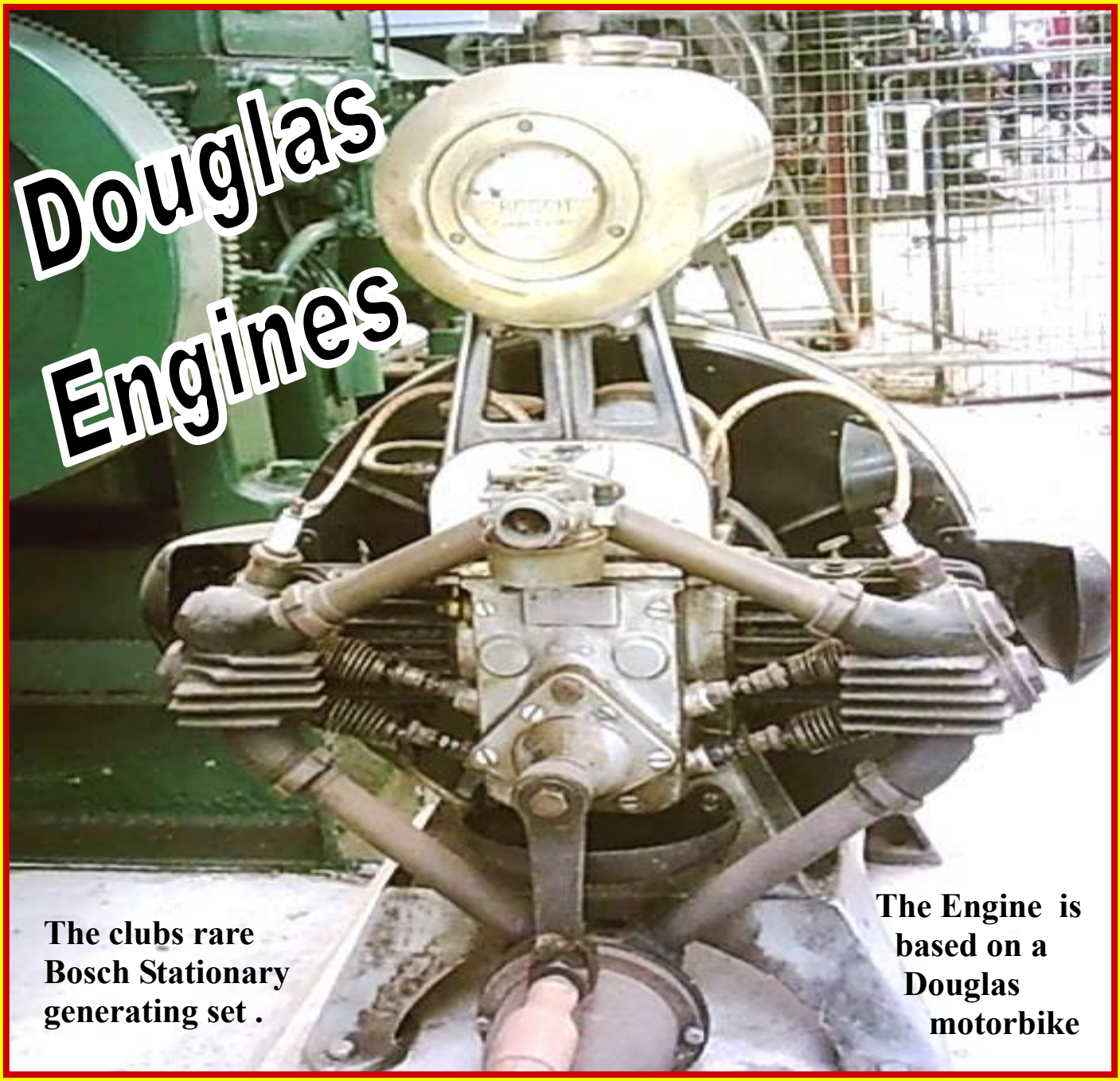
Issue 655 August 2025

A Wisp of STEAM SUPREME

Extracts from the Melbourne Steam Traction Engine Club Newsletter

Douglas Engines



The clubs rare Bosch Stationary generating set .

The Engine is based on a Douglas motorbike

Pressure Gauge Calibration

Thornycroft Engine Update

Unsticking Pistons

THORNYCROFT TORPEDO ENGINE UPDATE

Now the engine has been installed and plumbed up steam tests have shown a bit of money needs spending to get it into top condition. To this end the possibility of Maritime Heritage grants have been explored by Rohan Lamb and our Secretary Chris Glassock .

The engine is the first one you see when you come in the main door of Bay 1 . It is a fairly small 2 cylinder doupbe acting compound engine with heavilly counterweighted crank shaft but very light rod frame between the bedplate and cylinder block . Obviously made for power and light weight not long life. Warwick pic

The Australian National Maritime Museum Heritage grant scheme assists cultural organisations nationwide to preserve Australian maritime history

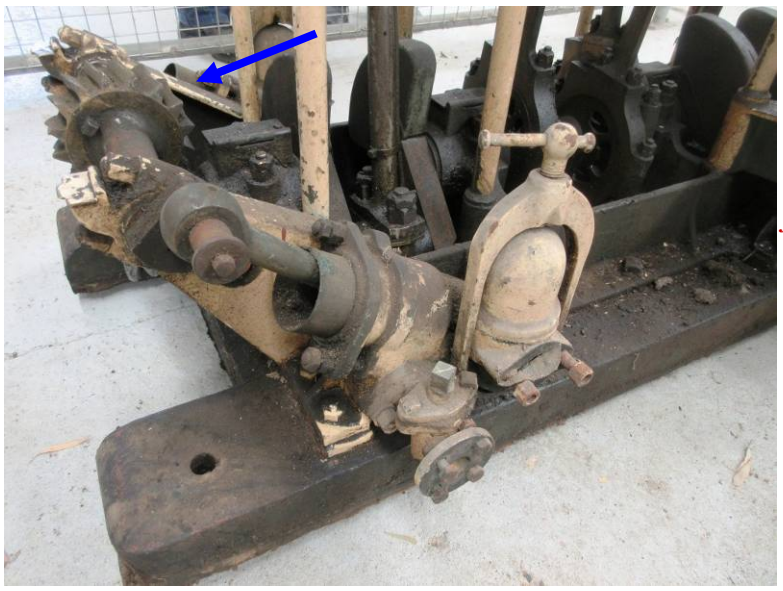
Applications for their latest round of grants under the Maritime Museums of Australia Project Support Scheme (MMAPSS). Opened recently . These grants are aimed at museums and cultural organisations across the country and provide funding and support toward projects that protect and preserve Australia's proud maritime heritage.

Rohan Lamb and Chris Glassock submitted a grant application for the replacement of the worm gear drive on 1883 Thornycroft torpedo boat marine steam engine.

The 1883 Thornycroft marine compound steam engine no 191 is significant at a national level. It has historical significance as the main propelling engine from the only vessel of the Tasmanian colonial navy. The torpedo boat was later transferred to the South Australia torpedo station. Once decommissioned the machinery was transferred to the Gordon College in Geelong for training naval reservists and engineering students. It has technical significance as a rare surviving operational example of high-speed light-weight engine designed for use in a second-class torpedo boat. It provides a direct link to the period of pre-federation colonial navies. It allows interpretation of the defence practices of the era through the use of torpedo boats by Victoria with two boats, Queensland with one boat, and Tasmania with one boat which were all supplied in the 1883-84 period by Thornycroft.

It is the only engine from this class of torpedo boat to remain in Australia (another less complete engine was exported back to England some years ago). The engine has technical significance for its innovative light weight design, and high operational speed for the time of 600 rpm. It is associated with a significant and influential maker, John Thornycroft & Co., England. It is one of the most complete examples with its boiler feed pumps intact, original lubricator, and other fittings present. It is operational.

The aim of the project was to return the marine engine to full operating condition. The return to operation of this marine engine identified heavy wear on the bronze worm wheel gear and broken away lead in edges on the steel worm gear. This prevented the full revolution of the engine and risked damaging the engine if not addressed. In the short term the bronze worm gear was removed to allow the engine to operate, but the feed pumps are now static.



A closer view of the twin feed water pumps and the worn out bronze worm wheel on the cross shaft between them .

The steel worm itself is underneath at right angles on the front end of the crankshaft . (Just a note bronze worm drives need special oil !) ***Warwick pic***

Given the completeness of the engine, the project benefit is allowing the pump to operate to give a full interpretative experience of viewing the whole engine operating. The design solution of using a worm drive for the pumps given the high operating speed of the engine is unique and justifies the effort to ensure this aspect is operational. In accordance with the Burra Charter, the work proposed is the replacement of the two gears only and stamp them 2025 so

they are identified as replacement gears. The original gears will be retained with the engine, and the repair is fully reversible. Given the specialist nature of making worm gears, an experienced external manufacturer in Melbourne will be used to make the new gears.

Twenty-five successful MMAPSS applications will share in more than $120,000 in grants and in-kind support, with fifteen receiving funding for projects ranging from vessel preservation to exhibition development, three receiving in-kind support only, one receiving both funding and in-kind support, and six recipients will be funded to attend an on-site museology course under MMAPSS.

Unfortunately, MSTEC was unsuccessful in getting a share of the funding, but we were one of three to receive in-kind support which will be provided to document and promote the history and significance of a Thornycroft marine compound steam engine, built in 1883.

Rohan has been scoping up how / where the in-kind support could be used and is also continuing to investigate options to have the gears manufactured locally in due course.

By Chris Glassock

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PRESSURE GAUGE CALIBRATION .

The Lyttelton crew have been busy installing a steam pressure gauge at the end of the line that runs from the Cleaver Brookes boiler being commissioned next door .

This relatively modern automatically controlled oil fired boiler is being set up in pavilion 6 to supplement the steam to the Lyttelton engines in bay 5 . With this extra steam it will make it possible to run both the huge triple expansion tug engine at once .

Ian Malcolm helping with the Dead Weight Apparatus for testing pressure gauges . The rack to the left holds the various dead weight s to cover a range of pressure settings. Brian Wright photo

The Cleaver Brookes boiler being commissioned . This almost unused boiler was very generously donated to the club by Phil Randall .

The sight of both these 625 hp engines running at the same time would certainly have gladden the heart of this old Marine Engineer and be something unlikely to be seen anywhere else in Australia.

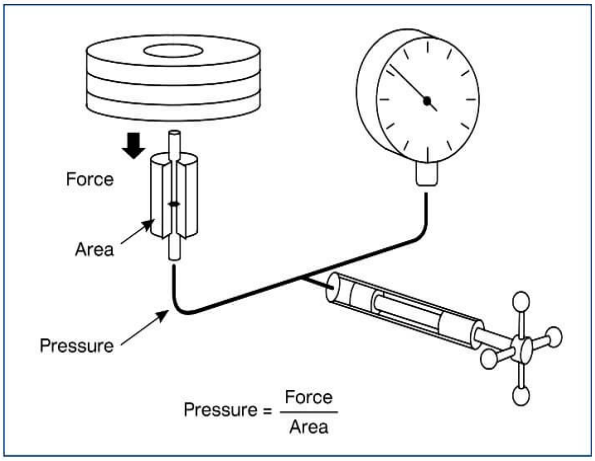
Of course when running machinery like this with its high steam demand and long steam supply line it is necessary to keep an eye on steam pressure so a dependable pressure gauge at the far end of the line is essential . To this end a bleak Thursday was spent checking the gauge calibration using the special apparatus in the back of bay 3 .

Here is a rundown how this very accurate but simple apparatus .

How it Works is the essence of simplicity relying on 2 basic principles . First pressure is force divided by the area it acts on . For instance if you take a cylinder of say 1 inch in diameter it will have a crossectional area equal to pi by radius squared = 3.142 x 0. 5 " x 0. 5 " = 0.78 square inches . Filling the cylinder with oil and fitting a combined plunger and weight totalling 10 pounds will raise the pressure in the oil until it I just sufficient to support the weight . The pressure in the oil can be found by dividing the weight by the area of the piston supporting it i.e. 10 pounds divided by 0.78 sqr in gives 12.7 pounds per square inch

The second principle is that pressure in a liquid is transmitted equally in all directions so you just hook up your gauge and check if it reads 12 .5 pounds .

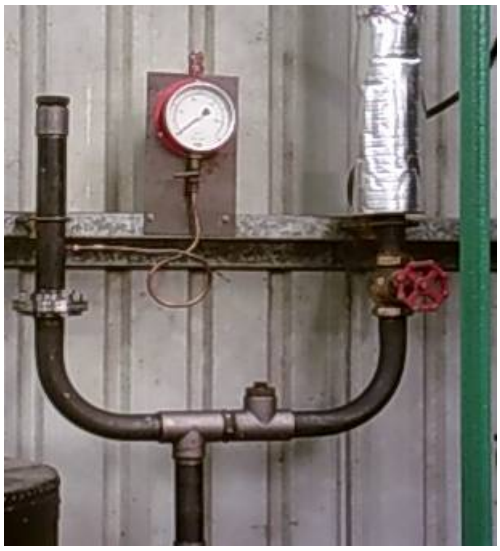
Schematic of the apparatus



On the left is the deadweight pushing on the piston pressurizing the oil . To the right is the pressure gauge . The screw plunger in the middle is wound out to lower the piston for storage . Wound in to expel air before fitting the gauge and raise the weight on the oil column making it ready for use. A range of deadweights are used to check for calibration .

Brian Wright photo

What can go wrong ? Very little . The gauge and piston are arranged to be at the same height so there is no difference in head between legs . Being perfectly bled of air is not important since it also transmits pressure equally in all directions . Expansion of oil due to temperature will have no effect but might effect the gauge's mechanism . About the only thing is very slight variations in gravity around the world . Stiction in the piston is counteracted by setting the weight spinning slowly during taking readings .



The Calibrated Gauge installed

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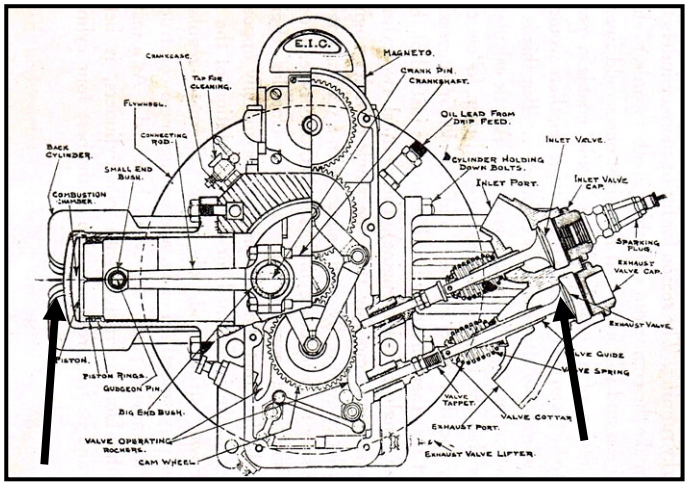
REMOVING A STUCK PISTON

Anyone who has had anything to do with old engines will sooner or later run into the problem of freeing up a stuck piston . There are all sorts of remedies that people swear by (or at) such as patent easing fluids including full cream milk , judicious application of heat , big hammers and special pullers. These work to a degrees but often end up breaking the piston particular the aluminium ones now common in middle aged engines. When finding myself in this situation with a Douglas Stationary engine the problem was exacerbated even further by this engine using a blind cylinder .

The Douglas horizontally opposed twin cylinder engine did not look too bad initially

It is a side valve engine where the cylinder head and barrel are a single casting so there is no access to the top of the piston for applying force without breaking something and possibly rendering the whole engine useless .



Blind Cylinder Side Valves

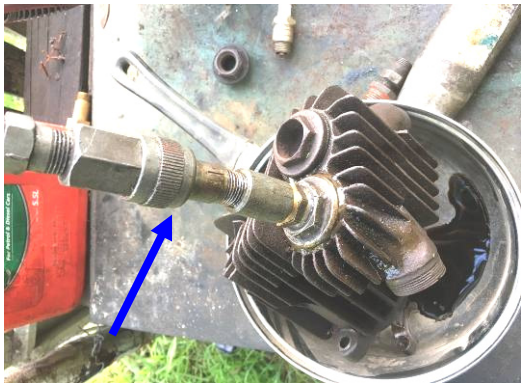
Engine cross section of the Douglas engine .

The left section through the cylinder shows there is no access to the piston appart from drilling a hole through the casting .for a slender pumch . The thin piston crown shurely would not stand much of a blow .

The right section through the side valves show the screw in caps for acess. Lukilly the inlet one was threaded for a 1/2 " NPT spark plug .

Now having recently observed the calibration of a pressure gauge using the dead weight principles of where pressure operates equally in all directions and force is the product of pressure multiplied by area I decided it was time to give it a try and use oil pressure to force the piston out !

The first hurdle was to find a source of pressure . The air compressor was considered but with only about 130 psi available it was not thought to be enough besides if something lets go at that pressure the risk of injury was very high if something suddenly went flying due to the expansive characteristics of air . That that had to be ruled out . Attention then turned to my Porta Power , a hand operated hydraulic pump and oil reservoir that is connected to a remote portable hydraulic cylinder for assembling / disassembling of press fitted machinery parts. Made to order with its oil reservoir , high pressure hand pump and hose with quick connect fittings so that was settled on .



The engine uses the old fashioned sparkplugs with a pipe thread which matched the quick connect on the Porta Power making plumbing up simple . The cylinder once filled with old sump oil was placed in a handy kitchen saucepan to catch any spilt oil . Warwick photo

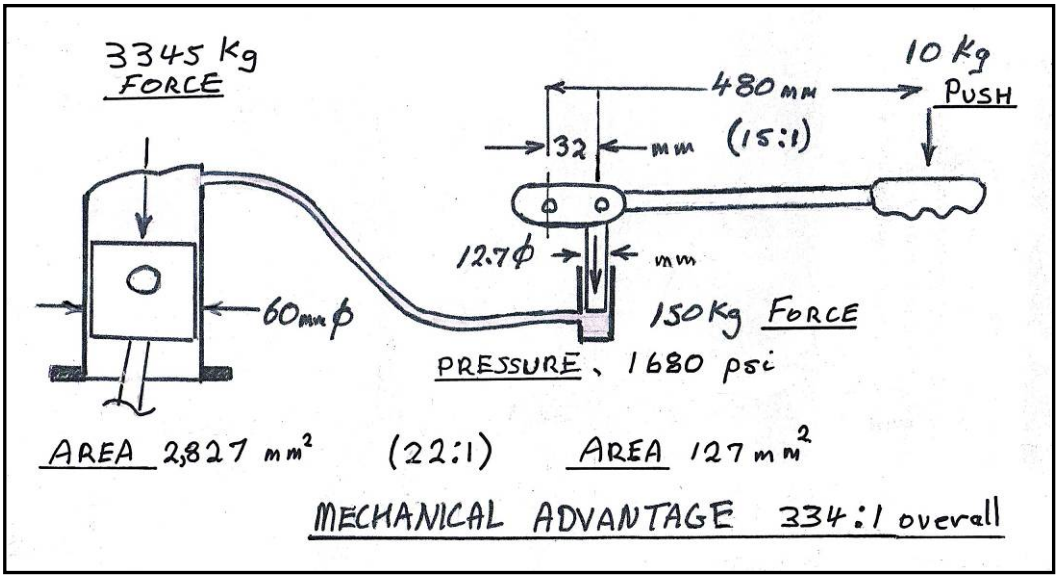
The setup ready to go . Note the cans of easing fluid in the background that did not seem to do much especially the cheap one and the bearing puller that hat no way of attaching to the piston .

Now for the big moment . Several pumps to build up the pressure and with only about 10 kg force on the handle there was a bit of a click and the piston moved to my great elation A few more rapid pumps and it first moved easily then resistance built up and restuck . Something was wrong.!

Anyway it was quite a battle to get the piston back to the top of the cylinder and required making up a special puller that pushed on the piston from underneath . Once back to it's old position it moved much easier and with a bit more pumping could be soon worked back and forth a small distance by hand gaining a little more each stroke. After a bit more working and lots of easing fluid it could soon be pulled right out of the cylinder by hand Obviously the lesson learned is expect the piston to be tight near the button of the bore because of the wedging action of rust and less wear in this area . Do not try and get it out in one go but take a lot of small steps.

Once clear of the bottom of the bore the piston was soon moving freely . After cleaning up with a bit of fine emery paper it was looking good .

Gentle tapping of the piston rings round and round with the blunt end of a screwdriver for about 1/2 hour had then free and still in one piece ready for further use.



A schematic of the apparatus to get a feel for the forces involved based on the 10 kg push it took on the pumps handle to move the piston .

Pushing with 10 kg on the handle of the pump exerts 150 kg on the plunger of the pump due to the 15 to 1 mechanical advantage .

Now the pump is 12.7 mm dia and the engine cylinder is 60 mm dia so this gives a further multiplying effect of 22.3 to 1 .

Combining these 2 effects gives an overall mechanical advantage of 334.5 to 1 . So this turns the estimated 10 kg push it took on the handle in to 3,345 kg push on the top of the piston to get it to move with no damage at all . Experience has shown me it takes an almighty blow with and engineers hammer to produce an impact of around 3 tonnes which would have surly smashed the cast iron piston to smithereens ! Further calculation shows the pressure in the system peaked at 1681 psi . I am sure this sort of pressure has the added advantage of bulging the cylinder a bit to further facilitate loosening of the piston .

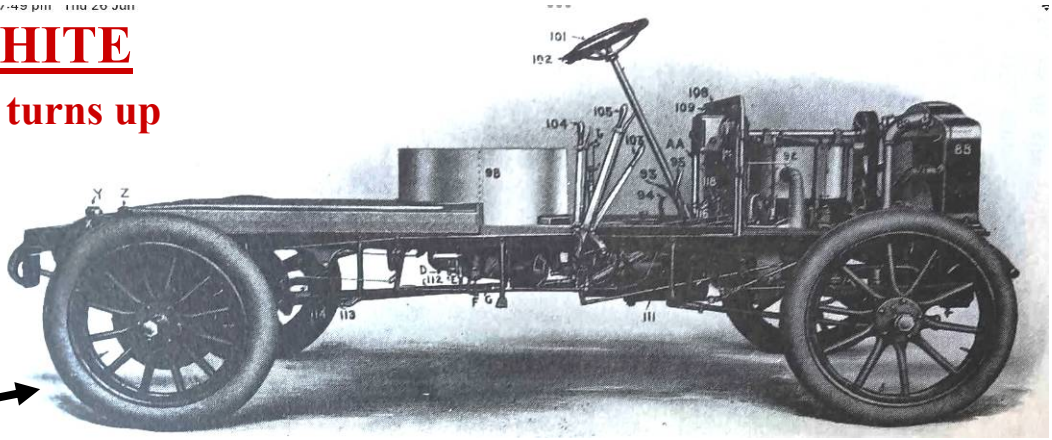
A few comments I cannot claim to have thought of this idea myself but have heard of people advocating filling the cylinder with grease . Much more expensive than used oil but a good lever action grease gun would produce similar pressures just take more pumping of the handle .

I would be very wary of pumping with any great force as either pump could easily produce enough pressure to split the cylinder . That said gentle pumping is far less likely to break something than the equivalent heavy blows with a hammer .

Offcourse this method relies on the valves of the engine being a reasonable seal so they might need a bit of work first. WB

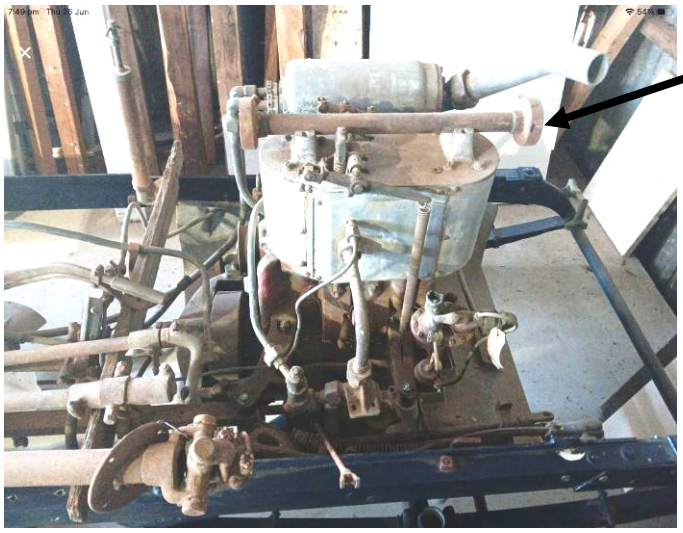
ANOTHER WHITE STEAM CAR turns up

Adrian Anderson found these pictures of Trevor Gaunts White steam car for sale in Buy Swap and Sell and thought we would find it interesting to compare with ours and give us a feel for what is being asked for them theses days.



It is a bit hard to work out what model it is but it has many similarities to this 1908 40 HP *image*

What distinguishes it from ours is the single compartment fuel tank and rear spring hangers which are more characteristic of the 40 hp model M rather than our smaller 20 HP model O .



This picture of Trevor's engine shows the fan is driven by belt from the flywheel at the back of the engine via a shaft that passes along the cylinder head directly to the fan .

Ours does not use a flywheel but simply drives the fan directly by Vee belt from the front just like a modern car .

James McInnes's 1906 model M has an identical engine to Trevor's

The boiler is a monotube very similar to ours and is advertized as coming with a new burner plate .

This answers the question of who got the second last burner to ours!

A great plus with Trevor's is the 4 new wooden wheels that take beaded edge tyres . We have a set of tyres and quite a collection of odd wheels but nothing that matches our car . Actually ours has been converted to 21 " Sankey wheels and although are spoked and so somewhat resemble the original are actually 2 pressed steel shells back to back welded around the perimeter A normal conversion of the day when the original wheels get rickety

What is Happening with Our ? It continues to be on display as a rolling chassis with all major components clearly labelled and visible along with interpretative sign boards explaining how it all works so is a great display as it stands

The next step is to do the high pressure steam plumbing, make a new fuel tank , finish the boiler cladding and fit the replacement tyres .

I was hoping to get some help in these specialized area as the Steam Shovel with it's deadline was taking all my time. Warwick

As for the asking price according to the Buy Swap and Sell .$ 35 k . Not bad when you consider the new parts it has.

Our White emerging from 50 years in a dark shed

A New Mower for John

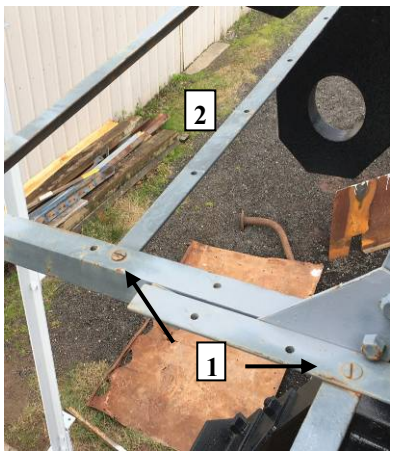
John Mills looks on as the mower service man adjusts the length of the PTO shaft to suit Johns 175 Massey Ferguson tractor . John is very proud of his new mower , being a flail mower it produces a very fine cut in contrast to the clubs old slasher he has been using which just chews the grass off . Astute members will notice John has been steadily updating his tractor fitting LED lights to the corners of the tractors cabin and now new proper agi pattern front tyres and taking the opportunity to paint the rims while at it . No starting problems with this Fergy !

Steam Shovel

The **cabin frame** is looking good with special thanks to Alice Jacka for taking on the painting of the steel work.

Roof and wall cladding is being procured thanks to Robert Jones with his expertise and contacts with specially rolled old style roof sheets coming from Queensland .

Veranda roof has been the subject of considerable discussion. It's angle iron frame with it countersunk bolts [1] and attaching holes [2] with spacing matching the side wall sheets show it was clearly designed to have flat iron cladding .



What is confusing is all the pictures we have shows poorly fitting battered corrugated iron . Robert Jones is going to do some experiments to see if he can roll sharp enough radii in corrugated iron to get a good fit while avoiding crumpling and water pooling .

Engines Slewing engine nearly done with attention now turning to the racking engine.

Steam Pipes and valves are being refurbished by Laurie Hall . It would help to have the boiler in so we can see what they connect to so we know what they carry and the pressure .

Boiler There has been steady progress in many areas but the boiler is starting to hold things up . It was hoped that the regular steam guys would take it on but it is obvious they are fully engaged in more important work particularly the Ploughing engine fire box so we will have a go at doing it ourselves. Fortunately the Lyttelton people have offered to help particular Ross Shilton who is a qualified Ships Engineer doing a 6 week stint at sea at the moment . So far Ross has been concentrating on getting out most of the broken off studs . His approach is to concentrate heat on the damaged stud till cherry red then allowing to cool naturally. After 4 or 5 cycles it is tried and is usually loose enough to come out without inflicting damage.

Cont.

Some of the studs Ross removed were in a sorry state.

Help with thickness testing would also be appreciated . I have done about 1/2

The Way Forward I gather the following needs addressing :- for details see Boiler Refurbishment Steam Shovel , Warwick Bryce , July 25

Working Pressure - was 100 psi the , I gather the maximum for a single row riveted lap seam .

Repairs Ashbox - Replate heavily corroded segment below the pressure area Pad weld lesser wasted areas**.** Ashpan , establish what it had and fabricate a new one.

Boiler Barrel - Thickness testing more rigorous . Hand holes - Needle gun and clean up joint between barrel and reinforcing , Pad weld if required . Descale sealing surface .Tie rod attachment - inspect the 8 carrot bolts replace & reseal as required . Studs Replace all pressure related ones , procure or make from low carbon steel .

Boiler Fittings - Descale and dress door sealing faces Procure new sealing gaskets . Gauge Glass and steam cocks - lightly lap tapered surfaces . Dress sealing faces, repack glands. Safety Valve - refurbish and set calibration . Hydro Test

Chimney - Remove wasted 400 mm from the bottom , Fabricate transition section between boiler and chimney . Fabricate roof collar for the bottom . Fit new guy wires.

Weir Pump - Clean Repack Check and dress flange faces as required

Feedwater Heater - Check tubes are clear, Check and dress flange faces as required. Relag with wood staves .

Turbo Generator - Refurbish and construct switch board and replacement spot lights

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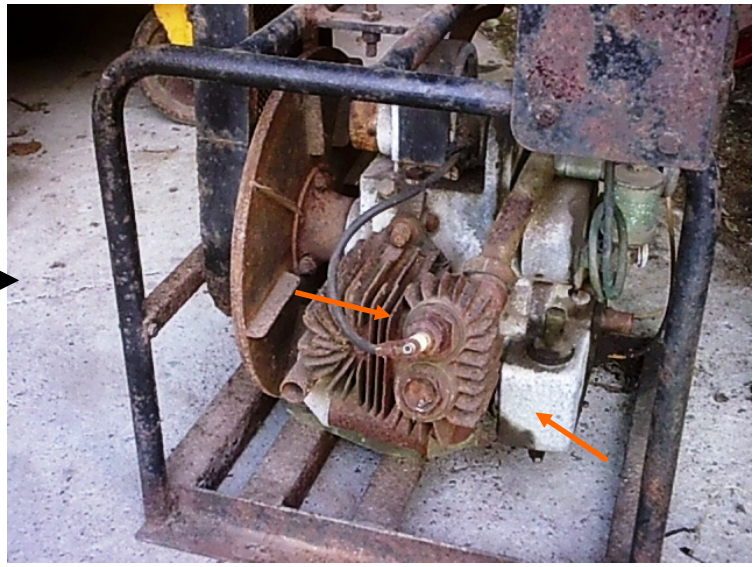
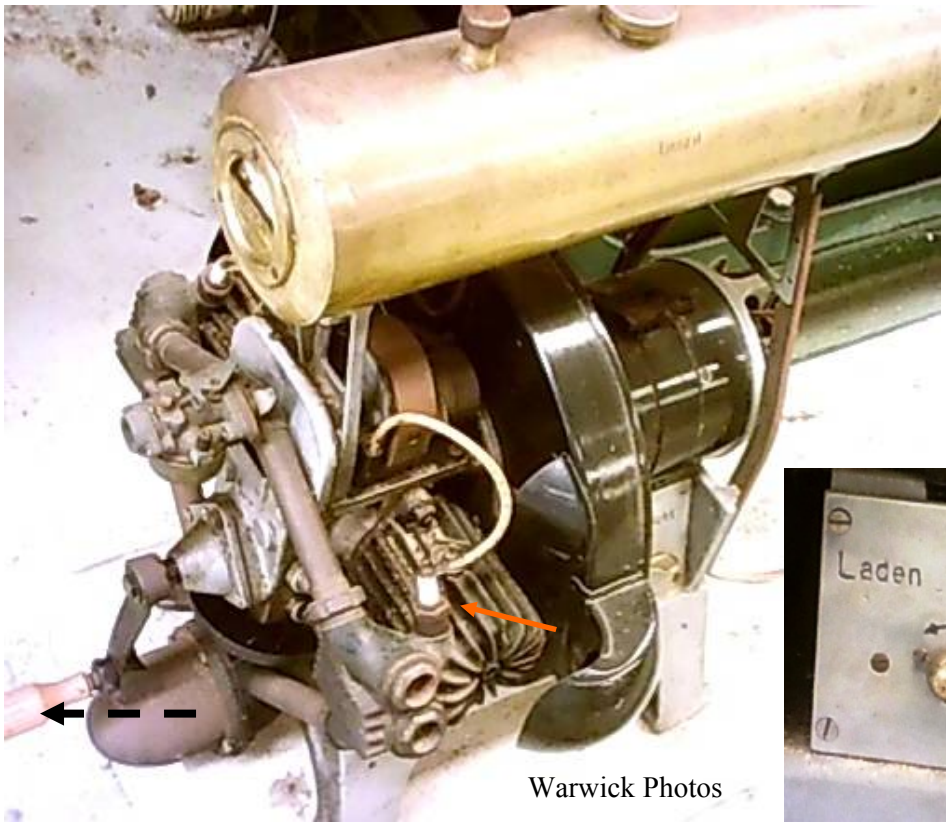
Douglas Military Gensets

Both British and German versions where heavilly based on the 2 cylinder horizontally opposed English motorbike engine

The Allied set appears mostly standard motorbike except a larger dia flywheel incorporating crude cooling fan blades and an oil tank attached to the crakcase . In the bike the total loss oil reservoir is a compartment in the petrol tank



The Bosch version seems significantly re- engineered with a much more effective cooling system incorporating a quite elaborate shroud. Also note the spark plugs have been moved to a vertical position . They protrude horizontally in the motorbike version which would be very vulnerable to being broken off in transit

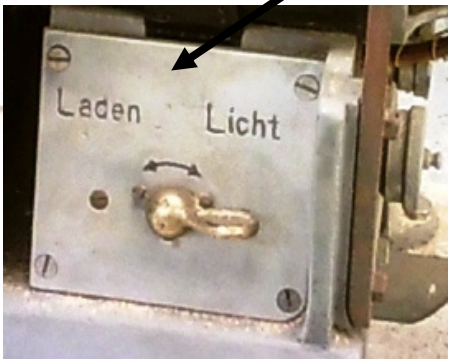


Warwick Photos

Douglas 2 3/4 hp 350 cc belt drive 2 speed motobike cc 1915

Interweb pic

The Bosch control panel



Laden means charge or store obviously as in batteries.

Licht is light .

The built in starting handle is typically military practice .

Warwick Bryce

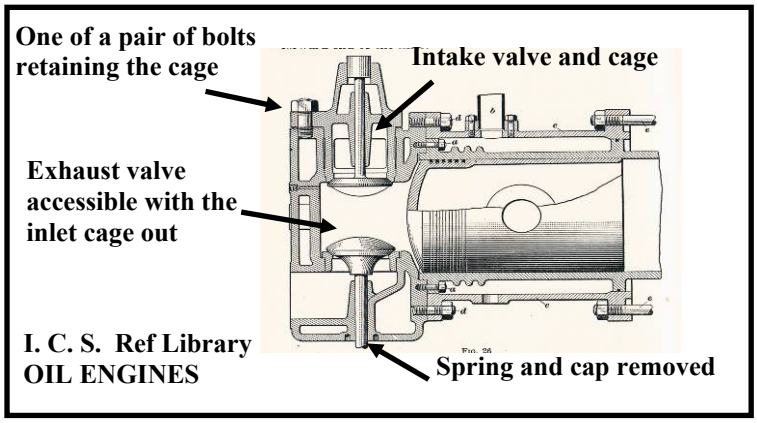
Cont bottom p 9

DIESEL DOCTORS

Our 4 cylinder horizontal Ruston BP engine has not been feeling well lately exhibiting symptoms of irregular and noisy firing for some time . On a recent wet cold and gloomy day an appointment was made with our Diesel Doctors Ian , Len and Kerri who were looking for an indoor patient .

Consultation soon produced the diagnosis of a leaking valve on number 4 cylinder so an operation was immediately called for .

Now these engines have what is known as a clerestory (clearstory) combustion chamber so named because of the 2 small high up opposed valves at the top of the cylinder along the lines of the small windows in the roof of the Red Rattler vintage rail carriages.



With the intake valve cage off cylinder no 4 Kerri is steadying the exaust valve while Ian pushed it up from below.

Anyway for an engine the advantage is that the intake valve complete with its caged seat can be easily removed by undoing a couple of bolts which then allows the exhaust valve to be drawn out through the inlet opening once it spring and cotter pin is removed. This has the advantage that the valves can be removed without the need to amputate the cylinder head and transfuse the cooling system.

Anyway the exhaust valve was indeed found to be in a congested state so the passages were cleaned out and seat lapped in with the aid of an extension . The Engine was soon stitched up and running like new with a clean bill of health. .

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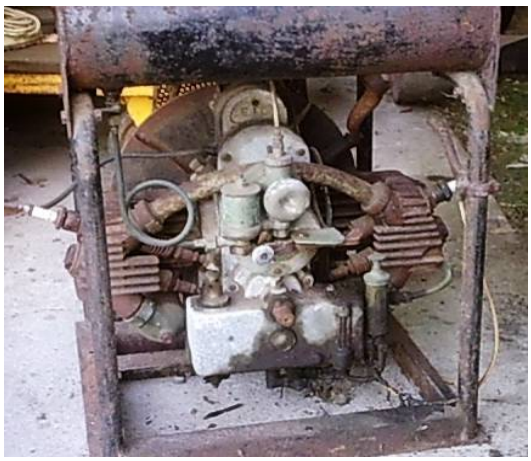
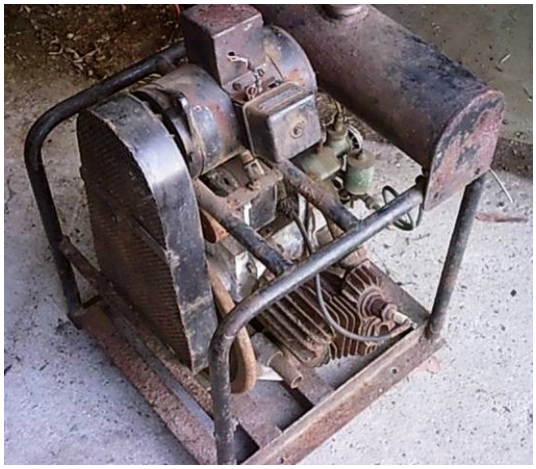
The clubs other Douglas Generating Set can be found in the Stationary Engine section of shed 11. Heavily based on the motor bike engine but with a cooling fan fitted





Railway Report

Thursday saw the track crew , including Rob Worland , Katie Jamison , Laurie Hall and Hamish Haugh replacing the last of the original redgum sleepers that were laid down through the S bend out the front 35 years ago . The entire track (almost 1 kilometre) now uses sleeper we have specially made from recycled plastic. I remember speculation at the time of ordering the first batch just how durable they would be , well they are still going strong with no sign of deterioration .

The last panel going in .

The buckets contain ballast that has been taken back to the station yard for sifting and cleaning before being used again .

A close up of the last of the original sleepers . Although showing heavy weathering and cracking they were still in safe condition after 35 years of service .

The simple little trolley, made up from old mining skip wheels acquired years ago, has been invaluable in transporting the lifted panels back to the station yard for resleepering. Here they are dismantled and set up on a special table with jigs to give correct spacing and gauge while the new sleepers are attached in no tame at all .

A Blast from the Past

I wondered what was going on when Rob Worland was led into the train shed by what looked like a centipede of wheels . *Actually 2 highly detailed 3 axle locomotive bogeys*

Well all was soon revealed . Rewind to 1988 when we first got tenure of our grounds .One of the first priorities was to set up the railway we had had in storage at Wantirna. Key members of the team included Reg Murton , Ian Ruscoe and Ken Spillet . All had various loco projects in hand and Ken was always talking about the Diesel / Electric 12 ‘’gauge loco he was building . Nothing had been seen and on Ken’s passing a few years ago all was forgotten .

Fast forward July 2025 and this gentleman turned up at the club with some loco parts he thought we may want. Yes Ken’s son David ! Now middle aged with his own business in railway crossing signals and involved with the Mornington mob .

Ken Spillett delivering some railway signal lights he built for our club .

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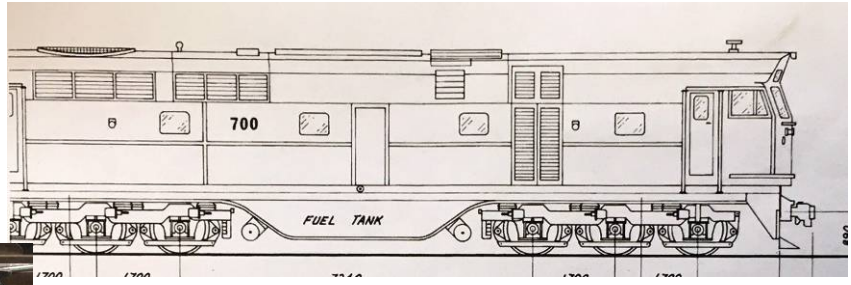
August 2017

A G class locos amongst others had this type of bogey

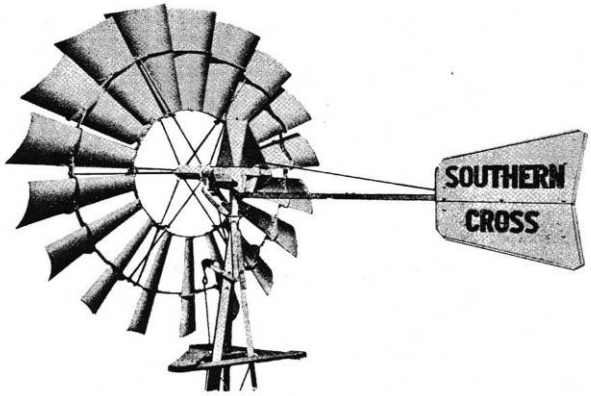
Robs Traction motor display

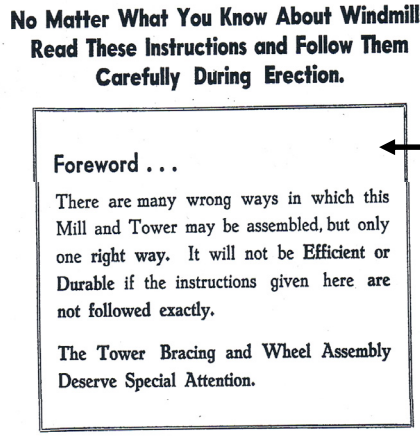


Various other parts accompanied the bogeys including highly detailed brake mechanisms for each wheel and electric drive motors for each axle . These swing on the axle itself so the chain drive tension does not vary with axle movement . Various different motors have been tried. Ken was using 6 Lucas generators [1] from higher quality English cars as these have full ball bearings yet are short enough to fit between the frames of 7 1/4 “ loco . The favourite is the North Eastern Electric Starter / Generator [2] from 1920’s American cars . These are still sought after today and command high prices. Better still are aircraft generators [3] but not widely available . Our Joy loco uses 2 .

Putting Up the Windmill

Laurie Hall is interested in getting involved with setting up the windmill so I have handed over the rather quaint Instruction Manual to him





No Matter What You Know About Windmills Read These Instructions and Follow Them Carefully During Erection.

Foreword . . .

There are many wrong ways in which this Mill and Tower may be assembled, but only one right way. It will not be Efficient or Durable if the instructions given here are not followed exactly.

The Tower Bracing and Wheel Assembly Deserve Special Attention.

It tells us we need a couple of good men in conjunction with a pair of shear legs and a block and tackle while warning any other approach is sure to end in tears.

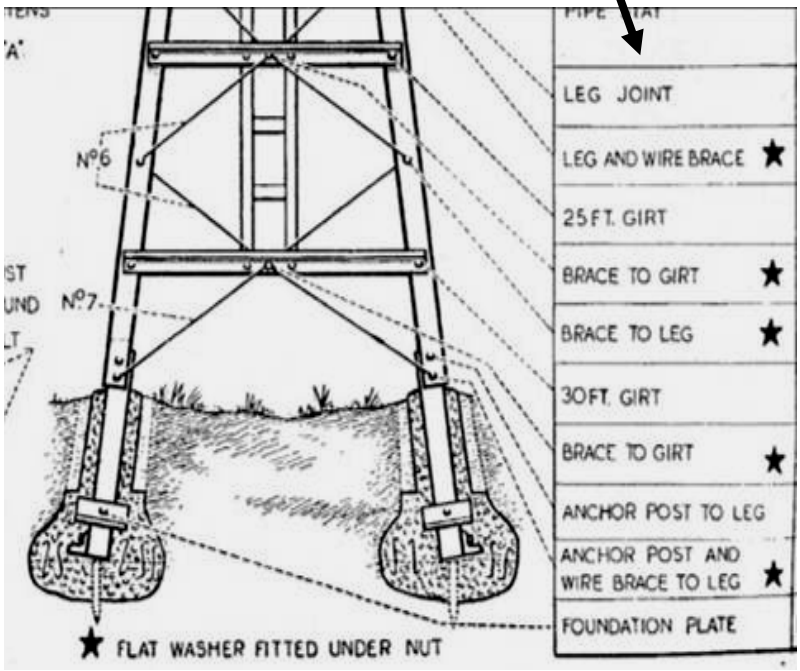
Anyway I am sure there are better ways to do it theses days but the criteria that the stub tower , the kingpin the mill engine swivels on, is plump is still most critical .

Full details of the foundations are given being simply 3 holes 3 foot deep belled out a bit at the bottom and filled with concrete.

If you are interested in getting involved have a talk to Laurie .

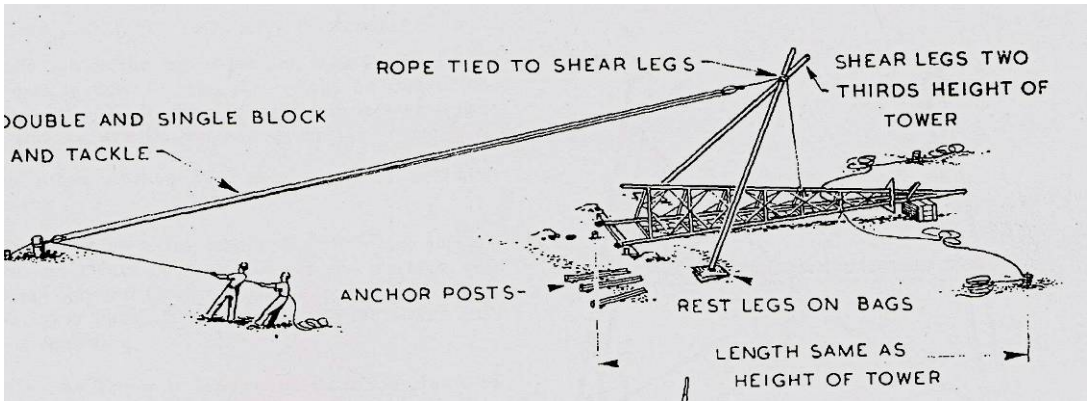
The full story appeared in SS 630 July 2023

Following feedback X is the preferred spot for our windmill . Steam Supreme 631 August 2023



How to put up the tower

Very low cost will be involved with the main items a length of galvanized angle iron to replace a couple of bent sections and 1/2 cubic metre of concrete .



Coming Events

SOCIAL MEETING
Wednesday 6 August

Regular Events : - MSTEC Social meetings, 8 pm Scoresby. First Wednesday of each month .

Museum open every **Thursday, Saturday** and **Sunday** . Miniature Train running every Sunday 11 am to 4 pm

Museum Machinery in action. Last Sunday of each month **Except end of year December.**