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“Old Rube restoration part 23”

This document was written by Paul Naylor in summer 2026 and is the twenty third article in a restoration project. The articles were published more or less simultaneously in the Frimley and Ascot Locomotive Society newsletter.

I finally summoned up the urge to get on with the tender. I had already removed the items from the top that could easily be removed as earlier fill in jobs, so I had to turn it over to get at everything else. I could not wait longer for family muscle, so had a go with the crane and slings myself. It was quite easy to lift it with slings over each bogie and then move it on the end of the crane onto the drive outside and finally lower it, right way up first, onto the ground. Some blankets and a wood block or two helped me lever it onto one side. I could then see how the bogies were held on: just a split pin each on the pivot welded to the frame of the tender. The rub was getting these pins out as they were rusted in and difficult to get at with anything shorter than 150mm, but using some Birkenhead screwdrivers (apologies etc) and naval language they came out eventually allowing the bogies to come off – memo for later, use R clips for reassembly, they will not fall off in operation and are easier to remove.

At this point, I have to correct an earlier comment: the tender *is* braked, on each bogie with actuation using what look like car drum brake actuators driven by air (at least the flexible hoses to each that I had to cut were dry). The whole lot is mounted inside the bogies and was hidden by gunge and bits of bogie: that's my excuse. The good news is it is braked, the bad is that it is more to be checked and 'sorted'.

Taking the bogies off significantly lightened it to the extent that I could lift each end off the ground myself. I then strung it back on to the crane and, while suspended, treated it to a spray with degreaser and a pressure wash – and the same for the bogies. This got off a lot of the sticky old steam oil on the top, but I had to do more applications of degreaser wire brushed in and washed off before it started to look clean. After this lot I was soaked through (there are a lot of angles on a tender that when you spray into them it all comes straight back at you, like radar reflectors on ships!), so it was time to put it all away and let it – and me - dry. It was a lot easier now that it was lighter, and it is now on the floor upside down waiting for me to strip (and check) the underside components (the red strip is my now soaked lifting strap drying off as well). On a superficial glance, more good news is that the



tender wheels look OK and not really worn, and for some reason the underside of the body was not painted black.

About this time, I had paid a visit to a 'steam fair' and got into conversation with a chap that had a small (but still with largish steel boiler) steam car that he had rebuilt. He has fitted an oil burner to it and that is interesting, since I woke up one night a few weeks ago thinking when I finish this engine, will I still be able to find some coal? He uses a central heating burner (running off 250 V AC using a car battery and inverter to power it, but there are 12 volts ones available too). Something like this *might* fit onto the footplate, with or without adaption, and blast through the coal hole door, so that is food for thought in the future.

After walking past (round!) the tender body for a couple of weeks, I thought I had better get on with it... I was not looking forward to dealing with the rusted-on covers. A spur for this was visiting a local grit blasting and powder coating specialist to get a price and in order for them to do this, they needed dimensions, so I manoeuvred it to a suitable place outside for photos. Then I thought no time like the present, so got the angle grinder out to cut the 'hatches' out. After wearing away four 1mm cutting discs, I was able to see inside the tank, presumably the first eyes to do this for 40



odd years. Since there was a brace across the larger hatch, this complicated the cutting out a bit and it ended up in more than one piece. After these photos, I cut away the cross bit of the brace away too, although this was a little messy owing to poor access. I



cannot see any evidence of coating on the steel inside and it was quite rusty: this is what 40 years of wetting/drying a bare steel surface does. I got the scrapers out to get the flaky rust off so that I could see the condition of the steel underneath (hoping not to find very thin remaining sheet and/or holes). There were three shovelfuls of flakes after this, but no holes or dubious looking plate. I imagine that it is thinned in places of

course, but since it started out 1/8" thick, I think there is sufficient left for the purpose. Whether the grit blasters leave any steel of course is going to be a moot point.

As an aside, I took a photo of the thickest bit of flake (about 25 square cms) - it is nearly 5mm thick. When steel oxidises (rusts), the resulting compound is a mixture of the original iron, plus an assortment of elements from the environment making compounds mainly like hydrated iron oxides. The chemical formula for these is similar to $\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$, where n might be greater than 1. In crude terms, this means that for every two iron (Fe) atoms, there are at least four Oxygen (O). Ignoring the hydrogen (H) because it is very light, this in turn means that for every original iron only atom, atomic weight 56, there are at least another two oxygen atoms, atomic weight each 16 – so rust weighs at least 57% more than the iron did that it came from, and it takes up more space. This means that the tender weighs more now than it did when it was new, and the volume is more, hence the flaking causing deflection and disturbance. For those with experience of rusting older cars, this will not be a surprise!



I also cut out a larger hole for the front hatch: I intend to make two more 'hatches' to cover these holes, but as boxes let into the tender top. The larger rear one will be about 80mm deep to house things like a 12volt battery and compressor, and the front one to hold coal. I will also make them easier to remove to check the insides from time to time. There will be a loss of water space as a result: I did try to work out how much loss this would be in terms of running time between refills, and it came out as a reduction from around 10 laps of my club track (c10km) to around 8 laps so not really significant. This alteration means some metal bashing and welding 2 or 3mm thick steel (the tender seems to be 3mm/1/8") as the next major job before it goes off for grit blasting and powder coating (inside and out). I looked through my stock of sheet and found some 3mm... and it was exactly the right width for the hatch widths! That saved some time and a couple of cutting discs. In case you wonder where this sort of 'stock' comes from, I had a habit a good few years ago, of raiding (with permission of course) the skips of an engineering company I worked for and also from time to time, paying them scrap rates for odd bits of steel that I thought might come useful one day. Other projects have not required the use of 3mm steel in any quantity, so I still had it...



I don't have a bending machine, and all the ones at companies I used to know around me have gone, so out with the heavy hammers. I started with the large (and rectangular) cover, making it in three pieces: a long bit for the length, two ends and flanges, and then two side pieces with a flange on each. This way, all the bends are relatively easy to make by hand and I don't have lots of cutting and welding that more flat pieces would need. I marked out and cut the sheet with the angle grinder, and bent the pieces up as best as I could with the aid of some heavy steel bar G clamped to the plate and then bashed as evenly as I could with a large hammer until the folds were at 90 degrees. Inevitably, there is a large corner radius this way that more bashing can reduce. Not as neat as a large folder would do the job but sufficient, I hope. Actually, the hardest part of this is putting up with the noise (wear ear defenders!), then the complaints afterwards (wear ear defenders here too... but choose times sympathetically). After checking and fettling the bits to fit each other, and grinding some weld preparation into the plate, I tacked the bits together. For this gauge, I tend to use my MMA stick welder, although I will only attempt welds on the outside edges, leaving those inside clean. The point of these covers is that they are for holding stuff rather than adding essential strength, so as long as the welds are sound (and stop water entry from the tender when it is full), they will suffice. The photo shows the results after tacking. The numbers visible refer to the size of the main plate before bending.



I intend to get the other cover up to the same state then have a grand welding session: I want to get the noisy bits out of the way quickly. The weather is currently tropical and welding during it does not fill me with enthusiasm.

This is now done and I can put the ear defenders away for a bit. This cover is a little smaller, but it does have the complication of a sloping bottom to make it easier to scoop coal. I have checked that they both approximately fit their respective holes in the tender.



Welding completed, ground smooth and holes tidied up in the tender top now, the photo shows them in place, I need to think about holding them in next. Since they (and the tender) will be powder coated, I also need to arrange the means to hold them down, and also any bits and pieces for the contents of the rear box, intended to hold a battery, air compressor and no doubt a relay and wiring. The rear box in particular is likely at some point to get flooded with water (note proximity to the tank filler) and so I need to include a drain of some sort since turning the tender upside down in operation is not an option.

The contents of the rear box will be protected with a wooden cover including a tandem seat in due course.

