a 4mm hole first to fit the screw and then a 9.5mm countersunk hole to sink the screw head.

Slat spacers

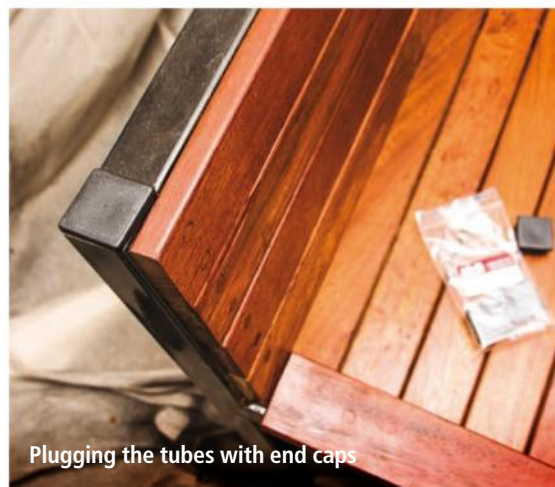
The kwila was water and sap stained so I sanded each piece before attaching it. Meanwhile I painted the seat frame in rust-inhibiting paint. I fitted the slats with spacers between them — 2mm flat-head nails work well and are the tried-and-trusted method of most deck layers. Although the screws are designed to drill their own hole I found it took quite a while to do, so I pre-drilled each hole for the screw just enough to give the self-drilling

end less work to do. Make the holes you drill undersize because the screw has to cut its own thread. The screws are hardened to allow them to do this.

Next I fitted the armrests and then filled each hole with a plug cut from the off-cuts of kwila. These plugs serve both to hide the screws and seal off the holes so water can't penetrate. After cutting the plugs flush, sand the area to remove any vestige of the plug and the marks of the saw. With all the slats attached and the plugs sanded I gave each slat another sand with 120 grit using a random-orbit sander and oiled the slats with stained decking oil.

I fitted plastic end caps to the open ends of the tubes, including the feet. These tube caps are available from Hi-Q (hiq.co.nz).

The bench is as comfortable as I hoped it would be. The only change I would make is to make the seat a little deeper and maybe I was a little too conservative with the seat angle — it could be more than 5°. Overall I am pleased with how the bench turned out. It was quite simple to make and it's a good welding project. It has given me some insight into anthropometric design too and I might well make another incorporating the lessons I learnt here. 



Plugging the tubes with end caps



The finished bench oiled

BOC Smootharc Elite® Multiprocess 180 Pulse



Features

- Light industrial use
- MIG/MAG standard, MMA and TIG (Liftarc)
- Pre-programmed welding tasks
- Perfect for stainless steel and aluminium
- Pulse welding

Also Features



impuls®

Controlled, short circuit-free pulse arc for all positions, resulting in minimal spatter.

Part No. **091-005135-00032**

Package consists of:

- Power source
- MT221G 3M EZA M6 torch
- Work return lead
- Gas nozzle, innershield
- Regulator and Gas hose
- Operating manual



3 YEAR CONDITIONAL WARRANTY

Full three year guarantee

Our welding machines embody top technology at the highest level. Each product is carefully checked to ensure quality is maintained.

\$3,517⁴⁸ Inc. GST
\$3,058.68 Exc. GST



Add a reel of BOC MIG Wire for just*

- 5 kg Handi Spool

Part No. 0.8 mm **1081150** 0.9 mm **1091150**

\$115* Inc. GST
\$1.00* Exc. GST

*Offer applies to one reel of either 1081150 or 1091150 wire only. It is not valid for further wire purchases and is only valid on purchase of the Elite Multiprocess Machine part 091-005135-00032. Promotional offer only valid until 30 May 2017.

Shop online at **boc.co.nz**



Ted holding a model resembling an American P-51 Mustang



sky high

MAKING AND FLYING MODEL PLANES GETS THE ADRENALIN GOING

By Sue Allison

Photographs: Juliet Nicholas

Ted Perry heard the planes before he saw them, howling in the skies above his house on the outskirts of Christchurch. A recce to the nearby Halswell Quarry to investigate launched a compulsive new hobby making radio-controlled aircraft.

That was about 15 years ago, when the retired surgeon with a lifelong interest in woodwork and a host of hobbies already under his belt was in his mid 70s.

As a youth, motorcycles were Ted's passion. Later he became one of Canterbury's early jet boaters

("In the days when you could have the Waimak to yourself"). A keen fisherman, he tied his own flies and made rods. After moving to a lifestyle block, he grafted walnuts and went on to become president of the New Zealand Tree Crops Association. Along the way, he took up skiing and did an intense post-retirement stint golfing. "My life has been a succession of excesses. I go overboard with certain things," admits the now 89-year-old.

"Motorcycling and jet boating were exciting, but I think flying these

model planes is the most exciting thing I've done. It's not a relaxing hobby but it is exhilarating. If I was 60-years younger I would get into the air myself but I think it's a bit late."

Drawing plans

Ted's first radio-controlled aircraft was a kitset glider, which, without a motor, used elevator and rudder controls, as well as wing tilt to catch the thermals required to stay aloft. "It was a bit of a disaster and crashed after a few flights," he says. Since then he has made about a dozen



The longerons hold the vertebrae in place

*“They’re not as light
as balsa but stronger
so you can cut it
finer and use leaner
dimensions”*

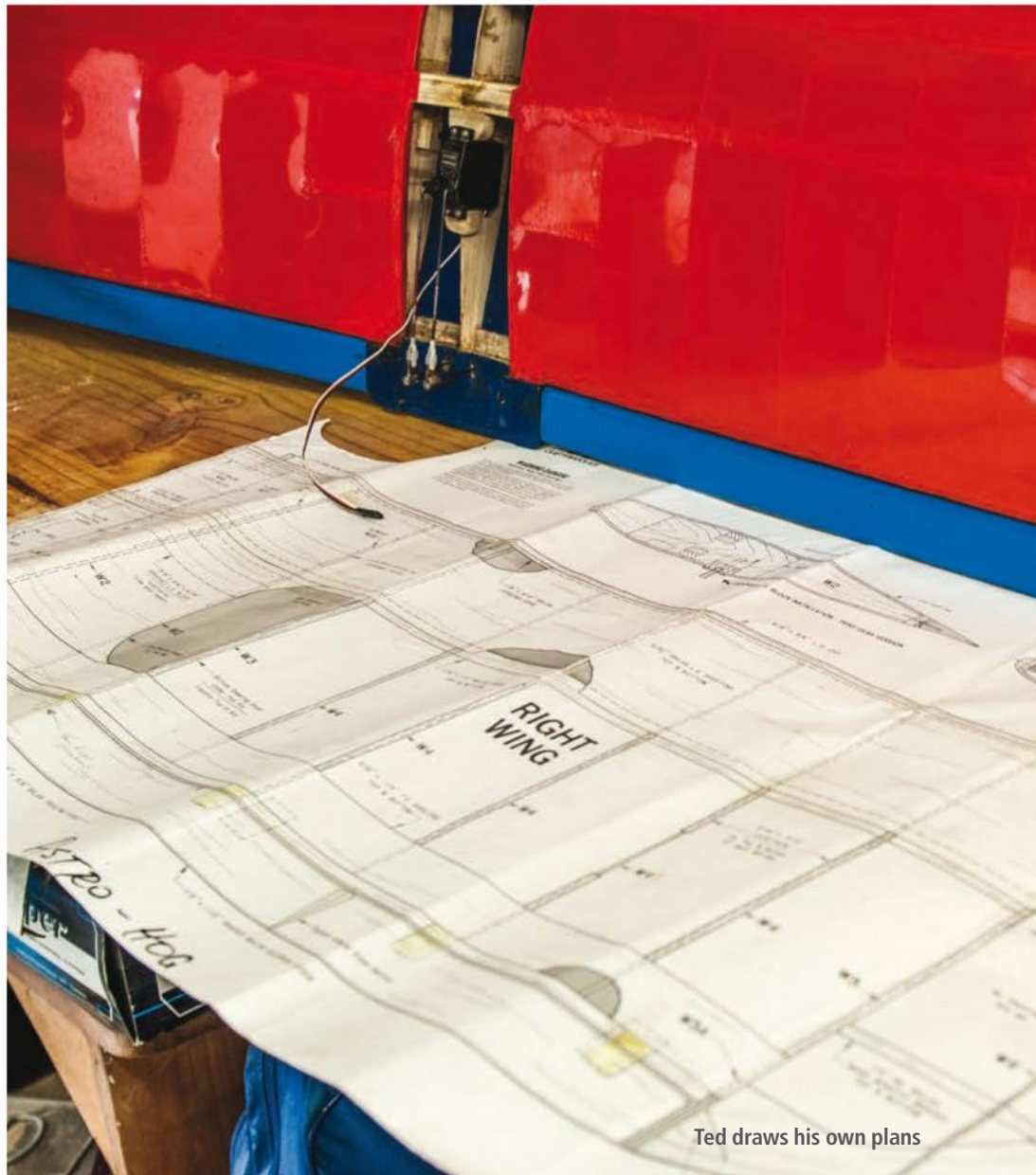
aircraft, as well as a radio-controlled yacht, almost all to his own design.

“I felt, in a way, [that] it was cheating using someone else’s plan. Perry perversity makes me want to start from scratch, although the models I make using my own designs do tend to crash very early.”

Most people use balsa wood to make their models. “It’s the lightest of all timbers, but that’s because it’s not dense and therefore not very strong,” he explains. Ted prefers to use paulownia and poplar, both salvaged from trees on his former lifestyle block: “They’re not as light as balsa but stronger so you can cut it finer and use leaner dimensions.”

After drawing up plans in two profiles, from above and a side elevation, Ted uses his band and fretsaws to shape the formers that make up the framework of the fuselage. The vertebrae are held in place with an outer skeleton of ‘longerons’ (or stringers), which are thin strips of wood tapering to the tail. “I use poplar for the longerons as it is dense and almost unsplitable,” he says.

While some model-makers use two-pot epoxy glues, Ted finds ordinary PVA does the job: “It’s ideal because it makes a firm union that is also slightly flexible, which gives the model a little bit of give, which takes some of the stress, especially when landing.”



Ted draws his own plans

Paulownia and poplar are the preferred timbers





Wings and tail added

The tail is then constructed with a stabilizer (horizontal part), fin (vertical part), and rudder.

The wing is a separate construction and can be of various dimensions — long, short, or delta shaped (triangular). It either sits on top (high wing) or is attached below the fuselage (low wing). “A simple rectangular wing is the easiest to make and to balance,” says Ted. “A low-wing model is harder to fly as the centre of gravity is above the wing. It’s more stable if the wing is on top.” The wing is attached with light plastic bolts.

Three motors

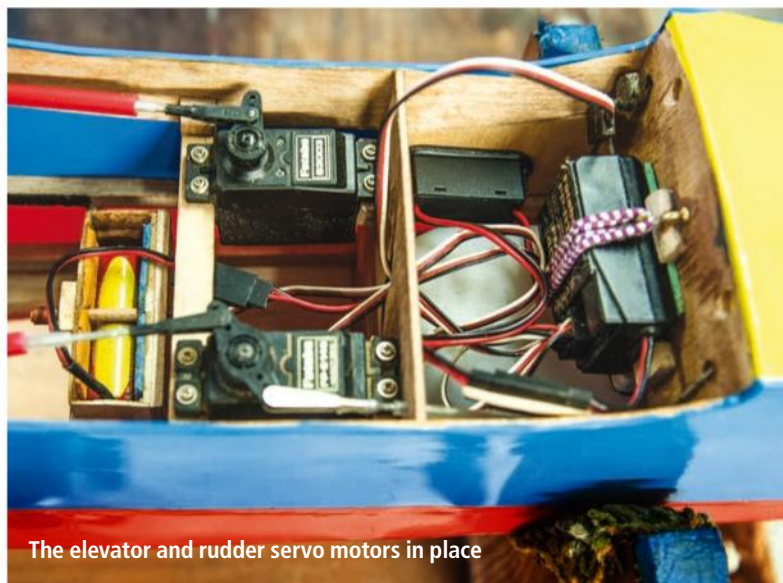
There are two ways to steer a plane, either by using the rudder or by tilting the ‘ailerons’ (French for ‘little wings’). These are hinged sections at the trailing edges of the wing that are used in pairs to control the roll of the aircraft. “It’s the most reliable way of turning your plane,” Ted says. “If you don’t have ailerons, the wings must be at a dihedral angle [sloping up from the horizontal].”

Each model aeroplane requires three electric servo motors to operate the throttle, elevator, and rudder. “Some

“The most important thing is balance. If you have that right, it will probably fly”



The plane gradually takes shape



The elevator and rudder servo motors in place



The circular saw ...

... and drill press
come in handy

guys make their own engines but you can buy excellent little Japanese-made motors from model shops," he says. Either two-stroke or four and around 5cc, they are made of light aluminium.

"I try to avoid weight at all costs. The heavier a model is, the faster it has to go to stay aloft. As I've got older and my reflexes are a little slower and my eyes not as sharp, I like something that flies slowly so I can keep it close," Ted explains.

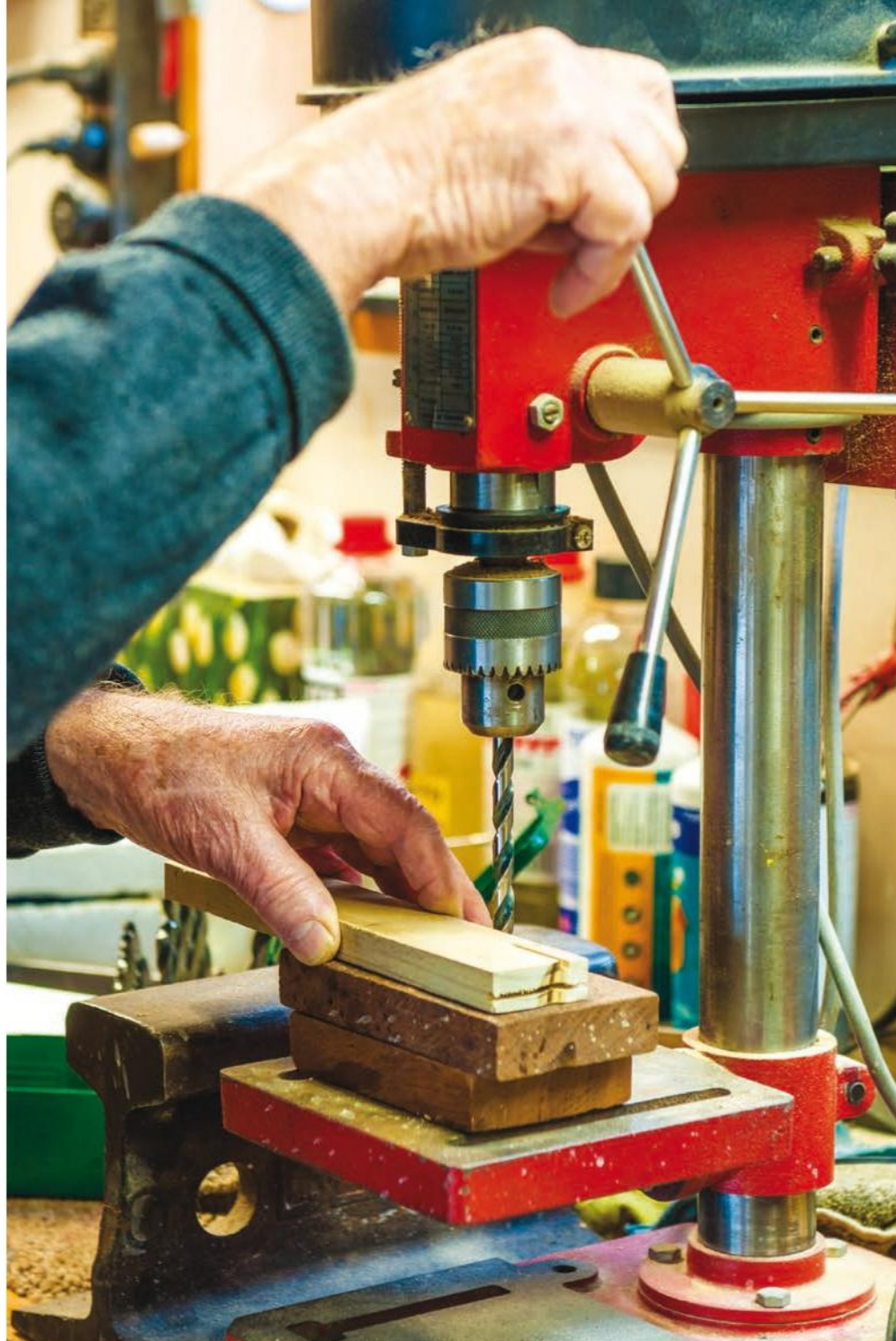
A metre-long plane ends up weighing about 1.5kg.

"The most important thing is balance," he says. "If you have that right, it will probably fly." The main engine is placed near the nose with the fuel tank close by and the servo motors and battery positioned so the centre of balance is about a third of the way back from the leading edge of the wing: "That means [that] the balance is ahead of the centre of lift so the plane is slightly nose-heavy. If a plane isn't nose-heavy it won't turn properly and will misbehave all the time."

Fuel tank

Some radio-control modellers attach the receiver and aerial unit to the outside of the plane, but Ted prefers to have his inside the fuselage and makes a hatch for easy access to the mechanism.

He uses methanol as fuel, carried in four-,



six-, or eight-ounce (118, 177.5, or 236.5ml, respectively) plastic tanks. "You always balance the plane with an empty tank so, as the fuel is used up, the plane remains nose-heavy and won't end up stalling."

In the old days, tissue paper was used for the skin but now coloured plastic with adhesive on one side is ironed on, the heat stretching out any wrinkles. Yellow is the most visible colour in the sky.

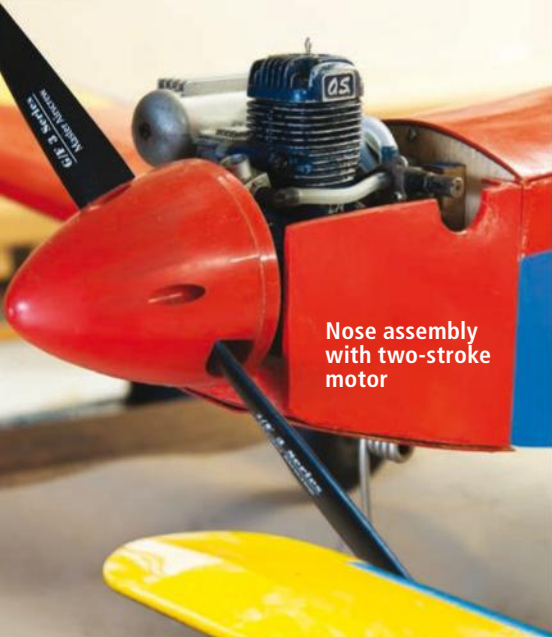
While Ted has turned his own wooden wheels in the past, he now opts for ready-made plastic and steel sets.

The propeller is made of tough plastic. "Most modellers have scars on their fingers from inadvertently putting them

in the propeller," he observes. A simple electric starter motor fits on the nose of the plane and, once fired up, a light plane can take off within a few metres and fly for up to 15 minutes.

Flying buddy

Ted's flying buddy is Derek Hamilton, a 92-year-old model aircraft enthusiast who had trained as a pilot at the end of World War II. "Derek offered to give me a hand when I was first interested and I've been hooked ever since." They fly at the Christchurch Model Aero Club, where members get together weekends and midweek at The Willows on the south side



Nose assembly with two-stroke motor



Servo motor operating the ailerons



Ready for take-off

“Very few die of old age. But I do seem to have had an abnormal number of crashes”

of the Waimak River. “The really good fliers are extraordinarily skilful,” says Ted. “Although it’s a sport that doesn’t attract many kids, those who do get into it are very good. Older people like me tend to go on a Wednesday morning when there aren’t too many critical observers.”

Essential to successfully piloting a model aircraft is imagining that you are actually in the plane, he says: “Flying the model away from yourself is relatively straightforward, but if it’s coming towards you the controls are reversed. I thought I would never get the hang of it but after a while it becomes instinctive.”

The transmitter’s range can be over a kilometre but a plane out of sight is almost impossible to control. “You’ve got to keep them close or you have no idea if they are responding. I’ve only once lost a plane but luckily it had landed beautifully in a neighbouring paddock,” he says.

Almost every plane is destined to crash

in the end: “Very few die of old age. But I do seem to have had an abnormal number of crashes.” Aside from design faults, the little aircraft face hazards such as trees, fences, and telephone wires or can come to grief landing on stony ground.

Frequencies

Interference from fellow fliers is something the aero club goes to great lengths to avoid, with boards posting frequencies of attendees. “Very occasionally the frequencies are close enough that you find you are flying someone else’s plane, which is unnerving. I think that did account for one of my crashes,” recalls Ted.

His most tragic was that of a delta-wing

plane, which had taken four months to build, that crashed on its maiden flight. “The delta looks beautiful but it’s hard to work out the centre of lift. I thought I had it right but I must have had it very wrong. It got it up to about 60 feet [18.2m] then suddenly nose-dived. It’s all a matter of getting the balance right, as Derek pointed out as it plummeted to the ground.

“I choked back the tears then took it home, stripped out the reusable parts, and put it in the wheelie bin. I’ve got used to breaking them up. I keep thinking I won’t build another one. There’s a lot of work in them, but I do enjoy making them and I’ve still got a lot of wood to use up,” he says.

“In life, it’s important to always have a project so you go to bed at night excited about what you are going to do the next morning.”



Ted's shed

Ted has tinkered in sheds all his life, from building his first two-cylinder steam engine as a boy to making furniture for his family and go-karts for his grandchildren. Ted's current shed is the garage of the Christchurch home he shares with his wife, Rosemary, 88, an accomplished potter. In their 63 years of married life, 'his and hers' workshops have been a requirement of their abodes, usually with an opening between the two for passing cups of tea.

Ted, who grew up in Hokitika on the West Coast, inherited his love of woodworking from his father: "He was

a handyman, as I am, with a workshop like this but a bit more primitive." He also inherited some of his tools. Perhaps the most historic is a simple anvil made from a piece of 19th-century West Coast railway iron that his father's nephew, an engineer, sliced off for him with oxyacetylene. "It's an excellent anvil, but I think it's responsible for some of my hearing loss. It emits a very high-pitched sound, which would leave my ears ringing for some time," says Ted, who now always wears earmuffs. "Not only does it save your ears but it's much nicer working when you shut out unwanted noises."

Rosemary bought him the Wade metal lathe for £10 at an auction 50 years ago. "It was cheap because the bearings had been broken but it still functions well," says Ted.

Ted's circular saw is an old-style model in which the saw and buzzer cannot operate independently.

He buzzed off a bit of his fingertip in his younger days: "It was the best thing that happened to me. I've been so careful ever since."

His old drill press fell off the bench in the earthquakes so is "a bit skew-whiff" but still does the job.



The MX2 set up to record a time-lapse movie on a slope

A photograph of a wooden folding chair on a patio. In the foreground, a camera is mounted on a dolly, which is part of a travelling dolly system. The dolly is on a metal rail. The background shows a stone wall and green foliage.

In the frame

GETTING TO GRIPS WITH TRAVELLING DOLLIES

By Mark Beckett

Photographs: Mark Beckett

This project started as a conversation about time-lapse photography. I already had a commercial intervalometer (a device that counts time intervals) but hadn't really used it. I was shown the difference a moving shot can make, and thought, this is worth doing.

As with most things, someone has already done some — or all — of the work, and I found lots of references to travelling dollies for video work. I found some really expensive commercial units, and some pretty basic units that might work once or twice.

Finally I ran across this video: vimeo.com/23673555. It shows a camera dolly mounted in an aluminium rail with a fitted slider driven by a belt and motor drive.

The key points about this approach are that it:

- is able to handle large cameras
- allows vertical movement
- is portable
- is easy to set up
- is Arduino based.

It seemed to be a popular option and I even found another site devoted to time-lapse photography: [Timescapes.org](https://timescapes.org). In fact it's a website set up by Tom Lowe to promote his film of the same name (music by Nigel Stanford of Wellington). Within the forum there is plenty of discussion on equipment and techniques. Here I found a detailed drawing of the Igus slider set-up and the motor drive for it and even a list of the parts and software sources. Note that this discussion is six years old and some of the links are no longer extant.



The Igus carriage showing the Drylin bearings



The Igus slider with carriage

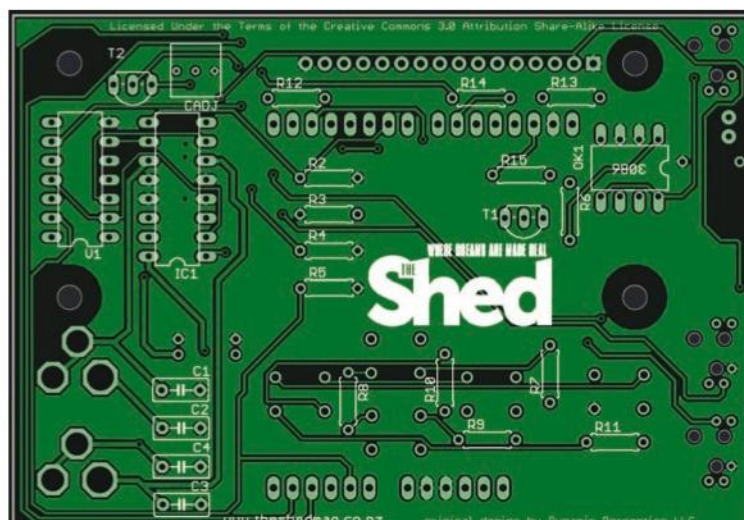
Dolly designs

There are many dolly-rail designs that range from simple PVC pipe to folding square tube. From the various websites and discussions online it seemed that the Igus aluminium slider is one of the more popular. Igus is a German plastics company that makes a long-life lubricant-free plastic linear bearing called 'Drylin'. It's used commonly on an extruded aluminium rail with an aluminium carriage also supplied by Igus.

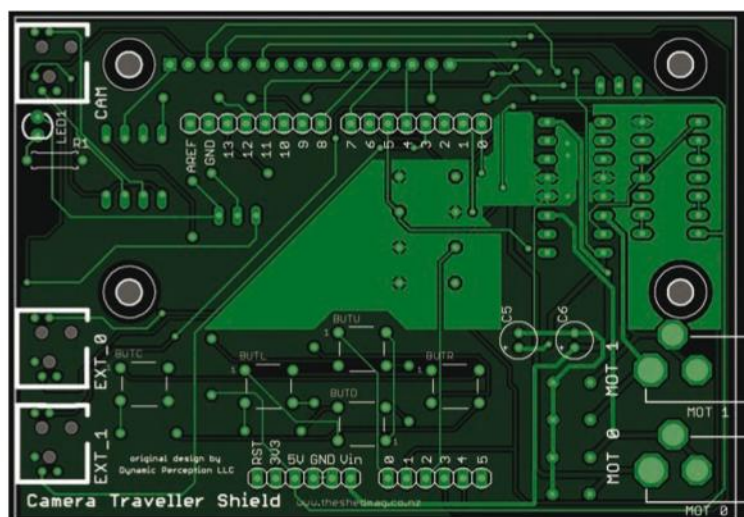
The next question was what length to make it. Too long and it'd be of no use; too short and it'd be wasted. After a phone call to the New Zealand distributor of Igus (igus.co.nz/wpck/6189/filmtechnology) based in Hamilton, I purchased their 1.5m option at \$250 plus GST plus freight.

While some may consider it an expensive piece of anodized aluminium, the cost includes the carriage with its replaceable glides (always think of the future). There are no adjustments or delicate bits to go out of adjustment and the smooth operation reduces frustration. We did look around for other suppliers in New Zealand, since getting long lengths of material posted from overseas can be prohibitively expensive. It seems the Igus is one of the cheaper versions of commercially available rails.

Most of the recommendations I was getting pointed to the Dynamic Perception company and its MX2 controller. It's an



The MX2 circuit board (actual size)





The belt and idler pulley

Technical drawing of a belt bracket assembly, showing two views: a top view and a side view.

Top View Dimensions:

- Overall width: 133mm
- Overall height: 144mm
- Top edge features: 2.5" (63.5mm) and 5mm segments.
- Internal vertical spacing: 48.5mm, 2.375" (60.3mm), and 32mm.
- Internal horizontal spacing: 0.728" (18.5mm), 1.17" (29.7mm), and 87.5mm.
- Internal vertical spacing (lower section): 7mm, 9.5mm, and 16mm.
- Internal horizontal spacing (lower section): 22.75mm.
- Internal vertical spacing (bottom): 60mm and 6.25mm.
- Internal horizontal spacing (bottom): 44mm (distance between two large circles).

Side View Dimensions:

- Overall width: 100mm
- Overall height: 72mm
- Top edge features: 20mm and 40mm segments.
- Internal horizontal spacing: 14mm and 67.5mm.
- Internal vertical spacing: 62mm.
- Radius: 20mm (indicated for the bottom corner).
- Slot: "slot to suit" (indicated for the top edge).

Label: Belt bracket x2

Plans for the dolly parts

Belt bracket x2

can handle the current drain and, if you want to do vertical, ensure it has enough power to pull up and hold the camera.

Dayton motors are available from a variety of sources but I sourced one from Electric Motor Warehouse in Michigan (electricmotorwarehouse.com).

These motors have an 8mm ($\frac{5}{16}$ -inch)

Mechanical assembly

There are several ways for the motor to ‘pull’ the carriage and camera along.



Drilling the plastic washers

I decided to mount the motor to the carriage and use a fixed belt. I used a piece of 3mm alloy for the end plates, with one end adjustable.

The belt has tension along with any vertical load, so it needs to be strong and close to the slider. For proper engagement the belt needs to cover 180° of the drive cog. Two idler pulleys run on the back of the belt and guide the belt while turning it 90° towards the drive cog.

The idlers are 608 bearings, but I found some 624ZZ bearings that allowed a 4mm bolt without spacers.

To guide the belt onto the bearings, I used a hole saw to make some plastic penny washers, and since I lack a lathe (hint for Santa) I mounted them in a battery drill and chamfered them with a file and sandpaper.

The motor plate is also made from 3mm alloy and bolts onto the carriage using the extra holes at each slide. Allow space for the idler pulleys, end-stop switches, and the controller mounting when you lay out your design.

You can purchase belt clamps, but you need to ensure they match the belt. I elected to use a different method, involving folding the belt back on itself around a central spacer and then cable tying it. Whatever method you choose, ensure the carriage can travel the full length without fouling your belt or tripod, or hitting a mounting fixture.

To hold the Arduino and Shield, I bent a piece of 100x100mm plastic and slipped it over two of the motor screws, with a washer above and below. The excess cable was looped and fastened underneath.

DollyShield assembly

The original article used a kit from Dynamic Precision that it used for its MX2 controllers. Unfortunately this has been discontinued.

The next best option is to purchase a complete MX3 controller, which has lots more features (dynamicperception.com/product-p/mx3-option.htm).

If you intend fitting the completed board and controller into a case, you may wish to space the push-buttons off

the board, as they are a similar height to the mounted LCD.

I straightened the button pins and fitted them carefully to ensure they were parallel to the board. This resulted in a height of approximately 1.5mm above the LCD.

Resistors

Start with the lowest-height components, which are the resistors.

The circuit was designed with one-per-cent resistor values and in each case the nearest five-per-cent value will work.

- R1 is 120Ω (this is inserted from the top side of the board)
- R2–R5 are 100kΩ
- R6 is 43.2Ω (use 39 or 43Ω)
- R7–R11 are 499Ω (use 470 or 510Ω)
- R12 is 6.78 (use 6.8Ω)
- R13 is 63.4 (use 62Ω)
- R14 is 2.61K (use 2.7k)
- R15 is 5K (use 5.1K)

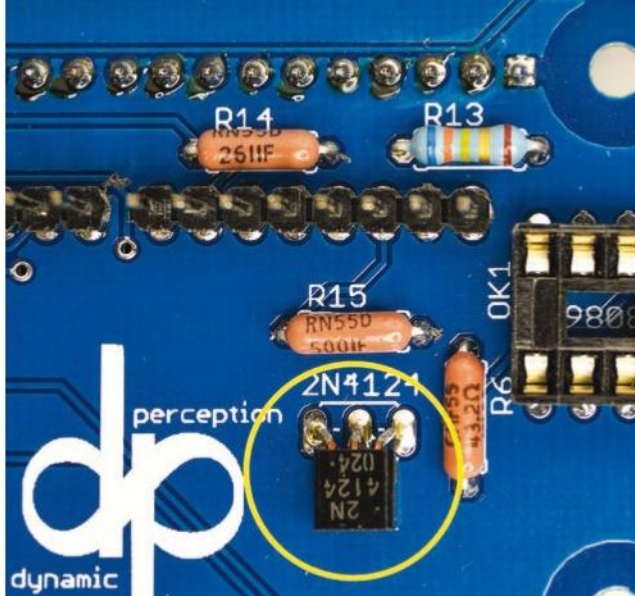
Some of the resistors will require more heat as they connect to a large area of copper that acts as a heat sink.

Integrated circuits

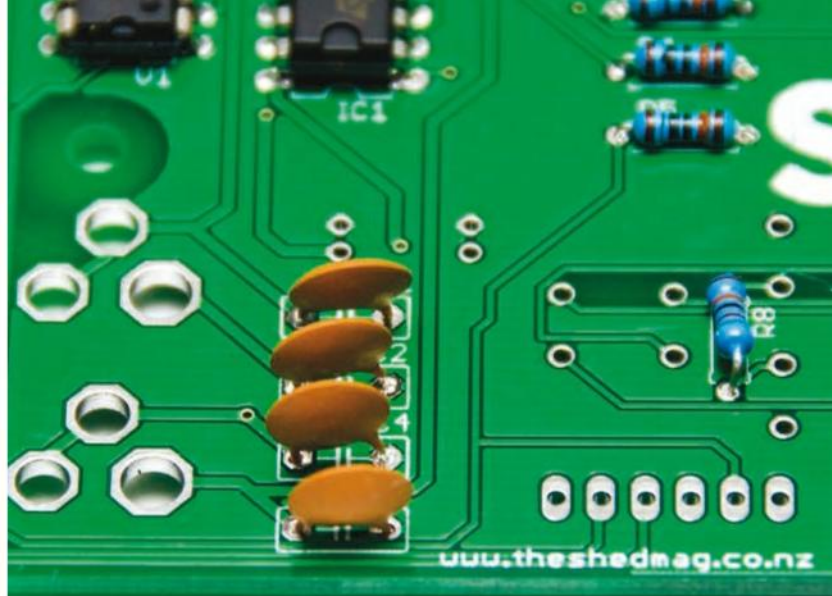
I used sockets for the integrated circuits (ICs; one 8 pin, one 14 pin, one 16 pin) but you can solder them directly onto the board. Note: the notch end goes to the middle for U1 and IC1, and to the outside



Belt end



T1 bent over to the clear the Arduino controller board



The 100nF capacitors

for OK1. Solder one corner and the other diagonal corner and ensure they are flush with the board before soldering the other pins.

I used a nut and two washers (total 3mm) to hold the LCD above the board before soldering the connector. The LCD contrast control pot is CADJ and is 10k.

T1 and T2 are 2N4124. For T1, I bent the leads 90° and mounted it flat to clear the Arduino controller.

Capacitors

Fit the four 0.1μF (100nF) capacitors into C1–C4.

Turn the board over and fit 100μF 16V

Electrolytic caps into C5 and C6 and note the '+' marking, which is the longer lead. The '-' mark on the capacitor body should be facing the middle of the board.

LED

I fitted a 3mm LED into LED1 and bent the leads 90° so it faced outwards.

The silkscreen is difficult to see but the flat side of the LED goes to the middle of the board.

Push-buttons

I found a 17mm long switch cleared the LCD and gave more case options.

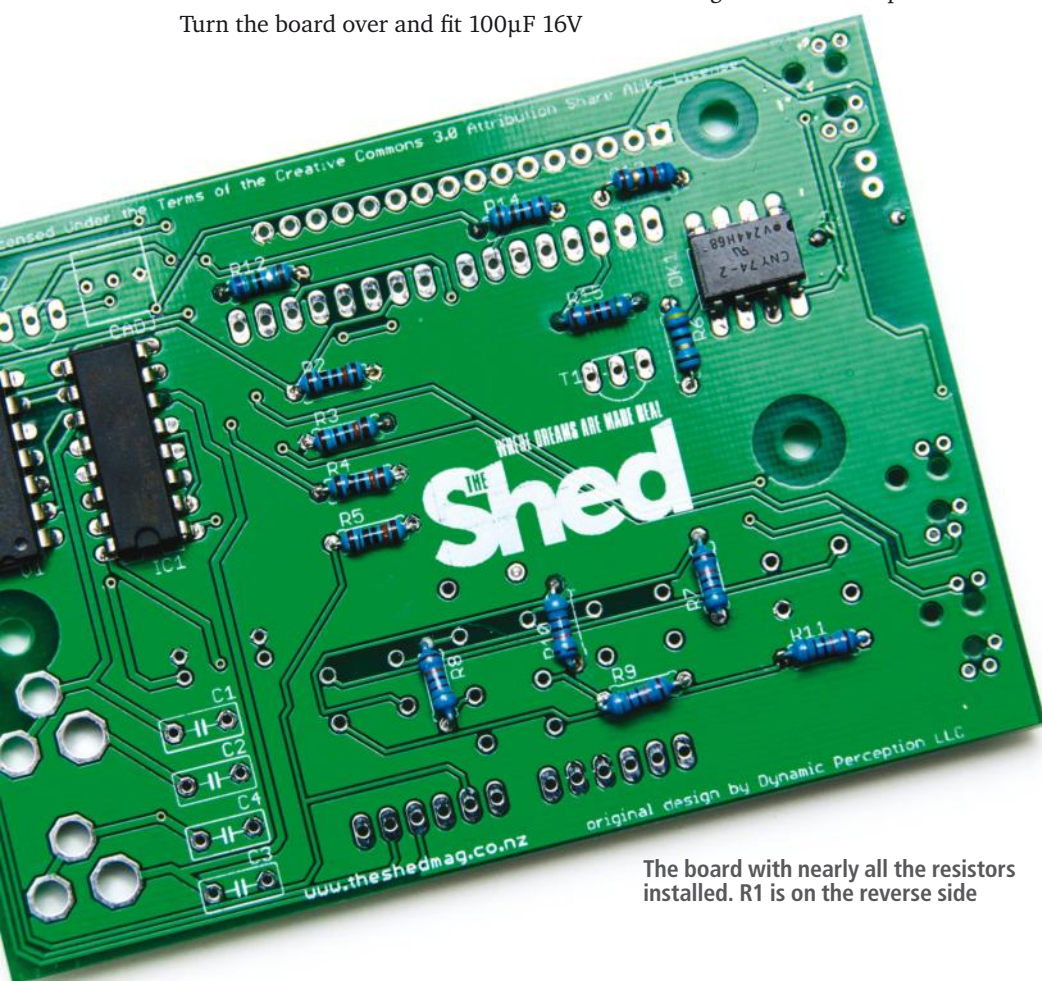
These are available from Element14 (nz.element14.com; part No. 2056822). There are five in total and they act as a jumper, so use the right version switch with four pins.

Connectors

You need to solder the connectors that connect the shield to the Arduino before fitting the LCD. I found it easier to fit the headers into an Arduino and place the shield over it, with the pins just sticking through. You will need to slide the plastic down after soldering all the pins. Solder one end of each set and check before soldering the other end.

Carefully remove the shield and pins from the Arduino and then solder using plenty of heat and solder. The solder should flow through to the other side.

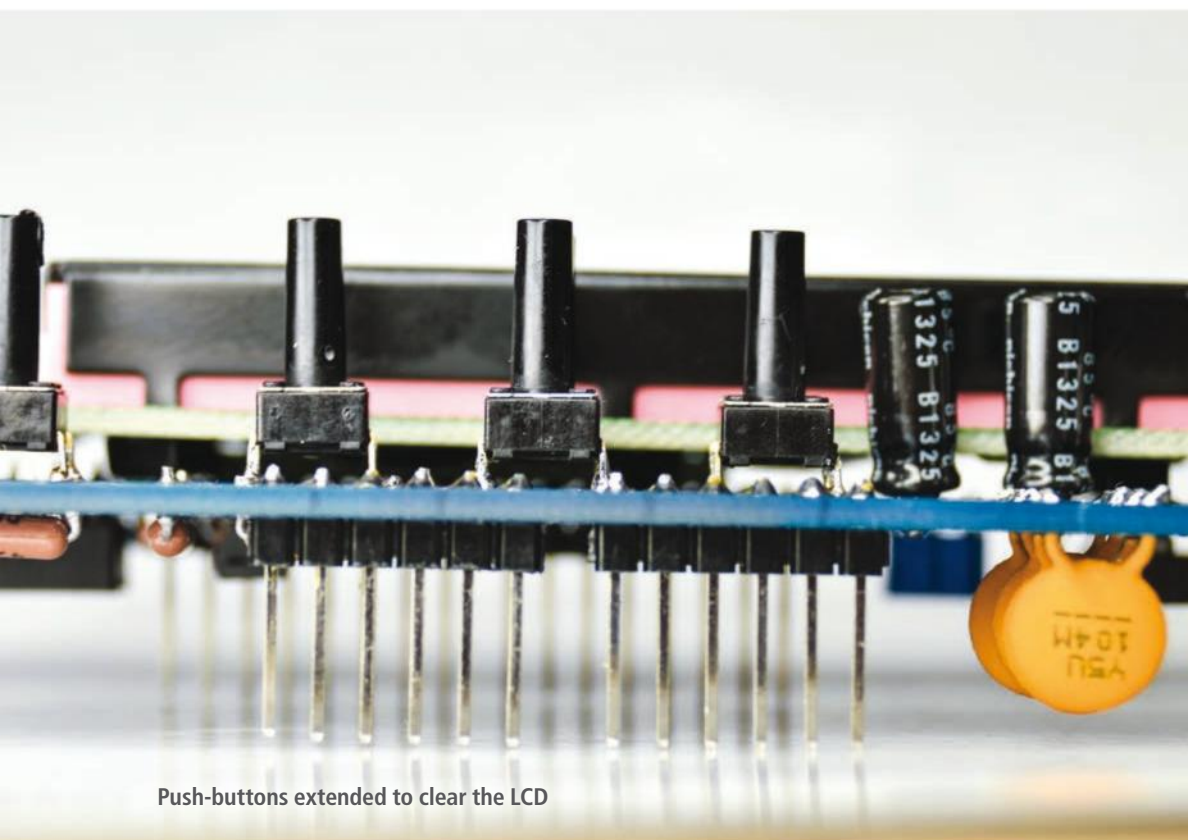
You can then carefully slide the plastic down, working from side to side and



The board with nearly all the resistors installed. R1 is on the reverse side

Open-source pitfalls

I think open source is great, unless you are the leader or a commercial business dependant on sales of the latest gadget you've designed. You've spent a considerable amount in time and resources developing this gadget, and then you make it open source so that every hobbyist can copy it and possibly make dollars from selling it. So if you are saving money and using an open-source product or kitset, don't expect the original company to provide support and a warranty ... that's the quickest way to kill it.



Push-buttons extended to clear the LCD



moving it a little each time. A third connector is soldered with the pins upwards to accept the LCD. For this, solder one end and then straighten it and solder the other end before soldering all the remaining pins.

Sockets

The motor sockets M0 and M1 are simply 2mm centre DC power sockets.

Element14 has a version (part No. 1737246) but whatever you use try

to match the cable and socket at the same time.

Hold the socket onto the board to provide mechanical strength in service and solder one pin, ensuring the socket is flat on the board, before soldering the other pins.

It is advisable to wait and let the joint cool before soldering another pin.

Tip-ring-sleeve sockets

Inserting tip-ring-sleeve (TRS) sockets is hard and I found angling them to ensure

the pins were in place, before applying pressure to get the rear snap in, was the only way. Don't be alarmed by the extra hole on the one closest to the LED.

Inspection

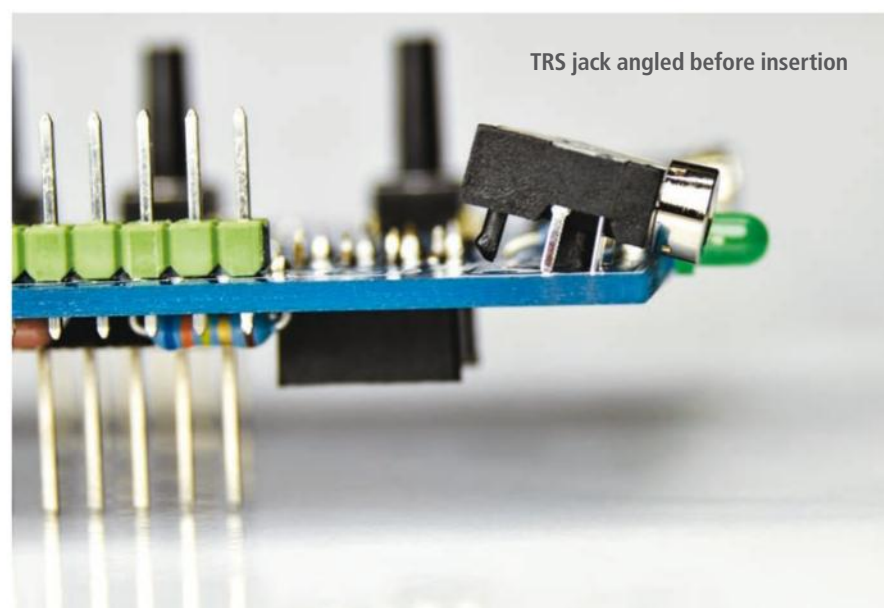
Before soldering the LCD onto the board, it is advisable to check your work. Look for any solder joints that might require attention and any component leads that missed getting soldered. It's always a good idea to remove the excess flux and residue from the board. This provides the assurance that all the joints are soldered. Also, over time the moisture will break down the flux and can cause issues. There are commercial products you can use, but meths and an old toothbrush work very well. After any cleaning you should stand the board on its side and let it dry before applying power.

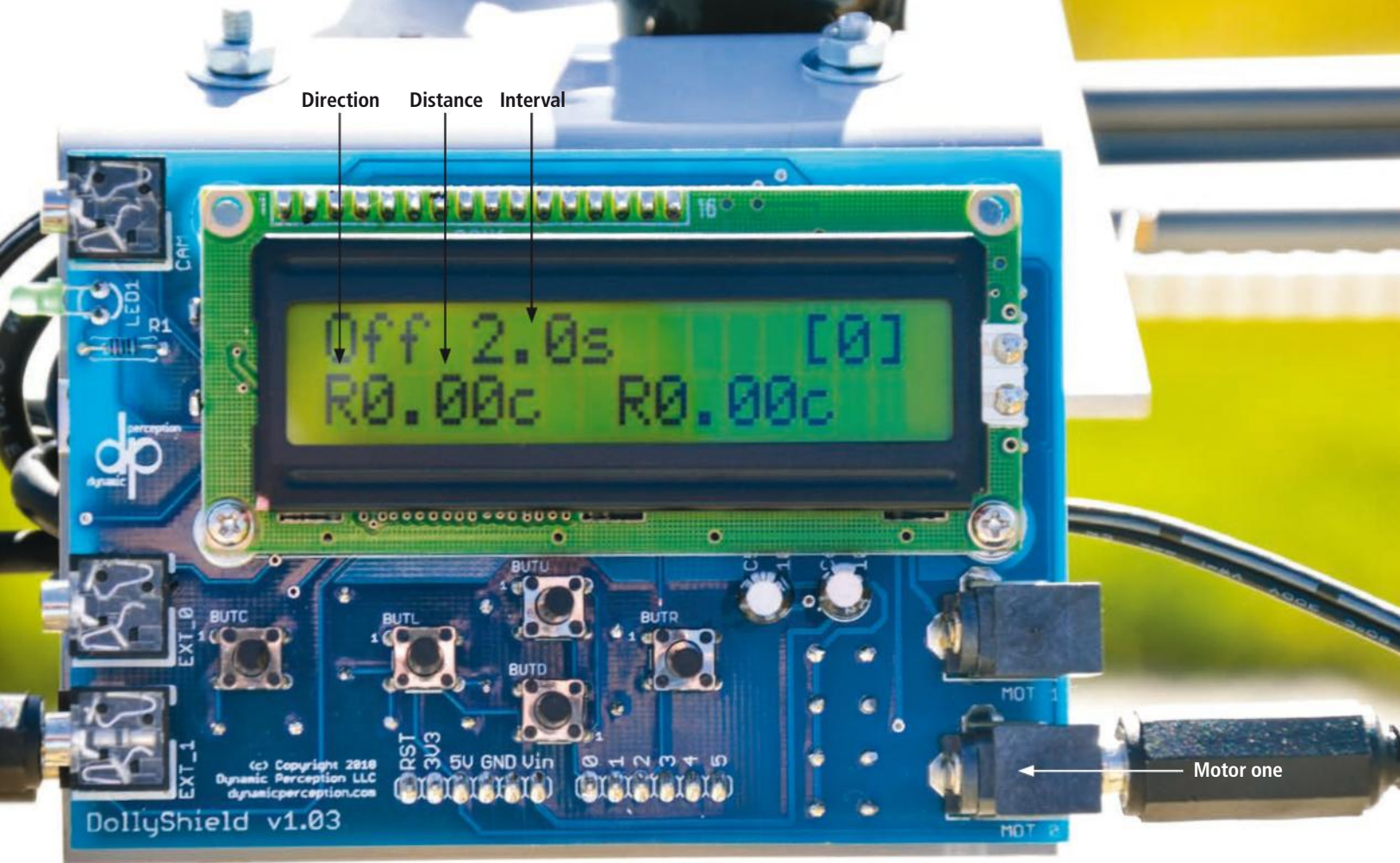
The last job is to fit the LCD.

LCD

You will need to mount the LCD before soldering the connector.

My original kit had shorter buttons, but a 4mm spacer between the LCD and board should ensure the metal surround doesn't short to R5.





Mounting

To hold the Arduino and shield I bent a piece of 100x100mm plastic and slipped it over two of the motor screws, with a washer above and below.

The excess cable was looped and fastened underneath.

Power

The power is applied to the Arduino and this is passed to the shield and the motor(s). I used a 12V gel cell and made a long lead to allow full travel and avoid having to step over the battery. I would strongly suggest covering the terminals to prevent accidental contact with metallic objects. You may wish to include a Velcro loop to support and stop the power lead being pulled during traveller movement.

Testing

When you connect the shield to an Arduino, you'll need to load the software and adjust the LCD contrast. Test each button to ensure it works.

The software includes a calibration routine for the motor, so there are no other adjustments required on the board.

Congratulations: you are nearly ready to start taking moving still photos or video.

Cables, end-stop switches

You will need a suitable cable to connect to your camera.

If you already have an external remote, you can adapt that by inserting a plug and socket in the line or, as I did, adding a socket out the side of a wireless unit I had.

I then made a suitable cable to go to the 2.5mm stereo plug that is inserted into the 'CAM' TRS jack on the DollyShield board. TRS (or stereo) jacks have a tip, ring, and sleeve (body). For the camera, connect Focus to the tip, and Shutter to the ring, while the common goes to the sleeve.

The software allows for two end-stop switches to be fitted and these mount to the carriage. I used a couple of readily available microswitches, which strike the belt fixing bolts. They are wired in parallel to the ring and sleeve of a second 2.5mm stereo plug and they operate 'Int1' on the Ext1 socket.

Arduino software

The software will work with most controllers (there are issues with Uno below R3), but the Dynamic Perception updater only works with a Uno. You can

use the Arduino IDE ver. 1.0 (or above) to programme it.

Extract the files and copy the three Libraries into the library directory *before* starting the IDE. You need to copy the DollyShield directory containing the .ino files into a folder called 'DollyShield' and then open DollyShield.ino, which should open all the other files it needs.

Be warned the compiled size is 30,510B — that leaves just 210B.

Set the LCD contrast pot to fully clockwise and, assuming you have everything correct, you should see a start-up screen. The set-up instructions are here: support.dynamicperception.com/hc/en-us/categories/200048324-Controllers.

When I started on this project I thought the software would be simple. You specify the number of shots, total time, then move and fire the trigger. Dynamic Perception's software does so much more. You can calibrate the amount it moves horizontally, 45° and vertical. This allows you to set the distance between shots. You can set the start/stop ramp speed along with the travel speed for video.

These are just a few of the features — many more than I would have thought and all open source!

Components required



QTY	VALUE	PACKAGE	DESCRIPTION
5	SKHHDTA010	SKHH	Alps — SKHHDHA010 — switch, tactile, 6x6mm, vert, blk
3	161-2508-EXTHRU-HOLE-PCB-RA	PCB-HORIZ	Connector, RCA/phono, jack
1	L293E	DIL16	Push-pull driver
1	LCD-16X2	LCD-16X2	1x2 parallel LCD black on yellow
1	3mm LED	LED3MM	
2	RAPC-712X	RAPC712X	Switchcraft — RAPC712X — connector, DC power, jack, 5A
1	3086	DIL08	Vishay — CNY74-2H — optocoupler, dual, transistor O/P, 5.3KV
2	2N4124	TO92-EBC	on semiconductor — 2N4124G — transistor, NPN, TO-92
1	Power	1X06	Six-way header pins
1	Analog	1X06	Six-way header pins
1	Digital_0_7	1X08	Eight-way header pins
1	Digital_8_13	1X08	Eight-way header pins
1	74HC00N	DIL14	NXP — 74HC00N — IC, 74HC CMOS, 74HC00, DIP14, 5V
4	0.1μF	C5B3	Capacitor
2	100μF 16v	E2-5	Electrolytic capacitor
1	10k	3362W	¼W resistor
1	120Ω	0207/7	¼W resistor
4	100k	0207/7	¼W resistor
1	41.5K	0207/7	¼W resistor
5	500Ω	0207/7	¼W resistor
1	6.2	0207/7	¼W resistor
1	62.5Ω	0207/7	¼W resistor
1	2.6k	0207/7	¼W resistor
1	5k	0207/7	¼W resistor



The rail and carriage assembly.
Note the excess belt

Set-up

The first thing to set in the software is the Metric (Menu Settings > Metric to On) and set the end-stop switches (Menu Settings > I/O2 to Stop). You should then repower the controller to pick up the new setting. While some of the menus still display inch per minute (IPM) I found the calibration to be in centimetres.

For the calibration I suggest sticking a length of masking tape along the middle and moving the carriage to the centre. I used a steel ruler on its edge to mark both carriage positions before running the calibrations (0°, 45°, and 90°).

My drive cog was quite small; hence the default figures are much larger.

I got: steps 1+2=0.5, 3+4=0.9/1.3, and 5+6=48.4/42.7cm.

Motors are not the same in both directions so you can expect some variance in left versus right figures. Be aware that as soon as you enter the figure it goes to the next stage, which is the opposite direction.

Steps 1+2 and 3+4 are at slow speed, while 5+6 is at your full speed/distance setting.

Conclusions

The effects achievable are very different and the post-production (convert to a video) does take some experimenting. If I were to repeat this exercise, I would

ask that the carriage isn't drilled for the tripod screw, which allows some flexibility to tap it yourself. The rail came with three holes tapped for my tripod. I used two of these for the belt holder, but there are 11 other clearance holes you can use, or you can specify where you want the end two placed when you order it.

Dynamic Perception has produced some great videos on using this controller, and while its Stage Zero rail system is different, the controller is the same:

- controller: youtube.com/watch?v=L6hOmskEgWw
- Continuous mode: youtube.com/watch?v=3Xl8AXmg43c
- Shoot Move Shoot mode: youtube.com/watch?v=CgjoK7xlLaQ
- advanced use: youtube.com/watch?v=MVIU_4e7WU8
- post-processing: youtube.com/watch?v=_ART-xXaDsY





For more information, visit: likeapro.co.nz

Leica Q (Typ 116) Titanium Gray

A no compromise compact, the titanium gray Leica Q (Typ 116) Digital Camera wields a full-frame 24.2-megapixel CMOS sensor within its exceptionally portable, and beautiful, body.

Leveraging the power of the Leica Maestro II series image processor, high-resolution, low-noise imaging is possible at sensitivities up to ISO 50,000 and at a continuous rate of 10 fps.



Progear
www.progear.co.nz
3 Railway St, Newmarket
09 529 5055



IT'S BEER O'CLOCK SOMEWHERE

Any layman can stroll down to the local and order a pint, but few brew their own to taste. With the Grainfather Connect all-in-one grain-brewing system, you can brew a professional-quality craft beer from grain, no matter your brewing experience. Recipes are easily created from scratch and you can sync it to the Connect App on your mobile device and be guided through the entire brewing process — allowing you to chuck it all in and simply relax until you're alerted to when the next step is required! Electrically powered and designed to be used indoors, there is no need for burners or hot plates; just plug it in and brew, and there really is no limit to the styles of beer you can make.

The Grainfather Connect all-in-one grain-brewing system is priced at \$1350. For further information, visit grainfather.com.



FORM A STRONG BOND

For those keen DIY masters looking for a clean finish on surfaces that would otherwise be ruined by other securing methods, Selleys The One Adhesive delivers a superior bond strength on any building surface,* taking guesswork out of the equation. It can be applied to wet or dry surfaces and is suitable for interior and exterior applications. The flexible and long-lasting formula is also paintable with water-based paints, so it won't become an eyesore on any surface.

*Not for Polyethylene (PE), polypropylene (PP), polytetrafluoroethylene (PTFE), or permanent water immersion.

Available in a 290g tube for \$19.80, Selleys The One Adhesive can be purchased from Bunnings and selected Mitre 10 stores nationwide, or visit selleys.co.nz for more info.



SANDBLASTING MADE EASY

We've all wanted to have a crack at getting rid of rust and dirt off old car parts, or even etching our names into a beer glass, but never had the means to do so. The Hafco SB-200 Sandblasting Cabinet changes that. Featuring fully sealed side-door access with a secure single-lock latch; an internal cabinet size of 835x510mm; and an internal height of 360–550mm, front to back, this sandblasting cabinet has more than enough room for jobs of all sizes. It also includes a low-voltage internal work light, protective gloves, blast gun, hopper and stand, replacement protective screens, and an assortment of ceramic tips. The hopper effectively recycles your blast-bead abrasive so that you can continue to use it until it breaks down into fine dust — value for money right there!

For further information or to purchase, visit Machineryhouse online at machineryhouse.co.nz/S289 — priced at only \$368.

FOR A SMOOTHER FINISH, GUARANTEED

The exterior of your home and surrounding structures are the first things anyone sees when arriving, and nobody wants to see a bad paint finish. Resene's new Brushing Additive is designed for use with Resene Lustacryl and Resene Enamacryl waterborne enamels when painting trim and joinery by brush. These are traditionally areas that are coated with solvent-borne paints, and while they tend to have good flow and levelling, they are prone to early chalking when used outside. With the new Resene Brushing Additive and Resene waterborne enamels, you can expect the benefits of a waterborne finish with a smoother brushed finish.

Available from Resene ColorShops, Resene Brushing Additive is priced at just \$6.95. For further info, call 0800 RESENE (737 363), or visit resene.co.nz/colorshops.



STAY WARM THIS WINTER

Winter is fast approaching and any tradie will tell you that those cold mornings have some bite to them. Luckily Remington Power has just announced what it's calling the quietest, most-effective solution for portable job-site and workshop space heating — specifically engineered to reduce noise, increase efficiency, and simplify use. The Silent Drive RPH2200DFV series uses the latest tech to directly inject fuel for super-efficient combustion and increased heat output. Don't expose yourself to the elements this winter; work smarter, not just harder.

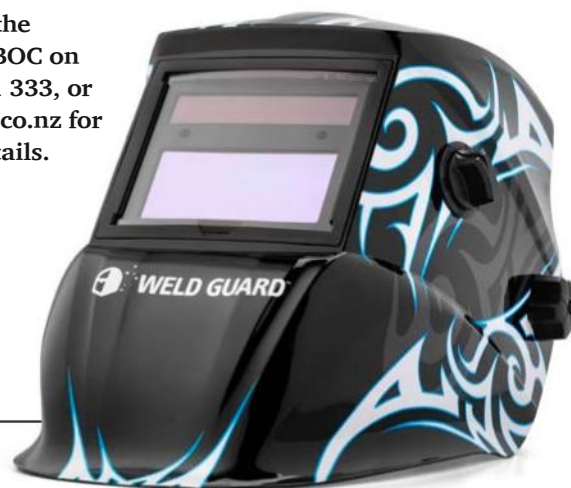
The Silent Drive RPH2200DFV series is priced from just \$1195+gst. For all the finer details, visit remingtonpower.co.nz.



PROTECT YOUR SIGHT THE RIGHT WAY

It only takes one time to realize that welding without a helmet is not only silly from a safety perspective but also bloody hard. Weld Guard's High Impact Welding Helmet (WGWH04) has you covered with an auto-darkening feature making it ideal for manual metal arc (MMA), MIG / metal active gas (MAG), and TIG welding. The variable shade filter lens has a fast switching time, going from light to dark in just 0.3ms — and because welding isn't usually a quick process, this helmet was designed to be comfortable while meeting all standards, including its optional magnifying lenses. It comes with a two-year conditional warranty.

Contact the team at BOC on 0800 111 333, or visit boc.co.nz for more details.



KEEP YOUR BREWS ICY FRESH

If you're a seasoned homebrewer, you'll understand the pain that is cleaning bottles for reuse with the next batch. Forget that business with Mangrove Jack's Kegerator — this cooling fridge unit allows you to pour up to three of your favourite beers at the same time, served delicious and chilled, straight into your glass. The bonus is that your beer matures more quickly, too, so you'll have the lads over in no time! Easy to set up, Mangrove Jack's Kegerator only requires the addition of a CO₂ bottle, then pop in some kegs and you're good to go.

The Mangrove Jack Kegerator is priced from \$769. For further info, visit mangrovejacks.com.





DRILL PRESS revolution

THE NOVA VOYAGER DVR
IS THE WORLD'S FIRST
INTELLIGENT DRILL PRESS

The drill press is one of those tools that we all take for granted. Its design hasn't changed in a hundred years: a chuck on a spindle that is spun by a sequence of belts and pulleys. Now a New Zealand company, Teknatool, has thrown that out with the launch of a revolutionary new concept that has implications for machine-tool technology across the board.

The Nova Voyager DVR 18-inch pedestal drill press is a complete rethink of the tool that will set the benchmark for the future. At the heart of the Nova Voyager is the Digital Variable Reluctance (DVR) two-horsepower motor developed by Teknatool to power their very popular Nova DVR wood lathes.

The DVR motor is a digitally controlled, brushless, direct-drive, infinitely variable-speed motor that electronically monitors power usage and keeps the torque constant despite the load, smoothly

driving speeds from 50 to 5500rpm when the knob on the interface is turned.

Computer programme

The motor is programmed via an on-board computer with a touchscreen interface. It can be preset to specific speeds according to what material it is drilling, what drill type is being used, and the size of the hole required. Traditionally bit speed was set with a combination of belts and pulley clusters and was an approximation at best.

However, this drill can do more than merely set speeds. It has a built-in menu of 12 different drill-bit types ranging from twist drills to hole saws to fly cutters. The menu allows you to enter the material you are drilling (wood, plastic, or metal), the size of the hole and the depth, and selects an appropriate speed for that application.

The computer constantly monitors the power to the motor to ensure that the



The drill-bit selection features up to 12 types of bits and allows the user to input the size and material to be drilled



The Pilot Hole mode and Tapping Mode are accessed via the LED screen



Precise control over the speed and torque makes the use of fly cutters easier and safer

The computer constantly monitors the power to the motor to ensure that the torque at the drill bit remains constant

torque at the drill bit remains constant. It also determines the drill depth, warns you when you are approaching the set depth, and stops automatically at the right depth. You can programme the drill to automatically reverse to clear debris once it reaches its prescribed depth.

Automatic start

For repetitive operations the drill can be programmed to start as soon as you pull the quill handle so you can drill a series of precise holes in sequence, such as drilling holes for shelf supports in cabinets or for drawer-slide hardware.

The menu also includes an innovative pilot-hole programme that slows the speed of the bit until it can gain some purchase. As soon as it does, the computer engages the full speed selected for the hole. This avoids the problem of a drill bit's tendency to wander on hard or round materials like steel or metal tube, even when chucked in a drill press. There is also a tapping-assist mode using the drill press to tap threads.

Upgrading

The Nova Voyager has another surprise not normally found on a drill press: a USB port, which will allow the computer programme to be upgraded in the future.

Safety

Safety has been considered too. Built into the programme is the ability of the motor to sense when the work has come loose. The torque change or excessive vibration will be sensed and the machine will stop. There is a large emergency stop on the front too. You can also set a password to prevent unauthorized use — ideal in schools or in workshops with untrained personnel.

Clamp slots

There has also been considerable thought put into other aspects of the press. The very solid cast table has machined grooves specifically designed for F-clamps. The central hole in the table is designed for through drilling. Overall the machine is very sturdy and solid, being made of high-grade cast iron, and this density ensures that there is no detectable vibration at the drill tip. In use the Nova Voyager is very smooth and very quiet; apart from the rotation of the drill bit, the motor makes almost no discernible noise.

This is clearly a machine for the digital age — the world's first intelligent drill press. It is only a matter of time until a drive such as this gets mounted on a mill drill or any number of machine tools.

Specifications

Power	Two-horsepower direct-drive variable-speed DVR motor
Spindle speed	50–5500rpm variable
Direction	Forward and reverse
Swing	18-inch
Spindle travel	Six-inch
Speed range	50–3000rpm is default (option in settings to increase to 5500rpm)
Spindle taper	MT-2
Distance to table	(Max.) 587mm
Distance to base	1040mm
Table size	419x419mm
Tilt table	–45° to +45°
Table rotation	360°
Chuck size	3–16mm
Column diameter	92mm
Base size (LxW)	565x445mm
Power supply	220–240V, 10–15A, two-horsepower







JOB-LIST

© 2004 EWM AG - 0400001


MIG/MAG / Stick Weld


Shielded Metal Arc Weld

Material	Gas	Wire	Ø Wire			
			0.8	0.8	1.0	1.2
Job No.						
Stainless	CO ₂ / He	CrNi	176	1	2	3
	Ar/Ar	90 / 90Z	175	6	8	9
CrNi	Ar/Ar	90 / 90Z - 90/13	24	35		
	Ar/Ar	135	62	63		
Cord-Like / Beaming	Ar/Ar	111	114	115	116	
	Ar/Ar	90 / 90Z - 90/13	115	117		
AlMg	Ar/Ar	111	24	25	26	
	Ar/Ar	111	92	93	94	
AlSi	Ar/Ar	111	90	91	92	
	Ar/Ar	111				

Material	Gas	Wire	Ø Wire			
			0.8	1.0	1.2	1.6
Job No.						
ET15-Ti	Self-Shielded		172	173	174	
ET15-Ti	Ar/Ar	90 / 90Z	182			
E70TC Metal	Ar/Ar	90 / 90Z	237			
GMAW non synergic						
90Z / Ti			188			
8-Metal / SMAA			189			

Bookcase

PLUS
CHECK OUT
magstore.nz
FOR THE SHED BACK ISSUES
\$14.95 + SHIPPING

Best of The Shed

\$19.90

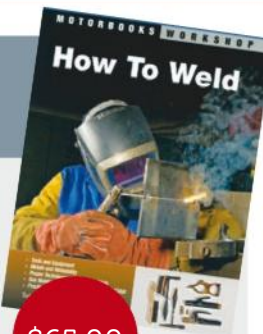
Featuring 18 of the best projects from the last 10 years, *The Best of The Shed* includes all of our most popular projects. With step-by-step instructions, the 176-page book will take you through a variety of projects, including a pizza oven, a trailer, a rocking horse, and a knife.



How to Weld

Learn how to weld with this best-selling book on the subject. Suitable for beginners through to experienced welders, this 207-page book will help you to transform ordinary steel into a blank canvas for invention.

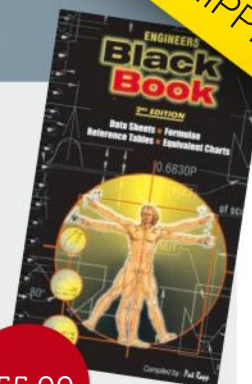
\$65.00



Engineers Black Book

Boasting all of the information you need — including useful tables and templates — this 172-page pocket-sized book is the essential reference for machinists, engineers, designers, and makers.

\$55.00



Professional Sheet Metal Fabrication

The most detailed sheet-metal book available, this 304-page paperback includes clear instructions on a variety of subjects — including directions for using pneumatic hammers, an English wheel, and more. Learn how to form door seams and to make fenders, hoods, and other body parts.

\$75.00



Handy Workshop Tips and Techniques

The ultimate workshop companion, this 320-page book is a comprehensive guide for anything crafted of wood and metal. With something to teach everyone, this book has ideas to encourage and inspire, and clear directions that'll lead you through a project every step of the way.

\$49.00



The Complete Kiwi Pizza Oven

This 288-page book is the ultimate guide to Kiwi outdoor living. Including a step-by-step guide on how to build your own pre-cast oven, as well as profiles of 17 Kiwis' ovens, with their (often hilarious) experiences, recipes, and tips.

\$50.00



ORDER NOW

Online:



Phone: 0800 727 574
Fax: 09 360 1470
Email: subs@parkside.co.nz

Post: Parkside Media,
Freepost 3721, PO Box 46,020,
Horne Bay, Auckland

TITLE	PRICE	QUANTITY
<i>Best of The Shed,</i>	\$19.90 plus P&P: NZ \$6.50, AUS. \$10.00	
<i>Professional Sheet Metal Fabrication</i>	\$75.00 plus P&P: NZ \$6.50, AUS. \$15.00	
<i>How to Weld</i>	\$65.00 plus P&P: NZ \$6.50, AUS. \$15.00	
<i>Handy Workshop Tips and Techniques</i>	\$49.00 plus P&P: NZ \$6.50, AUS. \$10.00	
<i>Engineers Black Book</i>	\$55.00 plus P&P: NZ \$6.50, AUS. \$10.00	
<i>The Complete Kiwi Pizza Oven</i>	\$50.00 plus P&P: NZ \$6.50, AUS. \$15.00	

PAYMENT DETAILS
Total number of items
Plus P&P
Total cost

Name: _____

Postal address: _____

Postcode: _____

Phone: _____ Mobile: _____

Email: _____

Visa ☐ Mastercard ☐ Cheque ☐

Cheques payable to Parkside Media Ltd

NAME ON CARD

CARD NUMBER

EXPIRY DATE

Signature: _____

Terms and conditions

Only while stocks last. New Zealand billing addresses only. Offer available on direct purchases from Parkside Media. See magstore.nz for full terms and conditions.

Order form



SWAP ON THE SPOT

EZISWAP GAS PRESENTS

THE
NEW

B SIZE GAS BOTTLE!

Unique to EZiSwap the new size is ideal for tradesmen or anyone on the go that needs a smaller lighter gas bottle.



The new B size bottles are refillable and swappable with EZiSwap's "swap on the spot" deal. No rental fees to pay, ever.

- ✈ More cost effective than disposables
- ✈ NZ approved
- ✈ Uses a standard NZ regulator

AVAILABLE IN:

- ✈ Argon
- ✈ Argon/CO² mix
- ✈ CO²
- ✈ Nitrogen
- ✈ Oxygen

AVAILABLE NOW
from EZiSwap
stockists
nationwide



**EZiSWAP
GAS**

For your nearest outlet

www.eziswapgas.co.nz

0800 EZI SWAP

NEW **nova™**

18" VOYAGER DRILL PRESS

Accurate performance, meets new technology

The computer-controlled DVR motor is poised to revolutionise woodworking drill presses

Direct drive - no belts

\$2799
INCL GST



Available at
carbatec
THE HOME OF WOODWORKING

www.carbatec.co.nz
0800 444 329
110 Harris Rd, East Tamaki, New Zealand



The Kempack RA For a rapid, quality weld

Created specifically for the modern workshop repairer, the Kempack RA range sets new standards in delivering outstanding welding performance in the compact MIG/MAG class.

Packed with technologies, the Kempack RA series features Brights™ cabinet lighting, WireLine™ service indicator and the GasMate™ chassis design - all for easy welding. Users can choose from 180, 250 and 320 ampere power sources in either Regular or Adaptive models. All models help deliver precision welding and energy cost savings. For more details call Matt Heron on 0220 200 626, email matt.heron@kemppi.com, call 61 2 8785 2000 or visit www.youtube.com/watch?v=ravqVGZ2uQ8



 **KEMPPi**

www.kemppi.com

• BUY • SELL • TRADE

• NEW AND USED TOOLS

TOOL BARN

The Home Of Preloved Tools



Carba-Tec mortiser
\$450

Tanner Radial arm saw
\$750

Carba-Tec Band saw
\$750

Thicknesser 14-x6-inch
\$850

Tanner 10-inch saw bench
\$995

Wyler precision level 12-inch
\$350

45 Jellicoe Rd, Panmure, Auckland phone (09) 570 8064
email: toolbarn@xtra.co.nz

www.toolbarn.co.nz



Miniature Bearings for Bikes, Fishing Reels, RC Cars, Power Tools and more...

- Huge range available
- Metric and imperial
- Stainless available

Auckland Branches

Glenfield
56 Diana Drive, Glenfield, Akld
Ph (09) 444 6566
sales@aucklandbearings.co.nz

Manukau
7/6a Keith Hay Drive, Wiri, Akld
Ph (09) 969 1876
wiri@aucklandbearings.co.nz

Taranaki Branch

New Plymouth
140 Molesworth Street
Ph (06) 757 8241
rod@btstaranaki.com



www.aucklandbearings.co.nz

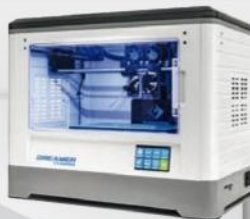
MBA

Authorized MBA Miniature Bearing Distributors



MAKERshop

3D Flashforge Printers



DREAMER

- 230x150x140mm
- Dual Head
- PLA and ABS Printing



CREATOR PRO

- 227x148x150mm
- Steel Chassis
- Dual Head
- PLA and ABS Printing

FINDER

- 140x140x140mm
- Safe and Quiet
- Prints with PLA



ORDER ONLINE AT
www.makershop.co.nz



The right component for your project



Plastic fixings, fastenings & hardware
Plastic protection caps & plugs
Electronic components & enclosures
Industrial operating elements

www.hiq.co.nz

Hi-Q Electronics Limited
sales@hiq.co.nz
0800 800 293

Hi-Q[®]
components

WAGENER *Sparky*

THE CUTE WEE FIRE WITH A BIG HEART

He's built of solid 5mm steel, is multi fuel, has a stove top cooking surface and optional top rails.

Fit Sparky in your shed, mobile home, cottage, holiday bach or house boat and he will keep you cosy and warm. Let him boil your kettle for a cuppa and even heat your water for a nice hot shower.



5 Allen Bell Dr, Kaitaia

(09) 408 2469

www.wagenerstoves.co.nz

HAVE YOU EVER WANTED TO BUILD A SIMPLY BEAUTIFUL MODEL SHIP?



Model Ship Supplies

Phone: 07 868 6251
www.modelships.co.nz

Gubba Sheds

www.gubbagardensheds.co.nz

Phone: 0508 448 222

4 Parkhead Place, Albany, Auckland

- Under 10m²
- no consent required
- Huge Range
- 7 different brands
- Over 120 models
- 19 sheds on display
- Workshop, Storage, Ride-on, Tack Room
- Kitset or full assembly available
- Customisable

**CALL US OR VISIT OUR YARD
FOR EXPERT SHED ADVICE.**



Model Pictured
The Shed Smiths
Classic Gable 4.1 x 2.4m





Those were the days ...

By Jim Hopkins

Wal was a good bloke. Straight as a die, tough as goat's knees, and ever ready to kick 'er in the guts in his singlet and Red Bands — provided he had a bit of No. 8 wire and a some 4x2 handy. And Dog was, as dogs should be, loyal, stoic, and optimistic — even when confronted by the low guile and vile savagery of cats.

They were a good team, Wal and Dog. We liked who they were and what they stood for. That's why millions of people were happy to visit Footrot Flats every week. Because they knew, however ramshackle it was and although it was no place for a Brylcreemed lothario or soy latte, there'd be a passible home brew on tap and a good laugh too. And, more important, because they felt a little part of their heart lived there too.

Footrot Flats never existed, of course, except in the mind and through the pen of its brilliant creator, Murray Ball, who died in March, leaving a legacy that is much more than a cartoon strip or feature film. It was a gift he shared with us that mirrored some of the deepest things we felt about ourselves and the land we lived in.

RIP Murray Ball. Long live Wal and Dog — even if they were nostalgic the day they were born, a slice of life the way it was in the years after World War II when town and country were closer and farmers generally regarded as the

backbone of the country, even if that didn't sit well with the wharfies.

A&P shows were major events then; annual opportunities for cockies to display their best beasts and big Fords, and for urban urchins to roam the rows of shiny new tractors. Students got summer jobs in the freezing works or wool stores to pay for their university studies, and everybody seemed to have some connection with somebody out in the country.

We certainly did.

My aunt and uncle had a farm, inland from Cheviot. In the burnt heat of January we'd head up for holidays and clamber over oily harvesters, explore the sheds, climb haystacks, bomb the duck pond, and race from the farm house to the magpie-guarded stand of gum trees on the hill.

I remember riding on the back of cousin Bruce's Army Indian, hanging on grimly as we snaked down the gravel road to the railway station to pick up the mail and milk. We went round the farm on a trailer behind the tractor; helped to pick up dead sheep; slept under scratchy wool blankets; and got tormented by sandflies and the hot, wet tongues of friendly huntaways.

But sometime between then and now, things changed. And New Zealanders changed too. Our mindsets moved. Old religions waned. New ones took their place. The environment became

something less to be worked and more to be worshipped. And, slowly but surely, the divide between town and country grew bigger. Today, it's a chasm and 'dirty dairy' is the new face of farming.

The affection Murray Ball's strip reflected and fostered has also died. In a recent opinion poll, only 16 per cent said they were positive about the dairy sector. Farmers today are seen more as polluters than producers; river-killing, global-warming environmental barbarians, recklessly ravaging fragile ecosystems. Footrot Flats has become a disaster, not a destination.

Which ignores one crucial fact. Without farming, New Zealand would just be two small islands at the bottom of the Pacific with a lot of poor people living here. Farming still pays our bills, builds our schools, roads, and hospitals. It's still where we find most Kiwi innovation. The fact that four per cent of our population can generate about 70 per cent of our export earnings should tell us something. But it doesn't, apparently.

And here's the rub. How poor do we want to be? Some say we need to find a nice way to put it. No we don't. Let's just ask: how poor do you want New Zealand to be?

It's time for a farming fight back. Wal would be into that, boots and all. But he's lost his voice, so we need to do it for him.



Metal Working	Sheet Metal Fabrication	Wood Working	Workshop & Automotive	Lifting Handling	Cutting Tools	Machine Tools & Accessories	Measuring Equipment	Spare Parts
---------------	-------------------------	--------------	-----------------------	------------------	---------------	-----------------------------	---------------------	-------------

FD-45 Industrial Floor Fan

- Ø450mm 3 blade design
- Swivels 140° inside frame
- 3 x fan speeds
- 165W, 240V



Order Code: F026
\$95
SAVE \$20

ST-254 Table Saw

- Ø254mm TCT blade
- 1170 x 800mm cast table
- Tilt arbor 45°
- 3hp, 240V motor



Order Code: W486
\$1,495
SAVE \$103.50

HM-46 Mill Drill Geared & Tilting Head & Stand Package

- 3MT taper & Tilting head
- Dovetail vertical slide
- 6 speeds (95-1600rpm)
- 730 x 210mm table size
- 1.5hp 240V motor
- Travels:
- (X) 475mm (Y) 195mm (Z) 450mm
- Includes stand (M135A)



Order Code: M123+M135A
\$2,600
SAVE \$125.50

SSB-18 Stainless Steel Work Bench

- 1800 x 700 x 900mm
- 100mm return splash back
- Reinforce bench top



Order Code: F300
\$430
SAVE \$115.10

EB-280DSV - Swivel Head-Dual Mitre Metal Cutting Band Saw

- 245 x 180mm capacity
- Electronic variable blade speed
- Swivel head - 45° left & 60° right
- Ball bearing blade guides
- Quick-action lock/release vice
- Heavy duty gearbox drive
- 1.5kW / 2hp 240V motor



Order Code: B063V
\$4,100
SAVE \$385

GT3600ES GT Power Electric Start Generator

- 3.8kW (max.), 3.2kW (cont.)
- 4 stroke OHV electric start engine
- 2 x 10A 230V outlets
- 10" pneumatic wheels
- 15L tank/9.5 hours use
- 50kg



Order Code: G105
\$999
SAVE \$91.20

UTE-1450 Industrial UteTool Box

- 1450 x 500 x 700mm
- Aluminium checker plate
- Dual gas struts on lid
- Built in top shelf



Order Code: T742
\$565
SAVE \$56

HP-20 Hydraulic Press

- 20 Tonne
- 110mm ram stroke
- Spring return ram



INCLUDES BENDING PLATES
Order Code: P144
\$299
SAVE \$69

XMP5000 TIG-MMA-Plasma Multi-Function Inverter Welder

- 200 amps TIG & MMA
- 50 amps plasma
- High frequency TIG & ARC start
- Inc. TIG & ARC lead set, plasma torch, foot control, argon & air regulator



Order Code: W1124C
\$1,150
SAVE \$798.10

DC-3 Dust Collector

- 1200 cfm - LPHV system
- Portable on wheels
- 5 Micron fine filter bag
- 1.5kW/2hp, 240V



Order Code: W394
\$399
SAVE \$38

BP-255 Wood Band Saw

- 245 x 152mm cap.
- Cast iron table tilts 45°
- 2 x blade speeds
- LED lighting
- 0.37kW / 0.5hp 240V



Order Code: W950
\$440
SAVE \$66

AL-336D DELUXE Centre Lathe

- 300 x 900mm capacity
- 2-Axis digital readout
- Hardened & ground bed
- 38mm spindle bore
- 2hp 240V motor
- Includes: 3 & 4-jaw chucks, faceplate, dead centres, light, steadies, brake, splash tray & stand



Order Code: L682D
\$5,100
SAVE \$523.50

Industrial Work Bench & Backing Panel Package

- 1800 x 750 x 900mm
- 1000kg load capacity
- Heavy duty steel fabricated frame
- High density laminate top
- Square holes suits optional hooks & holders
- Louvre slots to suit optional buckets



Order Code: A420+A426
\$669
SAVE \$90

WE HAVE THE RIGHT TOOL FOR YOUR JOB!

- AMY
Staff Member



UNIQUE PROMO CODE

TS3APR

ONLINE OR INSTORE!

BECOME A MACHINERYHOUSE MALE
www.machineryhouse.co.nz/signup

- ✓ PAPERLESS WARRANTY
- ✓ TRACK YOUR ORDERS
- ✓ EXCLUSIVE OFFERS
- ✓ LATEST RELEASES

- ✓ ONLINE PROMOS
- ✓ CLICK & COLLECT
- ✓ COMPETITIONS
- ✓ NEWSLETTERS

\$70 FREE DISCOUNT VOUCHERS

VIEW AND PURCHASE THESE ITEMS ONLINE AT
www.machineryhouse.co.nz/TS3APR

2 Waiouru Road, East Tamaki 2013
Ph: (09) 2717 234

Emirates TEAM NEW ZEALAND
OFFICIAL SUPPLIER 2017



PURRFECT FOR DIY



10 REASONS WHY MAMMOTH IS PURRFECT FOR DIY

- 1 Non-itch, non-irritant
- 2 No masks, goggles or gloves for handling
- 3 100% polyester – safe as a duvet inner
- 4 Self-supporting sections for underfloor
- 5 Ceiling blankets to avoid heat-loss through joists
- 6 Self-supporting sections for walls
- 7 Moisture resistant
- 8 Won't slump over time
- 9 50 year manufacturer's warranty
- 10 Made in NZ

As people look for an easy option to install their own home insulation Mammoth is the purrfect choice.

It's non-itch and so is easy to handle and install without irritation. For underfloor Mammoth has unique self-supporting sections that are safer to install.

 **Mammoth**TM
MODERN INSULATION



0800 MAMMOTH
mammoth.co.nz