THE MIKADO MESSENGER

2007 PRINCE OF WALES

Building Britain's Most Powerful Steam Locomotive

One of the two new boilers in the X-ray room at DB Meiningen for anaylsis of its welded seams - *DBM/A1SLT*

Welcome to edition No. 77 of The Mikado Messenger, our monthly eNewsletter which aims to provide a regular progress update on the construction of new Gresley class No. 2007 *Prince of Wales*.

As you will read elsewhere in this issue of The Mikado Messenger, significant progress is being made on all current areas of activity including both of our new boilers (where assembly of the first boiler is well underway), the heavy motion and the cylinder block as well as the electrical system and the pipe work fitting.

We are pleased to announce that our online donations system is now live on the P2 website for signing up as a P2 Covenantor, joining any of the P2 clubs and contributing to The P2 Support Coach Appeal.

Due to the ongoing COVID-19 situation, our staff are still working from home or at Darlington Locomotive Works (DLW) where they are taking all the necessary precautions. The Works remain closed to volunteers, non-essential staff and visitors. We hope you understand that these circumstances are beyond our control and the restrictions are very necessary at this challenging time. We are reviewing all our activities on a frequent basis to protect everyone involved with the Trust and to secure our long-term future. Please keep an eye on our website and Facebook pages for updates, call 01325 460163 or email enquiries@p2steam.com if you have any questions.

FUNDRAISING UPDATE

A P2 for the price of a pint of beer a week: over 940 supporters have signed up as Covenantors for No. 2007 *Prince of Wales,* from as little at £2.50 per week, and are now kindly donating over £205,000 annually including Gift Aid. If you haven't yet signed up as a Covenantor we would encourage you to get on-board. You can find more information here. **We still hope to reach 1,000 regular supporters by the end of July 2021 as this is the 60th anniversary of the scrapping of the last of the former P2s - now is the time to come on-board or recruit a friend!**

The Boiler Club has reached 221 members, leaving just 79 spaces available - almost three-quarters of the initial target. As substantial progress is now being made on our boilers, we would urge those who haven't yet contributed towards the purchase of No. 2007 *Prince of Wales'* boiler to join us. This is the single most expensive component on the locomotive and the boiler for No. 2007 is due to be delivered to Darlington Locomotive Works (DLW) in 2021. More information about The Boiler Club can be found here.

The Tender Club is still filling up too slowly, with only 95 places taken - just over one third of the initial target. In order to keep on schedule to complete No. 2007 within three years, we need to complete the manufacture of the tender frame. Our target for The Tender Club is 250 members, each donating £1,500, so if you would like to contribute towards the tender more information can be found here. **Why not show a little Tender-ness: help us to reach 150 members by August.**

We launched **The Turbogen Club** in July 2020 and the fundraising campaign has already 'generated' 38 members - just two short of the initial target. Our target for The Turbogen Club is 40 members, contributing £1,000, so if you would like to contribute towards the turbo-generator more information can be found here. **Help us to get this club over the line by the end of March.**

Our newest fundraising campaign, **The P2 Support Coach Appeal**, was launched to acquire, overhaul and convert BR Mark 1 BSK E34547 into the support coach for No. 2007. Our target is to raise £100,000 from 100 supporters each donating £1,000. We have already recruited 48 supporters - if you would like to contribute towards this appeal more information can be found here. **Help us hit the half-way mark!**

The Motion Club has now reached our initial 175 members target.You can find more information about The Motion Club here - **help us to complete the manufacture of No. 2007's motion!**

The Pony (Truck) Club, has attracted substantial interest and has galloped past its initial target of 20 members and has already recruited 32 members. You can find more information about The Pony (Truck) Club here - **help us to fund the manufacture and certification of No. 2007's pony truck.**

You can sponsor components of No. 2007 *Prince of Wales* from as little as £30, ranging up to £15,000! The **Dedicated Donations** scheme has already raised over £400,000. If you would like to sponsor a component, please email dedicated.donations@p2steam.com, detailing the amount you would like to donate and/or if you had a specific part of the engine in mind, we will then send you some component recommendations to suit your donation.

To-date, over £3.4m has been spent and more than £3.8m raised of the estimated £5m required to complete No. 2007 *Prince of Wales* within the next three years.

If there are any surplus funds left when our fundraising clubs have fulfilled their nominated purpose, we

will use the money to buy other components for the Gresley class P2 that the charity would not otherwise have.

ENGINE FRAMES UPDATE

Rear shelf being welded in situ by a coded welder and the finished item after cleaning and priming - *A1SLT*

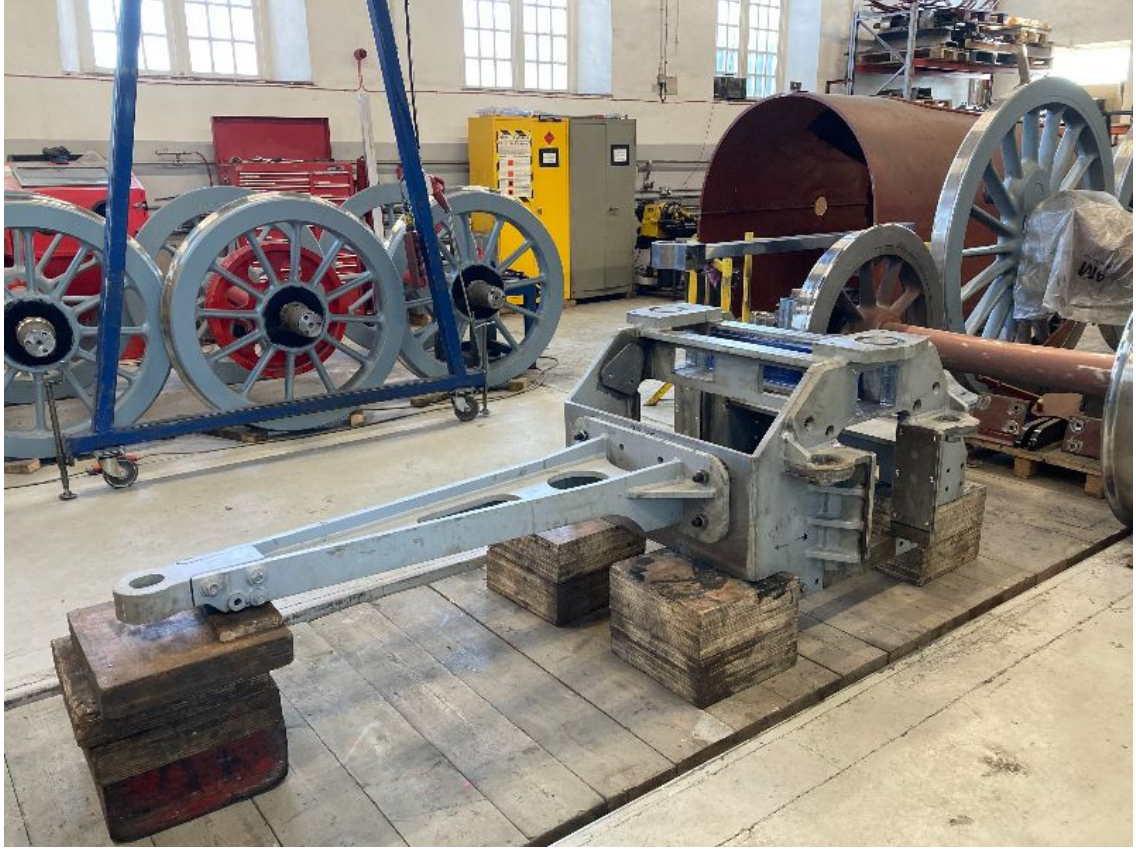
Summary: engine's frames erected; all major frame stays, brackets, horn blocks, axle boxes & buffers cast and fitted using around 1,000 driven bolts.

Progress update: the entire smokebox (cladding, smoke box barrel & door) has been dismantled and moved away to allow access to the front part of the space between the frame plates - the whole set of various copper pipes which form the air reservoir and train brake runs are being trial fitted; the rear shelf has been fully welded by a coded welder, descaled, all surfaces primed and had a final fit in the frame using driven bolts - the shelf is now structurally complete and awaits various electrical junction boxes to be mounted.

Next steps: mounting various structured trunking and junction boxes and a bracket for the exhaust steam injector on the rear shelf.

Fundraising: The Founders Club was established in September 2013 to give the project a racing start and get it to the point of erecting the engine's frames with a target of raising £100,000 plus Gift Aid from 100 supporters each donating £1,000. The Founders Club closed in July 2014 having attracted 360 members and raised around £450,000.

PONY TRUCK UPDATE



The pony truck frame at DLW - *A1SLT*

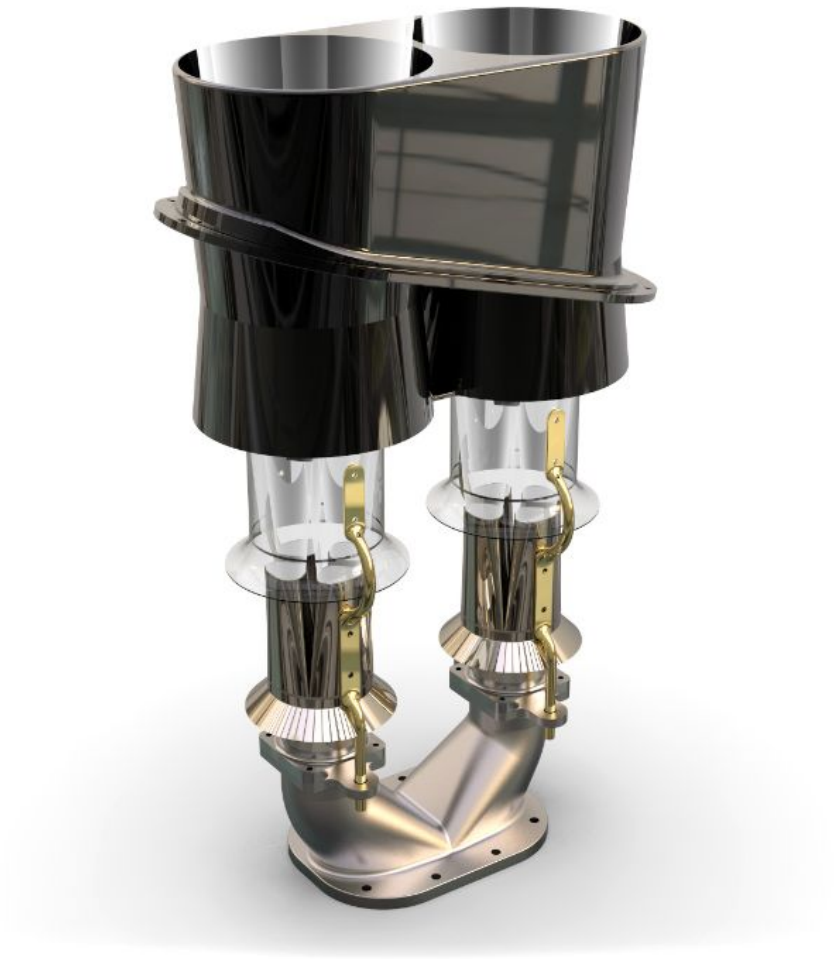
Summary: redesign of the pony truck, using side control springs, has been completed; order for pony truck frame fabrication placed with North View Engineering Solutions (NVES) in Darlington; pony truck wheelset and cannonbox delivered.

Progress update: NVES have delivered the pony truck frame, steering arm and cross head to DLW - all are now undergoing a thorough dimensional check; the cross head has required some fitting into the frame to ensure a perfect fit as designed; the spring cross beams have been sent to North Bay Engineering Limited for machining; drawings for the pony truck side control components have been final checked and profiles ordered for fabrication at DLW; quotes have been received for the spherical pony truck side bearers and cups which transfer the vertical load from the engine frames into the pony truck.

Next steps: continuing FEA study for approval of the new design; completion of machining of principal components; manufacture of spring gear details such as spring cross beams; final assembly of the cannonbox onto the wheelset; machining of the spring planks, bearer cup and spherical side bearers; final fitting of received pony truck components and trial fit of cannonbox onto the wheelset; order bearer cup and spherical side bearers.

Fundraising: in April 2020, we launched a £20,000 appeal – The Pony (Truck) Club – to fund the construction of the leading pony truck for No. 2007 *Prince of Wales*. We set a minimum target of 20 generous supporters willing to donate £1,000 plus Gift Aid (in up to four payments of £250) but this mini-club has galloped away and already passed its initial target. We therefore decided to extend the club by a few members to cover the considerable certification costs associated with the modified pony truck design and we signed up 32 members. **Please consider joining The Pony (Truck) Club - for further information click** here**.**

CYLINDERS UPDATE



Artistically rendered 3D view of the Kylchap exhaust and chimney assembly - *Simon Apsley/Frewer Engineering/A1SLT*

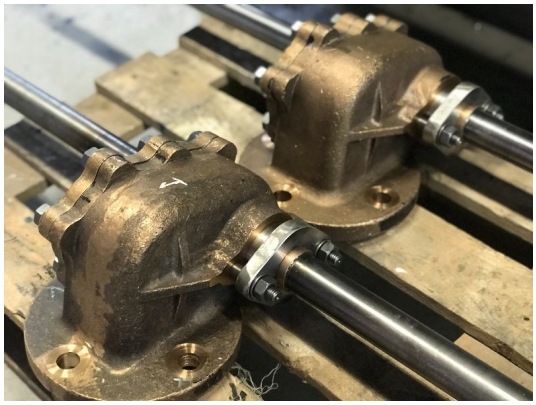
Summary: design studies into cylinder block manufacture and selection of valve gear complete; 3D CAD design of the cylinder block and valve gear substantially complete; further progress has been made in applying the weld details to the cylinder block inside exhaust passages with particular attention being paid to the order of fabrication to ensure that all welds can be completed properly.

Progress update: responses to request for quotation (RFQ) received from a number of shortlisted companies to fabricate and machine the cylinder block are under review; Alan Parkin has produced the few remaining detailed drawings and tweaked a couple of areas where the Computation Fluid Dynamics (CFD) study by Frewer Engineering indicated improvements could be made; Frewer Engineering has also produced an artistically rendered 3D view of the Kylchap exhaust and chimney assembly as part of the smoke lifting study (Coanda Effect CFD); Alan is producing comprehensive assembly drawings which will be required when construction starts.

Next steps: meetings with responders to the RFQ for selection of preferred supplier and negotiation of contract; RFQs for cylinder details - valve cover castings, cylinder liners, etc.

Fundraising: The Cylinder Club was founded in October 2017 to fund the redesign and manufacture of the cylinder block with an initial target of raising £100,000 plus Gift Aid from 100 supporters each donating £1,000. The Cylinder Club reached its inital target in March 2018.

BOILER UPDATE



Stuffing boxes, at DLW, before final hydraulic test - *A1SLT*

Summary: boiler design study completed, revised design approved by TüV Sud notified body and sent to UK authorities for information and comment - no adverse responses have been received; forged foundation ring corners manufactured & machined and regulator castings delivered to DLW - all subsequently despatched to DB Meiningen (DBM); superheater header cast and machined; boiler cladding manufactured, trial fitted to frames and now in storage; boilers order placed with DBM for delivery in 2021; minor re-design of the banjo dome to suit the P2 cladding completed by DBM; major progress on manufacture of the boiler and its components including the assembly of the barrel sections and marrying up to the inner firebox for the first boiler.

Progress update: construction progress at DBM means the delivery of the P2 boiler is on target for the end of 2021 - all of the basic components have been manufactured so uniting of the main sub-assemblies is underway and the first boiler is beginning to look like a boiler; the regulator cross shaft has been welded onto the crank (which operates a link between a cross shaft and a regulator) and subjected to Non-Destructive Testing (NDT); machining on all parts of stuffing boxes has been completed; the stuffing boxes have been fully assembled with gaskets in place and all fasteners tightened to a specified torque, all clearances have been measured and found to be within a specification to assure smooth operation when in use; all castings were hydraulically tested prior to machining but a final hydraulic test needs to be carried out before a dispatch to DB Meiningen.

Next steps: full assembly of barrels and fireboxes; hydraulically test fully machined stuffing boxes and send to DB Meiningen along with gaskets and other boiler blanking plates to facilitate hydraulic testing of the new boilers.

Fundraising: The Boiler Club was founded in October 2017 to fund the design modification and manufacture of the boiler with a target of raising £600,000, plus Gift Aid, from 300 supporters each donating £2,000 in up to 16 payments of £50. As of today, The Boiler Club has attracted 221 members who have generously donated over £440,000, excluding Gift Aid. For further information click here - **we must reach our 300 members target in 2021.**

WHEELSETS UPDATE

The wheelsets have been removed from the engine to allow access for fitting the extensive pipework systems - *CAG Photography/A1SLT*

Summary: study into ride and suspension completed using Vampire® software; crank axle re-designed to comply with modern standards, approved and manufactured; all engine wheelsets complete and trial-fitted to engine; cannon boxes ready for final fitment to intermediate and trailing coupled wheelsets.

Progress update: Ian Matthews has completed the additional machining of the lower coupled cannonbox halves to enable the spring links to be fitted - the castings being slightly oversize in this area have required additional machining; Ian has also altered the shape of spring links around their lower circumference so they are free to rotate when inserted into axle and cannon boxes - this is due to the nature of the corresponding castings; pony truck axlebox bearing spacers have been surface ground to the required thickness and are ready to be inserted into an axlebox assembly - once this task is complete, the axlebox will be re-measured for sideplay which is required for the bearings to maintain their service life.

Next steps: assembly of the intermediate and trailing cannonboxes onto their wheelsets.

Fundraising: The Mikado Club was founded in March 2016 to wheel the engine with an initial target of raising £200,000, plus Gift Aid, from 160 supporters each donating £1,000. This was extended in May 2017 (to also wheel the tender) to 200 supporters raising £250,000 plus Gift Aid. The Mikado Club closed in May 2018 having achieved its target.

MOTION UPDATE

Progress at Stephenson (Engineering) Ltd: outside connecting rod forging underway; forged outside connecting rod; forged inner connecting rod strap; polished leading coupling rods at DLW - *Robert Stephenson/A1SLT*

Summary: all heavy motion ordered from Stephenson (Engineering) Ltd of Atherton; intermediate and leading coupling rods delivered to DLW in 2020 have been fettled and polished to a mirror finish; work continuing underway on other heavy motion; updated poppet valve gear design almost complete with first components in manufacture.

Progress update: inside connecting rod and strap and outside connecting rods have been forged; outside connecting rods have been heat treated prior to machining; all bronze white metal lined bushes have been pressed in intermediate coupling rods - this video show the process of pressing in one of the motion rod bushes; material has been acquired for the gradient pins which connect the coupling rods together; taper plug gauges made to match the tapers in the gradient pin holes in the trailing coupling rod.

Next steps: continued machining and heat treatment of remaining rods; drawing of leading rod bushes including knuckle pin which serves to connect leading and intermediate coupling rods; ordering bronze rod bushes for leading coupling rods; altering design of the oil lids and commencing their machining;

ordering material for small plain bushes for intermediate coupling rods.

Fundraising: The Motion Club was founded in May 2018 to fund forging and machining of the heavy motion, with a target of raising over £210,000 including Gift Aid, from 175 supporters each donating £1,000 in up to eight payments of £125. As of today, The Motion Club has passed its initial target of 175 members, who have generously donated over £200,000. **For further information on how to become a member click** here**.**

TENDER UPDATE

The tender tank in green undercoat at DLW; the brake cylinders in the frame and the tender frame at ID Howitt - *Nigel Facer/A1SLT*

Summary: axlebox and other tender castings produced by William Cook Cast Products; frames being assembled by I D Howitt; tank construction complete, painted in green undercoat by Ian Matthews and now stored outside under a tarpaulin to create more space inside DLW; tender wheelsets at DLW, having been have been assembled South Devon Railway Engineering and painted by Ian Matthews.

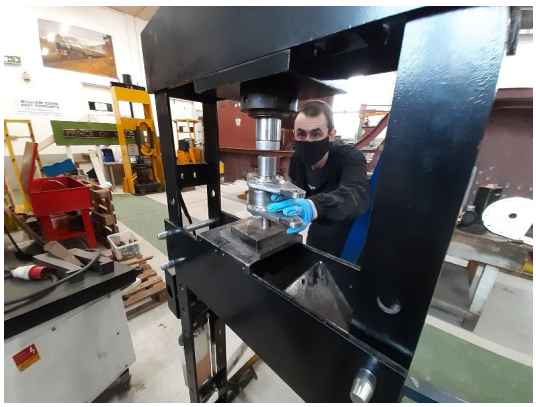
Progress update: all the tender hornblocks have been fitted to the tender frame and work is now concentrated on the tender brake gear; materials and sub-assemblies procured and machined for the brake gear with fitting to frame underway; quotes sought for machining axleboxes; brake cylinders

delivered to ID Howitt Ltd for fitting to frame.

Next steps: completion of the brake gear and machining of the axleboxes; continued 3D CAD work on electrical and pipework layout.

Fundraising: The Tender Club was launched in April 2019 to fund the construction of the tender, with a target of raising £450,000, including Gift Aid, from 250 supporters each donating £1,500 in up to fifteen payments of £100. As of today, The Tender Club has so far attracted 95 members who have generously donated just over £140,000 - we still have a long way to go to fund the tender's construction. For further information on how to become a member click here. **Why not show a little Tender-ness: help us to reach 150 members by August.**

ELECTRICALS UPDATE



Alan Parkin pressing a bearing onto axle driven alternator (ADA) shaft - *A1SLT*

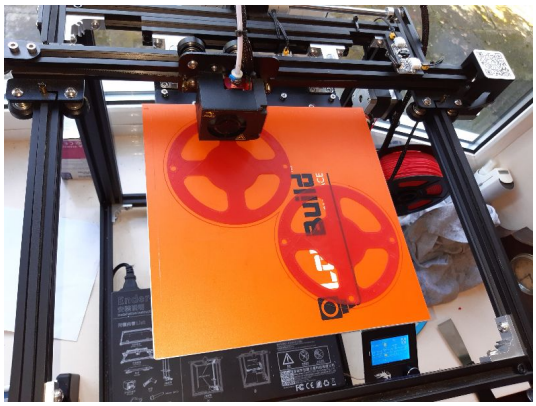
Summary: design of the main circuits for the electrical system now complete; initial draft of clause-by-clause assessment of conformance with applicable standards complete and under internal review.

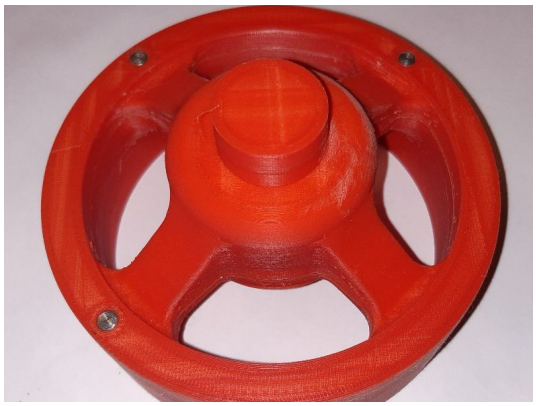
Progress update: updated drafts of the clause-by-clause assessment of relevant standards and the electrical Hazard Log are under review by Graham Nicholas; work continues on the turbogen startup circuit and its interface with the automatic switching circuitry within the Turbogen Switch Box; Alan Parkin is assembling the new ADA - the first trial build has been completed and it has been turned on the bench by hand; design for a test rig to spin the ADA it has commenced and some components have been ordered and delivered.

Next steps: once the Standards and Hazard Log documents have been reviewed any required changes will be incorporated into the documents - the Electrical System Specification will then be brought into line with these; design of ADA test rig to be completed and materials ordered to manufacture so that the ADA can be fully tested.

Fundraising: We launched The Turbogen Club in July 2020 and the fundraising campaign has already 'generated' 38 members - just two short of the initial target. Our target for The Turbogen Club is 40 members, contributing £1,000, so if you would like to contribute towards the turbo-generator more information can be found here. **Help us to get this club over the line by the end of March.**

MISCELLANEOUS FITTINGS





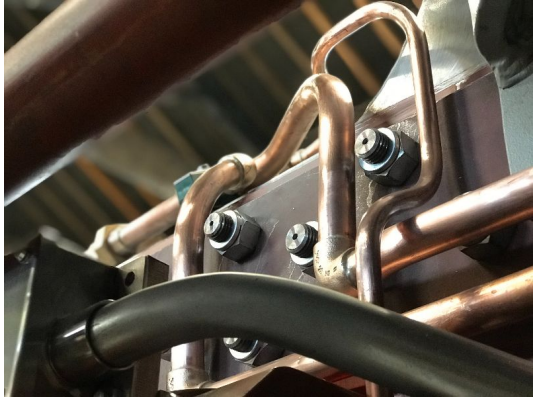
Brake hanger cotters and washers; brake hangers trial fit; 3D printed patterns for the bronze parts of the anti-vacuum valves - *A1SLT*

Running Gear

Summary: brake gear fully designed and mostly manufactured, drain cock linkage (based on A1 design) drawn, components made and trial installation commencing; started assembly and trial fit of the brake system.

Progress update: using a Davies and Metcalfe class K exhaust steam injector borrowed from No. 70000 *Britannia*, all exhaust steam injector components are being drawn as 3D CAD models as a precursor to producing detailed manufacturing drawings; Edward Laxton machined all 18 bushes need for CNC machined brake hangers and these had been pressed in; brake hangers have been trial fitted on the frame and all dimensions taken carefully noted; David Elliott has been 3D printing patterns for the bronze parts of the anti-vacuum valves which can be seen on both upper sides of the smoke box at the rear end.

Next steps: measurement of the lateral clearance between the brake cross shaft bushes and shafts to determine the actual side play and adjust the bronze bushes then machining and press fitting them into Y-shaped brake hangers; calculate material removal for side clearance on brake cross stays and have them turned down to a specified width; refurbish newly acquired air brake cylinders; completion of 3D CAD model of class K injector - checking that the pattern agrees with the injector body.

Complex pipe runs between frame plates - *A1SLT*

Pipework

Summary: the design is well advanced and installation under way.

Progress update: Alan Parkin has continued modelling the pipework through the engine frame plates; production of 2D manufacturing drawings of the copper pipework continues at a fast pace; imperial & metric copper pipes and GHD pipe fittings have been delivered; sander pipes manufactured and fittings silver soldered; all sander pipework fitted, including machined coupling nuts to connect them to sand traps; pipe bracket backing plates welded onto frames and pipe clips final fitted; 3D CAD design by Alan Parkin in conjunction with Ian Matthews has resulted in an excellent fit of all pipe runs as can be seen from the photos above.

Next steps: RFQ for various machined pipe fittings made of bronze; manufacture special extended coupling for air inlet pipes to air brake governors; continuation of 2D design of pipework details; quotations are now being sought for the materials to make the numerous LNER style pipe fittings; complete the drawings for exhaust injector main body casting and all its internal components.

Fundraising

The Dedicated Donations scheme was founded to fund numerous components including the non-ferrous fittings and has raised over £400,000 to-date with new parts being frequently made available for sponsorship. For further information, click here.

P2 SUPPORT COACH UPDATE

BR Mark 1 BSK E35457 at Great Central Railway; Commonwealth Bogies at DLW - *A1SLT*

The A1SLT acquired BR Mark 1 BSK E35457 for eventual use as the support coach for No. 2007 *Prince of Wales*. Brake Corridor Second (BSK) E35457 was built at Wolverton in 1963, is fitted with Commonwealth bogies and was most recently used as the support coach for BR standard class 4 No. 76084. In surprisingly excellent condition, E35457 will require minimal work other than the reinstatement of its dual-brakes and the addition of a similar electrical system to that fitted to E21249, No. 60163 *Tornado's* support coach.

E35457 is currently stored at the Great Central Railway, where it may see occasional use as a passenger vehicle until we are ready to make some essential alterations to prepare it for use as a support coach behind no. 2007 *Prince of Wales*. In the meantime, work continues to overhaul a pair of Commonwealth Bogies for use with both support coaches.

Fundraising: The P2 Support Coach Appeal was founded in August 2020 to fund the acquisition and overhaul of a support coach for No. 2007 *Prince of Wales* with a target of raising £100,000 from 100 supporters, each donating £1,000 in up to eight payments of £125. As of today, The P2 Support Coach Appeal has attracted 48 members - almost half of the initial target. For further information on how to become a member click here. **Help us hit the half-way mark!**

Progress on No. 2007 *Prince of Wales - A1SLT*

TRAVEL WITH *TORNADO*

No. 60163 *Tornado* at Wensleydale Railway, March 2020 - *A1SLT*

It has been a difficult year, with only very limited operation of *Tornado* due to the pandemic. The patience of all our passengers and supporters is much appreciated. We are now in a more positive situation with the locomotive recertified for the next 12 months of operation and a full programme ahead. We are working hard to redate those trains affected by lockdown, and we have already got several confirmed. There is nothing better than main line steam, especially with *Tornado* at the head of the train, so please have a look at the diary below and we look forward to welcoming you on-board.

Tornado Railtours 2021 Diary

- Saturday 22nd May - 'The Pennine Explorer' - Leicester to Carlisle and return
- Saturday 26th June - 'The Fens and Fells Flyer' - Cambridge to Carlisle and return
- Saturday 3rd July - 'The Cumbrian Explorer' - Darlington to Carlisle and return
- Tuesday 20th July - 'The Viking Venturer' - Linlithgow & Edinburgh to York and return
- Thursday 22nd July - 'The Aberdonian' - Edinburgh to Aberdeen and return
- Saturday 31st July - 'The Aberdonian' - Edinburgh to Aberdeen and return
- Thursday 12th August - 'The Aberdonian' - Edinburgh to Aberdeen and return
- Saturday 21st August - 'The Clyde Aberdonian' - Glasgow to Aberdeen and return
- Thursday 2nd September 'The Aberdonian' - Edinburgh to Aberdeen and return
- Saturday 11th September - 'The Aberdonian' - Edinburgh to Aberdeen and return
- Saturday 18th September - 'The Caledonian' - Birmingham to Edinburgh and return
- Thursday 30th September - 'The Ribblehead Rambler' - Hull to Carlisle and return
- Wednesday 20th October - *Tornado* and *Flying Scotsman* - West Midlands to Carlisle and return
- Thursday 21st October - *Flying Scotsman* and *Tornado* - Peterborough to Carlisle and return
- Wednesday 27th October - *Tornado* and *Flying Scotsman* - Middlesbrough to Carlisle and return
- Thursday 28th October - *Flying Scotsman* and *Tornado* - Birmingham to Carlisle and return

Please note that we are currently working on rescheduling the following tours:

- Saturday 13th February - The Valentine's Luncheon Circular
- Saturday 13th February - The Valentine's Evening Circular
- Saturday 15th May - The Jorvik Express - Liverpool to York and return

We will then be in touch with all passengers to confirm new dates before making the announcement on our social media and our website.

Tornado Railtours trains can be booked through the links above, our website or by calling 01325 488215.

DOWNLOAD THE 2021 RAILTOURS BROCHURE

LOCOMOTIVE ART INSTALLATION UNVEILED IN DARLINGTON

David Elliott and No. 2007 *Prince of Wales* - *Paul Bruce/A1SLT*

A new art installation has been unveiled in Darlington to celebrate the town's rich railway heritage. This piece of public art takes pride of place on the re-designed roundabout on Haughton Road, a key route into the town centre.

Created by regional artist Andrew McKeown, the artwork features four signs depicting significant locomotives from Darlington's past and present. The designs are influenced by an example of railway signage held in Darlington's Head of Steam railway museum and feature locomotives with

particular significance to the town – *Locomotion No.1, Derwent, Tornado* and *Prince of Wales*. Manufactured in metal and painted in traditional style, the signs include the names of the locomotives and the dates they came – or are set to come – into service. Special lighting has also been installed to enhance the artwork. The project has seen the council's heritage and highways teams work alongside The A1 Steam Locomotive Trust and the Friends of the Stockton & Darlington Railway from the initial concept and design to the finished product. More information and photographs are available on the Trust's website here.

THE A1 STEAM LOCOMOTIVE TRUST - THE VERY BEST OF BRITISH ENGINEERING

David Champion and Steve Davies MBE - *A1SLT*

David Champion, President of The A1 Steam Locomotive Trust (A1SLT), and Steve Davies MBE, Chairman, A1SLT, would like to invite you to their talk which is being hosted by The Leaders Club. This Zoom event is on Wednesday 31st March 2021 from 18:00hrs to 19:00hrs. Their talk will reveal all and tell how a bunch of very determined individuals decided to build a new main line steam locomotive from scratch - a triumph of achievement over adversity and a study in engineering prowess. The Leaders Club are pleased to give supporters of The A1 Steam Locomotive Trust access to the event by clicking this link.

The A1 Steam Locomotive Trust built and operate brand-new main line express steam locomotive *Tornado*, which recently achieved 101 mph on the East Coast main line north of York. Based in historic railway buildings in Darlington, this audacious project succeeded on the back of an inspiring vision, a dedicated and energetic team to deliver it, and a sophisticated fundraising and marketing campaign. Enjoying Royal patronage from TRH The Prince of Wales and The Duchess of Cornwall, the Trust is now in the process of building a further steam locomotive – *Prince of Wales* – which on completion in 2023 will be the most powerful in the UK. David Champion, the driving force behind the project in its earliest years, and Steve Davies MBE and will jointly tell a compelling, entertaining and inspiring story of British fortitude, determination and engineering at its very best.

This event is free to members of The Leaders Club and £30 for non-members. 50% of the proceeds will be given to The A1 Steam Locomotive Trust.

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Our mailing address is:
The A1 Steam Locomotive Trust, Darlington Locomotive Works, Hopetown Lane, Darlington. DL3 6RQ