

1). INTRODUCTION :

Dear Reefsteamers and Friends of Steam,

Here is the latest Reefsteamers Depot Report, issued on 24 February 2013, which covers events up to the previous weekend. This week's photographs have already been uploaded and processing has begun.

Since the events covered by this Report, the Class 12AR No.1535 'Susan' has passed her hydraulic boiler inspection. The rear tube ends have since been beaded over, ready for welding, and the new steam downpipes (and their studs) are being fabricated. There remains one more visual inspection after the welding has been done and then we can do a steam test. Before the loco can be steamed up, the safety valves need be refitted, the fire arch rebuilt and the induced draft gear fabricated/repairs for the smokebox.

The somewhat thin front tubeplate is probably good for service for another few boiler cycles but the locomotive will need strict adherence to smokebox cleaning routines after every run, to prevent further corrosion.

The Class 15F No.3046 'Janine' is going to be removed from service in mid-March, for HER 3 year boiler inspection. So it is essential that we get the 12AR Locomotive back into steam as soon as possible, otherwise we will need to start cancelling trains. She has done well though, being the main bread winner for almost a year instead of the more usual four month cycles.

We have a lot of work to do and are still appealing for our members to volunteer some of their time in the workshop over the next few busy weeks. We have had a good turnout for the last two weeks and Engineering Director Shaun Ackerman has already expressed his thanks to the people that came along.

Regular road worthy checks have revealed a tyre starting to work loose on the leading axle on the rear bogie of the 15F 3046's Type EW tender. We had caught it in time and the tyre has started to turn (under braking effort) around the wheel center even during shunting. At the time of sending this email, a spare axle has already been removed from a spare EW bogie and the axle boxes stripped. The bearings will be repacked this week and the faulty axle swapped out.

With the recent addition of a few concrete sleepers and very careful manipulation of the points, we were able to get the 15F No.3046 'Janine' into the 15F shop without incident. Now that the new electric fence is up and energized (although it still needs to be connected to its dedicated energizer) it is now worthwhile fixing up our headshunt, replacing the rest of the stolen sleepers as well as the components from the point-gear that were stolen for scrap.

The Hunslet Taylor shunter gearbox featured in this report was installed last Saturday. Once the 15F tender axle is done, the fellows will fill that gearbox with oil, tighten the drive line, re-install the rods and recommission 'Andrew' the Hunslet. He probably has water in the diesel and a flat battery by now, but Jeandre just loves messing around with IC engines.

Another background job under way is the gradual re-allocation of the tools and supplies into the old long-roomed 15M Fitter's Workshop, which will become the new general shop and centralized tool storage point. AT the same time, the mixed-up tools are being categorized and sorted. We might even colour code them in future. There's a lot of the old junk and a demolished office cubicle making the 15M yard look untidy. But once the Hunslet is running and coupled to a gondola, getting the junk out will be a relatively simple operation.

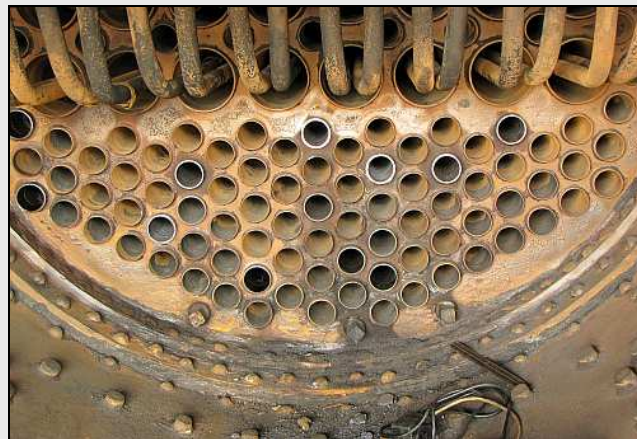
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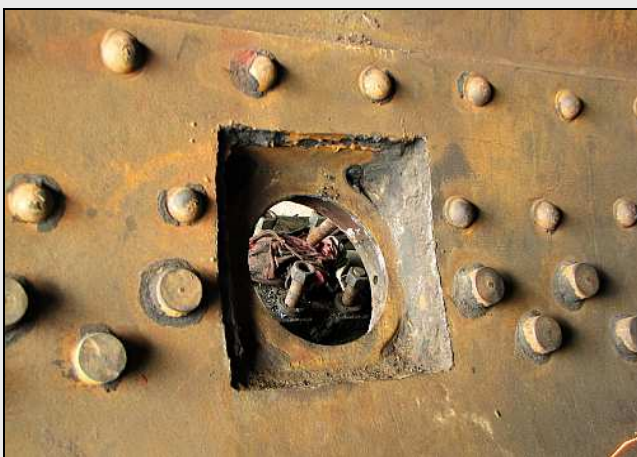
2). PROJECT – 12AR 1535 BOILER WORK:



B01 – Aidan noisily works at grinding down the protruding ends of a dozen new tubes. Except for two of them, they ended up fairly close to the originals. Overly-long tubes are more vulnerable to knife-edging from char cutting.



B02 – It was a bit galling to be ordered to trim tubes by the Boiler Inspector, as we would have done it anyway. But we sucked it up and Aidan got the job done. There were, however, no leaks at this end during the last hydraulic test.



B03 – The next project would be about studs, and not the lusty male variety either. They would all need to be removed, cleaned and refitted, and replacements made for those that were cut down. Visible here through one of the steam down-pipe ports are the studs for a vacuum breaker.



B04 – Ding-a-Ding! Seconds away for Round Three! Simon Bennett puzzles out the knock-out strategy for his third attempt at getting the second last stud out. Never again though ... the rehabilitated and replaced studs will all receive a generous dollop of copper-slip as they go in.



B05 – Stud : Three – Bennett Jr.: Nill. And it was a dirty and blistered defeat too. I love these guys – they are often quite funny just by having a pulse and being their own funny steam-lovin' selves. (This picture was unposed.)



B06 – The cut-down studs had to be flatted and then drilled out. And ooh, you should have heard the bad language when that key-less chuck kept slipping! Fair enough to scorch my delicate electronically enhanced ears.



B07 – Of the studs pointing up from the steam chests, 3 out of 8 survived. Here, Dr. Smudge is running a clean hex nut along the threads, with lots of oil, for a rough cleaning and straightening before re-cutting the thread with a proper die.



B08 – A potentially incriminating photograph that will remain forever in my archives as collateral. Actually, Shaun wasn't doing a Nazi salute, but joking about something taking off. Notice the die running on the stud.



B09 – Simon is busy re-tapping the stuffing box cover for the vacuum seal. 'Big Robbie had just finished removing the upward pointing studs with the largest stilson wrench he could find. Simon was about to discover that not all of the old stud's remains were out and that hole was too shallow.



B10 – One of those so GLORIOUS moments in Bennett Junior's life. He had been trying to pop a center into the remains of that broken stud and promptly dropped the center punch. It obligingly bounced and then rolled sullenly down out of reach behind the cylinder cladding. Oh dear!



B11 – A sand-bagged Bennett illustrating the need to maintain a good sense of humour when working with these 'marvellous, magnificent, stupid, bloody engines' as Frans van Dyk called them in an early Reefsteamers DVD.



P12 – Mike 'Rekots' Thiel was tasked with removing the cut-in-half remains of the right side studs in the afternoon – requiring some delicate work with that torch! His compact but muscular build came in useful for those tight quarters!



B13 – Another top view at the right steam chest (cf B04) – a stubborn Michael gets stuck into those stubborn studs. The new steam pipes need to be fitted and measured in-place for cutting, so all the old studs need to be removed beforehand, to be able to use temporary drifts and bolts.



B14 – This picture shows the exacting nature of this work – Michael had to burn away the remains of the cut-down studs without damaging the flange. If you look closely, you can see some of the old threads are still intact. Naturally, the holes will be re-tapped, even drilling out, if necessary.



B15 – Michael was also having one of those moments. He had many today, in fact. The acetylene torch's pintel needs servicing and it kept flaming-out with the unforgiving tightly tapered flame necessary for the close-quarters work.



B16 – Aidan patiently settles down and removes the lube line's cover plate to try his luck at fishing around for that dropped punch. Us steam-doctors really don't like leaving tools inside the patient – but this one could not be retrieved.



B17 – A load of steel plate has come in. This is for the fabrication of baffle plates and repairs to the table and toe plates for the 12AR's smokebox, and the leftovers for 15F 2914 – although she will need even more plating to repair to the horizontal sections of the tender's coal bunker.



B18 – The fire arch bricks have arrived. The 12AR doesn't use special cast bricks as many of the more modern engines do. However, these plain-looking rectangular bricks have been cast with a 2 degree slope on the flat sides, to help build up the arc-shape of the fire arch.



B19 – 40Kg worth of bagged and tubbed Refractory Mortar fresh from Vereeniging. As the 12AR doesn't have fire arch tubes, the fire arch has to support itself – which it does using tapered mortared bricks and a central keystone – all assembled on a wooden former which is later removed.



B20 – Gordon gets into cutting off the four straight lengths of pipe for the new steam down-pipes. He then had to cut off two extras as adapters for Dawie to work with. Due to the long spark trails which could damage machinery and parked locos, we use this machine in the cleared walkways.



B21 – Illustrating the previous point, those sparks are showering down the walkway. The cut-off machine is clear off from the other side of the class 25NC's tender. The two gearboxes for the wheel lathe are going to be moved during the week in a machine shop clearing project by the staffers.



B22 – James needed to turn out the interior surfaces of the flanged collars. We are using pipes of a slightly larger external diameter. The right side collar needed more cleaning than the left, as a slightly smaller outside diameter pipe had been used on that side by railways personnel.



B23 – A busy scene in the workshop. Michael Thiel is cheating and using a grinder to put a welding chamfer onto one of the slow-turning pipes, while James Thomson busies himself in making new studs for the steam chest flanges.



B24 – A closer look at some classic Millsite (Krugersdorp) Loco Depot turning techniques – Mike was once employed there as a steam fitter by Spoornet. Notice the protective plastic cover laid out on the lathe bed.



B25 – Mike exchanges Millsite Style for ESKOM Style and turns the big lathe by hand to cut the inner chamfer. This pipe has to withstand boiler pressure, so the welded edges have to be chamfered for full deep penetrative welds.



B26 – As complicated as the old down pipes looked, there was actually only one bend within the lower pieces once removed. We had the new bends fabricated and bent for us, while the straight lengths were standard sections.



B27 – Dawie was busy making the lower end adapters as the steam pipes are wider than the sections that go into the steam chest flanges. The cut off piece was necessary to allow access for welding to the inside of the lapped join for a smooth path for the steam and for a stress-free transition.



B28 – Here's a view of the start of the second pass of the interior weld – as seen through the full width ring that would be welded to the rest of the straight down-pipe section. Note the cleaned and chamfered edge at the near end for deep-penetrative welding to the straight section.



B29 – The magnificent Viljoen was happily occupied welding these pipe ends for most of the day and it kept him out of our way. Both steam pipes will now have matching 6.6mm diameter thick walls and should last many years.



B30 – The steam pipe ends and the steam chest collars wait ready at the end of the day. The smaller pipe ends are to be expanded into tapered rings and then the collar loosely slipped over the pipe before it is tacked together.

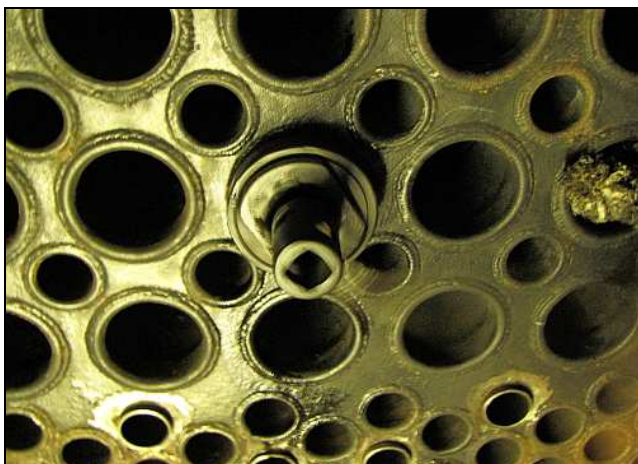
3). PROJECT – 12AR 1535 TUBE LEAKS:



L01 – Alan (LHS) and Gordon re-apply PTFE tape before refitting the test injection line. Procedurally, it does not need to be removed in between tests. But it protrudes into the walkway and is thus prone to damage - so we remove the test injection line every time we finish a round of testing.



L02 – Michael has been to The Mountain, and he is the only one of the boiler boys who can stand up straight in the 12AR's firebox! We had one flue and two tubes reported with cracked beading. You can clearly see the weeping water from the flue tube currently being re-expanded.



L03 – Contrary to popular belief, the rolled-over beads are not intended to seal the boiler. The copper ferrules do that job. You can, in fact, see several new 'naked' boiler tubes that had already been through a boiler hydraulic test (Up to 1650 kPa for 3 hours) withOUT being rolled and welded.



L04 – Shaun grinds down the flue's bead to try to find the crack and to dress it for welding. As it is the copper ferrule that is the actual pressure seal, it is also possible for a tube bead to crack without weeping water, if the ferrule is intact. Those ones are quite difficult to spot without weep water.



L05 – The 6ft3 Smudge-miester literally bends to his task and dresses the cracked bead of a tube, while the boiler is currently being filled by Gordon for a hydraulic pre-test.



L06 – I solemnly swear that I know what I am doing – says He with his LEFT hand held aloft. He does, actually, being a veteran of numerous boiler tube & flue operations.



L07 – For the afternoon test, Gordon is keeping an eye on things and for instructions concerning the boiler pressure. Jeandre had mistakenly loosened a safety valve blanking plate to vent the boiler during the week and hadn't made a water tight joint – so that caused some leaks on Saturday.



L08 – It is fascinating watching guys working in the firebox and Simon gets caught in the single-channel 'Tube-Tube.' The wrapper sheets and boiler got wetted with that extra leak, so the fellows would concentrate on those tubes instead and check for external leaks again during the week.



L09 – Simon just can't take it any more and plunges right in on the full 3D action entertainment. Since getting engaged to a certain blonde Miss, his depot visits are no longer that frequent, so this work is still new to him. But that's how you learn in this place – jumping right in and getting involved.



L10 – Simon gets a-going with the ratchet and driving the tube expander, with the boiler at about 1400kPa. As you can see, we slipped up a bit and had neither the firebox or tube plate cleaned properly, which was another reason why the Boiler Inspector was a tad grumpy on Wednesday.



L11 – Dr. Smudge looks cheerful enough, but there was a little rat of worry scurrying within his mind. We had run out of taper on the mandrel for the flue tube's big expander, and two of the smaller tubes just would not stop weeping.



L12 – While Simon is now wrestling with another weeping tube end, Shaun has to make a call to go on or quit. Tubes cannot be just expanded indefinitely as it spreads the metal, thinning out the tube walls as well as the ferrules.



L13 – Aidan now takes the best seat in the house for the great boiler show, as the tension mounts within. Wisely, he forebore to make comments.



L14 – Just one more despondent rummage in the tool store (soon to be vacated) and SUCCESS. The bigger conical expansion mandrel had been found. (It is the one on the left.) So, we could have one more go at the leaky flue tube.



L15 – Yeah! See that happy bit-more-encouraged smiling face now! (A grumpy Smudge is not pleasant to be near and throwing soap at him doesn't keep him at bay.) However, this would be the last attempt at stopping that flue tube from weeping with the risk of over-thinning those tube walls or 'smooshing' the ferrule within the tube plate.



L16 – He is really putting some grunt onto this one! (Boiler is at 1600kPa.) What makes this tricky is that water gets into the doughnut-shaped cavity between the bead and the copper ferrule. When the tube is expanded, the trapped water is squeezed out under pressure. The trick is to work out if it is a squirt or a leak before over-expanding the tube.



L17 – The fan club is cheering their favourite Smudge on to get that blasted flue sealed. We would have one more round (all taking turns, even lil' ol' me) and then have a last cup of tea with the boiler waiting at full test pressure.



L18 – The flue tube seemed to seal up OK. Gordon Bennett has a go at a tube. Due to a general abdominal hernia risk, he wasn't able to take the ratchet up to the full-squeeze, but he did manage to get a few good licks in.



L19 – That big clanker on the top of the lunch box is the FLUE expander – compare it to the visible TUBE expander on the left. The mandrel is the second last one that we used.



L20 – A cleaned and serviced fusible plug. (The other two will be removed before the first light up and they will be cleaned and the lead section re-cast n' date-stamped.

This was my last photo before we left for tea and let the boiler alone. At about 9pm it was time for the last check and the expanded tubes seemed to be holding the pressure. So it was time to pack our stuff and vamoose to homes, suppers and baths to wash the scent of ye olde fireboxe orf.

4). PROJECT : HUNSLET TAYLOR GEARBOX REASSEMBLY:



G01 – A week ago , Jeandre and Gordon sprayed-cleaned the dismantled Hunslet Taylor gearbox, which had been standing for a few months waiting for the jackshaft gear to be case-hardened and pressed back onto the jackshaft, as well as the counterweights to be fitted. (Pic by VLM)



G02 – Gordon takes over and is doing the gear carrier. The white stuff is degreaser – which was a free bonus as it was discovered forgotten in the recently demolished office in the Compressor Room. The chaps also used diesel fuel in batches for the gears and shafts. (Pic by VLM)



G03 - Gordon took extra time to pressure-wash the floor where the gearbox work had been taking place. The WAP pump works a treat since the mixed up wiring was repaired. It had American 3-phase wiring colours – which uses black as a phase, instead of the neutral as we do. (Pic by VLM)



G04 – ‘Andrew’, the partially disembowelled Hunslet looks on towards his own spread-out viscera. There are four main sections to this ancient gearbox – the basement-level sump is out of sight behind Greg McLennan’s Class 24 tender axles. (Pic by Lee)



G05 – The main frame waits with a cover plate and the input shaft, both chambers forming an upper level sump. Interestingly enough, this complicated frame was not cast but machined. It fits in exactly between the Shunter’s plate frames, hence the lack of paint on the flanks. (Pic by Lee)



G06 – The jackshaft and counterweights went in easily, using the forklift as a hoist. And they had gotten two of the four frame sections bolted together. But the reversing shaft caused some heart palpitations as the new roller bearings were too small for the bearing seats. (Pic by VLM)



G07 – They had forgotten the seating rings, as they had been stored separate from the rest of the components. Gordon found them. These bearings and the previous set (both metricated) are slightly smaller than the originals, hence the need for spacer rings. In fact, the first set of spacer rings were made from brass strip! (Pic by VLM)



G08 – This gear is the jackshaft drive pinion. It survived the break-up of the jackshaft's old gear's teeth, but the old roller bearing got a good dose of the grindings via oil transport over the gear teeth. The canted steel ramp is one of two oil runners which fill up the 'upstairs' oil sump from this gear's drippings. (Pic by VLM)



G09 – Jeandre Gordon does a final close-up diesel spray on the two-speed cluster shaft. The gears themselves are mounted on roller bearings - as they are not shifters, but are rather free-wheeling gears engaged by a double dog-clutch arrangement. Jeandre took care to clean those bearings. (Pic by VLM)



G10 – The shafts are in with the two speed cluster shaft in the foreground. The cross-shaft was once a reversing shaft and had a second crown gear working with that dog clutch. Reversing is now done with the hydraulic clutch. Note the oil dippers that take the place of the missing bevel gear in terms of drip-fed lubrication for the bearing. (Pic by VLM.)



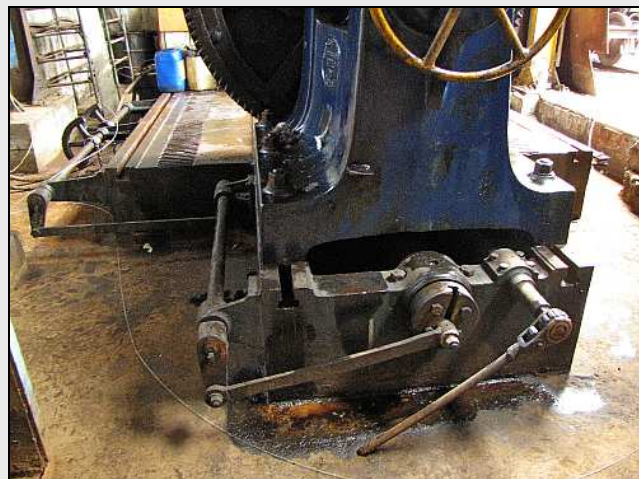
G11 – The upper frame is being bolted in. This gearbox goes together like a big ferrous sponge layer cake, with silicone sealer applied as an oil seal on the joints. Notice the new square key on the counterweight. (Pic by VLM)



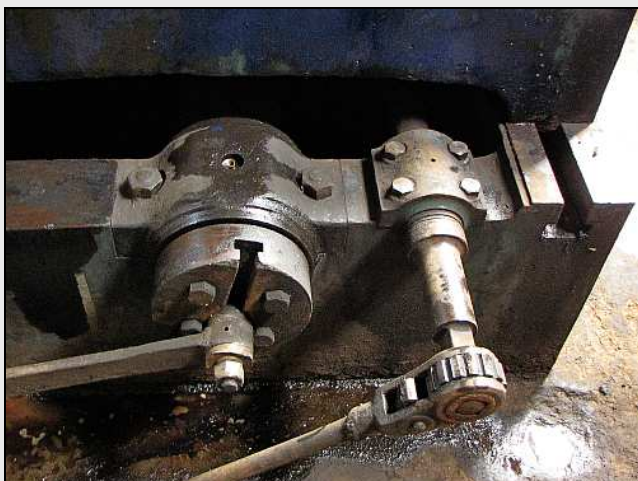
G12 – This rear view shows the gearbox is almost done and Attie (with the coke and boep) has ambled out to check progress. While it is clean, you can see the literally dozens of bolts that hold this 3D jigsaw together. (Pic by VLM)

5). PROJECT : WHEEL LATHE REBUILD:

W01 – Work has been continuing in the wheel lathe house with pressure washing, cleaning and lubrication of the existing equipment. You can still see the oils and diesel runoffs – the floor needed to still be cleaned.



W02 – With the floorboards gone, you can see the crazy-looking linkage and the crank that drives the tool feed quadrants. Notice the ingenious slot arrangement in the crank for resetting the linkages and the quadrants.



W03 – Here's a close up of the tool-feed crank. The shaft to the right advances or retracts the entire tender-side chuck pedestal. The mechanism is complete, including the stock-lock, but it still needs more cleaning and lubrication.



W04 – Both of the tool beds have been cleaned and the tool tower studs freed up. The outer bed still needs to have the rack indents wire-brushed and lubed, but the casual doing the work had since been put onto weed bustin'.



W05 – Clean and green – the tool feed quadrants and their chains were pressure washed.



W06 – Another look at the chain-driven ratchet clutches still waiting for cleaning. This view shows the pawl that is manually rotated to be able to turn the center drive boss backwards and retract the cutting tool.



W07 – The oil cellars had their old wicks removed and were cleaned out. They were deliberately flooded with oil to get the overflow down into the copper pipes. The fact that the oil levels are all down to the wick-stems in a good sign.



W08 – The two gearboxes have all their shafts, keyways, gears and selectors ready, and new Vesconite bearings or liners. (You can see one between the vertical shafts.) Once the lathe has been rotated and its bearings assessed, the gearboxes can move on over for reassembly.



W09 – The switch board, surprisingly, is still functional but the scary switchgear within needs servicing after years of rain water – the motor starter may need to be re-rated to suit the refurbished motor. The drive gear's safety cage looks like we can use it after all, with just one rung needing to be replaced, which saves a bit of extra work.



W10 – The traversing crane's flap and pull cord arrangement works a treat. Not only does it keep rain water off the lathe but also provides a cosy little cave for the traversing crane to stay dry – if the staff and volunteers actually remember to park it under cover ... of course.



W11 – The wheel lathe house now has a new full height access door, with a separate personnel-door inset within. It originally only had a 5 foot high gate. Note too that one of the windows has had the broken glass repaired



W12 – This scrofulous scene shows the main reason for the traversing crane's existence. Work on the wheel lathe project will be slowing down temporarily until the Class 12AR and the Hunslet Taylor locomotives are running.



This Depot Report was compiled by Mr. Lee D. Gates on behalf of Reefsteamers Association NPC.
For observations, corrections and suggestions – email me at documenter@reefsteamers.com

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