July 2007
No 325

THE GENERATOR

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.**

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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 onerous.

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.

A bitterly cold night, but again a great turn out of members. Empty chairs were quite scarce.
As expected **Bruce Geange** gave a very good talk on working in tinplate. Bruce showed the tools that relate to this type of work. From small snips, to a miniature metal folder that he had made. There was also a set of rolls and too big and heavy to bring along was a guillotine. Tinplate suitable for modelling is not easy to get hold of now. Bruce says that the best source is via the 500 gram coffee tins. Simply cut off the ends, cut down the seam and roll it out flat and you have useful sized sheet. Keep the ends for smaller pieces.
For soldering, Bruce uses a small electric soldering iron and .8mm resin core solder. In some cases he uses a flux paste but never Duzall as it is too corrosive.
A small square magnet is useful for holding pieces together while soldering and **Murray Bold** has a source of these from ATM machines.
Bruce and Murray had examples of the models they have made using tinplate and Murray demonstrated the Model T Rail Bus that he has just completed. (see the June Newsletter) Members were surprised to see him set the Rail Bus going along a straight length of track, and then just before it reached the end of the track, it pulled up to a halt. All controlled by sensors beside the track.
As always there were other examples of model engineering to look at.
Graeme Hall had the connecting rods and some of the valves that he has made for his Offenhauser engine.
Ian McLellan had parts of the cab for his 'Maisie'.
Richard Stevens showed progress on the little traction engine. Good progress too as he only received the castings and instructions last month.
Richard Lockett showed us the connecting rod and piston rod, piston and rings that he has made for the NZR 'W'. Also the name plates for the side tanks.
Doug Chambers had the little 5" gauge 'Chub' 0 –4 –0 tank loco he is completing. Doug also had the rear half of the original boiler for members to see. Doug had condemned the boiler and built a new one for the new owner of the project. The old boiler was cut in half prior to being disposed of for scrap. However the state of the inside of the boiler gave Doug (and others) quite a shock and as he said if he had only known of the internal problems he would have had less hesitation in condemning it.
From the amount of chatter over the 'tea and biscuits' it was obvious a lot of ideas and information was being exchanged and after all that is what it is all about.

JULY MEETING.

A visit has been arranged for members to view progress on the Supermarine Spitfire Mk 9 being restored at Taonui Airfield.
As the electronic security gate is closed after 5.30pm members are requested to time their arrival between **6.50pm and 7.10pm** when there will be someone available to operate the gate.
Members arriving after 7.10pm can ring Laurie on his cell phone 027 44 29 037 and he will come down and open the gate.

COMING EVENTS

Mid Week Run at Marriner Reserve Railway

24th July between 10.00 am and 2 pm
28th August between 10.00 am and 2 pm
Please contact Doug Chambers beforehand.

Track running at Marriner Reserve Railway

5th August 1.00 - 3.00 pm
19th August 1.00 - 3.00 pm

VISIT TO THE TAWHITI MUSEUM

For some time we have been thinking of arranging a trip up to Hawera to visit Nigel Ogles' Museum.

A date has been set Sunday 9th September. A bus has been arranged and now we need to fill the seats.
If **30** seats are sold then the cost will be $22.00 each.
If **56** go it will be $14.00 per seat.

Think about it and call Richard on 323 0948 for more information and to make your reservation.

The closing date for the next issue of The Generator is Friday 10th August

SUBSCRIPTIONS

Subs remain the same as last year. $30 full members $15 for country and junior members.
Note that Murray Bold is the new treasurer.
You can give the money to him or post it to him C/o 22 B Haydon Street, Palmerston North.

MODEL ENGINEER MISSING MAGAZINES

We are still just a few issues short of completing some of the years of our collection of 'Model Engineer' magazines. Here is a list of the issues we require to complete our collection.

Year,	Issue Number.
1939	No. 1990,
1940	Nos. 2017, 2062
1941	Nos. 2098, 2193
1943	Nos. 2180, 2193
1946	Nos. 2333, 2334, 2337, 2351
1947	No. 2143
1948	No. 2434
1959	Nos. 3035, 3041, 3042, 3043, 3044, 3047, 3049
1963	Nos. 3230, 3232
1964	Nos. 3243, 3252
1965	Nos. 3269, 3271, 3286

If any one has any of these issues that they are prepared to part with would you please contact Doug Chambers, the Librarian at 22 B Haydon Street, Palmerston North or phone him on (06) 354 9379.

THIS MONTH'S FEATURED MODEL.

The Model	Wild Hare Edge 540T
Wing span	84"
Length	78"
Weight	approx 16lb
Engine	Desert aircraft 50cc petrol
Prop	22"

The Prototype
The EDGE-540 is an advanced, Unlimited Class aerobatic aircraft which can perform aerobatic maneuvers to +/- 10g. Weighing only 1200 lb, and powered by an 8.75 litre, 350hp Lycoming engine, the aircraft has an excellent power to weight ratio. It is a highly aerobatic aircraft, capable of a 420 degree per second roll rate and a 3,700 foot per minute climb rate, it has been flown to victory on the international Unlimited aerobatics circuit several times since the mid-1990s.
A tandem-seat version is sold as the Edge 540T.
The single-seat EDGE-540 first flew in 1993, and since 1992, the plane and/or the EDGE wing have been represented with every U.S. Aerobatic Team and in every World Aerobatic Championship. Five of the current nine U.S. Aerobatic team members fly the EDGE-540 Aircraft.
The aircraft utilizes a computer optimized steel tube

fuselage with a number of unique features.
This results in a stronger, lighter fuselage that is designed to take over 15 G's of sustained loading.
The use of steel tube frame with composite fairings results in an extremely light, easily repairable, and very durable overall fuselage. The E-540 aircraft has the highest aerobatic thrust to weight ratio of any competition aerobatic aircraft currently available.

TIP of the MONTH

From Doug Chambers
Stainless steel balls to be used in check valves, safety valves and feed pumps. After being caught out on a couple of occasions with supposedly stainless steel balls turning into a lump of rust, I looked around for a method of identifying a stainless from a steel ball. Both are attracted to a magnet although the stainless ball does not require so much effort to remove from the magnet as the steel one.
The most reliable test I have found is simply to put them in a glass of water for a week. In that time the steel balls will start to rust and will discolour.
I suggest you do not use the wife's crystal glasses as the inevitable rust stain is almost impossible to

remove. The rusty balls can then be discarded and you can safely use the others. This simple test will save you time, frustration and high blood pressure.
I recommend this test regardless of your source of supply.

MAKING PISTON RINGS

By Doug Chambers

There have been many articles written in 'Model Engineer' about making piston rings for steam or internal combustion engines. As most of these articles are in 'Model Engineer' magazines in our club library and thus available to all our members, I intend to just highlight the essential details of what is really an easy task. Listed are the writers, volume and page of some of the 'Model Engineer' articles on the subject.

Bertinat	Vol.155	Page 692,
Blackmore	Vol 154	Page 315,
Chaddock	Vol 133	Page 399,
	Vol 142	Page 665,
	Vol 142	Page 871,
Evans	Vol 161	Page 30,
Mason	Vol 139	Page 942,
	Vol 139	Page 992.

All the writers seem to agree on the basic dimensions, but some of the methods used in manufacture are open for discussion.
I have made rings for about ten steam engines, stationary and locomotives so the following is drawn from my own 'learning curve'.

Material. Fine grained cast iron. My own preference is to use 'Flo cast' iron bar. Continuously poured cast iron it has the benefit of being fine grained and has no chill spots.
Dimensions of the ring. Turn the outside diameter of the ring to the bore size. The depth of the ring is established by dividing the diameter by between 1/25 th to 1/32nd. Note. In practice I have found it better to be closer to 1/29 th to 1/32nd.
The width of the ring can be determined by the same calculation.
After boring out the cast iron to achieve the desired depth, then you can part off the ring. I usually leave the ring a few thou oversize and lap the sides of the ring on fine 'wet and dry' paper on a surface plate or ground glass till the ring is a sliding fit in the piston groove.

The next step is to cut the ring. Some will tell you to snap the ring in your fingers, some to press it down a tapered mandrel until it breaks. I was not happy with these ideas as I felt that there was a chance that further parts of the ring would develop cracks and although it would break in one place there might be other fractures beginning that would cause problems later one.
To test my theory I pushed a ring down a tapered mandrel until it broke. Where I was working at the time we had some crack testing dyes and after applying that to the ring I could easily see further cracks in the ring. To cut the ring I use a very fine toothed modellers saw. It is going to give you an .008 thou gap in the ring but the end gap should be 1 ½ thou per inch of ring diameter and a little extra will not make any difference.
Finally the rings have to be given their 'set'. The gap between the ends of the ring should be four times the thickness of the ring or diameter divided by 3.75.
I usually set the ring on a taper to achieve the desired end gap and then heat the ring with a propane torch until it just begins to change to a dull red colour. The ring is left to cool down slowly. I leave mine on the mandrel that has also become heated and thus it slows the cooling down.

The ring now has a set or spring in it which will make it easier to fit it to the piston and also it will assist the ring to scrape the bore of the cylinder. When fitting the rings to the piston it is usually easier to slide the rings over very thin feeler gauge (.005 thou) than spreading them with your fingers.

If you are fitting the rings in cold weather it is a good idea to place thing rings in boiling water for a few minutes as they are definitely more fragile in cold conditions. (As I found out the hard way some 45 years ago trying to fit new rings to a Triumph motor cycle in a cold shed on a frosty night).

If you have two rings on the piston, make sure the ring gaps are opposite one another before fitting the piston down the cylinder bore.
Hope this helps.

More on rings next month.

Injector Trouble

I've had to do a bit of maintenance on the loco ROBYN of late and in the process gained some knowledge that I'll try and pass on.
The injector stopped working so the usual trick is to soak the said item in vinegar over night to clean the insides of scale but this time it didn't make any difference so I thought that perhaps the steam cone had broken.
I've had to make about four new steam cones for it over the years, the current one has lasted a few years as I had made it out of bronze unlike the previous editions which had been made from brass which didn't last long at all. The steam tends to leech out the zinc leaving a porous brittle structure that breaks away, causing an instant stoppage of the injector.
So we pull the injector off the loco and find that I can't remove any of the cones from the body and that any serious attempt to remove them would result in a damaged injector body so I decided to build a completely new one.
Robyn's injector was built by our own Ken Nielsen to a design in an article by a Basil Palmer out of the Model Engineer (May 1976) and has given reliable service for 12 years bar the new steam cones.
I have copies of Ken's detailed drawings as I have built two of these for the W192 loco that I'm building (untried as yet) but couldn't flog one as they have a larger union nut thread on the body.
A full days work a new injector fitted to Robyn , now to test it which involves steaming the loco up at home, with pressure up it was on with the water, on with steam and to my disappointment all it did was hiss steam out the overflow.
So we dismantle the injector with the assumption that I've made a mistake somewhere, measure all diameters and lengths etc and found that overlooked the fact that the steam cone protrudes into the combining cone by 0.25 mm. The effect was being to deprive the injector of any water.
Steaming up the loco again (another day) saw the injector work but not liking higher boiler pressures and seemed to be a bit slow on water delivery.
A run at the track convinced me that more work was needed, as it wasn't a reliable starter, too slow and didn't like anything over 60 psi, in other words no bloody good, although a leaky clack doesn't help.
A good long think and a chat to Doug about it and a plan was hatched, we'll give it some more water.
A shim was machined to between the shoulder of the steam cone and the body of the injector, the effect to increase the gap between the steam and combining cones and while it was at it I recut the seat on the injector clack.
Another steam up at home saw a vast improvement, injector lifts at any pressure, water or steam on first doesn't matter, will work right up to blow off pressure, drips a bit of water at lower pressure's but so what.
A run at Marriner Reserve and up at Thames saw the injector continue to perform, so much more relaxing to operate a locomotive if the injector is reliable.
The injector a tricky little thing to make, mainly because of the very small diameters (tapered at that) involved and our inability to measure them accurately with the equipment at our disposal, a good design with detailed drawing is a big help, Thanks Ken.
Most loco builders buy their injectors but there's a degree of satisfaction to be had in making your own, so give it a go.

Working with Tinplate

To set the record straight I am only a self-taught person working with tinplate.

Tinplate is a little hard to find from sheet metal suppliers, one easy source of supply being the large coffee tins. Wash the tin clean and remove the ends by running a can opener around the sides of the tin. Next cut along the seam with a pair of tin snips and then roll the tin flat.

Marking out the job

The usual tools will be used for this. Marking Blue rubbed on the tinplate or felt pen makes it much easier to show the scribed lines. I use a combination square and set this at the various dimensions and scribe the line. For doing multiple measurements the divider works well.

Cutting

This can be done with tinsnips. I mainly use the small snips both straight and curved. Keep the hinge pin on the snips oiled. If you are lucky and have a guillotine, that's great. If you need to cut a small round or square hole you can drill some holes and cut it out with the snips finishing with a file. A larger hole can be roughed out by clamping the tinplate between two pieces of angle iron inside the marked line by about 4-5mm and run a sharp cold chisel along all sides and then finish with the snips. A notching tool can also be used for this and will leave a neat square corner. If you own a Dremel tool and

have a thin cut-off wheel this can be used to cut along the line leaving a neat finish. A larger round hole can be cut using a hole saw with the tin clamped between two pieces of custom wood. Drill a pilot hole in the custom wood pieces and the tinplate, clamp the lot together with the holes lined up and hold on the drill press and run the hole saw through. Clean up with a small file. The tinsnips will leave a slight crease and most times this can be flattened with flat nose pliers or placing between two pieces of bright steel and hit with an aluminium hammer.

Folding

Tinplate can be folded easily with a folder or two pieces of angle iron held in the vice with the tinplate in between and folded over with the aid of a piece of custom wood. To make a simple folder that can be used in the vice cut a piece of 25 x 3mm angle iron and a piece of 25 x 4mm flat to a length of 225mm long or the length you think your folder should be. One edge of the strip will need to have the rounded corners filed or milled square. Place the angle girder on a flat surface and clamp the flat piece of steel to the vertical side of the angle girder with the milled end down. Drill a 6mm hole at one end of the two pieces and a 3mm hole at the other end. A 6mm bolt holds the two parts together with a strong spring, washer and nut. A short piece of 3mm rod is used to keep the two parts in line and is held to the angle iron with loctite. This simple little device makes a neat fold when in use.

Rolling into a curve

If a set of rollers are not available for rolling the tin a piece of round rod can be clamped in the vice with safe jaws fitted and one end of the tinplate. Fold the tinplate around the rod, shift the folded piece in the vice and fold some more. Repeat until you have a circle. The diameter of the rod may need to be slightly smaller than the finished diameter of the tinplate.

Soldering

Tinplate is very easy to solder as long as the tin is clean. Most times the tin can be soldered with rosin core solder and a heat regulated soldering iron. If you do have a stubborn piece that the rosin core won't work on use some paste flux and then solder. To temporary hold the pieces of tin in place for soldering use small magnets with square faces. Excess solder can be removed with a small craft knife or file.

Essential tools

Tinsnips small – straight and curved cut, Scriber, Ruler, Combination square, Craft knife, Round and flat files – small with medium cut, Solder – rosin core, Soldering iron – heat controlled, Magnets – to have square sides, Cold chisel. Flat nose pliers

Luxury tools

Guillotine, Folder, Rollers, Marking blue, Dividers, Dremel tool with cut off wheel, Notching tool, Jenny for forming, Rivet machine for making imitation rivets.

Bruce Geange

Some of the members at the June Club Night.

26 July Club Night

Taonui Airfield

Campbell Road

6.50pm to 7.10pm

for access to the hanger