



NORTHERN DISTRICTS MODEL ENGINEERING SOCIETY (PERTH) INC.

## January—February 2010      Completion of Ground Level Track

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### Your Committee

President  
Andrew Manning    9446 4825

Vice President  
Ken Austin        9409 2336

Secretary  
Paul James

Treasurer  
John Shugg

### Committee Members

Ken Cooper

Phill Gibbons

Tony Jones

Nigel Sales

### AALS Competent Person

Andrew Manning    9446 4825

### Publicity & Events

Paul Costall

### Librarian

John Martin        9448 8843

### Newsletter Editor

Jim Clark        9446 5870

NDMES  
PO Box 681  
Balcatta 6914  
Western Australia

[www.ndmes.net](http://www.ndmes.net)



The Ground Level Track project reached a major milestone on Saturday 20 February 2010. The ends of the outer perimeter track were finally joined up to form a continuous line.

Whilst track levelling, ballasting and superelevating where required are yet to be undertaken (with dust and gravel

Above: Paul Costall and Ron Collins fitting concrete sleepers as the new Ground Level Track circuit nears completion.

Photo: John Shugg

ordered for the task), the great day has finally arrived.

*(Continued on page 3)*

### CALENDAR OF EVENTS

Public Run Day	Club Track Site Vasto Pl, Balcatta	10:00 am — 2:00 pm	Sunday 28 February
General Meeting	Club Meeting Room Vasto Pl, Balcatta	8:00 pm	Friday 12 March
Club Run Day	Club Track Site Vasto Pl, Balcatta	09:00 am — 2:00 pm	Sunday 14 March
Public Run Day	Club Track Site Vasto Pl, Balcatta	10:00 am — 2:00 pm	Sunday 28 March
Club Meeting and Grounds Day	Club Track Site Vasto Pl, Balcatta	08:00 am — 3:00 pm	Saturday 17 April

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## November General Meeting

The November General Meeting was held on Friday 13 November 2009 at the Society's meeting room commencing at 8:00pm, chaired by Andrew Manning.

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

### Model Engineering:

New member **Laurie Morgan** displayed and discussed some manufacturing details of three beautifully built garden railway locomotives that he has completed. Included in his discussion was boiler manufacture, cylinder arrangement, valve gear and methylated spirit burners. Laurie made mention of a 3½" gauge Mountaineer loco he completed in 1995 but has never steamed - we look forward to this event soon.

**George Palmer** displayed the fibreglass nose cone of a Victorian S Class loco he is about to make. This loco will be around 3.1 metres in length and be powered by a 3 cylinder Suzuki engine with a mechanical drive. George made mention of the use of various objects to make component parts including umbrella frames for wiper blades and forks for door hinges etc.

**Nigel Sales** showed a small single cylinder water pump which he had found at the junk section of the Great Dorset Steam Fair and restored to its former glory.

**Richard Turner** talked about a digital micrometer he had purchased and had little success with. He has now gone back to using the genuine article.

**Andrew Manning** showed his new Springbok horizontal lubricating pump he has completed, and a small jig he has made for forming acrylic tubing. Andrew has also started making a drill sharpening jig.

The meeting closed at 10:00 pm.

## January General Meeting

The January General Meeting was held on Friday 8 January 2010 at the Society's meeting room commencing at 8:00pm, chaired by Andrew Manning.

### Model Engineering:

**Clive Chapman** showed a newly flanged tube plate for the Virginia locos that he, Phil and Doug are making.

**Ron Collins** showed some commercial stainless steel check valves available from Aviaquip.com. They are priced around the \$9.00 mark, contain ceramic balls and are pretty well leak proof.

**Paul Costall** displayed a nice Gauge 1 meccano-style locomotive he and his daughter recently assembled.

**Andrew Manning** showed a riding car that he had rebuilt the brakes on, to be used behind his Springbok. He also displayed some machined lathe tool holders he has been making. Finally, Andrew made mention of a prick punch he had made from a small worn thread tap ground to a suitable point.

**Clive Jarman** ran a beautifully built Edwin loco chassis on compressed air using a bicycle pump.

**Steve Reeves** stole the show with a 3½" WA "River Class" locomotive (*see photos below*). These engines were produced around the 1930's in real size with quite a number being built. Steve revamped and completed the model which is to be used as a static display on behalf of the owner's family. It is beautifully detailed and a credit to the original builder and Steve's finishing touches. Steve also gave a talk on the history of these locos in Western Australia to the delight of members present. He mentioned six such models in existence and knowing the whereabouts of five. The full size "Blackwood" was based in Merredin for many years.

The meeting closed at 9:35 pm.

(Photos: Jim Clark)





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## President's Report for February

by Andrew Manning

Tuesday 16 February will be a day to remember for the group of members building and laying the Ground Level Track (*see main article and photos*).

The circuit has now been completed. There are a few welds to complete and dress off, sleepers to be fitted and a lot of levelling, but the circuit is there. Congratulations to Tony Jones and his team, a really terrific effort.

The signal system is progressing with another team guided by Nigel Sales and pushed by Dennis Lord. We now need to get water and compressed air to the north side of the station and complete the point actuating water system.

On the prior Saturday those at the grounds day enjoyed the NDMES 25th birthday cake beautifully made and decorated by Lynne Shugg, Thanks Lynne!

What a lot has been achieved in the 25 years that the Society has been in operation. I have been active in the Society for 11 years and it has been full on — building and maintaining all of those years. Last year we agreed to slow down for a while when the Ground Level Track is operable, and that will be soon.

A year or two of focus on model engineering will be a pleasant change, so let's start developing the habit with

the Club Day on 14 March. This will be the first of the bimonthly club days. A day of model engineering, instruction, driver training and enjoying our grounds. Please make the effort to come down, bring the family and your latest efforts in the workshop, or a model engineering problem you need some help with.

If any member would like to have some specific assistance please let one of the Committee know so we can, if necessary, arrange the best person to help and any equipment needed.

Laurie Morgan ran his 3½" Mountaineer on Tuesday morning, not only is it a beautifully completed model, it ran well and has quite a turn of speed. The run highlighted a few problems, as happens on all new models. (Also on the older ones).

The January run day was quiet, there was a large birthday party and a few members of the public. Enough for a relaxed day of steaming. The Blowflies again did the bulk of the work along with my Springbok (I will have to give it a name). By 2 pm it was getting quite hot and we were all pleased that we could shut down at an hour earlier than last year

**Andrew Manning**  
President

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## Completion of Ground Level Track

(Continued from page 1)

The final "golden welds" were located on the track adjacent to the large Jarrah tree on the western side of the circuit. Tony Jones performed the final rail welding task with assistance from John Hudson, whilst Ian Huxtable tidied up the welds with the angle grinder.



Concrete sleeper fastening was undertaken by Paul Costall and Ron Collins.

The tunnel storage road still awaits completion and apart from a few points for sidings and loops which are underway, it will not be long before we have a fully operational railway (Sorry Ron - "Railroad").

**John Shugg**

Left: Tony Jones straightening rails after welding in the final track panels.

Right: Part of the completed main line, now ready for ballasting.

Photos: John Shugg



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## May The Flow be With You... Part 3

by Jim Crawford

*Continued from September-October 2009 Steamlines — an ongoing series of articles on loco operations by the Society's Driving Examiner, Jim Crawford.*

**Atmospheric pressure** is pushing on the surface of the tender water (and everything else exposed) at around 15psi. When the pump ram moves backwards, i.e. away from its valve chamber, a low pressure or partial vacuum is developed in the pump cylinder.

The delivery valve closes and the intake valve opens. The opening of the latter valve causes a drop in pressure in the line from the tender to the pump.

Because nature is not too happy with a vacuum and tries to "fill the gap" — in this case an imbalance of water pressure — the atmospheric pressure on the tender water will force it through the line to fill the vacuum, or low pressure area, in the pump.

On the forward or delivery stroke, with the cylinder full of water, the inlet valve closes and the outlet valve opens, allowing delivery of the water to another place and the cycle starts again.

There are limits to how much help atmospheric pressure can give and this is eroded by such things as:

### **Length and Diameter of Intake ("Suction") Line**

Ideally, this line should be as short and direct as possible. This is where a tender pump has the advantage, being very close to the water supply, in fact usually within it!

The intake line diameter needs to be generous, in relation to the delivery diameter — 1.5 times is a good start, especially with a long line.

### **Line Restrictions**

For example, joins, bends, valves, etc. The strainer (filter), which should always be at the beginning of the intake line, needs to be of an adequate area so that a partial blockage will not disrupt flow. Filter sizes need to be generous.

An inadequately sized pump intake line and accessories will probably work reasonably well, if it is not expected to give top performance and can operate slowly.

I guess most of us have heard the sounds of protest coming from a hand pump being worked beyond its capabilities. A sort of buzzing noise from the valves (intake, usually), indicating that the pump is trying to deliver more water than it can take in.

This is called cavitation. In a large centrifugal pump, cavitation sounds like the machine has ingested a load of gravel. It can do serious damage, if left in this state.

To summarise, the pump intake line ideally should be as short as possible, of adequate diameter and with a minimum of flow restriction.

Next time, we will cover the delivery line, from pump to boiler.

**Jim Crawford**

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## Bits & Pieces



Above: A pair of water gauge glasses in 1/3 scale manufactured by Kentin Engineering.

Right: A very neat 3 chime whistle available from DNC System Technologies.

Photos: Jim Clark



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## NEWS ITEMS WANTED

As always, I need more items for Steamlines. Don't leave it all up to the few stalwart correspondents — surely you have seen, been or done something of interest to other Model Engineers recently?

In particular, photos are worth a thousand words, so let's have a few more from around the track.

How about a few words and photos showing your current project? Or an article about somewhere you've been? Or a short article on how you solved some workshop problem? Please email your material to:

[jimclark@hardwareandsoftware.com.au](mailto:jimclark@hardwareandsoftware.com.au)

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



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# Dead Weight

by John Shugg

A little on Isaac Newton's (1642 – 1727) Laws of Physics:

*Law II. The relationship between an object's mass,  $m$ , its acceleration,  $a$ , and the applied force  $F$ , is  $F = ma$ .*

Why haul a train with more dead weight (or mass) than necessary?

"Force", in the context of a locomotive, is also described as tractive effort. It is concerned with hauling trains out of a station, up a hill, and always a necessity, with stopping the train when going down a hill. The heavier the unladen weight of your rolling stock, the less the payload (i.e. passengers) you may haul, simply because a locomotive has finite tractive effort.

In short, the bigger the "Mass" of the carriages the bigger the "Force" required to accelerate and decelerate your train. Too much weight will likely cause the locomotive to stall on a hill.

There are those who may argue that the heavier the weight of your bogies the more likely the train will stay on the rails, and it also helps keep the centre of gravity low. A low centre of gravity is ideal. It could certainly help stop the wind blowing your train off a high bridge! The CoG depends more on your seating geometry, than other factors, assuming a reasonably decent track.

Here's a bit of trivia purloined from an old Mechanical Engineering text book:

**Q:** A train of total weight 500 tons is hauled by a locomotive along a level track at a constant speed of 30 mph. The horsepower developed at this speed is 600. If the train now ascends an incline of 1:75 what horsepower must be developed if the speed is to be maintained at a constant 30 mph? (Tractive resistance may be assumed to be the same as on the level track).

**A: 1794 hp** — A threefold outcome!!

(Tractive resistance is 7500 lb or 15 lb per ton, for those who care).

Do you see the principle? Train weight does matter!

So when considering carriage and bogie design, let's specify that:

- All passenger cars for the GLT will have continuous brakes.
- There shall be an effective parking brake to allow empty coupled cars to be stored on a sidings or loop.
- Cars and bogies shall be as light in weight as possible, consistent with structural integrity and should be of the gondola type, not a straddle type car.

**John Shugg**

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## Library Resources

John Martin has a comprehensive index of all the materials in the Society's library. The resources available for your use includes full sets of the Model Engineer, Australian Model Engineer, Engineering In Miniature and various other model engineering magazines, railway books, videos and DVDs.

John's lists can be sorted by title, subject, author, etc. He is happy to assist you in finding what you want.

Please contact John at the meetings or on 9448 8843.

*(I will try to publish a list of the available materials on [www.ndmes.net](http://www.ndmes.net) shortly. Downloading of files from the web site will unfortunately not be possible due to technical limitations of the service we are using — Ed)*

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## A Couple of Shots from the Past



Starting the club house building — the late Richard Langford on the newly poured concrete slab at the end of 2000. Photo: Tony Jones



More recently — Milton Smith and Andrew Manning looking forward to ground level track developments. Photo: Nigel Sales

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# A Tale of Two Nuts

by Tony Jones

I own a second-hand Taiwanese drill-mill TDM30. It has done a lot of work to the extent that the cross slide nut wore itself to nothing. On checking with Ron Mack from whence it came, they informed me 'we don't do these — go and try Hare and Forbes.

So a trip was made to our friendly H&F salesman and three of them crowded around me to help order from the Eastern States two new nuts. The nuts came in pairs and as the long travel was also badly worn I accepted. A few days later a phone call informed me my nuts were ready for me to pick up. I duly went to Belmont and when shown the nuts they appeared perfectly OK. So I paid the \$90 bill and off I went to my car satisfied I had got my nuts. I opened the boot to place the nuts therein when I remembered in my wisdom I had placed the lead screw there for checking purposes.

Well, if it was sat there I might just as well try it and much to my horror it did not fit. I couldn't believe my eyes. Back into the showroom with lead screw in one hand and nuts in other and I showed them the problem. They were dumbfounded as I. A lot of checking on their PCs going through the spare parts lists and the conclusion was they had been upgraded and that's all there was. OK says I, let's get technical, find me a vernier and a thread gauge. New packs were opened and on checking the O.D. was 30mm not 28mm as before and the thread was 3mm pitch not 2.5mm as on the previous one. This meant I had to accept the fact that I now had to make a new lead screw to fit the new nuts.

I was disappointed at first but soon realised the screw was also worn and a new screw and nut was the way to go. A visit to our friendly factory and a piece of bar was acquired of the right material.

It was now a matter of setting up the lathe and screw cutting the new acme thread — the previous one looked like a square thread due to wear or whatever. Many hours later I had a new shiny lead screw which was a perfect fit in the new nut. I installed it in the mill and it is working very well with no backlash. Now I am waiting for the long screw to give up the ghost. That will be more difficult due to its length.

## FITTING A DRO TO THE TDM30 MILL

A later event with the mill was that in the 'Z' direction the original measuring stick was a real pain and not user friendly. In the back of my mind I remembered that in the 'Workshop' magazine several months earlier I had seen a DRO installed in a smaller milling machine so I became interested. On inquiring at H&F and other places a 150mm long DRO was not available. That was the shortest one made. On looking through ads in the Workshop magazine I found a website I could look up in

England, so to the PC I go and when on the 'Net' I got into the site. It invited me to pick which one I wanted and gave an enlarged picture of it. Then it told me it was out of stock but if I left my email address it would duly inform me when it became available. Yes, I thought to myself, 'if pigs could fly'. They won't come back.

But to my surprise a week later an email came through telling me to place my order and pay by card the fee of £25 Stirling plus postage. Now as it was a week before Christmas, I said to my stepson Ian have you got me a Xmas gift yet? No, says he, I was wondering what to get. I asked: Do you want to share with Mum, as what I really need is for you to pay by card for this item on this website here. So it was agreed. Xmas morning arrived and the DRO was there all nicely wrapped up. This also meant I would not get yet another pot of aftershave I didn't really need.

Over the holiday period, the old screw and neck bush was removed and the thin printed increments plate was put aside for measurements for the new plate. After studying it for a while a start was made to draw up the new system on AutoCAD.

Details of each component were made and subsequently cut out and machined where *needed*. The replacement stainless steel backing plate had to be a neat fit in the plastic recess so it was milled parallel to dimensions of the old plate and also a slot 8mm wide x 140 long on the centreline. The old plate was used to mark through positions of retaining holes. The new plate had to be about 40mm longer to carry the bottom clasp of the new rule, and also was 2mm thick. This plate was polished up with wet and dry to provide a presentable background for the impressive looking DRO unit (*see below*).



When the unit is supplied it has an extra 40mm of length provided on the rule. It took courage to desecrate the fine finish of the hardened stainless rule by cutting a piece off with a cutting disc. It was trimmed up and the cut was hidden by the top clasp. The old screw is replaced by a 12mm BMS rod 140mm long which had thread cut for M12 40mm long. An M12 Nyloc nut was used against a backing nut to hold it in the original hole which needed a brass bush to keep it central. A small clamp was made which I called a candle stick holder as that what it looked like. An actuating rod tack welded to



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# 7<sup>1</sup>/<sub>4</sub>" Rail Construction Report

*IT'S FINISHED!*

**Tony Jones**

## A Tale of Two Nuts (cont...)

by Tony Jones

it operated the DRO unit by engaging in to a 5mm hole in a brass plate 3mm thick; of course this had to be a neat fit. The brass plate is screwed to the back of the unit. This little holder had to be slim to pass with clearance by the casting inside containing the quill. A flat had to be ground on the casting to provide clearance, so care was taken to wrap all machined parts to prevent grit getting in.

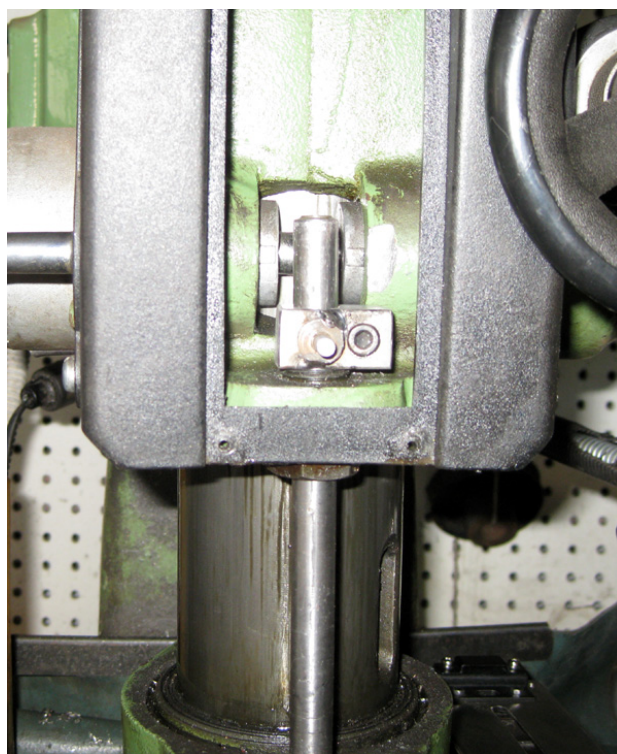
It since has been used very successfully and I highly recommend it being done as I now can work to 100<sup>th</sup> of a millimetre.

Right: The "candlestick holder"

Below right: In place on the new vertical operating rod.

Below left: The completed DRO ready to use.

Photos: Tony Jones



## FOR SALE

There are two interesting part built models available for sale.

**2" scale Ransome Steam Tractor.** It is about 60% complete: boiler, wheels, gears crankshaft and cylinder block completed. A detailed description of the engine's construction by John Haining appears in Model Engineer Vol 143 number 3564 July 1977 onwards. The boiler has a Society of Model Engineers WA boiler certificate not an AALS certificate. The vendor is looking for offers around \$2,000. The engine can be inspected at Andrew Manning's residence.

**5" gauge Super Simplex.** 70% complete with NDMES certified copper boiler. Asking price \$2,200. Contact via Andrew Manning, phone 9446 4825.

## Old Computing Technology

Does anyone belong to, or know of, an organisation interested in preserving old computing and electronic technology?

I have in my shed a "vintage" (almost steam driven) computer, circa 1975-1980. It used to run the entire accounts and delivery system for Midland Brick and has removable disc drives the size of big saucepans. I have full service manuals and a collection of spare parts. It is the size of a fridge and weighs 200kg.

I would like to see it go to a good home, e.g. to a technology museum or similar group, rather than be thrown out or dismantled for scrap parts.

Contact Jim Clark on 9446 5870 if interested.





Northern Districts Model  
Engineering Society (Perth) Inc.

Track Site/Club Rooms:  
Vasto Place, Balcatta  
Western Australia  
Site phone: 9349 0693

All correspondence to:-  
PO Box 681  
Balcatta  
Western Australia 6914  
[www.ndmes.net](http://www.ndmes.net)

## An Occasional Letter from the UK by Dave Burman



In September I attended a Polly Loco Rally at the track of the Peterborough Model Engineering Society.

Peterborough is located about 120 km north of London in the county of Cambridgeshire. The society's track is located within a walled apple orchard in the grounds of a large country mansion. (See — us Poms only go to the best places).

The mansion is presently a Hospice run by the Sue Rider charity. The founder of the charity, Sue Rider, believed that the patients should be housed in beautiful buildings to make their remaining time as pleasant as possible.

Unfortunately, the charity is now run by accountants who have said that the running costs of the mansion are too high and it is now up for sale, so the Peterborough MES have to move. They have already located a new site, but it is not so interesting as this one.

The Polly Rally is for locos in the Polly range of designs. All the locos shown are designs from the Polly range. A total of 16 locos were in attendance at the rally. If readers are interested, I could provide an article about these locos.

In the next issue I will describe the system used to unload the engines, then onto the steaming bays, then onto the running track.

**Dave Burman**

Above: Current stately home of Peterborough MES.

Insets: Having fun playing trains with various Polly locomotives.

Right: Steaming bays.

Below: Lifting table used to raise locos to the traverser track.

Photos Dave Burman:



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