

PROJECTS :

PRESSURE GAUGE REBUILDS :



To keep the rebuilt pressure gages authentic the original cases and movement were refurbished, but the dials we changed to remove the pounds per square inch markings in line with present legislation. The lower left gauge is for the 12AR 1535 and the remaining three are for 25NC 3472. The old dials are shown alongside.

From the Editor

A very important Reefsteamers' function took place on Saturday the 17th October at Ekudeni Lodge in Muldersdrift. 90 Reefsteamers members and the partners enjoyed a wonderful evening at this smart venue. Awards were handed out, food and drink were consumed and a band provided dance music. Thanks to our great chairlady for organizing this for the Reefsteamers family.

A full report next month. The Main awards were

- Chairman's award winners: Les Smith and Andrew King
- Vice Chairman' award winner: Attie de Necker
- Best performer 2009: Sakkie Kekana

Boiler Water Level by Dawie Viljoen

In locomotive (mobile) boilers there are a couple of factors that contribute to water level variation in the boiler. The locomotive crew has the disadvantage that this is only visible through the gauge glasses, giving only a limited picture of the actual state of the water level as well as the physical occurrences in the boiler. The factors affecting this level do not occur independently and interact with each other to give the gauge glass water level that is seen by the locomotive crew. The most significant factors that affect water level are as follows:

- Acceleration/deceleration of the locomotive.
- Orientation of the locomotive. (Uphill, downhill, sideways tilting.)
- Leaking gauge glasses.
- Sudden release of steam. (Safety valve)
- Locomotive working hard

1. Acceleration and Deceleration

When a locomotive is accelerating or decelerating (braking) there is a change in momentum to the water in the boiler, this results in a force, which due to the nature of water, causes the water to “heap” to the front or rear of the boiler (Accelerating → Rear, Decelerating → Front). Acceleration thus causes the water level to rise in the gauge glasses while deceleration (braking) causes it to fall in the gauge glasses. When the locomotive is moving at a constant speed, the water level will be level (The level will take some time to level out after acceleration or deceleration). Figure 1 shows the locomotive accelerating forward, thus causing the water level to rise in the gauge glasses.

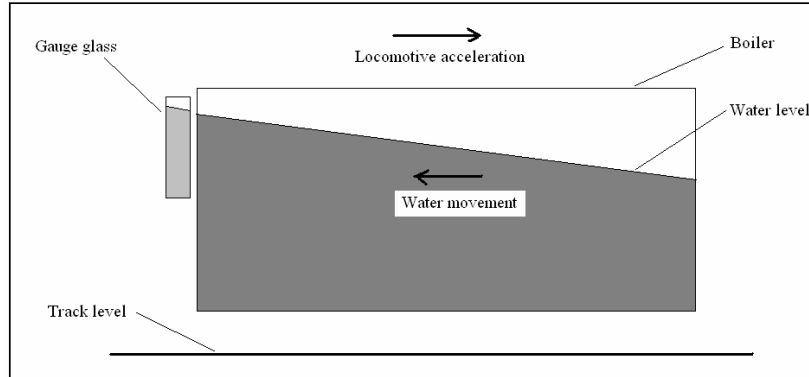


Figure 1. Locomotive accelerating, causing a rise in water level in the gauge glasses.

2. Orientation of the locomotive

When a locomotive is standing uphill, the water level will stay level relative to the earth's gravity field, thus causing the water to heap to the back of the boiler, thus showing a higher water level in the gauge glasses. Figure 2 shows the locomotive standing on an uphill.

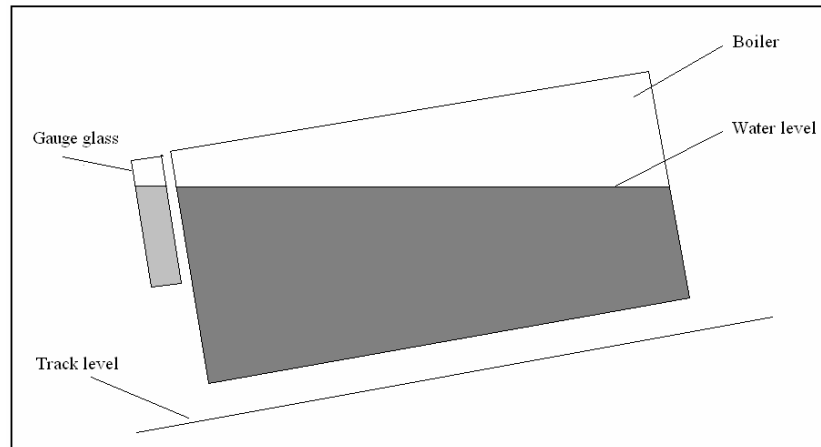


Figure 2. Locomotive standing on an uphill, causing a rise in water level in the gauge glasses.

The same goes for a locomotive standing downhill where the water will “heap” to the front of the boiler, thus showing a lower water level in the gauge glass. These phenomena can best be seen if the locomotive is standing on a banked curve (the locomotive is leaning sideways). If the locomotive is leaning to the left, the water will “heap” to the left of the locomotive, thus showing a higher water level in the left hand side gauge glass and a lower level in the right hand gauge glass.

Figure 3 shows the locomotive leaning sideways.

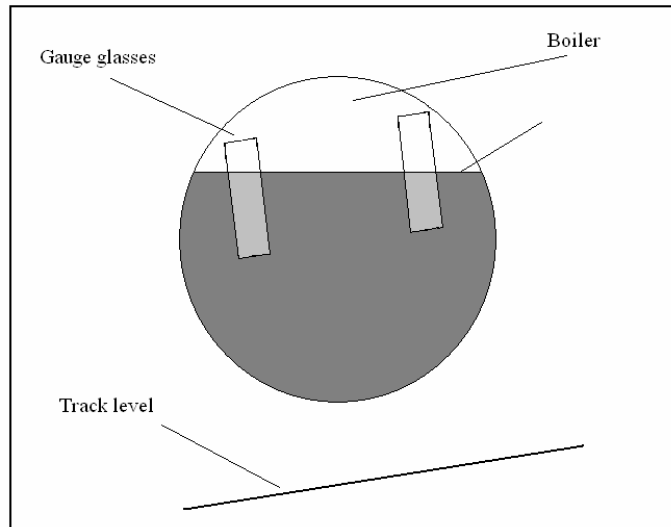


Figure 3. Locomotive leaning sideways, showing different water levels in the gauge glasses.

3. Leaking gauge glasses

3.1 Leaking gauge glass drain cock (Water side)

A leaking gauge glass drain cock can also give a false water level reading in that specific gauge glass. When a gauge glass drain cock leaks, the water in the glass starts to flow out. At the same time steam flows in from the top of the glass. The difference in water level in the boiler and that in the glass then causes a pressure differential which in turn causes water to flow into the glass from the boiler's side. The hole through which the water flows into the glass from the boiler's side is small, thus any flow through this hole causes a pressure differential over the hole. It is this difference in pressure loss over the hole and pressure difference due to the difference in water level between the glass and the boiler that causes the water level in the gauge glass to be lower than the actual level in the boiler. Figure 4 shows the difference in water level due to a leaking drain cock.

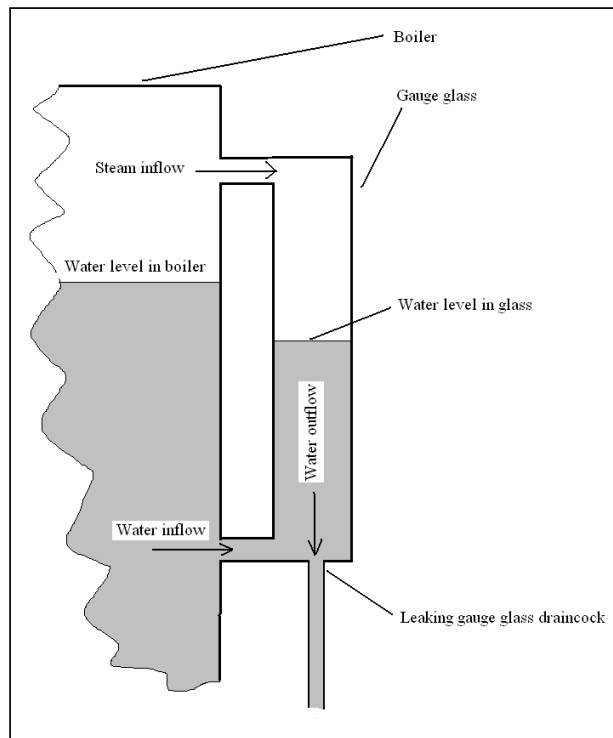


Figure 4. Difference in water level due to a leaking gauge glass drain cock.

3.2 Leaking gauge glass (steam side, top of the glass)

A leaking gauge glass on the steam side (top of the gauge glass) has an opposite effect to that of a leaking gauge glass drain cock. A gauge glass leaking steam will cause the water level in the glass to be higher than the actual water level in the boiler. This is due to the same phenomena as discussed for the leaking gauge glass drain cock, the only difference being that the pressure differential is set up over the hole feeding steam to the gauge glass.

4. Boiling

Definitions of certain terms used to describe boiling:

Heat transfer: Transfer of energy from one fluid to another (Heat transferred from burnt coal gas to water)

Radiant heat transfer: The energy transferred by means of radiation.
(This is the heat that burns you when you open the firebox door)

Convective heat transfer: The energy transferred by means of convection,
(This is the heat that burns you when you put your hand in the hot gas coming from the chimney.)

When water boils, vapour (steam bubbles) are formed in the water. As an example, if you have a glass filled half with water, and you take a hand full of marbles and throw them into the glass, the water level in the glass will rise. This can be compared to a boiler, the water in the glass being the water inside the boiler and the marbles being the steam bubbles inside the boiler. Thus if boiling inside the boiler starts to occur due to heat transfer from the warm coal combustion gasses to the water, the water level in the boiler will rise. Figure 5 shows the glass with marbles which illustrates the rise in water level.

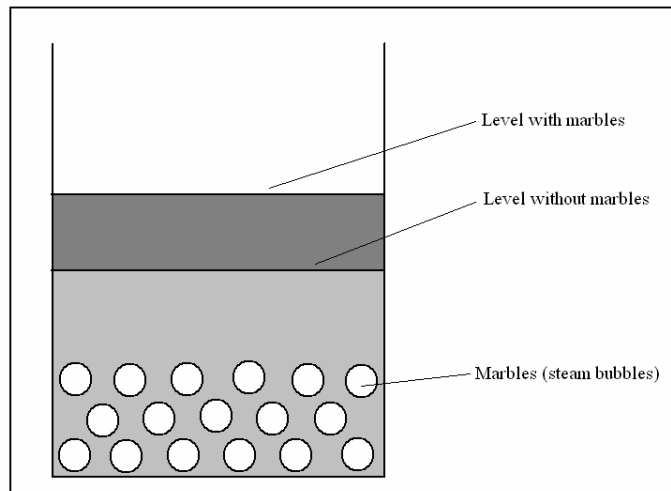


Figure 5. Glass with marbles illustrating the rise in water level.

5. Sudden release of steam

Water at atmospheric pressure (pressure at sea level) boils at $\approx 100^{\circ}\text{C}$. The higher the pressure, the higher the temperature at which the water will boil. If a locomotive has a pressure of 1440 kPa in the boiler, the water inside the boiler boils at $\approx 200^{\circ}\text{C}$. Should the pressure suddenly be reduced inside the boiler, the boiling point of the water would be reduced. The water inside the boiler will still be at the same temperature as before the pressure was reduced. The water will thus be above its boiling point and will therefore start boiling. This boiling will, as described above, cause the water level in the boiler to rise.

On some locomotives with violent safety valves (Ross pop valves), the release of steam is sudden and aggressive. This can cause a sudden reduction in pressure which in turn will cause boiling. This process is complex and will happen until equilibrium between boiler pressure and water temperature is reached. This boiling will cause the water level to rise as described above. When the safety valve shuts, the boiling will eventually stop, thus causing a drop in water level.

There will be a loss of water due to the steam being blown off and the evaporation of water due to the boiling that has occurred as a result of the reduction in pressure. In the authors' opinion the belief that the safety valve blows the water away, is caused by the rise in water level due to the sudden boiling followed by the fall in water level when the safety valve shuts and boiling stops. The difference in water level caused by this illusion is believed to be greater than the actual amount of water lost.



6. Locomotive working hard

In a locomotive boiler there are two areas of distinctive heat transfer. Firstly there is the firebox where radiant heat transfer (refer to definitions above) is dominant. Radiant heat transfer is largely dependent on temperature, thus the warmer the fire, the higher the heat transfer. Secondly there is the boiler tubes where convective heat transfer (refer to definitions above) is dominant. Convective heat transfer is dependent on the velocity (speed) of the gas flow through the boiler tubes as well as the temperature of the gas.

When a locomotive is working hard (regulator open, full forward) there is a fierce draft of air through the fire, this causes fast combustion of the coal causing high energy releases from the fast burning coal as well as high flame and gas temperatures. The high temperatures causes high radiant heat transfer (heat fluxes) from the firebox to the water while the fast flowing hot gas flowing through the boiler tubes, transfer the heat to the water by means of convective heat transfer. Rapid boiling is the result, causing a rise in boiler water level.

When the regulator is closed, the draft of air through the fire is almost stopped. The flow through the boiler tubes is thus almost stopped and thus the convective heat transfer in the boiler tubes stop. Boiling in this part of the boiler thus stops and therefore there is a sudden drop in water level. In the firebox however, the fire does not cool down immediately and boiling continues in this section of the boiler. As the fire starts to cool down, boiling in this section will gradually reduce and will therefore also contribute to a gradual drop in water level.

7. Combination of all factors

All of the described factors have an influence on the locomotive boiler level and may all occur simultaneously, having the effect of canceling each other out, or amplifying each other. The effect of a locomotive working hard up a gradient and showing a full glass of water is well known to crews. The moment the locomotive goes over the hill the regulator is closed and the locomotive is facing downhill. The combination of the downhill facing locomotive and the almost immediate reduction in boiling causes a fast drop of the water level in the boiler.

Depot Report :



3046 cab as of October 2009



Waiting for the fireman

15F 3046 is proceeding rapidly with the dedicated attention of Piet Labuscagne and will be ready to run in a few months.



3472 Chimney in place



Tender rejoined to the Engine

Trips

We at Reefsteamers never cancel a train. The train of the 10th October was a private charter that was organised for the West Rand Christian Care. Unfortunately, one of the leading organizers of the trip was killed in a car accident a mere few days before the train was scheduled to run. The people who belong to this religious sect thought it would be in bad taste to continue with the trip under the circumstances. They duly approached the Board of Reefsteamers and asked if the train could be re-scheduled to run on Saturday the 19th of December 2009. This request was acceded to by Reefsteamers.

All of our previous trips have been a qualified success. Our next two public trips scheduled to run on the 7th of November and the 5th of December 2009 are already fully booked. Our last public train scheduled for this year is on Saturday the 12th of December already has 271 passengers booked, and is surely to be another sell out like all the rest.

We have, of course, our annual run to Ficksburg for the Cherry festival on the 19th of November 2009. This train has been fully booked for some time now, and is becoming extremely popular with the South African public. (Who else runs main line steam passenger trains over a period of four days in this country?)

We also have a private charter scheduled to run on Friday the 27th of November 2009. This trip is unusual in that it will be running on a week day and not over the weekend.

Angel tours have proved to be very problematic, as all their proposed trips for the year to date have been cancelled due to insufficient support. Reefsteamers have now decided to discontinue the relationship with Angel Tours for the aforementioned reason.

Kind regards,

Les Smith

THE PLANNED TRIPS FOR THE NEXT 6 WEEKS ARE AS FOLLOWS:-

- Sunday the 25th of October 2009. SANRASM trip.
- Saturday the 7th of November. Reefsteamers trip.
- Thursday the 19th to Sunday the 22nd of November 2009. Reefsteamers trip to the Cherry Festival.
Bookings now closed!
- Friday the 27th of November 2009. Private charter for Resomed.
- Saturday the 28th of November 2009. SANRASM train.
- Sunday the 29th of November 2009. SANRASM train.



CHERRY FESTIVAL STAFF LISTING

- Alet Lubbe.
- Andreas Matthee.
- Andre van Dyk.
- Andrew King.
- Attie de Necker.
- Chris Saayman.
- Clifford Matthee.
- Coen Pretorius.
(Has paid for trip)
- Dawie Viljoen.
- Diana Sanderson.
- Elize Lubbe.
- James Thomson.
- Joey de Beer.
- Johan Breydenbach.
- Les Smith.
- Lee Gates.
- Luca Lategan.
- Michael Thiel.
- Phumlani.
- Philipp Maurer.
- Piet Molentz.
- Robbie Davies Hannibal.
- Ryan Fincham.
- Sakki Kekana.
- Sandy Smith.
- Shaun Ackerman.
- Sonette Brits.
(Nursing Sister)
- Victor.
- Security
- Shongololo staff.
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Notes from the Board

The growth of many steam clubs around the world is assessed by the quantity of rolling stock and the size of their Depot, or perhaps the number of trains that they run and the number of ticketed keisters on the seats. Reefsteamers has a further growth marker – people development. Johann Breydenbach and Sakkie Kekana are undergoing training as drivers. Patrick Ackerman and Andreas Matthee are soon to write exams as firemen. Furthermore, a program to select and train up several shed men is just starting. Well done guys – work well and study hard. and do Reefsteamers proud!

Reefsteamers' official permit from the safety regulator has been renewed and is on display at both the club houses, within the S&B van and within the Bar Car. Although Coen Pretorius, as a Transnet Safety Official, is a Reefsteamers member – he plays absolutely no favourites and is as strict on Reefsteamers as he would be on anyone else. This is not a Mickey-Mouse certificate about which we are talking here! It is now up to each member to think of safety and to work safely.

Via the diplomacy of Andrew King, Reefsteamers has been offered the long term use of a borrowed bulldozer. We need to pay for transporting the machine to the depot. The bulldozer would be useful for scraping and clearing our rough approach road as well as for land clearance and earthworks around our depot. We could even use it to consolidate our coal pile when we get down to the little bits at the bottom of the bowl!

Due to lack of time, Michael Thiel was unable to perform the role of Membership Liaison for Reefsteamers. This role is to be taken over by Fred Sewell and his details will be released when he is officially ready to take on the role.

Some people have asked what are the plans for Class 15F No.3016 'Gerda.' She has 'lent' a few parts, such as pipes and injectors to Class 15F No.3046 which is undergoing an impressively rapid rebuild. We have no immediate plans to restore 'Gerda' back into operation, especially as we will have No.3046 running soon, and then Dave Shepherd's No. 3052 once the tubes are done – two examples of the class 15F. (One with and one without smoke deflectors) We would rather put money into a complete re-flue for the recently re-tubed Class 15CA No.2056 'Dorothy', as well as looking at a restoration for 'Rusty Rosie', the class 12R No.1947 that has been waiting so patiently. To survive, we have to run Reefsteamers lean, like a business – and the relatively small, simple locomotives are proving to be more reliable and more economical to run on our day-trips.

We are asking for donations and for Reefsteamers members to ask for donations, towards our restoration and repair projects – it's an expensive business keeping these elderly iron ladies going! Here is an idea of the costs that we are currently looking at:

Class 15F No.3052 'Avril'	Replacement Tubes	R 40 000
(Donated Tubes cannot be welded.)	Inspection	R 4 000

**REEFSTEAMERS WAYBILL NO.4
- OCTOBER 2009 -**



Class 15CA No.2056 'Dorothy'	Boiler re-flue Boiler Certification	R 350 000 R 6 000
GMAM Garratt No.4079 'Lyndie Lou'	Boiler Certification	R 6 000
Class 12R No.1947 'Rosie'	Restoration Project	R amount unknown until assessed.
Class 15F No.3016 'Gerda'	Firebox Lower Sides Rear Corners replacement Fabrication of new pipe work.	R 85 000 R 30 000
(No immediate plans to restore this loco to steam until ample money is available.)		
Class 15F No.2914 'Spikkels'	Firebox Lower Sides Rear Corners replacement	R85 000
(No immediate plans to restore this manually fired loco to steam as yet.)		

If you can make a donation, it would be much appreciated. Donated moneys will be 'tagged' and moved into our FNB bank account – which is treated as a 'closed' account for dedicated funds – and the money therein is strictly NOT made available for use in day-to-day operations. Thus, we can guarantee that the money you donate will be allocated to the locomotive for which you are donating the funds.

Unfortunately, at the moment, although we are a section 21 company we are not a registered charity. Thus donations are not tax deductible. If you would like to make a donation, or know someone who can, please email Lee Gates at clubsecretary@reefsteamers.co.za for the banking details and so that we can have the donor's details.

Marketing is going well and even in difficult economic times, we are running trains at a profit. Our master Marketeer, Les Smith puts an incredible 15 hours of work a day, seven days a week at his home handling bookings and queries. Without an invisible someone like Les filling the trains, we may as well fill the boilers with concrete and walk away, for not one engine will turn a wheel without revenue – no matter how mechanically sound that locomotive may be.

Les is cooking up an interesting New Year's Dinner and Dance train, the details of which are on our website. Please note that while the dance venue is open to all Reefsteamers members, the train is not. As this is a special train, the normal rules for 'staff freebies' do not apply.

If you wish to sleep on board the train and partake of the good food and the breakfast the following day, you will need to pay your way as well as that of your partner and family members or friends that you bring along.

However, if you would just like to join us for the night, Reefsteamers will charge Reefsteamers members R200 per person attending for the Picnic Ground Fare and for the braai pack.

Contact Details

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Tail Marker :



Sandstone Heritage Trust's 60 ton Sheldon Steam Crane has been moved into the open allowing a better photographic opportunity than has been possible while it was tucked up in the lower workshop. This was not for photographic reasons but to fumigate and get rid of the bees that had found a home deep inside the crane's turning motion.