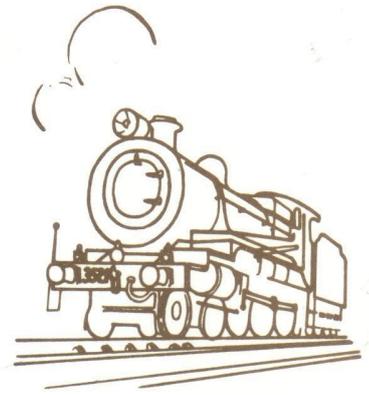


Sydney Live Steam Locomotive Society

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

'Newsletter'

Volume 48. No. 4.
November 2020



Britannia type locomotive 'Shooting Star' is seen here with happy builder Warwick Allison, which had its debut at the Small Gauge Festival. This loco has been through two deceased estates and parts of it would be probably 60 years old. Now it is completed it is a tribute to the workmanship of those who have gone before. Full details are in the following article!

Editorial

In a recent issue of the Port Bay Express, the Newsletter of the Portarlington Bayside Miniature Railway, there were some Covid-19 comments. There was one that I especially liked and it probably sums up how we all feel, "I'm staying up this New Year Eve, not to see the New Year in but to make sure that this year leaves."

As we look back over the year despite how things have been we have still managed to make progress on some of our projects. The western retaining wall is progressing in a southerly direction and the ground level automatic signalling project is going well, especially with a big work effort at the beginning of this month. The elevated track replacement is preparing for the next lot of track laying with all the piers cast, a jig for forming the curved track sections has been designed and built and three sections of track prepared and the plastic sleepers fastened on. An expansion joint of unique design has been fitted into the first section of the replaced track.

As the restrictions have eased we have been able to enjoy some locomotive running and BBQ lunches and we were very lucky to have held our Small Gauge Weekend with more people present at the beginning of November.

There has been a steady stream of locomotive construction work displayed from time to time. I think that some of us have used the excuse of Covid isolation in our workshops to good avail.

Through these very different and difficult times we should extend our sincere thanks to Mick and the rest of our executive for the way they have managed and guided the Society through this year. It has been a situation that, this time last year, no one could have imagined happening. With so many regulations to abide by difficult decisions were made with our welfare in mind. As we start to return to normal it is hoped that operations can return to what we have been use to over the years.

I would like to wish all our members and friends of the SLSLS a safe and happy Christmas and New Year period and hope that we can look forward to 2021 with far less trauma.

Fill in Editor. John Lyons

Shooting Star

A Britannia in 3½ inch gauge.

Warwick Allison

A Challenge!

It was December 2015 when we acquired a partly built 3½ inch gauge Britannia. It was from the estate of member George Robertson. Its history is somewhat clouded but it is believed it was built by John Nichols, who lived in Ryde. It was John Nichols' name against the entry in the 'rough' boiler book for its boiler. It is believed the entry was made in the 1970s. His name also appears on some of the drawings. It is also not clear what work George had done to the locomotive. As obtained it consisted of a running condition chassis for the locomotive and tender and the boiler in two main parts, the barrel and outer firebox assembly, and the inner firebox and tubes. As well the smokebox was well advanced and there was a large collection of other bits and pieces including many cab fittings. The workmanship on the chassis was first class and thus considered to be worthy of purchase.

It was an LBSC design, so the Model Engineer articles from the club library were obtained and scanned. The articles omitted much of the detail so it clearly was not for the faint hearted!

Firstly, an assessment was made of what was needed to complete the loco.

In March 2016 I enquired of the UK Model Engineers Laser as to what was available and subsequently obtained a brass laser cut kit for the tender body. This certainly saved a lot of work in obtaining and cutting out brass sheet. It was already tab and slotted to ease construction (or so one might think). There were a lot less parts available for the loco. Cab sides & back, footplate, roof, ashpan and smoke deflectors were the main items. These were also obtained. The smoke deflectors were OK, but the other cab parts turned out to be the wrong size, more on this later.

The Belpaire boiler was a solid sophisticated unit and had a tapered barrel with combustion chamber containing 6 water tubes and 4 superheater flues.

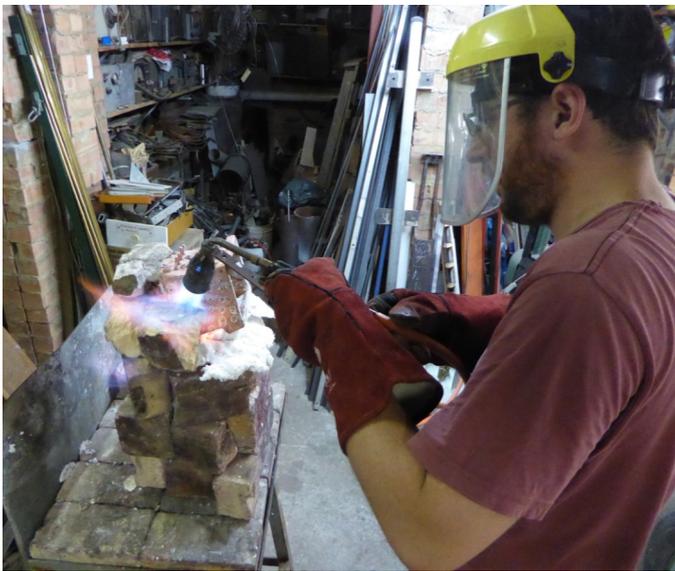
Below: The palm stays and crown sheet rod stays and Crosstays can be seen before the backhead is installed.
Right: The set up for silver soldering the smokebox tubeplate.



The set up for silver soldering the crown stays and foundation ring at the one heat using a 50mm LPG burner which was applied from below. This did the foundation ring and crown stays inside the firebox with silver solder previously placed onto the joints. The top of the crown stays is then done at the same heat.

The boiler was assessed and here was the main problem and probably why construction stopped where it did. By December 2016 a proposal had been developed and accepted by our boiler inspector. This also provided for it to be 100psi. In theory this would boost power by 25% over the designed 80psi! The main problem was that the two assemblies when fitted together would not allow installation of the longitudinal stays. This was due to the firebox crown, thickened by the crown stay girder flanges, encroaching into the longitudinal stay space. As well it was considered the flat Belpaire top of the outer firebox casing was not stayed adequately. The corresponding place on the crown had a long T stay. This is OK on a round top, but not when its flat! It shows what can occur when a 'typical' arrangement is followed without full consideration of the variances. An amended design was done which disposed of the flat crown girder stays and replaced them with 3 rows of rod stays. The longitudinal stays were also dispensed with. The smokebox tubeplate and backhead had some 3mm plate bronze brazed across the holes already provided for the longitudinal stay bushes, usefully thickening up these plates. The smokebox





At the time I was rebuilding a 36 class which needed some boiler work done. As well, we were going to need boilers for a Beaver, Austere Ada, and Ayesha as well, all of which were already on the priority list!

A Start is Made.

To do the boilers together made sense as I could make up a pickle bath in a Sulo bin and set up the brazing hearth to suit. As well I obtained plenty of supplies of tobin bronze, 235 and 245 silver solder plus some 115 for emergencies!

A start was made late in 2016 with the Britannia boiler being completed in February 2017 and passing its hydrostatic test. It was then put aside pending starting final assembly work.

tubeplate required no additional staying but four palm stays were provided from the front of the Belpaire to support the backhead. As well I revised the backhead fittings. The LBSC water gauge position was rather ugly so a proper arrangement of two water gauges was substituted and bushes provided accordingly. As the cab was supported off the back of the boiler, a large copper bar was bronze brazed to the lower part of the backhead for all the attachments to be made without impacting the boiler itself.

LBSC designed a poppet valve regulator two of which were with the parts. However I could only see them being a lot of work and maintenance and preferred a ball valve. Thus the main steam pipe was made a part of the wet header and a ball valve provided in the smokebox that screws directly onto the wet header. The stainless superheater header then screwed in to the front of the ball valve. Conveniently, the operating spindle was in the correct spot for the operating mechanism to exit the side of the smokebox. An internet search revealed a likely ball valve candidate. One of 316 stainless steel with stainless ball and teflon seals, 1/4" BSP threads and AGA approved to boot! I supplied one to Garry Buttel who installed it in his 3½ inch gauge 36 class with much satisfaction.

Left: Andrew applies the flame thrower while silver soldering the backhead on.

Below: Placing the completed boiler in a tub of water with some compressed air applied shows any pinhole leaks easily.



The tab and slot construction of the tender progressing. Soft solder was used to join the panels and to seal all rivets.



The Tender

The tender was built as a separate project in February 2017. Once the ME Laser parts had arrived a start was made. They had some good instructions and a large number of photos of one being assembled supplied on CD. The tab and slot parts were assembled using soft solder and a Primus torch. The main coal plate required bending with the top edges to be tab and slotted to the sides. This was the hardest part. Getting a sharp bend was not easy, and any 'bendiness' on the bend line resulted in the taps missing out in the slots. It probably would have been better if the plate was three separate pieces. Other than that, it went together fairly well and quickly too with a high amount of detail. I used 1/32 rivets for the sides. I recall a conversation with Barry Tulloch where the assembled wisdom was always to go for a smaller rivet if the exact head size was between standard sizes.

The brake handle and shaft was tricky as it required two spur gears but alas, they were not to be at 90 degrees. The vertical shaft is inclined by about 10 degrees. After only 4 weeks or so, the tender was complete

After a delay while Beaver, a Heisler, Ayesha, and a lathe rebuild were completed, then 8 Pullman car bogies, work started again on Britannia in early 2020. No doubt progress was helped by the pandemic lockdown!



The tender nearing completion. The central portion at the front slides out vertically to provide driving access.

The Cab & Lagging

One of the big issues with Britannias (and 9Fs) is the very low cabs which are snugly fitted close to the boiler, but with a myriad of pipes from the manifold. As well the cab sides bend inwards as do the spectacle plates and need to match a belpaire firebox that slopes in all directions! Many builders fall down in this area and I was determined I would not be one of them! I assembled the ashpan, and boiler to the chassis and had a good look and alas it all appeared to be much higher at the rear end.

To make matters worse, the cab parts I had from ME Laser seemed to make the cab too high and long, and the front spectacle plates did not fit either. Much pondering over plans and head scratching ensued. The LBSC plans were a little sparse in some dimensions (it didn't help that I was missing the general arrangement) so it was not easy to see where the troubles actually were, nor their extent. I found an elevation plan in a book so scanned that and imported it into my CAD program. Knowing the size of the driving wheels, I was able to scale the whole drawing to 3/4 inch scale and once this was done I could then dimension all the parts I wanted! Taking some vertical measurements from the model I could now see exactly how much the variance was.

The front of the loco was not too bad, but the bottom of the cab was too high and the top of the boiler and cab far

Superheater arrangement showing the ball valve regulator.



too high. Firstly I decided it was not level in the frames and this was traced to the roller bearings that supported the rear of the trailing truck. These were removed and with some adjustment of the axle box springs I now had a level frame. The boiler was a little high and this was lowered by some judicious fettling of the ashpan and filing an angle to the front foundation ring below the throat-plate so the boiler would sit square onto the frame, which was its main support. This brought the boiler top to measurement. Now for the cab and roof. It was quite clear that something was seriously wrong with the ME Laser parts. Fortunately the cab windows seemed correct. To get the height of the cab correct, a 10mm piece was cut horizontally out of the side and the two halves then butt silver soldered back together. This preserved the tab and slot attachments to the floor. The cab roof was too long so it was trimmed, also by about 10mm, and the sides were trimmed once it was rolled to shape. The back of the cab was too wide. It was made to suit the cab sides but in fact the back piece is somewhat set in to allow for the cab door handrails. Thus it was cut into 3 pieces and



Cab construction in progress checking the fit of the roof.

then silver soldered back together. Care was needed in this to avoid upsetting the tabs and slots! I knew that access into the cab was going to be hard so I decided I would make the roof removable. This means the cab roof is made as per prototype which is much better for photos etc and just lifted off for driving or maintenance. The two sides needed to be tied together so that it fit snugly against the firebox sides. This was achieved by a thin brass strip that held the top of the sides across the top of the boiler.

The sides were soft soldered to the cab floor and all rivet holes marked and drilled on the final assembly. These were glued in place to avoid upsetting the soft solder!

A special construction was needed to form the visible Belpaire corners. This piece had to have the boiler lagging flush across the top. It was built up using copper sheet and brass bar bent to shape and silver soldered all together. Brass strip was rivetted on and silver soldered to form a suitable recess for the lagging to be attached to and thus provide a flush top surface. The lot fitted snugly



Fitting the lagging sheets using a special dummy Belpaire construction to match the barrel and firebox sheets.

Interestingly it is a dual ram pump with one ram providing oil to the cylinders and the other to the slide bars. As well there are two longitudinal pipes feeding oil to the axleboxes. These were unconnected so an oil point was mounted on each side that took the oil can nozzle and connected to the oil galleries.

The Smokebox

An analysis of the smokebox arrangements indicated the blast nozzle was too high to meet Greenly's 1 in 3 rule, so this was lowered. No internal blower connection through the boiler was provided so a fitting was provided below the running boards for an external pipe. The typical hollow blower tubes are a mixed blessing. They do eliminate external plumbing but with a deep smokebox as on a Brit, the tubeplate fitting is hard to access. It is also extra work to do if you have eliminated the longitudinal stays!

over the boiler. The lagging was cut out in cardboard and the holes determined. Masking tape was used to restore any edges cut back too far! The barrel lagging was cut from some 0.55mm stainless steel sheet while the firebox used thinner brass sheet as there was not a lot of room around the firebox. LBSC never described lagging for any of his engines which generally makes them a bit large to make the lagging fit easily. Many stays were cut back to their minimum length to help keep this aspect under control. The lagging was decorated with various washout plugs and mud hole doors as per the prototype. These details were made of brass parts silver soldered together onto thin brass sheet, and then the brass sheet was soft soldered to the inside of the lagging with the detail poking through the hole.

The barrel lagging was rolled and held in place with a large Utilux band while the rest of the loco was sorted out. Once painted the clip was replaced with the final boiler bands. By this time the utilux band had taught it manners!

The Lubricator

The lubricator had been fitted protruding from the front (in accordance with LBSC's design) and this interfered with the prototypical cover plate below the smokebox. This was cut back as most of the upper part of the box enclosed the mechanism which was far enough back so as not to affect the cover plate. This reduced the oil capacity but as it simply reduced it from enormous to normal, no further action was deemed necessary.

The Ashpan



The underside of the tig welded ashpan. The centre part is covered by a removable door. The knob allows the support for the central part of the grate to be retracted.

Now to the ashpan. ME Laser had provided me with a fully TIG welded stainless steel ashpan. While this fitted nicely over the rear frame stretchers it had only 3 smallish holes in the bottom (these seem typical on UK ashpans) and absolutely no way to drop the grate! Much pondering ensued. LBSC had a central

Setting the chassis level so that accurate measurements could be made to determine cab height, window heights, top of boiler and top of cab roof. The Belpaire, cab and firebox top are critical to the appearance of the Brits.



dropping portion which would need a completely different type of ashpan for which there was little room. It was initially considered that if the side was cut away, the grate could be inserted through the side, such as in many 5 inch 38 class. The side was cut off to modify it, but it soon transpired that this was not going to work either due to insufficient space, so it was welded back on!

The arrangement adopted was to have a three piece rosebud grate with a 14% air



Components spread out for painting.

space. A bar was welded into the rear of the ashpan to support them. The sides would sit in place while the central portion was supported by a push rod which allowed the grate to drop when pulled. A large hole was cut into the central lower part of the ashpan which permitted the central grate to drop out through the rear truck.

As well small lifting blocks were welded to the top. These could be hooked by a suitable poker through the fire door and lifted out. These mainly allowed the sections to be inserted easily. Overall, not as easy as I would have liked it to

The chassis with painting in progress. The proper British Rail 'Signal Red' which adorns the buffer beam and inside frames has a (not unpleasant) orange tinge.



be, but probably much better than other similar models!

Fittings & Finishing

A lovely everlasting type blowdown was supplied. A copper pipe was silver soldered to this with a union so that it could be extended between the frames to not only direct the blowdown but to also act as a means of filling the boiler.

Many of the cab fittings were supplied but did not have captive fittings so were modified to be AMBSC compliant.

Plumbing in progress.

The tender drawbar was captive in the tender. As the tender itself projected beneath the loco cab, and the cab floor is some distance above the drag beam, fitting the drawbar pin was going to be tricky. The length of the pin could not be longer than the distance from the top of the drag beam to the cab floor and this meant that there would not be room to fit an R clip beneath to prevent it working out. The solution was to attach a handle to the pin which allowed it to be manipulated from outside the cab. Not original - most 38s have it! Still tricky to insert but at least its now possible. Once in, the handle is swung back to be secured under a clip.

When the engine was assembled and in running trim the rear truck rollers were repositioned and new holes drilled to have them support the rear end at the correct height. The front bogie looked problematical. It had no rock or tilt without lifting the whole engine. The problem was seen to be the very large sliding block mounted on the pivot pin. This effectively locked the bogie frame to the loco, only permitting rotation. A new thinner block was made. it was counterbored for a spring that fitted on the pivot pin to press down on a slightly convex washer that fitted on the lower part of the bogie. This arrangement permitted bogie movement in all dimensions with a steady downward spring pressure to ensure it stayed on the rails.

Painting is always an anxious time. The loco was (mostly) dismantled with masking being used where necessary. The buffer beams and inside frames were Signal Red, a colour to BS381C No. 537. The main colour was Deep Bronze Green BS381C No. 224 (also coincidentally a Land Rover colour) and available as Humbrol enamel number 75. The black is Rustguard Enamel Satin Black in a spray can which I find excellent. The main colours were obtained from a automotive paint supplier in a quick drying spray enamel. It was rather cold when I wanted to do the spraying and better results were obtained by warming the spray can in warm water! Rustguard SLS etch primer was used throughout, another excellent product as it can be oversprayed in 30 min-

utes!

As the components were painted and reassembled they were tested on air to ensure all leaks were eliminated and all the fittings were done up properly. I had some trouble with the red lined type gauge glass which seemed very fragile. I soon ran out of it and used plain glass tube without any further difficulty!

Test Steamings

Before steaming a number of items had to be prepared. An adapter for the electric blower, a shovel, a pricker, and a means of filling the boiler. These were soon sorted and it was steamed jacked up outside the garage door. It took a while to raise steam. A pinhole leak was detected in the hand pump clack nipple. The drain cocks were very difficult to operate. The injector would pick up for 5 seconds then stop, quite consistently! The hand wheels were very hot when gripped. The safety valves couldn't cope with the steam generation and pressure accumulated. The axle pump worked well, but there was a leak! Apart from all this the



mechanism worked fine both forward and reverse and the regulator also was good, the ball valve having freed up nicely.

Back to the bench!

First the nipple. The pipe had been installed before the footplate and of course the union nut would not fit through the hole! Some drilling and dremel work enlarged the hole (fortunately all covered by the decorative timber footplate), the pipe was removed and repaired and replaced. The hand wheels were also all removed and pins inserted in



their sides. They can now be knocked on and off without having to grab them tightly. Now for the injector. This was a special small thread injector made especially by Andrew for the Britannia and tested well on the test boiler. Because it worked for a (very) short period before knocking off it was theorised the problem was in the delivery side. The top feed was a small clack with a 3/16" ball, leaving little space for any water feed. I replaced the ball with a 4mm silicon nitride ball. While I was at it I did the axle pump top feed clack as well.

The hardest fix was the leak in the axle pump. This was a silver soldering pinhole in the delivery fitting. Undoing unions from underneath the loco with arthritic fingers is certainly a trial! The pump stay was secured by counter-sunk screws accessible (fortunately) between the spokes of the front driving wheel. Seeing the pinhole was very difficult, but a clean and flux and heat with a touch of silver solder wire solved the problem. After test reassembly was the reverse of removal. By now I had had practice!

The safety valves had been installed as they came except for a grub screw to lock the adjustment. The design showed a stainless spindle with a coned seat and triangular guide in the orifice, all very nicely made in one piece. The coned seat part was designed to fit into a recess in the valve body, but the builder obviously did not know the significance of the clearances here so the valve was a simple spring loaded valve. The body was phosphor bronze which I was loathe to dispense with. I had a pop valve tool



Some views of the finished details which add greatly to align the character of the miniature in line with the prototype.

which I had made for my Tich many years ago and I decided I could run this into the body and create the internal recess and seat required for a pop recess. This was done, and then new spindle and cups were made for 4.76mm silicon nitride balls which were pressed into the seats. The valve bodies were not as long as I would have liked so there was a bit of fiddling to get the springs correct. Pop valves need a stiff spring but with plenty of coils for flexibility.

Test on the air compressor was promising so its now time for another steam test.

A second steaming raised steam much quicker (I don't know if it was me or the engine!) An accumulation test was most satisfactory although the valves were a bit touchy to adjust probably because of the shortish springs. At least they popped nicely. The hand wheels were much easier to operate. As well the injector worked reliably, although its range was about 90 down to 50 psi. We will see how it goes as its usually best to be able to get an injector to operate at blowing off pressure! (There are probably few, if any other, 100psi 3½ inch gauge Brits!) All the leaks I fixed were actually fixed but a couple more were discovered! With those attended to post steaming, it was now time to arrange a formal steam test. While not done under the cover of darkness (as Sydney Trains does with its new trains) this test and subsequent track trials were conducted on a Monday in time for the Small Gauge Festival. Fortunately all went well and even the guest drivers were impressed. It was fascinating to see the shimmer above the hot char on the wide rosebud grate!

Finished!

Finishing off an unfinished locomotive has several advantages. Providing the work to date is sound, the construction time is shorted potentially by years. As well you can actually put more effort into detailing as you reach the final stages much quicker. It is very satisfying to bring to fruition a locomotive that others have put much of their life into, and after all, a finished and operating locomotive has much more value and satisfaction than a pile of parts. It is a tribute to those who have put such effort into its construction.

Small Gauge



e Festival!





Members Days.

With the easing of some of the imposed restrictions our Board set up Member's Days in place of our normal running days, following is a record of these activities.



August.

This turned out to be a rather good day for the last month of winter despite the weather we had experienced the day and evening before. We had a sunny morning with cloud and wind coming much later. Graeme K had been at the grounds on Thursday doing a lot of cleaning up and Martin and Sheila were there oiling the points so they would

operate well for the day. Early in the day John L and Bill P unboxed the plinths that were cast last week and Bill returned some spacer tubes that he had milled at home. In GL loco we were able to admire the chassis, smoke box and cab with tender of Ray L's latest construction, P class C3374. As we have come to expect the craftsmanship is superb. Ray also had the



boiler plates for Andrew to inspect and so boiler work will be well underway by the time you are reading this report. Ray's C3112 was there as well but did not steam.

Graeme K steamed 2-8-0 D5032, running on the outer main with several drivers during the day. Warwick and Andrew steamed C3609, 4-6-0, and hooked up to the Pullman car set and ran on the inner main. When the cars were stowed David J and Warwick R had a turn driving. Jo and Neal ran their 422 class sometimes with small, well behaved, furry passengers! Barry M was in the signal box and later David J and Warwick R were assisting as well. Lunch consisted of sausages, onions and a roll prepared and served by Jo-Anne, it was enjoyed by all present. Ken had some more laser cut parts for his J class to show and Paul T was getting some boiler advice for his recently purchased Austere Ada. Later Peter D, Paul B, Tony and Craig carried out some welding comparison tests, and John H has eased the hinges on the inner carriage shed door, it now operates very freely.

A good day was enjoyed by all and we observed our 20 limit for the grounds.

September.

With rain overnight and an early morning shower things cleared and we were able to enjoy a reasonable day keeping just under our 20 limit. Simon ran his "Simplex" and after the run booked a few items in for attention. Gary steamed his C36 class having a good run before lunch. Brian K showed off his recently acquired NSWGR 45 class, a battery powdered diesel outline loco. It looks very nice and Brian gave it a good run and later load testing.

Bernie was noted having a drive at one stage. Ross steamed his 0-6-2 Fowler to give it a run and later Dennis O'B was given some footplate instruction. Bernie had his Blowfly for a hydro test checked by Brian K. This was fine but a blow in the superheater ended the steam test. As well Bernie had some 3 1/2" gauge





C36 class boiler parts for inspection. David L and Peter W attached some conduit and brackets on the Hawkesbury Bridge. The next stage of this work will involve some

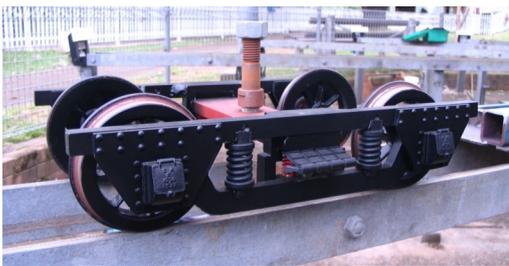
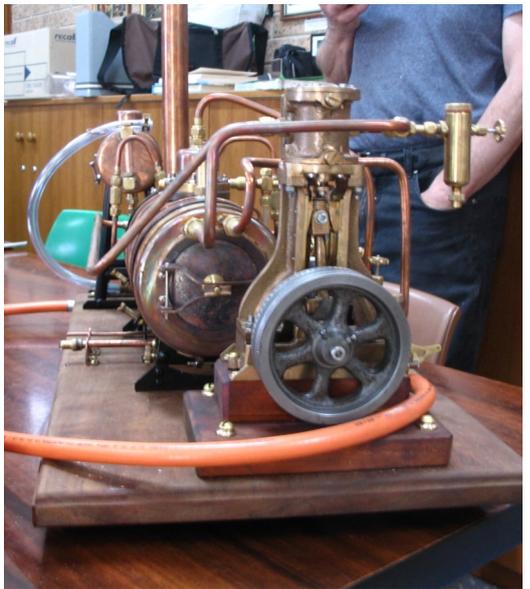
machine assisted trenching for the rest of the conduit. Earlier in the day Dennis O'B had cleaned the GL carriage seats.

On display in the club house we saw the cylinder block with some rods and other attachments for Ross B's Fowler ploughing engine. The size is impressive and the quality of the work superb! New member Chris Denton showed a steam plant, boiler, engine and pump with lots of pipe work. There are other components to be added. John L showed the superstructure unit for his Avonside. On display in the GL loco depot was a chassis and bogies for a Commonwealth Railways guards van being built by David L Very nice work, fabricated and decorated with 3-D printed items to add detail.



with the forecast rain not happening till about 3.00pm. In the week before this day David L and Peter W started the conduit run for the entrance bridge CCTV cameras. They came across some sandstone obstacles on their way. Further trenching will be by mechanical means. On the ground level Gary B steamed his C36 class and hauled some of his 4 wheel NSWGR wagons and bogie guards van. Brian K ran his NSWGR 45 class again following some work after his initial run last month. With a mixed train hooked up Brian and several other drivers enjoyed a good run.

On the elevated John L steamed Z1915 after a long break. John actually had loaded the 19 for a run in September but was put off by the prospect of rain. The Z19 ran well with Bill P and Mike D having a turn at the regulator. Later on the elevated Neal fired up his 0-6-



A BBQ lunch was provided once again with Mike D setting the fire and Peter D prepared and cooked the sausages and onions. With the bread rolls all present enjoyed a great lunch.

October.

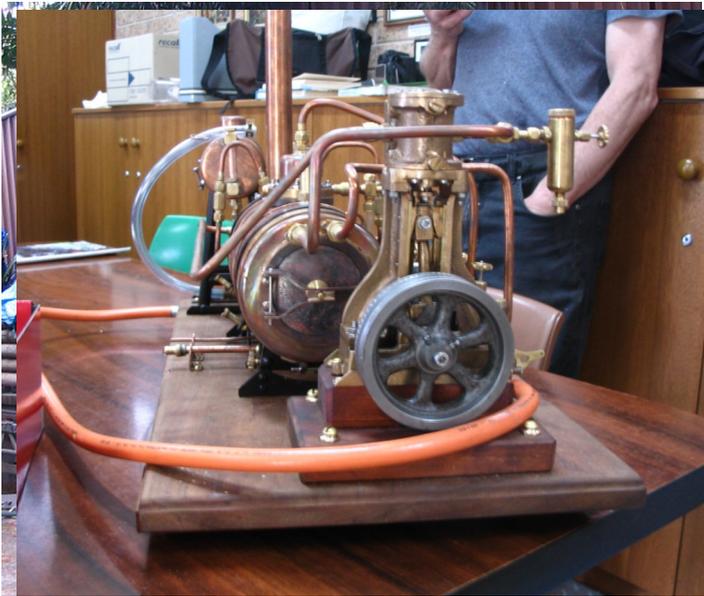
The day started off cool but warmed up during the day becoming humid in the afternoon



Diary

- 21 November Members Meeting & Members Running Day
- 19 December Members Running all day & SLSLS Christmas Party (evening)
- 31 December (Thursday) New Years Eve
- 31 July 2021 SLSLS Interclub.

Please see AME for other events.



0 tank Butch and eventually, after some running repairs, headed on to the track to do some reverse running. Craig D was also noted having a drive. Butch will be booked in for repairs and the fitting of a new clack valve.

In the clubhouse Simon displayed his G scale Eric, Scot's NA class front bogie frame (an impressive piece of fabrication) and David T's SA 600 class power reverser.

Scott spent some of the time on the CCTV system helping Mick understand some of the mysteries of the WiFi video transmission.

The BBQ lunch was again enjoyed by all present with Ian T, Ross B and Mick taking part in the preparation and cooking of the sausages and onions and preparing of the bread rolls.

Once again another enjoyable member's day.

Small Gauge Weekend 2020.

John Lyons

It was very fortunate that the Covid-19 regulations, that have ruled our lives since mid March, had been eased somewhat in NSW to allow this event to occur. Preparation began the previous Saturday when the 3½" and 2½" gauge track inserts were fitted to some of the elevated track locomotive depot tracks by John L and Mike D making more space available for the smaller locomotives. On

the day before this event a good team assembled at the grounds for final preparations. We had Warwick and Wendy, John H, Garry B, David T and Simon. The grounds were given a general clean up, kitchen stocked and banners put up.

By the time running began on Saturday there were items for display in the club house. Dennis O'B provided some early steam O gauge locomotives, in gauge 1 there was a "Jack", "Ellie", NSWGR Z 26 class and a "Perry" with the cylinder sets. Neal B had a British Railway enamel sign and a HO gauge diesel shunter.

David J showed his Manning Wardle 5" gauge tank engine which is progressing slowly. Paul T displayed an "Austere Ada" that he recently added to his collection. There were some components for Ken B's N & W J class, Andrew's reversers for a 5" gauge C38 class and parts for a West Country class and a governor for a stationary engine.

Over the two days our catering was looked after in a Covid-19 safe manner. On Saturday we had the help from Wendy, Hana, Mandy and Jo- Anne while on Sunday Wendy, Jo-Anne and Sue. On both days Ian T and Jo-Anne were the BBQ chefs!

The weather for the two days was fair enough considering what had been forecast. Saturday morning was very hot



for the time of the year, there was a bit of rain around lunch time and then it settled in late in the afternoon. Sunday saw more rain on and off with extended dry periods. This did not curtail the running as the station covering for the main line provided refuge for those drivers who wished to remain dry while the more adventurist used the station loop.

The locomotives in the steaming bays over the two days were as follows. Between Warwick and Andrew Allison we had "Tich", "Britannia" on its first outing, "Ayesha", "Austere Ada", "B2", Heisler, Climax and "Beaver".





Forming large radius tank ends.

John Lyons

The side tanks on the Avonside have very large radii curved ends, 8 inches radii in full size. The tank sides and the cab sides form an integral unit so when starting work I decided that the tank sides would be set out starting at the rear end and keeping the cut out for the cab entry to be carried out after the cab side had been located. At the front end there was a reasonable length of plate left over that would allow me to apply a good lot of leverage. I had made the decision that the tanks would be for decoration only and not carry water. All the rivets would be for decoration. I was very fortunate that there were no vertical rows of rivets in the immediate area of where the curve would be. I made a hard wood former slightly less in radius than that specified to allow for spring back once the forming was done. This former was bolted to a large piece of particle board with the tank side underneath. When the plate for the tank side was fastened to this board the whole assembly was fastened to the work bench. The extended end of the tank side was then fastened to a suitable piece of scrap timber to provide plenty of leverage to form the curve. This method worked well to form the initial shape. The sides were then trimmed to their actual length and in turn clamped back in place and given some attention with a rubber mallet to make the final shape.

The prepared and shaped tank tops were adjusted to match the shape of the formed tank side / end. In hind sight I should have waited to shape the tank top after the end forming was completed.

The whole of the superstructure fastens to the running boards with six, three each side, special design screws that are obscured under the running boards.

Garry Buttel ran his NSWGR C 36 sounding great as it charged up the grade. Jo and Neal ran their battery powered diesel shunter and James ran his "Buffalo". Ray L ran his NSWGR C32 now over 50 years old. John H intended to run his King class but it needed some more attention in the work shop.

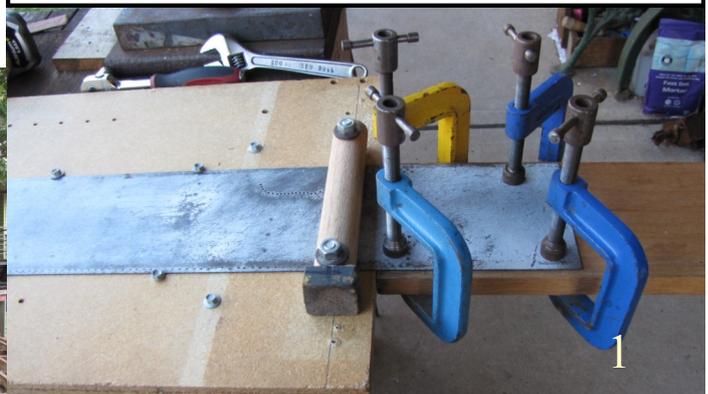
Many of the locomotives had a sleep over and they were joined by a "Dyak" for a run on the Sunday driven by David Coulshed. With all these small gauge locomotives running all were happy with the new expansion joint.

Considering things our numbers were very good.

Visitors were from the Sydney area, Uralla, Yeoval, Newcastle and made up about 39 on the Saturday and 27 on Sunday. We did not have any interstate visitors this year as it would have been too difficult to comply with the restrictions.

A big thank you to all who assisted in making this event such a success in a year that has been devoid of our usual gatherings. *(More pictures of this event are in the centre pages).*

Below: The 4 stages of forming the tank ends.



Duty Roster.

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

January: John Hurst, John Lyons, Matthew Lee, Jim Mulholland, Martin Yule, Warwick Allison, Tony Kidson, Nigel Woolley, Bill Perrin, Eddie Jones.

February: Ross Bishop, Neal Bates, Tony Eyre, Jo-Anne Topp, Ray Lee, Peter Wagner, Paul Taffa, John Tulloch, John Simpson, David Judex.

March: Mick Murray, Andrew Allison, Mark Gibbons, Wayne Fletcher, Graeme Kirkby, John Noller, Ian Tomlinson, Glen Scott, Chris Denton.

Gate Roster and Track Superintendents: To be advised when running recommences.

Elevated Railway Expansion Joint

Warwick Allison

During my overseas jaunt during 2019 I made a point of investigating elevated track construction, and one item in particular being how they allowed for expansion. In the UK many of their tracks use aluminium profile rail and this has a large coefficient of expansion. There was one railway that made no allowance for expansion, but all the others made allowances in varying degrees. The main thing I noticed was that their expansion joints were fairly regular. In some cases they seem to have been installed where they had a problem, rather than with any predefined principle.

They were usually of either a simple break in the rail, or a more traditional approach with the rails milled to a half profile and mated to form a sliding joint.

For a steel track the coefficient of expansion of steel is around $12 \times 10^{-6} \text{m/m}^\circ\text{C}$. Now $12 \times 10^{-6} \text{m}$ is 0.012 mm. To get the expansion it is multiplied by the length in metres and the degrees C. If we consider the temperature range to be 50 degrees, (and some may think this is too low!) for 10m of rail it will expand 6mm. As the SLSLS elevated is about 400m long, this translates into 240mm! This expansion has to go somewhere, so it needs to be allowed to occur without damaging the structure of the railway.

Two railways I visited had flexible rail sections for stub points that consisted of 'fingers' or leaves of thin stainless steel strip. The arrangement appeared to offer good prospects for a minimum effort but high quality expansion joint. This was important because a simple calculation will show that if each joint could accommodate 20mm of expansion, we would still need 12 of them! (Assuming they were ideally placed, which of course is not feasible).

In our case we did not need flexible rails but the idea of using bundled thin strips as the rail was desirable to greatly reduce the gap in the railhead and in particular the gap in the running face. The existing expansion joints with the large gap in the running face presents a significant challenge for tiny 2.5" gauge loco pony wheels – which sometimes decline to climb out of the hole they have dropped into!

I sent Andrew the concept who worked out the details and produced a design which had 8 different profiles, all which could be laser cut. This were 4 different leaves, a base plate, rail gauge plate, clamp plate and fishplate. For a typical joint catering for 2½, 3½ and 5 inch gauge, these 8 profiles translated into 1 base plate, 4 rail gauge plates, 16 fishplates, clamp plates and 48 leafs to construct one joint. The leaves are 1.2mm stainless sheet and were bundled together (with staggered joints) to create rail sections of 4.8mm for the inner gauges and 9.6mm for the 5 inch rails.

Due to clearances, two of the fishplates had to be tapped rather than nitted, and one of the clamp plates requires a counterbore to accept a nut. This represents the main effort in construction. Assembly involved removing the plastic backing from the stainless and finishing both sides to remove burrs. A bit tedious but essential. A jig of 3 bolts in a plate allowed the leaves to be assembled and captured in the fishplates before transferring to the bed plate to which the rail gauge plates had been welded. Then assembly requires mainly the insertion of bolts and the application of nuts!

Once installed in the track, the top of the leaves is dressed with a flapwheel to remove any high spots.

Feedback so far has been very good. You cannot feel their presence running over them, they are neat and compact and hopefully will perform their role in keeping the track as new!



Left ; Here is a typical expansion joint using aluminium profile rail as seen at the Sale and Urmston tracks in the UK.

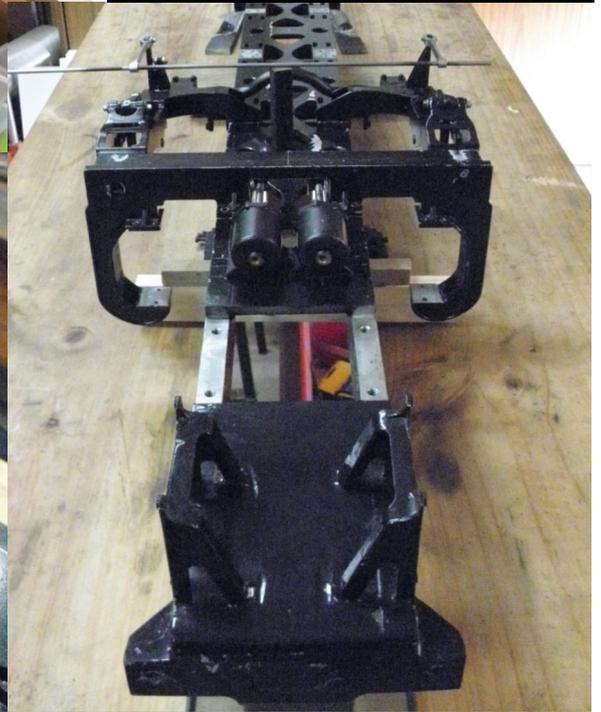
Right: The Maidstone track is concrete beam on posts. Timber sleepers are embedded into the cast beam and the track is screwed down to these. Between each beam the track is fishplated providing a small expansion allowance while the beams themselves are physically separated but keep in line with a timber key.





Here is Trevor Arney with his 2-6-0 loco ready for final assembly. Trevor was instrumental in the construction of the club house, the electrical reticulation system and the eastern retaining wall. All major projects that greatly benefited the Society. Trevor is currently residing near Canberra.

Below: Views of Ken Baker's N & W J class. Left: A close up of the weigh shaft in its bearings with reach rods attached. Right: The stripped down frame with the rear section cut out ready for rewelding into the correct position to provide cornering clearance for the delta truck. Ken hopes to have it rolling by Christmas.



Here is Austere Ada posing in front of our new expansion joint.





Above: Jim Leishman inspects Greg Croudace's rebuild of the Ps4 on 24 October 2020.
 Below: Ayesha at speed driven by David Coulshed during the Small Gauge Festival.



'Newsletter' is Published by: Sydney Live Steam Locomotive Society Co-op Ltd.

Track location is Anthony Rd, West Ryde adjacent to Betts St, behind West Ryde shops. 33° 48' 15.99" S; 151° 05' 12.78" E
Telephone: (02) 9874 8696. **Postal Address:** The Secretary, PO Box 124, West Ryde, NSW, 1685

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.