



**60163 TORNADO**  
New Steam for the Main Line



**2007 PRINCE OF WALES**  
Building Britain's Most Powerful Steam Locomotive



**3403 ANON**  
Recreating Gresley's last design

# THE COMMUNICATION CORD

No. 66 Summer 2022



David Elliott

Front view of the cylinder block.

## THREE-IN-ONE

by Graham Langer

If it's not considered blasphemy, one could claim that this is the P2's "Holy Trinity" (or should that be "Holey Trinity"?), so long desired and now reality. Howco in Irvine have performed miracles to fabricate and then assemble this incredibly complicated piece of engineering. Now that the cylinder monobloc has been welded together

it will be heat-treated to stress-relieve the completed component, followed by further detailed measuring before delivery to Darlington Locomotive Works. The challenge will then be to mount the monobloc in the frames and start the process of producing, machining and fitting the Lentz/Franklin valve gear, arguably the most significant

part of *Prince of Wales* and the thing that will set the new P2 apart from any other main line locomotive in the UK. None of this would have been possible without the continued support of our Covenantors and there is still time for newcomers to join the party - the next couple of years are going to be momentous. **TCC**

# CONTENTS

PAGE 1  
**Three-in-one**

PAGE 2  
**Contents Editorial**

PAGE 3  
**From the Chair**

PAGE 4  
**AI overhaul overview**

PAGE 5  
**AI overhaul report**

PAGE 10  
**AI electricals update**

PAGE 11  
**European Train Control System (ETCS) update**

PAGE 13  
**Shed notices**

PAGE 14  
**Railtours Covenantors' Diary**

PAGE 15  
**The AI Steam Locomotive Trust is your legacy**

PAGE 16  
**The big picture**

PAGE 18  
**AI profile - No. 60137 Redgauntlet**

PAGE 20  
**Indicating locomotives**

PAGE 22  
**AI Engineering update**

PAGE 24  
**Club Badges**

PAGE 25  
**'The Monobloc Club' visits Howco**

PAGE 26  
**DW2 update**

PAGE 27  
**Join 'The P-Way Gang'**

PAGE 28  
**P2 Fundraising update**

PAGE 30  
**Workshop notes**

PAGE 31  
**From the archives**

PAGE 32  
**Sponsors and contact information**

## EDITORIAL by Graham Langer



In dealing with the day-to-day management of the Trust it can sometimes be easy to lose sight of the amazing process we are involved in, the constant challenges of keeping such a mammoth project on track blinding us to what we have already achieved and the prize still to come. It will be sad to leave Darlington Locomotive Works when the new build in Bonomi Way is complete but the new facilities will transform the way the Trust operates in Darlington and give us direct access to Network Rail for the first time. One of the most awkward parts of the Hopetown Lane building is the cramped entrance lobby and yet this is also one of its most charming features, new visitors are funnelled through the narrow passage before turning the corner into the workshop itself, which is normally the point at which there is a sharp intake of breath! I recently had the pleasure of escorting a friend from the United States round the Works and, despite the fact that he had been much involved in main line preservation in that country, he still exclaimed, "Oh! My word! What a sight!", as he turned the corner and saw No. 2007 for the first time. If our new locomotive can produce such a reaction from a man used to Union Pacific 'Big Boys' and 'Challengers' just imagine what the great British public is going to think!

I am sure that we will all share the engineering team's disappointment that *Tornado* will be unable to return to the main line this summer as planned. An already comprehensive overhaul became increasingly complex, a problem compounded by delays re-tying the wheelsets and overhauling the boiler as well as the massive scope of work required to modify the locomotive for the installation and commissioning of the European Train Control System (ETCS). The in-cab signalling fitment will be the first time that a British steam locomotive has been so equipped and there is enormous

pressure to ensure that it is done right, first time – *Tornado* will then lead the way and provide a pattern for other locomotive owning groups to follow suit. The fitting of ETCS may well mean that we are one of the few steam locomotives able to operate on the East Coast Main Line (ECML) once the system goes live. The Welwyn Garden City-Hitchin section of the ECML is expected to be fully upgraded in early 2024, before migration to ETCS begins in early 2025 with the complete roll-out of ETCS on the southern ECML expected in late 2029. Management staff are currently undergoing training with ETCS, while driver trainers are due to begin training in 2024, before all drivers begin training with the new system from June 2026.

It is estimated that the first of a type or class can cost up to £5m, but *Tornado* is forecast to cost significantly less and be the first steam design. The other big news story, covered in this edition of *TCC*, is the rapid erection of our new home in Bonomi Way, adjacent to North Road railway station. Since breaking ground in March, contractors working for Darlington Borough Council quickly cleared the site and levelled the area for the footings to go in. Drainage has been laid and the first steelwork has already been erected. We are extremely grateful to our partners in this project, the lynch pin of the Darlington Railway Heritage Quarter, Darlington Borough Council and the Tees Valley Authority, in financing much of this work. However, the Trust has undertaken to provide and install the trackwork required for which we have launched a new club, 'The P-Way Gang', read all about this on page 27.

It is an acknowledged truth that the Trust would be unable to function without volunteers, indeed the input made by the Trustees alone must be worth tens of thousands of pounds per annum. However, anno domini is catching up with some of our long-standing helpers and the Trust now has a number of volunteer vacancies to fill. One of the most critical roles

is that of Work's Guide, ideally we need a number of people to Darlington with a good working knowledge of both the A1 and P2 Classes who would be able to cover a Saturday or two a month, 10:00hrs until 15:00hrs – this is an exciting time to undertake this, as the Trust makes the transition from the old carriage works in Hopetown Lane to new, bespoke premises in Bonomi Way. We also require the help of volunteers who are able to work digitally, either helping to keep the office records and crunch numbers or to manage the Trust's enormous photographic archive – experience in either area would be helpful but not essential. Contact volunteer@a1steam.com if you think you can help. In addition we are also seeking a Data Administrator, a full-time temporary position, duration six to eight weeks enquiries to officemanager@a1steam.com .



One of the most recent images from the construction site.

Unfortunately it is my sad duty to record the passing of Tom Greaves, one of the railwaymen who indicated No. 60136 *Alcazar* in 1957 and whose memories of that day we published in the last edition of *TCC*. [tcc](#)

Steve Davies

## FROM THE CHAIR by Steve Davies



Life's experiences can be hugely contrasting, and that is certainly the situation we find ourselves in here at the Trust. As you will read elsewhere, the overhaul of *Tornado* has had its frustrations, not least in the identification of a number of unexpected problems, and of course with the delay in completion of the boiler and supply chain issues which seem to be indicative of the current troubled times across the whole of UK industry. However, the sight of immaculate, freshly applied apple green paint is a sign that we have turned the corner and are now on the home straight. The parallel installation of the European Train Control System (ETCS) to allow the engine to operate on the East Coast Main Line (and elsewhere in due course, under the new Network Rail signalling regime) is an honour for us in that we are part of the main line steam fleet test bed, and it is reassuring that we are about to be future-proofed against the day that ETCS becomes mandatory for all main line steam locomotives. Nice to be in at the start, as they say.

Delivery of key components for the P2 have been a tonic for team morale with, for example, the newly fabricated inside connecting rod now receiving the Ian Matthews polishing treatment, so good your Chairman can shave in the reflection, he does it so well (*rather hard to hang on your bathroom wall though!* – Ed.) and, in particular, imminent completion of the fabricated three-cylinder monobloc. This really is a very special and iconic part of the project, expertly modified from the original by David Elliott, as I'm sure those Club members who visited Howco in Irvine to see it will testify.

Meanwhile a few hundred metres away from our current

home, our new workshop facility is making rapid progress and we look forward with eager anticipation to occupying it in about a year's time. We also look forward with huge pleasure to the forthcoming Convention when we hope to reveal yet more progress across a broad front, but also make the point – yet again (groan, I hear!) – that the P2 and our other projects can be delivered only as quickly as the money supply can be maintained. These are challenging times for everyone across this great country of ours, but if you feel you can increase your current contribution, or indeed join the cause, then we will be forever grateful. In the meantime, may I thank you for your support, in whatever shape, size or form it may take, to help us fulfil the dreams we all share in bringing long-extinct LNER classes back to life. [tcc](#)



The Chairman's new shaving mirror!

David Elliott

## AI OVERHAUL OVERVIEW by Ben McDonald

Since the previous overhaul report we have achieved good progress combined with several setbacks, which taken together have led to delay to the original planned schedule and the completion date for the locomotive. On the positive side, the tender chassis has been re-wheeled and painted and the additional conduit and electrical work completed in preparation for Phase 2 of the European Train Control System (ETCS) installation.

Our small electrical team is now ready to begin the installation of the multitude of cables into the new conduits and termination boxes. The locomotive driving wheels have been re-tyred and profiled at South Devon Railway Engineering and are now back at Locomotive Maintenance Services (LMS) in Loughborough. Some small cracks in the crank axle wheels were identified, repaired by welding and subjected to further testing before the tyres could be fitted, which added some delay. These will be cleaned and prepared for painting in the next week and once painted, the cannon boxes can be reassembled before they will be ready to back into the frames.

A small team has painstakingly cleaned the frames, removing every last sign of oil and grease to prepare them for painting. At the same time, some of the intermediate frame stays have been inspected and refitted with new bolts and rivets and the hornguide liners are away for grinding before refitting to the frames ahead of replacing the wheelsets. The cylinders and valves have been bored and the piston heads are being built up with weld prior to machining to the correct size and new rings manufactured before they can be refitted into the bores and the remainder of the motion completed. All the rods and key components have been tested to check for any signs of stress cracks or fractures and the bronze bearings are ready to be white metalled and machined to the correct sizes.

Working with our ETCS partners, the redesign of locker space and the final layout required to fit ETCS equipment during Phase 2 of the works has progressed slowly. The tender lockers on the fireman's side of the cab have been rebuilt and changes to some of the locomotive and tender air systems are underway to enable ETCS to control braking in addition to AWS and TPWS which will remain active for running with current signalling systems. With most of this welding work complete, painting of the tender tanks has begun, with the driver's side and the tender back having received their first coats of undercoat.

Readers will be aware that the AI's boiler is at DB Meiningen being refurbished as the (new) spare boiler would not have been ready to meet the AI Overhaul schedule. Further delays have occurred as components were delayed in

shipping and clearing customs – Brexit has certainly made importing and exporting goods more bureaucratic and costly than previously and can add significant delay if the appropriate paperwork is not correct. Unlike other commodities frequently transiting between the UK and the EU, surprisingly not many steam locomotive boilers, air pumps and turbogenerators do, and knowledge and understanding of how to treat these correctly for customs purposes has been something of a nightmare! Shipping and receipt of the forged firebox corners required to finish the welding in Meiningen has only just been completed and the boiler is ready for a final inspection by our own boiler inspector prior to the tubes and flues being fitted and a hydraulic test in Germany. Once complete, the boiler will return to the UK for a steam test before the cladding can be refitted and the fittings and cab controls added. The boiler cladding sheets have been refurbished by Ian Matthews at DLW and most of the boiler fittings have been overhauled by a small group of dedicated volunteers and are in store ready to fit once the steam test is complete.



**Tornado's 'face', the refurbished smokebox door, ready to be re-fitted to the locomotive.**

Finally, the AI Support Coach No. 21249 currently resides at the Great Central Railway and has been maintained in running order even though it has not turned a wheel since before Christmas. We have a second set of Commonwealth bogies, which are currently being refurbished at Nemesis Rail in Burton upon Trent. Both these bogies have now returned from shotblasting with no faults so will be painted and progress made on starting to reassemble them ready to exchange for the pair currently under No. 21249. The bearings have been removed from all the re-tyred wheelsets and are beyond repair, so not suitable for refurbishment, but this was anticipated and a full set of replacement bearings is in stock. The pedestal liners have been prepared and are ready for fitting to the frames ready to receive the wheelsets once the bearings and axleboxes have been refitted. Once the bogie swap is complete, we will look to refurbish the old bogies ready for use with No. 35457, the P2 Support Coach, which is also at the Great Central Railway and has been in use as a brake coach on GCR dining and service trains. **TCC**

## AI OVERHAUL REPORT by Richard Pearson

In Loughborough, work continued to ready the locomotive for receipt of the larger components being overhauled in various locations, such as the boiler. This process saw parts of the locomotive being painted and lined ready for *Tornado* to roll out in the iconic Apple Green livery.

**1. Alex Burnside of the Great Central Railway engineering department preparing the bogie and Cartazzi wheelsets for further painting prior to lining out.**

**2. Sarah Jarman of Sarah Jarman Art starts the long task of lining all the components to restore the locomotive to apple green.**

**3. New roller bearings are being fitted to the tender wheelsets from spares stock as the originals required overhaul, and due to issues with supply there were no seals available.**

**4. The cylinder block has been needle-gunned by Ian Greenan and painted ready for the lagging and cladding to be fitted.**



**5. One of the most time consuming and labour-intensive jobs has been refitting the brake stretcher. This is now 50% assembled with new bolts.**

**6. At LMS the two air brake cylinders, which had recently been overhauled at DLW, have been refitted to the tender frames. In between the air cylinders can be seen the new rubbers spring/disc assembly for the engine to tender draw bar, once connected with the engine the large nut is tightened to compress the rubber springs which provides the tension between the engine and tender.**



7. In the tender, new lower coal space upright gussets have replaced the rotten sections.



8. The overhauled and reassembled cylinder drain cocks on the shelf at LMS, ready to refit to the engine again.



9. A new set of T-Bolts for the superheater elements under manufacture at LMS.

10. Significant structural alterations have been required to Tornado's tender front to accommodate the new ETCS cabinets. Here the metalwork is seen being cut away.



11. This image shows the replacement structure in place.

12. Front bufferbeam and fall plate from between engine and tender shotblasted and now in gloss ready for refitting.



13. Brakegear in the process of being rebushed and pinned as required.



14. Intermediate reverser wayshaft and middle engine reverser arms NDT tested and ready for refitting.



15. Cartazzi axleboxes refitted to re-tired wheelsets and examined bearings. Now ready for refitting to the locomotive.

17. Front bufferbeam gussets and brackets shot-blasted and now painted ready for refitting.



16. Apple green again! The rear of the tender in the process of being reassembled and painted.



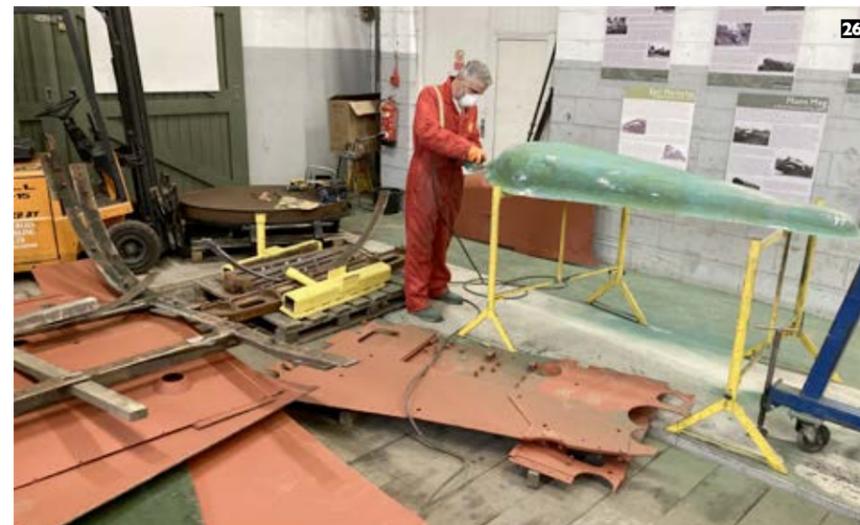
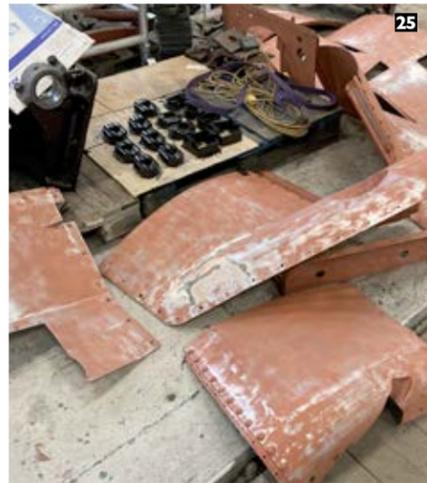
18,19, 20. Tornado's re-tired driving wheels are returned to LMS.

At Darlington *Tornado's* atomisers were overhauled at Darlington Locomotive Works (DLW). This is a very small and fiddly but necessary time-consuming job. The atomisers are part of the locomotive's cylinder lubrication system, and to ensure their efficient and reliable operation they were stripped right down for examination and, where necessary, repair.

**21. Here you can see the component parts of one of the Non-Return Valve (NRV) – oil is delivered from the mechanical lubricator via the NRV, and in normal operation the NRV stops steam (at boiler pressure) from passing back up the pipework and into the lubricator. Work on the NRV's included a thorough clean and de-carbon, the tapered plug valves lapped in with fine grinding paste, and the coil springs replaced with new springs.**

**22. Once the oil has passed through the NRV's it enters a chamber where it mixes with steam, this image shows the mixing chamber inserts, the insert on the right has already been cleaned the other two are still to be cleaned, all three were in good condition and once cleaned were re-used.**

**23. The fully assembled and overhauled LH Atomiser.**



The slow and heavy job of stripping down and overhauling the rocking fire bars is also taking place at DLW. The firebox has twelve rocking firebars, six on each side, and on average we overhaul about one and a half rocking bars per working day. The bars are dismantled, and the individual finger bars removed for examination. Most finger bars require the attention from an angle grinder to dress the edges but some do require full replacement if hairline cracks are found, the main rocking bar and the clamping plates which hold the fingers onto the bars are then set up against a straight edge and where necessary put in the hydraulic presser for straightening, the bars are then fully re-assembled.

**24. Volunteer George Bee assembling one of the rocking firebars.**

**25, 26. The boiler cladding is back at DLW for repairs and painting, as the picture shows, with Ian Matthews sanding the dome cover.**



**27. The smokebox door has had a number of repairs at DLW including fitting a new back baffle plate and a new door ring, both of which were welded on to the back of the door, the heat from the welding process blistered the old paint on the front of the door. The picture shows volunteer Oliver Brooke using a needle gun to remove the old paint prior to sanding and repainting.**



**28. Volunteer Malcolm Harwood fitting the new studs to the main steam manifold.**



**29. The superheater header has been away at Daniela Works for machining and restoration of the working and joint faces. The attached photo shows the header at DLW being prepared for a hydraulic test using the Trust's tried and tested method employing rubber dog balls!**

**30. The cylinder draincocks have been overhauled by the staff and volunteers at DLW, the picture shows one of the six drain cocks going through final inspection before assembly. From top to bottom you can see, the main valve body with newly re-cut valve seat, the new valves and new valve end collars and new split pin, the new return spring and end collars, the cap nuts and locking table.** TCC



## AI ELECTRICALS UPDATE *by Ben McDonald*

Work on the electrical modifications and refurbishments on the engine is almost complete, and the more extensive tender programme is also well advanced. Our ETCS contractor SNC Lavelin has continued to work hard to complete all the Phase I ETCS-ready design work and over half of the drawings have now been delivered.

The AISLT core electrical team comprises Rob Morland, Alan Parkin, Andy Meredith and Paul Depledge. David Elliott is acting as a trusted advisor and continues to support Alan in getting up to speed quickly with everything on the AI. David is also leading on the mechanical design, installation, steam supply and exhaust for the second turbogen which will be required for ETCS working. The Trust scope ETCS electrical system design (mostly the power supply) is complete. Three major electrical and electronic assemblies need to be constructed:

**Turbogen Switch Box** – Containing all the interfacing, start-up control, protection and switching for the two turbogens

**ETCS Battery Box** – Comprising a pair of new 100Ah AGM batteries plus dual chargers and protection circuits

**ETCS Input/Output (I/O) Panel** – Providing control, protection and visibility of the whole ETCS power supply system

Assembly of the ETCS battery box electrical panels is underway offsite. Once these are complete work will move on to the turbogen switch box contents. The ETCS I/O Panel enclosure design has just been completed and will be handed over to the Trust shortly. Alan Parkin has already started work to lay out the front panel, which will be pre-cut to mount all the components. This will be painted and silk-screened before assembly of the panel and the rest of the electronics are fitted.

### Tender Work

The new stainless steel conduit system and associated boxes is now installed on the tender. LMS has carried out a trial fitting of the tender tank to the frames, to check that the new conduits and boxes fitted to the frames clear the tank. This trial was successful and no significant issues were found. The frames have now been moved to the front workshop at LMS, which is a cleaner and quieter environment, more suited to installing the electrical wiring, connectors and electronics. The first new wires have been installed on the tender and identified – these being the power feeds to the water point bulkhead fittings (which have been beautifully refurbished by Liz Gibson).

The next step will be to make up the new main wiring looms



**Paul Depledge and Alan Parkin identifying the tender rear essential lamp wires.**



**Above: Paul Depledge replacing conduit connecting to one of the underframe bulkhead lights.**



**Paul Depledge wiring up a replacement underframe bulkhead luminaire.**



**Reconnected underframe bulkhead light with new luminaire.**

and pull these through the conduits. This work will be undertaken by Alan Parkin and Andy Meredith over the next few weeks. The tender rear marker light assembly had been removed to allow the rear of the tender to be taken back to metal and repainted. This has now been refitted and all 27 wires belled-out and identified, ready for connection to the driver's side rear tender wiring box once the tank has been permanently fitted to the frames.

All the marker lamp housings have had their paint removed and are now polished to a high shine. They look very smart but will be an additional challenge for the cleaners when the locomotive re-enters traffic! We had an additional job to refit and populate the rear headlamp connectors (on the sides of the lower marker lamps), which is also now complete.

The first set of flexible conduit ends to the fixed conduits have been installed. Working with DAE we have determined the best routes for the flexibles in the congested area at the front of the tender. We believe we have avoided conflicts with other pipework that is yet to be installed. Lengths of conduit passing up through the 'chimney' and driver's side locker have been calculated and optimum paths for these will be determined shortly.

### Engine Work

It was hoped that the turbogen switch box would have been wired-up, but the delay in its construction (see above) means that this has not been possible. A further visit will now be needed to complete this work. All the rest of the engine wiring for ETCS power has been completed. The rewiring to allow the steam chest temperature gauge signal conditioner to be repositioned to the turbogen switch box has been completed. A fault in the driver's

side cab bulkhead fitting has been fixed and new bulkhead fittings (to the same design as we have chosen for the P2) have been installed.

We were pleased to say that the three new turbogens (paid for by Network Rail) have arrived safely at DLW. One of these will be fitted to the AI as the second turbogen. All the replacement inside and outside frame lighting strips have been built, installed and tested. The cross-frame conduit displaced when the main stay was removed has been remade, fitted and wired. The opportunity was taken to remove an intermediate breakout box which, being directly under one of the boiler mudhole doors, was susceptible to getting drenched during boiler washouts. All the engine outside frame lighting has been installed and tested.

Paul Depledge and Rob Morland have completed most of the work to provide power to the ETCS. This includes new wiring and use of spares to connect the second turbogen, shore power and I/O Panel outputs to the rear drag box and rewiring of both the front turbogen boxes. The only remaining ETCS-ready work on the engine is the wiring of the Turbogen Switch Box. This is awaiting completion of the box design by Alan Parkin. The box will then be manufactured and fitted by LMS.

### Coach Work

Some additions are required to the coach DC electrical system to enable to the ETCS to be powered from the coach, in the same manner as is currently provided for the ES and AS systems.

This requires additional protection and high-current wiring from the electrical control cabinet in the guard's compartment to both ends of the vehicle. The wiring will be carried in new runs of flexible conduit. Advantage is being taken of the need to lift the body from the bogies for the planned bogie swap in order to carry out this work, which would be virtually impossible with the vehicle on its bogies (all the original underframe wiring was completed before the body was fitted to the bogies). **TCC**



**Water filler light wiring installed with identification codes added. Every wire on the AI has a unique ident number.**

## EUROPEAN TRAIN CONTROL SYSTEM (ETCS) UPDATE

*by Rob Morland*

Meanwhile, in Darlington Locomotive Works (South), Rob Morland has now completed the assembly and bench testing of the electrical panels for the ETCS Battery Box. This is the new box to be mounted under the rear of the tender to house a pair of 100Ah batteries and chargers for the ETCS equipment. The batteries are mounted on the lower shelf and above this are two GWH chargers – the same units as we have used successfully on the engine since new. We need two of them as the 22A current demand of ETCS exceeds the output of just one charger. They are designed for parallel operation and are set up to 'current share'. This also gives us some redundancy – if one charger fails, we will still be able to get 17A into the batteries from the other one. All photos by Rob Morland.



**Components being assembled at DLW(S).**



**Rob bench tests one of the panels.**



Power feeds attached, starting with a Variac on the mains to provide a variable output from one of our old shore power supplies.



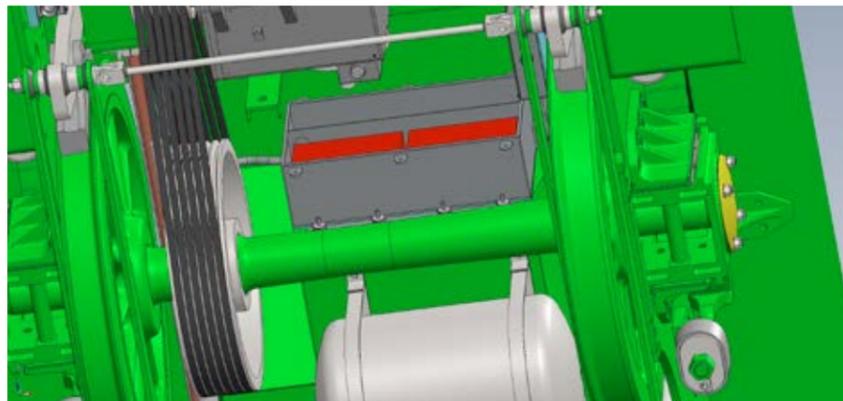
The two GWH converters and associated wiring and protection. These are mounted on two brass panels which attach to the rear of the battery box upper shelf.



There are two of our 68Ah AGM batteries (simulating the 100Ah ones) and the load bank to load up the system.

The old shore power supply.

The system was put on an eight-hour soak test with a load of 22.9A (this is 22% over the expected maximum ETCS demand). It has also had a stress test for two hours at 36.6A (66% over the maximum ETCS load). Everything performed well in both tests. Once the tests have been documented, the equipment will be dismantled. The GWH panels will be boxed up and transported to LMS, ready for fitting and wiring-up. **TCC**



A CAD of the new battery box to go under the tender.

## • SHED NOTICES •

A nameplate from No. 60120 *Kittiwake* came up for sale at GW Railwayana Auctions. Allocated to King's Cross, Copley Hill and York from where it was withdrawn in January 1964 following collision damage, it was scrapped at Darlington Works. The catalogue recorded that the face was restored and the rear carried the names of other similar length plates cast in. It begs the question as to which nameplate this was, given that the nearside plate was badly bent when the locomotive was withdrawn. The plate was knocked down for £7,000.



GWRA



The nameplate as sold at GWRA Auctions.

The reverse of the plate showing additional locomotive names.



Chris Nettleton

The driver's side nameplate following the accident that ended *Kittiwake's* career.

At Great Central Railwayana Auctions' sale in May a clutch of A1 items went under the hammer, starting with a nameplate from No. 60151 *Midlothian* which sold for £8,000, followed by a smokebox number plate (£2,200) and Doncaster works plate (£1,850) from No. 60158 *Aberdonian* (GCRA sold a nameplate from this locomotive in March for £7,000).



Images GWRA

The nameplate from No. 60151.



The smokebox number and works plate from No. 60158.

### The 'Special Relationship' is alive and well at DLW!



Graham Langer

Steve Davies and Jim Heffernan at DLW.

Darlington Locomotive Works was recently visited by Jim Heffernan from Utah. For 25 years Jim was a member of the NRHS, the National Railway Historical Society, while living in the Washington D.C. area. The NRHS undertake of locomotive restorations and are connected with numerous steam special excursions. At the time (1980-1995) they were affiliated with the Southern Railroad steam program, which included the Texas 610, an oil burner, which was then the largest operating steam locomotive in the U.S. Jim was involved in a lot of those operations/excursions over several years. After moving to Utah in 1995, where the NRHS has no chapter, his membership, perforce, lapsed, and his only current steam affiliation is membership in the Union Pacific Big Boy Association. Jim much enjoyed his tour of DLW and was ably looked after by David Elliott and Steve Davies.

## RAILTOURS by Sophie Bunker-James

We are sorry to announce that the September series of 'The Aberdonian' trains is sadly postponed and will not run this year.

This decision has not been taken lightly and is the result of several factors. The first is that *Tornado* itself will not be ready from overhaul in time for these trains. As you'll have read, extra work and a delay on key components have pushed its return to operations back. There is also the continued concern over strike action from various unions which shows no sign of abating, with dates announced across the UK through July and August. This not only threatens the trains themselves, but also makes it much more difficult to consider an alternative steam locomotive. This is a very disappointing decision to have to make and we know that it will be very unsatisfactory for our supporters as well.

Looking to next year, we will be running 'Aberdonian' tours in the Spring and we are working with the railway companies to confirm the dates. We are planning to run 'The Aberdonian' from Edinburgh to Aberdeen on Thursday 27<sup>th</sup> April, and 'The Clyde Aberdonian' on Thursday 4<sup>th</sup> May and there are also dates through the summer of 2023 which are available to book.

The programme for 'Aberdonian' tours 2023 is as follows:

- **Thursday 27<sup>th</sup> April** - 'The Aberdonian'
- **Thursday 4<sup>th</sup> May** - 'The Clyde Aberdonian'
- **Thursday 20<sup>th</sup> July** - 'The Aberdonian'
- **Thursday 27<sup>th</sup> July** - 'The Aberdonian'
- **Saturday 29<sup>th</sup> July** - 'The Aberdonian'
- **Saturday 19<sup>th</sup> August** - 'The Aberdonian'
- **Thursday 31<sup>st</sup> August** - 'The Aberdonian'
- **Thursday 7<sup>th</sup> September** - 'The Aberdonian'
- **Saturday 16<sup>th</sup> September** - 'The Aberdonian'

We will be announcing further tours for the first half of 2023 this September, so keep an eye on your emails for the latest updates. It will be a varied programme, running regularly from the spring. For a little extra luxury, 'The Yorkshire Pullman' (1<sup>st</sup> April) is available to book now. We look forward to welcoming passengers on board again. **TCC**

## Covenantors' Diary by Dawn Phillips



As we near the end of July, planning for the convention is progressing nicely. Invitations should land on your doorstep

sometime in August, and we look forward to meeting you all at Blackwell Grange Hotel, Darlington on Saturday 22<sup>nd</sup> October. If you have any questions about the event, please contact Lauren George or Dawn Phillips on 01325 460163.

We had a fantastic response with our Spring Raffle Draw and raised a whopping fourteen thousand pounds. The winning ticket (a table for two in First Class Dining on a *Tornado* Railtour) was won by a gentleman in Leatherhead. A big heartfelt thank you to all that took part, and to all our lucky winners.

Open Days are continuing to attract visitors with 353 stepping into our Darlington workshop to look at and find out more about No. 2007 *Prince of Wales*. As well as our fantastic volunteers helping to inform our visitors, we will shortly be providing more visual updates to allow people to stop and read about the progress of the P2. Our Open Days are held

on the 1<sup>st</sup> and 3<sup>rd</sup> Saturday of the month between 10:00hrs – 15:00hrs, please refer to our website to gain any updates about these days.

Over the next month, we are meeting with our friends across the field, 'Head of Steam', Darlington Railway Museum, to further strengthen our bonds, and look at opportunities to maximise our visitors' interest in the P2. The Head of Steam will become our immediate neighbours when we move to our new location on Bonomi Way in 2023.

- London Roadshow - unfortunately, due to the ongoing rail strikes which affected the chosen date of 20<sup>th</sup> August, we were forced to postpone the event at the London Transport Museum. A new date has been set for 3<sup>rd</sup> September and we hope to see as many of you there as possible.
- Gauge 1 Model Railway Association 75<sup>th</sup> Anniversary Show On 1<sup>st</sup> & 2<sup>nd</sup> October. Trust members will be taking the roadshow to this impressive event at Bicester Heritage. In addition to layouts in many different scales, expect lots of live steam, vintage cars and aircraft and a miniature traction engine rally, not to mention the on-site brewery and gin distillery!

Other presentations:

- 13<sup>th</sup> September 2022 – Tewkesbury Railway Club, P2
- 1<sup>st</sup> & 2<sup>nd</sup> October 2022 – GIMRA 75<sup>th</sup> Anniversary Show, Bicester, P2
- 2<sup>nd</sup> November 2022 – Stockport U3A, Graham Nicholas, P2
- 5<sup>th</sup> April 2023 – Bristol Society of Model and Experimental Engineers, Huw Parker, P2

Please refer to our website for future events.

And finally... after one day's annual leave, my office manager's seat was already filled by a cute pooch Archie Bruce! **TCC**



**Archie working hard.**

## THE A1 STEAM LOCOMOTIVE TRUST IS YOUR LEGACY

You can ensure that Peppercorn class No. 60163 *Tornado*, Gresley class P2 No. 2007 *Prince of Wales*, our yet-to-be-named Gresley class V4 No. 3403 or any other on-going project at the Trust, has a secure future for generations to come by leaving a legacy to The A1 Steam Locomotive Trust in your Will. When writing your Will, if your wish is for the legacy to go to a specific initiative of the Trust, please specify this and we will of course respect your wishes.

Donations via legacies during the 30 years that The A1 Steam Locomotive Trust has been in existence have been relatively limited when compared to other types of donation – although the Trust has always been extremely grateful for any gifts received. If legacy donations to the Trust were to reach the same level as those for the top UK based charities – where it represents around 40% of fundraising income – the Trust would raise an additional £80,000 per year. This would go a long way towards funding a five-year overhaul for *Tornado* or *Prince of Wales*.

Many Trustees have already made provision for No. 60163 *Tornado* and No. 2007 *Prince of Wales* in our wills by leaving a legacy to The A1 Steam Locomotive Trust. If you would also like to support the Trust through a legacy, then please take a look at [www.a1steam.com](http://www.a1steam.com) or contact our Legacy Coordinator who will talk you through the process on [legacy.coordinator@a1steam.com](mailto:legacy.coordinator@a1steam.com) or 01325 460163.

### How has Legacy funding been used by the Trust?

Legacies helped the Trust during the construction of No. 60163 *Tornado* by funding specific components and equipment in Darlington Locomotive Works. Since completion, generous gifts have helped fund the conversion of BR Mk 1 E21249 into *Tornado's* support coach and contributed towards the repayment of loans and the £500,000 bearer bond.

### What will my Legacy go towards?

A bequest left in your Will will not be used for the general day to day expenses of running No. 60163 *Tornado* or No. 2007 *Prince of Wales* on the Network Rail main line and heritage railways. If you do not state a specific use, we will devote your gift towards the funding



Bob Hughes

### Newly painted in apple green, *Tornado* outside Darlington Locomotive Works, 2015.

of *Tornado's* next major overhaul. If, however you would like your legacy to be used for something more specific, you will need to talk to our Legacy Coordinator in order to realise your contribution and by doing this we will be certain that your gift will be used for a specific purpose.

### To whom do I make my bequest?

If the value of your estate is above a nil rate band threshold value, then it will be liable for inheritance tax (IHT). Any gifts made to UK registered charities are exempt from IHT and further tax savings can be made if you gift more than 10% of your net estate to charity as the IHT tax rate reduces to 36%. A gift to The A1 Steam Locomotive Trust would be classed as a charitable gift and therefore, attracts the favourable tax rules. If your estate is chargeable to IHT, specialist advice should be sought. The A1 Steam Locomotive Trust is the organisation that holds the funds for fundraising projects and has trustees that can accept bequests for any purpose linked to it. The Trust is governed by a Council and its Trustees will ensure your wish is fulfilled.

### How do I make a Will?

You could simply fill out a form from a major stationer or online but if your

affairs are a little more complex it would be much better to take advice from a solicitor. It costs between £150 and £200 to make a Will.

### Can I update my existing Will?

Yes, you will need to produce a document called a codicil; it is not that complicated and suitable forms are available from [www.a1steam.com](http://www.a1steam.com) or from our Legacy Coordinator.

### What wording do I use?

It depends on how you wish to divide up your estate. Details are available on [www.a1steam.com](http://www.a1steam.com) or from our Legacy Coordinator.

So, please remember The A1 Steam Locomotive Trust in your Will and you too can help to ensure that No. 60163 *Tornado*, No. 2007 *Prince of Wales*, No. 3403 and our subsequent locomotives have a secure future on the main line for generations to come. **TCC**



Mandy Grant



The AI Steam Locomotive Trust's new headquarters starts to take shape.

## AI PROFILE – No. 60137 REDGAUNTLET by Phil Champion

As Darlington Works No. 2056 this was the 13<sup>th</sup> AI, over a quarter of the way through the construction of the class, the first record of it being on 20<sup>th</sup> November at the Works, leaving with boiler No. 3926. It was one of eight completed in December 1948, five from Darlington and three from Doncaster. No. 60137 was one of the 23 AIs built by Darlington under an order issued in January 1947. Both the engine and its tender, No. 757, were turned out in LNER-style apple green with white and black lining with 'BRITISH RAILWAYS' lettering on the tender. As with other Darlington examples not only did it have countersunk rivets to give a smooth rather than riveted finish to the tender and cabsides but the numbers and letters on No. 60137 were in old gold.



An undated view of No. 60137 in late condition at Grantham.

It entered service on 3<sup>rd</sup> December from Gateshead shed where it was the fourth AI to arrive in what would be a dozen. While it was seen at Darlington shed on the 11<sup>th</sup> its first recorded working was the 13:15hrs from King's Cross on the 31<sup>st</sup>. The up 'Flying Scotsman' was hauled from Newcastle by No. 60137 a number of times from January to April 1949, that on 8<sup>th</sup> February recorded as a thirteen-coach train. An ordinary passenger train, the 16:31hrs from Edinburgh-King's Cross was taken forward from Newcastle on 22<sup>nd</sup> January with 14 coaches. Workings into Scotland saw it come back with the up fish train, the 17:35hrs from Edinburgh on 8<sup>th</sup> January 1949, passing Heaton with it at 23:00hrs on 11<sup>th</sup> July and working it from Aberdeen to Edinburgh on the 25<sup>th</sup>.

The locomotive visited Doncaster for a general overhaul during May 1950, including a repaint into BR express passenger blue with black and white lining with the early BR tender emblem, and left bearing the name *Redgauntlet*. It was quite

early with the naming, being one of a trio named in June with six named previously. However, it was half-way through the appearance of the class in blue being one of four to be repainted to join the 25 already in blue. *Redgauntlet* was one of those names previously carried by NBR locos, in this case NBR 897/ BR D29 4-4-0 No. 62402 which was withdrawn in June 1949. *Redgauntlet* was thus one of those AIs named after the historical novels or characters in them of Sir Walter Scott. It describes a fictional third Jacobite rebellion but is said to be largely autobiographical.

Typically, Gateshead engines worked between Edinburgh Waverley and London King's Cross. Records from this period show No. 60137 on the 'Flying Scotsman', the up thirteen coach train from Newcastle on 8<sup>th</sup> February 1951 and bringing the down train into Newcastle on 30<sup>th</sup> July. On 7<sup>th</sup> May it had hauled the Delaval-Holloway ECS, seen leaving Stockton at 11:34hrs with nine bogie coaches and three four-wheelers. During

June 1951 the locomotive returned to Doncaster for another 'General' including its first boiler change, leaving with boiler No. 29843. Some 1952 workings took it further afield and unusual was passing Morningside on Edinburgh's suburban line on 15<sup>th</sup> August. *Redgauntlet* hauled the 08:45hrs Edinburgh-Perth on the 27<sup>th</sup> and 28<sup>th</sup>. On 27<sup>th</sup> November it was on the 10:50hrs Cambridge-King's Cross. Starting the next year with a further overhaul at 'the Plant' during February (boiler No. 29851 fitted) which included repainting on BR express passenger green, lined black and orange, becoming one of the last two AIs (the other was No. 60160) to be repainted BR green. 30<sup>th</sup> May 1953 found it nearer home ground working the 08:47hrs Stockton-King's Cross.

Following a 'General' at Doncaster during June 1954, which saw No. 60137 leave carrying boiler No. 10597, ordinary passenger trains on No. 60137's diagram were the 16:45hrs King's Cross-Newcastle on 10<sup>th</sup> September 1954, an arrival at 13:10hrs into King's Cross on 28<sup>th</sup> January



No. 60137 at Princes Street Gardens, Edinburgh on 20<sup>th</sup> June 1959.

1956 and taking a York-Edinburgh train forward from Newcastle on 21<sup>st</sup> April 1957. October 1955 was spent at Doncaster having a general overhaul and boiler change (No. 29811 fitted) and between 1954 and 1958 No. 60137 could be found on a number of named expresses, the up 'Queen of Scots' into Newcastle, the down 'Flying Scotsman' and 'North Briton' from that city, the down 'West Riding' and 'The Heart of Midlothian' from King's Cross and, particularly, the up 'Heart of Midlothian' from Newcastle. *Redgauntlet* was seen on the 'Tees-Tyne Pullman' exiting Gasworks tunnel in early 1957 before another 'General' in April (boiler No. 29817 fitted) the later BR crest was applied to the tender. One unusual working was on 8<sup>th</sup> April 1956 when it was piloted by Class A8 4-6-2T No. 69850 on the 17:00hrs Newcastle-Liverpool Lime Street as it was diverted via Wellfield in east Co. Durham. By contrast, No. 60137 pulled an up goods into Harrogate at 20:45hrs. *Redgauntlet* spent Christmas 1958 back at 'The Plant' undergoing another general overhaul including the fitting of boiler No. 29887. Working the up 'North Briton' but this time from Edinburgh to Newcastle was done on

20<sup>th</sup> April 1959. On 13<sup>th</sup> April 1960 No. 60137 hauled the 16:13hrs Newcastle-Liverpool via Sunderland, albeit in grubby external condition, something which would be remedied during its last general overhaul at Doncaster that August, a repair which saw the locomotive leave with its final boiler to be fitted, No. 10599. Like the other AIs new to Gateshead No. 60137 was transferred to Heaton in May 1960. *Redgauntlet* was seen climbing out of Durham with the 10:10hrs Edinburgh Waverley-King's Cross express



An undated photograph of the locomotive in late condition at Grantham.

one day in September 1960. 'The Night Scotsman' was taken from Newcastle to King's Cross on 12<sup>th</sup> March 1962 and the next day it was on the 16:05hrs back up to York. Though in poor external condition it was pictured steaming well after leaving Newcastle with seven Mk 1s on the 15:30hrs to Birmingham New Street on 28<sup>th</sup> May 1962. 8<sup>th</sup> June found No. 60137 working Edinburgh-Newcastle and back again. An Edinburgh-Newcastle train was again worked on 3<sup>rd</sup> August and the following day No. 60137 hauled the 1M64 troop train, then still a feature of the railway scene.

Reallocation of all of Heaton's AIs to Tweedmouth came in September 1962. Here, a breakfast time Berwick-Newcastle passenger, goods trains, and substitutes for failed diesels on mainline work were common. An example of the first was No. 60137 on the 2G85 Berwick-Newcastle on 14<sup>th</sup> September. The second is shown by bringing a down fitted iron ore train from High Dyke on the 16<sup>th</sup> followed by going on Heaton shed. The third is typified by bringing the 1A41 'Anglo-Scottish Car Carrier' into Newcastle on the 25<sup>th</sup>.

When withdrawn on 29<sup>th</sup> October 1962, No. 60137 was just the second AI to go. It had carried seven boilers, the class average, in its time, all of them to diagram 118. It was in service well over a year less than the average, 13 years and 10 months instead of the average of 15 years 2½ months. On 6<sup>th</sup> January it was still at Tweedmouth. This AI was seen as up light engine at Newcastle at 10:50hrs and was reported stored at Blydenham shed for a while. It was sent to Doncaster Works for scrap on 13<sup>th</sup> April 1963.

*This history was compiled by Phil Champion based on the RCTS book "Locomotives of the LNER Part 2A", a database supplied by Tommy Knox of the Gresley Society and various published photographs. Revised and updated by Graham Langer, June 2020. TCC*

# INDICATING STEAM LOCOMOTIVES *by Graham Langer*



**No. 2001 Cock o' the North is prepared for indication during its trials in 1934.**

'Railway Wonders of the World' was a weekly magazine published in 50 parts during 1935-1936 and having a cover price of 7d. The following is an article from the journal describing the process of "indicating" a steam locomotive. The article was entitled "Testing a locomotive - How the efficiency of a modern railway locomotive is proved". Following the articles in TCC 65 about indicating No. 61036 Alcazar, it seemed sensible to add a bit of detail about the process.

A designer's work on a locomotive does not end when the product of his brain begins work on the track. It is not enough that the engine hauls its load within the scheduled time. Once on the track it must be tested to ascertain the horsepower that the engine is developing in relation to the amount of fuel that it burns; unless this is done the engine may prove to be uneconomical in its work. This test of horsepower requires measurement of the pull exerted by the engine on its train during the course of the journey.

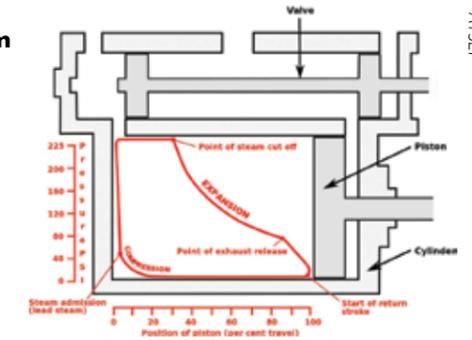
But the horsepower exerted by the locomotive on the train takes no account of the power that it utilizes in moving itself and its tender; therefore, means must be devised of measuring the total horsepower exerted by the locomotive while in motion. To do this, there must be an examination of what is going on inside the engine's cylinders. This examination also makes it possible to determine if, at all speeds from the lowest to the highest, the expansion of the steam in the cylinders is going on efficiently.

Another important line of investigation concerns the boiler; the designer will want to know that the combustion of the fuel on the fire-grate is thorough and complete, and that no valuable sources of heat and energy are being thrown out of the chimney. This calls for an analysis of the gases in the smokebox, and it is necessary for the analysis to be carried out while the locomotive is in motion. All these tests are usually conducted at the same time.

Round the front and two sides of the smokebox of an engine undergoing its tests is a shelter, generally made of sheet steel, and containing two windows in front. This is to house two observers, who, well muffled up, half scorched by the heat of the smokebox, and half frozen by the draughts behind them, "indicate" the engine during the course of the test journey. Their temporary home is known as an "indicating shelter".

The indicator itself consists of a small vertical cylinder with a rotating motion, worked by a connexion off the motion of the engine. Every time the driving wheels of the engine rotate, the

Right: A typical indicator diagram superimposed over a drawing of a locomotive's cylinder to illustrate how the graph relates to the movement of the piston.



Below: No. 2001 storms north from King's Cross with the indicator shelter in place (note the dynamometer car immediately behind the locomotive).



indicator makes one complete forward turn and one backward turn, so that it is in rapid motion, forwards and backwards alternately, all the time the engine is running. An opening is made in the front cover of one of the cylinders, and from this a small tube is led to the indicator. In this steam-tube, therefore, the steam is at a pressure exactly corresponding with the pressure in the cylinder between the cylinder-end and the piston.

As the piston moves away from the cylinder-end, the pressure is at first roughly equal to the boiler-pressure, while live steam is still being admitted; then comes the moment of "cut-off", after which the steam does the remainder of its work by expansion, and the pressure rapidly drops until the end of the piston-stroke. But at this point it may tend to rise again, owing to what is called "backpressure" - that is, pressure on the other side of the piston, as the expanded steam from the last previous stroke is being pushed out of the cylinder up into the chimney, and the final stage is reached when the piston "cushions" that steam up against the opposite cylinder-end. In designing and setting modern valve-motions, the aim is to use the expansive properties of the steam to the maximum, and to reduce the backpressure or cushioning to a minimum, as more efficient working will result from the realization of both aims.

It is of this process of expansion that the indicator diagram gives an exact picture. At the selected moment the observer in the shelter opens a cock in the small steam tube; the pressure

in the tube actuates a small pen, which rises and falls according to the actual pressure in that end of the cylinder; the pen makes a line on the rotating cylinder of the indicator, to which a sheet of paper has been fixed. It is shaped like a boot. The top horizontal part of the "upper" shows the pressure as steam is admitted up to the point of "cut-off"; the sloping front of the boot, where it would be laced, down to the toe-cap, represents the expansion from the cut-off to the end of the forward stroke; and the underside of the boot, from sole to heel, represents the pressure in the same end of the cylinder on the return stroke of the piston, as the expanded steam is being "exhausted" to the chimney. A "fat" diagram is sought; thin diagrams often mean inefficiency, especially if, near the end of the stroke, the return, or exhaust, line crosses above the line representing the final stage of the expansion; this shows that excessive backpressure is taking place.

From the indicator diagrams, which are taken at a large number of selected points during the test journey, it is possible not only to watch the process of expansion in the engine cylinders at all speeds, but also to make an approximate calculation of the total horsepower which is being developed by the locomotive. A certain proportion of this - and the proportion so expended must obviously be kept to the lowest possible percentage - is used in propelling itself and hauling its tender. **TCC**

## P2 ENGINEERING UPDATE *by David Elliott*

### General

Covid-19 has finally subsided within our workforce to the point that it is no longer having a significant effect on work at Darlington. However, our resources are still very much tied up with *Tornado's* overhaul and enabling works for the Network Rail European Train Control System (ETCS).

### Frames

The problem with the Philidas self-locking nuts used all over the frames which were showing defects in their locking devices has moved on. Our supplier has obtained samples of the required sizes for us to check and, having subjected the samples to various non-destructive and destructive tests, I am pleased to confirm that they behaved very well. A large batch of replacements are now on order.



**Crack detection of locking ring after five fitting and removal cycles.**



**Destructive test on a Philidas nut showing displacement of locking ring without cracking.**

All photos David Elliott

**Cylinder block** - Howco at Irvine continues to make good progress on fabricating the cylinder block to the point where it is about to be sent for stress-relieving prior to machining. Howco has managed to keep the critical dimensions (distance between cylinder centrelines, positions of valve ports and overall width) remarkably close to the drawing dimensions and certainly well within the 1/4" to 3/8" machining allowances on all the still-to-be-machined surfaces. We are hopeful that the stress-relieving process will not cause it to change shape excessively!



**The three cylinders are united for the first time, strapped together prior to welding up.**



**The block was then accurately measured using a Faro Arm.**



**Assessing the Faro Arm results.**



**The three cylinders set up for welding together.**



**Above: Rear view of cylinder block showing slide bar brackets and piston rod stuffing boxes**

**Left: The rear end of the left-hand cylinder.**



**The smokebox saddle showing middle cylinder steam pipe flange, blast pipe flange and access hole.**



**The left-hand cylinder frame plate bolting face showing the stiffening gusset to the cylinder.**

## Motion

We have now received the inside connecting rod from Arthur Stephenson Engineers Limited which completed delivery of the “heavy” motion parts. Ian Matthews has polished this rod to the same standard as he has applied to the others.



The inside connecting rod.

## Pony Truck

We are still awaiting welding on of new manganese liners to the pony truck cannon box, as this job is in the queue behind liner welding for *Tornado's* coupled wheel hornblocks and the extensive work being done on No. 60163's tender to accommodate ETCS equipment.

## Boiler

The boiler is expected to be delivered to Darlington before the end of the year.

## Valve gear

With one of the major areas of design modification being the Lentz/Franklin valve gear, we are exploring the feasibility of building a wear and fatigue test rig for a cam box. The complexity and dynamic forces associated with the fully variable cams and their followers would make Finite Element Analysis (FEA) a difficult task and because of the number of variables, would not necessarily provide reliable results. The plan is to make an actual cam box powered by an electric motor and with spring/electro-hydraulic load units

representing the valves to give us confidence in the durability of the design and facilitate minor changes where necessary.

The late 1940s American experience with the Franklin rotary cam system demonstrated that it is inherently reliable, however, we need confidence that the changes being incorporated to enable it to fit into the P2 cylinder block and to not foul the Network Rail loading gauge are not going to adversely affect this reliability.

## Tender

The machining of the tender axleboxes is now complete which brings the delivery of the frames to Darlington closer. However, with the intended delivery of *Tornado's* overhauled boiler to Darlington for steam testing and having the cladding fitted, delivery of the tender frames is being held off until *Tornado's* boiler has gone as we will otherwise run out of space.

Meanwhile Ian Matthews has started making up the conduit work for the tender frames based closely on that designed for the ETCS installation on *Tornado*. **TCC**

**Attention all Club Members!** - Exclusive badges are available to purchase -



**The Boiler Club, The Mikado Club, The Cylinder Club, The Motion Club, The Tender Club**  
**All Club Badges £5.00 each** (Badges shown actual size)

To purchase your badge please send a cheque for the relevant amount made payable to 'The P2 Steam Locomotive Company' and send to The A1 Steam Locomotive Trust, Darlington Locomotive Works, Hopetown Lane, Darlington DL3 6RQ.

## MONOBLOC CLUB MEMBERS VISIT HOWCO by Sophie Bunker-James



The 'Monobloc Club' members who made the pilgrimage to Irvine.

On 7<sup>th</sup> July, members of 'The Monobloc Club' were invited to visit Howco in Irvine to view progress with the construction of No. 2007's cylinder block. The P2 engineering team arrived at about 11:00hrs and were met by two very keen 'Monobloc Club' Members already waiting. The P2 team then had a technical meeting with Howco discussing requirements for blanks, etc. and the two early birds really enjoyed being party to the discussion.

Just before 12:30hrs the other club supporters arrived in time to have lunch in the canteen with the Howco team - including a tasty chicken curry! After lunch everyone got dressed up in very fetching PPE. Howco took the group on a tour around the machine shop explaining what they use the machines for, with the oil and gas industry as Howco's main business. They viewed the inspection equipment, paint and pressure test facility and saw the P2 cylinder liners and valve covers ready to be machined.

The group then went to the Drummond site (two miles away) where the cylinder block was being welded up and everyone had a good look round the monobloc under assembly. David Elliott, Director of P2 Engineering (who designed the cylinder block) was in his element, taking questions and explaining things. The Howco representatives were helpful, explaining the welding challenges they are overcoming.

The next steps are to finish the welding and measure the important features. If all is well, the block will then be heated



The Howco employees responsible for measuring the monobloc with the Faro Arm.



'Monobloc Club' members are shown the result of their largesse.

to stress-relieve the assembly before measuring again to quantify any distortion. Following this, a few weeks of machining will begin. Completion and delivery are planned for the autumn.

Whilst construction of the monobloc



The Howco team who looked after the Club members.

has accelerated, we need fundraising to keep pace. If you are interested in supporting this project, please consider becoming a 'Monobloc Club' member, a P2 Covenantor or making a one-off donation. **TCC**

## DLW2 UPDATE *by Paul Bruce*

The Trust's new works has taken several leaps forward since TCC 65. Willmott Dixon, Darlington Borough Council's contractor for the Rail Heritage Quarter has started on site and the foundations of the new works can already be seen in the accompanying photos. During August the steel structure of the works started to go up, making the building much more recognisable.

Our big move is currently programmed for early summer 2023 and a team is being set up to manage the migration to our new home whilst minimising disruption to the build of the P2.

Readers will recall that the Trust has made a commitment to sourcing and installing the track to support our activities including connecting the site to the main line rail network. I'm pleased to announce that we have been successful in tendering for 3.6km of rails being cascaded from the Northumberland Line project. This should see the full extent of our plain line requirements delivered. The cost, including haulage to Darlington, is set to be a little under £45,000 and they should arrive on site in mid-August in time for the contractor to incorporate the rails into the shed floor.

The rails will be partnered with the 1400 concrete sleepers already purchased from Network Rail and 375 wooden sleepers donated by Nexus. A further 200 sleepers are being sourced to complete the plain line requirements which should cost around £75,000 - please see the fundraising initiative announced on the next page.

In parallel, regular discussions with Network Rail continue to source the seven sets of points required for the Trust's element of the track layout with good potential for some coming out of Northumberland. Installation of the track in 2023 is planned to be supported by the 507 STRE Regiment and volunteer organisations with the track in place by the end of 2024.

TCC



Photos Ed Laxton

Rapid progress had already been made by June.



The concrete footings, poured and ready for steelwork.



Drainage work in progress.



Steelwork for the office structure starts to take shape.



## JOIN 'THE P-WAY GANG' *by Sophie Bunker-James*

By next summer we will have a brand new, purpose-built locomotive works within the Darlington Railway Heritage Quarter (DRHQ). Owned by Darlington Borough Council and funded by the Council as well as TVCA and Central Government grants, the £4.5m building will provide many of the facilities that we require for building and operating our steam locomotives. For the new building to reach its potential, The AI Steam Locomotive Trust has agreed to contribute to the project.



3D illustration of the new site for the AI Steam Locomotive Trust.

This scheme will ensure that the site has a main line rail connection, running track, inspection pits and more. Such features will future-proof the activity of the Trust. There will be three phases for fundraising, the first for the running line, allowing movement around the site and live steam rides. With the Stockton & Darlington bicentenary fast approaching, we ask that you consider supporting this project as its legacy will ensure the future of new build steam in Darlington and ensuring that the DRHQ functions as a live steam destination for the UK, as well as a national and international visitor centre.

To cover the cost of materials and transport we are looking to raise £75,000. Any contributions are welcome, but for full club membership of 'The P-Way Gang' the minimum donation is £500, with £750 sponsoring a full 60ft rail with your name going next to that section on the track plan displayed in the new building. TCC



Sleepers being delivered to the new site.

Sign up online, or download forms at: [a1steam.com/tornado/support-us/a-new-home-for-the-trust](http://a1steam.com/tornado/support-us/a-new-home-for-the-trust).

Jack Bossett

# P2 FUNDRAISING PROGRESS *Sophie Bunker-James*



Mundy Grant

**Gresley class P2 No. 2007 Prince of Wales outside DLW.**

Fundraising is ongoing for both the P2 build and the A1 overhaul. We appreciate all of your contributions to date, we simply couldn't have come this far without you.

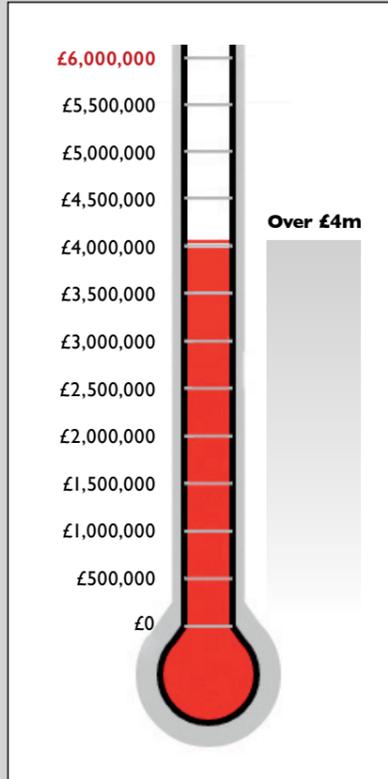
Although our Covenantors provide the essential funding that is responsible for building the P2 and keeping *Tornado* on the tracks, we need to increase the rate to ensure that No. 2007 is completed in time for S&D 200 in 2025 and No. 60163 is back in traffic at the earliest opportunity.

Huge strides are being made on the P2 construction this year. Please consider joining one of the Clubs to boost the fundraising needed to reach these goals. The Trust will ensure that Club members have unrivalled access to the engineering works where their

effort is producing results and to special previews of completed tasks. The boiler, monobloc and tender are all on target to be completed and arrive at DLW before Christmas. Despite the impressive progress being made from an engineering perspective, fundraising is flagging. Now is a great time to contribute to one of the Clubs and enjoy the exclusive events planned as each component is delivered.

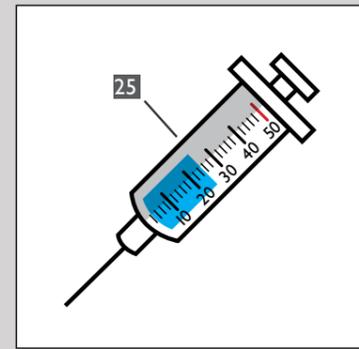
Similarly, *Tornado* not operating for a whole year means that the engine is not earning and relies more than ever on donations from our generous supporters. The Overhaul Club is the best way to support the A1 at this time.

We welcome one off donations, would be very grateful if you wished to increase your monthly covenant.

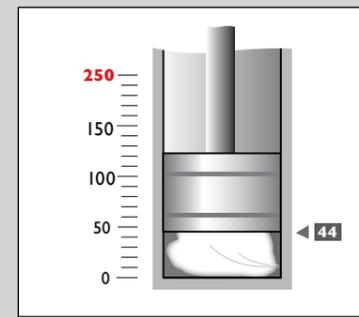


**Donated to date.**

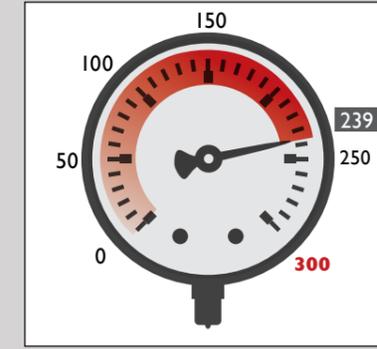
Note also that we have launched a new Club, 'The P-Way Gang' to finance the trackwork required at DLW2. This is a Club for all, whether you support the A1 or the P2, both locomotives will benefit from the new works building which, in due course, will witness the erection of No. 3403, the new Gresley Class V4 2-6-2.



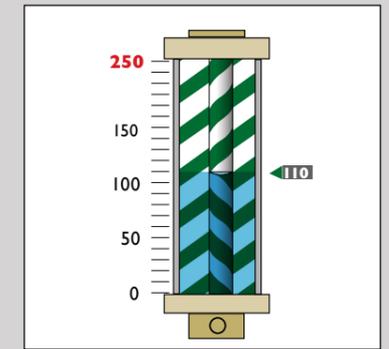
**Injectors Club - 25 members.**



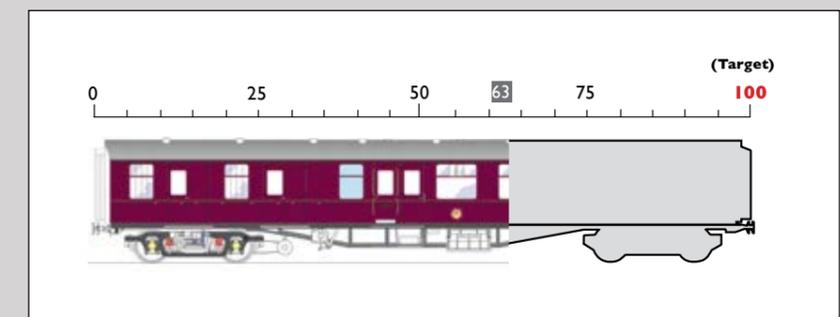
**Monobloc Club - 44 members.**



**Boiler Club Gauge - 239 members.**



**Tender Club Gauge - 110 members.**



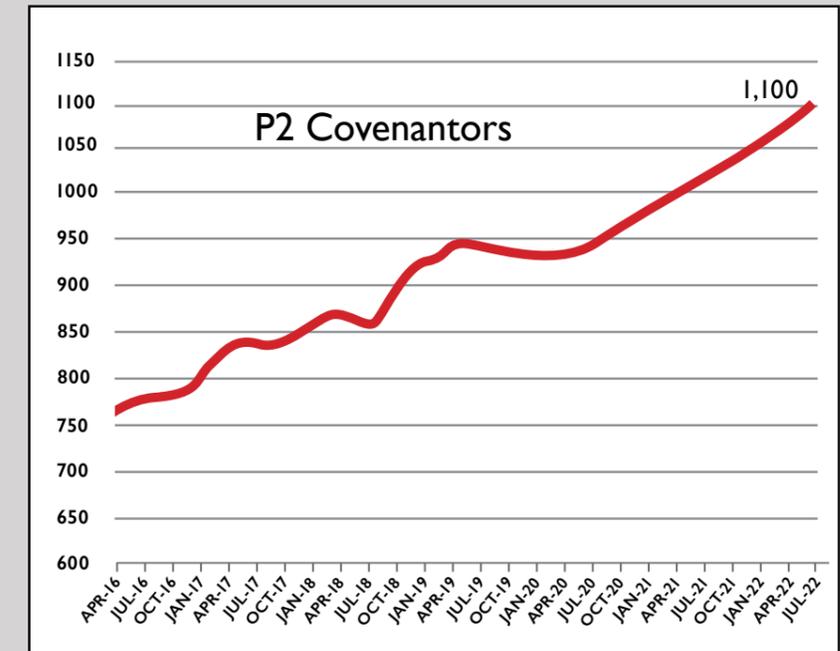
**The P2 Coach Appeal - 63 supporters.**

## OTHER WAYS TO HELP

**Legacies** - This is not a subject that we like talking about, but the lasting impact from leaving a gift in your will is considerable. Leaving a legacy can help secure the P2's future for generations to come. See the article devoted to legacies on page 15. Please contact [legacy.coordinator@alsteam.com](mailto:legacy.coordinator@alsteam.com) or phone 01325 460163 for more information.

**DLW Open Days** - Darlington Locomotive Works is open on the first and third Saturday of each month. Why not come in and see first-hand the progress we're making and bring a friend too? Please note our new opening hours, 10:00hrs until 15:00hrs.

**Covenantors** - From as little as £10 per month, your regular donation makes a huge difference. If you haven't already done so, please consider joining us today and become a part of something special. Visit our website at <https://www.p2steam.com/support/regular-donations> for more information.



**Social Media** - We're social creatures so please do follow us on Facebook and Instagram and like us on Twitter. Don't forget to like, share and comment on our posts too as this helps our content reach a wider audience.

## CLUB FOCUS

### The Monobloc Club

Launched in July 2021, 'The Cylinder Manufacturing Club' has been now been renamed 'The Monobloc Club'.

This is a shift in focus to draw attention to this unique fabrication and raise the profile of this bold undertaking. Production of the cylinder block is well underway at Howco in Irvine, Scotland, and delivery is expected later this summer.

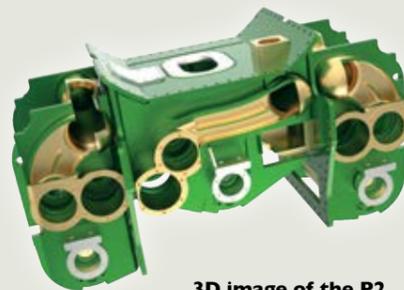
Whilst we are pressing forward with the manufacturing of the monobloc, donations are now needed to help fund the work. We do not want to slow the pace of the P2 build, so all contributions towards *Prince of Wales* are greatly appreciated. To-date, over £4m has been spent of the estimated £6m required to complete No. 2007 *Prince of Wales* within the next three years. This is testament to the generosity our loyal supporters.

In order to keep to this schedule, we must complete the cylinder block by the autumn. Please consider joining 'The Monobloc Club' today and help us to complete Britain's most powerful steam locomotive in record time – we have a way

to go to reach our £250,000 club target! Donations of £1000 can be made as a lump sum or in four or eight smaller monthly payments. Thank you to those who have already donated.

Find out more about 'The Monobloc Club' on the [p2steam.com](http://p2steam.com) website or contact the office by phone on 01325 460163, or email [enquiries@p2steam.com](mailto:enquiries@p2steam.com).

As you can read on page 25, 'Monobloc Club' members have already visited Howco and further exciting days are planned for supporters, perhaps a little further south next time! If this interests you, sign up today!



**3D image of the P2 cylinder block.**

## •WORKSHOP NOTES•

### AI Steam Locomotive Trust visit to HMS Prince of Wales.

Representatives from the AI Steam Locomotive Trust were invited to visit HMS Prince of Wales at HM Portsmouth Naval Base on Tuesday 10<sup>th</sup> May 2022 to celebrate the Bond of Friendship between the two organisations.

After a safety brief from Lt. Sam Ellis RN, our Liaison Officer, they were treated to a tour of the ship starting in the Ship's Control Room from where the Marine Engineering Department monitors and manages all the ship's systems, from HV Power, fuel and fresh water to fire and flood warning systems. They then visited the aft engine room to see two of the six huge generating plants that provide HV power to the whole of the ship, including the propulsion systems. Next, the tour continued to the hangar deck where the many aircraft and helicopters that operate from the carrier are maintained and prepared for flying operations when the ship is operational. From here, climbing what felt like several more storeys onto the vast flight deck (which is 70m wide and 280m long), they were able to walk to the top of the ski ramp at the bow to look back and admire the sheer scale of the ship. This was followed by a visit to the bridge where the Captain and his team manage the operation of the ship at sea (flying operations which are managed by the flying operations team based in the aft island).

Before lunch, the Captain Steve Higham OBE RN, the Commanding Officer, and Commander Helen Jones RN, Commander Marine Engineering Department, enjoyed a short



Huw Parker

The P2 nameplate presented to the ship, now adorning the bridge.

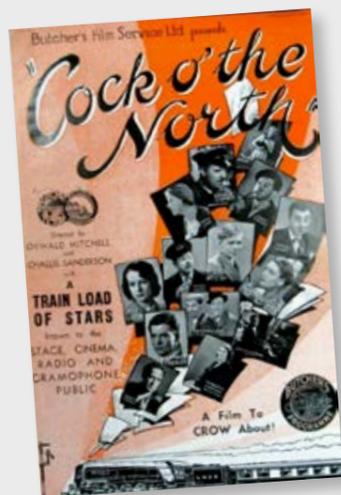


Members of the Trust aboard the carrier.



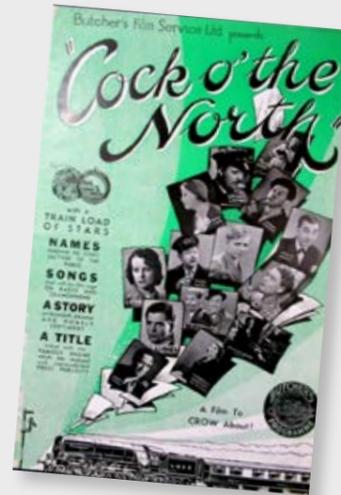
Members of the ship's company and Trust officers at LMS.

presentation about the activities of the Trust, our operation of *Tornado* and the construction of our own *Prince of Wales*. Later, Trustees Graeme Bunker-James and Huw Parker presented a nameplate to Captain Higham, who said he was "absolutely chuffed" to receive it and will do his very best to promote our activities as a result of our Bond of Friendship. It is intended that the nameplate will be mounted prominently on the ship's bridge and will hopefully be a talking point for the many senior military, government and international dignitaries who visit the ship in the future.



### From P2 Steam to Screen!

Mandy Grant continues to find amazing P2 memorabilia, recently discovering these two posters for the 1935 film, 'Cock o' the North'. The posters are original A3 sized movie posters and were a chance find on a well known auction site! Dated 20<sup>th</sup> June 1935, they are in immaculate condition considering their age, and reflect wonderfully the design and printing techniques that were available at the time! If anyone knows of the whereabouts of a copy of the original film we'd like to hear from them!



## FROM THE ARCHIVES by Graham Langer



David Elliott

*Tornado's* boiler is lifted into her frames at DLW.

**Summer 2002** – Much of the early part of the year had been devoted to setting up the AI's frames and hornguides for fitting the roller-bearing cannon boxes. Infinite pains had been taken to ensure the accuracy of the frame, valve gear and axle alignment, several adjustments were made, inserting shims or removing small amounts of material, until the axle centres were about 0.003" less than nominal. The hornstays were then replaced and the gap between the hornblocks and the rear faces of the cannon box was measured. Final measurements indicated the distance between centres was accurate to within 0.003" and the axles were parallel to within 0.002" with boxes in their nominal positions.

**Summer 2007** – The big news during the summer of 2007 was the fitting of *Tornado's* boiler to her frames on 28<sup>th</sup> June, a heavy lift crane being employed

to perform the task in front of the press and anxious Trust members. However, all went well and the boiler was soon securely located in place. Feverish activity at DLW continued, prior to the boiler lift, the frames had to be painted and the driving wheels were sent to Dowding & Mills at Middlesborough for balancing. The inside valve gear was largely complete and the outside valve gear was trial-fitted. Other efforts focussed on completing the pipe runs between the frames.

**Summer 2012** – The summer edition of *TCC* carried the news that *Tornado* had just completed an epic 510 mile trip with the Royal Train conveying HRH The Prince of Wales from Kemble to Alnmouth, although it originated in Wembley and terminated in Edinburgh! The journey was notable for a number of 'firsts', an overnight section which was probably the first 'night sleeper' hauled

by steam since the late '60s and *Tornado's* first ascent of the Lickey Incline (topped at 50mph). To return No. 60163 to London, she later worked the return leg of 'The Elizabethan' which had been hauled to Edinburgh by Deltic No. 9009 *Alycidon*.

**Summer 2017** – The P2 was making headlines during the summer, with news that over half the funds required to build the locomotive had now been raised. Cleveland Bridge, the Darlington engineering firm, had agreed to sponsor the construction of the tender tank as well as having some of their young employees apprenticed at Darlington Locomotive Works. Work continued at South Devon Railway (Engineering) on the assembly of the locomotive's wheelsets and a frame mimicking the boiler had been fabricated at DW to allow the crinolines and cladding to be formed. **TCC**

The AI Steam Locomotive Trust is pleased to display the logos of organisations giving us their ongoing support. Their contribution is gratefully acknowledged.

## **WILLIAM COOK CAST PRODUCTS**

**PRINCIPAL SPONSOR**



*York* **EMC Services**



M. H. SPENCER LIMITED



cleveland



**TIMKEN**

**LNER**  
LONDON NORTH EASTERN RAILWAY

**TOTAL**

**one**  
NORTH EAST

**CAF** Charities Aid Foundation



**securo@retail**  
secure payment solutions

**Redcliffe**  
Imaging Limited

**UNIPART**  
RAIL



**I.D. HOWITT LTD**



### THE AI STEAM LOCOMOTIVE TRUST CONTACTS

President **David Champion** ([david.champion@a1steam.com](mailto:david.champion@a1steam.com))

Vice Presidents **Peter Townend** ([peter.townend@a1steam.com](mailto:peter.townend@a1steam.com)),

**Ben Godfrey** ([ben.godfrey@a1steam.com](mailto:ben.godfrey@a1steam.com))

**Rick Peacock-Edwards** ([rick.peacock-edwards@a1steam.com](mailto:rick.peacock-edwards@a1steam.com))

#### Board of Trustees

**Paul Bruce** Property Director ([paul.bruce@a1steam.com](mailto:paul.bruce@a1steam.com))

**Graeme Bunker-James** Commercial Director ([graeme.bunker-james@a1steam.com](mailto:graeme.bunker-james@a1steam.com))

**Richard Courteney-Harris** P2 Project Coordinator ([richard.courteney-harris@a1steam.com](mailto:richard.courteney-harris@a1steam.com))

**Steve Davies** Chairman ([steve.davies@a1steam.com](mailto:steve.davies@a1steam.com))

**Graham Langer** Publications ([graham.langer@a1steam.com](mailto:graham.langer@a1steam.com))

**Ben McDonald** Group Engineering Director ([ben.mcdonald@a1steam.com](mailto:ben.mcdonald@a1steam.com))

**Huw Parker** Operations Director ([huw.parker@a1steam.com](mailto:huw.parker@a1steam.com))

**Chris Walker** Finance ([chris.walker@a1steam.com](mailto:chris.walker@a1steam.com))

#### Advisers to the Board

**Tom Benson** Review Coordinator

**Terry Graham** P2 Project Manager ([terry.graham@a1steam.com](mailto:terry.graham@a1steam.com))

**Mark Grant** Volunteer Coordinator ([mark.grant@a1steam.com](mailto:mark.grant@a1steam.com))

**Andy Hardy** Archivist ([andy.hardy@a1steam.com](mailto:andy.hardy@a1steam.com))

**Gary Hughes** Council & Board Business Coordinator ([gary.hughes@a1steam.com](mailto:gary.hughes@a1steam.com))

**Rob Morland** Electrical ([rob.morland@a1steam.com](mailto:rob.morland@a1steam.com))

**Graham Nicholas** Professional Head of Engineering ([graham.nicholas@a1steam.com](mailto:graham.nicholas@a1steam.com))

**Richard Peck** Commercial ([richard.peck@a1steam.com](mailto:richard.peck@a1steam.com))

#### Engineering

**David Elliott** P2 Engineering ([david.elliott@a1steam.com](mailto:david.elliott@a1steam.com))

**Alan Parkin** Electrical Design ([alan.parkin@a1steam.com](mailto:alan.parkin@a1steam.com))

**Richard Pearson** Locomotive Manager ([richard.pearson@a1steam.com](mailto:richard.pearson@a1steam.com))

#### Administration

**Sophie Bunker-James** Marketing and Communications Director ([sophie.bunker-james@a1steam.com](mailto:sophie.bunker-james@a1steam.com))

**Dawn Phillips** Office Manager ([dawn.phillips@a1steam.com](mailto:dawn.phillips@a1steam.com))

**Liz Gibson** Dedicated Donations ([liz.gibson@a1steam.com](mailto:liz.gibson@a1steam.com))

#### Railtours

**Lauren George** Railtours Booking Office Manager ([lauren.george@a1steam.com](mailto:lauren.george@a1steam.com))

#### Editor

**Graham Langer** ([graham.langer@a1steam.com](mailto:graham.langer@a1steam.com))

#### Picture Editor

situation vacant

#### Design

**Kevin Lumb** ([kevin@limegroveprintanddesign.co.uk](mailto:kevin@limegroveprintanddesign.co.uk))

\* All information correct at the time of going to press mid-August 2022. For up-to-date information and dates please check the website [www.a1steam.com](http://www.a1steam.com).

● The AI Steam Locomotive Trust, Darlington Locomotive Works, Hopetown Lane, Darlington DL3 6RQ

● e-mail: [enquiries@a1steam.com](mailto:enquiries@a1steam.com) ● website: [www.a1steam.com](http://www.a1steam.com) ● tel: 01325 460163

Darlington Locomotive Works is normally open to the public on the first and third Saturday each month (11am – 4pm).

Access to the works is via Head of Steam: Darlington Railway Museum where Covenantors are entitled to free entry (with Covenantor card). Charity registration No. 1022834.

The Trust respectfully requests that anyone wanting to see *Tomado's* main line passenger trains follows the rules of the railway and only goes where permitted.

© 2022 The AI Steam Locomotive Trust except where shown. Views of contributors are not necessarily those of The AI Steam Locomotive Trust.