



May — June 2009

FAIL SAFE AIR BRAKES by John Shugg

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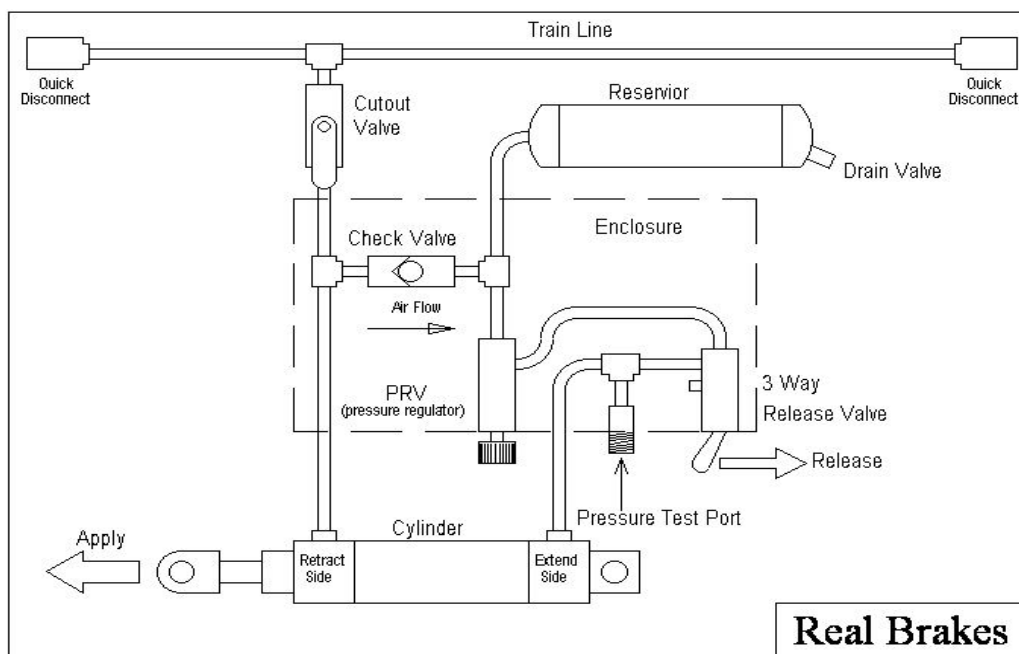
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Above: Diagram of the proposed air brake system.

Reproduced with kind permission of Phil McFadin, USA

At the February General Meeting, I suggested that we adopt the bar frame bogie and the gondola carriage designs as standard designs for our club. These designs were described by Karl Hempel (of Morphett Vale Railway South Australia) in the May/June and July/August 2007 (Issues #132/133) of "Australian Model Engineering".

At the present rate of track construction Tony Jones and crew will have the track for the outer main circuit down well before Christmas 2009. That's great news, and good progress. But it highlights another issue... we ain't got any completed 7¼" gauge carriages — yet.

(Continued on page 4)

CALENDAR OF EVENTS

Event	Location	Time	Date
General Meeting	Club Meeting Room Vasto PI, Balcatta	8:00 pm	Friday 10 July
Club Run Day	Club Track Site Vasto PI, Balcatta	11:00 am—3:00 pm	Sunday 12 July (see page 3)
Public Run Day	Club Track Site Vasto PI, Balcatta	11:00 am—3:00 pm	Sunday 26 July
General Meeting	Club Meeting Room Vasto PI, Balcatta	8:00 pm	Friday 14 August
Public Run Day	Club Track Site Vasto PI, Balcatta	11:00 am—3:00 pm	Sunday 30 August

May General Meeting

The May General Meeting was held on Friday 8 May 2009 at the Society's meeting room commencing at 8:00pm, chaired by Ken Austin.

The full Minutes of Meeting are enclosed with Steamlines as a separate Supplement for members. Some highlights of general interest are reproduced here.

Visitors Colin Osborn, David Burman and Les Graham were welcomed to the meeting.

General Business:

Ken Austin explained that the Committee had resolved to hold off on any further major projects when the outer loop of the Ground Level Track was completed later this year.

Our focus then should be on a general tidy-up of the grounds and on providing member services and enjoyment of the facilities.

A general discussion was held on the merits of club run days. The general feeling was that we should put more focus on meeting the members' various needs, be they training, track time or demonstrations of techniques.

All day or Saturday afternoons seemed to be preferred. Although once a month would be good, we will try for once every two months this year.

Model Engineering:

Ken Austin brought along some steel off-cuts for members and **Clive Jarman** said he had lots of Aluminium off-cuts available for members.

John Haggarty displayed his boiler - one of two that he and Ed Brown are building - it is assembled but not brazed up as yet.

Paul Costall showed the 7¹/₄" bogie that Ron Collins had built some years ago. He presented it as an example of what we could use as a Society as a basis for 7¹/₄" club passenger cars.

Paul also showed a finishing cutter for the lathe - round tool steel with a square end with 4° clearance. The tool is set at 30° to the horizontal and square on to the work. It will shave the surface to give a fine finish.

Ray Bradley showed a working steam capstan for his model steam drifter. The engine, on top of the capstan, is a two cylinder slide valve engine with a bore of 4 or 5 mm. It was made by hand without the use of machine tools. The capstan was gear driven from the engine.

The meeting closed at 9:20pm. Members enjoyed tea and coffee and a good yarn.

Andrew Manning
Secretary

June General Meeting

The June General Meeting was held on Friday 12 June 2009 at the Society's meeting room commencing at 8:00pm, chaired by Ken Austin.

Visitor Ray Forsyth was welcomed to the meeting.

General Business:

Ground Level Track Completion — A proposed completion date of November 2009 was proposed with a grand opening and model engineering display.

GLT Riding Cars — Ken Austin is looking into the use and manufacture of aluminium cars and will provide a cost for such cars. Ron Collins reported on the manufacture of two riding cars already under construction. These will be available in the near future at minimal cost to the club. Many thanks to all those concerned.

A number of other issues were discussed — see the May - June Supplement to Steamlines for details.

Model Engineering:

Paul Costall showed a telltale sight glass which will display when water is bypassing from the boiler feed pump. This is to be used on his Fowler Traction Engine.

Ron Collins showed a commercial non-return valve he had sectionalised. He also displayed a beautifully finished water pump complete with fittings and mesh filters for his Fowler Traction Engine.

Jim Clark displayed his completed steering worm and wheel for his Allchin Traction Engine. Jim first made the double start worm longer than required and then afterwards roughed out the wheel teeth using the worm extension as a hob to finally shape the wheel teeth. Rather ingenious and very successful.

Ken Austin showed some well made sight glass fittings for his Burrell Traction Engine and a recently purchased steam pump.

John Shugg produced samples of a commercially available pneumatic air cylinder, an air valve and a switch. These were the units proposed by John for use on the new riding cars being built. Details of the fail-safe braking system to be published in Steamlines—see main article in this issue.

Finally, **John Haggarty** mentioned the use of a two pack paint which he has used to paint brass zebra plates to be fitted behind sight glasses on his new loco. This paint is baked for approximately one hour at around 200degF and goes as hard as baked enamel.

The meeting closed at 9:25pm followed by tea, coffee and another good yarn.

Paul James
(Acting Minute Secretary)

President's Report for May—June

by Ken Austin

Another month has passed and progress on the first section of the ground level track is still on schedule to be completed in October this year. I should like to plan a Grand Opening of the track in conjunction with a Model Engineering Exhibition on the November Run Day.

We have had a request from Kevin Date to spread his father's ashes at the society's grounds during our Club Run Day on Sunday 12 July. This will include a tree planting ceremony (the tree to be supplied by NDMES).

I would like to request that as many members as possible attend, as Ron donated much of his later life to working on the Society's track site and the construction of the club rooms. He made a valuable contribution to the development of the Society during his lifetime. Light food and refreshments will be supplied by Kevin Date.

With regards to the riding car brakes (see main article in this issue), John Shugg has gone to a lot of effort to investigate a suitable air brake system for our club, which will no doubt work well. Richard Stuart of Castledare has also been developing an air braking system, a prototype of which I would like to demonstrate at the July General Meeting, for comments by members. Of particular interest is the driver's valve he is using, which provides a good proportional control allowing the brakes to be applied to any desired amount.

Lastly I would like to thank Ron Collins for his work in organising construction of two 7¹/₄" riding cars for the club and also Steve Reeves who has offered to donate 10 lengths of 25 x 3 flat bar for track construction. Many thanks Ron and Steve.

Ken Austin, Acting President

GENERAL NOTICES

The following items were provided by Steve Reeves — please call him on 9354 1395 if you need more details.

Whereabouts of a 3¹/₂" gauge tender engine, brown with teapot top to smokebox, which was brought to AMRA about 3 years ago. If anyone knows where this engine is at present, please contact Steve Reeves.

Welder, Drill Press, Shaper, Hacksaw and hand tools for sale, belonging to the late Bob Moss. Please contact Bernie Courtney on 9367 3860 if you are interested.

Looking for someone to help with restoration of an old Donkey Engine which needs a new piston and con rod amongst other things. The request for assistance was made during AMRA this year. If you might be interested, please contact Graham Ford on 9534 8719.

KATANNING VINTAGE FAIR

The Katanning Vintage Fair will be held on Saturday 12 September 2009.

If anyone is interested in running or exhibiting traction engines at this venue, please contact Graham Palethorpe on 9525 4252. He can provide full details about the facilities, insurance requirements, etc.

FOR SALE

One set of **E&J Winter's Drawings for a C32 loco** plus wheels: \$200.

Set of **E&J Winter's Drawings for a D50 loco**: \$100.

Please contact George Palmer on 9248 5080.

CEREMONY FOR RON DATE

A ceremony in memory of long-time member and past President of the Society Ron Date will be held in conjunction with the July Club Run Day.

The ceremony is planned to take place at midday and will be followed by some light refreshments.

Please come along, bring a loco if you have one, otherwise have a ride, have a chat and enjoy a day of club fellowship with other members and their families, while remembering Ron, a true Model Engineer of the "we will find a way or make it" school.

COST OF RAISING FUNDS

Our major source of revenue is from running our trains for the public once a month. Since we opened to the public in June 2000 the Society has raised over \$40,000. In terms of person-hours expended just to raise our first dollar every month, it takes approximately **100 hours** of labour by volunteers who help the club bring in revenue.

As Treasurer, but more particularly as one of those who gives personal time to the Society to help raise funds, it grieves me when the Society's funds are apparently wasted or misspent, given the hours it has cost the members to raise the funds in the first place.

Please do not spend funds on behalf of the Society without prior discussion, supported with a costing estimate, and possibly agreement at a Committee Meeting. If approved, the expenditure should be evidenced by a receipt from the supplier, to be presented to the Treasurer to secure a petty cash reimbursement. No docket – no dough, right!

John Shugg

FAIL SAFE CONTINUOUS AIR BRAKES (cont)...

by John Shugg

(Continued from page 1)

A few already constructed 7¼" bogies have been submitted since March, for consideration, and thank you to those who have provided them. But none was fitted with brakes and it could be difficult to retrofit those bogies with effective brakes. For our gradients, that's not too good!

So let's now deal with the issue of BRAKES. A concept for a fail-safe air brake system is reproduced here with kind approval from Phil McFadin of Real Brakes, Riverside CA, USA. Any errors and serious omissions in condensing Phil's web article are entirely my doing. Please go directly to the source for the full story!

www.realbrakes.com

How it Works — see diagram on page 1

Phil's operating pressure is 50 psi in the train line. The Pressure Regulating valve will allow adjustment of the brake pressure (which is set when the car is empty) to prevent wheel lock-up. There is always a slightly lower pressure differential beyond the non-return valve in the reservoir anyway.

While the air pressure in the train line exceeds the car cylinder pressure, your brakes will remain off.

Loss of air in the train line (from say a coupling hose separation) would mean that the greater pressure held in the reservoir and the lines to the "extend end" of the cylinder will exceed the train line pressure at the "retract end" and thus the brakes will be fully applied.

Likewise, a gradual driver-controlled release of air from the train line will cause the "extend end" pressure to slowly exceed the "retract end" and apply the brakes. With sufficient reduction of train line pressure you will have effectively parked your train! The train line pressure needs to be restored again to release the brakes, but there is also a manual brake release, explained later.

The Driver's control valve (not illustrated in the diagram) is located on the front of the tender with the train line connected to it. *(Suitable driver's control valves will be covered as a separate subject—Ed)*

The three way Release valve on each car, when released, will allow you to move the car while it is decoupled from the train line. Return the valve and the reservoir pressure will re-apply the brakes while the car is parked.

The suggested car reservoir is 2" copper pipe about 9" long, with tori-spherical ends silver brazed in. The working pressure of 50psi brings it into the ambit of AMBSC Code Part 1 (Copper), so please have your sketch of the pressure vessel(s) and the pre-assembled plates and barrel inspected by a club boiler inspector before silver brazing it together.

A 12 volt battery, a compressor with pressure operated switch gear and a main train pipe reservoir could be mounted in a box car, Caboose (or brake van) say, coupled to the loco tender with a line forward to the front end control valve on the driving truck, tender or whatever it is you sit on or in. A tap from the loco/tender main reservoir to the train line will allow you to recharge the train line and car reservoirs.

Of course if you have a steam driven cross-compound compressor or even a single cylinder Westinghouse steam air pump you have "got it made". You do not need to have a battery powered compressor. A loco or tender mounted reservoir will be needed however. As an easier option, the club's compressor could charge the main train reservoir at the station every few laps.

Phil advocates a brake cylinder mounted under the car centre, with rods activating the brakes on each bogie through equalising beams. A bogie-mounted cylinder with some re-arrangement of the plumbing from that illustrated in the diagram could work as well for bogies designed to accommodate that arrangement. That would suit the MVR designed bogies.

The concept, briefly outlined here, is fully explained in the Real Brakes web pages. It is a design that certainly answers our needs for an effective continuous train brake, fail safe in operation, prototypical in use and its excellent design provides effective parking brakes.

I commend it to you. We have little time to achieve what we must. Let's get moving!

John Shugg

Editor's Note: I edited this article extensively due to space constraints – apologies to John! It is an important and current topic, and some more details and photos from John's article will be published in the next issue.

NEWS ITEMS WANTED

I am always looking for more material for Steamlines. Thanks to the recent contributors, I have some ongoing articles, but I still need more. Everything you send will get published, but it may not appear for a few issues.

Please also note that email is not a guaranteed delivery method — emails don't always arrive! I always reply to my emails, so if you haven't received a response from me within a couple of days, you can assume I didn't receive your email. If not, please check the address and send it again, or call me on the phone — 9446 5870.

Please email your material to:

jimclark@hardwareandsoftware.com.au

or post c/o Secretary, PO Box 681, Balcatta, WA 6914

Fowler—the “King” of Traction Engines

by Ron Collins

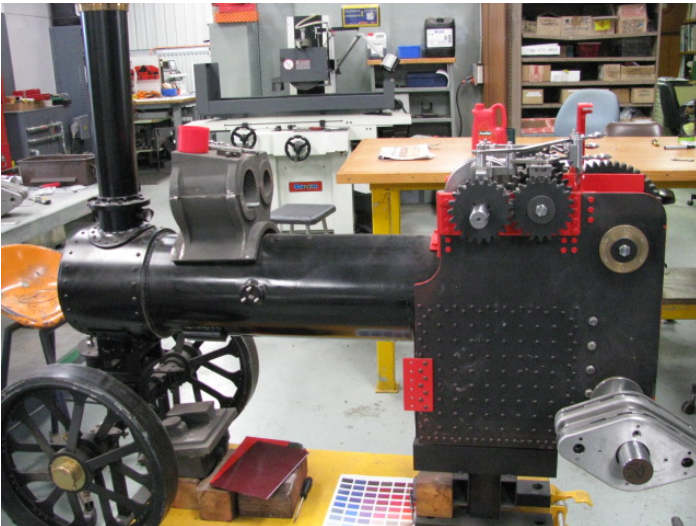
A short dissertation on the building of a pair of Fowler Traction Engines under construction by Ron Collins and Paul Costall — continued from the March-April issue.

Boiler Testing:

Phil Gibbons was contacted and he mentioned he would come and witness the pressure test on a Sunday. What really occurred was Phil conned his wife into going for a Sunday drive to be followed by a romantic lunch, but ended up pressure testing the boilers in Mt Helena – *Romantic Devil isn't he!*

Fortunately Phil approved the pressure test before leaving and we are still unsure whether Mrs Gibbons received her romantic lunch.

The completed boilers were mounted into the hornplates and connected to the smoke boxes. Things were starting to get heavy and big.



Photos: Ron Collins/Paul Costall

Gears and Gearing:

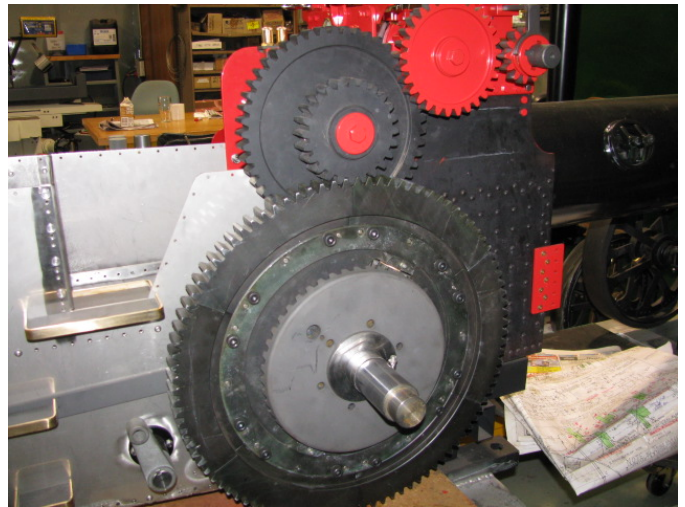
The traction engines are 4 Shaft engines with three speeds, this means at total of 10 gears, and a differential (2 crown wheels and 2 pinions).

All the gears were wire cut complete with keyways and splines as required.

The final drive at 500mm diameter was too big to wire cut in one piece so it was made into six segments, machined and wire cut (16 teeth per segment), then bolted and dowelled to the final drive housing.

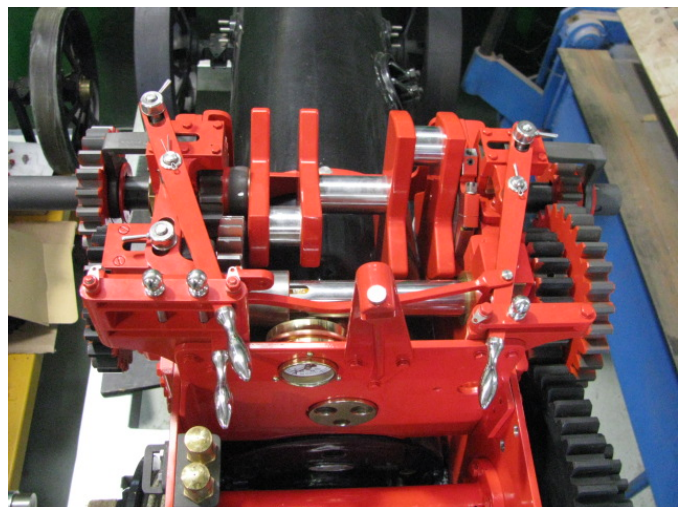
The differential crown wheels were machined and the parallel depth bevel gear teeth were laboriously cut on the manual mill, indexing 3 times for every tooth.

The completion of the gears and associated shafts meant the gear change mechanisms could be fabricated and fitted.



All the separate levers and arms had to be measured and fitted to ensure that all the gears were properly meshed and aligned. The traction engines are large scale, however some of the gear clearances in relation to the crankshaft are very small.

A decision was made to make all handles and unpainted components in stainless steel to save polishing and prevent corrosion. The polished stainless handles and knobs look quite pleasing, (photo below).



Rear Wheels:

The rear wheels are quite large, complete with 20 spokes each and 4 rivets per spoke (total 320 rivets). The rims were made from “I” section beam split in the centre of the “I” to form the Tee Section. The Tee sections were then rolled and welded.

The wheels were satisfactory as the worst run-out was about 1.5mm and the diameter across the wheel only varied about +/-1mm. This should not present any problems unless the engines are raced at high speed!

(To be continued in the next issue)

Ron Collins

The Foundry — Johnston & Wells Part 3 by Andrew Manning

A description of Andrew Manning's experiences as a boy in a general engineering works — continued from the March-April issue.

The hardest job I had in the foundry was making moulds on the jolt squeeze moulding machine. I had to make a large number of pipe bend moulds in boxes about 500 x 400 mm.

The pattern was double-sided, mounted on a plate sufficient to fit across the moulding box and register on the box pins. The machine had a table at waist height. The pattern was set up on a mould box and a box fitted on top of the plate, the mould box partly filled with face sand and a pedal was pushed to jolt the table up and down a couple of times to compact the sand. Then the backing sand was added to fill the box and jolted again, more sand added, then a top plate swung into position above the mould and a second pedal pressed to squeeze the mould between the top and bottom plates.

The two moulding boxes with the pattern between were then turned over and the cycle repeated. The hard work was that each cycle only took a couple of minutes so I was flat out lifting, shovelling sand, turning moulds over, then separating boxes to remove patterns, cutting runners and lifting the boxes down to the floor.

Scrap iron was delivered into the yard between the machine shop and the foundry. The scrap was often in the form of an old machine and had to be broken up. On one occasion a full printing machine was delivered. I was able to salvage lots of bright square and round steel bars from which I hoped I could build a lathe.

The scrap metal, pig iron and coke was delivered to the first floor by an hydraulic lift, the hydraulic power coming from the main water supply.

On casting day a kindling fire was set in the cupola from the charging door at first floor level and lit. The furnace was slowly warmed up over the morning, first with wood then hard coke was added. After lunch it was all hands on deck for the cast. The blower was turned on and the coke bed built up to white heat then the scrap and pig iron was added with just a little extra coke. The charging continued until the level in the furnace was just below the charge door. Looking through the tuyere hole (a port through which air is blasted into the furnace) the molten iron could be seen dribbling through the white hot coke.

When the iron started to run freely out of the tapping hole it was plugged with clay. The pool of metal was allowed to build up until slag appeared at the slag hole above and to the side of the tapping hole. A preheated ladle was positioned under the tapping spout and the clay plug chipped out with a crow-bar.

As the ladle was filling, the moulder would fill small hand-held ladles under the spout and use them to fill the small moulds. My job was to move the crane, using the chain, up and down the shop as the ladle was used to fill the larger moulds. The capacity of the furnace was not sufficient to give enough metal for big jobs in one tapping, so when this occurred the furnace was drained into the ladle then plugged until the next lot of metal had accumulated. Diatomaceous earth was spread onto the top of the metal in the ladle to keep the heat in (the same stuff as used in pool filters).

As the metal was poured into the moulds the coal dust and wood flour in the sand would gasify and blue gas flames would appear across the top of the moulding boxes.

The crucible pit furnaces were not used very often, only for quite large bronze castings, as there were a number of smaller non-ferrous foundries close by that cast every day. One was only 50 metres up the road called "Retlass Bronze" and they specialised in small castings. All of their moulding was done over sand fill troughs. They made lots of fittings for the power industry and boat fittings, as well as the general run of engineering bits and pieces. Their furnaces were oil fired and they seemed to have a couple of melts on most days.

Another small non-ferrous foundry was in the middle of a well-to-do area — it was in a shed not much bigger than a double garage, where they had two coke fueled pit furnaces and made high quality bronze castings.

I visited these other foundries as fetch and delivery boy, and I walked all over Hobart delivering or collecting patterns, castings, tools, etc.

Next trip down memory lane will be my time in the pattern shop and the strife a boy can get into when asked to clean the place up. It had over 50 years of dust on the rafters!

Andrew Manning



An iron foundry scene that would be typical of Andrew's experience

My First Australian Steam Up

Article & photos by Nigel Sales

Well where do I start? After the long strip and rebuild to get a boiler test done, Phil finally gave Cygnus the OK so we were ready for the Convention at Castledare.

Packing up the tools and bits required for the first public outing: Brass polish - check, blower - check, matches - check... and so it went on with anticipation as Pauline and I loaded the car ready for the trip. Well it only takes 25 minutes to get to Castledare but that seemed to be an eternity — “What did I forget?” just kept going through my mind all the way there.

We have arrived, so time to sign in, find the cabin, find our badges and now to find where we can unload. Reverse the car up to the unloading ramp — “Do you want it lowered?” comes a voice. “Yep”, I replied so it was duly lowered. Now to reveal my pride and joy to the Australian sun! Almost as soon as Cygnus touched the ground click-click went some cameras. I hope that the pictures come out well for the camera owners and so Cygnus and her trucks are on rails again ready to shunt into a bay and wait for her turn to run.

We decided to have a look around the site first and wait to steam up later it as it was good to have a ride and enjoy the atmosphere at the Convention.

The time had come — we found the water supply and shunted our train within reach of the water hose and started to fill all the tanks, then shunted back into a position ready to light up. In goes some wood soaked in kero to start, then the match. “Blower on”, I say and Pauline connects the electric blower to the battery. A slight hum is heard — Great, that still works!!! “More wood” my brain tells me as it goes into auto pilot. This must be the 200th time I have steamed up a loco but somehow it feels very special. Well, pretty soon the gauge starts to move up. “Open steam blower, remove electric blower” my brain tells me so I do, then the fire makes a very satisfying roar and I know that we are getting closer to a real fire. I add some coal — it lights very easily and as I am later told and I find out, it is very fast burning, so this I will have to get used to in time. A look at the gauge — yep, over 50psi and time to check systems, so open water, open steam, and...



The injector fires up and water issues from the overflow, the pressure starts to drop — great, the injector is working very well, so injector off and wait while I build a decent fire in the firebox. As soon as I think she’s ready I sit astride the riding car and open the drain cocks then very gently open the regulator. Here we go! — a hiss and a puff and away we go, moving very slowly towards the turntable. Turn towards the main line and maintain the fire, move forward slowly, whistle to let the signalman know we are ready to join the fun on the main line.

The points change and we move slowly onto the platform area and get ready to have some long awaited steam driving fun. *PEEEEEEP!* I whistle and the signalman nods, the signal drops and I have the road. I open the drain cocks and crack the regulator. The loco moves slowly forward, no slipping — “good driving” I think to myself — I open the regulator more and away we go, still slow and careful but we are both gaining in confidence as we pull out of the station and hit the main line.

We complete a full circuit of the track through Wilson wetlands, some 5kms, and I feel right at home just like we always do when we are in full steam, happy and covered in soot! Well, we have some learning to do about how fast the coal burns and how the track feels but we are soon ready for another lap and another trip out into the bush, so off we go again feeling very happy and warm to be finally in steam on a track in our new home Australia.

Nigel Sales





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7¹/₄" Rail Construction Report by Tony Jones

Right: GLT progress.

The bend on the SW
corner, with the new
track awaiting rail
joining, sleepers and
ballast.

Photo: John Shugg



We have had good support this last couple of weeks as members have helped out on a Club run day i.e. Sundays by laying sleepers. The appearance is good, so say the guys and I go along with that. We did run out of galvanised nuts but Ron Collins came to the rescue and bought a bag of stainless nuts for attaching sleepers.

Since then I visited Ernie Redford to say hello and we discovered that he had bought 10000 nuts last year and now we can purchase them from him. He also gave me 5 unfinished moulds for producing concrete sleepers. We will see what we can do in our spare time as we are running out of concrete sleepers.

The points are an ongoing project handled by Ken Cooper, between us we make up fittings in the week at home to keep production rolling. We find we can make small improvements as we go, but it is a slow process. At the moment we are finishing a set to go down the north end of the steaming bay, so we can then put together the curves over the brick apron. They are sat there waiting to be joined.

We are trying to organise somebody to diamond cut a trench to set the heavy duty rail in concrete, it will take at least 1 cubic metre of concrete to give good support. Meanwhile, production continues on curves with excellent help from Paul Arnley as he is a first class welder and very strong to boot. It has been a struggle to handle the 30mm rails due to the weight.

At the moment production will be held up due to us running out of 25 x 3 flat bar so we will take advantage of this lull to weld together the curves which are ready to go at the far western corner. There are 4 sets at 22.9m radius, then we are within sight of the container which will bring us to the last corner.

Good use has been made of the flat car donated by Ron Collins as it is used to carry rail sections down the track plus the welder and all the tools we require.

In the tunnel approaches the earthworks continue with Paul James, Clive Chapman, John Shugg and Andrew Manning building a small retaining wall to hold the 7¹/₄" rail in a gradual incline up to the two points which are in good use. Since the long awaited rain came Brian Lawrie has operated the compactor and that is a real tough job, he has now gone right down to the tunnel and beyond the western corner.

There are other Gentlemen whose names I haven't mentioned but whose help has been appreciated, thanks guys—we will get there!

Tony Jones

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