

INTRODUCTION : 'Just a quick run' :

This is one of those 'just because' articles. On padding my way into the old Germiston Depot on the 24 January, trying hard not to step into oil-skinned puddles with my 'civvie' shoes, I was pleasantly surprised to see the GMAM Garratt being steamed up for a quick revenue earning run with the Shongololo Express coaches. These Shongololo Shifting jobs are often missed by the weekend Depot-Day gang as they don't appear on the public train rosters and the crew roster only appears on the bulletin boards within the clubhouse. This one was a bit of a surprise too and only the footplate crew members directly involved were notified. To add to the unusual nature of this steam-turn, the fire-lighter would also be the depot fireman as well as the main-line gravel chucker. The main buffer bender, er, driver, would also handle the depot movements and there were no locomotive minders involved at all. (So, no loco minders were hurt in the production of this Depot Report.)

This particular Shongololo Sortie was even more unusual though, as it scurried on a Saturday, whereas they are normally done during the week. The short trip was evidenced by the only third-full coal bunker, which we normally pack to overflowing, with the black nuggets rolling languidly over the sides at every sprung rail joint.

There was otherwise nothing special about the day, the weather conditions or the ambient lighting ... no pre-announcements or fanfare. Only one visitor at the depot and only two cameras present. Even resident videographer Paul Hloben, was displacing atmosphere elsewhere. Just good ol' steam power doing its work on the high irons. I have included some pictures of the preparation for the run, as well as some pictures from the few weeks preceding, which cover repair and improvement work on the GMAM Garratt No.4079 'Lyndie Lou' for the 2009 running season

The newly steamed engine rolled out into a crowded, busy Depot Day Scene (see Pic EP01 below) and at that point, I couldn't really think of a better place to be on a Summer Saturday Afternoon.



EP01 – A happy, busy scene at an old steam depot with our two green machines side-by-side and about ready to swap places. Not bad for a steam depot that should have been demolished years ago. This wasn't an 'Open Day' – just the people who happened to be on-site when this transfer run was to be made.

PROJECT : GMAM 4079 'Lyndie Lou' – Reverser Repair : (10 – 18 Jan.)

The GMAM has had a 'sick reverser' for a while. While it performed the forward and reverse movements adequately enough it was constantly blowing and not automatically stopping after the actuator and the indexing links lined up. The driver would have to manually stop the reverser, and also try to keep it in position when it tended to drift.

The power reverser's D-valve chamber, shaft and the D-valve block itself were removed and overhauled on this Saturday in an attempt to cure the problem. It was to be dismantled for lapping of the D-valve block and the valve's port plate anyway. These two elements mentioned are normally the first suspects when a power reverser's actuator valve starts to blow, although in theory, they are self lapping and self sealing. But they can be scratched or otherwise damaged by foreign bodies getting into the steam, and the valve block wears over a long time.



VL01 – A view up into the valve chamber in the underside of the somewhat mucky power reverser valve body (with the displacement lubricator still attached), just after removal from the GMAM. The D-valve block slips in loosely around the spool and is shifted by the longitudinal movement of the spool bobbins – one visible on the left.

Like most D-valves, the valve block itself is a 'floating' element and is pressed down towards the matching port plate by means of the incoming steam pressure within the valve chamber and is thus self-sealing and self-lapping in operation. (Or rather ... is meant to be!)



VL02 – Here is the newly lapped D-valve block itself, standing upside down on the work surface. The shiny top surface is the newly lapped working surface, while the deeply indented slot fits around the valve spool and is keyed between the two bobbins.

Notice that the sides of the valve are inset. The live steam is fed from above into the valve chamber at the front end. (Actuator Rod) If the D-valve is offset via the reverser lever, the steam also flows into one or the other of the exposed ports. The live steam travels from one end of the valve chamber to the other via those inset slots.



VL03 – Fireman Sakkie Kekana is patiently lapping that D-valve block against a salvaged ex-Millsite machining plate with very fine wet-abrasive papers and cutting oil. He was using the correct gentle circular motion to avoid cutting a straight grain into the surface.

For the D-valve block, he got away with holding the paper down by hand, but when he started lapping the port plate (visible to the left) he had to set up a pair G-clamps and cross bars as a paper stretcher.



VL04 – At the dynamo-cluttered bench right next door to Sakkie, Shaun Ackerman managed to cut out two almost identical new gaskets. Unusually, he used a Stanley knife for the entire job rather than a ball peen hammer to punch out the outlines for the holes.

The valve chamber cover flanges are a bit too thin for whacking, and the threaded spinney of six long studs upon which the valve is bolted down to the cylinder body, obstruct the hammer strokes.



VL05 – A lapped D-valve block (upside down) and a lapped port plate await the tender attentions of Michael Thiel. The center port is the exhaust. Steam is fed into the chamber and through into one end of the actuator cylinder through one of the exposed narrow slots if the D-valve is offset. The recess in the D-valve 'cups' and links the opposite end's port to the center exhaust port. The movement of the actuator piston pushes out the warm, moist air and steam condensate from the idle side of the piston as it is driven by the live steam entering the opposite end of the cylinder.



VL06 – Sakkie Kekana lapped in the port plate using a pair G-clamps and bars to hold the paper out stretched. He is correctly lapping the port plate primarily 90 degrees to the ports so that the straight grain of the cut surface does not connect two of the ports together.



VL07 – Michael Thiel performs a valve spool pedicure with careful application of a wide, fine grained file. He has withdrawn the spool further back than it will ever go in steam and is touching-up the rough, nicked length of the spool rod that slides within the gland. Any roughness here frays and grinds away the gland packing and results in steam leaks after only one or two trips.

Note the D-valve block has been incidentally been placed in a realistic operating position on top of the port plate to the right.



VL08 – A view of the assembled reverser assembly on a previous date. The actuator (Power) cylinder is the red one. The steam inlet pipe is the sharply angled copper pipe seen above the valve, while the piped exhaust exits from the center of the cylinder casting. It is routed via a cast duct from under the valve body, and the piped exhaust steam is discharged within the ash pan. (To reduce danger of scalds from sudden jets of exhaust steam and to reduce interference with the forward vision of the crew in the cab.)

Upon reassembly and testing under steam, the Reverser's fault remained extant with very little difference and much disappointment. During the week the whole reverser actuator cylinder and the valves were stripped down, to check the rings and to double check the assembly. Something had been missed somewhere... The actuator's piston rings weren't in good shape but that still didn't explain the constant blowing, overshooting, creeping and refusal to auto-stop.

After careful measuring, the D-valve block was found to be marginally too short in the long axis and would tend to leave one of the intake ports slightly open. When dismantled and on the bench, the D-valve block was sufficient to cover both of the actuator intake ports and leave the central exhaust port cupped and sealed. But when assembled and operated under steam, the lost motion caused by the necessary play in the reverser rods and indexing linkages meant that the D-valve would never travel quite far enough to cover one port or the other. Basically, the cylinder was always 'live' and under pressure on one side or the other. Although the locking cylinder and the cataract valve is working – it is not designed to hold a LIVE actuator cylinder's piston rod, and hence the valve gear, in one position for sustained time periods. Normally, when the reverser and the index rods line up as the valve gear reaches the desired setting, the steam supply is cut off to the actuator cylinder at the same time that the cataract valve closes and locks the motion with oil trapped on both sides.

Thus, the reverser would be constantly trying to creep to one side or the other depending upon the last relative movement of the indexing links. The reduced flow of steam was enough to sneak past the worn rings and hence the constant annoying blowing of the reverser's exhaust within the ash pan. Shaun Ackerman machined a brand new D-valve block from scratch – 1.5mm longer than the original and this has solved the creeping and indexing problem.

In the process he machined a brand new valve spool and welded on the clevis yoke cut off from the old unit. Even an experienced fitter like Michael Thiel can only do so much to file and dress a deeply pitted shaft. He was unable to smooth out the all pits without altering the shaft profile or making it out of round. So now Lyndie Lou has a new valve spool to go with the new D-valve block. The reverser glands, a frequent weak point on SAR locomotives, should last much longer between servicing and packing replacement intervals.

A second set of gaskets was made, and the six valve-body studs were cleaned and individually had their threads straightened and re-cut. Naturally, they were 'copper-slipped' on reassembly – as per all steam, heat or water exposed fasteners.

PROJECT : GMAM No.4079 'Lyndie Lou' – Drop Grate Repair :

The three rows of moving firebars (operated by the Grate Shaker) and the manually operated drop grates on most South African locomotives are held in place by a pair of chorded circular pins dropped into a corresponding slot at either end. The grates are inserted rotated at 90 degrees and then rotated in their slots to lock them in. An end view of that chorded pin is like a clock dial cut in a straight line between 10 and 2 o'clock. The diameter of the circular pin (between 3 and 9 o'clock) is wider than the slot in which the chorded section fits. (6 o'clock – line between 10 and 2) Then a robust, tapered grate finger is fitted in from the top and coupled to the linkages below. If the ends of the chorded slots in the runners are worn at the 10 and 2 o'clock positions, they become semi-circular and the firebars or grates can now lift vertically. The resultant force from the linkages may lift the grate or firebar right out of the firebed.

A frequent complaint while servicing the Sandstone Heritage Trust's GMAM Garratt was that the drop grate would sometimes disengage from its hinge slots in the runner bars and tend to lift up from the firebed upon an attempted closure. It would then jam in the grate and be unable to close – resulting in a holed fire right at the tube plate. It's a problem that can be 'fixed' from within the cab by pushing or pulling the 'dislocated' drop grate with the fire slicer, while simultaneously operating the drop-grate lever. The dislocated grate would then slide and the side pins drop back into their worn slots. It was tending to lift on the left side, because the linkages are offset to the left and not through the center as you might expect. (The drop grate lever is on the left side of the cab floor – fireman's side.)

Dawie Viljoen was tasked to fabricate a simple keeper bar for the side pins to slot into on the left hand side. Basically his task was to bridge the worn slot to stop the hinge pin from rising. He got really cozy in that firebox and used a cut down bolt to form a totally enclosed hole for the hinge pin on the left side of the grate. (It's called a 'keep'.) Andreas and myself reinstalled the grate and put the linkages back together again – although he did the ash pan based work, being slim enough to climb up comfortably under the locomotive and literally stand within the ash pan chute.



DG01 – Cosily ensconced in the left front corner of the firebox, Dawie Viljoen is using a portable inverter welder to build up the tack welds on either side of a cut-down bolt being welded in to close the left hinge slot. Because the bolt protrudes into the active fire space, it needs substantial welds for strength and also for heat conductivity.



DG02 – With his welding mask still on, Dawie is tapping scale from the new welds. It is a bit surprising that a big locomotive such as the GMAM Garratt only has one grate through which to shovel the detritus of the coal fire.



DG03 – A close-up of the welding. The dark cylinder is the cut down shank of a bolt being used to bridge the worn chorded slot, as a 'keep'. Dawie had fun clamping that bolt to get the job started with a tack weld! You can see a chorded hinge pin riding in a slot just to the top right of the wire, and another just to the right of the threaded end of that bolt.

On the right hand pin you can see the rust coloured 10 and 2 o'clock sections of the chorded hole in which the pin rotates.



DG04 – A flop grate instead of a drop grate. Andreas and I have just wired the firebox for light and muscled the heavy grate through the firebox doors without dropping and cracking it. (it is made from cast iron cast into moulds and is brittle.) With the linkages uncoupled, it just pathetically hangs vertically within its slot.

That figure-of-eight shape in the foreground is the top, wider end of the triangular grate fingers which pin the individual firebars to the steam-driven reciprocating linkage beneath.



DG05 – This is a deep firebox but thankfully has a flattish ascending stoker tunnel outside on the cab floor. That of the 25NC has more protrusion from the floor (30 degrees) and the mechanically stoked 15F is a tummy-down deflated-chest wriggle job (and don't snag your belt buckle) with the 45 degree ascending stoker tunnel to roll over once you get outside. Ouch. Or you can crawl out on your hands and support your body weight in a prolonged press-up while trying to get your legs out.

Here, Andreas Mathee wriggles out the firebox to get out and get under the locomotive to enter the ash chute. I've snapped him in the hardest and most painful stage when the feet have left the grate, the spreader's vanes are digging into both gluteus maximi and you're relying entirely on your arms to lift your back up from the gouging vanes of the spreader plate and the canted cover plate for the deflector pins.

Note the white coloured refractory material that protects the underside of the stoker's spreader plate.



DG06 – Andreas Mathee has arrived under the ash chute and is about to unfold himself to enter the chute. He's pushing the somewhat sticky ash pan door backwards onto its slides. The door later got a bit of a service by cleaning and wire-brushing the slides and the steel doughnuts that do duty as primitive wheels.

We didn't realize until afterwards that we'd violated a safety rule - someone could have closed the slide onto Andreas within in the chute and with me inside the firebox not realising what was happening. (Until he starts yelling up through the grates, of course.) However, those that have worked on locomotives for a while begin to develop a sense of checking who's underneath or within before operating linkages and devices.

Unless in case of emergency, it is considered to be very bad manners to alter the controls and settings of another man's locomotive, whether it is in steam or just standing cold in an active workshop.



DG07 – The drop grate linkage went together easily enough – notice that the grate (op left) doesn't have a separate finger like the firebars do. Here, after fetching Andreas some fencing pliers and a ball peen hammer, I sneaked a shot in through the side-flaps before chasing down a set of washers.

The firebar were awkward to reconnect as links wouldn't line up with the plates having been rocked against their neighbours by people walking on top of them.



DG08 – Andreas Mathee looks a lot more cheerful (and dirty) as the grate shaker's pin goes home though the linkages and through the grate shaker finger. Now he's ready for some of those washers to build up the bolt to the split pin axis. We used six out of an assortment of 12 washers to take up the clearance between the link pin and the split pin that holds everything together.

The drop-in tapered grate shaker fingers are prominent underneath in the front row of firebars.



PROJECT : GMAM No.4079 'Lyndie Lou' – Axle Horn Lube Pipe :

The undercarriage of Mrs. Lou of the Lyndie is garlanded with copper lubrication pipes like the tinsel of a department store Christmas tree. And sometimes those pipes go astray if they spring out of loosened clamps or were perhaps poorly fitted under tension or compression in the first place.

A rather convoluted pipe for a driver axle horn had to be removed. During locomotive roadworthy inspection it was noticed that the horn bearings were always dry on the affected axle. (Yes ... we actually do check for lubrication.) 'Smudge' Ackerman kept his eye on that axle while he had Sakkie turn over the mechanical oil pump by hand. They suspected a blocked or disconnected oil feed pipe, or perhaps a pipe that had gotten badly kinked somewhere. It didn't look good as no oil was coming out, although the other axle horns were getting anointed and the valve motion getting positively slathered. Shaun was expecting a strip down and chase job when a blob of fresh oil suddenly splatted on the front valance of his brain cover. He looked up and got more oil drips onto his bristly dial. The pipe was leaking oil from along its length. It turns out the pipe had shifted after all and was being ground down against the back of the wheel. The pipe was removed in one piece but with extra bends along its length and now needs to be cut and spliced.

The pipe was spliced with a barrel into which the two fresh ends were be fitted and brazed, rather than trying to braze the two cut-back ends together.

The affected wheel was the right hand trailing driver for the rear unit. As locomotive driver axles are always numbered from the cylinder end, and the rear engine unit of a Garratt faces opposite to the conventional smoke box \ water tank forward direction of motion, the axles on the rear unit are numbered backwards. On the GMAM it goes Leading Driver ; Intermediate Driver ; Main Driver (with the crank) and then the Trailing driver. On the articulated rear unit, the 'Trailing Driver Axle' is the driving axle closest to the rear of the ash pan.



OP01 – The removed oil pipe, doubled up, takes up two lengths of the forge work bench. It is going to take patience to replace this pipe, bending and relaxing the copper so it isn't under pressure or tension when in place and the various brackets and clamps are screwed down.



OP02 – The ground down section of the axle horn oil feed pipe makes a real life cross sectional view – complete with oil residue still inside the bore. It got twisted like this upon removal.

PROJECT : GMAM No.4079 'Lyndie Lou' – Water Transfer Pipe Relocation :

An unusual problem had become apparent on the water transfer pipe on the left side of the articulated front engine unit. The GMAM Garratt has a 2 ½ inch pipe running under either side of the water tank on the front engine unit. The pipes run from the pair of built in water transfer couplings in the buffer beam and right along the length of the engine unit. At the rear end of the front engine unit (towards the middle of the locomotive), the pipe is connected to a flexible pipe, which is connected to a water transfer pipe that runs the full length under the boiler. There 'is a tee fitting on either side under the water tank, and another tee fitted and a cross piece to feed the water to the pair of injector water valves. The pipe continues right to the rear of the boiler unit, right under the cab, loops through another flexible section and on through under the coal bunker to the rear water transfer couplings in the rear buffer beam. The injectors can be fed from all or any of the two water bunker valves and/or the four buffer-end transfer valves.

Naturally it is a pipe and pipes tend to be rather static devices – at least, on other machines apart from a steam locomotive! Where this pipe horizontally ducks in from the outside of the chassis to bridge over the wheels and run forward between the cylinders towards the buffer beam, it crosses over the mountings for the upper cross head guide for the left cylinder. In those mountings are a pair of brass elbows which terminate two small bore copper pipes from the lubrication system. They feed lubricating oil through to the crosshead slipper. The big water transfer pipe was found to actually be in contact with the rear elbow and with the constant vibration of the pipe was actually chewing up the softer brass of the lubrication elbow. This was leading to a critical lubrication failure.

A more noticeable problem on the left hand water pipe was a clamp next to the tee-piece for the water tank. Water was constantly leaking from that clamp, no matter how tight the bolts were done up. And there shouldn't have been a joint under there anyway. Not only does the water leak look unprofessional and waste precious water – it allows air in on the suction side of the injectors and makes them erratic.

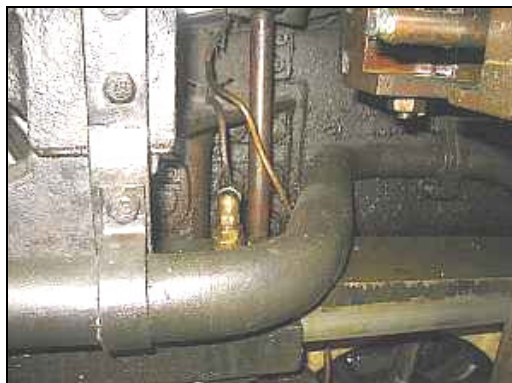
Patrick Ackerman was put onto the job of taking the entire (rather long) pipe off and cutting-and-shutting a section out of the buffer beam end to move the inward sweep forward and clear from the cross head slipper lubrication elbow. At the same time he would be able to open that dripping clamp and see what sort of leak we had.



WT00 – Here is the problem.

This is the section when the water transfer pipe sweeps inward from the outside of the frames to pass over the slide bars and behind the valve chest – the rear of the unit is to the right. You can see how the swept section of the pipe is contacting and gradually wearing away the brass union.

That vertical pipe in front of the wrench's jaws is the discharge pipe for the leading driver axle's sander – and it has been placed in the wrong position. This whole set up is some poor fitting – perhaps the water pipe originally came from a different locomotive when No.4079 was repaired after an accident back on the Randfontein Estates Gold Mine in her previous life.



WT01 – Here, by contrast, is the properly mounted water pipe on the other side (front of loco to the right)

Note the pipe does not contact the brass lubrication elbow and the vertical discharge pipe for the sanders is mounted vertically and is also efficiently straight. (ie : less prone to blockage.)



WT02 – An ever-optimistic Patrick tried to undo the pipe flange bolts in a civilized manner – fat chance boyo! Here he is resorting to grinding off the two bolts. The black painted water transfer pipe can be clearly seen in front of the wheels and where it connects to a flexible pipe that leads to the boiler section. The angled tee-section that leads from the water tank is visible above the nucleus of sparks.



WT03 – After the bolts were cut through, the flange is supported with a pin. It's the left side of that pipe that is to be removed. The tee piece and the water tank's valve is quite obvious here.



WT04 – The camera flash makes this seem like a fairly pleasant place to work, instead of the cramped, oily, dark dredge-hole it really is.

This is the coupling of the flexible section of the sanding pipe to the outlet flange of the sanding valve casting. The pipe had to be withdrawn and will need to have its bracket remodelled to line it up correctly BEHIND the water transfer pipe.



WT05 – It would be vital to measure the distance between the pipe, its planned new position and the rearmost position of the combination lever. This meant the big fat lassie would have to be moved to shift the valves and she's a tad too porky to use pinch bars. Luckily the Hunslet Taylor was right in front, on the reception track and it wasn't too much effort to get Attie to fire it up, back up to the GMAM and pull her backwards a little to shift the valves.

Patrick's funny hand positions are the outbound mid-position of his back-up signals – he's not wriggling bracelets away from his wrists.



WT06 – Unless one uses a trans-dimensional machine, it is not possible to have the combination lever and the water transfer pipe occupy the same spatial coordinates. Here the combination lever (canted vertical bar) is in its rearmost part of the stroke and the valve gear has been jimmied over by hand too, to get the radius rod (upper horizontal bar) in its lowest and rearmost position..

As you can see the black water pipe can be moved forward only about it's diameter's thickness, about 2 inches for safety's sake. (Our locomotives are time machines, not translative spatial converters.)



WT07 – The pipe pops off (not) once the bolts to the front pipe (copper) have been removed. It was easy to withdraw once unbolted.



WT08 – The constant leak under the pipe clamp turned out to be a section of pipe that had thinned with corrosion and then crushed and split in a straight line under repeated over-tightening. This whole section was cut out right up to the flange and discarded.

No wonder those injectors were gulping air and having hiccups!



WT09 – Pipe charmer. Patrick clamps the aggressively rearing pipe into the chain pipe camp. Of interest is the ground out line visible being the front flange. Patrick would cut the section off at this point, remove the remnants of the pipe from the flange casting and then put the flange casting back onto the cut off neck. This of course makes the neck shorter and the whole pipe would move forward.



WWT10 – The waste pipe is cut off flush with the bolttable flange casting. Patrick isn't just cutting through the pipe, he is actually carefully grinding off the collar welds that physically attach the flange casting to the pipe – hence the canted angle of the grinder.



WT11 – A whole lot of grinding and a cup of tea later, Patrick is left with a ring of pipe wall left within the flange casting. It was originally expended into position before welding. To release the tension, Patrick cut through the pipe wall at 6 o'clock (you can see the slot) – the width of the saw-cut providing enough room for the ends to shift inwards. In the photo he is knocking the ring out with a cold chisel.



WT12 – When the pipe wall came out, Patrick cleaned and chamfered the pipe collar at both faces and then tapped it onto the cut back pipe neck. (pre-ground to bare metal.)

What was very tricky with this job was that he had to get the bolt holes exactly in line with those at the other end of that long s-bend pipe as the bolts must be vertical to each other when mounted on the engine.



WT13 – Here's a test fit of the tapped together but unwelded front end going together, the bared steel shining in the gloom behind the cylinders. Note how the pipe has shifted forward from the brass elbow. (Compare to Pic WT01) In fact, the water pipe now occupies the space where the sanding pipe was originally routed, and now the sanding pipe can be routed correctly and straighter behind the water pipe.



WT14 – A G-clamp attached to the expansion link was used to support the loose long tail at the opposite end while Patrick was checking the alignment and sizes before committing himself to welding. James is stopping the pipe from rolling off while holding the spring and end cap of the 25NC dynamo governor in his left mitt.

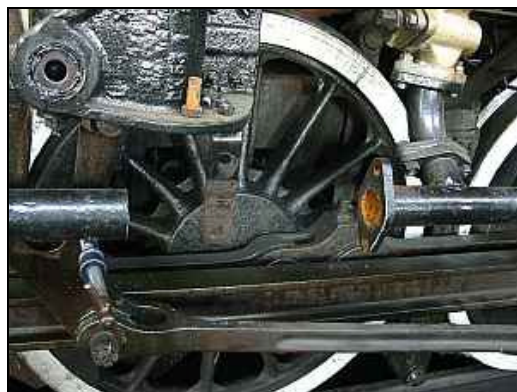
James was also calling out the alignment of the bolt holes.



Wt15 – Satisfied with the positioning and alignment, of the flange casting, Patrick commits to melting and fusing some mild steel, both on the inside surface and around the rim of the flange. This double welded pipe ain't going no-where!



WT16 – The bread slicer made short work of the end of that pipe!



WT17 – With the pipe section cut away, this looks like a cut-away view to show the beautifully spoked wheel. Notice the alignment of the rods at TDC.



WT18 – After scrap pipe was sourced and cut to size, the routine changed a bit. Here a cheerful looking Patrick is expanding the pipe into the flange casting before doing his welding. The chain vice was a bit baulky but this job was simple with plenty of clearance and leverage.

That's Oom Attie de Necker standing in the background with the surprisingly serious face that he shows when not talking to others – and he's one of the most cheerful and sociable people we have at the depot.



WT19 – Here's a view of the pipe end before welding, the bright exposed steel of the expanded pipe visible within the flange casting. As this is a straight section of pipe, Patrick didn't have to worry about alignment until welding the pipes together – no tedious knocking and tapping to get the flanges straight.

The welded pipe fitted first time and was painted black as per the original by the end of the working day. The front bracket, however, was fitted with padding.

DEPOT WORK : Setting up GMAM No.4079 'Lyndie Lou' for a run : (24 Jan)



GR01 – GMAM No.4079 'smokes it up in the Top Shed – all alone without an adoring crowd, and only one camera shutter click. (Mine – and even that click is digitally simulated.)

Even us Reefsteamers sometimes tend to take the sights, sounds and smells of a fired up, live steam locomotive for granted. Although the fact that we were all quite busy with our assigned Depot Day Jobs at 10am this morning might have something to do with it. Lyndie Lou is actually not unattended – Rostered Fire Lighter and Fireman Andre van Dyk is actually standing out of frame at the forge vice off to the right.



GR02 – From a camera settings point of view, the depot is a nasty place for photography – indifferently lit interiors contrasting with bright South African sunlight streaming in from locomotive sized entrances and endless rows of windows – resulting on odd exposures. The discharge lighting gives a flat green cast to the subject in the evenings.

This was an over exposed photo backwards along the GMAM's boiler top – but I was interested in the way the smoke acted as sunglasses and the over-exposed outside scenery is visible within the smoke plume.



GR03 – For some reason, the plant draft seemed insufficient and the fire was coughing and tending to blow back into the cab. I'm sure Andre van Dyk lost some of his generous boer-pelt of arm hairs. The 'Spoores' call this 'burning the cab' and the smoke and heat creates deposits on the interior fittings and the brass oxidizes with a dulled layer that is reluctant to shift.

We had just switched over to a second air supply and it was marginally better. The hiss from the chimney stack was louder and sharper anyway. Here the newly spread and hot fire is still smoking with the plant air full on. (Door opened for photography.)



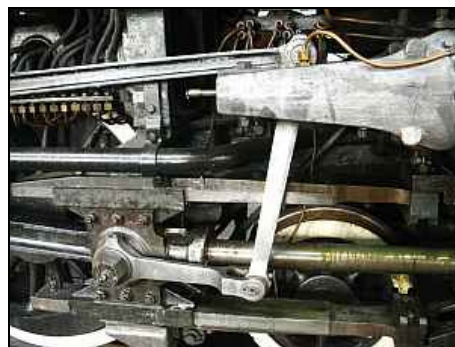
GR04 – This glistening green liberation looks messy but is actually good practice. You are looking at a generous helping of fresh steam oil applied to a piston rod and drizzled onto the lower crosshead slide. Yummy-yum!

The GMAM (Like our Class 25NC) has mechanical lubrication which needs to be primed by manually turning the pump before the oil lines fill up and discharge at the nozzle. This smear is a backup for the first few strokes as even a primed oil distribution system tends to have the discharge sections of the pipe tend to drip-it-self empty while the loco standing for prep and steam raising.



GR05 – This is Lyndie Lou's rather scabrous left front Combination Lever (Vertical) and Union Link (Horizontal) The GMAM's valve motion had been painted in black during Rovos Rail service (As was her pipe work on the boiler). While painted parts are easier to keep looking clean and it hides the hammer dents of generations of impatient SAR fitters, it is actually bad practice as the coating of paint may hide a fatigue crack. Aggregations of paint in crevices may make a loose fastener appear to be tight during the roadworthy inspection, only to have the fitting work loose during a run.

Chemical paint stripper had been applied to the GMAM's valve motion on the previous day, but not cleaned off yet, and thus she took this run looking rather scruffy about the wheels.



GR06 – This is more like it! The left Combination Lever and the Union Link on the rear engine unit have been beautifully polished, although the Radius Rod (upper left) is still looking scabby.

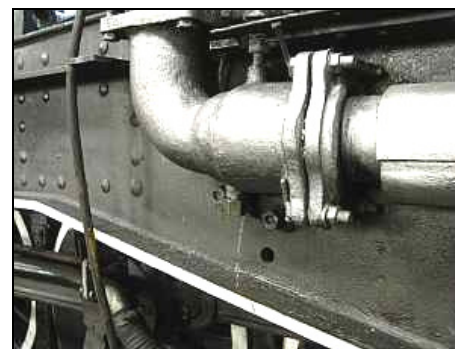
Polished loco parts get fouled quickly with the oils and grease, especially on the mechanically lubricated engines. But with regular cleaning, and the use of hot water and degreasing agents, the oil comes off. But if it is left in place, it stains the metal with a sticky brown patina and then only laborious wire brushing and abrasive papers will get the muck off.

It is common practice to wipe the linkages down with fresh MH oil before a run and after abrasive cleaning like this as the exposed steel rusts literally within a few hours of exposure to moisture.



GR07 – Andre van Dyk timed his fire spreading well with a hot biscuit of a fire casting a beautifully even glow through into the entire ash pan. This thin fire generated much heat and it was surprising how quickly that massive boiler picked up steam – the safeties lifting during our noontime chicken curry al'a van Dyk.

Unless the fireman has to pack fuel for some coming hard work, you try to extract the most heat from the least amount of coal by firing 'light and bright' as the Spoories call it.



GR08 – The exhaust steam transfer pipes have condensate valves at each end and these have long been troublesome. After a recent service and one replacement the valves are functioning as designed. Here, the left front valve is discharging a stream of water as the locomotive's moist breath is percolating through the still cold cylinders and the steam exhaust piping. (From the rear unit.)

Originally, four steam operated valves were fitted and would be opened from within the cab, or by levering the external linkages.



GR09 – The squared off articulated bulk trundles sleepily out to the Reception Track with a minimum of cylinder cock condensate steam on this warm Saturday afternoon. The people in the background are not admirers, but displaced workers from the S&B van that was previously occupying this track. It reminded me of a kicked ant-hill.



GR10 – Fire cleaning is about to commence. In the foreground, ant-hill evictee Willie Wehmeyer doesn't waste a moment admiring steam locomotives and continues to inspect a full width plywood patch for the S&B Van's front vestibule floor. (The flooring gang have been working to a tight deadline.)



GR11 – A closer view of the rear buffer beam and one of the two cow punchers. The two new black-painted water transfer couplings are going to be used for the first time with a tank car. Even on a short trip like this, the water in the front unit's tank is primarily used for ballast (for adhesion) and not as an actual water supply.

Notice that this engine doesn't have conventional front steps. One has to climb up by using the little tread shelf at the top corners of the cow catcher, and using the vertical stanchions as a hand-hold to pull yourself up.



GR12 – Some rather ranky injector discharge issues forth as the water valves for both injectors have been opened to allow them to discharge under gravity.

This was done to clear out the water transfer lines and sediment within the front unit's tank. Loco fire lighting is normally done on a ½ full boiler to save time and often the boiler is then not topped up until the locomotive is moved for the first time. The general practice is to top up the boiler to full before cleaning out the fire, and then allow the water level to drop to the 'road height' for the coming work.



GR13 – That's better! The sediments and rust have cleared out and the water is running free and clear through those injectors.



GR14 – Patrick's water transfer pipe modification has shifted a leak about five inches to the rear. Instead of leaking at the clamp where the rusted pipe had been crushed by over-tightening, the pipe now leaks at the two-bolt flange. It turns out that the gasket material is too thin for the alignment for the alignment and it will be replaced with thicker material for the first Magaliesburg Run of the season.



GR15 – Ackerman 'Slightly Junior' attempts to tighten up that leaking joint but with little effect. By nature he is a perfectionist with his work, taking time and delivering correspondingly consistent good results – but also having a good sense of balance between perfectionism and delivery. He was annoyed at this obvious leak but didn't over-tighten those bolts to try to eliminate it.

The leak isn't just a cosmetic issue or a waste of water. It allows an operating Gifford injector to suck in air with its water supply. The air bubbles expand within the vacuum created by the steam condensing within the water flow, and destroys the vacuum. The injector hiccups and the cones may even 'drop out' from play altogether.

By the following week – the leak stopped on its own – sediments plugging the gap. Patrick is still going to re-fit thicker gaskets though.



GR16 – 'Danny Duck' Cubitt shows a phenomenon that we often see with kids with steam locomotives in the vicinity. Even adults with supposedly (and assumed) normal hearing gradually lose their high frequency hearing perception. Kids have canine-like hearing in contrast and we often see them plugging their ears in auditory self defence when a locomotive is hissing, or the safeties blowing off, while the adults aren't distressed.

This little guy was under auditory distress at the grate shaker exhaust – those safety valves are MUCH louder!



GR17 – Even in broad day light, the inferno glow of the falling coals, clinkers and hot ash is obvious. The GMAM firebox is hard to clean with a typical ash rake because of the closed sections in the air-flaps at the front (left) and especially at the rear. But a hockey-stick ended pricker bar works well and the angle of the ash pan is sufficient for hose water to do the job too.



GR18 – Dianna Sanderson becomes Diana Steamerson as she gets her epidermis moistly cooked. This is the second wave of the fire cleaning. The front of the fire is cleaned first with the coals at the rear retained. Then the fire is stoked and moved on the grate to allow for cleaning at the rear. In the second wave – more hot coals tend to be dropped hence the ash-pan Vesuvius that you see here.



GR19 – Dysie Sanderson gets a few tips from vintage steamer Frans van Dyk. Frans was instructing her to be careful not to allow the ash pan cooling water to contact the hot firebars for the risk of cracking them from local thermal contraction. The low mounted ash pan with the full length side-grates makes this easy to do.



GR20 – To clear the Reception Track for the locomotive preparation, the S&B Van had to be shunted out and alongside. Here the van, properly wearing the end of train marker, waits for the locomotive crew to finish their business so its own crew can get on with installing the plywood sheets for the new flooring.



GR21 – The African people generally aren't really into industrial, military, architectural or transport heritage, being more interested in preserving tribal heritage and of political history. Some are even antipathic towards this kind of preservation, seeing it a 'Eurocentric', 'Colonial' or as an unnecessary luxury in a hard-scrabble existence.

In this post apartheid country, a subtle struggle we Reefsteamers face to let people know, especially those who were subject to the rigours of apartheid, that we preserve these machines on behalf of ALL who call South Africa home and for EVERYONE to enjoy and experience.

These prejudices aside, Mark 'Weed Eater' Berry was quite pleased that the young men within his gardening service team got to see a real live locomotive in steam – and they were all proudly posing at the buffers for the cell phone cameras.



GR22 – A busy scene as the final steam raising is done under a classically columbus cloud-cluttered (say that fast!) Highveld summer's sky. Some shunting would be required as the GMAM has to pass down the Crossover Track where the diesel (and the S&B Van) are currently standing, to pick up the auxiliary water tank.

The Diesel and the S&B van needs to be retuned to the Reception Track for proximity to electrical power so the flooring and door repair work can continue/



GR21 – Facing 180 degrees from the previous picture.

The GMAM has backed up alongside the old forge house, the scrap metal heap and the sleeper pile. This area has since been tidied up as sleepers piled close to the track like this are frequent causes of bent steps and injector overflow pipes.

The Garratt, being a long and articulated locomotive, with centrally mounted injectors and no side steps, is the most tolerant of all our locomotives in terms of line-side obstacles.



GR22 – Does a moving 'light loco' count?

The little green critter and the S&B van are back in the reception track and now No.4079 'Lyndie Lou' can move forward from alongside the forge house, clacking over the face-to-face points and in the crossover track. A Garratt is technically double ended – but this GMAM is conveniently facing the right direction for the loaded run to Boksburg East.



GR23 – Having run forward alongside the Top Shed (The old boiler workshop) and under the water tower, GMAM No.4079 'Lyndie Lou' now backs in carefully on the number one road to pick up her auxiliary tanker.

As in keeping with Reefsteamers practice, this green painted locomotive remains un-adorned. But note the relatively new oval 'Sandstone Heritage Trust' sticker on the coal bunker.



GR24 – Backed up and coupled to the water tanker. We're slightly ahead of schedule but the tanker is still being filled up with its 30 000 litres of water. The water tower could have been used but the crossover track was kept clear because of all the coach shunting moves performed that morning.

Incidentally, that is a brand new fire hose in use – quite a pleasure filling up locos and tankers without being sprayed with mischievously random water jets and wondering when the nozzle will drop off.



GR25 – We've become a little more confident with the coal consumption of this large machine and here is a sight you rarely see – a GMAM Garratt's coal bunker only 1/3 full before a new trip. Clearly visible to the right is the inset section which contains the coal doors and the hinged shovel plate. When firing by hand, the crew members have to take at least one step between the firebox doors and the shovel plate, and thrust their shovel deep within those narrow, articulated confines.

This pic and the ones following were taken from the top of the water tower.



GR26 – Here is a high level view of the triple safety valves and the split turret valve manifold arrangement with its characteristic lagged pipes. You can also see some of the lime deposits from the safety valve discharge.

As in most SAR locomotives, the whistle is horizontally mounted and is visible as a drum shape at 10 o'clock from the rearmost safety valve.



GR27 – The great train race? With the GMAM Garratt's water tanker topping up and the S&B Van in place for flooring work and safely chocked, Attie de Necker fired up 'The Little Green Critter' and tidied up the leftover Shongololo coaches back into their rented home tracks again.

End Piece : Light for the Fight :



EP01 – GMAM in the mist. Read my thoughts below.

A week after the work and the short Saturday afternoon run described in this report, I was put onto Loco Minding duty for the first Magaliesburg run of the season. This romp would be co-starring a certain rather large green machine. (Surprised? Didn't think so!) The duty hours went well except for when I tried to tighten up a non-existent cab roof light bulb on the fireman's side. Not watching what I was doing, I poked my fingers into the empty conduit head instead – the live exposed brass wiring terminals shorted out and stalled the dynamo. A good job that it is only 32 volts or I would have been beautifully electrocuted!

Oddly, it didn't blow the old fashioned open-span fuse-wire fuses in their compartment to the right of the headlight switch, and when steam pressure had built up to about 750kPA after going down to 550kPA while filling up the boiler from just under an inch of water showing in the glasses, the steam-turbine driven dynamo started up on its own. As stated previously I always run a locomotive dynamo with either the headlamp or the tender's backup lamps burning to put a load on the stator windings and drop the voltage a bit. Hence, the photo you see above. Running on an electrically loaded dynamo renders the cab lights less likely to fuse during the night.



The new 'Top Shed' internal water connection to the water tower works a treat – high pressure and high volume. I wasted quite a bit of water this night with the tanker overflowing in the Top Shed. Even Shaun Ackerman got caught out, as the hose that he had rigged up in the tank car's neck slipped out from under the lid with the more forceful jet. It flopped down by the tanker and writhed like a seriously pissed off serpent. Luckily I was in the right hand stall of the ablution block and had just opened up the tackle box and lifted the lid, when I heard a pulsing hiss, some slithering sounds and a strange erratic metallic boinking noise – it turned out to be the writhing hose whipping against the ground staff's steel cloak cabinets. For someone as slow, stiff legged and as clumsy as I usually am, I moved andrenically quickly and managed to stomp that hose on its neck as it writhed back along the steps in preparation for another watery strike. I was actually quite pleased with myself and even took the time to zip up again as I trudged through the puddles, with the hose spraying into the pit, to turn the water off before putting it back into the tank car.

I had under-estimated the volume of coal required for the banked fire and had to do a double layered spreading and stoking in the morning, but I had a piping hot locomotive at 1200kPA and a nice even glowing fire bed waiting for a nervous fireman Dawie Viljoen when he came on duty at 4:30am, half an hour earlier than his rostered time. (This would be Dawie's first mainline fireman duty on the GMAM.) And Shaun 'Smudge' Ackerman, who was also up early having given up on trying to share his cru-booze compartment with steam depot sized mosquitoes, wasn't TOO sarcastic at the length of time that I ran the mechanical stoker. In spite of her size, Uncle Wilfred's GMAM is a fairly easy loco to look after at standstill, regularly picking up steam pressure from a surprisingly small fire. She was perky all morning and rather than have the safety valves screaming, I dumped some steam through the left blow down valve – at half cock as not to blow the depot windows in!

Ah yes, the GMAM Garratt – 180 tons of fun.

But onto something more serious...

Something that enlivened the night was a bank of mist that came stealthily across the depot at 3am – it was eerie and other worldly walking amongst the well known depot and seeing the grey-shrouded outlines of the coaches and vehicles looming up from the opaque night. The depot lights had a strange cast to them and I couldn't resist spinning up the GMAM's dynamo and switching the headlamp on to see what sort of headlight beam effects I would get. (I normally do loco minding by torchlight.)

Seeing the resulting headlight beam reminded me of comments made by one Albie Bester. Albie is a long distance supporter of Reefsteamers, an elderly fellow who was employed many years ago at that great cathedral of South African steam, the Salt River Workshops. He has memories of the conversion of the Condensers to 25NC, and also of the modifications and early testing of the Red Devil. He is a very enthusiastic supporter of Reefsteamers, and of steam preservationists in general and was quite complimentary of my work and of the marketing work of our Les Smith.

Albie used the following expression as a compliment:

Hi Lee, with all the good wishes you cannot but have a successful year.

You can even try this one, which I found in one of my old note books:

THE HEAD LIGHT ATTRACTS ATTENTION BUT THE UNSEEN ENGINE DOES THE WORK.

Your pick, partner, what you would like to be. A bit heavy to be both in your position so I would rather leave the choice to you. Some more the next time round.

My daughter arrived in Jeddah but one suitcase is still somewhere on O.R.TAMBO
Albie

I got to thinking about that – are Marketing Manager, Les Smith n' little me the typical SAR style pair of sealed beams in the attention-attracting locomotive headlight with the rest of the Reefsteamers gang laboring unseen and powering the preservation? It's a nice analogy but I believe to be somewhat inadequate. Les Smith with his Marketing and me with the Web Site and my publications highlight Reefsteamers and not so much the way ahead to which Reefsteamer sis moving. If we absolutely have to be compared to train lights – I'd say Les would be the coach center-strip lights – providing light for the public and easing their way, while I would be the locomotive cab lights, making the hardworking crew and their fascinating actions and rituals visible to the spectator. But in a way, that is still inadequate. When last did anyone see a photo of Les, or of me – as we both highlight the activities of Reefsteamers and yet remain unseen behind the camera and besides the fax machine.

It's not about Les or me at all.



Albie is spot on with the unseen engine analogy though. As I sat on the concrete retaining wall next to the articulated coach hotel, and admiring the mighty machine simmering away in the strangely stilled air, I got to thinking of the amazing range of interesting people involved in getting 28-wheelered 'Lyndie Lou' to where she is today. (Being a Brit In Exile, I inherently enjoy cool, damp weather.) The GMAM Garratt was standing proud with dew drops glistening on the tank and the bunker, whips of steam flirting alongside the boiler, flames just turning blue on the banked coal in the firebox and the dynamo whirring while powering that beaming headlamp – when this particular GMAM should have been scrapped and the torched off chunks melted down into obscurity long ago. The locomotive's owner, Wilfred Mole, must always get the initial credit – as a businessman like farmer with a duty toward heritage, purchasing the machine from a gold mine to rescue it from scrapping.

And just what does someone who, contrary to popular belief, is not really a steam train enthusiast, do with 180 tons of broken locomotive and no railway workshop?

Wilfred's 100% self funded restoration of the locomotive, his attempts to get the engine into consistent productive work while being expertly taken care of, and his eventual passing of the locomotive into our trust to keep her busy and healthy, are all initial factors in her continued active preservation.

But there are many other parts that make up the unseen engine behind that bright, probing headlight beam. From the Chief Engineer, widely respected for competency, high standards and ingenuity, to the greenest Reefsteamer who doesn't know the difference between a 'gwala' and a 'shifter.' But both with a heart for steam. From the Train Manager who carries the responsibility of those lives on board and speaks the railways lingo, to the newest of the coach controllers. There are the financial people, the logistics management and the rostering clerk, right down to those who commit to feeding the guard dogs and wash the workshop team's hard hats once a week. It's the cheerful photographer who lends a hand, the fellow who brings the biscuits and the fellow who shares his on-train movies. It is the paid staff member who willingly spends a weekend day doing volunteer work, the loco minder who stays up with the engine on a Friday night after work, sometimes accompanied by the already tired fitters when a fault has been newly discovered at the 7:30pm road worthy inspection and they need to get the repairs done before the morning. It's the fireman who takes pride in wiping down his locomotive in the morning, the fitter who climbs into the hot firebox after the fire has been dropped when a fusible plug has begun to fail and he can only breathe with cool compressed air being fed in through the firing hole. It's the fellow who shares his boerewors, the fellow who grinds off the worn graphite paint and the other fellow who takes locomotive parts home to machine them in his own time.

The hypothetical unseen engine is powered by people just as much as coal. These people have a vision and a drive that makes them do what they do to facilitate the survival of the remnants of South African steam. Many of them have probably become familiar faces to you through the depot reports but several you have yet to meet. These people are true preservationists.

The mark of a true steam preservationist, rather than an individual who is merely a 'steam enthusiast', is someone who consistently gives sacrificially of themselves for their cause.

And you can quote me on that.

And the comparing the authority of the two individuals is like comparing the silver painted headlamp on a model train to the real thing at which I was musing, the beam of the powerful double sealed beam headlamp refracted and yet defined by the airbourne mist drops. The sacrifice is the real thing.

The burning headlight is a glimpse into the fires within the hearts of those who make up the unseen engine. Like that misty headlamp beam, true steam preservation is shaped by that special selfless quality that is rarely found in the world today. And in so doing, with a common goal, just like the light is merged and made parallel by the parabolic geometry of that reflector, we diverse people are brought together into one unified, concentrated group – a bunch of very different people gradually become an ever closer knit family.

The preservation of steam in South Africa faces a misty and uncertain future. There are no hard, fast reasons as to why South Steam must be terminated – most of the obstacles set in our way are man made. But as the clinging, creeping mists of apathy, power mongering, prejudice, paranoia, jealousy, and sheer lack of imagination become thicker, so the more obvious and visible our light beam becomes by contrast. It only takes a little filament to make a lot of light in the gathering dark, and we have a lot of them!

We Reefsteamers don't know what the future holds for steam although we hope to haul our weight and bring about a status quo or an expansion and an appreciation for steam traction. Continuing to shed light, as if it were, on the opportunities for international tourism, local and foreign revenue, promoting a special South African brand and hopes for employment and increased opportunities for local communities. We can only take the steps in the time line that we see within the beam of light that we project.

(PTO)



But let me tell you this : to our detractors, to those that think we're nuts, to those that think we're fighting a lost cause and should just fade quietly into the mist shrouded night, to those that criticize our efforts and decisions from the comfort of distance and the shelter of their keyboard, to those that reject the efforts and opportunities offered by people like us because it doesn't go 100% their own way, and to those that deliberately set obstacles across our rails...

Know this ... as long as there is fire in our hearts, a loaded shovel in our hands and tracks laid plain before us, we will not give up.

The darker and thicker the surrounding mist becomes, the brighter, clearer and sharper our headlight beams will be seen to shine and the more local and international respect and admiration we true South African Steam preservationists get. And I don't just mean the Reefsteamers, but others like us around the country. By contrast, the greater the level of condemnation and contempt that will be earned by those that history will eventually judge for hindering the cause, wasting valuable opportunities and through sheer neglect and bureaucratic inaction, letting something beautiful that once belonged to all the people of South Africa ... finally die.

The history books are being written ... that headlamp may one day become an interrogative spot light when questions are asked for the reasons for neglect, failure and a sad waste.

Albie Bester wrote in a subsequent email :

*But if you read reports of Reefsteamers and their successes,
of Steam in Action ---700 members in 12 Months.
of the Friends of the Rail, of the Umgeni Steam Railway, of The Sandstone Estates*

you feel that there are possibilities that our neglected heritage have a future but on one condition-----the different societies will have to fight for every part of the heritage which Transnet is holding without any plans what to do with it, according to the newsletters.

What a pity it is that we do not have a Hendrik Schoeman as Minister and Kobus Loubser, these are General Managers who both had steam in their blood. Then Lee, from what I know about them, South Africa would be a showcase of steam locomotives.

*I wish you people success in the trenches where your small group is fighting a formidably superior number of people who do not care a damn. Good Luck.
ALBIE*

Don't look at me. I never said it. There are a growing number of people in South Africa and those abroad, including a growing number of prominent and respected personalities who are asking the same questions and coming to the same embarrassing and aggressive conclusion. An inconvenient truth is that the railways are in the business of moving freight and passengers, more so than preservation. But what then of the dysfunctional, infighting and unresponsive heritage bodies that claim to represent us? Do you people have an answer for the obstructive mist that you are casting?

Incidentally, I specifically obtained Albie's permission to go to print and he said the following in response :

*Lee,
You can quote me any time. Praise comes to those who earn it.
Anybody who wants to take exception to that is welcome to state his case. ALBIE*

Albie, on behalf of Reefsteamers, and our colleagues in preservation at other depots around the county, I thank you for your forthright communication and encouragement. Would that there were more people out there with that attitude.

Lee Gates.

REEFSTEAMERS PHOTO ESSAY

- 'JUST A QUICK RUN' - 24 JANUARY 2009 -



This bi-weekly Depot Report compiled by Lee D. Gates on behalf of Reefsteamers
For observations, corrections and suggestions – email me at webmaster@reefsteamers.co.za

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Owners of locomotive(s), rolling stock, equipment and machinery will be given material for reports and photographs by me upon request and not necessarily through a Depot Report.

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