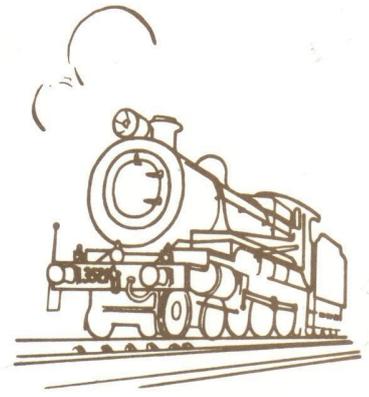


Sydney Live Steam Locomotive Society

Anthony Road, West Ryde, N.S.W.

'Newsletter'

Volume 48. No. 2.
May 2020



Simon Collier and Simplex leads Tony Kidson and the 10 wheeler with 4 cars and guards van with guard John Simpson just visible, downhill past the inner main station with V1224 and crew conversing. Between Simon and Arthur, Geoff Hague is patrolling the outer main platform. The recent rains has accelerated grass growth, it was mown the week before! Photo David Judex.

February Running Day.

We were fortunate that this day was suitable for running at all. We had experienced a week of very unsettled and stormy weather. Today's forecast was for a chance of rain and possibly a storm. At various times there were spots of rain but nothing arrived and the promised storm did not eventuate till about 8.00PM.

Because of the weather previously mentioned there was a lot of cleaning up to do to get the grounds in a fit state for

our visitors to enjoy. The early arrivals were into this as soon as they arrived. John H and Barry M along with Craig D and Graeme K were at work early. Barry M put up the flags while Martin D oiled the point mechanisms and checked their operation. Mick M cleaned the toilets. Graeme K used the leaf blower to clear the GL running tracks. Elevated cars were marshalled for the afternoon by John S. There was a lot of leaf litter and branches to clear off the track and this was done by Ross B, Scott,



Ross Bishop and Toneya roll downhill with a full load with guard Tony Eyre. Photo D Judex.

off the train. The four cars were taken off and replaced with the blue set and the service was continued till the end of the day. Greg C was guard on this train and station staff included during the afternoon John H, Evan L, Nathaniel, Brian K and John L. John L also provided the afternoon tea service. The red cars were inspected later to see if any maintenance was needed.

On the outer main the blue car set was hauled by Mick running the Wolgan Valley Shay. Geoff H was guard for most of the run with Evan L having a turn along the way. Our second train, Central West set, was a double header with Graeme K, 2401 4-6-2 and Ray L and 4-6-0 C35 class. Bernie C was

Craig, Bill P, Tony E, Nathaniel and David J. John L trimmed the overhanging bushes around the elevated track. There was a great deal of litter collected and placed in the club trailer for later disposal.

We ran two trains on the elevated for the afternoon, one was a four car set hauled by Simon with the Simplex 0-6-0 tank locomotive double heading with Tony K's ten wheeler. David J was at the regulator of the 4-6-0 for much of the afternoon. This combination ran well for the afternoon with Brian K and John S alternating as guard. The second train was again a double header with Gary running his B1 "Impala" 4-6-0 with John T and the 2-8-0 J class coupled to four of the red cars. The train was running well till a passenger leaning over took all on the car

Brio trains on the birthday party table!



John Tulloch prepare 2904 and train with some onlookers.



guard and at one time Tony E was at the regulator of 2401. Station masters on the outer platform were Bill P, Martin Y and Geoff H with some swapping with guard duties. Both trains ran well for the duration of the afternoon.

The inner track was serviced by two trains as well. The red car set was hauled by Ross and the Fowler 0-6-2 "Toneya" and during the afternoon guard duties were performed by Tony E, Graham T and Paul B. The second train, the green set, had Warwick with WAGR V Class 2-8-2 at its head and Arthur H was guard for the

entire afternoon. The station was cared for by Carol L and Craig D. Peter D attended to some track work on the inner curve after some repeated derailments with Warwick's train. The cause of the derailment was later found to have been caused by a broken bogie bolster. The carriage was removed from the consist.

The ticket count for the day was 1691, this was a bit low but considering how the weather forecast was it was not too bad a total, Peter W was our ticket seller. The signal box was attended to by Mark G, Martin D, Mike D, Steven B, Michael W and Barry M. David L was track superintendent and the gate was attended to by Ian T and Jo-Anne.

The kiosk was looked after by Joy, Margo, Diane and Elizabeth. A big thank you to all who had helped make the day a success and reasonably enjoyable for us all.



Our March running day notice for our patrons.

Members Projects



Parts of Ken Baker's Norfolk & Western J class baker valve gear.



Ross Bishop's massive connecting rod for his ploughing engine.



Some pictures of John Lyons' 20 class which is receiving some attention alongside the Avonside.



Making Injectors

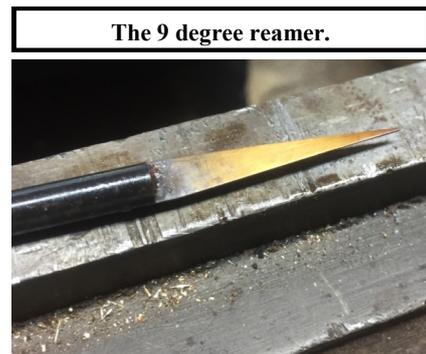
Simon Collier

I have always thought injector making was the preserve of only the most accomplished model engineers, among the elite of the hobby. I had read various articles in the magazines over the years, but none so clear or compelling as to tempt me to have a go. Then in 2010 a book was published, *Miniature Injectors Inside and Out*, by Derek Brown. I immediately bought the book, and it gave very clear instructions on how to go about making working injectors. The author cautioned that it would test man and machine, and stressed the need for very sharp and accurate lathe tools, cone reamers and drills. In other words, bodgeers need not apply! He said that you would be spending the first two weeks making tooling before you got to "cut brass". I found the book quite beguiling, but was not ready to make the commitment at that time and thought "one day".



Brown body parts.

Fast forward a few years and fairly recently, James Sanders borrowed the book and quickly ordered his own copy. In true Sanders style, familiar to most members, James immediately started making injectors. Success was not long coming, and James churned out a few very good injectors, including, significantly, a couple of 12 ounce injectors. The difficulty of making injectors is inversely proportional to their size, that is, the smaller they are in ounces per minute, the harder they are to make. The reason is that the smallest hole to be drilled in the injector, the delivery cone, requires tiny drills, and injectors are often named by the number drill required to make the delivery cone, so a number 69 uses a 69 drill for the smallest hole. The smallest injector described in the book is the 4 oz, and with a number 80 drill required, i.e., 15 thou or 0.34 mm, is only for the true optimist. The largest is 40 oz, but the detailed instructions feature the 26 oz, a size regularly used on our 5" gauge locos, and the commonest commercially available from our suppliers. The smallest drill needed is about 0.7 mm, so not too scary.

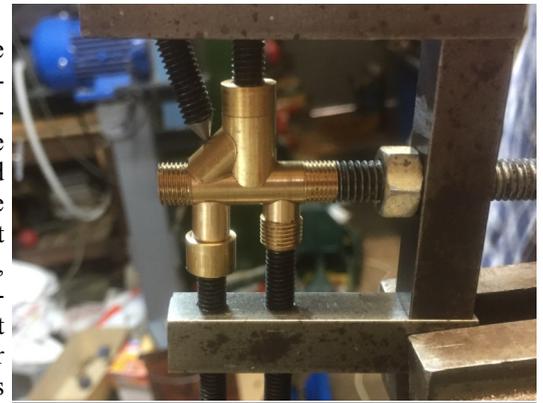


The 9 degree reamer.

The sight of this drill held in the 13 mm keyless chuck in the rather hefty 3 MT tailstock on my 300 x 900 Hafco lathe does not promise great feel when drilling! But this proved not to be the difficult part.

Injectors are a marvel of physics and operate because of the Venturi

Effect and the Bernoulli Effect. Very simply, when the water and steam are turned on at their valves, the high velocity steam at nearly boiler pressure enters the convergent steam cone

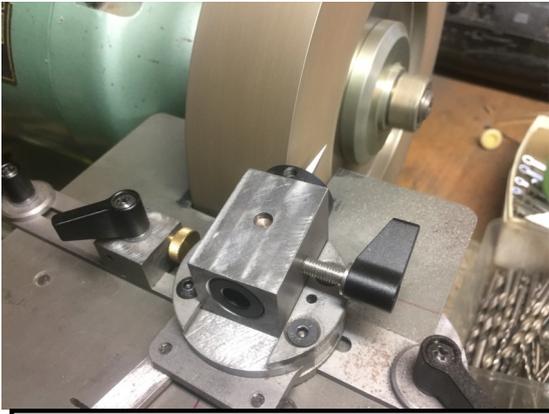


Body soldering jig.

which increases the velocity further and lowers the pressure to below atmosphere when it enters the combining cone, drawing water through the critically sized annular gap between the O.D. of the end of the steam cone which just enters the combining cone, and the I.D. of the latter. The water is entrained in the flow and condenses the steam, hence the need for coolish water. The combined flow jumps the gap into the delivery cone, which is divergent. This exchanges velocity for pressure and the now higher than boiler pressure but slower flow enters the boiler through the check valve. The two part combining cone allows water to flow out the gap, through the ball valve chamber and out the overflow until the combined flow is established, the relative vacuum sucks the ball onto its seat, and the injector starts.

To make the cones, you need two taper reamers, a 9 degree and a 13 degree. The book specifies D bit style reamers, turned to the taper then halved, hardened and tempered in the familiar way that we use for D bits for ball seats or parallel reamers for a size we don't have. The 9 degree reamer in particular, needs to be exactly nine degrees as critical dimensions depend on this. This means setting the top slide over to 4.5 degrees, using the scale as a starting point, then adjusted accurately using the dial test indicator and trigonometry. The tip needs to be smaller than the smallest hole it will enter, and about 15 thou is suggested. This demands a very sharp lathe tool exactly on centre height. An equally demanding task is milling the reamer to just more than half thickness, and to top it off, you then have to harden and temper it without overcooking the tip or otherwise spoiling the job. I think I attempted three before I got a good one. The 13 degree reamer is a little more forgiving as its exact angle isn't critical.

Another method of making the taper reamers was described in an article in *The Model Engineer* in 1976, by South African Basil Palmer. A triangular reamer was made by grinding HSS in the lathe using a tool post grinder. I tried this very appealing idea, also used by James, but using my Acute Sharpening jig (kit sold by Eccentric Engineering) and grinding against the side of my CBN wheel. This is a precision steel wheel coated with cubic boron nitride, and it takes six and a half minutes to stop! However I used only a cardboard template for the 2.25 degree angle required for the 9 degree reamer (draw an equilateral triangle in a circle and do the trig), so it is not surprising that the resulting injector was unsatisfactory. However my current 13 degree reamer is



Grinding reamer.

the triangular type, made from silver steel and hardened and tempered, as I had no suitable HSS blanks. So far I have made four 26 oz injectors.

As fiddly as the cones are, I had a surprising amount of trouble making the bodies. The bodies are not a trivial exercise but even so, I had a far amount of trouble. The Brown bodies are rather dainty, using the minimal amount of brass, with a 5/16 barrel to which are silver soldered the water intake, the overflow outlet, the valve chamber, and the problematic overflow cover. The instructions are to drill the bodies 5.3 mm before soldering up, then using a hand 7/32 reamer afterwards. Initially, I left the final drill, and machine reamer, in my case, until after brazing up the body. It is then in a very soft, annealed state and there is no way to safely hold it for these operations. The results were visibly bent bores, with the reamer coming out the delivery side eccentrically, rendering the body a scrapper. This body requires a silver soldering jig to hold it all together, as the fittings are scalloped to the body O.D. and just butt against it. I remember Ray Lee showing such a jig at the club some years back. More than a sparing application of solder will find its way into the bore, and again a scrapped body results, as any attempt to drill out the much harder silver solder from the soft brass bore will fail. You definitely want to be using 1/32 silver solder wire here. In the book he uses silver solder paste, which I have never come across. It is much easier to make the bodies from 3/8 square brass rather than 5/16 round. A jig is not really necessary as the bottom fittings can be made a press fit in a slightly counter bored hole and sealed around the outside with a touch of silver solder. The valve chamber can be another bit of 3/8 square with a groove milled into the underside to connect it to the overflow hole in the body, and the ball seat cut slightly into the main body section. I use a 7/32 slot drill to make the seats, and the caps are threaded 1/4 x 40. The downside is that the square injectors are ugly and bulky compared to the Brown style. I tried to refine the appearance on injector 3 by rounding off some of the square corners. Injector 2 has an overflow cover made from a bit of rectangular brass milled at right angles to conform to the valve chamber and body diameters. Now to the important bit, how did they work? My first injector picked up, but spilled a large amount of water



Injector showing cones.

from the overflow. Various attempts at remediation failed. I'll come back to why. Today, ANZAC Day, I steamed my Simplex at home to retest this injector and three untried new ones. Number two picked up straight away cleanly, with no dribbling. Success. Number three picked up but immediately something changed and it then refused to work: the combining cone had been moved by the flow, something that had happened to number 1 weeks earlier. It is extremely difficult to get the light interference fit of these cones that you need as it is in the range of microns. A spec of Loctite is the remedy, but it is permanent, not that combining cones should ever need removal. Injector 4 was a beauty like number 2, and would still pick up down to at least 40 psi as I let the fire die. I should say that the only true test is running day operating when the injector must work at a variety of pressures and water tank levels etc., and not need too much coddling and coaxing.

The first injector was made with a ground 9 degree reamer, but it was probably out by at least +/- one degree. The other three were made after I had made my good, accurate, D bit type of 9 degree reamer, so the caution urged in the book on this point was validated. There are other ways to ensure the correct spacing of the combining cone halves and the annular gap, as Mr Brown readily states, but his method depends on exactly 9 degrees. My 13 degree reamer is a ground triangular type, and from the tests, it seems to be adequate. To conclude, I'm pretty happy with the results. I can now make a 26 oz injector and be confident that it will most probably work. Equally valuable, I have gained a good understanding of how injectors work and which bits are the most critical. Before this whole exercise, I really didn't have much of a clue what was inside them or how they worked. I will put them aside for now and try to get on with painting my Springbok, but eventually I will have a go at a smaller size, perhaps the 18 oz. These fascinating little squirts really are quite addictive. Infectious too, as I caught it from James, and now Andrew is showing symptoms, tooling up for a production run.

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The four injectors.



Dear Members and Friends, **COVID-19 and SLSLS**

As we are all very much aware, the COVID-19 pandemic has, and is having, a significant effect on our lives and activities.

In Mid-March, the Australian Government requested the cancellation of all non-essential gatherings to contain the spread of the coronavirus.

As a result the Board decided on 14 March that our Public Running Days would be cancelled until further notice, and that we would continue to monitor the situation, particularly Government advice on non-essential gatherings, and resume our normal Running Day program as soon as possible.

In the meantime, the Grounds would be open to Members and Friends as usual, and our program of maintenance and improvement works would continue as normal.

On Wednesday 25 March, based upon the announcement made by the Prime Minister, in relation to Community and Recreation Centres, it was no longer be legal to open the Grounds for our regular Saturday activities, or for meetings, as they were considered to fall within the category of restricted premises. As a result, it became necessary to close the Grounds effective immediately, and until further notice.

Further, Ryde City Council advised on Thursday 26 March that there were no exceptions to these measures, and as a result, all organised sporting and community facility use in City of Ryde's parks and reserves was to cease from midnight on 25 March.

This meant that our regular Saturday maintenance and improvement activities and our face to face meetings were suspended until such time as the lockdown on non-essential services was lifted.

Your Board has been monitoring the situation as it develops, and keeping Member informed when things change, as well as and looking at what arrangements would be possible in the context of the various lockdown restrictions by the way of regular security checks, mowing, etc.

In mid-April we have received from Council an agreement that we can have limited access to the Grounds to perform essential or necessary maintenance. The primary maintenance required is that performed by the gardening roster. In addition, there would be a weekly security check performed by a Board member, also checking for items requiring attention.

Attending to identified Items would be co-ordinated by the Board with the appropriate Members. Attendance would be restricted to 3-4 people maximum at a time, with specific tasks to be done and with a short duration of stay, and social distancing rules to be followed. All attendances were to be notified to the Board, and approved, prior to them occurring so we knew who had been at the Grounds and to do what. If the attendance was not deemed "essential or necessary maintenance", then it was not to occur.

Whilst not ideal, this arrangement has allowed us to do some mowing, attend to the gardens, and keep the weeds under some semblance of control in anticipation of a relaxation of the "stay at home" rules.

A special thank you to those who have volunteered their services over the past weeks to attend to this essential and necessary maintenance.

The decision to close the Grounds, coming on top of our Running Day cancellations, has not been an easy one, but given the Government directives, one that had to be taken for the good of the community, and in particular our Members, Friends and their families.

As I write this, there are some signs of the "stay at home" restrictions being gradually eased. Easing of the restrictions, though, comes with the risk of a future spike in COVID-19 infections, and re-tightening of the restrictions.

Hopefully, we will be able to resume our Saturday maintenance and improvement activities sooner, rather than later.

What is clear, though, is that resumption of our Running Days will be very much dependent on the lifting of restrictions on large outdoor gatherings and on social distancing.

It is also likely that our planned President's Breakfast, AGM and SGM scheduled for 30 May will not take place exactly as planned. Members will be advised of the arrangements for these as soon as is possible.

Pending the resumption of our activities, please Keep Safe.

On behalf of myself and the Directors, our very best regards to you and your loved ones, and a special thank you for your ongoing support.

Mick Murray
29 April 2020

Duty Roster.

June: Evan Lister, Simon Collier, Garry Buttel, Barry Millner, Scott Murray, Graham Tindale, Paul Brothie, Mike Dumble, Deven Shirke.

July: David Thomas. Bernard Courtenay, Greg Croudace. Stuart Larkin. Lionel Pascoe. Shaun Sorensen. David Lee. Brad Wilkinson. Geoff Hague. Martin Dewhurst

August: John Hurst. Jim Leishman. John Lyons. Matthew Lee. Jim Mulholland. Martin Yule. Warwick Allison. Evan Lister. Nigel Woolley. Bill Perrin

September: Ross Bishop / Neal Bates, Tony Eyre, Jo-Anne Topp, Ray Lee, Peter Wagner, Paul Taffa, John Tulloch, Zac Lee, Nick Kane.

October: Mick Murray, Andrew Allison, Mark Gibbons, Wayne Fletcher, Graeme Kirkby, John Noller, Ian Tomlinson, Glenn Scott, Bruce Hartwell.

Gate Roster:

June: B Courtenay; **July:** G Croudace; **August:** M Dewhurst; **September:** M. Dumble.

Track Superintendents

To be advised.



On what would have been the March running day Andrew gave the A10 a run. It had been recovered from display in the living room and toned up ready for the convention that never happened.



Right: Neal uses the trailer and mower to deliver mulch from the tree removal to various trees and gardens and , left, to the top of the new retaining wall.



Diary

Dates tentative and subject to confirmation with Government restrictions and advice from the Board.

30 May	Presidents Breakfast AGM & SGM.
20 June	Public Running Day
18 July	Public Running Day
15 August	Public Running Day & next newsletter.
29 August	Central Coast Steam Co-op Interclub
19 September	Public Running Day

31 October– 1 November Small Gauge Festival

Please see AME for other events. Note the Hot Pot is cancelled.

Editorial

What strange times we are in and one wonders how long it will be before things return to how they were! In the United Kingdom the Great Plague of 1665 to 1666 saw many Institutions shut down. Isaac Newton was sent home from Cambridge and while in this enforced exile wrote his papers on Calculus, Optics and the Laws of Gravity. Now I do not expect any of us will complete anything as grand as that but hopefully our time in isolation will be put to good effect. I decided the best place for me was to get into the work shop and tackle some things that have been on hold for some time, so far so good! A big thank you to all members who have prepared material for this news letter to make it a good publication. A special thought for all those who may be more seriously impacted by the rules that have been implemented to try to stop the spread of the virus.

John Lyons
Fill in Editor.

Around the



Above: Laying grass on our drain.
Left: Three scenes of manufacturing new elevated track supports.
Below left: Garry has a friend in his jeep!
Below: Replacing the ground level track after removal for the tree trucks.



Graham Tindale demonstrates his battery powered simulated sound, radio controlled Gauge 1 38class!

Grounds!



From Above clockwise: Peter Wagner terminating wires; An audience watching a boiler test on Andrew's A10; Deven and Neal transporting spoil from the retaining wall; Martin supervising Neal repairing an air line in elevated loco; Mick installing video equipment; Martin spraying bindi; Mike painting an elevated signal; our tree contractor removing a dead tree, and Craig, Peter and Tony replacing a repaired track section.



New Lever Nameplates for an Old Ground Frame

By D Lee

The SLSLS has a 10 lever NSW Railways style 'G' ground frame that operates the signals and points on their elevated railway. The original lever nameplates were actually timber patterns made by Bernie Courtenay, that were never cast. When these started to decay Warwick produced some 3D printed plates from a CAD design by Andrew and have



As the name plates had already been printed I thought simply importing the 3D object file, step file, into the software and using the manufacturing tools would be straightforward. Whilst this was true to a point it also produced an abnormally large machining file, too large for the old machines to accept as a single file. The reason was that the curves were converted to a spline which means several straight lines to make up each arc.



served well considering they have to survive in the elements. Over the years they had developed a bit of a bow and every now and then, an overly eager throw of a lever has dislodged a plate from its mounting. I offered to manufacture new identification plates using the equipment I have at work. The plan was to use 3" x 1/4" plate and machine it 1mm deep. Please forgive my mixing metric and imperial but 76.2mm x 6.35mm just doesn't flow off the tongue. A bracket from 20 x 1.5mm brass was bent up and silver brazed on the back after the milling had been completed.

I am fortunate in that I am encouraged to learn new CAD/CAM software and use the CNC machines at my employ to develop my skills and understanding of the software. The software is Autodesk's Fusion 360® and although it's not new on the market, being released in 2013, it is a new tool for me. It is available as a free educational version and I believe, but don't quote me, it is also free to small business. The Fusion 360 package can be used for drawing 3D models, developing 3D printed parts for printing and manufacturing parts by writing codes that the CNC machines can read.

These straight lines were only 0.05mm each. So I redrew certain parts and replaced all the splines with either arcs and straight lines or sometimes used the eclipse function for the compound curves like that on the number 8 label. To put the number of lines of code into perspective, milling the outside of the letter O was 725 lines down to 4 lines.

The actual machining was carried out with successively smaller slot drills. A 10mm cutter was used to run around the outside to get the plate down from 76mm to 70mm and milled to length. A process call pocketing was carried out using a 5mm slot drill and it automatically left 0.3mm on all edges. When I say automatically, the parameters for the cutter are setup whilst the window used to pick the edges for the limits of the pocket are displayed. Other parameters like how to get into the cutting and stepover are also up for changing if the suggested values don't suit. The cutters used for contouring, following the outlines, were replaced after 4 plates had been machined as a precaution rather than breaking a cutter. Contouring started with a 3mm slot drill which went around every edge. The software is smart enough to leave spaces too small to machine well alone.

Duplicating the previous contouring was the easiest way to proceed and changing the cutter to 1.5mm so I could get into those pesky corners and the inners of most letters like O and S etc. This cutter also got in between letters missed by the previous 3mm cutter. Deselecting edges that didn't need anymore machining helps speed up the times and prevent undue wear on the cutters from rubbing. The CNC maxes out at 6,000 rpm, half the recommended speed, so the feed rates had to be reduced to suit. Last was the all important 0.8mm slot drill where only specific edges were selected. This helped define the corners of letters such as L and T whilst also being used inside 4 and



Spline versus Arcs and lines

Each square dot represents the end and middle of a line or arc. Above is a blur of blue and black.





After machining, showing a couple of oops.



After sandblasting, without the oops.

B etc. The calculated speed for this little item is 18,000 rpm and as luck has it, there is a geared head to achieve this. Looking at the manufacturers specifications, the feed rate is calculated at 2 microns per tooth or cutting edge. Easy to achieve when programming the CNC, as it relies on numbers.

The last problem was how best to paint the labels. Decisions, decisions, decisions. Should I paint them all black and paint the highlights white, or paint it all white and fill in the hollows with black. I did experiment with trying to paint the embossed sections with a hard roller but found it too easy for the paint to slip down into the lower portions. Painting every letter and digit by hand was a passing thought and it passed very quickly. So etch priming and painting the face white was underway. Mixing 50% paint and 50% thinners then



using a syringe to get the paint to flow all through the hollows was almost without trouble. On my first experiment I didn't have the plate perfectly level and the paint pooled in one corner. My local chemist supplied the syringes and I had to explain what I was up to so I could purchase a couple of 20gauge needles to fill the inners of letters and numerals.

Hopefully the plates will stand the test of time. I am presently playing around with the turning commands to machine up some wheels although I have already written these longhand.

Sheet Bending Jig. Geoff Hague

When my boiler-making tutorials with James out at Ye-oval came to an abrupt end because of the "Lockdown", I had to think of something I could do in the interim.

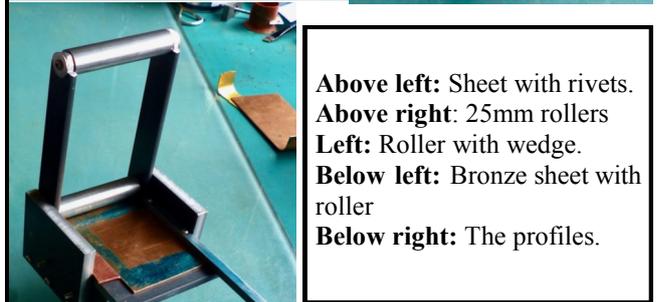
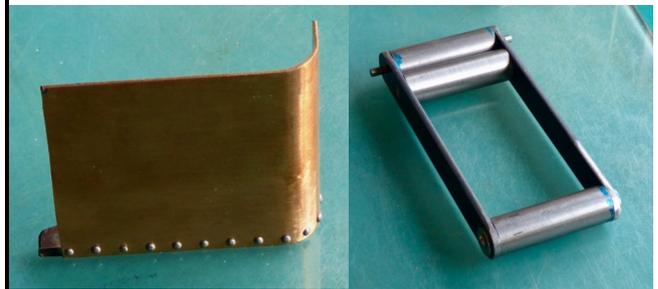
So I turned my attention to Cab Construction for Speedy and that meant trying to solve the problem of curved profiles around the bunker.

This meant designing a jig that could do small radii – 15 to 30mm, yet keep it small enough so the necessary clamping could be effective, as I soon discovered it is easy to let errors creep into the work.

These samples are of Phosphorous Bronze sheet @ 1.2 mm. The gap between the two rollers was made fractionally undersize – in other words – about 1.1mm, and then fitted to suit the sheet.

I learnt it was important to make a tight fit, as any gap is accentuated when you pull the lever down. It is also necessary to use a wedge to hold the sheet hard against the fence, otherwise there is a tendency for things to move as pressure is applied. Two 'G' clamps were also used, but I've left them out for the sake of clarity. So long as you allow a little extra material for length and width and do the trimming up afterwards the results can be very pleasing, especially when you achieve something that looks like the real thing.

Questions I can answer next time we meet at the club when I'll bring the jig in for inspection from the jig-inspectors.



Above left: Sheet with rivets.
Above right: 25mm rollers
Left: Roller with wedge.
Below left: Bronze sheet with roller
Below right: The profiles.



A Reverser Screw for the 620.

Simon Collier

When David Thomas was asking around to borrow a left hand tap and die to make the reverser for his 620 locomotive, I thought that his impressive build deserved better than a Whitworth thread which would require many turns to get from full forward to full reverse. I offered to make a

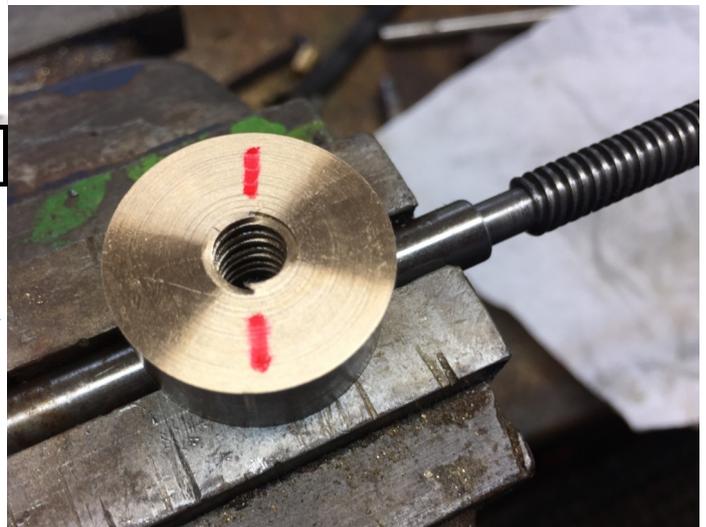
about 1/32 wide, but after breaking one I decided to use steel hex, rather than round BMS, on a couple of spares I cut later, as the hex is free machining steel. What a difference! I selected 8 tpi on the gearbox, cut the first thread 40 thou deep, cautiously taking cuts of only 1-1/2 thou deep at a time. Then the top slide is moved along 1/16, so .0625" on the dial, and the second thread cut. The stages are shown in the photos, and note that the tool is angled to the helix angle of the thread.

The nut blank was made from LG2 bronze, so much easier to machine, and just as well as the internal tool needed is very delicate. I used the original tool I had made years ago, where some 3/16 steel was cross drilled to take a tool made from a bit of 2 mm drill shank. The nut blank was only about 1/2" long, so it didn't take long compared to the screw, which I had made over length as I didn't know the length required. In the photo, the two starts can clearly be seen in the nut blank.



Screw blank and tool angle.

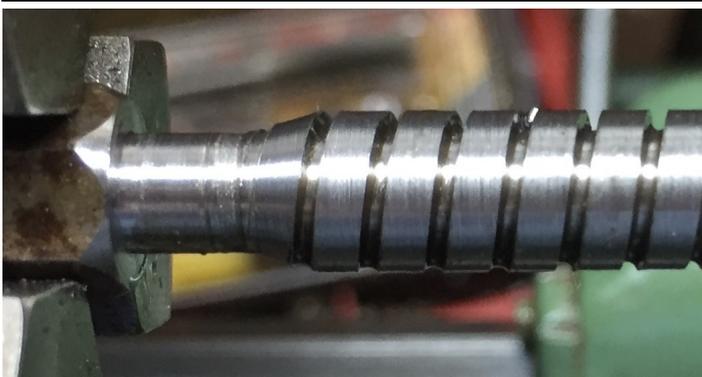
two start screw and nut, which I had done for my Simplex. Years ago now, Bill Richards had presented me with a beautifully made reverser mechanism for my Springbok, with a left hand, square, 5/16, two start screw with a 1/16 pitch and 1/8 lead. He had done the same for a number of other locos at the club, to the delight of their owners, and it was something of a Richards hallmark. At the time, I had never heard of multi start threads and was intrigued. It is hard to envisage, but the two threads are a bit like the DNA double helix. The advantage is that for a single turn of the screw, the nut goes twice as far (the lead) as the pitch, while being a sensible size and appearance. They are left hand, because for most locos, turning the reverser clockwise puts it into forward gear. So I made one for my Simplex, nothing close to Richards quality, but which did in 13 turns what the old one had taken 32. That was some years ago so I did have to think and remember hard to do it again. It actually isn't very difficult. Being left hand, you are cutting away from the chuck, so less hazardous, but you need tailstock support, so still have to be careful. It isn't hard to grind up a square tool, like a parting tool,



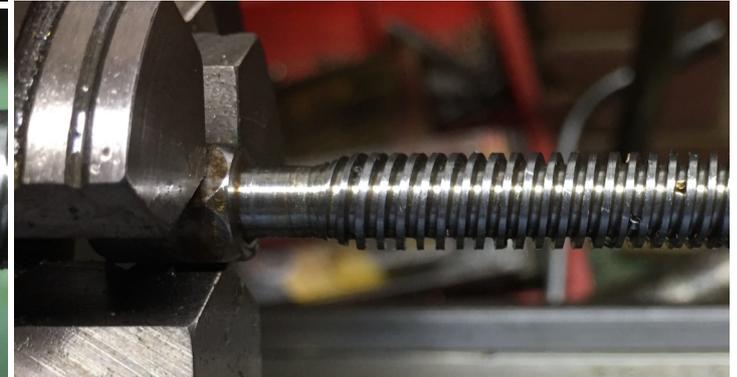
The nut.

The result was far from perfect, exemplified by the fact that the nut would only start on the screw in two of the four possible positions, and the crests of the two threads were visibly different widths. Nevertheless, the nut ran easily with no backlash, so David should be able to adapt the parts to suit the reverser on his 620. I look forward to seeing this magnificent loco in operation in the not too distant future.

First thread cut.



Second thread cut.



Recent happenings from Yeoval.

James Sanders

Productivity has decreased in intensity in the workshop with a great deal of time now being preoccupied with Rosie, who is now approaching 7 months old. However, I do still find time and ways to get things done. Our baby carrier allows many activities to continue and a pair of baby earmuffs allows for some noisy jobs also. Rosie seems to be fascinated by the lathe and appears to enjoy watching me drill holes on the drill press. There are times where the pram makes workshop activities with her around safer, however it is a balancing act. I am sure there are people who would suggest having a baby in a workshop is negligent. It may very well be if you do not actually think about what you are doing, particularly as little hands become more interested in touching everything. Watch that box of 5ba bolts, they might be mistaken for something yummy. Thankfully I have longer arms than she does, but they are getting longer!



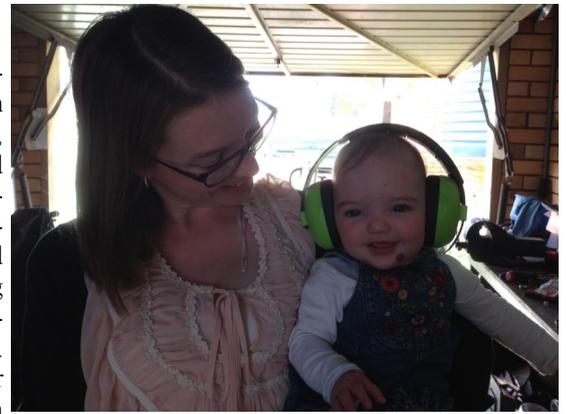
When Rosie was only a few months old I would try and put her to sleep in the carrier whilst doing workshop activities. I

would arrange things so that I could do hand tool jobs when she was going to sleep and save machining for when she was asleep inside the house. One of the earliest jobs I remember doing with her out in the garage was tapping M3 holes in the 35 class steam chest faces. This was a bit of a challenge as Rosie was very squirmy. Thankfully hand tapping with a loose grasp saved any broken taps. More recently, having her in the carrier, awake or asleep is much easier – apart from when she reaches out to touch something she shouldn't! Just means one has to be super vigilant and leave those potentially dangerous jobs for another time.

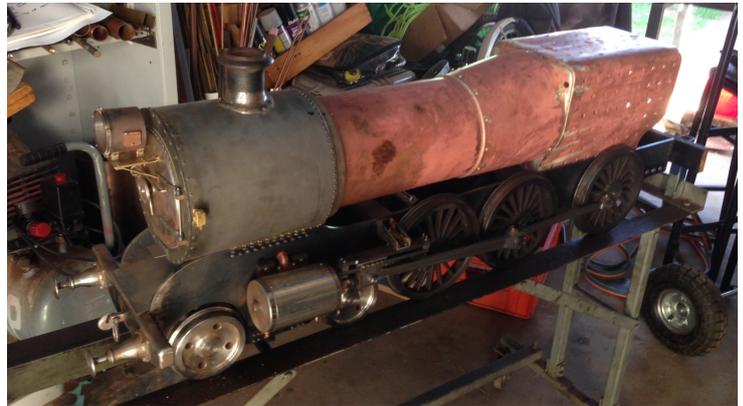
Building the 35 class boiler started in February this year with plates being formed around steel formers kindly cut by Wayne and Jeanette Fletcher. Flanging plates was great as I could anneal and then leave the plate and then come back later as time allowed. Doing the double flanged throatplate was tricky, however advice from others with more experience than I paid off, forming the inner flange to attach to the barrel first and using a disc inserted into this space which was bolted through a water cut locating hole in the throatplate former which included the Belpaire corners. This is a very handy method since it means that successive anneals could be carried out on the second flange and the centreline of the boiler would be maintained.

As it stands the 35 class project is going well, the chassis goes on air, as of two weeks before Christmas 2019. The smokebox is largely complete and the boiler is currently un-

der construction with tubes in, inner and outer fire-boxes together and stays being silver soldered in. The boiler construction



has produced some interesting logistical challenges, which I haven't had to previously consider. Recently the bulky nature of the boiler has meant finding a container to fit the pickle in became a problem, my little office bin broke late one night dropping a toasty boiler into it, gashing the side leaking sulphuric acid all over the backyard. Thankfully this was the same night it was pouring with rain! And don't worry, Rosie was inside the house fast asleep. Thankfully the in-laws came to the rescue with a standard garbage bin surplus to requirements free to a good home. Only trouble is that I think I might need to make a frame to hoist the boiler in and out with because it is getting heavy.



A school excursion to the Yeoval Light Railway.

Just before the coronavirus took right off, I had the opportunity to use my big train set around the house for “educational purposes”. Several weeks prior, I was approached by my fellow colleague history teacher about whether it was possible I could do a lesson on steam engines in the context of the industrial revolution. Our principal was on board from the get go, having previously been a passenger, it just needed a risk assessment. I steamed Gresham and explained the principals of steam to Year 9/10 History, with rides round the home track to follow. The students had a great time, telling their teacher it was the best history lesson they have ever had!



A New Hoist for the Workshop

Mick Murray

Some years ago, I had a need to lift some heavy items in the workshop including my trailer canopy and Tinkerbelle, the 0-4-0 industrial diesel.

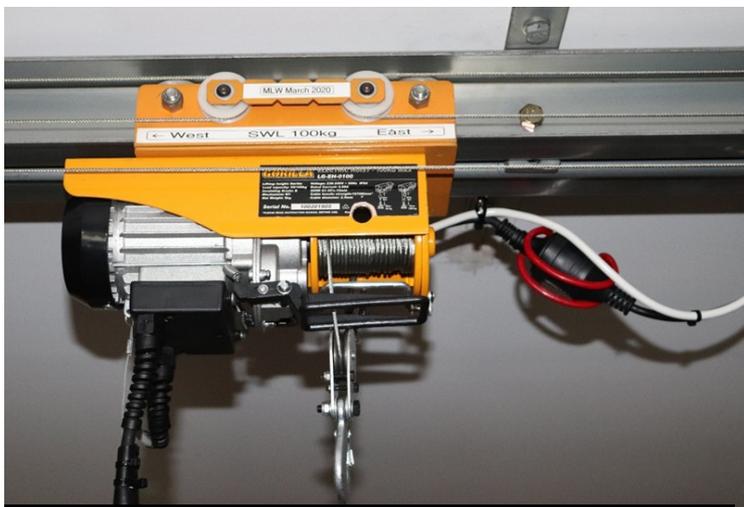
Being a bit of a scrounger, I managed to find some heavy duty door tracks at the local scrap yard, and these, cobbled together with some RHS, a trailer winch and the power units from defunct electric drills provided me with a hoist of around 100kg lifting capacity and 1500mm or so cross travel. Power was provided by a 12V 10A supply and control by a set of 4 relays, a speed controller and a pendant handset.

At the time, my office overlooked some building sites and studying the site cranes informed the rigging of the hoist and the cross travel drive. The lifting and cross travel were performed by nylon ropes with the cross travel prone to slipping once any sort of load was on the hook.

This original hoist served well, but the limited cross travel and some of the clunking sounds when lifting the load finally meant it was time for a replacement.

It was time to work out the specifications for the new hoist:

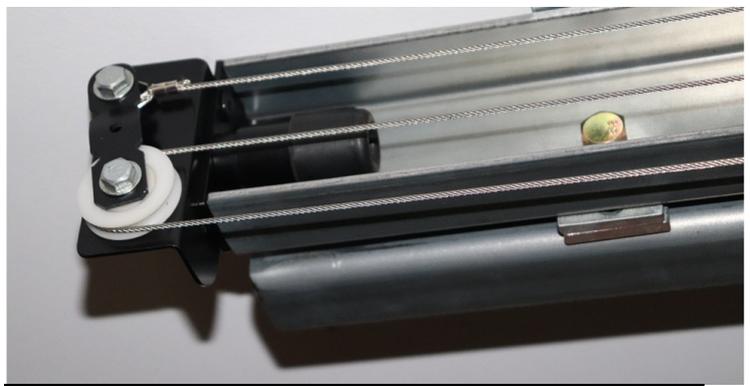
- 100kg capacity to lift the HO trainset which lives on the top of the trailer,
- A reasonably slow hoist speed,
- Increased cross travel range to allow said trainset to be lowered clear of the trailer, say 3.5m,
- Increased lifting height,
- Cable management for the power and control leads
- Reliable cross travel drive, and importantly,
- Incorporating a commercial 240V electric hoist and pendant control.



The trolley and hoist in place on the girder – note cross travel pulleys and drive cable .

The local big green hardware stocked a suitable 50/100kg hoist ideal for the purpose, so now it was time to think through the support girder, hoist trolley, cross drive and cable management.

After trawling the WWW looking for ideas, I settled on a girder comprising back to back 75 x 40 x 4 Duragal channels. An on-line beam calculator confirmed the stress and



Above : Cross travel anchor end and buffer
Below: Cross travel drive end, cable tensioner and buffer



deflection were OK, so the girder support structure comprising four sets of back-to-back commercial angle brackets was settled.

The girder is supported through the angle brackets which are secured by 100mm coach screws to suitable roof truss bottom chords at the selected location.

The WWW also provided a solution to the cable management requirement by way of a girder mounted steel cable supporting pulleys, which in turn supported the cables. This assembly (sans electrical cables) was installed on one of the channels prior to erection.

With the girder mounted, it was time to think through the cross travel trolley and cross travel drive.

Based on the earlier design a trolley was fabricated from 75 x 75 x 3 angle and 3mm plate. Four 6202 ball bearings fitted with flanged tyres provided for movement, support and guidance. The electric hoist was then mounted to the trolley using the supplied bolts.

For the cross travel, the design from the original hoist was replicated,

The pendant control.



though this time using 2mm stainless steel cable instead of the earlier nylon rope. As the cross travel drive is still provided by one of the original 12VDC geared motors, a separate control handset was required. This was attached to the hoist pendant control and the cable to the 12V control box was paired with the hoist's 240V lead to allow for cable management during cross travel.

So, did the project meet its objectives?

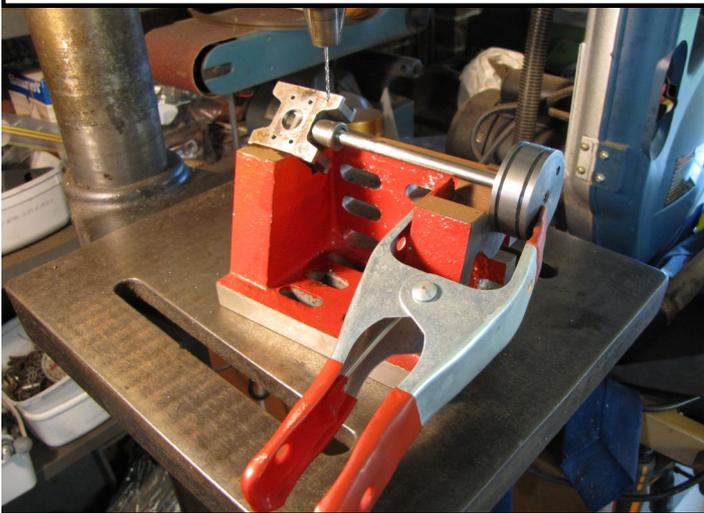
- 100kg capacity – yes, provided by the commercial pendant control hoist unit,
- A reasonably slow and controllable hoist – yes, with the hoist configured for 100kg lift,
- Cross travel range – yes, around 3.3m,
- Increased lift height - yes, around 200mm more than the old hoist,
- Cable management – yes, after a bit of fiddling,
- Reliable cross travel – yes, after a lot of research on rope drive pulley design.

I will let the pictures tell the rest of the story.



Above we see David Thomas amidst the alligator weed infestation, thought to have been brought in by ducks! Below is how it is now after being eradicated! Thanks to David Lee for the latest photo.

Another Work Holding Arrangement



Below is a mid April photo of the weed growth during the coronavirus lockout captured by David Lee.

I had put off a few tasks with the Avonside for some time but with the cooler weather there was no excuse to keep out of the workshop. One task was to cross drill the cross head and piston rod for the cotter pin to keep things in place. Initially I was going to try to manage with the small vee block as shown holding on as well as possible with a suitable glove. Then I remembered that I had the v-angle plate that I had purchased some time back thinking that it may be useful one day! Having found where it was hiding I realised that the cross head, piston rod assembly could be supported far better and also was much better to hold. The operation was completed with only one broken drill so I was very happy.

John Lyons.



Don Ashton

Don Ashton will be familiar to many members for his book on valve gear design and knowledge of valve gears.

He passed away on 12 April in the UK.

In this current time he was probably the world's foremost expert on valve gear design, always advocating for a good design and providing much advice to model engineers. His web site survives and is a source of much excellent advice to aid understanding of valve gear design. His book provides a straightforward approach to laying out Stephenson and Walschaerts gears and will be a valuable reference work well into the future. It will be difficult for it to be improved upon. Few people have made such a contribution to model engineering as Don did.





More scenes from the February Running Day from David Judex. Above, Warwick and V1224 takes a good load of passengers on the Inner Main downhill with Arthur as guard in parallel with Garry Buttel and Impala leading John Tulloch and 2904 down the elevated. Below, Graeme Kirkby and 2401 leads Ray Lee and 3506 downhill on the Outer Main with party groups enjoying the proceedings.



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Web Page Address: <http://www.slsls.asn.au>

Public Running Day is the **THIRD** Saturday in each month from 1.30pm. Entry is \$4 adults, \$2 children. Rides are \$2 each.

To ride on the trains, enclosed footwear must be worn.