



Newsletter of THE PALMERSTON NORTH MODEL ENGINEERING CLUB INC

Managers of the "MARRINER RESERVE RAILWAY"

Please address all correspondence to :- 22b Haydon St, Palmerston North.

PRESIDENT

Richard Lockett
(06) 323-0948
pnmec_president@trains.net.nz

SECRETARY

Stuart Anderson
(06) 357-7794
pnmec_secretary@trains.net.nz

TREASURER

Murray Bold
(06) 326-9665
pnmec_treasurer@trains.net.nz

EDITOR

Doug Chambers
(06) 354-9379
pnmec_editor@trains.net.nz

July 2011
No 368

PNMEC Home Page www.pnmeec.org.nz
Email:- pnmeec@trains.net.nz

**T
H
E

G
E
N
E
R
A
T
O
R**

TRACK RUNNING

This is held on the FIRST and THIRD Sunday of each month, from 1 pm to 4 pm Summer and 1 pm to 3 pm during the Winter. All club members are welcome to attend and help out with loco coaling, watering and passenger marshalling - none of the tasks being at all

Visiting club members are always welcome at the track, at the monthly meeting, or if just visiting and wishing to make contact with members, please phone one of the above office bearers.

Sender:- PNMEC
22b Haydon St,
Palmerston North

Place
stamp
here

This Months Featured Model



Report on the June Meeting.

The theme for discussion was

'Disasters in the Workshop'

Murray Bold told of setting up a data base on the computer that would advise our regular patrons if we are running or not (due to weather conditions etc).

Everything seemed to work well and the next morning a final check and nothing worked as planned.

Bruce Geange had brought along the now nearly completed Caterpillar RD 8 and an assortment of parts that for one reason or another did not work out right.

Ian Stephens had a brass cylinder for the half beam engine he is making. He explained that the boring of the cylinder had caused him quite a lot of grief before getting it right.

Chris Morton had recently been asked to tighten the front wheel nuts on a tractor. He started on the RHS tightening to the correct torque with a tension wrench. Then found to his dismay that the LHS nuts were left-hand thread and the tension wrench he had only worked for right-hand threads!!

Richard Lockett had a hot air engine that has been a source of frustration for some time. It has run, but cannot be relied on to run on demand. Very much a 'work in progress' challenge.

Doug Chambers told of having to remove the rear wheels from a Kenworth truck after the 'Budd Stud' wheel nuts had been incorrectly torqued. Also he recalled setting the Stephenson's valve gear on his Midland Single and then finding that it wouldn't run on air in either direction. The valve on one

cylinder was set up for forward and the other set for reverse!!!! Doug admitted to having many disasters over the years but less in the last few years as perhaps some of the early lessons have been learnt. He recalled his father telling him that the man who says he never makes mistakes probably never made anything. Doug showed the members a Stuart Turner No 4 that he had been asked to complete. Doug had fitted it up with reversing gear and just that afternoon it had been run successfully on compressed air.

July Club Night

7:30pm, Thursday 28 July 2011

Hearing Association Rooms

Church Street, Palmerston North

Bruce Geange will discuss and demonstrate how to make small DC electric motors do what you want them to do.

COMING EVENTS

Track running at Marriner Reserve Railway

August 7th from 1pm to 3pm

August 21st from 1pm to 3pm

Open Weekends

Steam Up North - 5th to 9th Jan 2012

International Convention

http://www.wmec.org.nz/convention_2012/front.htm

All the information is available on the above website. If you want to go but don't have internet access please contact the secretary or treasurer and we can print the pages for you.

Subscriptions are now due.

They are \$30 for Full Members and \$15 for Junior or Country Members.

Note:-

There is a \$10 Joining fee for new members

The closing date for the next issue of The Generator is Friday 12th August

THIS MONTH'S FEATURED MODEL.

By Graeme Hall

The photo shows a Pip Radial Engine named after the designer's daughter.

It was derived from a 'Morton M 5' design from the 1940's. A three cylinder, air cooled 4 stroke radial of .7 cubic inch capacity with glow plug ignition, fuelled by methanol-oil mixture.

I was loaned a very comprehensive set of plans by a club member) and a decision was made to start construction. Materials were obtained 6061 T6 aluminium for cylinders and crankcase components, 4130 aircraft tubing for cylinder sleeves and 4130 steel bar for the crankshaft.

The first part was making tools and fixtures, nearly half the building job. Next came the cylinders, four in all, one extra in case of mistakes. Set up for machining the cylinders required much thought as cutters had to be set up using a false cylinder fixture and machined blind. Three good cylinders were eventually made, fitted with aluminium-bronze valve seats and guides, rocker posts and cylinder liners. The crankcase was next with the bearing dimensions changed to metric as these are cheaper and easier to obtain. The crankshaft was from HT 4140 which I found was not easy to machine. Then came the connecting rods, pistons and rings (very small) and the rear diffuser impellor.

Two lobed cams and timing gears were cut (48DP) including a planetary ring gear which was unobtainable from the US suppliers. Valves from the plan proved too short so longer replacements were produced, cam roller followers and rockers were made, very fiddly and time consuming.

Partial assembly followed and then the dreaded bending of the brass tubing for the induction and exhaust pipes. Success was obtained after annealing and filling the tubes with low temperature metal.

Outside sourced parts included bearings, carburettor, glow plugs, propeller, screws, clips and springs.

An interesting model to build requiring patience, care, precision, especially when you break an M2 tap in a cylinder, later removed with help from a club member.

The model is assembled and mounted on a base, but requires a fuel tank and carburettor fittings before a test run.

LETTER from ENGLAND

By Stan Compton.

Doug sent me a copy of 'The Shed' recently, what a fine magazine it is, the editor was very complimentary about Des O'Brien's ingenuity making up a carrier for his mobility unit to mount on the trailer hitch of his car.

This reminded me about working in an engineering shop in Canada in the fifties, a regular job was to make up and fit a trailer hitch to American made cars. Even then there were no proper chassis to mount a hitch on, pre-war cars had strong bumpers on which the trailer –hire people would clamp a tow hitch ball, suitable for a light trailer. But often the need was to tow a 32 foot caravan and this required something more substantial made of 50mm x 100mm channel steel. The first thing was to back the car up a pair of ramps, we had no hoist, then cut pieces of 3mm steel plate and weld them to the floor pan about 1½ metres forward of the rear bumper to find something to weld to. Watch out for the petrol tank while lying on your back holding a sheet of plywood to protect it from the arc welder being struck on the tank.

Once you had about six plates to weld to the real work began ending up with bolting a heavy steel bar behind the bumper to take the vertical loading when the fabricated hitch was welded to it. The need for heavier springs was the owners' problem; pick-up trucks were far more suitable as towing vehicles.

In those days we had just bought our first home, with a mortgage to pay, it was a struggle and I wanted to build-up a workshop.

I fabricated up a drill-press using the firm's equipment during lunch time. How the card players hated hearing that D.C. welder running while they were trying to hear the calls.

Next I wanted a small A.C. welder and made my own from an article in the American publication "Practical Mechanics". The core laminations were cut from 26 gauge stove pipe sheet, a laborious job by hand, copper wire for primary and secondary windings was obtained, the core was completed by baking the varnish insulation. Now I had a 110 amp welder for 110 volts to suit the local domestic supply. But I should have fitted an overload cut-out. This was not specified as it was intended for amateur use, not someone used to commercial welders, you can guess the result. Fit a 3mm rod, switch on and started welding, thinking

meanwhile, "Not a bad job, it puts down a nice even bead. Hello, what is that funny smell?" It had burnt out!!! All my effort wasted. So now I did what I should have in the first place and wrote to Lincoln Electric Co USA. "Dear Sirs, can you supply me with a 180 amp AC welder." A week later a crate arrived, all complete, the invoice followed later. My enquiry had been had been taken as an order, later on I found that some Lincoln Electric employees made as much money, on production work, as the management. Pipeline welders told me that 'Lincoln Generators' were the most reliable for picking up from an idling speed on striking an arc. I can confirm this as when I was working in Vancouver with a team repairing cargo ships, damaged during loading. The 'Lincoln Electric Generator' of 180 amps would be run flat-out for hours doing work at its limit.

Can you imagine an old 'Liberty Ship' that had been loaded with bulk raw sugar in Fiji? The hatches were opened up and the holds filled. On arrival at the dock the sugar was emptied out with cranes feeding a conveyor into the works. All this in just 24 hours!!! Small bulldozers had been used to push the raw sugar from the sides of the hold to underneath the hatch, this often caused damage to parts of the vessel and our team had to work fast to allow the ship to sail on the next tide. Visualise the mess our equipment got into all covered in sugar? There was one perk, an old hand gave me a small sack to fill up with raw sugar to take home. The snag was, bits of rust got into the sugar and our children hated picking it out of their porridge!!!

At the Hereford track site, incidentally public running has just re-started for the next six months, certain Saturdays are called club days with no public allowed on the site. This means members have time to test a locomotive and learner drivers get instruction. One member had acquired a new 'Simplex' locomotive and he was hoping that someone would show him how to raise steam etc. I offered to help and quickly found that the new loco owner had bought the engine at an auction sale and that he had no idea of how an engine runs. The engine was new but not quite completed. The drain cocks were loose in the cylinder castings, so they had to be fixed first. "What are they for?" asked the owner!! Then steam could be raised but his new electric fan was 24v and our power supply is 12v. I got the fire going and left it to the owner to keep firing and he managed to put the fire out!!

OK drop the ash pan off. Well it turned out the locomotive had to be laid on its side to get the ash pan and grate off. He fetched a pillow from his car and once the grate was cleared the engine was reassembled and we relit the fire. This time I did the firing and achieved 30psi. I removed the blower and told the owner that now he would see the pressure rise quickly. No luck there, the pressure didn't rise at all. I opened the smokebox door and I could see a big hole around the exhaust pipe. No wonder I couldn't get steam up!!!!

MOUNTAINEER

By Doug Chambers

An interesting sideline of building a model locomotive of a prototype is researching the history of the full-size engine and this small locomotive certainly has a varied history. Towards the end of 1916 the war in France had become fairly static with the opposing armies firmly set in a massive series of trenches. Constant shelling had turned the fields into a virtually impassable quagmire. The trucks of that period were incapable of carrying more than about a ton of payload and that only on well-formed roads. A method of getting supplies up as close to the trenches had to be found. The answer appeared to be the use of narrow gauge railways. A gauge of 600mm was chosen and work began. The French already had a large number of locomotives, rolling stock and track but nowhere near enough. English locomotive builders were able to supply a few engines but so many of their staff had left to join the army that they did not have the capacity to build more. The British Defence Department ordered some 4-6-0 tanks from Baldwin and not long after another 100 2-6-2 tanks from ALCO. By May 1917 these locomotives were in service. The Baldwin's were not quite as successful as the ALCO's. The ALCOs would run happily in either direction over the roughly laid track, but the Baldwin's were not happy running in reverse and they required a wye to be laid to enable the engines to turn so that they pulled the wagons chimney first. Of course the Germans were having exactly the same problems behind their trench lines and they used the same 600mm track, but of course the engines they used were Krauss, or Orenstein and Koppels. After WW1 ended, the locomotives, rolling stock and track were all abandoned. Near the town of Pithviers was a large sugar beet factory. There

they had a similar problem, only this time it was getting the sugar beet from the farms to the factory. Once again trucks and roads were not up to the job and the traditional horse and cart too was no longer practical. The owners of the sugar beet factory gathered up some of the ALCO locomotives, rolling stock and tracks and re-laid them from the factory out to the farms. After a few years the lines had to be extended further from the factory as farmers further away were now prepared to grow sugar beet as the transport problems were overcome.

In 1965 the railway closed and one of the locos was bought by an Englishman and shipped to Portmadoc in Wales where it was given to the Festiniog Railway. There the ALCO was overhauled and fitted with a new cab which resembled those on Austrian or German tank engines. The engine was named 'Mountaineer' and put to work hauling passenger cars on the old slate quarry line. 'Mountaineer' found the steep grades and tight curves a bit hard to handle and the engine when worked really hard started throwing sparks which resulted in line-side fires and some of the Welsh Forestry's trees getting a bit singed. A spark arrestor was fitted to the chimney and this reduced the line-side fires and also the engines steaming ability.

The engine was converted to oil-firing and this stopped the sparks setting line-side fires and improved relations with the Welsh Forestry Commission. In the 1970s a new boiler had to be made, and was designed to better suit oil firing, also the cab had to be altered and the slide valves were replaced with piston valves. This now meant that the engine performed better.

The French had retained at least two of the ALCOs for use on tourist type lines and about three years ago one of them was shipped to Portmadoc where it reunited with Mountaineer. The two engines and crews enjoyed a happy reunion.



The Generator

At present 'Mountaineer' is awaiting an overhaul after the ten year ticket expired. The picture shows an Alco 'trench locomotive' still in use in France on the Froissy Dompierre Light Railway. This engine retains the cab and the short smokebox originally fitted by Alco.

O Rings for Model Engineering

By Richard Lockett

I haven't seen any articles on the use of O-Rings in any of the magazines that we purchase during the period that I've been involved in this hobby. O-Rings are used on some projects incorrectly. (Not from PNMEC members). I thought that a few pointers as to their use would be in order.

So what's an O-Ring?

Torus shaped, i.e. round cross section formed to a ring. Made from a flexible material (Elastomer), used to seal against pressure without leaks.

A brief history:-

A patent was taken out in Sweden way back in 1896 by a J O Lundberg.

A United States patent was taken out in 1937 by Niels Christensen a machinist who designed automatic brakes for tram cars. The Patent ended up with the Westinghouse corporation but during WW2 the US government commandeered the patent as it was deemed to be a critical war related item. Niels got \$75,000 for it. Litigation in 1971 got his heirs \$100,000 19 years after his death.

So were can we use them?

Most published designs to which we work, have been around for a very long time and generally use soft packing's for sealing purposes and in all cases these can be replaced with O-Rings i.e., Piston rings, Piston rod gland seals, Valve Gland seals, Water pump piston and gland seals, oil pumps (Ewing's type), flange or cover seals. For steam, air or water.

A successful O-Ring Joint design requires a rigid mechanical mounting that applies a predictable deformation to the O-Ring.

O-Ring Materials:-

Out of all the many O-Ring materials out there, there are two that you need to know a bit about.

Nitrile Buna-N

Hardness, Shore scale A 70 or 90 i.e. N70 or N90

Temperature range up to 120 deg C

Colour Black

This Material will handle most of our requirements.

Viton Fluoroelastomer Viton A

Hardness Shore scale A 75

Temperature Range up to 200 deg C

Colour Black, brown or white.

O-Ring sizes:-

O-Rings are available in Imperial and Metric sizes and are sized by the ring cross section and the internal diameter of the ring. I.e. 2mm x 12mm dia or 1/8 x 1.25" dia.

So how do they work?

The O-Ring is held in a groove dimensioned and machined, to apply a predictable deformation to the O-Ring (crush). You can not compress rubber, you can only deform it.

O-Ring Groove Design:-

There is a difference between a metric and an imperial O-Ring other than the size difference and you will need to remember this!

A 1/32 cross section O-Ring 0.032 dia is actually 0.040 in dia i.e. 0.008 bigger.

A 3/32 cross section O-Ring 0.094 dia is actually 0.103 in dia i.e. 0.009 bigger.

The crush is built into the cross sectional dimension which means that we machine the groove to the nominal ID or OD diameters.

Metric o-rings are made to size ie a 2mm cross section is 2.00 mm dia. This means that the groove has to be dimensioned and machined to give the amount of crush required!

The surface finish of the moving component is important!

Width of the Groove:-

As a rule of thumb the width of your groove should be nominal cross section x 1.5. This is to give some room for the O-Ring to deform under pressure.

Our Local Suppliers:-

Seal House (Hydralink) cnr JFK & Rangitikei St

Dotmar (Engineering Plastics) Bennett St

Saeco Precision Tremaine Ave

Ludowici Seals Online

RAFFLE

The Committee has three vouchers from Trade Tools and have decided to raffle them.

First Prize is \$70

Second Prize is \$50

Third Prize is \$30

The tickets are \$2.00 each or three tickets for \$5.00 and are available from the treasurer. There only 13 Tickets left so be in quick.

Palmerston North Model Engineering Club members only.

FOR TENDER

A Stuart Turner 10 V casting and parts set, complete, with drawings.

Tenders must be in the treasurer's hands by the 31st July

Highest or any tender not necessarily accepted. Tenders restricted to Palmerston North Model Engineering Club members only.

FOR SALE

An injector, brand new, commercially made.

The pipe fittings are all for 1/4" pipe. The size of the injector indicates that it would deliver 3-4 pints per minute. Suitable for a large 7 1/4" gauge locomotive or perhaps a 4" scale traction engine.

Phone Laurie Perkins at 06 357 4623 or contact the Editor 06 354 9379.

MODEL MEE EXHIBITION

We are having a Model Engineering Exhibition in the Leisure Centre, Fergusson Street, Palmerston North over the weekend of October 29th-30th

All members are invited to put something on show and remember it doesn't have to be finished.

Works in progress remind the public that the models are not bought at the 'Warehouse', and that they are made from 'scratch'.