



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. 65 Spring 2022



David Elliott

The middle cylinder block at Howco pending dimensional checks.

MONOBLOC MAGNIFICENCE!

by *Graham Langer*

We are delighted to be able to report significant progress with the assembly of the cylinder monobloc for *Prince of Wales* at Howco in Irvine. All the cylinders have now been formed and are currently being subjected to finish-machining before the three assemblies

are united to form the monobloc. With over £1m of components due for delivery to Darlington Locomotive Works this year, there is a genuine feeling that we are approaching the home straight in the construction of No. 2007. The next eighteen months

are going to be crucial in terms of fundraising and engineering and a sign of this is the transformation of 'The Cylinder Manufacturing Club' into the 'The Monobloc Club' to complete the financing of this key component. You can read more about this on page 32. **TCC**

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EDITORIAL by Graham Langer



It is hard to believe how much has changed since *TCC 64* was published, with the war in Ukraine suddenly adding to the already considerable challenges facing the Trust. The first and most immediate effect has been the halting of coal shipments from Russia, a source of fuel the British preservation movement has relied on for many years. The consequences of this have been two-fold, firstly the availability of coal was immediately reduced and secondly the price of coal doubled almost overnight. Fortunately, some fast work by our Commercial Director, Graeme Bunker-James, secured the Trust a supply for the 2022 season at a guaranteed price and we can only hope that the situation will have settled down by the end of the year.

Unfortunately, the problems faced by Meiningen in coping with Germany's Covid-19 regulations have significantly slowed their output and even by playing "musical boilers", *Tornado's* refurbished, original boiler will not return to the UK in time to enable completion of the overhaul before the start of our planned operating season. Alas, this means that we have had to take the difficult decision to postpone the first two trains planned for July. Full details of the remaining programme are covered in the railtours article on page five. A further consequence of the global supply situation is that the costs of materials used in both *Tornado's* overhaul and the construction of *Prince of Wales* have risen significantly.

Given the above and the country's economic situation it would be easy to think that we are facing a "perfect storm" of events that threaten both our main line operations and progress at Darlington Locomotive Works. However, we have been here before. It is worth remembering that the scheme to build a new AI was launched in a recession and that No. 60163 was completed during another downturn and yet the final two years of her construction, the most expensive part of the build in many ways, saw people dig deeper than ever to finance that amazing project, such was the desire to complete the locomotive. We hope

you, our valued Covenantors, can repeat this performance on behalf of No. 2007 by supporting the various clubs, upping your contributions and, almost as importantly, encouraging others to join the final leg of this amazing journey. In order to give something back, we are aiming to give club supporters unique access to locations where work is taking place, members of 'The Monobloc Club' will visit Howco, and those helping 'The Overhaul Club' will be able to see progress at Locomotive Maintenance Services. It needs to be stressed how important supporting 'The Overhaul Club' has become to help us manage these unforeseen increases in costs.

Despite the above, there is still plenty to be encouraged by. Work on the cylinder monobloc at Howco is rapidly advancing and a lot of the finicky work that delayed *Tornado's* first moves, such as pipework and electrical runs, has been completed on *Prince of Wales*, allowing the boiler, when it is delivered, to be more or less dropped straight into the frames. We must not forget that by the end of this year it is likely that we will have added over £1m worth of components to No. 2007! We can then focus on the final push to get *Prince of Wales* up and running in time for the bicentenary celebrations of the Stockton & Darlington Railway in 2025.

Following our appeal in *TCC 62* for landowners to help us find additional woodland to increase the Trust's 'carbon bank' we are delighted to say that we have added a significant acreage to the total, to such an extent that the organisation is now effectively 'carbon neutral', although more will need to be added when No. 2007 enters traffic. There will be more about this in a future *Communication Cord*. Finally, we must not forget Fathers' Day in June. Our Dedicated Donations Coordinator, Liz Gibson, is poised and ready with a tempting list of P2 components that need sponsoring. If you think that a Dedicated Donation fits the bill, why not contact Liz and see if she has a part you'd like to "buy"! **TCC**

STOP PRESS!

We have just confirmed the revised date for the P2 Roadshow at the London Transport Museum in Covent Garden. This will be held on 20th August - full details on the website.

FROM THE CHAIR by Steve Davies



To paraphrase the oft-quoted saying, we as a Trust do indeed live in "interesting times". Just as the Covid-19 pandemic restrictions begin to ease, the outbreak of war in Ukraine, exacerbated by the squeeze on the cost of living (particularly the impact of rising energy and commodity prices), now serves to cast a shadow of uncertainty over the international order. Whilst we can only begin to imagine the human horror and physical destruction being wrought upon the Ukrainian people, the conflict is already having an economic impact far beyond the physical space in which the war is being fought, and we in the Trust are not immune from these negative economic consequences.

By contrast, I am able to report much good news as we move forward with our ambitious plans. This edition of *TCC* provides much detail of the considerable progress to be found in many, many areas of Trust activity. As ever, I never cease to be amazed, delighted and impressed by the dedication of both our Board of Trustees and advisors, our paid staff and contractors, and of course our many volunteers who so often sacrifice their domestic priorities to help in fulfilling the numerous areas of activity which, combined, serve to put a smile on the faces of our many supporters and customers. For a while now we have sensed that the Trust's organisation and corporate approach required attention. We have fundamentally not changed our approach over the 30 years of the Trust's existence, yet our complexity and objectives have grown significantly in extent and breadth. With this in mind we have recently completed a major review, essentially asking ourselves who we are and what we are for, in partnership with a York-based consultancy Journey 4. This is essential stuff in binding our whole organisation together in common purpose, and Richard Courteney-Harris gives some outline detail of that process later in this edition.

The overhaul of *Tornado* continues apace. As you would expect, the process has confirmed exactly what we knew about the condition of the engine and has thrown up quite a few unexpected issues too which we are now working through. Taking place over five separate locations, with the Locomotive Maintenance Services (LMS) facility at Loughborough being the main focus, I am enormously impressed with the pace at which our flagship locomotive is coming back together. She will be in outstanding condition when she emerges from the works in the summer, and I know we all look forward to the sights and sounds of her doing what she does best. On the P2 front, the three cylinder monobloc fabrication really is making impressive progress at Howco's works in Irvine and we eagerly await the triumphant moment when this key component is lowered into the frames. The P2's tender frames are also coming together and these are also close to the point of delivery.

By the time this edition of *TCC* reaches you we should have signed the lease with Darlington Borough Council for the occupancy of our new premises within the overall aegis

of the new Darlington Railway Heritage Quarter concept. It will be a sad moment to finally say goodbye to our current facility in the former Stockton & Darlington Railway Carriage Works. We have made dreams come true at the Hopetown Works, but our new facility will be within viewing distance of it and we will still be able to look across the fields at our old site with fondness and gratitude for what we were able to achieve there. We have, I hope you will agree, therefore got a lot on our plate for which we need the appropriate funds to deliver. It is a fact that the rate of fundraising has declined of late for many and varied reasons. The P2 needs support if we are to complete it in time for a major role at the S&DR 200 celebrations and I would urge you to make the donation or contribution you may have promised yourself now rather than in the later stages of the project. Everything is in place to deliver this magnificent machine, but the rate of delivery is directly proportional to the rate of income we achieve. We could all do with some good news and what better way of cheering ourselves up than by seeing *Prince of Wales* complete and in steam? Likewise, the overhaul of *Tornado* will make inroads into our reserves and I am most grateful to all who have contributed to her over the years and in particular the current Overhaul Club. Your combined efforts are truly appreciated, and I would ask that you either dig a little deeper or introduce friends, family and colleagues to what we do. We have an exciting programme of main line tours lined up for later in the year and I know we will all get a huge thrill from seeing *Tornado* in revenue-earning service once again. Finally, could I please take this opportunity to thank you all for your support over the years across the full range of Trust activity? We put your money to very good use and I hope that in return you are rewarded with the satisfaction that you are a valued part of a complex team whose sole purpose is to make dreams come true and, in the process, keep new-build LNER steam on the main line for many years to come. My very best wishes to you all. **TCC**



STOP PRESS! As this edition of *TCC* was going to press, the machined middle connecting rod was delivered to DLW. Ian Matthews will now apply his magic and remove the machining marks, no doubt producing the mirror finish he has achieved with other components.

THE ABERDONIAN

RAILTOURS FOR 2022

- Thursday 21st July
- Thursday 28th July
- Saturday 30th July
- Saturday 13th August *
- Saturday 20th August
- Thursday 1st September
- Thursday 8th September
- Thursday 15th September *
- Saturday 17th September

Departing Edinburgh Waverley station at around 09:00hrs for Aberdeen, returning at around 21:30hrs
* Departing from Glasgow

Bookings taken via telephone or online on 01325 488215 or [a1steam.com/aberdonian](http://www.a1steam.com/aberdonian)

WWW.A1STEAM.COM

The A1 Steam Locomotive Trust Darlington Locomotive Works Hopetown Lane Darlington DL3 6RQ

RAILTOURS by Sophie Bunker-James

We are all looking forward to No. 60163 *Tornado* being back on the main line, taking day trippers for a nostalgia filled journey along beautiful cross-country and coastal routes.

The overhaul, particularly the disruption to the timeline of new boilers, will unfortunately impact two trains at the beginning of this summer's scheduled tours. It was with a heavy heart that we cancelled 'The Fen and Fells Flyer', having postponed the train previously. We thank the loyal passengers who held on to their bookings through the pandemic; it is a tour that we would love to run,

so expect to see the route return in 2023. Similarly, to allow time for the locomotive to be returned from overhaul, 'The Yorkshire Pullman' has been redated to 1st April 2023, for *Tornado's* first train to Harrogate. This opulent tour remains on sale, and we look forward to welcoming you on board this luxury train next spring.

On a brighter note, 'The Aberdonian' programme from Edinburgh and Glasgow to Aberdeen is set to begin on 21st July, with a total of nine trains through the summer. *Tornado* will be on top form with paintwork gleaming as we depart Edinburgh on the first

train. We have new off-train excursions planned this summer, including a whisky tasting in the heart of Aberdeen and a coach trip to the ancient Drum Castle. With seven dates from Edinburgh and two from Glasgow, 'The Aberdonian' forms the perfect excuse for a few days in these vibrant Scottish cities! Find out more at a1steam.com/aberdonian

We look forward to the next Railtours section of TCC which should see a triumphant *Tornado* with steam billowing from the chimney as she returns along the spectacular North Sea coastline! **TCC**



Peter Backhouse

'The Aberdonian' on the return leg from Aberdeen via Forteviot.

TORNADO TOUR DIARY - 2022

Below are the future operations *Tornado* is confirmed to be involved in. Further railtours will be added as dates are confirmed and will be published on www.a1steam.com as trains are finalised.

- **Thursday 21st July 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours
- **Thursday 28th July 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours
- **Saturday 30th July 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours
- **Saturday 13th August 2022** – 'The Clyde Aberdonian' – Glasgow to Aberdeen and return – Tornado Railtours
- **Saturday 20th August 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours
- **Thursday 1st September 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours
- **Thursday 8th September 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours
- **Thursday 15th September 2022** – 'The Clyde Aberdonian' – Glasgow to Aberdeen and return – Tornado Railtours
- **Saturday 17th September 2022** – 'The Aberdonian' – Edinburgh to Aberdeen and return – Tornado Railtours

Tornado operates on the national network with West Coast Railways and DB Cargo and the Trust respectfully requests that anyone wanting to see *Tornado* follows the rules of the railway and only goes where permitted.

For more information about **Tornado Railtours** visit www.a1steam.com/railtours or call our office on 01325 488215.

CAPTURING TORNADO *by Graham Langer*

Photography is a superb medium of telling a story, explaining an event or describing a point in history. All of this is certainly true in the railway industry, as one photographer who currently excels in making the most of an 'alternative viewpoint' is Jack Boskett. Captions by Jack Boskett.

Jack has had a camera in his hand since the tender age of five and won a photographic competition at the Gloucestershire Warwickshire Railway in the under-18 category in 1997, when he was just seven years old. His father Ian, an avid amateur photographer, took Jack out to photograph steam engines around the country in the early 1990s. Ian used to set the camera up for Jack and gave guidance as to where he should press the shutter, along with tips to compose the image. 24 years later Jack is now a regular figure on the footplate at that very railway.

The rule of only taking one photograph to save film was 'drummed in' from the start, as the cost of slide film was, and still is, expensive. Even today, Jack abides by this rule in the digital world. He didn't study photography at college or university, the skills developed over time, with years of practise, correcting mistakes and learning from them. This enabled him to push his love for photography further, which helped him to adapt to fast-paced working situations.

During his teenage years at school, he had his first picture published by Chris Milner in *The Railway Magazine*. It was because of this that Jack caught the bug to photograph the railway scene for publications across the board and continues



Above: A night-time photograph depicting *Tornado* with *Flying Scotsman* on Barrow Hill shed with a line-up of Class 40 locomotives in the background. There was no additional lighting for this photograph, the camera shutter was open for 30 seconds.

to do so to this day and is recognised as one of the leading railway photographers in the business.

Left: A backlit photograph of *Tornado* at Didcot during a night photography shoot with the locomotive.

Right: *Tornado* crosses Oldbury Viaduct near Bridgnorth on the Severn Valley Railway during a photographic charter with the SVR's superb teak coaches. It was a tricky challenge to get the reflection in the water as I straddled the stream between the two banks!

All photos by Jack Boskett





Combining railways and photography, Jack began his journey as a professional photographer in 2010 aged 19, during the height of a recession. Like many other photographers, he began his career specialising in wedding, portrait and commercial subjects and built his own studio, which he worked out of for eight years. This was to test the water and find his feet in the big wide world of the photographic industry. It wasn't long before he realised that he was a very small fish in a big pond! A few years down the line, he found his niche in the railway industry which opened doors into other fields. Using a Nikon D6 and a Nikon Z9 today, he has worked his way through a variety of cameras, including a Pentax 35mm, Mamiya 645 medium format, through to the latest Nikon DSLR/mirrorless cameras.



A black and white photograph of *Tornado* passing as the track gangers carry out their work on the adjacent line. I try to encompass the railway infrastructure as much as I can, I particularly like the telegraph pole on the right-hand side of the frame.



Above: The sunlit equivalent of the foggy photo on the SVR! No. 60163 approaches Hampton Loade.

Left: A panned photo of *Tornado* at speed along the Severn Valley Railway with the Teaks in the fog, this was a challenge to photograph as the visibility was awful!



Jack the track ganger tightens a nut on the fishplate as *Tornado* steams past with a van train. With his pipe in his mouth, Jack followed through with the motion of actually tightening the bolt and this added some realism to the final image.



No. 60163 rounds Kinchley Lane on the GCR in January 2022 during a photographic event. A common location, but a nice front three-quarter image all the same. A timeless scene which could've been on the main line.

Marking 12 years as a professional photographer in 2022, today his work is widely recognised in railway publications and literature for various Train Operating Companies and Heritage Railways. Jack carries a wealth of experience which has led him on to working with Prime Ministers, Secretaries

of State, celebrities and members of the Royal Family. Jack has made several television appearances and performances on the stage, he tours the country entertaining audiences whilst 'treading the boards' with his one man stand up photography show entitled 'From Railways to Royalty'.

The Severn Valley Railway is currently hosting an exhibition of his work at The Engine House in Highley until the autumn, so catch it if you can.



The P2 - I was kindly invited by Mark Allatt to go up to Darlington to photograph No. 2007 for some PR photos. I was over the moon with the results! David Elliott and the team were so welcoming and friendly, they happily posed for some photographs with dramatic lighting.



A memory of *Tornado*. Back on 26th September 2010 my family and friends went down to Bristol Temple Meads in a minibus to ride on 'The Torbay Express' for my Dad's 50th birthday. I had arranged with Pathfinder Ralltours and the locomotive crew in advance to have an aluminium headboard (that I had made by Procast) saying 'Ian's Birthday Express' on the top lamp bracket of *Tornado* on the way back from Dartmouth to Bristol. Fred Lewis was the driver for the day and we had arranged a surprise footplate ride for my Dad between Dartmouth and Taunton. He thoroughly enjoyed himself and still has the headboard (accompanied with hundreds of dead flies on the front of the plate) up in his train room at home. I am ever grateful to those who helped arrange that day. It's one that the family will not forget.

TCG

AI OVERHAUL REPORT by Richard Pearson

By the middle of February, the boiler had been removed and sent to DB Meiningen and, immediately following this, work at Locomotive Maintenance Services Ltd (LMS) in Loughborough continued to remove the remaining motion, pistons and crossheads prior to lifting the frames to remove the wheelsets. The frames were lifted and the driving wheels, bogie and Cartazzi were wheeled out. Several buckets of grease were scraped off the bogie and main frames and the bogie was stripped ready to release the wheelsets. The driving wheels will be retyred and profiled at South Devon Railway (Engineering) workshops and the bogie and Cartazzi wheels will just need reprofiling.

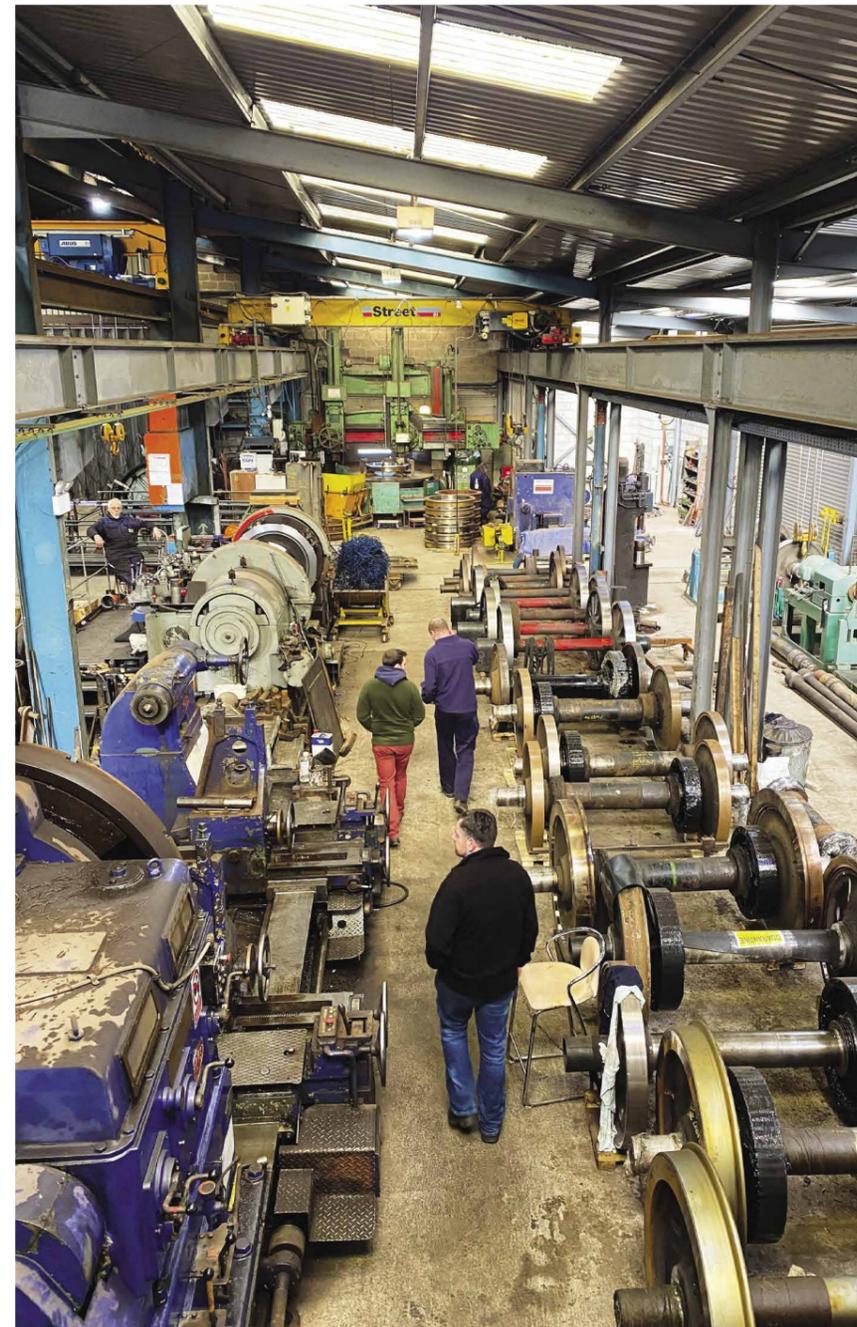
Right and below: Tornado's frames were jacked up and the wheelsets rolled out, ready to be sent to SDR(E).

At the end of February, the frames were wheeled outside and given a thorough clean using the AI steam cleaner. Several passes using the cleaner and degreaser were required to remove a significant build-up of grease and dirt from under the running board and outside frames. Access to the inside frames was slightly more challenging and involved getting very wet and covered in grease!



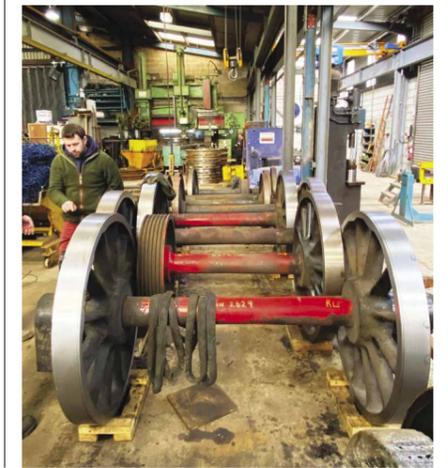
Above: An indication of the state a locomotive's frames can get in during main line work.

All photos AI/ST (except where marked)



Above and right: The team inspect No. 60163's wheelsets at SDR(E).

Ben McDonald (Director of Engineering), Huw Parker (Director of Operations) and David Wright (owner of LMS) visited South Devon Railway (Engineering) to view the tender wheelsets, discuss refurbishment of bearings and agree the plan for the locomotive wheelsets to be delivered to Devon. The tender wheelsets have been de-tyred and machined ready to receive their new tyres.



All the locomotive's axles have been ultrasonically tested and received a clean bill of health and the middle crank has also been closely examined. The tender spring hangers were subjected to MPI testing and are now ready to be painted prior to reassembly. The tender frames have been shot blasted and are receiving coats of new paint ready to receive the newly tyred wheelsets when they return.

The DLW team have been very busy as well. Under the direction of the Locomotive Manager, Richard Pearson, and the Director of P2 Engineering, David Elliott, our team of dedicated volunteers have set to work restoring many of *Tornado's* components.

The team has de-greased, sanded, inspected, painted and carried out repairs to the locomotive's sand pipes. The repairs have included weld repairs to fractured pipes, replacement of a sand trap due to defective threads, and they have all been cleaned out thoroughly since some of the old sand had set like stone.



Components moving from Loughborough to Darlington.

Richard Pearson



Above: Re-cutting the seats on the superheater header.

Right centre: Brake cylinders get their first coat of paint.

The five air reservoir tanks from under the tender have all been flushed out with a de-greasing agent, they have been cleaned (a very dirty job!) and now they have been painted, each receiving five coats of paint which should give them plenty of protection once they are back under the tender again.

Right and below: Volunteers George Bee and Keith Martin flushing the tanks out on a wooden track which was used to roll and tanks back and forth to aid the flushing process.



Above: volunteers John & Martin Bairstow cleaning components.



The cylinders were then primed, painted and palletised ready to send back to LMS.

All photos - Richard Pearson

The four air brake cylinders have also been serviced by our DLW team; each cylinder has been dismantled for inspection. The coil springs were carefully decompressed and removed for inspection, the brake cylinders were then thoroughly cleaned and painted before they were reassembled.

Top left: One of the brake cylinders is refreshed.

Top right: The reversing stand has been fully dismantled for inspection and repairs and George Bee is seen applying some paint after the first stage reassembly.

Right centre: The six cylinder drain cock valves have been cleaned, dismantled, and inspected and a number of repairs identified, all six will now have the seats re-cut as well as each receiving a brand-new spindle new matching guide bushes.



The new rubbers for the bogie spring box dampers have arrived and they have been assembled as seen in the picture. The new rubber spring box dampers for the locomotive and the tender are in stock and will be assembled but they are a little more complicated as they contain a multi-layer sandwich of rubber and stainless-steel plate, plus a jig will have to be made to aid accurate assembly



Ian Greenan machined new tender slipper block pads.



The underside of the tender has been cleaned and painted by Ben Poole. After cleaning the bare metal areas and painting in primer, and after a few coats of undercoat, a coat of black gloss is applied – the bogie frame in red primer can be seen in the background.

All photos - Richard Pearson

• SHED NOTICES •



COLIN KERSWILL – We are sad to report that Colin Kerswill passed away on Wednesday 13th April 2022 aged 86. Colin was a DB(S) Traction Inspector and a regular on *Tornado's* footplate, especially in the south and east of the country. He began his railway career at Faversham and after a long innings, finally retired as a Traction Inspector from Hoo Junction in 2015. He was a dedicated mentor to many railwaymen during his footplate days in steam preservation, both on the mainline and, in particular, the South Devon Railway. A core member of the Merchant Navy Locomotive Preservation Society, he did many turns on the Belmond British Pullman and was often part of the crew when *Tornado* handled that particular train. We will remember him for his unfailing good humour and his willingness to pass on his extensive knowledge to others.

Colin Kerswill with Jim Clarke, preparing to take *Tornado* out with the Belmond Pullman in 2015.



The P2, AI and Caravan Train at Bricktastic 2022.

BRICKTASTIC! – This is a photo taken at 'Bricktastic 2022' (held at the convention complex that used to be Manchester Central Station). The P2 was designed by Joe Bloomfield and the AI by Andrew Harvey. The Caravan Train, designed by Lewis Bird, replicates that used in a *Top Gear* episode filmed on the Great Central Railway – why is this included? Because our own David Elliott designed the running gear for the 'caravans'!

ABERDONIAN

ABERDONIAN GOES UNDER THE HAMMER - In auction news, AI items to be sold recently included a nameplate (with a blue painted background) from No. 60158 *Aberdonian* at Great Central Auctions. The locomotive was built at Doncaster Works No. 2052, in November 1949 and named in March 1951. Allocated new to King's Cross and later to Grantham, Copley Hill and Doncaster from where it was withdrawn in December 1964 and sold for scrap to Hughes Bolckow at Blyth. The plate went for a hammer price of £7000. A smokebox number plate from the same locomotive was due to be auctioned at GCRA on 7th May.

Covenantors' Diary by Dawn Phillips



Planning for this year's convention is continuing nicely. Lauren George, Railtours Booking Manager, and I visited Blackwell Grange Hotel earlier this month to sample part of the menu that will be offered to our Covenantors on the 22nd October. We are very pleased to report that the service and menu choices were

excellent and of a very high standard. This is reassuring as we want to make sure that this year's function will reflect the high standards and quality our team are striving hard to meet.

Our Supporters' Cards have now been issued, albeit a little later than expected. Hopefully the raffle tickets will be as successful as previous years and raise much-needed funds for the Trust. A big heartfelt thank you for all those who have purchased tickets. The draw will take place on Friday 20th May.

Open Days are continuing to be a success and since the beginning of the year we have had 173 people visit No. 2007

Prince of Wales during these days. Our fabulous volunteers are continuing to help enlighten people on the progress of the locomotive. As well as people visiting during the planned Open Days, we have had several smaller parties visiting us during the week, one was a birthday surprise visit for one lucky chap! Engineering Director David Elliott was onsite to provide a fascinating update on the progression of the P2.

During May, the Trust is offering two special visits. For members of the Overhaul Club, a personal invitation to visit *Tornado*, with the opportunity to see the engine in its stripped-down condition followed by lunch at the GCR. The second is exclusively for 'Monobloc Club' members (the renamed 'Cylinder Club'), a visit to the Howco factory in Irvine to witness some of the manufacturing taking place and have the opportunity to speak with the engineers at Howco and members of the Trust.

We are delighted to announce the appointment of our dedicated supporter administrator, Stephanie Turnbull. Find out more about Stephanie in our next edition. **TCC**

THE AI 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 AI 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 AI 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 AI Steam Locomotive Trust. If you would also like to support the Trust through a legacy, then please take a look at www.aisteam.com or contact our Legacy Coordinator who will talk you through the process on legacy.coordinator@aisteam.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 I 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



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 AI 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 AI 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.aisteam.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.aisteam.com or from our Legacy Coordinator.

So, please remember The AI 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**





No. 2007 as photographed by Jack Boskett in January this year.

INDICATING ALCAZAR by Bill Marley

Bill Marley was a member of the dynamometer car staff when No. 60136 Alcazar was tested between Doncaster and King's Cross and had the rare experience of riding on the front end of a steam engine inside the indicator shelter. The following account is from Peter Townend's book 'LNER Pacifics remembered' and is reproduced with Peter's permission.

The tests were of four days duration from 26th – 29th November 1957 on a Doncaster rostered passenger train to King's Cross and back. The running inspector was an irrepressible character called George Tasker who had a tough uncompromising appearance but a dry wit. It was decided to use the Crosby Marine Type Indicators for measuring the steam distribution at the respective ends of each cylinder. Only two cylinders could be indicated simultaneously but all three were done during the duration of the tests. It was necessary to have a wind shield on the front of the locomotive for the protection of the test staff. This was a substantial wooden structure made of boards approximately an inch thick battened together and arranged to form a box around the front of the engine. It was securely anchored to the footplate and painted black. Two strong glass portholes in brass frames were fitted into the front panel for the benefit of the test staff. Inside the box were two raised platforms, one fitted to each side for the indicator operators to lie along to take the diagrams. A colleague suggested it would be nice to have padded boards and this was arranged together with a covering of Rexine. The front and rear covers of each cylinder were drilled and tapped and brass connections fitted from which lagged copper pipes were taken to the indicators.

Indicator diagrams were taken under controlled conditions of full regulator and a nominal steam pressure over a range of selected valve cut offs. There was two-way communication between the cab and dynamometer car and when conditions were right the front-end staff were alerted by means of an alarm bell. This was their cue to take the diagrams and upon completion reload the drums in readiness for the next test.

At the time riding in the box was looked upon as a novelty compared to routine testing and was something very few people had the opportunity to do. The riding characteristics were possibly similar to those experienced in the cab but generally it was a controlled lateral oscillation but with hard vertical vibrations from the track. Turbulence of the air created problems. When travelling at speed the displaced air would tear around the back edge of the box then forward along to the smokebox to finally whip up over the smokebox door. Anything loose such as logging sheets or indicator cards could be swept away



Alcazar at King's Cross awaiting the 14:20hrs departure to Leeds on 27th March 1957 with the indicator shelter in place.

J F Aylard courtesy of The Stephenson Photograph Collection

and lost. It was for this reason that the indicator cards were kept in small wooden boxes with heavy steel plates fastened to the lids to keep them anchored. The upward air streams had one advantage, however, as it kept the operators dry when travelling at speed through rain.

On one occasion when leaving King's Cross station the conditions were just right for taking a diagram at full regulator and long cut-off. We were in position taking diagrams when we went under a signal gantry. The speed was low and the gantry sufficiently wide to deflect the steam blasting from the chimney back into the wooden box. It left us gasping for air and our faces the colour of lobsters. On another occasion, when speeding downhill from Stoke to Grantham during one of our slack periods, my colleagues and I stood up and looked over the top of our black box. It so happened that a gang of platelayers were working on an adjacent track ahead and as we approached the supervisor took off his bowler hat and solemnly placed it on his chest giving the impression as if we were a cortege passing by.

It was on one of these downhill runs that our inimitable Locomotive Inspector decided to give the front-end staff a ride to remember. He got the driver to attain a high maximum speed all the way which inevitable meant in some cases exceeding the usual 90mph. The results were disastrous, the vibrations causing all our pipe nuts to work loose and even our alarm bell lost its bell and clanger. By the time we ran into the next station steam

was blowing from the joints of all our indicator pipes. The Stationmaster was on the platform as we stopped and was quite cheerful as we were early but his mood changed and he became quite agitated when Inspector Tasker insisted that all the pipe connections would have to be tightened and communication equipment made good before he could allow the train to proceed. This caused a little delay but ensured safe conditions for the rest of the journey.

The results of the tests showed that generally the distribution of steam to the front and back of the cylinders was reasonably similar for the outside but on the middle cylinder it was found that much more work was being done on the back stroke than on the front of the piston. On this class of locomotive, the middle cylinder is set forward from the outside cylinders and the back edge of the middle casting corresponded to the front edge of the outside cylinders. It was suspected that because of the configuration of the cylinders the frame and middle cylinder were expanding forward when hot. By tramelling from a datum point to the centre line of the outside cylinders and to the centre of the middle cylinder it was found that there was no expansion to the outside cylinder but a sixteenth of an inch to the middle cylinder. When the valves were set, half this was allowed for expansion but in light of these readings it was recommended that although it should still be the case for the outside cylinders, no expansion allowance should be made when setting the valves on the inside cylinder. **TCC**

INDICATING ALCAZAR by Tom Greaves

Last September the editor was fortunate enough to be able to interview Tom Greaves who was also present during the indication trials of Alcazar and shared the shelter with Bill Marley among others. Here are some of his recollections.

I was based at Hertford East in 1957 when the question of testing and indicating No. 60136 Alcazar arose. The Peppercorn AIs had a bit of a reputation for "wagging their tails" and the locomotive had been fitted with a Gresley type bogie so it was decided to make it the subject of a series of road trials on the East Coast Main Line, mainly between King's Cross and Grantham where it came off the train to be replaced by another Pacific. We are aware of the tendency for the class to be a bit boisterous and a short-term solution was to tighten the tender drawbar up to act as a damper, if a locomotive started to get lively again we'd give it a couple more turns! This treatment did, however, cause additional wear the leading tender axle bearings, at least on those fitted with plain bearings.

Fitting the indicator shelter involved removing the locomotive's smoke deflectors and I think the upper sides of it were braced back to the deflector brackets. Among the indication team was Inspector George Harland and he instructed the crew to work the locomotive with a full regulator as much as possible during the trial. Compared to what is possible these days the marine-type indicators we used were fairly crude but assessment of the results allowed a reasonably

accurate interpretation of the data generated. The paper rolls were more than sufficient to record an entire run, changing them would have been a challenge while on the road and you certainly didn't want them blowing round inside the shelter. I remember that the top lamp bracket could only be reached from inside the shelter, although a step was provided on the front of it you wouldn't have been able to reach it – needless to say, you also had to keep your backside away from the smokebox door! It was a tremendous experience and also gave us the opportunity for some pranks, such as the occasion we ran into Grantham with two of us resting our chins on the top of the front of the shelter, like a pair of heads on spikes - apparently a lady on the platform fainted!

I loved the AIs (even though I am a Stanier man at heart) and I rated them better than any of the Gresley Pacifics. They steamed freely (in fact I preferred to fire them rather than driving) and could easily achieve 95mph although you had to fight for every additional mile per hour over that speed. As long as you kept the firing light and made sure the back corners were filled up they'd make plenty of steam, as I'd say to the driver, "I'll make it, you use it!". Great locomotives! **TCC**

THE CROSBY STEAM GAGE & VALVE COMPANY INDICATOR

by Graham Langer

An engine indicator is an instrument for graphically recording the pressure versus piston displacement through an engine stroke cycle. Engineers use the resulting diagram to check the design and performance of the engine – see the article on page 20. The Crosby Steam Gage & Valve Co. of Boston, Massachusetts manufactured steam engine indicators as well as whistles such as the chime whistle fitted to No. 2001 *Cock o' the North*. The use of the word "Gage" in their title is correct!

Perhaps the most successful of the late nineteenth-century designs, was the Crosby Indicator, made in Boston, Massachusetts, by the Crosby Steam Gage & Valve Company. The Crosby Indicator was the subject of patents granted in the USA in 1879, 1882 and 1885. The perfected pencil motion, an ultra-light pseudo-pantograph, was just one of several alternatives proposed in the master patent of 1882. The Crosby indicator was exceptionally successful, particularly after changes in the geometry of the links were made after intensive scrutiny by experimenters in Germany suggested that the original design was not as efficient as it should be. Post-1895 Crosby indicators, therefore, have a sturdier straight rear link than their predecessors, which relied on a very slender link with a noticeable curve.

The perfected Crosby indicator may have been the first to incorporate a spiral rotating spring within the drum body, which was soon accepted as an improvement over the conventional coil spring within the drum base. This feature was widely copied once Crosby's patents lapsed. Crosby was also known for the counter-wound spring but was responsible for a variety of other relevant innovations.

The Crosby instrument was very popular, allowing its manufacturer to maintain offices in Boston, New York and Chicago. A branch was also operated for many years at 147, Queen Victoria Street, London. These indicators were made in several styles and were often supplied in a single box as matched pairs, triples or even quadruples. Crosby-type linkages were used by a variety of external-spring rivals, including Maihak in Germany, and are still evident on the Leutert instruments being made today. It appears the Crosby instrument was the indicator of choice for the LNER during the 20th Century. **TCC**



A Crosby 'marine' type indicator gauge of the sort used by the LNER.



The contents of the small compartment, indicator rolls and instruments.

AI PROFILE - No. 60136 ALCAZAR *by Phil Champion*

Darlington Works No. 2055 was constructed in November 1948 with boiler No. 3924. The first record of it was on the 20th. It was one of five turned out that month, three from Darlington and two from Doncaster. It was painted in LNER apple green with white and black lining with 'BRITISH RAILWAYS' on the tender. Numbers and letters were in old gold. As with all Darlington examples countersunk rivets were used to give a smooth finish to the cabsides and tender.



No. 60136 Alcazar on a down train approaching New Barnet Station in 1957.

Entering traffic from Copley Hill (COP) on 26th November it was to be one of five AIs initially allocated there. It was noted at Doncaster on 23rd December but its first recorded working was on the up 'Yorkshire Pullman' on New Year's Day 1949. It worked between Leeds and the capital both on ordinary passenger trains and named expresses like bringing 'The Queen of Scots' into Leeds on 28th May and taking the 11:30hrs down 'Queen of Scots' from King's Cross on 2nd July.

A transfer to King's Cross shed (34A) took place in May 1950. Naming and repainting into BR blue with black and white lining and the early BR emblem on the tender took place that December following a heavy intermediate repair. Though one of the earlier AIs built, No. 60136 was one of four named that month to join 28 others already with names. It was well down the class for appearance in blue. With 41 already that colour No. 60136 was one of two repainted in December. Its name *Alcazar* was one of the thirteen racehorse names bestowed on AIs. *Alcazar* had won the St. Leger in 1936, *alcazar* is a type of castle built for kings in Spain and Portugal and derives from an Arabic word. On 2nd February 1951 No. 60136 was seen at Darlington with the

thirteen coach down 'Flying Scotsman'.

A transfer to Grantham (35B) was made in January 1952 along with eight other AIs. A repaint into BR green with orange and black lining was done in January 1952 as one of four to join the 18 in green already. Following its first general overhaul in April 1953 which included fitting boiler No. 10599, workings generally seemed to range between the capital and Newcastle but one occasion of note was the locomotive's involvement in taking HM the

Queen south from Aberdeen on 18th May 1953, a working which was unusual in that involved attaching three royal coaches to the up 'Aberdonian' thus increasing the weight of an already heavy train; No. 60157 *Great Eastern* worked the section from York to Peterborough whence No. 60136 *Alcazar* took it on to King's Cross. During a period that was interrupted by a further 'General' over Christmas 1955 (boiler No. 10596 fitted), a number of times in 1955 and 1956 *Alcazar* brought



Alcazar at 'Top Shed' on 30th April 1957.

Robin Gibson

Peter Townend



No. 60136 'Light Engine' at Doncaster 10th April 1961.

the down 'Flying Scotsman' into Newcastle though on 18th December 1956 it departed King's Cross with the down 10:00hrs 'Flying Scotsman'. Another named train hauled by No. 60136 was 'The Northumbrian', the 10:00hrs up train from Newcastle on 23rd June then the 12:20hrs down train from King's Cross on 25th September. When it pulled the down afternoon 'Talisman' on 9th September 1957 its eight coach rake included the ex 'Coronation' twin-set. In October it was a regular performer on the 10:20hrs King's Cross-Leeds. Many times that year and in 1957, departures from London on ordinary passenger trains were noted, the most common being the 10:20hrs to Leeds, the 20:20hrs for Edinburgh and the 05:50hrs to Grantham. After earlier workings in the day on 5th and 6th December 1956 it hauled the additional 19:30hrs King's Cross-Grantham.

On 7th April 1957 *Alcazar* transferred back to King's Cross shed. The locomotive re-visited Doncaster for another general overhaul during June 1957, receiving boiler No. 29863 in the process and the later BR crest was applied to the tender; the locomotive probably losing its Stones generator and electric lighting at the same time. It still worked as far as the North East with a sighting on an up passenger at Usworth near Chester-le-Street on 8th September. This locomotive had a reputation for particularly bad riding so it was sent to Doncaster works in November where it was found that the middle cylinder had been set with no expansion allowance and at the same time an A4 type bogie was fitted. Indicator shrouds were fitted to the front of the engine to monitor performance on King's Cross-Newcastle trains and the riding was much better. Each day from 25th – 29th November it worked the 07:43hrs York-King's Cross and 14:10hrs return (the indicated trips are covered in detail on

pages 20 & 21). A trip to Scotland came in February 1957 as it was seen on the up 'Flying Scotsman' from Edinburgh to Newcastle on the 11th.

6th April 1958 marked a transfer to Doncaster shed (36A) but it went back to King's Cross shed on 3rd August. On 5th April 1959 No. 60136 was reallocated back to Doncaster with four other AIs, returning to 'The Plant' in May for another general overhaul, leaving with boiler No. 29861 fitted. Notable sightings were the up 'Master Cutler' from Retford to King's Cross on 13th December 1960 and the up 'Tees-Tyne Pullman' descending Holloway bank on 9th September 1961, a year interrupted by its final visit to Doncaster for a 'General' which include the fitting of its final boiler, No. 29784, a Thompson Diagram 117 boiler with thicker barrel plates and the round dome further forward. More mundane was the 14:05hrs Leeds-Doncaster local of 30th June 1961. Between that September



An undated image of Alcazar in late, work-stained condition near Grantham.

Mike Mountford

and July 1962 No. 60136 was serviced a number of times on Gateshead shed. Leeds-King's Cross trains were worked too as on 24th August and the opposite direction also. The afternoon 'Talisman' was taken from Doncaster to King's Cross on 30th May. On 30th August *Alcazar* was the standby engine seen stationed just south of Doncaster station at 10:45hrs but was in full cry though when seen picking up water at speed from Langley troughs with its train of ex-LNER coaches and BR Mk 1s on 9th September. Four times in September and October No. 60136's diagram was the IA12 Newcastle-Tyne Commission Quay passenger (though the AI would come off at Newcastle) to return on the 3E22 up fish train. On 10th January 1963 *Alcazar* was on the 12:40hrs King's Cross-Doncaster passenger. The last workings noted were the IA39 09:30hrs ex-Glasgow to King's Cross from Newcastle on 6th April 1963, the same train on the 9th even though it was booked for A4 haulage, then an up special into King's Cross on 11th May.

Six boilers were carried by No. 60136 instead of the class average of seven. *Alcazar* was the eighth AI withdrawn when its turn came on 22nd May 1963. It lasted 14 years and 6 months, 8½ months less than the AI average. Unlike others it did not languish long and a week later it was taken into Doncaster Works for cutting up.

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, "The Pioneer" (AI Steam Locomotive Trust) and various published photographs. Revised and updated by Graham Langer, June 2020. TCC

Bill Reed

General

Progress with major components from outside subcontractors has continued apace, particularly on the cylinder block, with work on the P2 at Darlington being a little slower due to a number of factors. This includes the secondment of staff to the overhaul of *Tornado* and, perhaps predictably, Covid-19 having finally caught up with us though fortunately only in the Omicron form. Thus, whilst no-one has been particularly ill, isolation whilst positive has seen people away for a week or more at a time to stop the spread.

Frames

Last year when we had to remove the leading Cartazzi horn blocks to fit thicker manganese steel liners to gain the correct clearance, some of the Philidas self-locking nuts used to secure the driven bolts we found to exhibit a defect when removed. The Philidas nuts self-locking feature is achieved by having an extended shank on the nut which has two thin slots milled into it. The remaining semi-circular rings are bent so as to partially close up the slots, thus deforming the thread within. When fitted to a bolt, the slots open up and the threads within the ring grip the thread of the bolt, thus providing a locking function. When some of the nuts were removed, part of the locking ring fell off. On close examination, there appeared to be a change in the grain structure of the steel on the surface giving rise to brittle areas which have caused the rings to crack, and in some cases fail. Further metallurgical examination confirmed that the material is correct but further emphasised the change in grain structure on the surface.



A one-inch Philidas nut showing the failure.

As the nuts used were part of a large batch acquired in 2015 for the whole engine, as many of the other Philidas nut as possible were checked in-situ using dye-penetrant crack detection which revealed a fair proportion to be similarly affected. Those showing symptoms of distress are all zinc plated whilst the un-plated ones are OK. This is suggesting that the plating may have something to do with the cause. *Tornado* also uses Philidas nuts (over 700) but no similar problems have been experienced with



The newly machined inside connecting rod.

them. I am pleased to report that the suppliers have engaged with us and are pursuing their suppliers for replacements free of charge – as a precaution we are specifying self-colour, ie no plating and are replacing all nuts of the affected batches even if there is no evidence of failure. Fortunately, most of the affected nuts are accessible without removing other components and they will be changed sequentially to avoid the risk of any frame stays etc. moving relative to the frames.

Pony Truck

We now have a date confirmed for a coded welder to weld the new manganese steel liners to the Pony Truck cannon box as we continue towards completing this component and assembly.

Boiler

The continuing Covid-19 wave has had a more significant effect on German industry than in the UK and has had a serious effect on the output of Meiningen Works. The result is that they have not been able to deliver the first of the two new boilers ordered in time for *Tornado's* overhaul (as covered in *TCC 64*), so *Tornado's* existing boiler has been sent to them for a rapid repair. This means that the first new boiler will be fitted to the P2, and the second boiler delivered much later to become the spare. As a result, the German Covid-19 issue is unlikely to have a significant effect on P2 progress.

Motion

The most significant milestone following the trial fitting of both sets of coupling rods has been setting the frames up on the rotator originally constructed for *Tornado* and rotating the full set of coupled wheels. It was with considerable satisfaction (and relief) that the wheels rotated freely without tight spots. However, the rotator comprising electrically-powered rubber rimmed rollers under one of the wheels was protesting as with no balance weights fitted yet, the weight of a full set of coupling rods had to be lifted twice during each revolution. It was able to do this satisfactorily with *Tornado* (six wheels and four coupling rods) but has struggled with eight wheels and six coupling rods. Soon after the formal tests and filming was completed the rotator gave up with suspected drive pin failure which is under investigation at the moment. We are looking for a larger speed reduction gearbox to use with the bigger motor we already possess for the Axle Driven Alternator test rig, as we will need more power when the coupling rods pistons, and valve gear are fitted. In further good news, the last of the motion components, the inside connecting rod, has arrived from Stephenson's.

Brakes

The brake pull rods have been trial fitted to the engine frames and have had their forked ends tack welded on in the correct positions prior to a coded welder being brought in to complete the welds.

Cylinders and valves

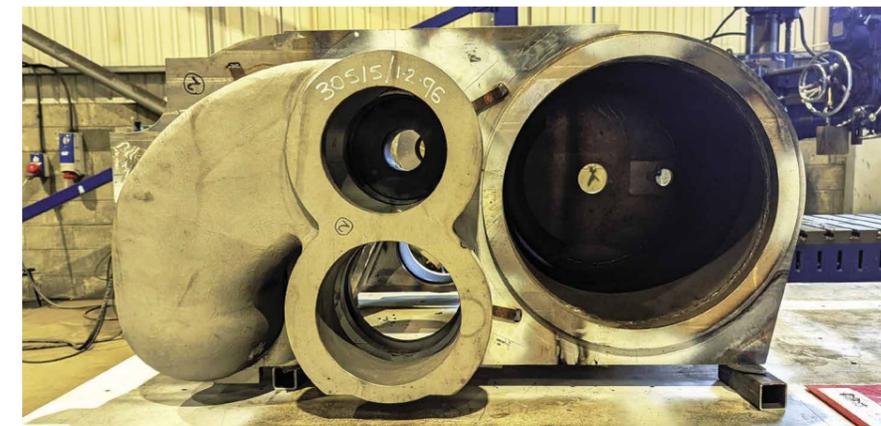
Howco at Irvine has made solid progress with the monobloc cylinder fabrication, with the inside cylinder almost complete and the two outside cylinders at a point where they are ready to be welded to the inside cylinder block. They are already massive and complex fabrications!



The two outside cylinders seen from the front with David Elliott's 1/8th scale model between them.



Above: The two outside cylinders seen from the rear.



Above: Detail of the front of the right-hand cylinder.



Above: A detailed image of the top of the left-hand cylinder.



Right: Setting up the steam ports and steam chest on the right-hand cylinder.



Above: Detail of the cast steam port welded to the fabrication.



Right centre: A member of Howco's staff welds the left-hand cylinder.



Far right: The middle cylinder viewed from the top showing the base of the blast pipe.



Tender

Further work has been completed on tender frame fittings including the clevis which forms the rear part of the engine/tender drawbar.

Above left: The engine-tender drawbar clevis being produced at Crofton Works – the cylindrical bar which was the starting point.

Top right: The complete drawbar with nut.

Pipework and fittings

Some further progress has been made on LNER style pipe unions and fittings by Machinist Ed Laxton between secondment onto fitting refurbishment for *Tornado*.

Electrical System

The main focus of effort from our electricals team has been *Tornado* and the ETCS fitment. Whilst not of initial benefit to the P2, once the work is concluded it will be a read across and enable us to undertake any design modifications and such like so that No. 2007 enters traffic 'ETCS ready'. **TCC**

P2 CERTIFICATION UPDATE by Graham Nicholas

Whilst the latest exciting news of bright, shiny components being added to the locomotive rightly makes the headlines, in the background, work is quietly progressing to secure the necessary certification and approvals to support the locomotive entering service to work railtours on the GB main line railway.

This will be based on the successful approach used for *Tornado*, although certain things have changed in the world of railway certification and approvals since the last time we did it. The requirement now is to demonstrate a combination of 'technical compatibility' and 'safe integration'.

The top-level document is the Certification and Registration Strategy. During 2021, this document was drawn up and was reviewed and accepted by our certification body (Ricardo Certification Ltd). It has now been forwarded to the railway regulator (ORR) and we await any feedback from them; in the meantime, various individual workstreams referred to in the document can be worked on.

Most recently, we have contributed to some collaborative certification work with several other new-build groups, including the 'Patriot', 'Clan' and B17 projects. A joint meeting took place in January at the premises of CTL Seal Ltd in Sheffield, where several aspects of the certification process were discussed, notably the generic parts of the risk analysis work to support the 'safe integration' aspect of the approvals. Ricardo Certification Ltd attended to witness the exercise, splitting their costs equally between all groups present – a small but welcome cost reduction. Further stages of the process will be undertaken in a similar manner where the opportunity presents itself. **TCC**

Help Britain's most powerful steam locomotive to build a head of steam

Join The Boiler Club today and help us to complete No. 2007 Prince of Wales in record time!



The boiler is the beating heart of a steam locomotive and to keep the construction of No. 2007 *Prince of Wales* on schedule for completion within two years, we placed the order for the boiler in 2019. We established The Boiler Club to fund the construction of *Prince of Wales*' boiler. Therefore our aim is to raise at least £600,000 for The Boiler Club from 300 supporters each donating £2,000 to the project (in up to 16 payments of £125 by standing order) - we are more than three-quarters of the way there, having pledges of over £475,000 (excluding Gift Aid) so far!

Special benefits for members of The Boiler Club:

- Opportunity to buy a ticket (seat already reserved) on one of No. 2007's first main line trips
- Reasonable access to No. 2007 at all times
- Opportunity to buy exclusive Boiler Club badge
- First choice of other components to sponsor
- Special limited edition version (signed/numbered) of the first official painting of No. 2007 *Prince of Wales* with No. 60163 *Tornado*
- Special supporters' day with *Tornado*.

Together we can build this remarkable locomotive - join The Boiler Club today!



Diagram 118b boiler drawing shows fitted with Melesco type superheater header as used on *Tornado*.

No. 2007's boiler in detail

- Use of the diagram 118a *Tornado* boiler with detailed modifications to improve life between overhauls
- Interchangeable with *Tornado*'s boiler
- *Tornado*'s boiler is 17in shorter than P2 boiler – No. 2007's smoke box will be extended within the cladding
- 250psi of No. 60163's boiler will be retained to improve economy and increase maximum power.



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

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.

For further information please visit www.p2steam.com email enquiries@p2steam.com call **01325 460163** or write to The Boiler Club, P2 Construction Fund, Darlington Locomotive Works, The A1 Steam Locomotive Trust, Hopetown Lane, Darlington DL3 6RQ

DLW2 UPDATE by Paul Bruce

Work has now officially begun on Darlington's Railway Heritage Quarter which provides a new home for the Trust and will be at the heart of the Bicentennial Anniversary of the Stockton & Darlington Railway in 2025. Heather Scott, Leader of Darlington Council, had the honour of breaking the ground to mark the start of construction of Darlington's Railway Heritage Quarter.

Darlington's Railway Heritage Quarter is a major project that will invest in the town's rail heritage ahead of the bicentennial anniversary in 2025 to create a national visitor destination in Darlington. Heritage and cultural regeneration are now recognised as a key ingredient in economic growth and the Railway Heritage Quarter will complement the economic growth ambition of the Borough. The AI Steam Locomotive Trust has been involved since the beginning of this project some twelve years ago, providing input on strategy, capability, history and engineering.

Essential improvements will be carried out on several historically significant buildings on the site, linking them together to create a cluster of attractions including the Skerne Bridge, the oldest working railway bridge in the world.

Digital and technological investment will bring history to life and plans include a new immersive ride experience the likes of which are only seen at theme parks. The Railway Heritage Quarter will have a café and shop, themed play area, show field, a new live engineering building, temporary exhibition space, archive and extended car parking, which will attract all generations to visit for years to come. The project is being supported by £20million of funding from the Tees Valley Mayor and Combined Authority.

Addressing the assembled guests and



Leader of Darlington Council, Councillor Heather Scott, addresses guests at the unveiling of plans for the Heritage Quarter at Darlington Locomotive Works.

press at Darlington Locomotive Works on 3rd March, Councillor Heather Scott, leader of Darlington Borough Council, said, "The Railway Heritage Quarter is a key project in our plans to celebrate Darlington's unique rail heritage and will give present and future generations the opportunity to use new technology to explore the history of the Stockton & Darlington Railway. This is urban regeneration and heritage celebration at its very best. Darlington has long been known for its engineering excellence both past and present and this fabulous project will help showcase our proud history."

Tees Valley Mayor Ben Houchen responded, "The Stockton & Darlington Railway was just one way our region had a massive impact on the world, that can still be felt to this day. Local people are rightly

proud of this heritage and it's only right we help tell its story. We've backed the Rail Heritage Quarter with £20million to make sure it does justice to our history and becomes a major part of the region's S&DR 200th anniversary celebrations. These exciting plans show the scale of ambition to make it a top-quality attraction, which will be a huge draw for rail enthusiasts, history buffs and families alike and help provide a boost for our brilliant businesses."

The new facilities for AISLT will comprise a double track workshop, administration block, storage, inspection pits and an electrical workshop house in one building with a direct connection to the national network. It should be ready for use by Summer 2023. It is also hoped to secure funding to provide a turntable adjacent to the new facility by 2025. **TCC**

P2 DEDICATED DONATIONS UPDATE by Liz Gibson



Did you know there are literally hundreds of items you can 'buy' for the P2? With Fathers' Day rapidly approaching, one of these would be the ideal gift for the dad who has everything! With something to suit every budget, Dedicated Donations are an excellent way of funding the build.

- For £10 you can sponsor a set of nuts or washers for the Pony Truck
- Fancy something shiny? A stainless-steel handrail baton comes in at £40 while a boiler handrail knob is £75
- If bits that get grubby float your boat then maybe consider sponsoring a brake hanger bracket for £250 or go even bigger - for £600 you could pay for a spoke on one of the magnificent coupled wheels!

Higher value items are also available but whatever the cost or size, every part sponsored is a step closer to bringing this beautiful locomotive to life. If you're interested in finding out more please email Liz Gibson at dedicated.donations@p2steam.com for more information.

If you know of a business owner or company who may be interested in sponsoring an item on No. 2007 Prince of Wales, please contact dedicated.donations@p2steam.com. **TCC**

DARLINGTON LOCOMOTIVE WORKS 2

Wasting no time, Darlington Council has started work on the site of the new Darlington Locomotive Works (DLW2) in Bonomi Way, adjacent to North Road Railway Station. The first job was to clear trees and scrub from the roadside and establish an access route to the area so that groundworks could commence.



The area of land adjacent to Bonomi Way cleared of scrub – this will be planted with trees in due course.



Above: A site office and fencing materials have also been delivered.

Right: The fencing is then set up to provide secure perimeter and to cordon off the access road.



Contractors deliver security fencing for the construction site.



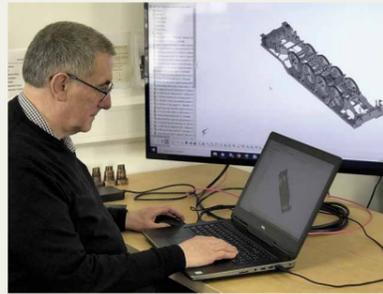
The Stockton and Darlington Railway was opened on 27th September 1825 with the prime purpose of transporting coal from the South West Durham collieries around Shildon, West Auckland and Witton Park, to the River Tees at Stockton, for shipment to the south of England. The Stockton & Darlington was by no means the first railway, but its opening in 1825 marked a very significant step in the development of railways by bringing together two features for the first time, the concept of a public railway, available to all, for transport of

passengers and goods and the use of steam locomotives.

This project will see the Darlington Railway Heritage Quarter (DRHQ) developed into a new internationally significant major visitor attraction and museum by 2024 so that it can be a central part of the bi-centenary celebrations of the Stockton and Darlington Railway in 2025. As well as carrying out essential improvements to a number of historic buildings on the site, it will be a place where local heritage is being activated in ways that will lead

to sustainable regional regeneration, investment and the transfer of new knowledge and skills to local communities.

Historic England has designated the 26 mile route of the Stockton to Darlington Railway a Heritage Action Zone (HAZ), the DRHQ is one of the key sites along the HAZ and will benefit from research and support to tackle heritage at risk and urgent repairs. A conservation management plan for the site will also be developed to ensure better long-term conservation and management of the buildings. **TCC**



"Why has it been necessary to change the foundation ring corners on *Tornado's* original boiler?"

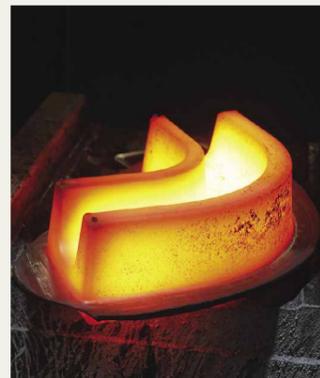
Steam locomotives are always a challenge in boiler design, and the larger the power output the bigger the challenge. The restrictions of maximum axle load and of the loading gauge (clearance with bridges etc) means that steam locomotive boilers have to be pushed much harder than corresponding static installations where weight and size are not usually a problem. A further issue is the frequent and extreme variation in required power output from almost nothing when stationary to the maximum power output of the locomotive.

Today most locomotive boilers experience a harsher operating regime compared with when the railways were operated by steam. Main line locomotives in particular suffer from being put into steam for one or two charters then allowed to cool down. Back in steam days a typical boiler was in steam for three weeks continuously and then taken out of steam for a washout and inspection, returning to steam immediately. Larger sheds operating front line express locomotives would use hot water to wash boilers which reduced the thermal shock of cooling and heating. Thus in a typical year of operation, the boiler would experience around 16-17 of these reasonably benign cycles compared with *Tornado* which can easily see 30 harsher cycles. The problem is that whilst the boiler will cool down fairly evenly, when being put into steam from cold this is not the case. This is illustrated by the fact that even after six to twelve hours to warm the boiler gently, with the pressure gauge registering a few pounds per square inch meaning that water is boiling, it is often possible to place a hand on the foundation ring (which joins

the inner and outer fire boxes at the bottom) without being burned. Then quite suddenly convection of water in the boiler will start and the foundation ring will quickly come up to near the boiling temperature of the water in the rest of the boiler. This imposes an unavoidable thermal shock.

The second and more significant effect is what can be termed micro-cycles. This is the difference between the boiler idling where the heat input is just sufficient to maintain boiler pressure against radiation and convection losses and full power. This shows up a disadvantage of a steel firebox. Steel has only one seventh of the thermal conductivity of copper, although as it is stronger, it will usually be thinner than a corresponding copper inner firebox. Steel is much cheaper and easier to repair or replace, which is its advantage. On a typical full day railtour with *Tornado* between 20 and 30 micro-cycles can be experienced.

When idling the temperature of the fire side of the inner firebox will be in the order of 5-10°C hotter than the water to enable enough heat to pass through the plates to maintain boiler pressure. When working at near full capacity, the temperature drop across the firebox plates will average 90°C to force the roughly 20 megawatts of heat into the boiler that is needed to produce around 1.8 megawatts (2,410 horsepower) at the drawbar. The effect of this is that the inner firebox will be average of 45°C hotter than the outer firebox, causing it to try to expand by as much as 1.5mm, this is resisted by the stays in the flat parts of the firebox and absorbed by the smooth curvature of the firebox at the corners. However,



Above: Forging the corners for the firebox.



David Elliott

where the inner and outer fireboxes are joined at the corners of the foundation ring, there is nowhere for this expansion to go, so high stresses are set up in the corners. This first showed up at the end of the 2010 season when cracks were discovered in the rear foundation ring corners which caused us to remove the boiler from the engine and return it to Meiningen for rectification. Given that the locomotive had only completed around two and a quarter years operation by then, it was obvious that this was going to be a serious recurring problem. Meiningen replaced the corners and the boiler went on to the end of 2014 when the first overhaul was undertaken by which time cracks were beginning to form in the foundation ring corners. This is not unusual on this style of boiler and is not unique to *Tornado*.

Meiningen's normal method for manufacturing foundation rings is to machine their component parts out of 100mm thick boiler plate. Whilst this works satisfactorily for the straight front, back and sides, it has a disadvantage for the corners. Steel plate is achieved by repeatedly rolling a billet of steel when white hot until it is the desired thickness. This has the effect of squeezing the crystals or "grain" of the steel into long thin shapes in the direction of rolling which is good for strength and toughness in the direction of the grain. However, it also produces a series of layers through the thickness of the plate, which is not of great concern provided they are stuck together adequately although the plate will not be as strong through its thickness as it is along the length of the grains.

Unfortunately, in our foundation ring corners, the high stresses from the



David Elliott

A foundation ring corner awaiting machining.

micro-cycles act across the thickness (weakest direction) of the plate. Most large German locomotives do not operate at anything like the frequency or output of *Tornado* so the cracks form over a longer time period, but we have witnessed the same issues on 01 and 03 Class boilers at the Meiningen works. Traditional riveted copper inner/steel outer fireboxes have foundation rings which are forged, ie formed by hammering when hot. This enables the grain to be pushed into the direction required to improve the strength/fatigue properties of the steel.

With this in mind, we approached the forging industry in 2014 to produce forged corners for *Tornado's*



De(M)

A corner tacked in place awaiting final welding.

boiler and Brooks Forgings at Cradley Heath in the West Midlands came up with a good solution. In order to achieve the accuracy we require, they made a set of closed die forging tools and we acquired twelve corners to bring the unit price down and to have some in stock. The results have been much better with the boiler going for three and a half years before showing signs of cracks beginning to form. In addition, we have been able to develop a method for cutting out the cracked metal and welding in fresh with the boiler on the frames. This should ensure that with one relatively easy repair intervention, the boiler will

last between major overhauls without being removed from the frames saving significantly on time and cost.

Subsequently the eight spare corners were sent to Meiningen to be incorporated into the two new boilers (P2 and spare), however as events have panned out, Meiningen are now overhauling *Tornado's* existing boiler which means that we needed another set in a hurry. Brooks Forgings has responded magnificently to our urgent request and have supplied four more corners in quick time. As you read this they are already in Germany and will be fitted to the boiler ready to give good service in the coming years. **TCC**

• WORKSHOP NOTES •

Daniela Filová, until recently David Elliott's Engineering Assistant, has now set up her own engineering firm in Shildon having shipped tons of machinery from the Czech Republic to do so. Almost immediately she started tendering for Trust work and we have been happy to award her with a number of significant tasks. I think David Elliott and the engineering team at Darlington Locomotive Works can be justifiably proud of what she has achieved.



Photos: David Elliott

Above: Daniela with her logo on the door of her new premises.

Left: Daniela sets up the superheater header on her horizontal boring machine.

P2 FUNDRAISING PROGRESS *Sophie Bunker-James*



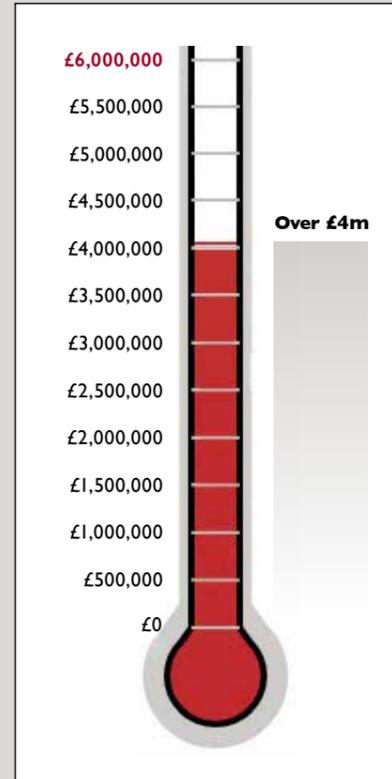
Gresley class P2 No. 2007 Prince of Wales.

2022 is gearing up to be a very significant year in the build of the P2 Class No.2007 Prince of Wales. This year we will take delivery of over £1m of components, some of which have been funded, others still requiring your support. These include the motion delivered in Spring (which you will have already seen in situ on the locomotive), the tender frames and the rather impressive cylinder monobloc due for delivery this summer and by the autumn, the heart of the engine, the boiler, will arrive in Darlington. Thanks to your generosity, 'The Motion Club' reached its impressive target and has now closed. However, the Tender, Monobloc and Boiler Clubs all remain open to donations at this critical time. No. 2007 couldn't have got this far without your contributions, and we ask again for your support.

As many feel the pinch, our income

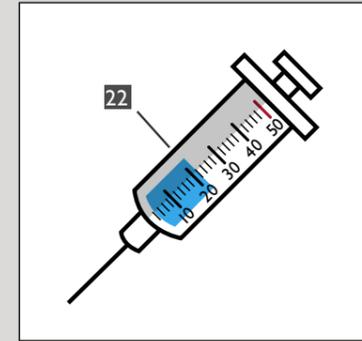
has inevitably plateaued, coinciding with a time when the P2 needs the funds more than ever to meet the planned deliveries. We recognise that everyone is seeing the price of living increase, and so we are all the more grateful for each and every donation made, helping us keep the project on track. The longer the build takes, the more it will inevitably cost to complete Britain's most powerful steam locomotive. We rely on a stream of donations to continue our progress. As a club member, monthly donor or one-off contributor, your money helps to ensure the future of main line steam. If you would be interested in making a further donation and help bring forward the steaming of this titan, please go to the p2steam.com website, contact the office by 'phone on 01325 460163, or email enquiries@p2steam.com.

Over the next six months, you are sure

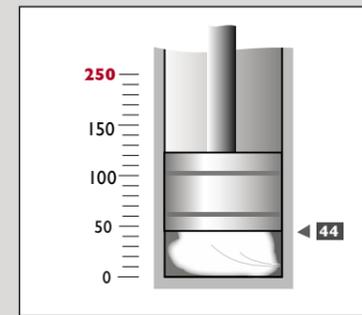


Donated to date.

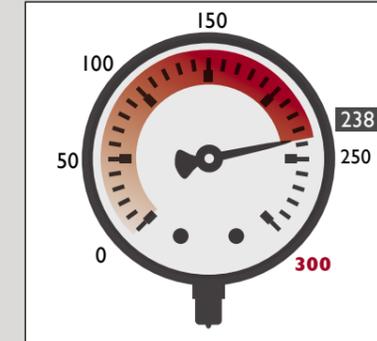
to be delighted with the freshly fabricated, machined, welded and gleaming metal due to arrive in Darlington. Everything that we have achieved so far in this build would not be possible without you, our loyal Covenantors, Club members and donors. All that remains to be said is a huge thank you from all the P2 team for your continued support.



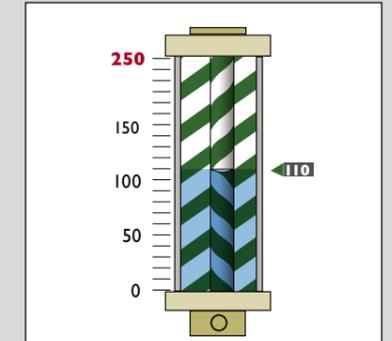
Injectors Club - 22 members.



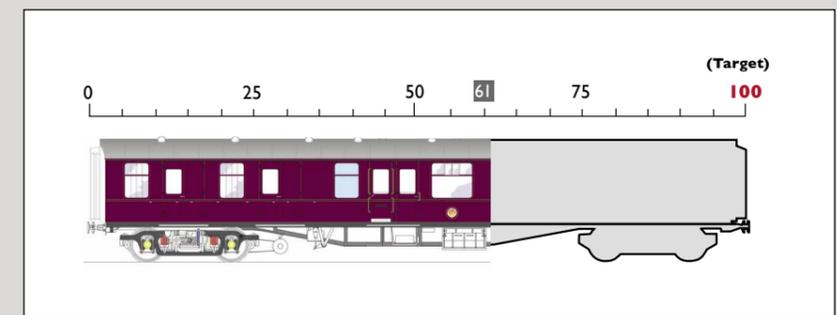
Monobloc Club - 44 members.



Boiler Club Gauge - 238 members.



Tender Club Gauge - 110 members.



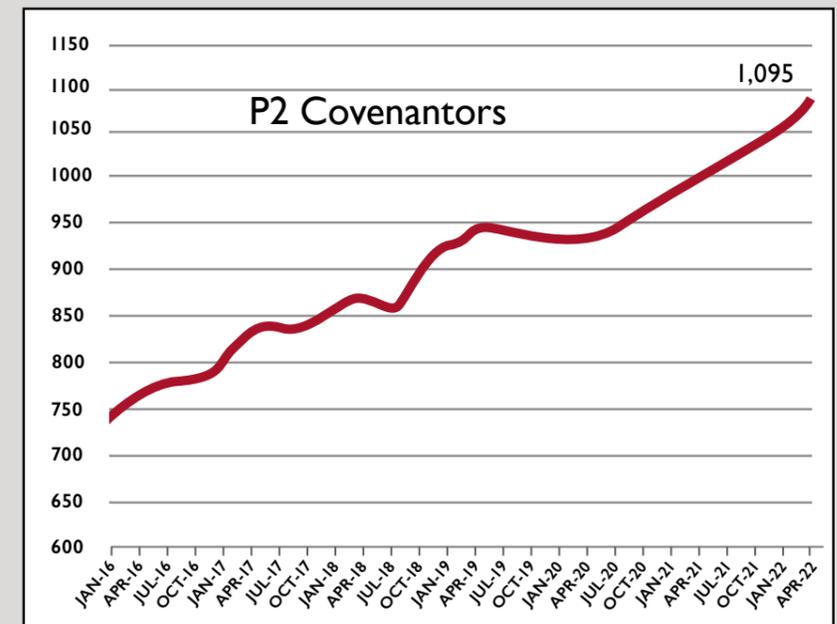
The P2 Coach Appeal - 61 supporters.

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. Please contact legacy.coordinator@p2steam.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? We're open between 11:00hrs and 16:00hrs.

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 this summer. 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 website or contact the office by 'phone on 01325 460163, or email enquiries@p2steam.com.

Monobloc not for you? There are many other aspects of the P2 build that you can contribute to, from injectors to the support coach. One-off donations are also very welcome. As always, there is more information on our website.



3D image of the P2 cylinder block.

THE AISLT ORGANISATIONAL REVIEW by Richard Courteney-Harris

Rear Admiral Grace Hopper USN, once said 'The most dangerous phrase in the language is "we've always done it this way"'. As well as being a Rear Admiral in the US Navy, she was an immensely gifted computer scientist who recognised that, in order to not only survive, but to flourish and encourage innovation, we must always be prepared to look forward.

During late summer 2021, AISLT Trustees identified the need for an objective review of the organisation, with recommendations on how it should be structured and organised to be fit for the next 10 years and beyond. Recognising, and indeed building on the work of the Trust since it formed in 1990, the idea was to reset the organisation so that it was ready to face the future. The Trust was moving on from building (and then operating) a single engine, to a time when we will be operating two engines and building a third!

We recognised the need to contract professional help in order to get the most from the review and, after some research, Journey 4 were engaged. Journey 4 are a York based consultancy who specialise in such work and who have considerable experience in working with the railway industry.

From a long way off it was clear that this needed to be done as soon as possible – 2022 was always going to be a very busy year and a time of significant change. We needed to be able to understand our position and how we were required to be structured as soon as possible or we were in danger of wasting time and money. So it was that the review started in Autumn 2021 to be finished, at the latest, by January 2022.

The first issue was to determine the parameters of the review. It was quickly established that an organisational review needed to be undertaken which went beyond an appraisal of the organisation's structure. Although we were able to articulate our long-term ambition, our vision, strategy and values were not clear and these needed to be explored and clarified before looking at the structure required to deliver that ambition, (i.e. how we wanted to operate and why, not just what we wanted to achieve). The review was thus broken down into three phases.

Phase 1 - Review of organisation at strategic and operational levels, including data gathering and diagnostic. This

included terms of reference for the project, a look at our mission, a review of Trustees (including role, responsibilities, spans of control), of operations, (including people), and a skills gap analysis. This was completed by a series of in-depth interviews with people at all levels in the Trust, including supporters, and a series of online workshops, where participants actively took part in discussing how they saw the Trust now and in the future. Journey 4 also reviewed our working practices and our key reference material. This phase enabled us to draw up the Trust's values and put together the strategic outline plan that we'll take forward.

There is clearly more work to do in both areas, but as a 'taster' the Values which we shall enshrine in the organisation will be:

- **Professional:** Always act in a professional manner; demonstrate reliability, consistency and honesty in our dealings with the rail industry and others.
- **Innovative:** Create new and better ways for the organisation to be successful. Adapt to change and engage in continuous learning and critical thinking to promote the growth of the individual and the organisation. Demonstrate a willingness to apply modern methods in a heritage context.
- **Passionate:** Demonstrate a clear passion to drive forward and deliver the Trust's vision and mission
- **Integrity:** Gain the confidence and trust of others through honesty, authenticity, and acceptance of responsibility
- **Accountable:** Take personal responsibility for the quality and timeliness of work, and achieve results with little oversight, working in close collaboration with rail industry partners.

The work which follows on the Trust's Strategic Objectives will cover five key pillars, (Customer, Engineering, Operations, Commercial and People / Place). We will then determine our strategy in each of these pillars out to 2031, expressed as short-term objectives, medium term aims and long-term vision

Phase 2 - Report and Recommendations. The consultants then created a draft report for the Trustees, outlining the results of the diagnostic

phase and setting their recommendations to support the future strategic mission and delivery of operational objectives. Trustees were then able to focus the report, in order that it matched the Trust's ambitions.

Phase 3 - Implementation plan. The final phase, in early January 2022, saw the creation of a final report and implementation plan detailing objectives, resources required and timelines.

Trustees, and other Board members, were extremely pleased with the plan presented by Journey 4 in January. It managed to articulate what many were thinking across the organisation, or had in their minds, and, most importantly, it gave Trustees an invaluable insight into how the Trust was functioning. Those interviewed were approached privately and were encouraged to be open and honest; one of the key premises of the review was that it was to be 'warts and all'. We saw what we were doing well and acknowledged where improvements were required. There was a mountain of advice offered up by people at all levels and what was most gratifying was the fact that, independently, they were coming to the same conclusions. That gives us something to work with!

The next stage in the process begins very shortly. Using the data and advice offered by Journey 4, moderated by the reality of how the Trust normally functions, we will start to work through the recommendations and begin to implement those in a measured and controlled fashion. Whilst change is good where it improves a situation, we must recognise that it cannot happen overnight. We are also limited by the resources at our disposal; there are only so many hours in the day and people to effect it!

In order to manage the not insignificant and somewhat complicated process of implementation, Trustees have appointed Tom Benson, a long-time supporter, as Review Coordinator. He will coordinate the work and ensure that the programme of transformation and change is manageable and coherent. Managing this change, whilst ensuring that the work of the Trust continues unabated, has been described as similar to changing the engines of a Boeing 747 whilst in flight! We wish him well and look forward to updates and news in the very near future.

tcc

FROM THE ARCHIVES by Graham Langer

Spring 2002 – Following an approach by Darlington Council, the Trust relinquished the northern half of the Hopetown building to give the North Eastern Locomotive Preservation Group (NELPG) a base in the city. It had been hoped to attract sufficient contract work to keep this part of the works busy but this, alas, had proved hard to achieve. All the machinery and facilities were consolidated in the southern half of the building and work continued on fitting this out for the final assembly of the locomotive. Following the completion of the optical alignment survey of the frames by staff from the Severn Valley Railway, the middle and rear cannon boxes for the driving wheels were now in position.

Spring 2007 – By Spring 2007 Bedestone had completed the grinding of the inside radius link and it went to I D Howitt Ltd at Crofton for assembly to the radius link trunnions which had been completed by Multi-Tech. All the case-hardened inside valve gear components had been collected from Holts and were at Crofton for grinding. The inside reversing rod lifting arms and cross shaft had been fitted, the reverser cross shaft removed and the arms to drive the inside cylinder reverser and for the balance spring slid on. The superheater header casting was subjected to ultrasonic non-destructive testing at Keighley Laboratories and found to be sound. It was sent to Multi-Tech for machining.

Spring 2012 – Following winter maintenance at the Mid Hants Railway and tyre turning at Wimbledon, *Tornado* returned to the main line in March, completing a number of tours before appearing at the Nene Valley Railway and Barrow Hill Roundhouse for their spring galas. In TCC 26, Graham Nicholas continued to enlighten supporters with further information about the VAMPIRE calculations involving the project P2 and the dynamics of the original class and proposed changes to the design to resolve some of the issues resulting from them. The Trust was also mourning the death of Malcolm Crawley, one of our Vice Presidents and a huge figure in the early days of the organisation.

Spring 2017 – The sensational news in 2017 was that *Tornado* had become the first British steam locomotive in preservation to bag the magic 'ton' achieving over 101mph on the East Coast Main Line north of York in the early hours of 12th April. The consequent news coverage was wall to wall and Tom Ingall of the BBC produced an excellent film covering the night's adventures. With its cab and smokebox in place, work continued on fabricating a multitude of small components for No. 2007 on the back of buoyant fundraising. On a sad note we also recorded the passing of Barry Wilson, a key member of the Trust board and for many years its financial controller.

tcc



Tornado tears north on the East Coast Main Line, pursuing 100mph.

The A1 Steam Locomotive Trust is pleased to display the logos of organisations giving us their ongoing support. Their contribution is gratefully acknowledged.

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THE A1 STEAM LOCOMOTIVE TRUST CONTACTS

President **David Champion** (david.champion@a1steam.com)
 Vice Presidents **Peter Townend** (peter.townend@a1steam.com),
Ben Godfrey (ben.godfrey@a1steam.com),
Rick Peacock-Edwards (rick.peacock-edwards@a1steam.com)

Board of Trustees

Paul Bruce Property Director (paul.bruce@a1steam.com)
Graeme Bunker-James Commercial Director (graeme.bunker-james@a1steam.com)
Richard Courteney-Harris P2 Project Coordinator (richard.courteney-harris@a1steam.com)
Steve Davies Chairman (steve.davies@a1steam.com)
Graham Langer Publications (graham.langer@a1steam.com)
Ben McDonald Group Engineering Director (ben.mcdonald@a1steam.com)
Huw Parker Operations Director (huw.parker@a1steam.com)
Chris Walker Finance (chris.walker@a1steam.com)

Advisers to the Board

Tom Benson Review Coordinator
Terry Graham P2 Project Manager (terry.graham@a1steam.com)
Mark Grant Volunteer Coordinator (mark.grant@a1steam.com)
Andy Hardy Archivist (andy.hardy@a1steam.com)
Gary Hughes Council & Board Business Coordinator (gary.hughes@a1steam.com)
Rob Morland Electrical (rob.morland@a1steam.com)
Graham Nicholas Professional Head of Engineering (graham.nicholas@a1steam.com)
Richard Peck Commercial (richard.peck@a1steam.com)

Engineering

David Elliott P2 Engineering (david.elliott@a1steam.com)
Alan Parkin Electrical Design (alan.parkin@a1steam.com)
Richard Pearson Locomotive Manager (richard.pearson@a1steam.com)

Management & Administration

Sophie Bunker-James Marketing Director, Press and Communications (sophie.bunker-james@a1steam.com)
Dawn Phillips Office Manager (dawn.phillips@a1steam.com)
Stephanie Turnbull Supporter Administrator (supporters@a1steam.com)
Liz Gibson Dedicated Donations (liz.gibson@a1steam.com)

Railtours

Lauren George Railtours Booking Office Manager (lauren.george@a1steam.com)

Editor

Graham Langer (graham.langer@a1steam.com)

Picture Editor

situation vacant

Design

Kevin Lumb (kevin@limegroveprintanddesign.co.uk)

* All information correct at the time of going to press mid May 2022. For up-to-date information and dates please check the website www.a1steam.com.

- The A1 Steam Locomotive Trust, Darlington Locomotive Works, Hopetown Lane, Darlington DL3 6RQ
- e-mail: enquiries@a1steam.com ● website: 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.

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