A.H. WORK IN PROGRESS Autumn 2025

Once again the time has come to provide an update on progress with *Normandy*, the Adams B4 class 0-4-0 Tank locomotive.

Since the last newsletter a lot of work has been done, primarily on the further stripping the chassis of all of its valve gear parts, and lifting it off of its wheels. As one removes these parts it gradually becomes evident that further work is required on lots of it, hardly surprising considering the amount of work it has done here on the Bluebell Railway. Not to mention the fact it was built back in 1893 or so. Shunting engines seldom lead a cosseted or sheltered life!

To start with, we found the rear coupling hook was worn down to an excessive amount and was in such a condition that it needed replacing. Building up with weld is a procedure that is totally unacceptable on such a stressed and safety critical component but a rummage in our storage came out with one that was in virtually new condition, but was about 3 feet longer than we needed. Our horizontal band saw sorted that bit, out but then it needed threading to take the retaining nut, plus the square shank was a little too large. It was mounted in the lathe and Malcolm carefully screw-cut the thread. After that he also made a new nut to suit. (Fig 1 & 2).

Fig 1. Shortened coupling hook ready for screw cutting

Fig 2. Reworked coupling hook being trial fitted New nut can be seen on top of the framing

At this time, while the chassis was still on its wheels the cut off studs that were used to hold the main steam pipes and also the exhaust pipes to the valve chests were tackled. Keith Sturt's many years of experience together with bucket loads of perseverance and patience allowed him to remove all of these studs without damaging the threads in the cylinders. The holes in the valve chests into which those studs were screwed resides underneath the bottom plate of the smokebox, about 1½" above the valve chest casting. (See Fig 3).

Fig 3. the plate over laying the valve chests. The cut off stud near the front shows the problem. These studs are firmly rusted into their threaded holes.

A major part of the work at this stage is removing great thick coverings of congealed grease, oil, ash and coal dust mix off of all of the parts prior to finding what fastenings one was dealing with. The whole of the mainframes were also similarly covered, often requiring burning or melting off before finishing by scraping and finally needle gunning. All of the frames both inside and out have now been needle gunned and painted in red oxide primer. As before the great majority of the work in dis-assembling, and needle gunning has been carried out by Melvyn Frohnsdorff. (See Fig4 & 5)

Fig 4. This shows the two right hand eccentric straps with the horn behind that is bolted to the frames.

Fig 5. The frames now cleaned, needle gunned and in primer.

The lifting frames made for the Atlantic were renovated where necessary. So once we had finished with the chassis on its wheels the time came to lift it leaving the wheels on the ground. (See Fig 6)

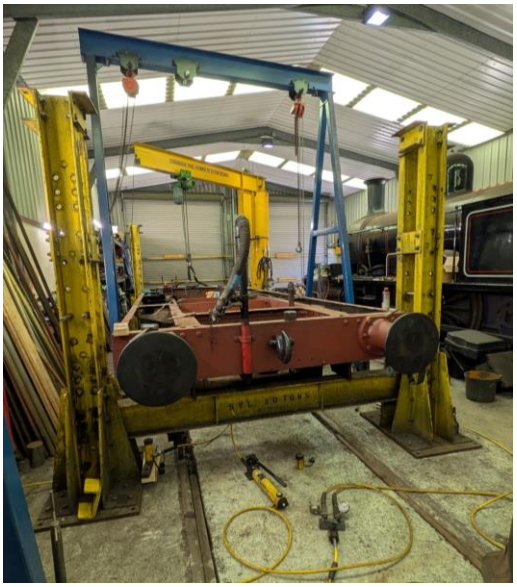

Fig 6. The lifting beams in place under the frames ready for lifting.

Getting to this stage though took a lot of effort as most of the taper pins and the spring suspension pins were firmly held in place by corrosion and lots of various contaminants mentioned above. Again lots of heat from the oxy acetylene torch was required to loosen most of these parts followed by drifting out the part with suitable sizes of punch. (See Fig 7)

Fig 7. The horn stay on top of the spring
and the axle passing through the axlebox.

Once all the springs had been lowered off of the hangers and the horn stays removed we could raise the chassis using the lifting frames and leave the wheels with their axleboxes on the rails. At this time we could really see the state of filth that the wheels and axleboxes were in and of course likewise the frame faces behind them. (See Fig 8).

Fig 8. The frames now lifted, the wheels
still on the rails. Note the dirt behind the
area previously made inaccessible by the wheels.

A review of some of the valve gear parts and their condition, which in general was not too bad with some exceptions showed the eccentrics sheaves when compared dimensionally with the eccentrics on the axle were useable as they are. The clearances are within tolerance and wear relatively light and once again though cleaning was necessary.
(See Fig 9 and Fig10).

Fig 9. Valve gear parts removed, in the foreground the Expansion links, the omega shaped part is an intermediate valve rod that dodges over the leading axle, and eccentric straps and rods behind.

Fig 10 To the left is the dirty eccentric strap as removed and, on the right, the cleaned version.

The expansion links and their respective die blocks were a little unusual as the right hand ones show considerable wear on both parts, but the left hand ones are fine as they are. (See Fig 11).

The bearing surfaces of the axleboxes looked good on all but one, where the white metal in the top of the box had at some stage melted and run out, some getting between the sides of the box and the oil tray underneath virtually soldering the two parts together. There seem to be problems with the fit of the horns, wedges and axleboxes as they appear to be allowing an excessive amount of side play to the wheels on their axle. The horns that contain the axleboxes and allow for their moving up and down are known as wedge type. One face of the horn is tapered, wider at the bottom than at the top. In between this tapered face and the vertical face of the axlebox there is a wedge. This has a stud on the bottom passing through the hornstay so it can be finely adjusted up or down to get the fit of the axlebox in the fore and aft direction and so also take up any wear that takes place in service. A thorough investigation will have to be conducted here before deciding the form any remedial action will take.

Once the frames were up in the air, then access was improved for needle gunning all the parts inaccessible before and the driving wheels could be rolled out and cleaned and then.

Fig 10. The cleaned wheels in black undercoat.

painted in primer and two coats of undercoat. (See Fig 12

Access to the cylinders and valve chests became easier so the front valve chest covers were removed. The B4 design is quite well thought out as there are large covers too on each valve chest facing each other and these allow good access and sighting of the steam ports, making valve setting a lot easier. To release the valves you have to remove the valve crosshead from the valve spindle. As with the crossheads and piston rods these are attached to each other by a self locking taper held in place with a tapered cotter through a slot. The cotter is initially simply removed but then the tapers have to be prised apart using a special three part tool. One part pushes on the rod itself inside the slot the second fixed part pushes on the outside of the larger part and between the two a wedge is be driven between the two fixed parts. We eventually managed to separate those on both sides of the engine allowing the valves and their buckles could be removed. The valves were both in good order, partly worn but re-usable. The spindles on both buckles are bent slightly and will need straightening in due course.

The piston and crosshead required separation. Again this is a self locking taper, but much larger. We have a hydraulic splitter to separate these parts used on all the BR standard locos plus lots of others, The B4 crosshead is too small to accept the BR standard hydraulic splitter, so again something new had to be made. A dummy gudgeon pin was machined from good quality steel, a hole was drilled then bored prior to tapping a hole right through it. We decided on 7/8" BSP as being a good size but with a fine enough thread yet robust enough to take a screw that will be tightened to its limit (or ours to be truthful!). (See Fig 13).

Fig 11. The dummy gudgeon pin with the fine pitched screw used to apply pressure onto the piston rod.

The dummy gudgeon pin fits through the crosshead replacing the original one, then the screw is threaded through it. The front end of the screw has a centre drilled hole in it as has the piston rod. When nearly in contact a hardened steel ball is positioned so in both the centre drilled holes in the screw and piston rod. The idea is that the ball helps prevent the end of the screw expanding under the pressure being exerted on it by the over tightening. Even with a length of pipe over a spanner no sign of splitting occurred so while under load the part of the crosshead with the piston rod taper in it was heated as quickly as possible using a large oxy propane torch. The crosshead should then expand slightly and its grip removed, and this is what happened to both sides. (See Fig 14 & 15).

Fig 12. The crosshead here is being heated to expand It while force was being applied to the piston rod.

Fig 13. Here you can see the taper on the piston rod that fits into a matching one in the crosshead. Also the slots in both items that take the key that retain the parts in case of shock loadings such as water trapped in the cylinders.

Meanwhile, Dave Westcott has been quietly working away renovating the vacuum brake ejector and is now making good progress with the steam brake valve. All of which are in need of a lot of care and attention after years of use. I must also welcome two new volunteers to our group, David Bell and Eric Pilbeam, known as John. Both have been doing sterling work in cleaning up components and getting primer paint on them for protection. David too has been assisting Richard Blakesley in getting the wheels cleaned primed and undercoated.

Just to prove something productive has happened here is a photograph of the original regulator casting now fully re-machined in our main works, ready for installation-- eventually! (See Fig 16)

Fig 14. Here is the re-machined regulator body.
When will this be installed!

Other than various works in Atlantic House I have been sketching out the new cab plate work. The locomotive is currently is the custodian of and owned by the Bullied Society. It was their wish to return it to the condition in which it was last when working for British Railways. This form of the cab is certainly not pretty, but does provide better weather protection for the crew and uses some of the replacement parts made by them in the early 1970s,. This does limit the colour schemes unfortunately to just black.

STOP PRESS! We have just lowered the slide-bars and crossheads and withdrawn the pistons. Hopefully I will include pictures next time.

Fig 15. Shortened coupling hook ready for screw cutting

Fig 16. Reworked coupling hook being trial fitted.

New nut can be seen on top of the framing.

Fig 17. the plate over laying the valve chests. The cut off stud near the front shows the problem. Bear in mind these studs are firmly rusted into their threaded holes.

Fig 18. This shows the two right hand eccentric straps with the horn behind that is bolted to the frames. In as received condition!

Fig 19. The frames now cleaned, needle gunned and in primer.

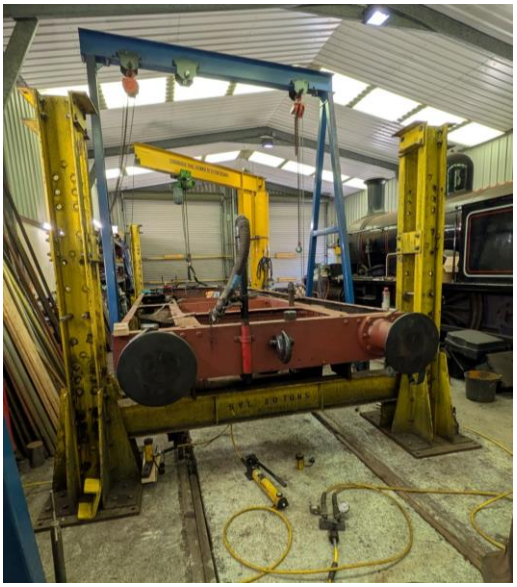

Fig 20. The lifting beams in place under the frames ready for lifting.

Fig 21. The horn stay on top of the spring and the axle passing through the axlebox.

Fig 22. The frames now lifted, the wheels

still on the rails. Note the dirt behind the
area previously made inaccessible by the wheels.

Fig 23. Valve gear parts removed, in the foreground the expansion links, the omega shaped part is an intermediate valve rod that dodges over the leading axle, and eccentric straps and rods behind.

Fig 24. To the left is the dirty eccentric strap as taken off of the engine, the rod to the right has been cleaned.

Fig 25. The cleaned wheels in black undercoat.

Fig 26. The dummy gudgeon pin with the fine pitched screw used to apply pressure onto the piston rod.

Fig 27. The crosshead here is being heated to expand it while force was being applied to the piston rod. Note: we spotted the screw was not correctly positioned and it was rectified prior to continuing.

Fig 28. Here you can see the taper on the piston rod that fits into a matching one in the crosshead. Also the slots in both items that take the key that retain the parts in case of shock loadings . For example water trapped in the cylinders.

Fig 29. Here is the re-machined regulator body.
When will this be installed!