# - REEFSTEAMERS DEPOT REPORT – A QUIET WEEKEND - 3 JULY 2010

## 1). INTRODUCTION :

There wasn't much going on at the depot today. On most of the days that a Reefsteamers train sallies forth, we can muster enough 'steaks' to swing along with several depot work processes at once. Today, we only had five steam-heads on the slab. However, we managed two work flows, being two smaller jobs, one of which would otherwise tend to not get done.

Class 12AR No.1535 'Susan' was out romping along on the Mafeking line – doing a film shoot for a Mountain Dew advert. So she is probably going to be uppity with stars in the headlamp for a while – but a few days of hard labour will bring her down to the rail-heads again. She better behave herself for our coming Depot Open Day on the 24th July. (Reminder. ☺ )

We moved the Wicksteed mechanical saw to a final location in terms of electrical supply and room for long work pieces to be able to protrude from the machine without bruising too many patellae. The chances are that we will use this machine mainly to cut boiler tubes and flues to fit shorter boilers. Of course we can cut those tubes n' flues by hand, but the Wicksteed will help save time and prevent wastage of material by cutting the ends dead-square first time.

Class 15F No.3046 received some attention to the Hadfield Type Power Reverser. She keeps trying to kick the reverser into the back-stop on the quadrant within the cab. Not only does it make the locomotive exhausting to drive, it's a danger in terms of distracting the driver. This ended up being an unplanned swap-out rather than a repair, simply due to the lack of manpower to get the refurbishment job done quickly. We didn't want ol' No.3046 rusting her wheels and waiting around another month or so for something as relatively minor as a refurbished cataract valve.

So yes, a quiet day, but we still got some stuff done. The lack of sugar for the tea reduced the tea breaks somewhat. ☺

## 2). MOVING THE WICKSTEED MECHANICAL SAW

**WSR-01 – Original position.**

Here's the start of today's electrical project, the Wicksteed mechanical saw as off-loaded on 4th April 2009. It was donated as a surplus machine from Andrew King's firm, Bosworth Engineering, and no, it didn't just 'walk away' from the factory floor. It was properly handed over otherwise it would have probably have been scrapped or dumped by now.

It has now moved from a career from being involved in facilitating the manufacture of belting and bulk conveyers to restoring bulk conveyances (e.g. : Steam locomotives) and has thus moved up in the world … if we can get it running.

There are two problems with the current position. A). There is no electrical power although the juice-jacks are available and B), The work piece, which will typically be boiler tubes and flues, would protrude into the work space of other machines, as well as inter-machine walkways. This end of the workshop is getting crowded anyway and there is barely enough space to swing a DZ wagon.

**WSR-02 – Rubba-dub-dub.**

Ex-South African Railways Fireman Johann Breydenbach shows that he still has luke-warm steam oil circulating in his blood stream. (The body temperature thins it out.) The percentage is probably less after years of selling properties instead of hurling chunks of carbon, but this old boomer has got steam in the blood until the day they finally call in his boiler ticket.

You can tell he is the genuine article because no true steam man can tolerate a corroded or a dusty name plate or badge without at least one wipe.

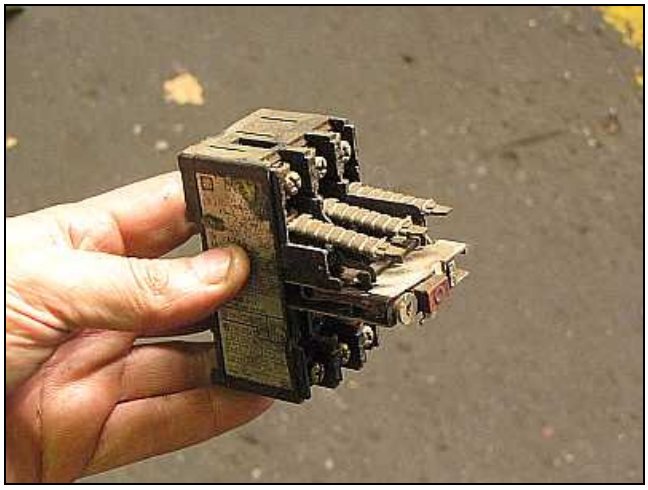
After spotting me taking a high resolution picture of that machine manufacturer's badge for prosperity (because they do, ahem, 'disappear' sometimes) Johann just could not take it any more and gave the dulled name plate a brisk rub down with a piece of oily waste.

The shardic debris scattered there are the remains of the old starter and its enclosure.


**WSR-03 – Trying hard to be brass.**

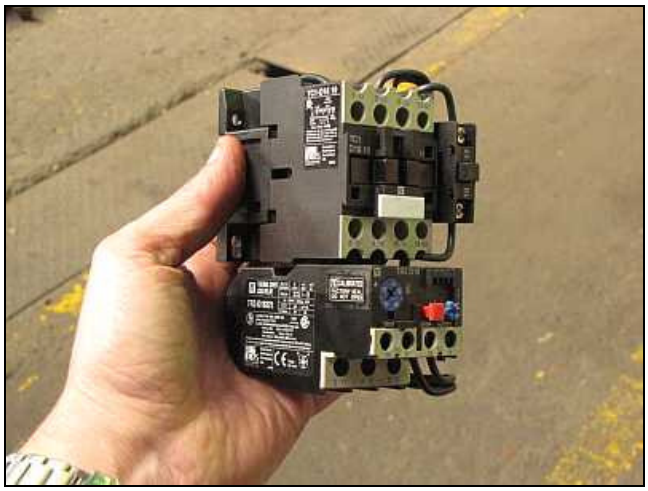
It is always charming to see the ornate name plates and badges that were placed with pride onto older machinery and they often become collectables in their own right.

This one says 'Wicksteed, Kettering – England.' Patent 364013/31 No. 1257763. The last number, being the machine's serial number, is hand stamped while the other numbers are cast.



**WSR-04 – Dead Soldier.**

Electrical equipment does not last long in a steam locomotive depot, particularly if it is not robustly sealed. The tired remains of this old bi-metallic thermal relay look good compared to some of the stuff I have seen around the depot. It is positively advanced compared to the cartridge type fuses which most of the 15M workshop equipment was originally supplied with.



**WSR-05 – Snazzy!**

Here is the replacement, being a much more modern and compact thermal overload replay combined with a contactor, pre-wired with a latch switch as well. The latch switch functions as the start. The red button on the thermal relay would be the stop and the blue button, the reset.

Heavy machinery often requires load relays to cater for the 'inrush' current that occurs when the machine is started. A standard circuit breaker rated to try and protect the motor under running conditions would tend to trip out if the machine is started under load. A fuse would generally be too slow if the motor overloads or goes partial short circuit.

The use of a thermal overload relay allows for tighter, more intelligent protection downstream of the cable – and lets the over current-protection in the distribution board be rated to protect the cable without worrying about the transient characteristics of the electrical load.

**WSR-06 – Snip n' Strip.**

Johann Breydenbach (rear) got the task of circumcising the freshly cut-back wires. He didn't enjoy the job for, as much as a steam man likes his shiny brass and copper, he also has the steam man's inherent dislike for electrical stuff. I could see that he was fighting his instincts.

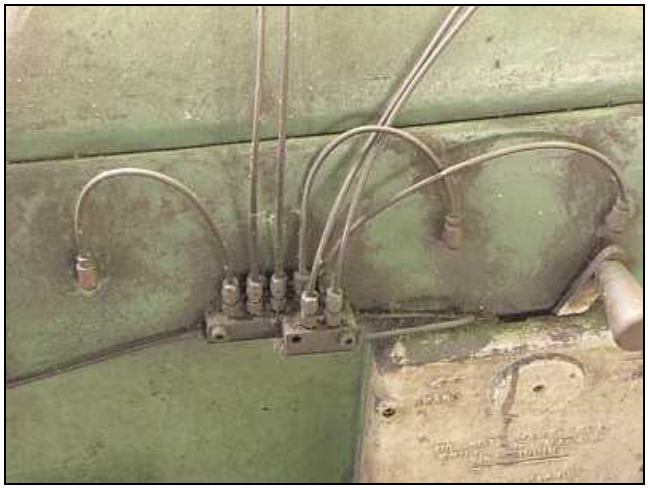
Those mangy wires were re-crimped and then taped up by Andrew 'Noddy' King. (Center) Being used on a reciprocating machine, a twisted wire or a screw connection probably wouldn't last long. I wasn't so sure about that tape though but it is fairly cool and dry under there. I now have photographic proof of who did the wire taping should the ol' Wicksteed go FIZZ….BANG one day. (Probably when trimming donated 15CA boiler flues – hint … hint.)

Andrew is partially colour blind to green – but as all the phase wires were red (Delta) and there was no green earth wire involved in the starter box wiring, there was no chance of a bi-chromatic mix up here.

**WSR07 – Much too clean.**

Not even a single greasy thumb print to give it some genuine steam workshop ambiviance. Uncanny. Unnatural. Here's the finished installation of the starter box which definitely needs a bit of 'weathering' to blend into the surroundings.

It is, unfortunately, in a very vulnerable location and is liable to get kicked or knocked. The external buttons operate the overload relay's actually controls remotely via little stamped Tetris-like push-plates. Thus, there are two layers of mechanical protection for the electrical components.



**WSR08 – Are we 'oil right' here?**

So far as we know, apart from a thorough clean up and lube job, the only other repairs required on the ol' Wicksteed saw is the cleaning and inspection of the mechanical lubricator, the lubricant manifolds (pictured here) and of the oil lines.

These very thin bore oil lines are of hard nylon plastic material and have no protection or sheathing. Several lines on the top of the machine, for the saw-bow's guides, have broken off. Interestingly, older manually lubricated Wicksteed saws used a hollow saw bow as an oil reservoir.

**WSP01 – Sparkin'**

At least these are merely acetylene sparks and comet trails of molten metal, and not those of a monster short circuit.

Andrew King's second-most favourite depot tool is the acetylene torch. (The all-star swingin' favourite being the 16 pound mallet.) After Mike Murphy removed one of the old cable glands which was good enough for salvage, the derelict isolation box could be cut down.

The plan is to mount a junction box directly to the machine once the final connection is made. The cable that is hotly haloed by the fire is actually a piece of scrappy flexible conduit with no conductors within.

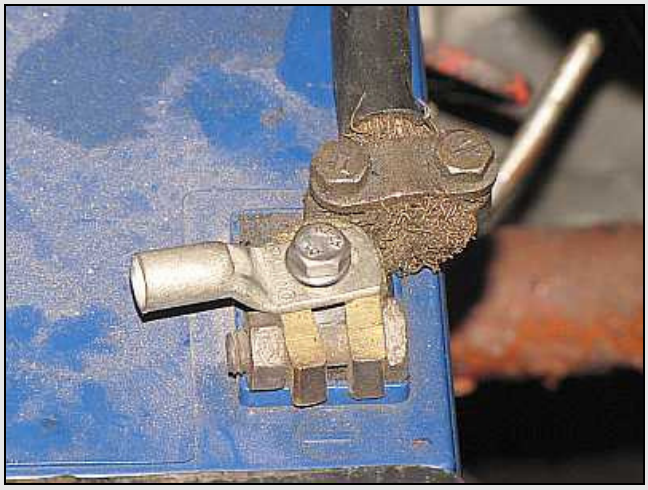
It was funny to see Johann Breydenbach pick up the freshly amputated box and casually toss it over his shoulder to the conveniently located scrap metal bin – visible at top right.

**WSP02 – Hyster-resis.**

A bit of hysteresis enters the job flow as time out is taken to check the vitals of the Depot's gas powered Hyster forklift before firing up. This machine is a bit battered and scruffy, even with a relatively fresh safety-orange paint job, but it is 100% functional.

Being fueled by LPG gas from a 'backpack' cylinder (see Pic. WSM-04), the forklift fires up quite reliably even after long periods of disuse, just so long as a fresh battery is inserted. This very useful machine was also donated to us several years ago by Bosworth Engineering.

The vitals all checked out and 'Noddy' is about to retrieve a known-charged 12V battery and the keys from the clubhouse. The forklift would be used to lift and move the Wicksteed mechanical saw by means of a pair of slings.



**WSP-03 – A terminal case.**

You have steam fever, Sir, and it's absolutely incurable. Terminal, in fact.

I'm not sure if this is classified as a bodge or a dodge, or just a king-sized kludge, but it shows a simple way of adapting a battery clamp designed for a taper post to suit a battery with a threaded post.

The 'gasser' forklift started right up! ☺ We don't keep batteries within our powered equipment for fear of 'affirmative redistribution' and of internal electrical discharge. The power van's generator sets do retain their batteries but they are disconnected when not in use.

**WSM-01 – Rat Run.**

You can see the treaded trench cover flipping up from under the forklift's rear wheel. This is one of the covers of 'The Rat Run', a traverse drain trench that runs the full width of the 15M workshop and separates the machine shop from the eight locomotive repair bays.

The depot's rats literally do use these runs as races. (Or they race along the runs – gotta love the English language!)

All the trench covers are slightly bent from years of use, so there is a particular metallic grating, slapping sound that ensues when one even walks on a grate, much less wheeling a trolley or a barrow.

**WSM-02 – Chain + Cable = Cradle.**

Here's the lifting arrangement.

The front sling is a two-part chain with link-hooks and a central eye, while the rear sling is a cable. They are both attached to 'gwala bars' passed through lifting holes in the machine's hollow base. The alignment worked out almost perfectly - although it wouldn't have been a problem if it didn't, because the forklift's tines can be moved laterally.

The slings are retained on the tines by a long bolt that was pinched from around the Dean Smith lathe and passed through a hole cast into the forklift's tines. It looked like a specialized bolt and I wondered if it would find its way back home. I'll sic James onto Johann if he wants that bolt back.

**WSM-03 – Murphy Motion.**

Mike Murphy guides the suspended mechanical saw as the forklift is carefully backed up. Andrew gets to breathe his own exhaust fumes. Guiding a load like this can be a tricky when lifting locomotive-sized parts or machines like this one - for although the weight is taken up by the sling or the tackle, the suspended object still has inertia and momentum, and can be damaged or can hurt someone.

You can see the vulnerable new box protruding out from the left and having just survived a close encounter of the dustbin kind. The machine's design doesn't look good with all the electrics on the right end, where the starter could have gone. But the starter was located to be within easy arms reach of someone closely examining the work piece.

**WSM-04 – The Wicksteed has landed.**

Here is a tender-deck (15CA No.2056 'Dorothy') eye-view of the approximate new location for the saw. The protective block of wood under the saw blade shows the alignment of the future work piece, which will sometimes be about 6 meters long. There is ample clear space to the left for a work piece to protrude alongside the drive-end of the lathe without protruding into the demarcated walkway area.

The oxide red container is our scrap metal bin and it is castor-mounted. It can be easily moved out the way when needed.

The yellow and black handrail sections for our workshop area are removable. Their bent-over ends slot into the tops of the hollow round posts. I can thus certify that no heritage handrails were harmed during this operation.

**WSM-05 – Power Pack.**

Grey-headed Johann Breydenbach, of course, still thinks he's 21 and instinctively hurls himself into the spine-wrenching, cumbersome task of shifting a heavy hydraulic power pack. While he's grunting and scraping it away, the other chaps are just about to turn around and rotate that blue work cupboard in the background.

The next project is to move that green hydraulic press out of the center-ground. It is out of service and is just sitting there, rather than being bolted down onto the floor.

This operation is more of a taking-of-an-opportunity rather than trying to clear space around the mechanical saw – basically striking while the forklift engine is hot and the workforce is wound up. Our currently operating 50 ton hydraulic press has been sufficient for our needs so far.

**WSM-06 – Hup!**

The hydraulic press is lifted a cautious centimeter or two off the floor and is just about to be rolled back into a pickle. The rear-most corner 'connected' with the mechanical saw's belt drive cover. (Visible just behind the press's ram.) Luckily nothing got bent and no damage was done.

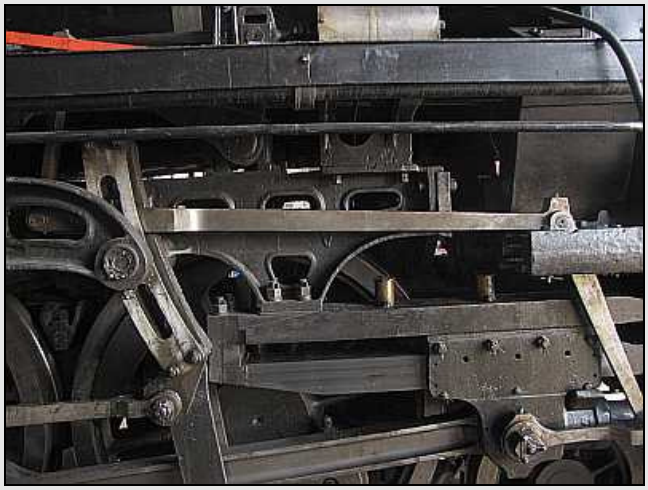
As I can attest from the fork-lift races and obstacle courses us electronics technicians used to hold on the railway platforms and loading areas of the then-SADF's 91AD Ammo-Depot out by Naboomspruit, rear wheel steering is quite different from what we get used to on the roads.

**WSM-07 – Final pozzie.**

Here is the Wicksteed mechanical saw as seen from the drive end, with the slings still attached. This angled arrangement works out well. The machine just visible to the left is the vertical boring mill but it is primarily operated from the far side. No one needs to stand where the scrap metal bin's lid is seen lying on the ground.

The yellow circle on the ground is a now-obsolete placement mark for a dustbin. The scrap bin can still be rolled out if the handrail is removed – so it isn't trapped.

## 3). CLASS 15F NO.3046 - CATARACT VALVE INSPECTION AND REPLACEMENT :



**CV01 – Raise the radius.**

The action of a Hadfield Power Reverser's locking cylinder at standstill can be checked by attempting to move the radius rod with a crow bar. But it can be difficult to find a convenient hole or projection in which to insert the crow bar and be able to put some grunt onto that radius rod.

Here, the valve gear has been put close to mid reverse by connecting the power cylinder to the air compressor. It was then easy to put a crowbar end into those oval holes in the valve hangar and try to shift the tilted radius rod back down towards horizontal. ('Mid-gear', or 'Neutral'). I did the test, and I was able to move the radius rod downwards without even lifting my feet off the ground. Not good…

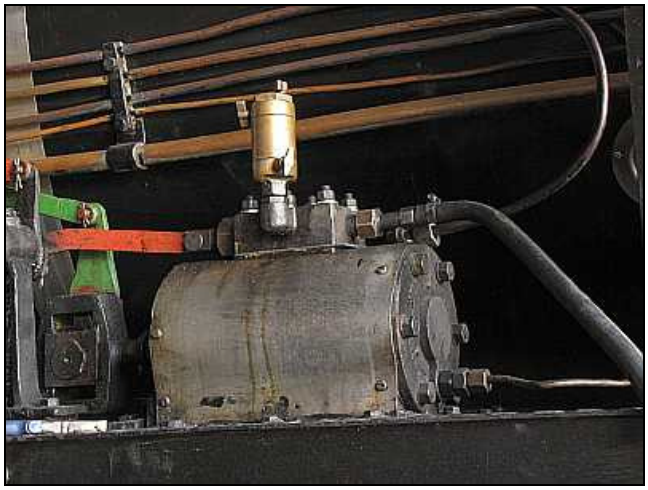
This means that there is oil leaking through the cataract valve. The asymmetric couples within the Walshearts valve motion try to shift the valves towards reverse full gear. The driver provides the compensating action on the reverser lever in the cab and it is said to be rather exhausting!

**CV02 – Aidan checks.**

Aidan McCarthy makes the second check. This involves disconnecting the tumbler rod (for which he is reaching) and rotating the valve spool within the valve body. Because the internals of the cataract valve are strongly spring-loaded at one end and seal against a conical washer, as well as running with close clearances, it should be fairly stiff to move. This one moved easily … too easily.

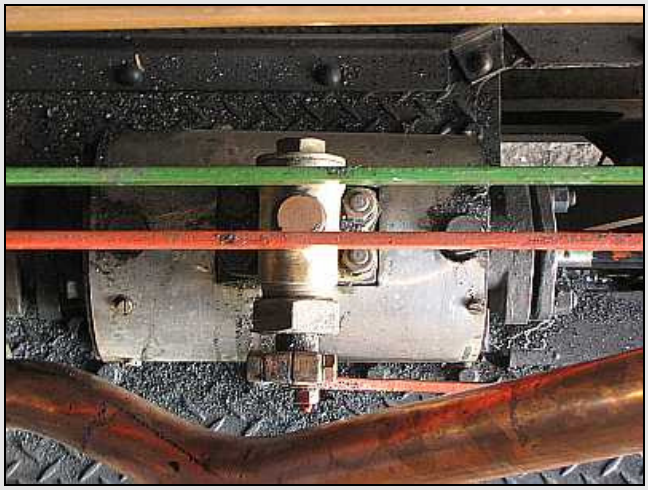
The red rods are the power valve's operating linkages and they are operated from the lower end of the reverser lever mounted at the quadrant in the cab. They usually operate in opposite phase to the locomotive's motion – the red rods move forward for reverse and backwards for forward.

The green rods are the indicator links which drive the pointer on the quadrant back in the cab, so the driver can see to what percentage the steam cutoff has been set at. They are driven from a crank plate directly from the way shaft and provide actual feedback of the cut-off settings.



**CV03 – The business end.**

Here is the power cylinder, a double ended steam operated affair. The steam line curving in from the top right has been disconnected – the black line connected instead is for the depot's air compressor. With the tumbler rod disconnected, this cylinder didn't need to be interfered with at all.



**CV04 – The patient.**

Here is the locking cylinder. The power cylinder rotates a bell crank and the way shaft via means of a scotch yoke. But on the other side of that scotch yoke (left in Pic CV03), is mounted the lock cylinder. If this cylinder locks, it also locks the power cylinder and the various valve gear links.

**CV05 – Inspecting the gadget.**

Andrew King was called to consult and he wasn't happy with the loose movement either. He has started his inspection by removing the rear cover, which also in cooperates the loading spring that presses all the tapered parts together. It isn't usually a suspect though.

The spring and its cap seemed to be OK and Andrew was sure the problem would be at the other end, where the counter taper washer is. We did incidentally find that the gland packing was done with a spiral piece of graphite rope and that is a classic example of bad fitting practice.

**CV06 – Haynes Spread.**

The cataract valve has been stripped out and here are the components in 'Haynes Order', from left to right.
# Gland cover. (This is the cover you see from trackside.)
# The valve spindle with integral conical valve plug.
# The packing spacer (to the left of my finger)
# The counter-taper washer to which I am pointing.
# The spring loaded rear cover.

The top-hat profile jumper washer that fits on the end of the spring and engages with the spring's bore within the valve spindle is missing. It all looks a bit primitive, but this valve has to maintain a metal-to-metal seal.

**CV07 – Depths … of despair.**

After cleaning the components and the bore, Andrew measured the dismantled components and then hopefully reassembled the valve to measure up-in situ. Here he is taking a depth check of the packing spacer. His hopes were dashed though, as there is too much clearance.

When the valve is assembled, the spring at the rear presses the assembly together against the tapered bore. The seal on the outer end is made by the chamfered edge of the spindle fitting into the counter-taper washer.

But due to wear or bad fitting, there is too much longitudinal clearance and it seems as if the oil is sneaking around the ends of the valve. This valve was probably assembled with mismatched parts from totally different units.

**CV08 - A cautious pull.**

King Kondemned the existing valve and went a-hunting for a replacement – convinced that a cataract valve was rebuilt and safely stored when No.3046 was originally worked on years ago. He wasn't able to find it, but this scabrous, black-painted example looked like it might be useful.

Of course it was as dry as salted camel bones, so it wasn't a good idea to take the ideal rotary resistance at face value. The valve would need to be stripped, cleaned, measured, reassembled and then have the gland repacked.

Here, the packing spacer wouldn't come off over the square shank for the crank. Some desperate(ly) incompetent fitter had beaten the spindle roughly in the past and the chamfered corners had raised burrs on then.

**CV09 – Bronze Pedicure.**

Mike Murphy gets the job of filing the chamfers clear from burrs on the square shank. They were approximately filed off with the spacer in place and the spacer then tapped off very gently with a copper hammer. Mike could then dress the shank end properly with the valve spindle removed.

That hole visible in the side of the spindle is the center-filler hole (for the valve itself) and it stands straight up and under a removable hex-ended plug, when the locomotive is in mid-gear.

The long slot passages in the spindle (See Pic. CV06) through which the oil flows from one end of the cylinder to the other. are joined in a tee-shape into an internal circular bore, into which this circular hole also communicates.

**CV10 – Down the bore.**

Here you see the tapered bore of the cataract valve. With the locomotive in mid gear, the tee-connecting oil transfer passages stand vertically like a 'tee' and those two angled ports are not connected. Oil remains trapped in the locking cylinder on either side of the piston within. As oil is incompressible, the piston thus cannot move and it holds the entire common spindle of the reverser in one position.

When the driver operates the reverser lever in the cab, the tee-connecting passages rotate 45 degrees (Either way) and oil flows via the base of the tee and one of the arms. This allows the piston to move within the locking cylinder beneath, pushing the oil ahead of it through the valve and back behind it. Not only does the cataract valve and its locking cylinder act as a hydraulic latch, but the restricted flow of the viscous steam-oil also acts as a damper, rather like those hydraulic door closers one sees. When low on oil, a Hadfield Reverser gets twitchy and shoots towards full-forward or full-reverse before the driver can react.

**CV11 – Scraping up some work.**

I got the mucky, abrasive job of cleaning up the valve body. (Thank you, McCarthy!) It wasn't bad a job though, especially with a new cup-type wire bush on the machine.

You can clearly see the filler hole in this picture. This hole is used to fill up the cavities and ports of the cataract valve with oil. The hydraulic locking cylinder itself is filled with steam oil via hex-ended plugs at either end.

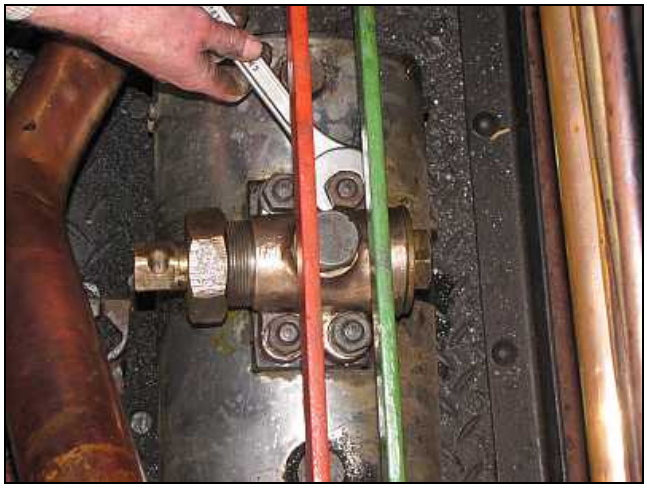
**CV12 – Brush up.**

Freshly brushed and looking more like bronze rather than tug boat gunwales. The valve has been put together and it appears that the elements are sealing properly. I'm just about to take the filler plug out, wire brush the surface rust away and rub it down with steam oil. The spindle is in the correct position according to the bolt notch for the clamp – the clamp points downwards on the finished assembly.

**CV13 – Get Stuffed!**

Muttering dire impreciations against those who still do spiral-wound gland packing, Aidan has been cutting little rings from the graphite-impregnated packing rope and is patiently inserting them one by one. The idea is to stagger the split ends of the rings 180 degrees apart so the packing rings form a serpentine seal. A spiral-wound packing rope, when it settles in, quickly forms a continuous path for leaks.

This is one of the most unusual packing joints on a steam locomotive as the packing has to seal oil, not steam. Oil leaks here though, are relatively rare because of the tapered washer on the out-board end of the valve spindle.



**CV14 – Screw Down.**

After Andrew King had tapped out a fresh Klingerite sheet-gasket (as they can only be used once), Mike Murphy gets to tighten the replacement cataract valve down.

The torque setting was guess work but none of the studs got broken in the process. In locomotive work, if one uses a open ended spanner like this without extending the end with a cheater bar, or standing on it, or hammering away, you won't break the stud. (Unless it is seriously corroded.)

Spanner lengths are designed to give sufficient leverage in a safe range for the bolt or nut they are sized to fit.

**CV15 – Gland Eater.**

Here is the locking cylinder's end of the common spindle. As you can see on close inspection it has become a bit pitted with rust. In operation, this shaft is naturally wiped with oil from within the cylinder but it had been standing dry for over a decade. The rough surface abrades the packing.

This spindle is going to need some polishing but will always be a bit of a 'gland eater' until it is skimmed on a lathe.

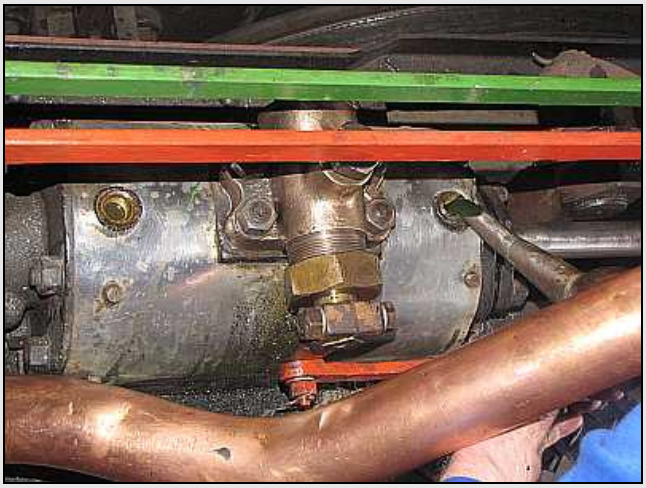
In the background is the bridle rod that couples onto the rear end of the radius rod. There is a matching one on the other side and it is rotated by a crank from the way shaft that passes right across under the boiler. The crank shown here is a bell crank (bottom right) and the opposite end is moved by the scotch yoke which is moved by the reverser.

**CV16 – Fill 'er up.**

After the pinning down comes the filling up. Each end of the locking cylinder has its own oil filler plug.

Unfortunately, there is no vent. And one cannot use the center port as a vent because when the circular hole (See Pic. CV06) lines up with the center plug, the oil transfer ports are closed. So one has to tipple the viscous steam oil in very slowly and let it blup and blop its way to its own level. The rear end of the cylinder was fine but the front end needed several helpings of oil between the blups and the blops.

Thinner oil would pour and settle easier. But depending on the volume used, it would reduce the damping qualities and speed up the operation of the reverser. However one can use heated compounded steam (valve) oil for easy pouring.



**CV17 – Tipple to the top.**

The Murphy-Man filled up both ends of the locking cylinder, plugged it up and we ran the Hadfield Power Reverser through several cycles (on compressed air) to circulate the entrapped oil from end to end and to collapse any air pockets. There were some, evidently, and Mike is here topping up the front end on the second round.

The central filler plug is primarily used to fill the cavities of the valve's tapered plug with oil. The idea is to then operate it once each way so the oil then fills the oval transfer ports by gravity and then top up the valve once again in the central position.

It is possible to not bother using this plug and simply push the entrapped oil back and forth by cycling the power reverser, just as we did, but you are guaranteed at least one re-fill cycle as those cavities in the valve fill up above the cylinder.

You can also see the arrangement of the split end clamp and the rear joint on the tumbler rod. Although the original washers were used, the split pins were replaced at both ends.

**CV18 – Finishing up.**

Poor Mr. Murphy had to patiently undo those end plugs a third time to check the oil level after a few air compressor-powered forward and reverse cycles. The oil level seemed fine this time around and this job could be wrapped up.

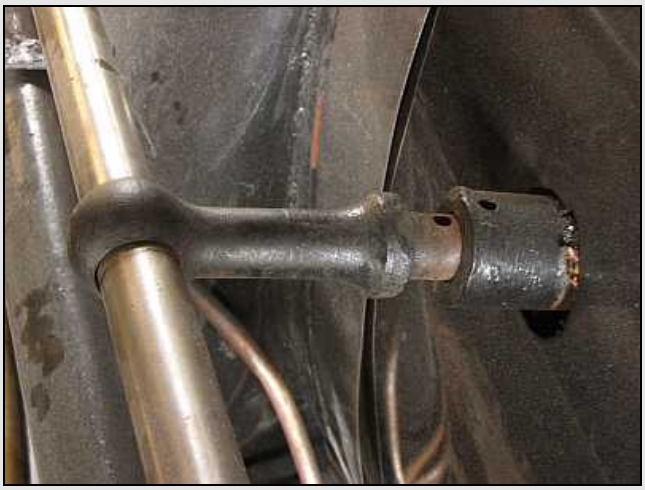
Although I didn't take photos of the final test, Aidan McCarthy did the crowbar test again, levering the radius rod against the holes cast into the valve gear bracket. Evidently we have done the job successfully for Aidan, who is portly of build ☺ , was able to hang onto that crow bar with his feet completely off the ground and the radius rod wouldn't budge.

That's just the way we like it! (Ahuh! Ahuh! Ahuh!)

When the locomotive is in steam, however, the oil within the locking cylinder heats up and thins out. So the damping effect is reduced (the reverser speeds up.) More importantly, the thinned out oil passes easier though any gaps. So the 'acid test' is when the loco is in steam.

Competent crew members and shed staff make a habit of keeping an eye on the radius rods (ensuring they are horizontal) and will shut down the reverser's steam supply if the loco is to stand possibly unattended. Otherwise the stage can be set for a runaway.

## 4). ODD JOBS :

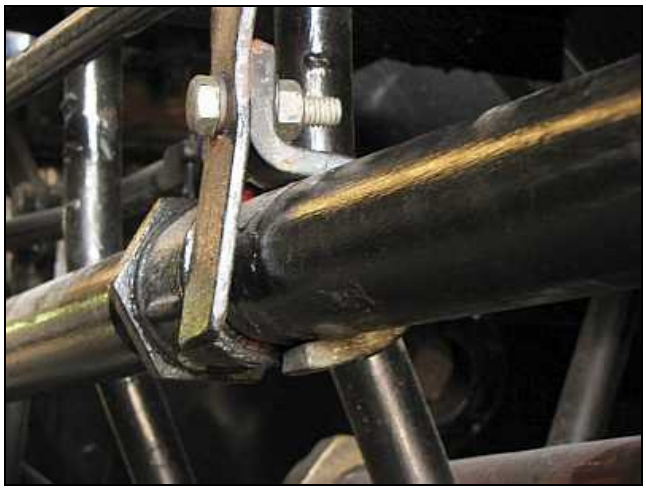


**JB01 – She's a man eater.**

Great. We have another killer lurking in the recesses of the 15M shop. Everyone has been super-wary about crabbing along boiler-side handrails ever since Sandstone's GMAM No.4079 'Lyndie Lou' tried to take out Robbie 'Honeyball.' (Bad welding.) With eyes peeled by the wariness, I happened to notice a loose handrail stanchion on the 15F No.3046 when climbing up for overhead pics of the reverser. I wonder who No.3046 had in mind?

Jokes aside, this is the stuff accidents are made from and Aidan McCarthy quickly got the tin of pre-made stanchion pins, pushed the rail inwards and pinned it up securely.

Incidentally, Class 15F No.3046 is known to have killed three men during her long career. We do hope that she has mellowed with age.



**JB02 – Creak.**

I was eagle-eyed enough to spot that lose handrail stanchion but I was too cloth-eared to hear the creak of the locomotive's vacuum brake line. This is a classic case of uncoordinated design as the vacuum pipe obscures the first rung of the walkway steps just before the side ladder angles inwards towards the wheels.

Thus, the pipe usually gets trodden on when climbing up to the walkway and often by hefty steam men too.

Aidan McCarthy heard the pipe creak and felt it was loose. So another trip to the spares bins salvaged an unused pipe-clamp that better fitted the profile of the vacuum pipe. Another case of mismatched parts from supposedly identical locomotives.

**JB03 – Concentration.**

I have to include at least one picture of Aidan McCarthy to balance things out. Not a camera in sight.

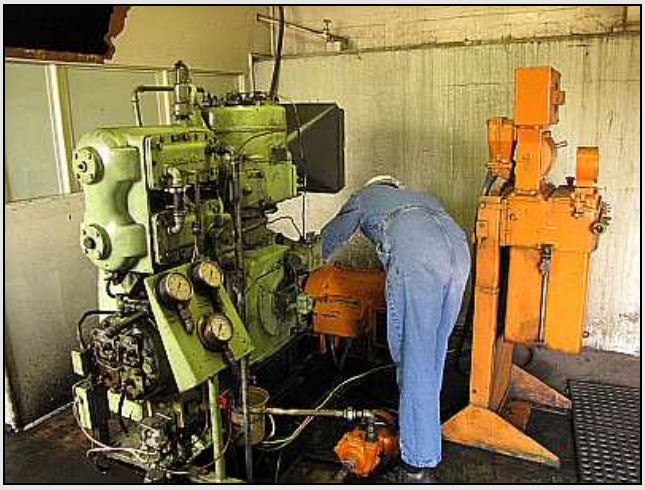
Here you can see how the vacuum pipe overlaps the side steps while the boiler feed delivery pipe runs neatly under the steps. Good thing too as it gets hot in operation!

Aidi-Mac also had to wrestle with the bracket's hangar-strap is it was twisted and distorted in two planes.

**JB04 – Milking Time.**

One of the first jobs in starting up the air compressor plant is draining the condensate from the air receiver and from the intercooler. Aidan knuckles down to the plug valve, which drains directly into a trench. The discharge is a sick milky-caramel colour, so the photo header isn't too inapt.

Try as we might, there is always moisture in the air lines and we always blow them out for a minute or two before hooking up a pneumatic appliance or even a draft blower.



**JB05 – Stick Dip.**

The Atlas Copco air compressor has a mechanical lubricator which all the users are familiar with. It is visible just to the left of Aidan's left elbow and is clearly marked 'Fill Me!' However, the crankcase dipstick and drain cock combination is a lot less noticeable and thus the crank case oil frequently does not get checked. And even when it is, the poorly designed dipstick can be ambiguous.

We even have air-compressor dipstick instructions drawn on the clubhouse buttering board. Aidan is being a good boy here and is doing the check – finding the crank case to be a little over half full. Good job he checked.

**JB06 – Strong arm approach.**

The general rule when working with steam locomotives and their supporting equipment is that if the job can be awkward, it will be. Aidan had to resort to the use of a stilson wrench to get the bulk oil can open.

He was quite pleased that it only took one grunt to get that cap off.

The oil is Compro P68 and is the second thinnest oil in the typical range of viscosities for this application.

## 5). BONUS PICS :

**BP01 – Superstar!**

Reefsteamers Depot Reports and Photo essays from late 2009 onwards are hosted on the website of the Two Foot Preservation Trust, operated by our good friend in steam, Philipp Maurer. You can find them on this web page : http://www.2fpt.com/css/News/NewsReefsteamers.html

A set of photos have been posted covering the advert film shoot in which our 'little' Class 12AR No.1535 'Susan' took part. You may find the photo set on-line at http://www.2fpt.com/css/News/Reefsteamers/2010/NewsReefsteamers2010July.html.

Photo taken by Philipp Maurer.

**BP02 – Heavy metal.**

Just in case you forgot what this beast looks like after many close ups of the reverser and the cataract valve – here is Class 15F No.3046 struttin' her ample stuff for the lucky photographers of the 2010 Geoff Cooke Photo Tour.

They couldn't go on their planned day trip because of the national Transnet rail-strike – so we had a morning and evening depot photo session for them instead.

She's hauling a 4 coach 'passenger' upgrade on the western entrance of the depot's turning balloon.

Photo taken by Aidan McCarthy - 23rd May 2010.

## 6). MISC :

**MX01 – Stay Array.**

A close up of an arrangement of somewhat corroded flexible stay caps on the right flank of the Class 12R 1947 'Rosie's' firebox. All 20th century SAR steamers have flexible stays.

The commonly understood name 'flexible stay' is somewhat incorrect. The stay 'bolt' that extends between the firebox's inner plate work and the outer shell is as rigid as ever. But the outer end is allowed to be able to pivot very slightly as the firebox's inner plates thermally expand and move in relation to the outer plates.

**MX02 – Not a customer.**

Here's one little locomotive that doesn't drink from that giant hamster bottle.
The 1951 vintage Hunslet Taylor is now running with a traditional steam loco 'milk churn.' That churn is actually a sand bottle to assist with the shunting on the winter mornings, when we tend to get frost on the rails.

Mr. Hunslet does actually have a sanding system – which is basically gravity discharged from hoppers. But it is defunct and we have found that manually sprinkling sand on the rails ahead of the lil' loco is sufficient for our shunting.

**MX03 – Pressure gradient.**

The depot water mains continue to be a problem. It was originally too narrow to supply more than one hydrant and was replaced with a wider bore pipe.

The wider pipe increased the pressure available at the end point, but the pipe material is not SABS rated and is definitely not UV resistant. Since then, the surface mounted sections of the pipe work have been splitting in response to the UV from the sun and in the harsh sunshine of summer we literally get a leak every week or so.

This splice looks ridiculous but it looks as if they were trying to avoid the electric cable going to that service box.

**MX04 – Lacework.**

The saying goes that 'Rust never sleeps.' This is the tin-worm-chewed boiler cladding of the 12R No.1947 'Rosie.'

The boiler cladding is the outer sheet that covers the gaunt, riveted boiler and protects the sheets of thermal lagging. It is the most vulnerable part of a steam loco in terms of rust as the thermal lagging gets damp if a locomotive is stored in the open and not used regularly.

The effect is rather like damp carpets under a piece of furniture – it takes forever to dry out. The thermal lagging, be it sheet insulation or rock wool, holds the unwanted moisture lovingly against the unpolished interior of the sheet metal, and the eggs of the tin-worms start to hatch.

**MX05 – A well stuffed workshop.**

An interesting variety of locomotives take their ease in the 15M workshop. In the foreground is Class 15F No.3046 who should have been in the running shed – but had to come downstairs for repairs. The face-less Class 12R No.1947 'Rosie' waits hopefully for restoration to start. In the rear, the mean green machine, GMAM No.4079 'Lyndie Lou', placed in our trust by the Sandstone Heritage Trust, also awaits repairs. She shows her great length by being buffered up to the end stops at the other end and still poking cheekily out the rear end of the shed.

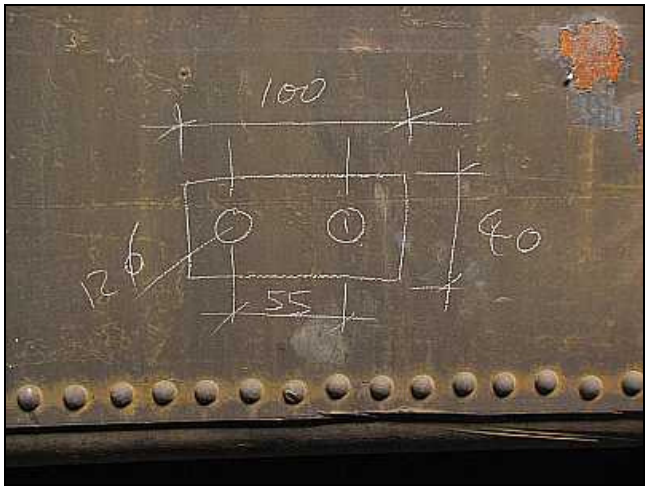
In the background, with only the elephant-grey smoke deflectors visible, is David Shepherd's Class 15F No.3052 'Avril'. There is a Class 15CA mixed up in that lot too.

**MX06 – Unmarred – for now.**

Here's a rare sight – a spanking brand new adjustable spanner in satin black finish at the Reefsteamers Depot – still positively virginal with hardly a scratch and it still has the price tags on. Freaky.

Reefsteamers Depot is hard on tools and could perhaps make money as a testing ground. If a Razor, or a Gedore, or a Mastercraft tool could survive the rigours of steam locomotive work, they could handle sissy stuff like army tank work, oil rig roustabouting and bulldozer repairs.

The biggest killer of adjustable spanners here is when an inexperienced person uses an adjustable as a slogging spanner. It often shatters the screw and/or breaks the pin.




**MX07 – Steam loco graffiti.**

The slab sides of locomotive tenders and cabs constitute handy chalk boards for impromptu diagrams and sketches. This drawing took me back 25 years to the rigours of Mr. Downes and the technical drawing class. I still dream about them to this day, waking up with an elevated pulse.

Whoever did this drawing would lose points because of the canted radius number on the arrowless leader and a lack of horizontal center line. The drawing also assumes that the holes are symmetrical around the center lines. Tsk! Tsk!

Old Da-Da-Da Downes would have choked on his brandy-laced coffee (tippled from a thermos) if he has seen one of us raw-doughs making a drawing like this.

**MX08 –Highlighted.**

Here's the front traction unit of Sandstone's GMAM No.4079 'Lyndie Lou' as picked out by some mellow sunshine via a translucent roof panel. This locomotive is basically in running order – put the fire-arch back in, fill up with water and light the fire, and off she'll go.

The recently tested boiler is OK from a pressure testing point of view. No leaks or containment problems found.

But a failed girdle bracket on the dry pipe within the boiler needs to be repaired. The dry pipe is the large diameter pipe that gathers the steam, usually from the dome, and leads it forward to the regulator. It is usually supported by flat-section traverse hangars inside the boiler.

**MX09 – Sunlit Saturday afternoon snooze :**

Yeah, another pic of the same end of the same GMAM at the same time but I couldn't resist the backlighting effect. The strange green highlights on the rounded front nose of the water tank are reflections from several sun-lit green-painted machines.

**MX10 – Spannered Surprise.**

This surprised looking old toppie, who fired locomotives here at Germiston in the early 1970's, casually 'wombled' in mid-morning for a leisurely look around. He ended up being put to work on helping to clear pipes and the water separator to remove the stoker reversing valve on Class 15F No.3046.

He had some interesting SAR railway stories to tell during the late afternoon tea-round, stumbling along shyly in hesitant, broken English but keeping us enthralled all the same.

This Depot Report was compiled by Lee D. Gates on behalf of Reefsteamers
For observations, corrections and suggestions – email me at leeg@leaf.co.za

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