



60163 TORNADO  
New Britain 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

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Alex Morton

## TORNADO RETURNS TO TRAFFIC

An image I am sure many of us have waited impatiently for, *Tornado* back in steam and running-in on the Nene Valley Railway. In this edition of *TCC* we bring you the full story of

the cause of the problems that beset 'The Ebor Flyer' and the extended repairs that have followed this unfortunate incident.

**TCC**



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## EDITORIAL by Graham Langer



It's been a difficult year in many respects and I can only apologise for the non-appearance of a summer edition of *TCC*. The lack of any positive news about *Tornado's* extended repair and the rolling impact this had on the tour diary meant constant changes to the content and dates that we could include and, rather than go to print with a raft of information that might be inaccurate by the time you received it, we elected to roll two editions into this one. As it happens, this editorial can bring you the welcome news that *Tornado* is up and running again, accumulating miles on the Nene Valley Railway while we await a date for a main line test run to be set; it goes without saying that we hope you will find an opportunity to travel with us in 2019 and we tried to provide as many different starting points as possible.

The other big headline was the placing of *Prince of Wales* on its completed wheelsets and rolling it out into the sunlight at Darlington Locomotive Works; we never had this opportunity at such an early stage during *Tornado's* construction and it was a thrill to be able to stand back from the locomotive and absorb its immense presence outside the workshop. Although it looks close to completion there is still a huge amount to be done, both in terms of fundraising and construction but the engineering team deserve our congratulations for giving us a sight that hasn't been seen for 80 years.

In the past the Trust had something of a reputation for burning team members out. Luckily before he reached this stage Operations Director Graeme Bunker-James advised the Board that he wished to reduce his overall commitment to the Trust after many years of service. Graeme has been involved with the Trust for almost 20 years, ten years of which have involved the hands-on operation of *Tornado*. Despite wishing to step back earlier he felt this wasn't appropriate after the failure in April; following the successful return of No. 60163 to steam he now wants to follow other avenues of interest both inside and outside the railway which not been possible while *Tornado* dominated his life – a problem many of us are familiar with! Graeme remains a Trustee and aims to take a full role in current and future AISLT projects including the P2 and V4 as well as the new train and expanded base in Darlington. However, he has agreed to serve on the SVR (Holdings) PLC Board as a Director; as well as being Vice Chairman of The Gresley Society Trust, which he felt was not compatible with leading the operation of a main line locomotive full-time. Graeme's service as Operations Director during *Tornado's* first 10 years in traffic has been invaluable and we are delighted that he will continue as a Trustee, especially inputting to our long-term development plans.

As The AI Steam Locomotive Trust continues to grow, it is becoming increasingly important that Trustees are able to spend more of their available voluntary time in their oversight role. As such, there will be a number of changes within the team in the coming months as the roles of our existing Trustees evolve and we seek to bring new people on-board, particularly expanding our capabilities in both engineering and operations. One of these new appointments, albeit not to a board position, is that of Graham Nicholas in the role of Professional Head of Engineering; Graham was formerly responsible for engineering quality, tied-in closely with the certification process for the locomotives with the Trust's Notified Body (Delta Rail). As a professional railway engineer working as a vehicle acceptance engineer responsible, for example, for the approval of class 66 locomotives entering the UK, Graham is well qualified for his new role within the Trust. The Trust is also in the final stages of appointing an Engineering Manager to oversee operations at Darlington Locomotive Works.

Finally, one thing that has started to make a significant impact on the money being given to our locomotives is the increasing number of legacies. These will always be hypothecated to the locomotive of your choice and usually towards capital costs associated with them. One feature of these legacies is that we have sometimes been left bundles of shares; although the purpose of the Trust is not to hold financial investments, shares in listed companies have been donated to us in the past and they have always been sold to provide valuable funds for our various projects. We now have a share dealing account with a stock broker and so any shares which are donated to the Trust in the future can more easily be realised.

As ever, thank you for your continued support of both *Tornado* and *Prince of Wales* and we look forward to seeing you on one of our tours or at Darlington Locomotive Works in the near future. **tcc**

## 2018 CONVENTION REPORT by Graham Langer

With a large crowd expected this year the Convention was spread over three sites, the Dolphin Centre, Darlington Locomotive Works and the Mercure Darlington Kings Hotel for the dinner in the evening. In the event, storm Callum prevented some supporters from reaching Darlington but over 180 people managed to make it to the 25<sup>th</sup> Annual Convention.

As ever Mark Allatt opened proceedings, launching the meeting with a screening of an edited version of the 'Extreme Cake Makers' episode featuring *Tornado* fashioned in chocolate and orange sponge by Lancashire baker Rosie the Cake Diva. It was good to see David Elliott getting his teeth into a section of firebox, albeit covered in ganache! Following Mark's introduction, Huw Parker then showed a compilation of clips from the Paddington 2 movie and revealed some of the story behind *Tornado's* excursion to Leavesden Studios for the filming. He then moved on to cover some of the successful trains that *Tornado* had hauled after last year's Convention before the locomotive was stopped for routine winter maintenance, including two Paddington themed trips with the Belmond British Pullman set, one with TRH The Duke and Duchess of Cambridge and Prince Harry, 'The Tees-Tyne Express', 'The Chester Christmas Cracker' and a visit to Didcot. Huw also reviewed *Tornado's* re-entry into traffic, working a number of tours and visiting several preserved lines, in the snow, including the NYMR and the SVR, although the journey between the two had to be made by road following the bridge bash at the former railway..... maybe this was a portent of things to come.

Unfortunately, Huw was the Responsible Officer on 'The Ebor Flyer' and had to deal with the aftermath of No. 60163's failure on the East Coast Main Line but he paid tribute to all those who had helped resolve the situation so swiftly, particularly the Nene Valley Railway (NVR) for taking the locomotive in for repairs at such short notice. While *Tornado* was unavailable, No. 60009 *Union of South Africa* deputised on the 'RAF 100' train and again Huw thanked the owner and crew of the latter for filling in. On a happier note, Huw was able to report that our locomotive has now had its repairs completed and he was able to show some footage of *Tornado* notching up some of the 750 miles of running-in that will be completed at the NVR.

To cover the engineering aspects of this story, David Elliott now took over the microphone. Recapping on what he described as having been an 'exciting' year,



The hall at the Dolphin Centre was well filled.

David noted that the locomotive had now run over 100,000 miles and needed a routine overhaul at the end of last year; this included upgrading the TPWS brake system to the Mk3 version, re-metalling of the rod bushes and the installation of 'Truckmaster' oil separation gear in the air pipework to reduce the amount of oil finding its way into the brake system. At the same time all the valves were re-lined while the locomotive stood on David's unique 'portapit' – Locomotive Maintenance Services not having a pit to use. Rob Morland joined David to run through the electrical work and to explain how the intermittent fault in the TPWS circuit had been identified and resolved (by the use of a simple diode!). It was a fault that baffled the experts and led to the piloting of 'The North Briton' with a class 66. Rob also expanded on the employment of a 'Raspberry Pi' computer with the middle big end heat sensor which proved itself on 'The Ebor Flyer'.

Mention of 'The Ebor Flyer' brought David Elliott back to the lectern to explain the circumstances of the valve gear failure that afflicted *Tornado* on her high-profile 90mph run, noting that it was a 'perfect storm' of four factors that brought the locomotive low; these included sub-standard lubrication, both in terms of oil purity and delivery, valve ring gaps, valve liner alignment and a taper in the bore. The consequence was that the valve heated up to an estimated 800 degrees and stuck in the bore, all the force of the valve gear was then directed into the combination lever which suffered a progressive, ductile failure before parting company with the locomotive, taking part of the crosshead with it and bending the



Huw Parker.

radius rod. In the ensuing investigation, every valve gear component was measured and NDT testing applied to any part that might have been damaged. Stephenson Engineering came to the rescue by producing replacements in record time and a new valve liner was inserted for the middle cylinder. The locomotive's return to traffic, however, was delayed by the DB Cargo (DBC) inspection regime and the difficulty in sourcing some parts because British manufacturing seems to be incredibly busy at the moment! After a minute examination of the engine, DBC pronounced themselves happy and the locomotive started a running-in programme on the Nene Valley; David expressed his gratitude to the railway and Ricardo Rail for the way in which they worked with the Trust.



Graeme Bunker-James now took the floor to look at “what happens next” with No. 60163. Once a date has been set for a main line test run, *Tornado* will be able to resume her work on the 'big railway' with a packed programme for 2019. A new tours brochure will be out soon and this will feature a distinct change in direction with a move to more repeat itinerary tours, a more efficient programme that will meet with favour from our industry partners. 'The Aberdonian' runs on five days in 2019, utilising the newly refurbished turntable at Ferryhill (once Network Rail have re-connected it!) and 'The North Briton' takes in the Settle & Carlisle Railway on six dates. Graeme stressed that there will be more trips from the East Midlands and that the 2019 programme allows the Trust to run some of the trains it lost in 2018. In addition, he was able to announce a new tour, 'The White Rose' in April, the first time we have included Harrogate as a destination in one of our trains. Preserved lines will not be ignored and although the diary is yet to be completed, visits to the Bluebell Railway and the Wensleydale Railway have already been indicated.

Chris Walker stepped up to cover what he called “the boring bit”, the financials. He was able to note that turnover was up all round but that *Tornado* had shown a small loss, mainly because of the cost of getting the 90mph derogation and the Trust investing in a full set of new driving wheel tyres for when they are needed. A1 Covenant take-up has stabilised but more new, young(er) Covenantors are still needed.

To conclude the A1 section of the Convention, Mark Allatt covered the subject of fundraising for *Tornado* and how the move to a new CRM system had proved both challenging and rewarding! He emphasised the need for more Covenantors, stressing that we need to recruit them on our trains, because, after all, the locomotive was the best ambassador we had! He was pleased to record that the value of an average covenant had risen by 10% and legacies (for both locomotives) had generated more than £150,000 during the past year, including one via someone who overheard a conversation about *Tornado* in the pub! Despite the bad headlines for No. 60163 in 2018 there were some things that were worth cheering about, not the least of which was that *Tornado* was now fully paid for with the completion of The 163 Pacifics Club and the presentation to Sir Andrew Cook CBE of a cheque for the tender, repaying the lease a full three years early. Finally Mark announced the 'I ♥ 60163' fundraising campaign to raise £60,163 to

cover the costs of the 'The Ebor Flyer' which have not been met by the insurance company.

After the audience had been given the opportunity of a comfort break, the Convention resumed with a review of progress with the P2. Mark Allatt introduced a new video shot by Tom Ingall showing the locomotive emerging from Darlington Locomotive Works (albeit being propelled by the work's forklift) into the sunshine; Mark recounted how he had hoped to be the first person to 'cab' a moving P2 since 1944 but during preparations for this saw No. 2007 glide past the workshop bothy with Tom on the footplate! Since he had now become the first person to enjoy this privilege it seemed only fitting that Tom should sign up as a Covenantor... Mark then turned his attention to the fundraising. £5m sounds like a lot of money to find but the dedication of Covenantors and the success of the various clubs is rapidly reducing the total still required; we now have 870 Covenantors (now over 900) who have donated/pledged £1.5m (only 25% of whom are A1 Covenantors), The Founders Club raised much more than was anticipated, Dedicated Donations have now raised £265,000 (now over £315,000) of an anticipated £1.1m, The Boiler Club is two-thirds subscribed, The Mikado Club is complete, The Cylinder Club was filled in just six months and there are already 85 (now over 90) members of The Motion Club with a target of 175 in total. Finally Mark emphasised the growing importance of legacies, stressing that they would always be hypothecated to the donor's preferred project.

David Burgess quickly dealt with the P2 finances, noting that annual income was up about 20% and on target to raise in excess of £600,000 this year alone. £2m had now been spent on No. 2007 and with £600,000 in the bank to set against £500,000 of current orders for work and components the project is on target for completion in 2021 but we still need new Covenantors and further legacies to guarantee this.

David Elliott now returned to the floor to deliver an update on P2 engineering progress. Showing an updated build flow chart he explained that although there had been adjustments to the timeline, completion for 2021 was still realistic. The wheelsets are complete, the cladding has been finished, brake gear components are now being delivered to Darlington and work on the tender frames is proceeding at Ian Howitt's workshop. The whole process is now benefitting from increased design capacity in the shape of Daniela who has recently finished designing the outside motion brackets as fabrications

rather than castings, although David noted that his own work on the valve gear and motion had been affected by the need to sort out No. 60163.

Looking to the next twelve months, David anticipated the completion of the pony truck, progress with the larger motion components, having the wheel balance weights fitted without the need for dynamic balancing (since this can now be computer predicted), starting the manufacture of the cylinder block and placing an order for the boiler. He was also able to introduce two additional members of the team, Alan Parkin, who has been employed to work on the electrical side, and Graham Nicholas, who has taken on the role of Professional Head of Engineering after a long association with the Trust and running *Tornado* on the main line. David also mentioned the fact that the Trust was in the final stages of appointing an Engineering Manager to oversee operations at Darlington Locomotive Works.

Rob Morland now took over from David to update Covenantors about the electrical provision for *Prince of Wales*, noting that the systems fitted to *Tornado* had proved to be robust and reliable, thanks in no small part to Paul Depledge's careful installation. With design work now focussed on our big Mikado, a lot of thought is being given to ensuring this is as effective. Through the good offices of Anthony Coulls at the NRM, we managed to borrow an original headlamp of the correct pattern from which Alan Parkin created a 3D CAD so that we will be able to make our own with full LED internals. David Elliott now re-joined the double act to discuss power generation for No. 2007, covering the need to provide an alternative to the ageing Stones' alternators found under most early Mk2 coaches; to do this he is looking at modern bus/truck alternator design, which Alan is reconfiguring using toothed belts to gear it up to the necessary 7000rpm. The German Fabeg turbogenerator (as fitted to *Tornado*) is proving increasingly difficult to maintain, due to the shortage of spare parts. To overcome this Alan has produced a set of drawings for new turbine wheels and blades and a trial example has been manufactured..

Huw Parker now looked at the future direction of the 'Bond of Friendship' established with HMS Prince of Wales, introducing Sub Lieutenants Matt Riley and Josh Cowan who were attending the Convention on behalf of the Royal Navy. Graeme Bunker-James was now able to add some detail to the scheme to create our own, bespoke Mk3 train which be another responsibility for our



**Covenantors fill Darlington Locomotive Works.**

newly appointed Professional Head of Engineering. Following delays to the introduction of the new Caledonian Sleeper vehicles it may not be until 2020 before the Mk3s are released to us, but work continues to identify the most suitable candidates and prepare the refurbishment specification for these, offering comprehensive disabled access, a dedicated support coach and a bespoke kitchen car. While on the subject of 'future proofing' our main line operations, Graeme also touched on the strategic aim of acquiring a third boiler for Nos. 60163 and 2007, something that could cut the time out of traffic for major overhauls from seven to three months!

Paul Bruce took over from Huw with an update on the Whessoe Road site. He paid fulsome tribute to Darlington Borough Council and the Tees Valley Combined Authority for their assistance with the process and although we had missed out on an initial source of grant funding, the development of the 'Heritage Quarter' scheme for this part of Darlington in preparation for the bi-centenary celebrations of the Stockton & Darlington Railway in 2025, will facilitate a Heritage Lottery bid in 2019. The aim is to have the whole area transformed by 2025.

It fell to Graham Nicholas to play the role of what he described as 'tail-end Charlie' and cover progress with our third locomotive, Gresley class V4 No. 3403. In

a very short space of time this has moved from a "what if" project to one that now has its first physical components from Malcolm Barlow (via David Buck, owner of Thompson class B1 No. 61306 *Mayflower* and new Chairman of Steam Dreams) including a chimney casting, tyres, air pump and a complete set of drawings, many of which are common with other classes and some of which bear the signature of Sir Nigel Gresley himself.

Finally, Mark Allatt wrapped up the formal meeting with a question and answer session. Some good enquiries were received from the floor and topics covered included; the linking of boiler funding to the provision of the new coaches, the future of 90mph running for *Tornado*, the pros and cons of prolonged high-speed running, the future role of the new V4, the challenge of a skills shortage, the coordination of 'group standards' with other locomotive owners in the provision of on-board electronics and the allocation of a back-up locomotive for future tours.

After an excellent buffet lunch provided by the Dolphin Centre, Covenantors were taken by vintage bus to Darlington Locomotive Works to view the progress with *Prince of Wales* for themselves which included a live-streamed walk round tour of the locomotive by David Elliott. The merchandise stand did a steady trade and, more significantly, the team signed numerous people up to the various

clubs, taking an estimated £20,000 on the day. Even after all this excitement the day was not yet done and some 90 die-hards turned up to dinner at the Mercure Darlington Kings Hotel that evening, enjoying good food and company and a most entertaining talk by Jonathan Glancey who tried his hardest to inspire us with suggestions for future projects for the Trust to build (a Chapelon 160A1 anyone?). The evening was wound up by David Champion's band performing for us, a novelty for a Convention dinner! **TCC**



**Jonathan Glancey entertains the diners at the Kings Hotel.**



# AI ENGINEERING UPDATE *by David Elliott*

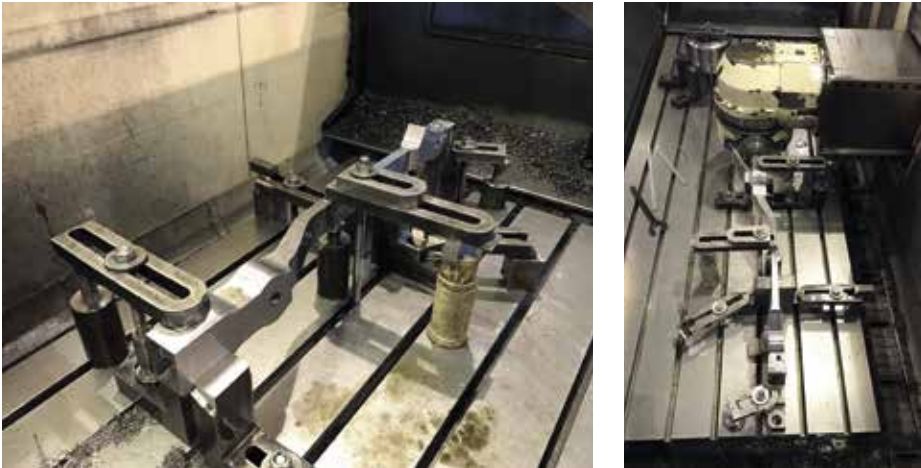
**Our hoped-for quick return to operations following the valve gear failure on ‘The Ebor Flyer’ on 14<sup>th</sup> April did not happen for a variety of reasons. However, Saturday 6<sup>th</sup> October was a significant day in the return of *Tornado* to main line operation. Following two of weeks successful running-in on the Nene Valley railway during which a total of 772 miles were covered, made up of 225 miles light engine and 547 miles loaded, one of DB Cargo’s steam examiners carried out an audit of the condition of the locomotive and the ‘relevant’ paperwork which accompanies it, including test certificates for the boiler and air reservoirs, ultrasonic testing of the axles, spring weights etc. No significant defects were found, although there were a number of minor deferred defects mostly arising from two weeks of continuous activity which were attended to during the A exam scheduled to start on 11<sup>th</sup> October.**

Following from the investigation and start of the repair process described in *TCC 50*, some of the subsequent procurement and machining turned out to be protracted. In addition to the essential repairs to the inside valves and valve gear, we decided to refurbish and renew parts of the outside cylinder valve gear whilst the engine was out of service.

The repair has proved to have taken rather longer to complete than we anticipated due to a number of factors, including having the locomotive based a long way from our engineering resources; and that the parts of the British mechanical engineering industry that we rely on being very busy at the moment. This resulted in long lead times to have specialist machining and welding work done.

Some firms were able to help us quickly, in particular Arthur Stephenson Engineers Ltd. of Atherton who were able to forge and machine a new union link and combination lever in a short period of time for the inside valve gear, and to Durham Precision Engineering Ltd of Newton Aycliffe who rapidly CNC machined a new crosshead drop link.

**Right: The combination lever during machining and the newly machined union link.**



*All photos David Elliott*



**The combination lever/union link and drop link.**

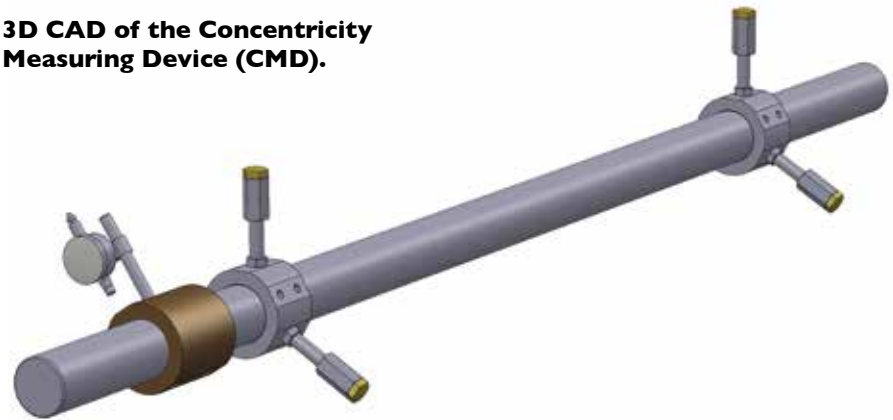
We were less lucky with the new middle cylinder valve liners, which, notwithstanding the kind ‘loan’ of two castings from LNWR Heritage at Crewe, took a long time to be finish machined, setting back their reinstatement and the subsequent assembly work. Although the outside valves and valve gear were undamaged during the incident, given the problem with the middle valves, it was felt prudent to dismantle and thoroughly measure and inspect them.

In order to gain a better understanding of what had caused the original failure, all three sets of valve liners were measured in three axis by a modern Faro arm and laser tracking system which can accurately measure surfaces curved surfaces. Whilst the outside valve liners were in reasonable condition, there was some scoring so the decision was taken to lightly re-bore them to remove the marks. Metalock Engineering from Coventry carried out the survey and subsequently machined out the inside liners and bored the outside liners.

One of the possible contributors to the seizure of the front middle valve piston was the liner being slightly off centre compared with the axis of the valve chest. A further issue which may have contributed to the failure was that the affected liner had a slight taper from front to back, which would further reduce clearance between the valve piston and the liner at the rear of the valve stroke. We realised that other than the expensive Faro arm method, we had no accurate way of the checking the concentricity of liners. The traditional process relied on the accuracy of setting up the boring equipment to ensure that the liners are concentric with the bores. To overcome this problem, I set Daniela Filová (our recently appointed Assistant Mechanical Engineer) the task of designing and supervising manufacture of a piece of equipment to check concentricity. Daniela came up with a splendid piece of equipment using the 3D CAD and tried it out on *Tornado*’s valve chests following re-boring. This indicated that the valve liners are now very close to truly concentric with the valve chests.

When the valves are fitted into the valve chests, they should be as close to concentric as possible in the liners so that the nominal 1/32in clearance is equal all round each valve head. It is important that the bearing in the front valve cover and the crosshead supporting the rear of the valve spindle are set up to ensure that the clearance is even. A method was developed to check that with the crosshead in its guide, when the valve spindle is slid into the hole in the crosshead, it lifts between 0.016in and 0.021in (being between

**3D CAD of the Concentricity Measuring Device (CMD).**



*Graphic: Daniela Filová / A / SLT*



**Daniela using the CMD.**



**The ‘lift’ test in progress.**

half the total clearance of the valves in the liners or slightly more to allow for subsequent wear). To achieve this the crossheads had white metal added to their undersides and were carefully machined to provide the required clearance. The final fitting required an iterative approach, i.e. the crossheads were initially machined

slightly oversize and tried in place, followed further machining to achieve the required clearances. With the machine shop being at Loughborough – 1 ¼ hours drive from Wansford – this proved to be a time-consuming process, especially if the process required repeating as it did on two occasions.





**Liner being inserted.**



**Inside liner ready to fit.**

The new liners were shrunk into the middle valve chest by Metalock using liquid nitrogen to cool the liners which shrinks them enough to be a clear fit in the cylinder block. As they warm up they expand and become very solid in the block. Before fitting when they are at ambient temperature, the liners are 0.008in larger than the holes the fit into in the block, so they are unlikely to move subsequently.

All the affected parts of the inside valve gear and motion were subjected to Non-Destructive Testing (NDT) to check for cracks. For items that required

straightening (radius rod and slide bars) NDT was carried out afterwards as well to confirm that the straightening process had not caused any cracking. Fortunately no structural cracks were found in any of the affected components.

One further suspected contributor to the failure was the fit of piston rings, in particular the gaps left between the ends of the rings to allow for expansion. These were found to be a bit variable, however the rings on the seized piston head were so badly damaged as to not be capable of measurement. The new rings were checked carefully that their ring gaps were correct in each liner.

The broken components were subjected to metallurgical investigation by Serco Railtest at Derby. The good news is that the failure of the combination lever (which flexed until it broke) was a typical ductile failure which is what is to be expected of the relatively soft metal it is made from. The other fractures were consistent with the severe forces encountered by the now flailing combination lever and union link. The valve piston is estimated to have reached over 800°C (which is red heat) where it “picked up” in the liner. The materials of the piston head and rings were found to be to the correct specification.

A further potential contributor to the failure was lubrication. A comprehensive range of tests were carried out on the lubricator and its atomisers which

produce oily steam which is fed into the valves and cylinders. Most of these showed the lubricator to be working correctly, however when the lubricator was driven by a lathe to replicate operation on the engine, it was anticipated that the output might fall off at high speeds. However, the opposite was observed in that the ratchet mechanism was turning the pump cam shaft less per stroke at low speed compared with when running fast. After some further investigation, the key which transfers the drive from the ratchet mechanism to the lubricator cam shaft was found to be worn, resulting in some lost motion. When running fast the momentum in the pump shaft prevented it from slipping backwards during each stroke which resulted in the higher output at speed.

The existing inspection regime would not detect the wear in the key as it was only visible when the pump was running with the cover off the ratchet mechanism. To overcome this the maintenance procedure has been altered to remove and specifically check the condition of the key on an annual basis. This is not felt to have been likely to have contributed directly to the failure which took place at high speed. However, it has been felt for some time that the ratchet mechanism is subject to a lot of stress and is a potential single point failure. The ratchet fitted to *Tornado* since new has a single pawl. The pawl is a spring loaded peg which



**The bent radius rod.**

engages in the teeth of the ratchet wheel to prevent it from turning backwards. We discovered that A4 Pacifics were fitted with a modified ratchet with three pawls acting on the wheel which reduces the risk of the lubricator stopping if a single pawl fails. *Tornado* now has a three pawl ratchet.

Finally, on lubrication, the oil extracted from the lubricator after the incident was found to be low in viscosity. No firm reason has been discovered for this. However we are instituting an enhanced inspection regime on new batches of oil including carrying out viscosity tests.

It is said that steam locomotives have souls. I am convinced that *Tornado* had one and she was upset at being broken. This has been demonstrated on several occasions when refitting components (in a process that has been straightforward in the past) not fitting first time and requiring further work! *(It sounds more as though she is behaving like a diva – Ed!)*

Great care has been taken throughout the reassembly process to ensure that adequate clearances have been achieved and the lubrication is fully up to specification. A further interesting discovery concerns valve spindles. They are long, thin bars with heavy piston heads on them and we know from past engineering activity that they tend to become slightly bent over time. This can be checked and rectified by setting up the spindle in a lathe and “clocking” it for concentricity using a dial gauge. A hydraulic jack is placed on the saddle of the lathe and small precise forces applied to the spindle to straighten it. However, having straightened the middle valve spindle with the valve heads removed, and then tested again with the heads fitted, we discovered that the force required to tighten the large nuts which secure the valve heads caused the spindle to distort again – the lesson is to carry out the straightening after the valve heads are fitted.

In summary, we have found four likely contributory factors in the failure. Each one on its own is unlikely to have caused the failure, however coming together, excessive rubbing between a ring or the valve head itself eventually resulted in localised heating which led to a thermal runaway causing the valve head to expand until it became locked in the liner. This stopped the spindle moving which placed a great load into the inside valve gear which was absorbed by flexing the combination lever until it broke. The maintenance instructions for cylinder and valve liner machining and the refitting of valve components, and for lubricator inspection and overhaul have been beefed



**Above: The oil pump test driven by a lathe.**



**Left: The rings are checked in the liner.**

**Below: The overhauled and upgraded Wakefield lubricator.**



up to reduce the risk of a repeat of these problems.

We owe thanks to the Nene Valley Railway which has made us most welcome and have gone out of their way to accommodate moves round the yard and the use of their railway to run-in *Tornado*.

We are also grateful for the assistance of many other firms and individuals, including our loyal volunteers. Our

especially sincere thanks goes to David Wright's Locomotive Maintenance Services Ltd. of Loughborough and his staff, particularly Andy Morgan and Andy Meredith who have spent many hours at Loughborough and Wansford manufacturing new components, fettling existing parts and fitting them to the engine. **TCC**



## KEEPING *TORNADO* ON THE TRACKS by Mark Allatt

Keeping No. 60163 *Tornado* in tip-top working order is an expensive business as we are being reminded following the locomotive's failure on 'The Ebor Flyer' on Saturday 14<sup>th</sup> April 2018. Whilst the profit from operating our programme of main line tours and *Tornado*'s hire fees from heritage railways and working for other rail tour promoters currently covers her day-to-day and year-to-year maintenance costs, they do not at present generate a sufficient surplus to fund her five and ten year overhauls, conservatively estimated at around £500,000 each. Therefore, it is vital for us to continue to maintain (and hopefully grow) *Tornado*'s on-going Covenant income.

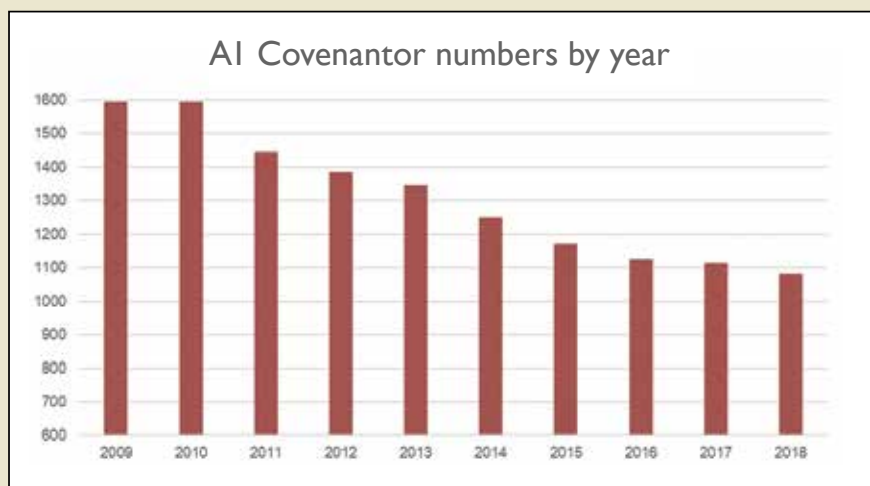
In the last couple of issues of *TCC* I have written about how the number of individual Covenantors supporting *Tornado* had gradually declined since a peak of around 1,600 (many more £5pm equivalents) in 2009 to around 1,120 today, each person donating an average of around £10pm before Gift Aid. This decline has been mostly due to anno domini and new covenantor recruitment failing to keep pace. We have issued over 2,700 Covenantor numbers since launch but only have around 1,120 on our books, a loss of over 1,500 supporters over the past quarter of a century.

The last few months have seen this attrition stabilise and even start to grow a little with the loss of around six Covenantors per month being matched by the recruitment of slightly over the same number. A silver lining to the unfortunate events of Saturday 14<sup>th</sup> April is the number of people who have decided to become covenantors following the publicity surrounding



Gareth Griffiths

*Tornado* tears past Arksey with 'The Talisman'.



the breakdown. Hopefully the more positive profile generated by last year's 'I♥S&C' Plandampf, 100mph test run, PADDINGTON 2 movie and our future 90mph operations will continue to help to grow this number. I would therefore urge all our existing AI Covenantors to help us to recruit new supporters and

for P2 Covenantors (around two-thirds of whom are not also AI covenantors) to come on-board if they are able to. And perhaps each of our existing Covenantors could pledge to recruit a friend or colleague? Now that really would be a great and lasting 10<sup>th</sup> birthday present for *Tornado*! **TCC**

For more information on how you can help to keep Britain's only new-build main line steam locomotive on the tracks visit [www.a1steam.com](http://www.a1steam.com) email [enquiries@a1steam.com](mailto:enquiries@a1steam.com) or call **01325 460163**

## VOLUNTEERS by Mark Grant

Since my last message (*TCC50*) we of course have not done any main line tours or events. However, our 'carriage hosts' and 'support team', alongside SRPS (Scottish Railway Preservation Society) stewards, were involved with the RAF100 event on Tuesday 10<sup>th</sup> July. We started very early in Lincoln and looked after our passengers on the way down to King's Cross with No. 60009 *Union of South Africa* at the head of the train.

We had two 'special' limited edition items to promote, a poster and a mug. These are still available to purchase from our website (whilst stocks last). Once in London, some of our

team went to get a vantage point to see the flypast, whilst some remained on the train to put orders together and tidy things up. Our return journey was diesel hauled from London Victoria, and we had a good run back to Lincoln with some very satisfied passengers.

I'm hoping I can have more to report in the next issue when our locomotive is back in traffic. However, for now, a big thanks to our 'on board' team who did a fantastic job, and to all who volunteer in whatever capacity to make our operation run. **TCC**

## I ♥ 60163 *Tornado*'s 10<sup>th</sup> Birthday Appeal



Jack Boskett

It's hard to believe that No. 60163 *Tornado* has now been in traffic for over 10 years – and what a decade it has been! Throughout these years we have had many highs and a few unfortunate lows; we have travelled the length and breadth of Great Britain, hauling main line charters and Royal Trains, visiting dozens of heritage railways & centres and making countless appearances in the press, on TV and even in a movie! The nation – and indeed people way beyond our shores – seem to have taken *Tornado* to their heart.

Unfortunately, *Tornado*'s 10<sup>th</sup> Birthday year didn't quite work out as planned and 2018 has been a challenging year for The A1 Steam Locomotive Trust following No. 60163's failure on 14<sup>th</sup> April 2018 hauling her first 90mph train, 'The Ebor Flyer'. Although much of the repair costs and loss of earnings have been covered by our insurance, unfortunately not all those costs could be recovered.

### The repairs to *Tornado* have included:

- Reboring the outside valve liners
- Manufacturing and fitting of new valve heads
- Remetalling and machining of outside valve spindle crossheads
- Rebushing of the outside valve chest covers
- Renewing the left hand outside union link and pins
- Boring of, and replacement of pins in the inside reversing gear
- Exchanging and overhauling the front air pump
- Replacing the blow down valves
- Overhauling the mechanical lubricator and atomisers
- Replacing some of the lubrication pipework
- Fitting of three-pawl ratchet mechanism to lubricator in order to improve reliability
- Following recent tyre turning, acquisition of a replacement set of coupled wheel tyres

Now *Tornado* is back in steam, we would like to take the opportunity again to thank our supporters for their patience and continued support. In response to the many offers of help we have received, we have decided to establish the 'I ♥ 60163' appeal to help close the funding gap and raise £60,163 from 100 people each donating £601.63 in up to six payments.

### By donating £601.63 to our I ♥ 60163 appeal, you will receive:

- An exclusive 'I ♥ 60163' car sticker
- Access to view *Tornado* at all reasonable times
- The Trust's newsletters on a regular basis
- Annual Covenantor Card
- The opportunity to attend the Trust's Annual Convention
- A special 'I ♥ 60163' day with No. 60163 *Tornado*
- Your name inscribed on the Roll of Honour at Darlington Locomotive Works.

For more information, please visit [www.a1steam.com](http://www.a1steam.com), email [enquiries@a1steam.com](mailto:enquiries@a1steam.com) or call **01325 460163**.





# THE 163 PACIFICS CLUB UPDATE - MISSION ACCOMPLISHED

by Mark Allatt

On the day marking the 50<sup>th</sup> anniversary of the end of scheduled steam-hauled services on British Railways, The A1 Steam Locomotive Trust announced that it had – thanks to the generosity of its supporters - purchased No. 60163 *Tornado's* tender from William Cook Cast Products Ltd following the success of The 163 Pacifics Club fundraising campaign.

Just a week before on Saturday 28<sup>th</sup> July, over 100 supporters of the Trust gathered at Darlington Locomotive Works to celebrate the tenth birthday of No. 60163 *Tornado*. The locomotive made its first moves in front of the world's press on 1<sup>st</sup> August 2008 and has subsequently become a household name.

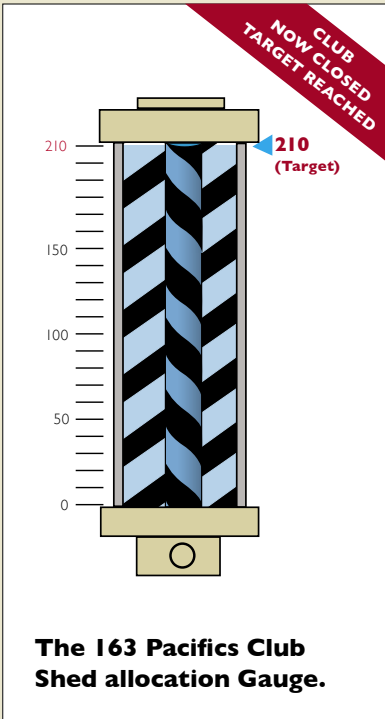
*Tornado's* tender was leased to the Trust under a 15-year loan agreement which was due to come to an end in 2021. The tender was owned by William Cook Cast Products Ltd (the Trust's Principal Sponsor) as Chairman Sir Andrew Cook CBE kindly offered to fund the construction of the tender in 2006, allowing funds being raised to be spent on building the engine. By 2014 the Trust had repaid all the £1m debt needed to complete *Tornado* in 2008 and funded the conversion of BR Mk I BCK E21249 into her support coach. The 163 Pacifics Club was launched in September 2013 to fund the purchase of *Tornado's* tender on the lease's expiration in 2021.

*Tornado's* tender is a development of those built for the original Peppercorn class A1s - mainly due to the different operating environment on the modern Network Rail main line. Due to the lack of surviving steam infrastructure, water capacity is at a premium and so *Tornado's* tender carries 6,200 gallons,

as opposed to 5,000 gallons, and seven tons of coal, rather than nine tons in the original A1s. The tender is also the home for many of *Tornado's* other unique features including an alternator, Timken cartridge roller bearings (pre-greased sealed self-contained units which do not have to be fitted in enclosed axleboxes), Train Protection & Warning System (TPWS), National Radio Network (NRN) radio, Global System for Mobile Communications - Railway (GSM-R) radio, GPS tracker and of course the mobile phone charger!

### Details of The 163 Pacifics Club:

- The Trust needed to raise £200,000 to purchase *Tornado's* tender
- Although *Tornado* carries the number '60163' - the next in the Peppercorn class A1 series following No. 60162 *Saint Johnstoun* – her pre-nationalisation LNER number would have been '163'
- There were therefore 163 ex-LNER express passenger 'Pacifics' (wheel arrangement 4-6-2) from the Gresley class A3s/A4s, Thompson class A1/I and Peppercorn class A1s available for sponsorship
- Due to popular demand, an additional 46 'Pacifics' were released for sponsorship from the Raven class A2s



- (five locomotives), Thompson classes A2/1s (four locomotives), A2/2s (six rebuilt Gresley class P2s), A2/3s (15 locomotives), Peppercorn class A2s (15 locomotives, including preserved No. 60532 *Blue Peter*) and Gresley class A4s (destroyed No. 4469 *Gadwall/Sir Ralph Wedgwood*); in addition, the un-named Gresley class W1 4-6-4 No. 10000/60700 has been sponsored
- 163 people made a one-off donation of £960 (or alternatively donated £240 per month for four months), with the addition of Gift Aid this raised £195,600; the club was subsequently extended to 210 places to include the newly released names.

- As with the previous fundraising schemes, this initiative came with benefits for those who generously take part, including:
- A numbered certificate recording the details of the donation and the number/name of the chosen ex- LNER passenger 'Pacific'
  - Name inscribed on the official Roll of Honour in Darlington Locomotive Works which will detail the 'Pacific' sponsored
  - Entry into a draw for a main line footplate ride on No. 60163 *Tornado*.



*Tornado's* tender outside DLW following No. 60163's overhaul.



David Elliott and Mark Allatt present Sir Andrew Cook CBE with a print of 'The Dream Team' by Chris Ludlow at Darlington Locomotive Works, marking the completion of The 163 Pacifics Club payment for the tender.

Membership of The 163 Pacifics Club grew steadily from its launch in September 2013. In July 2017 the additional Pacifics were added to those available for sponsorship and by September 2017 The 163 Pacifics Club had passed its initial 163 members target.

On 1<sup>st</sup> August No. 60163 *Tornado* celebrated her tenth birthday and remains the only new main line steam locomotive to be completed in Britain since 1960, despite over 20 standard gauge new build projects being launched. *Tornado's* first 100,000 miles have seen the locomotive criss-cross Great Britain, a testimony to those supporters who stuck with the project over the 18 years that it took to fundraise and build – 'This locomotive was built and paid for by people who shared a vision and were determined to turn it into reality'.

We are delighted that thanks to the generosity of our dedicated supporters we have raised more than £200,000 plus gift aid through our The 163 Pacifics Club

fundraising campaign. This means that we are now in a position to purchase *Tornado's* tender from William Cook Cast Products Ltd three years before the end of its 15 year lease in 2021.

William Cook Cast Products Ltd has been principal sponsor to The A1 Steam Locomotive Trust through its Chairman Sir Andrew Cook CBE since 1994, providing all the steel castings for No. 60163 *Tornado* and No. 2007 *Prince of Wales* – including all the wheels – at preferential rates and on generous terms – for which the Trust is enormously grateful as well as assisting with the funding of *Tornado's* boiler. Any additional funds raised have been ring-fenced and will be used for the next overhaul of *Tornado's* tender.

Keeping *Tornado* on the Network Rail main line is expensive and time consuming and so the Trust is always seeking new supporters and volunteers to come on board. There could be no better way to celebrate *Tornado's* first

ten years in steam than the purchase of her tender from William Cook Cast Products Ltd, thus completing the project to build a new Peppercorn class A1 'Pacific' launched in 1990.

Sir Andrew Cook CBE, Chairman, William Cook Cast Products Ltd, commented "William Cook Cast Products Ltd has been delighted to be associated with The A1 Steam Locomotive Trust for almost 25 years, supplying all of the steel castings for both No. 60163 *Tornado* and No. 2007 *Prince of Wales* and assisting with the funding of *Tornado's* boiler, as well as purchasing and leasing back to the Trust *Tornado's* tender, which enabled funds raised to focus on the construction of the engine. As the Trust's Principal Sponsor, I believe that the building of *Tornado* is a great example of 'The Cook Guiding Principles' – Nothing in the world can take the place of persistence... persistence and determination alone are omnipotent."

TCC



## 300 WORDS – SOME MEMORIES OF THE FIRST TEN YEARS IN STEAM



**DAVID CHAMPION,  
PRESIDENT AISLT -**

What a day it was, a day when history was made, a day that was so singular, a day that cannot be emulated because it was a first, and unique because there is only ever one 'first past the post'. That day, of course, was in August 2008 when the world's media descended on Darlington to see our powerful, beautiful creation take its first breaths. As

we admired *Tornado* looking fabulous in her Works Grey coat, patiently waiting to take the stage, it was wonderful to see virtually all of the people assembled who had been part of the project since 1990, and especially to meet again our great friend Dorothy Mather, Arthur Peppercorn's widow, who had been an inspiration to us all, (and jolly good company too) since learning of the project in 1993.

The time for the first move arrived, moving with my wife and Buddy the dog into the entrance to the Works we stood in front of *Tornado*. With a deafening hiss the cylinder drain cocks were opened and as the clouds of steam began to dissipate to a blast on the chime whistle, *Tornado's* smokebox receded majestically into the distance. We had done it. Just jolly well done it. All the collected legions of nay-sayers, the doom-mongers, the 'they'll never do it' brigade, we had proved them so comprehensively wrong. In the early days of the Trust I expected many similar projects to follow hot on our heels, and though we created the 'new-build' movement, ten years later we still are the only ones to have put a brand-new locomotive on the main line – and haven't we done it in style?



**MARK ALLATT,  
TRUSTEE AISLT -**

*Tornado* (and The AI Steam Locomotive Trust) has been an important part of my life for over 27 years now. Jobs, friends and even wives have come and gone but my commitment to the Trust, its aims & objectives and the people who support it have been a consistent across those years. In that time, we've achieved the impossible over and over

again. We've never listened to the nay-sayers who said that it cannot be done, we've come up with a plan, all got behind it and grafted. That's what makes the Trust different – its people's commitment to the end goal and willingness to go more than the extra mile to achieve it. I not only intend to be around to see *Tornado's* next ten years in traffic but also the entry into service of our own train in 2020, the completion of No. 2007 *Prince of Wales* in 2021, moving to our new main line connected base in Darlington before 2025 and our new Gresley class V4 also around that time. Come to think of it, the fun has only just started!



**DAVID BURGESS,  
SECRETARY & TRUSTEE  
AISLT -**

As Company Secretary my role is back office, but over the year's there have been many exciting highlights with *Tornado*. Some stick in the mind more than others, particularly in our first few months after completion of the locomotive. At Darlington Works on 1<sup>st</sup> August 2008 when I saw the first public moves.

The atmosphere was electric with anticipation and a little apprehension. When she moved, it brought a lump to the throat. The first time I had seen an AI move since King's Cross circa 1963. Twenty minutes later I got a 'phone call from my son to say "Dad, I am in a pub in Guildford with my mates and have just seen your engine on the one o'clock news". Wow!

The second "best memory" was the following January, when I was Train Manager for our first two runs from York to Newcastle and Durham. The crowds on York station were enormous, but when the train moved and accelerated around the double curve north of the station, my thought was, "what have we achieved and now unleashed?" Ten years on, I still get just as excited. The following week we had our first run to London. Seeing people lining the trackside in snow to see us pass was quite humbling but the arrival at King's Cross was staggering. It was a proud moment for us all.

**PHIL CHAMPION,  
PREVIOUS EDITOR OF**

**TCC** - Most memorable AI moment? It was 1<sup>st</sup> August 2008, the day of its public unveiling in Darlington. This was 18 years after the project started and 13 years since its components came to Darlington. Soon after arrival I saw my brother David with his dog Buddy. Sitting next to David was Dorothy Mather who always gave a good welcome. For this lady in particular it must have been a momentous day. Preparations were still being made on the AI. David Elliott was just getting on with it, quite unfazed by the occasion. A number of AI people from the past and present were there. So too were TV crews; in fact it was quite a media circus.

The un-named No. 60163 was just outside the open doorway. Suddenly, there was a blast of steam from the cylinder drain cocks. We all got up and out of the way of this big cloud of steam quickly. Buddy was rather un-nerved by it! A little later the moment had come. The Master of Ceremonies was the then Chairman, Mark Allatt. What impressed me was that all three Chairmen to date were lined up beside the engine: Mike Wilson the instigator of the idea of building the AI; David Champion the Founder of the Trust and inventor of the fundraising and business plan; and Mark who took it from 40% built to completion. Dorothy joined



Mark and the crew in the cab then opened the regulator! An AI moved again! Brilliant! The "impossible" has been achieved. Yes, one or two wobbles on the way in such a huge project but all who involved since 1990 had made this happen. It had confounded the "it will never happen" brigade with their self-assumed 'superior' knowledge.



**JIM CLARKE,  
DRIVER DB Cargo (DBC)**

On the 13<sup>th</sup> August 2016 I booked on at Hither Green MPD and was a passenger to Grantham. This was the booked water stop for No. 60163 returning to London from Chesterfield on the 'The Robin Hood'. I was the booked Driver from Grantham up to London King's Cross. Also joining me on the footplate was my Fireman Steve Matthews and Steam Inspector Sean Levell. Due to me

being a South Eastern and Chatham Railway driver and a little 'off my patch', I also had to be conducted by a fellow DBC Peterborough driver. The train arrived late due to delays out on the network. After water had been taken we had missed our booked path up to London. After a few 'phone calls made between the right parties we were allowed to leave right behind an up fast to London.

No. 60163 made easy work getting the big train out of the loop and into the climb. As *Tornado* started to eat the miles the speedo was climbing. Steve had the 'production of steam' well under control with more than enough for me to use. The run down Stoke Bank was at the train's maximum permitted speed of 75mph. The next part is the most memorable time I have had on *Tornado*. As we approached Peterborough at 75mph on the up fast all I could see were green signal after green signal. Still to this day I have never been blessed with a run where it has been mile after mile of 75mph cruising. With the loco up around 15%, regulator half open and the blower cracked to keep a draw on the fire, it was nice to feel what the locomotive had been designed to do. We arrived back at London only a few minutes down (mainly due to us getting held up with other passenger services). Talking to the passengers after a trip and seeing their smiles as they had a great day out makes it all worthwhile. I have always considered being able to work on the steam a great honour and I am looking forward to being part of the next ten years of history making with No. 60163.

**FRED LEWIS, (centre)  
RETIRED DRIVER DBC -**

The last steam turn before retirement from the foot plate grade with DB was 'The Red Rose' from Worcester Shrub Hill to London Paddington on 14<sup>th</sup> February 2016. I travelled up to Worcester Shrub Hill after booking on for duty at Newport AD Junction to relieve Didcot Driver Graham Ward in Hereford sidings at Worcester. When ready we pulled up over the signal at the Droitwich end of the tunnel and when cleared set back towards Forgate



Street to run back through Shrub Hill and then set back into the sidings and onto the back of our train once more, the locomotive was coupled up, a brake test made and we pulled down to the departure signal to take us out and then set back into the platform for the passengers to board and await departure.

The signal cleared and we were off for my last passenger turn, *Tornado* was up to the challenge as always, effortlessly pulling 'The Red Rose' on its way to London. As we cleared the restriction at Norton Junction onto the main line, *Tornado* got into her stride sounding and feeling as good as always. We cleared Cheltenham in good time, had a brief stop at Yate where they crossed us over reversible to Westerleigh but returned to the correct road once out on the main line. We passed down through Bristol Parkway to join the Box road, headed for Bath and Chippenham through Box tunnel, before we raced up through Wootton Bassett Junction and onto Reading via Swindon and Didcot where my fireman Vince Henderson was relieved by Eastleigh man Rob Binstead for our trip to Paddington. We were also joined on the footplate by the Chairman of Network Rail, Sir Peter Hendy, we had a good run up the main line to Paddington finally arriving with the only hiccup of the day, the whistle stuck open and loudly proclaimed our arrival into the capital GWR station. A good day was had by all and one I shall remember forever.

**TONY WATSON,  
PHOTO EDITOR TCC –**

'The Caledonian *Tornado*', 21<sup>st</sup> September 2011. I was part of the support crew on this challenging, but memorable run. It was always going to be a long, tiring day, being up well before dawn to ready the locomotive for a very early departure from Crewe. My leg was from Preston to Crewe; by Preston, the fire was very dirty, with a lot of clinker forming. John Pridmore assisted me to break up much of the clinker and we got a good bright fire going, a full head of steam and ample water in the boiler. A late start though was inevitable now whilst we undertook these tasks. Finally satisfied, Traction Inspector Bob Hart gave Driver Keith Murfin the nod and we whistled for the road. Things soon went downhill. All the good coal had been used up by now and we had to make do with all the dirty stuff that lay at the back. Both Bob and Keith were giving the pressure gauge anxious looks, as it dipped the wrong side of 175psi, with the boiler level hovering around a third.

By Warrington, efforts to liven up the fire were proving ever less productive, with much use of the pricker to try to coax some life into it. Pressure was now down to 150psi, with the water level bobbing about just above the bottom nut, I knew we couldn't carry on much longer. Then luck intervened. Just as we were about to stop for a blow-up, we were brought to a signal stop near Weaver Junction - this gave Chris and I a chance to coax some life back into the fire. The signaller then requested us to run at caution over the next five miles as the previous train's driver had reported a bump; this was a life-saver for us and we hobbled along with both of us by now well worn out. We coasted into Crewe with about 140lb of steam, water in the bottom nut and only sweepings up left in the tender. A close call! **TCC**





## • SHED NOTICES •

### STOP PRESS !

As if Graeme Bunker-James didn't have enough on his plate, Sophie has just "out-shopped" a new Bunker-James! Congratulations to both of them on the arrival of baby Joshua, we look forward to him joining 'The Tornado Team' in due course!



### AN AI AT WETHERSPOONS by Phil Champion

My wife and I spent a weekend in Edinburgh - Royal Wedding weekend as the tour operator put our trip back a fortnight. (Yes, we did see part of it as Barbara took her iPad to take photos and while in the Royal Botanic Gardens cafe she used their wi-fi to get the BBC iPlayer.) Next morning, we enjoyed the open top bus tour then we both fancied a coffee. Alighting at the final stop and coming round onto Waverley Bridge she spotted a Wetherspoons - 'The Booking Office'. Handy, reasonable prices and free refills!

Wetherspoons invariably celebrates the history of the building, if old, and the locality. Its website states that in 1846, "the North British Railway Company built North Bridge Station at the east end of Nor Loch. Two rival companies each opened a station here, in quick succession. In 1854, all three stations were combined and renamed 'Waverley', after the famous novel by Sir Walter Scott. By 1865, the NBR had 'absorbed' its rivals and built a new station. It rebuilt Waverley again in the 1890s. All that remains of the original North British railway station is the much remodelled Booking Office.... (which) became the Parcels Office for many years, until c1984." It became a restaurant until Wetherspoons converted it into a pub in 2016. On the wall next to us was a home signal arm (though wrong way round with spectacle on the left!) and a shunt signal. Due to the pub being very busy plus time constraints we didn't see other items like the NBR mosaic/crest I later saw on the website.

We paid a visit to the (downstairs) loos. After opening the door onto the landing, round the corner was a reproduction



BR poster for 'The Flying Scotsman' (TFS) with a blue A4 in front of the Scott monument - very nice. Turn again and above the mid landing is a striking June 1950 BR poster for TFS with its weekday times from principal stations. The AI in full steam with the two carriages seen was clearly numbered 60135 on the smokebox though was un-named.

Both posters were in black and white except for the blue A4 but it stood out all the more for that.

In fact, No. 60135 did haul TFS. Looking at the histories for Nos. 60114 - 60149 which I compiled first for *The Pioneer* then later the AI website, you can see that it was this Gateshead engine brought the Up 'Scotsman' into Newcastle on 22<sup>nd</sup> December 1948 - just over a month after it entered service - and again on 22<sup>nd</sup> January 1949. As it ranged along the whole ECML between the two capitals it was seen with the down 'Flying Scotsman' on 15<sup>th</sup> April 1955 having taken over at Grantham.

The poster is dated June 1950 and is a bit ahead of itself as it shows the early BR emblem on the tender. While AIs were appearing with it by then No. 60135 got its emblem that October when it was repainted blue and named. There would have even more of an Edinburgh connection for this reproduction poster had the engine been named then for it became *Madge Wildfire*. This was a character from Sir Walter Scott's novel 'The Heart of Midlothian' set in Edinburgh. Next time we're in Edinburgh I think we'll be off to 'The Booking Office' for two lattes and a look at the railway memorabilia, particularly those two posters.



### BY APPOINTMENT? by Graham Langer

With the Duchess of Sussex very much in the news again, it is amusing to note that Meghan chose a photograph taken by one Gerry Mooney for her official birthday 'thank you' cards. In case you haven't realised yet, Gerry is a key figure in operating steam in Eire and an occasional member of our support crew!

From the *Irish Independent*, "When *Irish Independent* photographer Gerry Mooney received a call from Kensington Palace, he thought it was one of his colleagues having a laugh. But once he was assured of their legitimacy, the PA to Duchess of Sussex Meghan Markle asked for permission to use a photo he took of the royal." The photo chosen was one of the Duchess mingling with fans at Trinity College during her visit to Ireland with Prince Harry over the summer; the latest addition to the British royal family was sending out postcards as a thank you to her fans following their best wishes for her 37<sup>th</sup> birthday. And Gerry's photo was the one they wanted to use for the cover.



Gerry (leaning out of the cab window) with members of the support crew at Paddington station in November 2011.

Mark Holloway

## 10<sup>th</sup> ANNIVERSARY PARTY by Graham Langer



Above: David Champion's band at Darlington Locomotive Works.

Left: Tornado's Birthday Party.

Over 100 supporters of The AI Steam Locomotive Trust gathered at Darlington Locomotive Works on Saturday 28<sup>th</sup> July to celebrate the tenth birthday of new steam locomotive No. 60163 *Tornado*. The locomotive made its first moves in front of the world's press on 1<sup>st</sup> August 2008 and has subsequently become a household name.

Since completion in Darlington in 2008, *Tornado* has covered over 100,000 miles and seen service on the Network Rail main line and heritage railways right across Great Britain. Highlights have included three Royal Trains including the naming by TRH The Prince of Wales and The Duchess of Cornwall in February 2009; BBC Top Gear 'Race to the North' with Jeremy Clarkson on the footplate; 'The Winton' train to commemorate the 70<sup>th</sup> anniversary on the Kinder Transport; the rescuing of stranded

commuters in Kent; the re-opening of the Settle to Carlisle Railway; the first steam locomotive in the UK to achieve 100mph for 50 years; featuring in two BBC documentaries, 'Absolutely Chuffed - the Men Who Built a Steam Engine' and 'Tornado the 100mph Steam Engine', and starring in *PADDINGTON 2* the movie.

*Tornado's* birthday party featured the showing of both of the BBC's documentaries on *Tornado* - narrated by their Producer Tom Ingall, a review of *Tornado's* first ten years in traffic, a hog roast, a band which included the Trust's President David Champion and a spectacular *Tornado* shaped birthday cake. Guests also had the opportunity to see for the first time new Gresley class P2 No. 2007 *Prince of Wales* and with its eight 6ft 2in driving wheels fitted.

TCC

## TORNADO AT TEN - PHOTOGRAPHY COMPETITION WINNER

In 2018, we invited both budding and more established photographers to enter their photos of *Tornado* into a competition. The winner was announced on 30<sup>th</sup> October 2018 and has received two First Class Dining tickets on a days railtour on *Tornado* of their choice. The picture on the right is the winning photograph taken by David Newbegin. The judges particularly liked the creative treatment of the photograph. TCC



March 2018 on the North Yorkshire Moors Railway taken by competition winner David Newbegin.



## TORNADO TOUR DIARY - 2019

Below are the future operations **Tornado** is confirmed to be involved in. More details will be published on [www.a1steam.com](http://www.a1steam.com) as trains are finalised. Contact details for tour companies are below.

- **Saturday 9<sup>th</sup> February** - 'The North Briton' – East Midlands to Carlisle via the Settle & Carlisle Railway and return – bookings through UK Railtours
- **Sunday 3<sup>rd</sup> March** – 'The Auld Reekie' – Doncaster & York to Edinburgh and return – bookings through UK Railtours
- **Thursday 14<sup>th</sup> March** – 'The Aberdonian' – Launch Train: Edinburgh to Aberdeen via the Fife Coast – bookings through UK Railtours
- **Saturday 23<sup>rd</sup> March** – 'The Bard of Avon' - Manchester Piccadilly to Stratford-Upon-Avon – bookings through UK Railtours
- **Saturday 6<sup>th</sup> April** – 'The Devonian' – Birmingham to Plymouth and return (Tornado Bristol – Plymouth – Birmingham) – bookings through UK Railtours
- **Saturday 13<sup>th</sup> April** – 'The Border Raider' - West Midlands to Carlisle via the Settle & Carlisle Railway and return – bookings through UK Railtours
- **Saturday 27<sup>th</sup> April** – **New Tour** 'The White Rose' – London to Leeds, Harrogate, York and return – bookings through UK Railtours
- **Saturday 4<sup>th</sup> May** – 'The Ynys Mon Express' – East Midlands and North Staffs to Holyhead and return – bookings through UK Railtours
- **Saturday 11<sup>th</sup> May** – 'The Mad Hatter' – Darlington, York and Wakefield to Chester– bookings through UK Railtours
- **Saturday 8<sup>th</sup> June** – 'The North Briton' – London and East Coast stations to Carlisle via the Settle and Carlisle Railway – bookings through UK Railtours
- **Saturday 15<sup>th</sup> June** – 'The Yorkshire Pullman' – London King's Cross to York and Scarborough – bookings through UK Railtours
- **Sunday 24<sup>th</sup> June** – 'The Torbay Express' – Bristol to Kingswear and return – Torbay Express
- **Sunday 14<sup>th</sup> July** – 'The Torbay Express' – Bristol to Kingswear and return – Torbay Express
- **Saturday 20<sup>th</sup> July** – 'The North Briton' – London and East Coast stations to Carlisle via the Settle and Carlisle Railway – bookings through UK Railtours
- **Thursday 1<sup>st</sup> August** – 'The Aberdonian' – Edinburgh to Aberdeen via the Fife Coast– bookings through UK Railtours
- **Sunday 4<sup>th</sup> August** – Linlithgow to Tweedbank and return – Scottish Railway Preservation Society
- **Thursday 8<sup>th</sup> August** – 'The Aberdonian' – Edinburgh to Aberdeen via the Fife Coast– bookings through UK Railtours
- **Sunday 11<sup>th</sup> August** – Linlithgow to Tweedbank and return – Scottish Railway Preservation Society
- **Saturday 17<sup>th</sup> August** – 'The North Briton' – London and East Coast stations to Carlisle via the Settle and Carlisle Railway – bookings through UK Railtours
- **Saturday 24<sup>th</sup> August** – 'The North Briton' – Grantham, Nottingham, Ilkeston, Chesterfield and Doncaster to Carlisle via the Settle and Carlisle Railway – bookings through UK Railtours
- **Saturday 31<sup>st</sup> August** – 'The Aberdonian' – Edinburgh to Aberdeen via the Fife Coast– bookings through UK Railtours
- **Saturday 7<sup>th</sup> September** – 'The Aberdonian' – Edinburgh to Aberdeen via the Fife Coast– bookings through UK Railtours

The Trust respectfully requests that anyone wanting to see Tornado follows the rules of the railway and only goes where permitted.

**UK Railtours**  
01438 715050  
[www.ukrailtours.com](http://www.ukrailtours.com)

**Pathfinder Tours**  
01453 835414  
[www.pathfindertours.co.uk](http://www.pathfindertours.co.uk)

**Torbay Express**  
01453 834477  
[www.torbayexpress.co.uk](http://www.torbayexpress.co.uk)

## TORNADO TEAM MEETS PRINCE OF WALES

Following on from the issues we have had with No. 60163 *Tornado*, the annual Tornado Team Day was cancelled. We took this opportunity to introduce the members of Tornado Team to No. 2007 *Prince of Wales*. On Sunday 14<sup>th</sup> October 2018, the children and their parents visited Darlington Locomotive Works (DLW), to take part in a number of activities including a quiz and a demonstration by local artist Stephen Bainbridge. The children then had an opportunity to sketch their own P2, based on the techniques Stephen had shown them! **TCC**

**Right: The Tornado Team at Darlington.**



## V4 NEWS - PROJECT REACHES PRE-LAUNCH STAGE *by Mark Allatt*



## 3403 ANON

### Recreating Gresley's last design

In early September, The A1 Steam Locomotive Trust announced that it had formed a new subsidiary, The V4 Steam Locomotive Company Limited, to carry out the building of its third new steam locomotive – the yet-to-be-named new Gresley class V4 No. 3403 - as part of its preparations for the formal launch of the project. It was also able to confirm that it had acquired over 500 original class V4 drawings from Malcolm Barlow, a Doncaster scrap dealer who launched the now defunct Gresley V4 Society in 1994 to build a new example of the class.

The London and North Eastern Railway (LNER) class V4 was a class of 2-6-2 steam locomotive designed by Sir Nigel Gresley for mixed-traffic use. It was Gresley's last design for the LNER before he died in 1941. The class V4s had similarities in their appearance and mechanical layout to the class V2s of which pioneer No. 4771 *Green Arrow* is preserved as a part of the National Collection. The class V2s, introduced in 1936, had limited route availability and the class V4 was a lightweight alternative, suitable for use over the whole of the LNER network.

Two locomotives were built at the LNER's Doncaster Works in 1941. The first locomotive, No. 3401 *Bantam Cock*, had a scaled-down version of the Gresley Pacific boiler with a grate area of 27½ sq ft. Its tractive effort of 27,000 lbs was produced by boiler pressure of 250 psi and three cylinders of 15in diameter. The second locomotive, No. 3402, incorporated a fully welded steel firebox and a single thermic syphon for water circulation. It was not named, but was known unofficially as *Bantam Hen*. The class was tried on the Great Eastern section of the LNER, and was well received, with more power than the existing Gresley class B17 4-6-0s and better riding qualities. It was anticipated that many more would be produced, but after the sudden death of Gresley in April 1941 and his succession by Edward Thompson, no more were built. Instead, the simpler two-cylinder Thompson class B1 4-6-0 was adopted as the LNER's standard mixed-traffic locomotive and 410 were built between 1942 and 1952. The two locomotives were sent to Scotland for use on the West Highland Line, although their wheel arrangement was not particularly suitable for the line's steep gradients. The two class V4s were renumbered Nos. 1700/1 in 1946 and later became British Railways Nos. 61700/1. Both locomotives were scrapped in 1957 when their boilers became due for renewal.

At its Silver Jubilee Convention in October 2015, The A1 Steam Locomotive Trust announced that it would follow its Peppercorn class A1 4-6-2 No. 60163 *Tornado* and Gresley class P2 2-8-2 No. 2007 *Prince of Wales* with the construction of further extinct LNER steam locomotives – a Gresley class V4 2-6-2, a Gresley class V3 2-6-2T and a Gresley class K3 2-6-0. At its Annual Convention in September 2017, the Trust confirmed that it has started work identifying and scanning the original drawings for the Gresley class V4 at the National Railway Museum in York in order that the design book for new locomotive could be created within 3D Computer Aided Design (CAD).

In January 2018, the Trust revealed that it had acquired and

taken delivery of a complete set of fully-certified tyres for the new Gresley class V4's pony, Cartazzi and 5ft 8in driving wheels. They were purchased from David Buck, owner of Thompson class B1 4-6-0 No. 61306 *Mayflower*, along with a chimney, two BR class 08 shunter speedometer drive generators and two two-stage single spindle air pumps of Finnish origin including lubricator pumps and check valves for use on No. 2007. The tyres were originally manufactured in South Africa in the late 1990s for Malcolm Barlow, a Doncaster scrap dealer who launched the Gresley V4 Society in 1994 to build a new example of the class. David Buck acquired the parts six months prior in a job lot of items that Malcolm Barlow had salvaged from Doncaster Works on its closure – including a number of class B1 components.

We are now in the pre-launch phase of the project to build our third new main line steam locomotive, with the formation of The V4 Steam Locomotive Company to actually build No. 3403, the opening of both the company and charitable bank accounts and the detailed review of over 500 acquired drawings.

We want to be ready to start assembling our new Gresley class V4 as soon as our new class P2 is completed. If we're in our new and much larger base at Whessoe Road by then – and there's a good chance we will be – we could even start work on No. 3403 before No. 2007 *Prince of Wales* steams in 2021. We anticipate the project costing around £3m and taking around five years subject to the pace of fundraising. Our new Gresley class V4 is an ideal locomotive for regional main line tours, repeat main line itineraries and the longer, main line connected heritage railways

Unlike with our class P2, where we have had to do a considerable amount of development work to complete the job that Sir Nigel Gresley started in 1934, there will be very little redesign work needed as there were no known problems with the Gresley class V4s.

Although there is no specific appeal open for No. 3403 yet, any donations made towards it will be ring-fenced for the project. The next steps will be to launch a website for the project and The Founders Club to fund the early stages of the project. More announcements will be made during 2018 as the project builds up steam.

For more information on how to help, visit

[www.v4steam.com](http://www.v4steam.com), email [enquiries@v4steam.com](mailto:enquiries@v4steam.com) or call 01325 460163. **TCC**





**We have a Mikado! No. 2007 stands outside Darlington Locomotive Works with a full set of wheels underneath!**





**No. 60122 is seen on shed at Grantham on 1<sup>st</sup> May 1953.**

**One of eight A1s to emerge in December 1948, No. 60122, as Doncaster Works No. 2039, was the ninth to come from 'The Plant' but the 19<sup>th</sup> to enter service. The first report of it was in the Erecting Shop on the 7<sup>th</sup> with the boiler mounted but wheels not fitted. The 21<sup>st</sup> found the locomotive seen running trials at St. James Bridge, Doncaster. On Christmas Eve No. 60122 entered service from King's Cross shed.**

Livery for this plain-chimneyed A1 was the then customary LNER apple green with black and white lining with white block capitals used for the owner's name on the tender. A Flaman speed recorder was fitted. Apart from visits to Doncaster for repairs the first observation in service was at Cambridge on 1<sup>st</sup> February 1949. The first train logged was the 10:25hrs King's Cross to Harrogate on 27<sup>th</sup> June followed by an up express from Grantham the same day. No. 60122 worked between the capital and west Yorkshire and also to the North East. Named trains hauled included the 'White Rose' on 27<sup>th</sup> August 1949 and the up 'Tees-Tyne Pullman' on 26<sup>th</sup> July two years later. On 12<sup>th</sup> August 1950 it pulled an up express from Newcastle along the Durham coast route.

A repaint into BR express blue had

been carried out that May along with three other class members making them the ninth to twelfth A1s so re-liveried. Naming as *Curlew* took place in July, one of half a dozen A1s to follow the fine LNER tradition of calling locomotives after birds. Altogether seven A1s were named that month. Usually the nameplates were fitted at Doncaster Works during overhaul but No. 60122 was one of a pair to have the plates sent to and later fitted by 'Top Shed'. It was about this time that the Flaman speed recorder was removed and a lipped chimney replaced the plain one. *Curlew* was among the first A1s to be fitted with the Hudd system of Automatic Train Control. Two consecutive days in October found it logged hauling the Delaval-Holloway ECS through Stockton; on the 16<sup>th</sup> with 11 bogie coaches and the 17<sup>th</sup> with eight bogie

vehicles, one six-wheeler and two four wheelers.

Re-allocation to Grantham took place on 9<sup>th</sup> September 1951. The area of operation stayed the same. An additional Sunderland-King's Cross train with 12 bogie coaches was seen leaving Stockton at 08:53hrs on 31<sup>st</sup> May 1952. Named expresses included the down 'Flying Scotsman', failing at Durham on 28<sup>th</sup> February that year. This working was hauled by a Grantham engine from its home town to Newcastle. Other 'namers' were the down 'Aberdonian' from the capital on 30<sup>th</sup> June and 17<sup>th</sup> July plus the down 'Scarborough Flyer' on 19<sup>th</sup> July. *Curlew* was one of a pair of A1s repainted in BR lined passenger green in October – well down the list as 38 of the class had been repainted before either of them. A transfer to Copley Hill was made

in October 1953, affecting the sphere of operations little. The up 'Bradford Flyer' was noted on 15<sup>th</sup> April 1954. During the previous month Nos. 60122 and 60126 had exchanged tender Nos. 740 and 745 during general repairs.

A return to Grantham shed was made on 28<sup>th</sup> August 1955. Workings continued to Leeds and the North East. Both the up and down 'Flying Scotsman' were seen hauled into Newcastle four times between March and June 1956. From September to the following January *Curlew* hauled the following trains a number of times; 15:10hrs and 17:35hrs. King's Cross-Newcastle; 08:20hrs. King's Cross-Edinburgh; and the 10:20hrs Leeds from the capital. Shorter runs were the 05:50hrs and 06:45hrs King's Cross-Grantham. The 05:50hrs on Boxing Day was followed by an additional King's Cross-Hull. Few records exist of No. 60122 on non-passenger trains; one is the 23:00hrs King's Cross-York parcels on 7<sup>th</sup> January 1957. The smokebox number plate and handrail were transposed. In July the later BR crest was applied to the tender.

A return to its original shed came on 15<sup>th</sup> September 1957, whence it was recorded working the up 'Flying Scotsman' 30<sup>th</sup> August. A less usual working was the 06:05hrs King's Cross-Cambridge. On 11<sup>th</sup> November 1958 the 17:30hrs from Peterborough to the capital was hauled to Hitchin before stabling on Hitchin shed. Re-allocation to Doncaster came on 5<sup>th</sup> April 1959. Sightings continued in west Yorkshire

and Newcastle with servicing on Gateshead shed. Sightings of *Curlew* in Lincoln were possible on 8<sup>th</sup> January 1961 and 11<sup>th</sup> November because of Sunday ECML diversions. Other workings of note were the Sunday 13:40hrs 1A43 Sunderland-King's Cross into the capital on 9<sup>th</sup> July 1961 and the King's Cross-Huddersfield on the following 7<sup>th</sup> February. An interesting diagram on 13<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup> September 1961 was the 1A12 King's Cross-Newcastle (for the Tyne Commission Quay) returning with the 3E22 up fish train. These are the only recorded goods workings for No. 60122. *Curlew's* last logged train was a 'namer', the up 'Harrogate Sunday Pullman' of 11<sup>th</sup> November 1962.

Withdrawal from service was on 17<sup>th</sup> December 1962. The final sighting was on 13<sup>th</sup> January in Doncaster Works yard where it was cut up. During its life, No. 60122 had carried seven different boilers. *Curlew's* 14 years of service on the East Coast was less than the A1 average of 15 years two and a half months although five class members had even shorter working lives. Even though it was amongst the first half of the A1s to be built No. 60122 was just the sixth to be taken out of service at a time when increasing dieselisation was taking away its work. *This history was compiled by Phil Champion based on a database compiled by Tommy Knox and with reference to the RCTS book 'Locomotives of the LNER Part 2A' as background TCC*



**Curlew is seen at Werrington on 26<sup>th</sup> July 1952.**



P2 ENGINEERING UPDATE *by David Elliott*

There has been some significant visual progress with the cladding trial fitting to the frames and a full set of wheels under the engine.



David Elliott

Wheelsets

The coupled cannon boxes have been trial fitted to the wheelsets and following some protracted measurements and we are now in a position to finish machine the adjustment rings. Meanwhile, Ian Matthews has made good progress with sculpting the balance weight plates to fit round the spokes. We now have all the wheelsets.

Above: The wheelsets unloaded.

Right: Preparation of the wheelsets is underway.



David Elliott

David Elliott



The balance weights ready for machining and fitting.



David Elliott

Mandy Grant



Above: The machined crankpins in place.



David Elliott

Balance weights in place.

Daniela Filová



The pony truck mockup.

The pony truck cannonbox is still in the process of being machined following an earlier machining error which required some welding. To enable us to trial fit the pony truck axle and to assist with finding suitable locations for the TPWS antenna and AWS receiver, Daniela has drawn and supervised construction of a wooden mockup by volunteer Terry Graham of the pony truck frame.



Measuring the P2's frames.

Daniela Filová





**A trial fit of the cladding sheets.**

### Cladding

Ian has largely completed the cladding and has since been working on fitting the front of the cab to the cladding and preparing the spectacle plates to accept the spectacle window frames.

### Air pumps

We now have the first overhauled air pump, both the Polish type lubricators and a quantity of spare parts delivered from Meiningen, and steps are being taken to order the overhaul of the second pump.

### Boiler

An order has been placed on Meiningen for the updated boiler design including reprofiling the dome to fit inside the cladding (the A1 dome cover is outside the P2 cladding profile at the sides). I visited Meiningen on 17<sup>th</sup> October to finalise the scope of the design work. Although the boiler for No 2007 is essentially the same as that for *Tornado* as there have been several modifications and improvements to the original design, the design as a whole needs bringing up to date for certification of the new boiler. We presently have expressions of interest in building the new boiler from a number of suppliers.

### Tender

Ian Howitt is making progress with the tender frame having collected the last of the castings from DLW. The tender axles are due any time now and will be sent with the wheels to South Devon Railway Engineering for assembly as soon as they have been inspected. Requests for a quotation for the tender tank have been sought from a number of companies with the necessary skills



**Tender hand brake shaft bracket.**



**Tender spring box washers.**



**Tender hand brake crank and link.**

David Elliot

Tender photos: ID Howitt

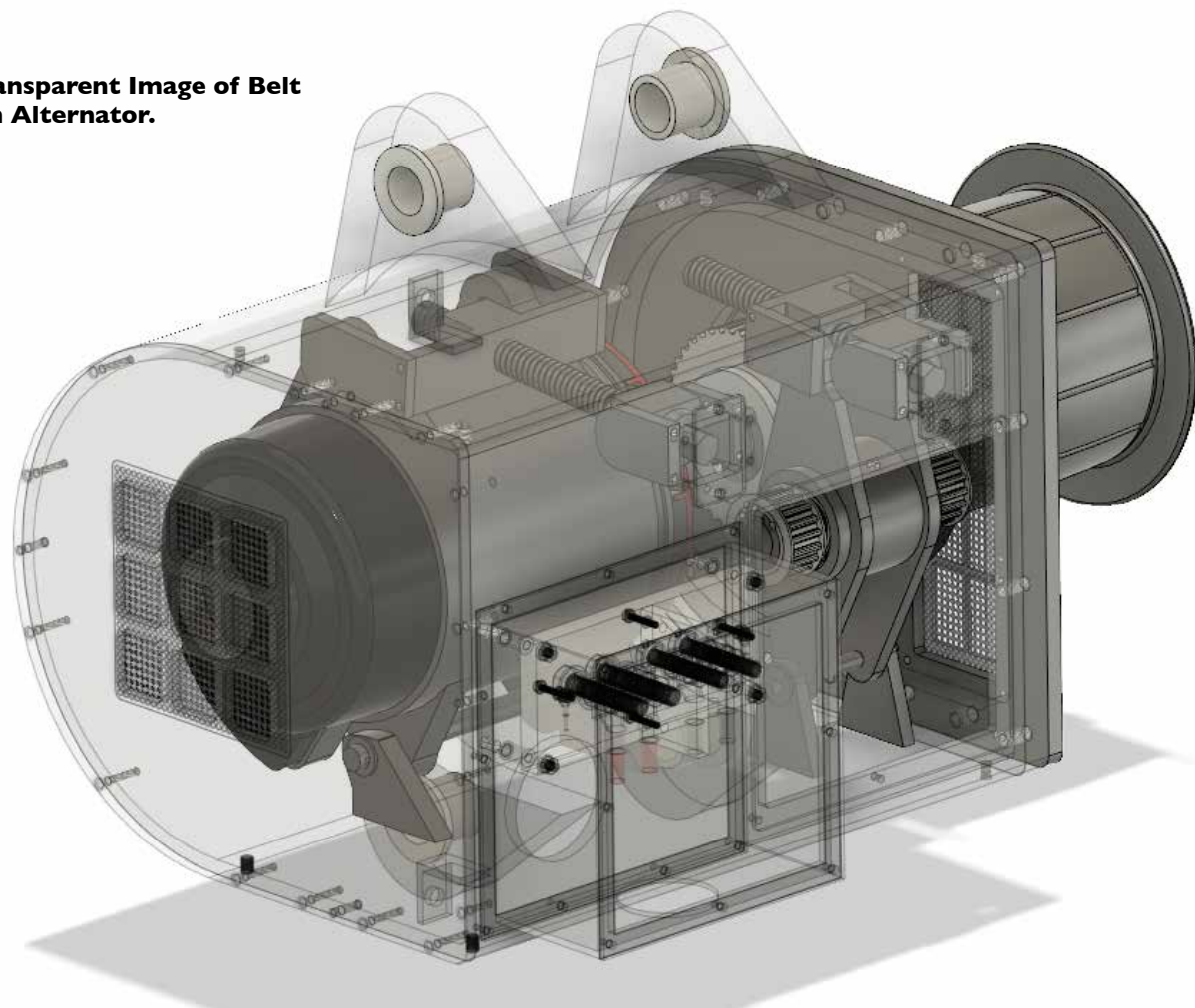
### Electrical

Alan Parkin has been retained part time to carry out detailed electrical design. So far he has worked up a design for a modern axle driven alternator as the Stones Altonum alternators used on *Tornado* and our support coach are becoming hard to find and are very expensive to overhaul. Their regulators are even more problematical as they use 1960s transistors! The new design uses a 28V 180A bus/truck alternator with a 2.5:1 step up drive through toothed belts to enable it to be driven by a rail vehicle axle. Mechanically it will be capable of replacing the Stones alternator

or a Wolverton type carriage dynamo. Alan is also working on manufacture of a new turbogen turbine wheel (as these are also becoming hard to find) with Durham Precision Engineering of Newton Aycliffe.

He has also visited the National Railway Museum, York to make a detailed 3D model of an original LNER headlamp with the flared lens shield which will enable Rob Morland to start work on the P2 combined head, marker and tail lamps.

### 3D Transparent Image of Belt Driven Alternator.



**Above: Turbine wheel parts.**



**Right: An original LNER lamp and the 3D CAD for a new one.**



All photos and Graphics Alan Parkin 1A1SLT



## Design Work

Daniela has almost completed manufacturing drawings for the pony truck frame and has converted the original cast steel outside slidebar brackets to fabrications.

Work on valve gear and the cylinder block has made sporadic progress but has been slowed by the time spent on *Tornado's* repair. repair of *Tornado*. With the extra design resource we now have, this should be caught up over the next few months.

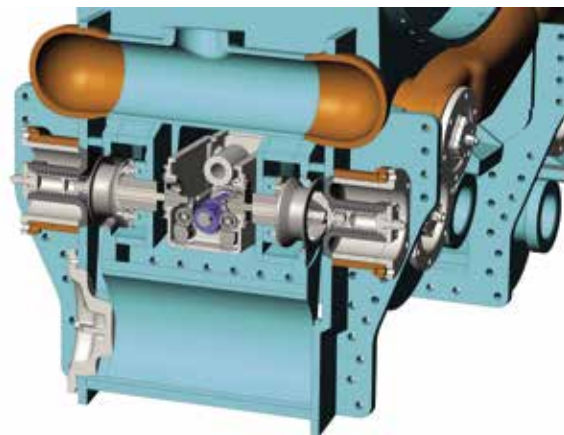
Gemma Braithwaite



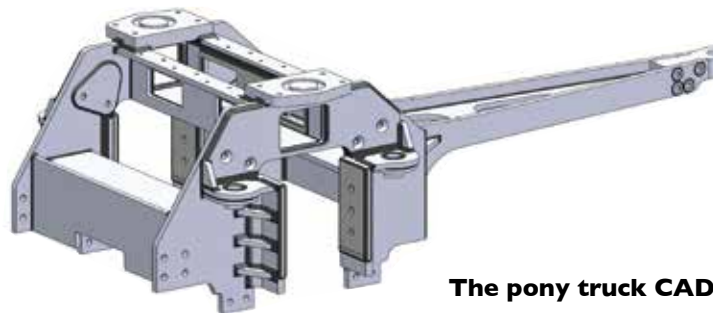
**Daniela with the cylinder covers she designed.**



**A 3D transparent image of the left hand cam box.**



**Section through a 3D CAD of the cam box and exhaust valves.**



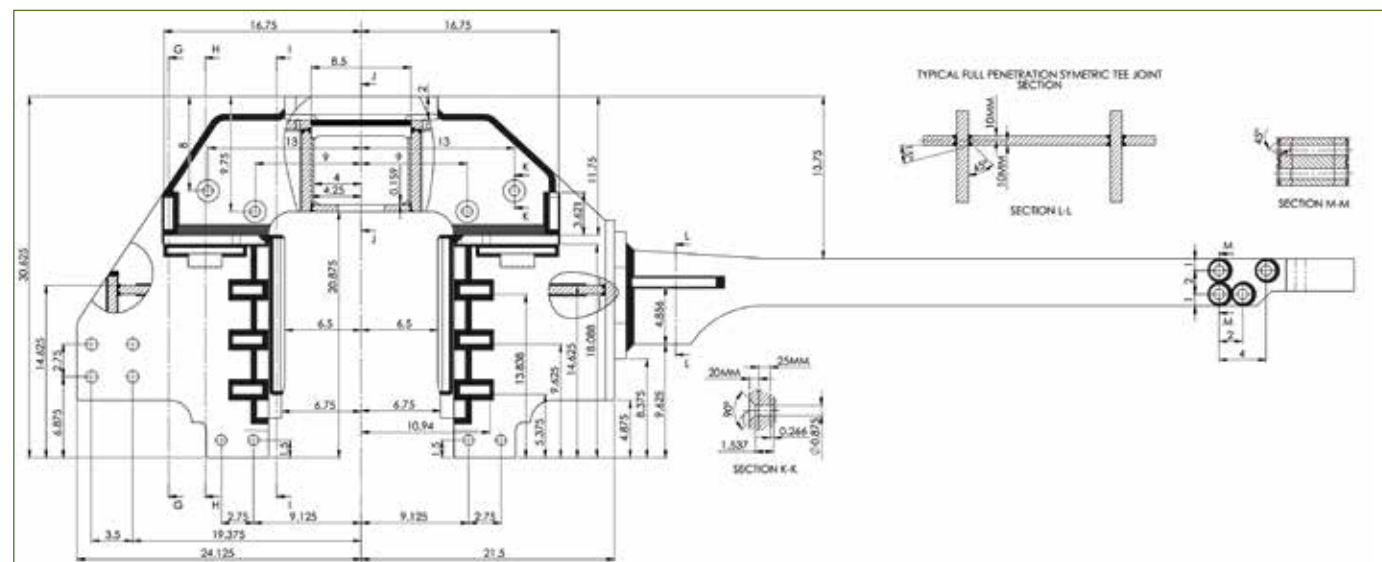
**The pony truck CAD.**

David Elliott / A/SLT

David Elliott / A/SLT

Daniela Florová / A/SLT

Daniela Florová / A/SLT



**The pony truck drawing.**

## £350,000 ORDER CONFIRMED FOR ELECTRICAL, SAFETY, TRAIN RECORDING AND COMMUNICATIONS SYSTEMS FOR PRINCE OF WALES by Mark Allatt

In early August, The A1 Steam Locomotive Trust announced that it had agreed a £350,000 order for a state-of-the-art electrical system for new Gresley class P2 No. 2007 *Prince of Wales*. The electrical system, based on that fitted to No. 60163 *Tornado*, includes systems that generate and store electricity, together with lighting and instrumentation systems. Also included are all current railway safety and communication systems, plus new systems that will soon be needed on the Network Rail main line.

In order to complete No. 2007 *Prince of Wales* before the end of 2021, the Trust needed start work on the electrical systems during the third quarter of 2018 and at its most recent board meeting, the Trustees reviewed the proposed system's architecture, key equipment locations, wiring & interconnect, power generation & supply, essential lamps, systems and instrumentation.

The Electrical system for No. 2007 *Prince of Wales* will be based on that fitted to No. 60163 *Tornado* which has operated successfully for the past 10 years. It will be based on the following key principles:

- Dual redundant power supplies
- Electronic battery management
- Steam turbine and axle-driven generators
- All LED lighting
- Structured trunking system for wiring
- Military specification components for reliability
- Optimised equipment locations for minimum wiring

The new system will improve on that fitted to *Tornado*, especially with regard to access and maintenance, and systems will be moved from the engine to the tender where practical. It will use the same tried and tested components for critical systems (including Huber + Suhner 4GKW Traction Cable for all wiring and AB MIL-C 5015 bayonet connectors). Conventional wiring will be used for power and lighting. A bus-based communication system is being considered for instrumentation, along with wireless connectivity where required.

The key elements include:

- Electrical systems: battery boxes (under the cab), control panels (driver's & fireman's side roof), distribution boards (under the crew seats), steam turbo-generators (two located on fireman's side running plate, (arranged to look like the feedwater heater on the original class P2 No. 2001 *Cock o' the North*) and tender alternator (behind and driven from the rear axle)
- Existing railway safety systems: On-Train Monitoring Recorder (OTMR), Train Protection & Warning System (TPWS) and Global System for Mobile Communications Railway (GSM-R)
- European Train Control System (ETCS): European Vital Computer (EVC), Train Interface Unit (TIU), Juridical Recording Unit (JRU), Euroradio, Balise Transmission Module (BTM) and ETCS Batteries (if required) all in a new locker on front of tender with a filtered air supply for cooling; Balise Antenna (under engine); 2-3 Tachometers; 1-2 Doppler Radars; two GSM-R Data Radio Antennas (on rear of tender top); and Driver Machine Interface (DMI)
- Wiring system: a structured stainless steel box trunking system, designed on 3D CAD, will be used for the main 'spine' trunks on engine and tender; most of the rest of the conduit will be flexible; visible conduit (e.g. in the cab) will be galvanised tube;

an improved system for connecting the cab to the frames will be implemented

- Power generation: a new design for an axle-driven alternator based on an off-the-shelf truck alternator is well underway (output around 160A at 27V DC (4.3KVA); the Trust's own design of turbo-generator also underway (output around 25A at 27V DC (675VA) with two fitted with a £7,350 order for a first complete new turbine wheel placed with Durham Precision Engineering; there will also be a shore power supply fitted
- Essential lamps: replicas of the distinctive class P2 lamps will be constructed and fitted with new LED luminaries inside (the P2s didn't have Stones marker lamps, so will need a combined head, tail and marker lamp within the same housing); the rear of the tender will be equipped with recessed marker/tail lamps and lamp brackets/plugin points for headlamps if needed on heritage railways (or for a main line Plandampf)
- Instrumentation system: drawbar horsepower measurement (effectively a dynamometer car), cameras, pressure sensors, temperature monitors and sensors to monitor important cambox parameters.

The team, led by Electrical Director Rob Morland, includes Alan Parkin (power generation and 3D CAD design), John Moyce (instrumentation), Steve Sims (instrumentation) and Paul Depledge (implementation). The electrical part of the project will run from now through to 2021, in parallel with the mechanical engineering work. **TCC**



**An example of the sort of equipment that will need to be fitted to No. 2007, this is the one of the electrical cubicles under the fireman's seat in *Tornado's* cab.**

Rob Morland



## P2 ROADSHOWS *by Mark Allatt*

As you will be aware, in 2018 we are holding a series of presentations in major cities associated with both the original Gresley class P2s and No. 2007 – a slight change from our journey along the route of the East Coast Main Line from London to Aberdeen during 2017.

Our fifth P2 Roadshow this year was held on Saturday 19<sup>th</sup> May 2018 at Sheffield Hallam University, Sheffield and was attended by 10 people and raised over £1000.

The sixth Roadshow was held on Saturday 9<sup>th</sup> June 2018 at Glasgow Royal Concert Hall, Glasgow and was attended by 11 people and raised over £1000.

The next Roadshow was at Manchester on the 3rd November at the Manchester Conference Centre which was attended by seven people although it raised over £2000.

The presentations are given by David Elliott and Mark Allatt and are also attended by other volunteers and supporters. Please do come along to support the project, hear the latest news and ask any questions that you might have. Even better if you can bring a friend or two! For more information visit

[www.p2steam.com](http://www.p2steam.com), email [enquiries@p2steam.com](mailto:enquiries@p2steam.com) or call 01325 460163. **TCC**

The next roadshows will run from 11:00hrs to 13:00hrs on:

- **Saturday 8<sup>th</sup> December 2018** – Hilton Leeds City Hotel, Leeds.
- **Saturday 12<sup>th</sup> January 2019** – Great Northern Hotel, Peterborough
- **Saturday 9<sup>th</sup> February 2019** – London Transport Museum, London
- **Saturday 2<sup>nd</sup> March 2019** – Darlington Locomotive Works, Darlington
- **Saturday 6<sup>th</sup> April 2019** – York – venue to be confirmed
- **Saturday 1<sup>st</sup> June 2019** – Dundee – venue to be confirmed
- **Saturday 8<sup>th</sup> June 2019** – Newcastle – venue to be confirmed
- **Saturday 6<sup>th</sup> July 2019** – Darlington Locomotive Works, Darlington
- **Saturday 14<sup>th</sup> September 2019** – Location to be confirmed
- **Saturday 2<sup>nd</sup> November 2019** – Darlington Locomotive Works, Darlington
- **Saturday 7<sup>th</sup> December 2019** – Location to be confirmed

## MANUFACTURERS INVITED TO TENDER FOR THE CONSTRUCTION OF PRINCE OF WALES' BOILER *by Mark Allatt*

In early June 2018, The A1 Steam Locomotive Trust went to the market to seek expressions of interest in the manufacture of the boiler for No. 2007 *Prince of Wales*. The boiler for No. 2007 will be similar to that which was built by DB Dampfloswerk Meiningen, Germany for new Peppercorn A1 class No. 60163 *Tornado* in 2006/7, being a fully welded design with a steel firebox. The Trust owns the design rights to the boiler and it is intended that a number of minor modifications that have been applied to *Tornado's* boiler since it was originally built will be incorporated into this design. The Trust sent the arrangement drawing to ten potential manufacturers in the UK.

The boiler for the new class P2 locomotive is intended to be directly interchangeable with the diagram 118A boiler fitted to *Tornado* and the constructor of the new boiler should be able to demonstrate fulfilment of the following requirements:

- To have a track record in construction of new boilers and/or major repairs to existing boilers of a similar size as the boiler of the new Gresley class P2.
- To have facilities and equipment large enough to adequately handle a boiler of this size.

- To operate a quality management system (QMS), which shall as a minimum include ISO 9000 and which clearly demonstrates adequate control of critical processes including material specification and traceability, weld procedures and welder qualifications.
- Have a clear relationship with a mutually agreed notified body to facilitate certification of the boiler to the appropriate National and European Standards.
- Ability to deliver on time to an agreed schedule.

The Trust has requested that potential suppliers provide an indicative price for a boiler to the standard defined in the drawings supplied. The anticipated schedule is:

- Selection of supplier end 2018
- Negotiations and finalisation of technical specification quarters one and two 2019
- Firm order placed June 2019
- Delivery required January 2021. **TCC**



### Attention all Boiler Club Members!

#### P2 Boiler Club Exclusive Badges Are Now Available To Purchase

To purchase your badge please send a cheque for £5 made payable to 'The P2 Steam Locomotive Company' and send to The A1 Steam Locomotive Trust, Darlington Locomotive Works, Hopetown Lane, Darlington DL3 6RQ.

## P2 DEDICATED DONATIONS UPDATE *by Mandy Grant*

May to November 2018 has seen an amazing increase in component sponsorship, with 71 individual components being sponsored, raising a further £59,500.00 before gift aid. Components sponsored include;

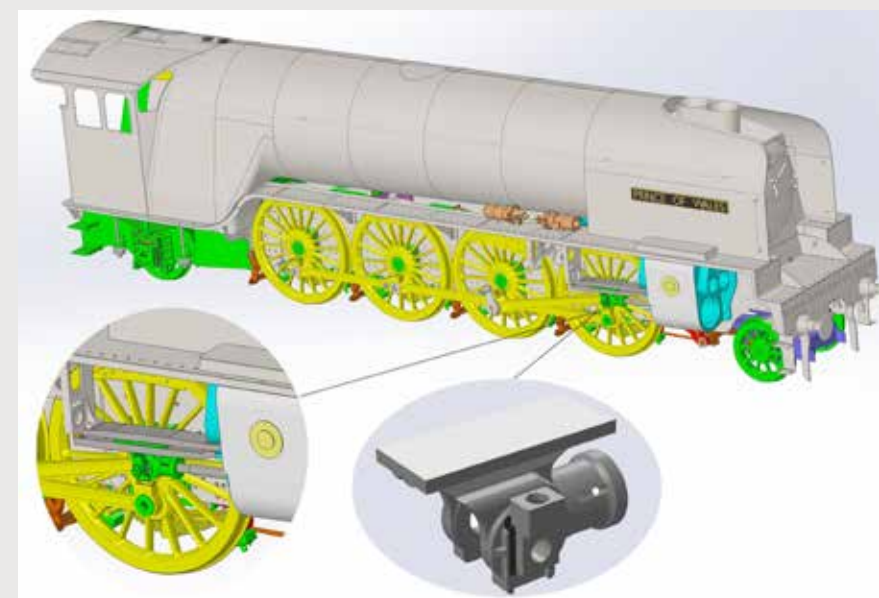
- Sandpipes LH & RH Leading
- Cartazzi Hornblock Leading RH Poly Pattern
- Spring Casing for Double Buffer LH Casting
- 5x Wash Out Door Escutcheons
- Cladding Sheet 5 LH (firebox front)
- Cladding Sheet 5 RH (firebox front)
- Combined Brake Hanger Bracket and Firebox Support LH poly pattern
- Boiler hand rail knob 3 R
- Tender sprinkler valve
- Cambox Casting LH
- 3x Inlet Valve Tappets
- Crinoline Ring Half 1 RH
- Chime Whistle Isolating Valve on side of boiler Body Casting
- Turbo-Generator Valve Body Casting on Steam Stand
- Buffer Rebound Spring Front RH Buffer boxes
- All tender Wheels, Tyres and Axle
- Intermediate coupled cannonbox, axle and bearing assembly
- Trailing coupled cannonbox, axle and bearing assembly

- Boiler band 7 (rear of firebox in cab)
- 12" Air Brake Cylinder Loco Rear
- Atomiser isolating valve on side of boiler body casting
- Pony truck cannonbox, axle and bearings assembly
- Vacuum ejector elbow into smokebox casting
- Vacuum ejector elbow into smokebox machining and details
- Inside crank pin forging
- Sand pipe RH backward driving
- Multiple Nuts and Bolts

We are most grateful to all of our supporters who have responded to the Dedicated Donations campaign so far!

If you haven't yet sponsored a component, now is the perfect time, with prices ranging in price from one of over 1,000 driven bolts & nuts for £25, to the complete exhaust steam injector for £15,000. Why not treat yourself or a loved one to something different and help us to complete this iconic locomotive by 2021! If you would like to sponsor a component on No. 2007 *Prince of Wales*, or you know of a business owner or company who may be interested in sponsoring an item, please contact us at:

[dedicated.donations@p2steam.com](mailto:dedicated.donations@p2steam.com) **TCC**



**The right hand Crosshead - just one of the many items still available to sponsor.**

## P2 PROGRESS TO DATE

Progress building Britain's most powerful steam locomotive continues at Darlington Locomotive Works and includes:

- Frame plates for engine and tender rolled and profiled; engine's frames erected at Darlington Locomotive Works; all major engine frame stays, brackets, horn blocks, axle boxes and buffers cast (44 in total); over 1,000 fitted and driven bolts ordered and delivered, approximately 800 now fitted to the frames
- All 20 wheels for engine and tender cast and proof machined; roller bearings for all engine and tender wheelsets and engine axles (including crank axle), tyres and crank pins delivered, tender axles, tyres delivered, Cartazzi, pony truck and coupled wheelsets complete
- Preliminary discussions held with boiler manufacturers, with expressions of interest submitted. Forged foundation ring corners manufactured; start made on boiler fittings with castings for combined injector steam and delivery valves, steam stand and valves and superheater header received ready to machine. Boiler cladding trial fitted to engine frames
- Study into ride and suspension completed using rail industry standard Vampire® software; Finite Element Analysis completed on re-designed crank axle to ensure locomotive complies with modern standards; assessment and notified body appointed to oversee certification - first site visit made
- Smokebox and cab substantially complete
- Crosshead castings received, coupling and connecting rods ordered
- Tender frame construction under way, axlebox and other tender castings delivered from William Cook Cast Products and I D Howitt Ltd of Crofton near Wakefield commissioned to erect tender frame – many detailed parts made including front drag box and brake linkage, castings being machined
- Nameplates and chime whistle delivered
- Over £2m spent, £2.5m raised and £3.1m pledged of the required £5m. **TCC**



## FUNDRAISING FOR No. 2007 PRINCE OF WALES by Mark Allatt

£2m spent, £2.5m donated and over £3.1m pledged of our £5m target

Bob Hughes



Gresley class P2 No. 2007 Prince of Wales at Darlington Locomotive Works under construction.

**Our project to build Gresley class P2 No. 2007 Prince of Wales continues to make solid progress on all fronts and we are still on target to complete the new locomotive by 2021 provided we can keep up the current pace of income growth. A huge thank you to all our supporters who continue to give most generously to the project.**

Pledges towards building No. 2007 Prince of Wales have passed £3.1m just over four years after the frames were rolled at British Steel's plant in Scunthorpe. Public interest in seeing a new Gresley class P2 become a reality sooner rather than later remains high and almost 900 people have already signed up to the 'P2 for the price of a pint of beer per week' (£10 per month or more) Covenant scheme since its launch in March 2014. The average monthly donation is now over £17 per Covenantor (including Gift Aid) and the projected monthly income for our P2 project from the monthly Covenant scheme is now running at around 110% of that of *Tornado* – a remarkable achievement in such a short period of time and all thanks to the generosity of our supporters. What is even more striking is that only around 30% of A1 Covenantors (36% of P2 Covenantors)

are regular donors to both locomotives, meaning that the overwhelming majority of the funds are being given by new supporters of the Trust.

In addition to this core scheme, funds have been raised through The Founders Club with over 360 members donated £1,000 each plus Gift Aid – target 100 people, now closed; The Mikado Club, launched in March 2016 with an initial target of 160 members to wheel the engine and extended in May 2017 to 200 members to also wheel the tender - now fully subscribed with 200 supporters pledging £1,000 each plus Gift Aid and therefore potentially raising £250,000; The Cylinder Club, only launched at our last Convention in October 2017, is now also fully subscribed with 100 people have already pledged £1,000 each plus Gift Aid and therefore potentially raising £125,000; The Boiler Club, over 160 people have

pledged £2,000 each to fund the boiler - target of 300 people – meaning two-thirds of the £600,000 target is now pledged; and Dedicated Donations, with over £315,000 from existing supporters sponsoring a variety of components. The Gresley Society Trust has also sponsored the locomotive's distinctive front-end for which we are most grateful.

There are still a considerable number of wheeling-related Dedicated Donations still available for sponsorship, ranging from a driving wheel spoke at £600 (or from £25 per month for 24 months) to a Cartazzi axlebox casting at £1,300 (or from £50 per month for 26 months) to and driving wheel casting & proof machining at £12,000 (or from £200 per month for 60 months).

April 2018 saw the launch of The Motion Club, established to fund the manufacture of the heavy motion for No. 2007, where we have set ourselves

the challenge of raising £210,000 from 175 supporters each donating £1,000 plus Gift Aid. In just ten days we had already signed up 24 members of The Motion Club, potentially worth £30,000 including Gift Aid – a remarkable achievement thanks to the generosity of our supporters. As of early September to October we had recruited over 90 members to The Motion Club, with over £100,000 pledged.

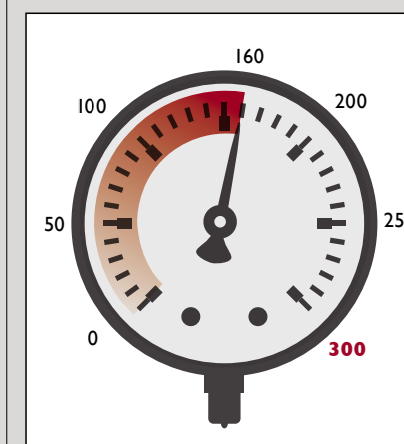
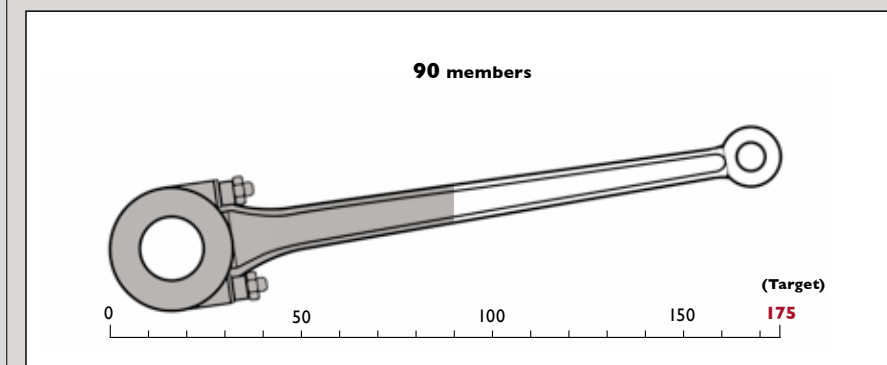
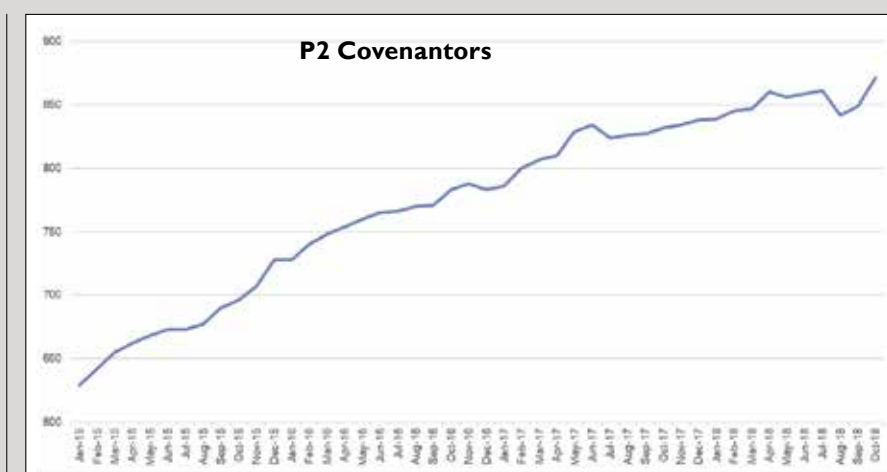
We are delighted with the level of support that the project to build Britain's most powerful steam locomotive has received since its launch. This means over £2m (40% of the total required) converted into metal, over £2.5m (50%) raised and £3.1m (62%) pledged.

In autumn 2018, we completed the rolling chassis for No. 2007 Prince of Wales

The rolling chassis was substantially complete in the autumn of 2018 and we remain on-track for completion of the new locomotive in 2021. However, to maintain this rate of progress we need to raise more than £700,000 per year, which given the nature of the regular donation scheme becomes more challenging as each year passes. Last financial year we more than achieved our budget of £500,000 and this new financial year we have set a fundraising budget of £700,000.

We would encourage all our supporters who haven't yet contributed to this exciting project to help us to meet these deadlines by becoming a monthly 'P2 for the price of a pint of beer a week' covenantor, joining The Boiler Club, becoming a member of The Motion Club or taking out a Dedicated Donation. It's time to get on-board!

For more information on how you can help to build Britain's most powerful steam locomotive visit [www.p2steam.com](http://www.p2steam.com), email [enquiries@p2steam.com](mailto:enquiries@p2steam.com) or call 01325 460163. **TCC**



**Top: Graph showing P2 Covenantors.**

**Above centre: Motion Club gauge - 90 Members.**

**Left: Boiler Club gauge - 160 Members.**



**How No. 2007 Prince of Wales will look on completion. Altered from an official portrait of No. 2001 Cock o' the North.**

The Gresley Society Trust



## 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!**

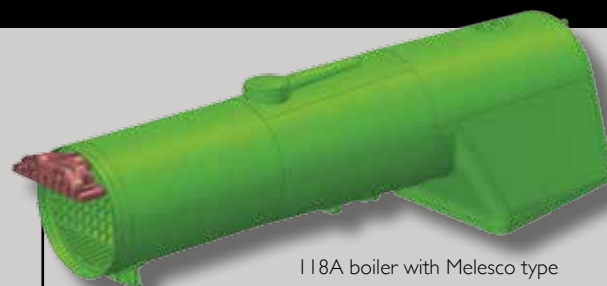


The boiler is the beating heart of a steam locomotive and to keep the construction of No. 2007 *Prince of Wales* on schedule for completion in 2021, we need to place the order for the boiler in 2019 for delivery in January 2021. We have established The Boiler Club to fund the construction of *Prince of Wales*' boiler. It is our desire to leave No. 2007 *Prince of Wales* debt free upon completion and 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 40 payments of £50 by standing order) – we are over half way there, having raised £400,000 so far!

Special benefits for members of The Boiler Club:

- Opportunity to buy 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
- Opportunity to join one of the teams building No. 2007
- 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 Boiler Club day with *Tornado*.

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



118A boiler with Melesco type superheater header as used on *Tornado*

### No. 2007's boiler in detail

- Use of diagram 118A *Tornado* boiler with detailed modifications to improve overhaul life
- Interchangeable with *Tornado* boiler
- *Tornado* 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

For further information please visit [www.p2steam.com](http://www.p2steam.com) email [enquiries@p2steam.com](mailto:enquiries@p2steam.com) call 01325 460163 or write to The Boiler Club, P2 Construction Fund, Darlington Locomotive Works, FREEPOST RTJS-XECR-XARL, The A1 Steam Locomotive Trust, Hopetown Lane, Darlington DL3 6RQ

## LATEST TECHNOLOGY BRINGS NO. 2007 PRINCE OF WALES TO LIFE by Mark Allatt

In mid-August, The A1 Steam Locomotive Trust announced that C3Sixty, a Darlington based company who scan and capture various buildings and projects, had completed a virtual reality 3D tour of Darlington Locomotive Works. The virtual tour allows visitors to the project's website from across the world to visit Darlington Locomotive Works and see new Gresley class P2 steam

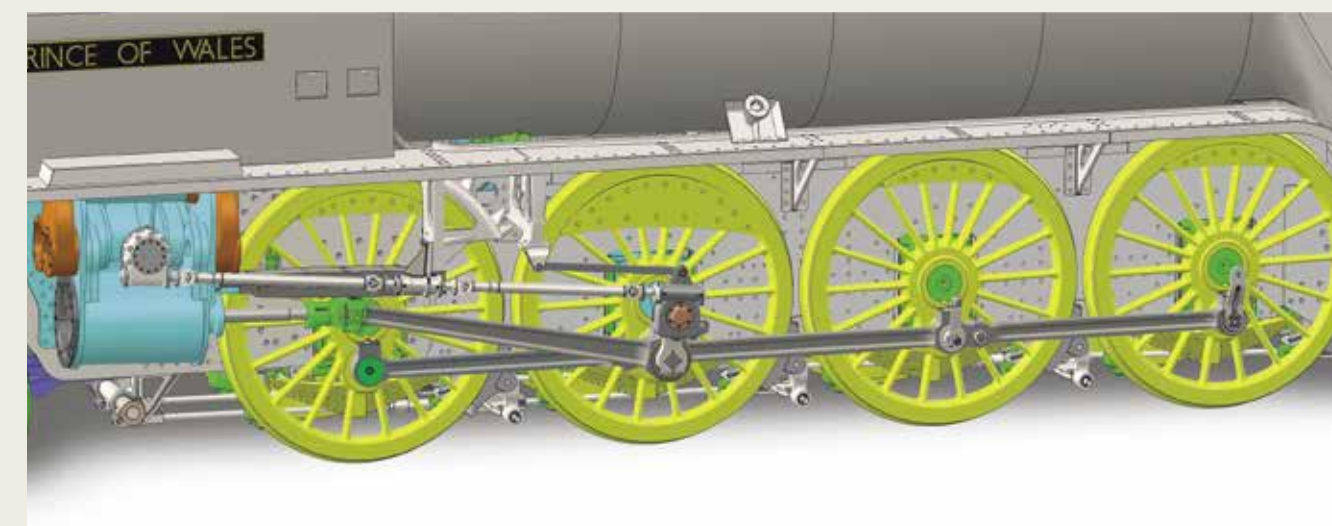
locomotive No. 2007 *Prince of Wales* under construction

Adam Pomeroy, Managing Director of C3Sixty approached the Trust following a family visit to Darlington Locomotive Works. Having a virtual tour online is perfect for us as it allows our supporters across the globe to look at the construction progress on No. 2007 *Prince of Wales*.

The virtual tour can be accessed via the projects website at [www.p2steam.com](http://www.p2steam.com). This allows supporters to click through the workshop, look at various videos relating to components and find out more about No. 2007 and its six predecessors. For those with 3D headsets/glasses, the tour can be accessed via the Google icon in the bottom right hand while viewing the tour and following the simple instructions. **TCC**

## COME ON, COME ON, DO THE LOCO-MOTION WITH ME!

by Mark Allatt



David Elliott / A1SLT

### 3D diagram of No. 2007's outside motion.

In April 2018, The A1 Steam Locomotive Trust launched a new appeal to raise the funds to manufacture the motion for new Gresley class P2 No. 2007 *Prince of Wales*. The Motion Club was established with the aim of raising £210,000 from 175 supporters each donating £1,000 (plus Gift Aid) to the project in up to eight payments of £125 by standing order. In just seven weeks the appeal had already reached over a quarter of its £210,000 target and by early September we had recruited 90 members to The Motion Club, with over £112,000 pledged.

In May we were delighted to announce that we had placed a £220,000 order with Stephenson Engineering Ltd of Atherton, Manchester for the heavy motion No. 2007 *Prince of Wales*. The order included the forging, machining and heat treatment of the nine heavy motion rods - intermediate coupling rod LH/RH, trailing coupling rod LH/RH, leading couple rod LH/RH, outside connecting rod LH/RH and the inside connecting rod assembly (including strap, gluts and strap nuts and washers) – and the combined piston and rod. The motion is expected to be delivered in batches between December 2018 and December 2019, with the first item, the intermediate coupling rods, expected to be delivered towards the end of December 2018. Orders are to follow for the motion include rod bushes, oil box covers and miscellaneous components.

In return for supporting this appeal, special benefits for

members of The Motion Club include:

- Opportunity to buy ticket (seat already reserved) on one of the first trains hauled by No. 2007 *Prince of Wales*
- Reasonable access to No. 2007 at all times
- Opportunity to buy exclusive Motion Club badge
- Opportunity to join one of the teams building No. 2007
- First choice of other components to sponsor
- Special Motion Club day with *Tornado*
- Special limited-edition version (signed/numbered) of Stuart Black's drawing of No. 2007 *Prince of Wales*.

We are delighted with the level of support that the project to build Britain's most powerful steam locomotive has received since its launch. Thanks to our supporters' continued generosity, over £3.1m has now been donated or pledged. We now need to turn our attention to the motion which is our next major manufacturing challenge. Given the level of support The Motion Club has received in just seven months, we are confident we can raise the additional £110,000 needed to pay for the heavy motion and remain on-track for completion of new Gresley class P2 locomotive, No. 2007 *Prince of Wales* in 2021.

To become a member of The Motion Club, email [enquiries@p2steam.com](mailto:enquiries@p2steam.com), call 01325 460163 or visit [www.p2steam.com](http://www.p2steam.com) for more information. **TCC**



## •WORKSHOP NOTES•



Gemma Braithwaite

Above: Jenny receives the print from David Elliott.

Left: Mark Allatt, Nia Griffiths MP, Jenny Chapman MP and David Elliott.

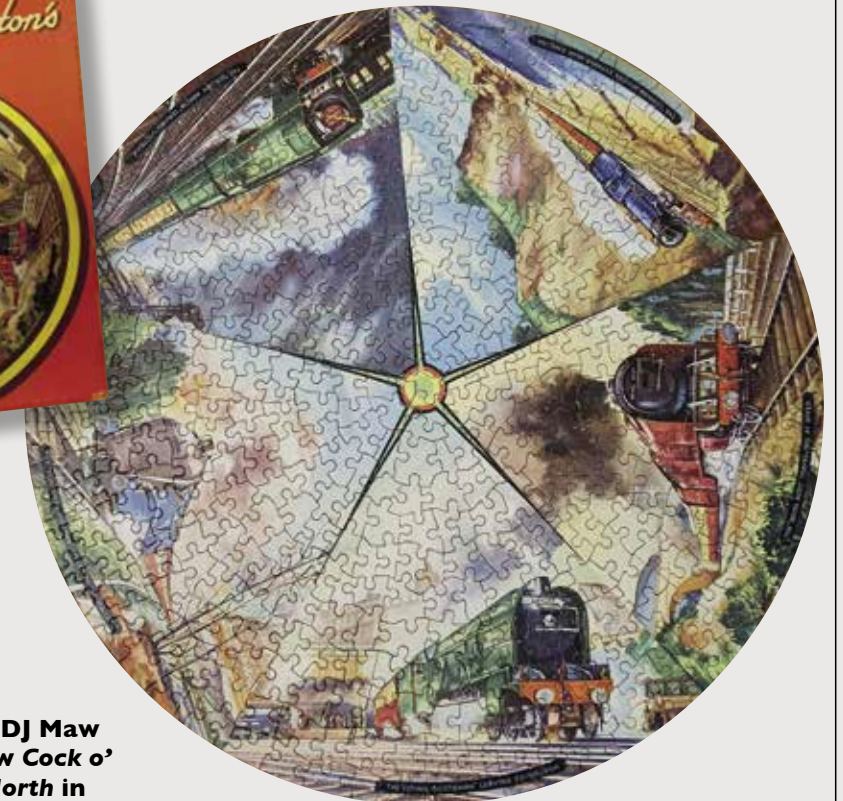
### MP VISIT TO DARLINGTON LOCOMOTIVE WORKS

On Saturday 16<sup>th</sup> May Darlington Jenny Chapman MP visited Darlington Locomotive Works with Nia Griffiths (MP for Llanelli and Shadow Defence Secretary). She was presented with 'The Dream Team' painting by Chris Ludlow depicting *Prince of Wales* and *Tornado* together to mark Darlington's 20 year association with The A1 Steam Locomotive Trust.

### P2 MEMORABILIA - JIGSAWS by Mandy Grant



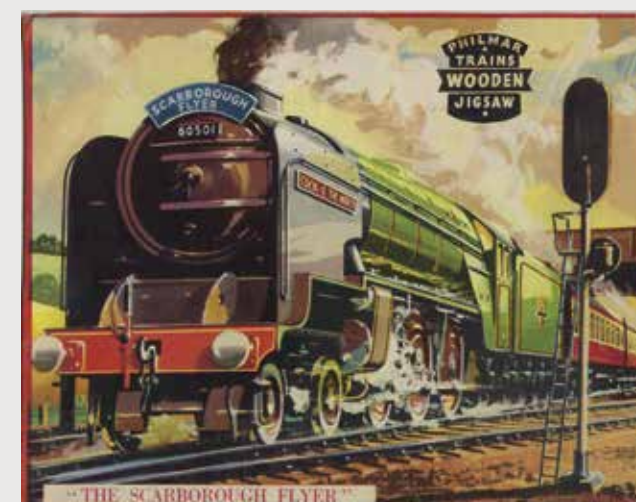
Waddingtons 1950s Famous Trains Jigsaw Box and circular jigsaw.



Left: DJ Maw Jigsaw Cock o' the North in the Highlands.



Above: Jigsaw Mammoth No. 29 Cock o' the North - (Green and black box lid with made up jigsaw in full colour.)



Philmar jigsaw, 'The Scarborough Flyer' with Cock o' the North in Thompson form as a 4-6-2 - wooden jigsaw, box lid and made up illustration.



### COCK O' THE NORTH IN SUGAR

In 1934 the newspapers carried a story about a chef modelling No. 2001 in sugar. P2 anyone? One lump or two?

Chris Calver (works guide and volunteer for The A1 Steam Locomotive Trust) sent us the following, "Whilst looking through a family scrap book of newspaper cuttings I came across an article that you might be able to use. Attached are photos of *Cock o' the North* in sugar and the accompanying article probably from the *Evening Chronicle* in Newcastle but I do not have the precise date in 1934... the give-away saying it is on test in Vitry.

The article was probably collected by my mother, then Constance Ferry, before she married my dad James Calver in

1941. One of the reasons she may have collected the article is that the model was to be on display in Newcastle Central Station during Christmas 1934 and a collection was to be made for the Royal Victoria School for the Blind which my grandfather, Lloyds Bank manager Frederick Ferry was a Trustee. The school only exists as a trust now and supports work for the blind although I remember going there in the 1950s and playing with blind children of my age. In the collection there is one other collected railway article about No. 2750 *Papyrus* gaining the world record on 5<sup>th</sup> March 1935 with a nice photo of her coming into Newcastle Central Station."



## PROFILE – PAUL BRUCE by Graham Langer

Graham Langer



**Paul Bruce at Darlington Locomotive Works in front of No. 2007 Prince of Wales.**

A career railwayman of some 39 years Paul comes from a family of rail workers dating back to 1841. In the 1850s his paternal great, great, great grandfather had a gang of men maintaining the railway between Preston le Skerne and Hartlepool. More recently (the 1920s) his maternal grandfather moved from Gateshead depot to Darlington where he was a blacksmith in the North Road works. Moving south in 1948, after six years in the Royal Electrical and Mechanical Engineers (REME), he became Chief Blacksmith at Stratford Works and created the opportunity for Paul's future parents to meet.

The Bruce family headed north in 1968 when British Railways Eastern Region HQ was set up in York and Paul continued his inevitable enthusiasm for all things rail and for steam in particular. After A levels in 1979 he deferred the lure of university 'til later in life and joined British Railways Operations Department in York. Initially in Signalling & Accidents he moved into the maintenance control looking after locomotive maintenance scheduling before taking an area operating role at Bounds Green depot in 1982. Here he met fellow A1 Trust volunteer, Richard Peck, and in 1984 joined Richard at Thornaby depot. This was the period when DMU operations were transferred to Teesside after the closure of Darlington depot.

After marrying Sue in 1985, Darlington was once again playing a greater part in the Bruce life and they have made it their home ever since. In 1988 Paul took a role as Operating Manager at Heaton Depot, restructuring the cleaning and operations team to reflect the increasing move of the workload to nights. He set up a dedicated team to look after the presentation of the then 'Tees-Tyne Pullman'. Looking after two coaches, the team went on to win various awards. A similar venture yielded rewards, and awards, when he managed the postal fleet based there for Rail Express Systems.

After secondment to the Engineering HQ in Derby during the early 1990s he became Fleet Commercial Manager for Regional Railway North East in Leeds. That caused paths to cross again with Richard during negotiations with First North Western for depot servicing. Responsible for managing stores and stock holdings as well as heavy maintenance and train refurbishments it was the period leading into privatisation. This sea change for the railways also saw him

at the heart of the regulatory arrangements which underpin privatisation. With a move to York he eventually became Head of Procurement and Head of Property in RRNE's successor organisations of Northern Spirit, Arriva Trains North East and Northern Rail. During this time in York Paul changed the face of advertising for ever when he ended up as one of the faces in Arriva's adverts for Transpennine Express. In 2002 on trains, stations and in newspapers people everywhere were shouting "Nooooo!". Too late!

Having long hankered to 'go it alone', 2006 saw Paul finally taking the leap into being self-employed and with a specialism in procurement, rail franchising and the Access Regulations he has been kept busy ever since. His commissions have involved mobilising a number of new franchises including East Midlands Trains, Southern Rail, Anglia and more recently Caledonian Sleeper. He has also occupied various interim roles such as Head of Rail Procurement for Stagecoach, Lead Procurement Manager for Tube Lines as well as Lead Procurement and Head of Regulatory for HSI supporting the sale of the High Speed rail network in 2010.

More recently he could be found around the Highlands of Scotland with Caledonian Sleeper delivering new facilities such as Guest Lounges, introducing wi-fi to Corroor (the UK's highest and most remote main line station) as well as supporting the introduction of the new Mk5 overnight sleeper trains. It was this period in Scotland where he was working with Graeme Bunker-James, Trustee of The A1 Steam Locomotive Trust. After a number of discussions over Merlot, the link to the Trust grew and he took on the role of project manager for the Trust's new Whessoe Road steam depot which will provide a new home for *Tornado*, *Prince of Wales*, the new train Gresley class V4, joining the board of Trustees in 2017. His key area of focus with the Trust is property management but he is also the Trust's representative on Darlington Council's Rail Heritage Steering Group Board. This is driving development of the North Road Railway Heritage Quarter and its part in the 2025 celebrations.

Since teenage years he has had a long-standing love of Morgan cars. Having had a range of models and colours his first was recently set free after being part of the family for 35 years. Paul is supported by Sue, two grown up children and an erratic young dog who brings a sense of unease but great joy - the dog more than Sue. **TCC**



**Paul Bruce (on the right) with Councillor Nick Wallis and Graeme Bunker-James with the 'Tornado Way' road sign.**

Stuart Bolton

## FROM THE ARCHIVES by Graham Langer



Neil Whicker

**The moment so many had waited for, *Tornado* makes her first moves in steam on the 3<sup>rd</sup> August 2008.**

**Summer 1998** – The four 3ft 2in wheels, the rear 3ft 8in pony truck and six 6ft 8in driving wheels were cast by William Cook plc on very advantageous terms to the Trust. Cooks also cast a dummy wheel centre which would be used to test the interference fit with a dummy stub axle to find the correct pressing force required to locate the wheels on the axles. All twelve locomotive tyres were delivered to Ian Riley & Co. at the East Lancashire Railway in Bury ready for fitting to the wheels.

**Summer 2003** – The remaining valve gear forgings had been delivered for machining and Ufone completed the inside connecting rod and strap. The forging of valve gear components was now complete and they were due to be heat-treated. Meanwhile, Ufone started machining the inside connecting-rod and strap, now that we have been able to calculate the precise length to correct for the growth in the middle cylinder and the final position of the crank axle. A decision had also been taken to issue a Bearer Bonds to finance the construction of the boiler.

**Summer 2008** – There can only be one story worth repeating from 2008 in this archive section – *Tornado*'s first moves in steam at Darlington Locomotive Works! On the first weekend in August 2008, *Tornado* moved in steam for the first time, the culmination of 18 years hard work lived and breathed in front of the assembled press, dignitaries and Covenantors. Waved away by the Mayor of Darlington and with Dorothy Mather on the footplate, *Tornado* eased up and down the short length of track laid for the event.



John Rawlinson

**Ian Riley Engineering, Bury 1998.**

**Summer 2013** – In her striking blue livery, *Tornado* continued to put down solid performances, not least on 'The Elizabethan' to Edinburgh on 11<sup>th</sup> June. Whilst in Scotland No. 60163 ran a series of Fife Circulars for the SRPS before resuming her duties on a number of 'Cathedrals Expresses'. 'The Elizabethan' was also notable for the debut of *Tornado*'s own, newly refurbished support coach, the removal of which from DLW allowed the works to be cleared for some much-needed maintenance. In other news, the Trust announced early redemption of the £500,000 Bearer Bond issue. **TCC**



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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\* All information correct at the time of going to press early - November 2018. For up-to-date information and dates please check the website [www.a1steam.com](http://www.a1steam.com).

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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 *Tornado's* main line passenger trains follows the rules of the railway and only goes where permitted.  
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