Maritzburg Matters

December 2019

PIETERMARITZBURG MODEL ENGINEERING SOCIETY

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Club Meetings- **General Meeting:** Third Monday of each month at 19H45 at Halley Park. Visitors welcome
Running Day: First Sunday of each month
Committee meetings: Third Monday of each month at 18h30
Work Day: Saturday following the General Meeting

Web Page- www.pmes.co.za

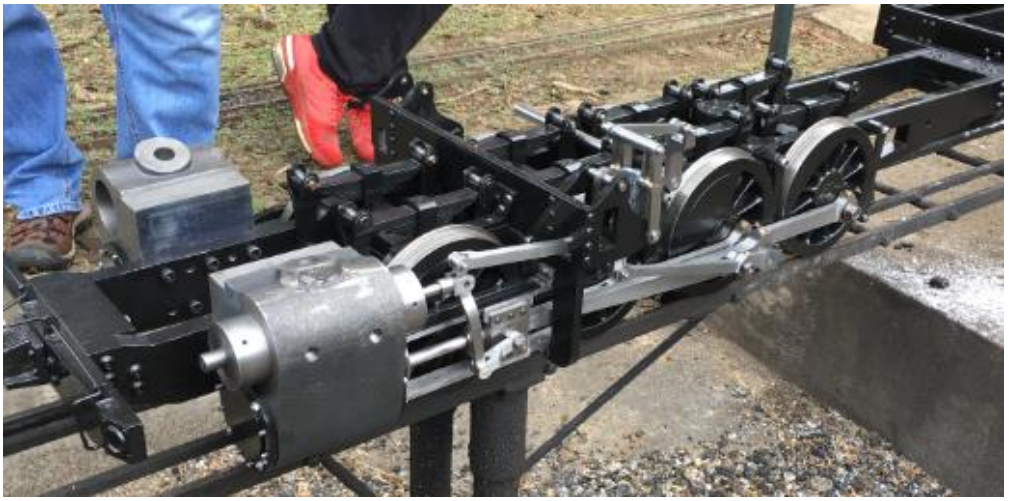
Facebook- Find us on Facebook (Pietermaritzburg Model Engineering Society)

GPS co-ordinates- 29.5833° S, 30.4167° E

No responsibility is taken by the Society for any subject matter in this Newsletter other than official Society notices.

Editorial Matters Martin Hampton

The end of another year and almost the end of another decade! We have had a most successful year from a Club perspective, meaning that we have spent a lot of money! On the success side, we have managed to make this money through our various endeavours!! We have completed the station paving, bought a new locomotive, built two new passenger cars, bought another mower, commissioned the new lathe, installed an irrigation system, done extensive work on the grounds, and managed to maintain and improve our locos and rolling stock. We have also welcomed two new members' locos, Keith Stevens and his grandson Josh have successfully steamed their Romulus called 'Emma', and Ray Teichmann and Dave Tanner have put their new diesel into service, this one not yet officially named but could be 'Wolf'…… the acronym backwards of Flippin' lot of work!!



A quick peek at Tinus Deysel's loco.

I would like to take this opportunity to thank all of those who have assisted in making the PMES as successful as it is, the beautiful park, well serviced rolling stock, very well-maintained locos, and excellent facilities. The workdays and running days are always well attended by members thereby reducing the workloads of the few. I hope to see this continue into the future!!

We would also like to welcome all new members, we hope that you enjoy a fruitful membership!

We had a brilliant Christmas Dinner, many thanks to Alan Hill for the smoked chickens and pulled pork, and the folk who produced the salads!

A Merry Christmas and a Happy New Year to all of you!!

What Happens in the Firebox? Roy Clemitson

Let us consider what takes place in a firebox. Air is supplied to the firebox in two ways; 1. Primary air, through the fire grate, and 2. Secondary air supplied through the fire hole.

Assuming coal has just been fired onto an incandescent (white hot) fire-bed, the volatile gases commence to be given off at once from the newly added coal, and are quickly drawn out of the firebox and through the smoke-box, and unless sufficient air for complete combustion is made available, they will pass out of the chimney-top in the form of dense smoke. Whilst the volatiles mix with a certain amount of primary air, this will almost invariably be insufficient, and they will therefore depend upon adequate secondary air supply through the fire-hole door to enable proper combustion to take place. As the volatiles contain a large proportion of the heat value of the coal, any failure to provide adequate air for combustion of these will result in considerable heat loss. Heat loss can also occur through admitting more air than is required for combustion; this excess air does not take part in combustion and is heated up by burning gases in the firebox, losses occurring due to the high temperature of discharge from the chimney.

As a matter of interest, it is necessary to supply 20% more air than is theoretically necessary to complete combustion in a locomotive firebox. If only the theoretically correct amount of air is supplied, it is not possible to fully mix this with the combustible gases due to the high speed at which they are drawn through the firebox to the tube-plate, and losses occur due to incomplete combustion in consequence.

From the foregoing we have seen what conditions are required for efficient combustion, it is now necessary to see how proper combustion can be attained in actual practice. On the road, the art of firing is to regulate the fire, and height of water in the boiler at all times according to the work to be performed, and to have full boiler pressure when required without blowing off.

Coal will be economically burned when the fire-bed is of the right thickness. If the fire is too thick the air cannot pass through it. If the fire is too thin

excessive air passes through the fire-bed and holes will be formed. In both cases the firebox temperature will be considerably reduced. The volatile matter begins to be expelled from the coal immediately it is placed on the fire-bed. If too much coal is fired at one time the amount of volatile matter given off will be so great that it will be impossible to provide enough air to burn it completely. The amount given off must therefore be controlled, so that it is no greater than that which the air supply can burn completely. Firing only a relatively small number of shovelfuls at one time can do this.

The whole of the volatile matter is not given off immediately the coal is fired, it is therefore necessary to wait before firing again for a period long enough to ensure that the air supply can then burn the volatile gases still being released

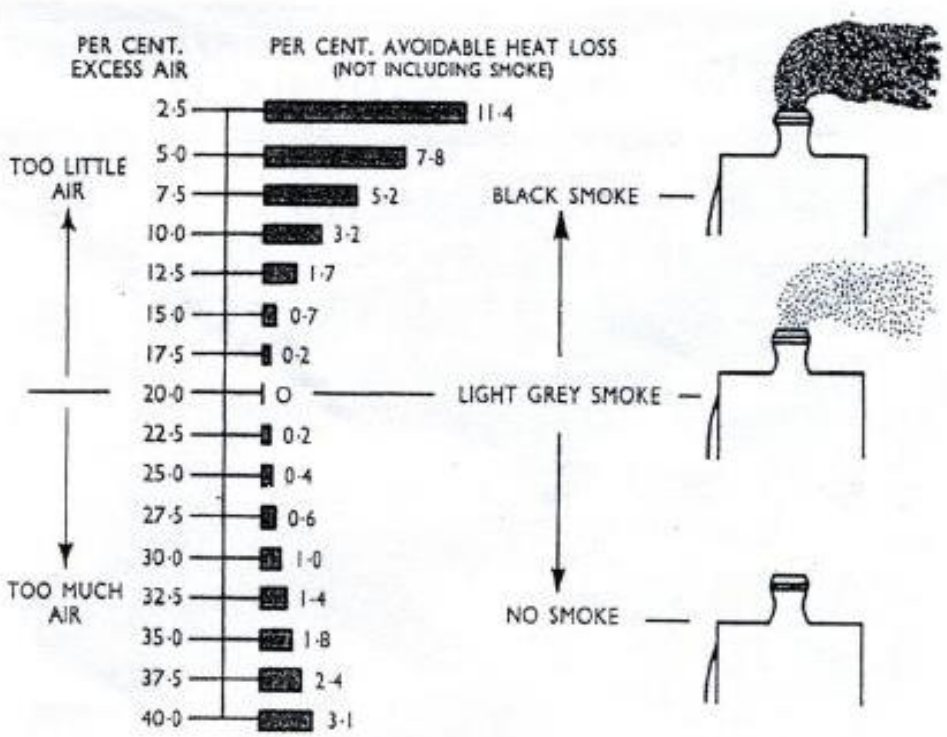


Fig. 2 EXCESS AIR, HEAT LOSS AND SMOKE

from the fire-bed, together with the larger amount which will be given off immediately the new firing takes place. To obtain the maximum amount of heat for the production of steam, the best method of firing is to limit the amount of coal put into the firebox at one time and to fire again only when the last charge of coal has burned away. Fire sparingly - work systematically. This is the essence of good firing and has been proved conclusively, not only by tests but also by analysing the way the best firemen work in practice. For all classes of locomotives, the most common mistake is over firing, whether

by large amounts haphazardly fired, or by small amounts fired too often. Not only is valuable coal wasted as a result, but the job is also made harder than it need be, because combustion is less efficient.

Size of Steam Pipes

Piston speeds in model engines are well below those for their full-size prototypes, so that steam speeds in 'scale' pipes will be reduced also. 'Full-sized' steam speeds are seldom met with in models. Messrs. Stuart Turner Ltd suggest the following pipe sizes for their models:

Bore ins	*Stroke ins*	*Steam pipe O.D.*	*Exhaust pipe O.D.*	*Remarks*
2	2	$\frac{3}{8}''$	$\frac{1}{2}'' \times 18g$	
$2\frac{1}{4}$	2	$\frac{3}{8}''$	$\frac{1}{2}''$	
$1\frac{1}{2}$	$1\frac{1}{2}$	$\frac{5}{16}''$	$\frac{3}{8}'' \times 18g$	
1	1	$\frac{1}{4}''$	$\frac{3}{8}''$	2-cyl. S.A. 2800 r.p.m.
$\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{3}{4}$	1	$\frac{1}{4}''$	$\frac{5}{16}'' \times 18g$	Triple Expansion.
1	$\frac{7}{8}$	$\frac{3}{16}''$	$\frac{5}{16}''$	Twin Marine Engine.
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{5}{32}''$	$\frac{1}{4}'' \times 20g$	
1	2	$\frac{5}{32}''$	$\frac{1}{4}''$	Slow Speed Beam Engine.

When designing models, estimate the bore of the *full-size* pipe to carry steam at 100 ft/sec. for supply and 75 ft/sec. for exhaust, and scale down. For 'modern' installations using high-pressure superheated steam, speeds of 120—150 ft/sec. might be used.

Useless fact of the day: Horse Tax. On Historical Lines

One of the reasons why locomotives superseded in several instances the horse was the staggering increase in the cost of the horse and their feed during the Napoleonic Wars. This was because the British Army, unlike other European Armies, lacked any form of remount system to purchase or breed horses which meant until the 1880s, in fact until WW1 in effect, it was reliant upon the civilian horse trade. The civilian horse dealers could charge what they wanted knowing they had control of the market seeing the cost of a 'good' horse double or treble e.g. in the period 1811-1812.

But another factor in making the horse more expensive was the pernicious Horse Tax. For every 'bridled horse' a tax of up to one guinea (£1 1s) was payable, depending on its size and whether it was a riding or carriage horse. Road transport was made even more expensive not only due to the Turnpike Tolls but also taxes on carts and stagecoaches. The Horse Tax was considered to be most 'ungentlemanly.'

Amongst the other things to be taxed for the 'war effort' included dogs, dried fruit, printed fabrics, coffee, hair powder (many gentlemen stopped wearing powdered hair because of this), cotton, but also pertinent to this discussion, the Canals were taxed and so was iron - the excise on the latter being reduced in the late 1820s thanks to the efforts of William Huskisson MP.

The railways were not taxed until 1832 when the road lobby managed to get a tax on passengers carried per railway carriage.

So not only were colliery owners faced with an increased cost of horses to purchase but also the cost of their food, and also thanks to the war effort, a tax on their means of motive power, too. Some colliery owners, such as the Fentons, the great 'Coal Kings of Yorkshire' used oxen or bullocks to work their colliery railway, thus avoiding the high cost of horses.

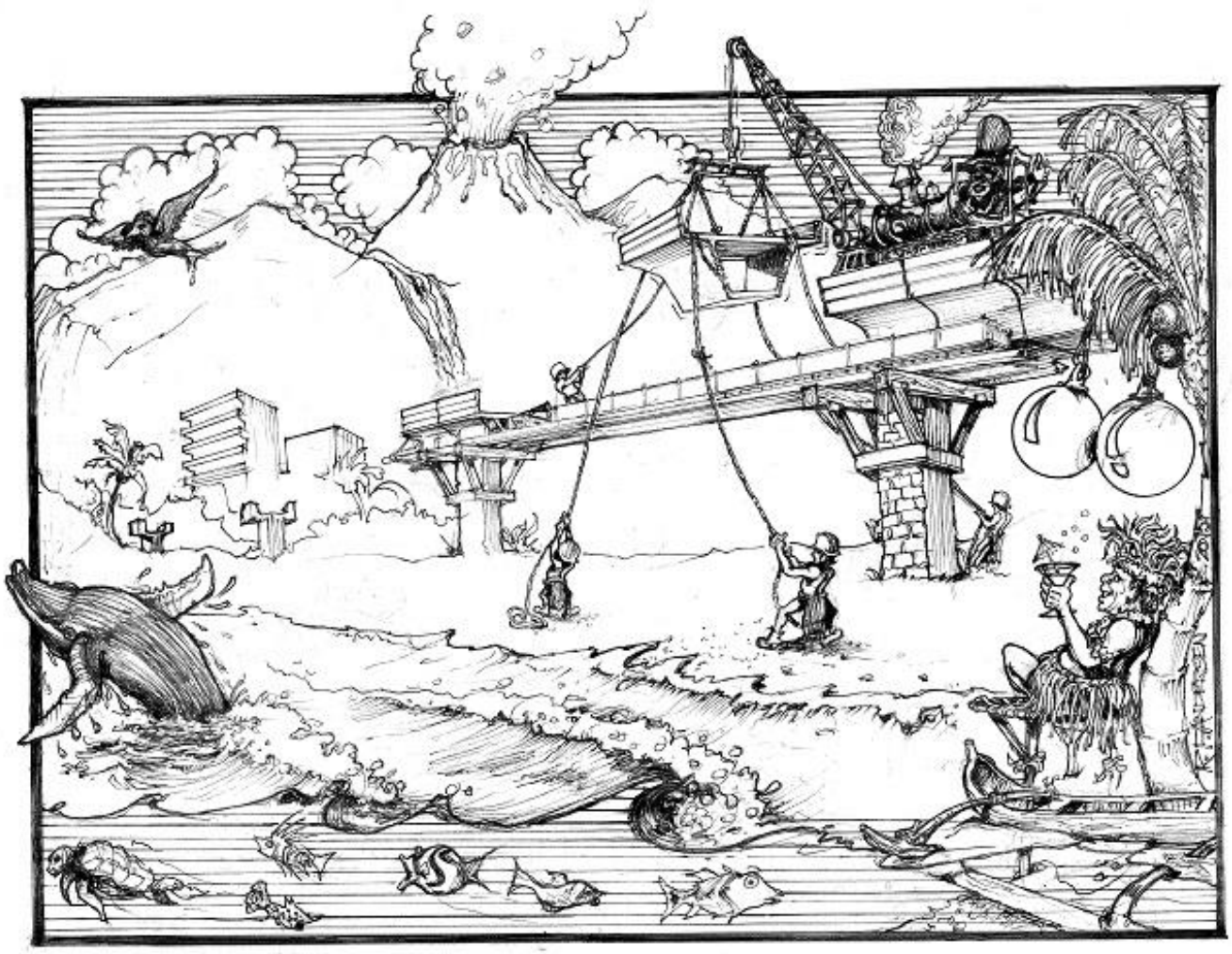
Tax returns of the Liverpool & Manchester Railway (for example) show that horses and carts were still heavily taxed into the 1840s but also due to their nature also show how many horses the railway owned, their age, size (with one exception they were all 13hh or lower, i.e. ponies), whether they were riding or draught horses and also the number and type of carts they owned and operated.

Who says tax is boring?

Club Notices

- There will **not** be a **General Meeting** in December, the annual dinner takes its place, **neither** will there be a **workday** in December.

- **For sale**: Vols 1 and 2 of Frank Holland's books **'Steam Locomotives of the South African Railways'**, both signed by the author. These two books are in very good condition with slight foxing in places. The asking price is R3000.00 onco for the two. Call Martin Hampton on 0833883149 or martinjchampton@gmail.com .
- There **will** be a **Running Day** on the first **Sunday, 5th January 2020!**



ON BEHALF OF THE COMMITTEE I WISH YOU AND YOURS ALL OF THE BEST FOR THE CHRISTMAS SEASON, AND A PRODUCTIVE NEW YEAR! ENJOY YOURSELVES, DO WHAT YOU DREAM OF, MAKE THINGS AND TRY NOT TO BREAK TOO MANY THINGS!!