

# THE MIKADO MESSENGER



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



The cladding has been removed to allow access for the trial fitting of pipework - A1SLT

Welcome to edition No. 79 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 nearing completion), the heavy motion and the cylinder block as well as the electrical system and the pipe work fitting.

We are pleased to confirm that our online donations system is 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 continues to remain closed to volunteers, non-essential staff, and visitors. We hope you understand that these circumstances are beyond our control and these restrictions are still currently required. Our Open Days will restart on the first and third Saturdays of the month starting from Saturday 5th June - to book your place please click [here](#). Please note that spaces are on a first come, first served basis and that booking

for the 3rd and 17th July will open in mid-June.

We are reviewing all our activities on a frequent basis in order 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](mailto:enquiries@p2steam.com) if you have any questions.

## FUNDRAISING UPDATE

**A P2 for the price of a pint of beer a week:** over 980 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 £207,000 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 60<sup>th</sup> 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 227 members, leaving just 73 spaces available - just over 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 starting to fill up, with 104 places taken - just over 40% 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 this year. 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 and help us to reach 125 members by August.**

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 initial target is to raise £100,000 from 100 supporters each donating £1,000. Having recruited 51 supporters we have passed the half-way mark. If you would like to contribute towards this appeal more information can be found [here](#). **Help us fill this club!**

**The Motion Club** has now reached our initial 175 members target. We may have passed the initial target of The Motion Club but there is still an opportunity to come on-board if you haven't already whilst the motion is being manufactured as there have been a couple of dropouts. You can find more information about The Motion Club [here](#) - **help us to complete the manufacture of No. 2007's motion!**

We launched **The Turbogenerator Club** in July 2020 with an initial target of 40 members each generously contributing £1,000. We are delighted to announce that this fundraising campaign has 'generated' 40 members - reaching our initial target. If you would still like to contribute towards the turbo-generator more information can be found [here](#).

**The Pony (Truck) Club** has attracted substantial interest, has galloped past its initial target of 20 members and has already recruited 32 supporters. 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](mailto: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 around £3.9m 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 FRAME UPDATE



Front screw coupling - 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 removed to allow access to the space between the frame plates whilst the whole set of various copper pipes which form the air reservoir and train brake runs is being trial fitted; the rear shelf has been fitted and the various electrical conduit boxes have been mounted; one of our volunteers took the front screw coupling home during lockdown and brought it back to the condition shown in the photograph above - this nicely complements the previously polished draw hook.

**Next steps:** prepare a bracket to position the exhaust steam injector on the rear shelf; continue with various pipe runs, including fully connecting air pumps and all bespoke pipe coupling fittings.

**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 frame 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



Clockwise from top left - At DLW, the pony truck frame assembly with clamped test bar and spherical bearer cups trial fitted; a pony truck spitoon bronze bearer; machining a spring control cross beam; a spring cup ready to be welded - A1SLT

**Summary:** redesign of the pony truck using side control springs has been completed; the pony truck frame, crosshead and wheelset with cannonbox are at DLW.

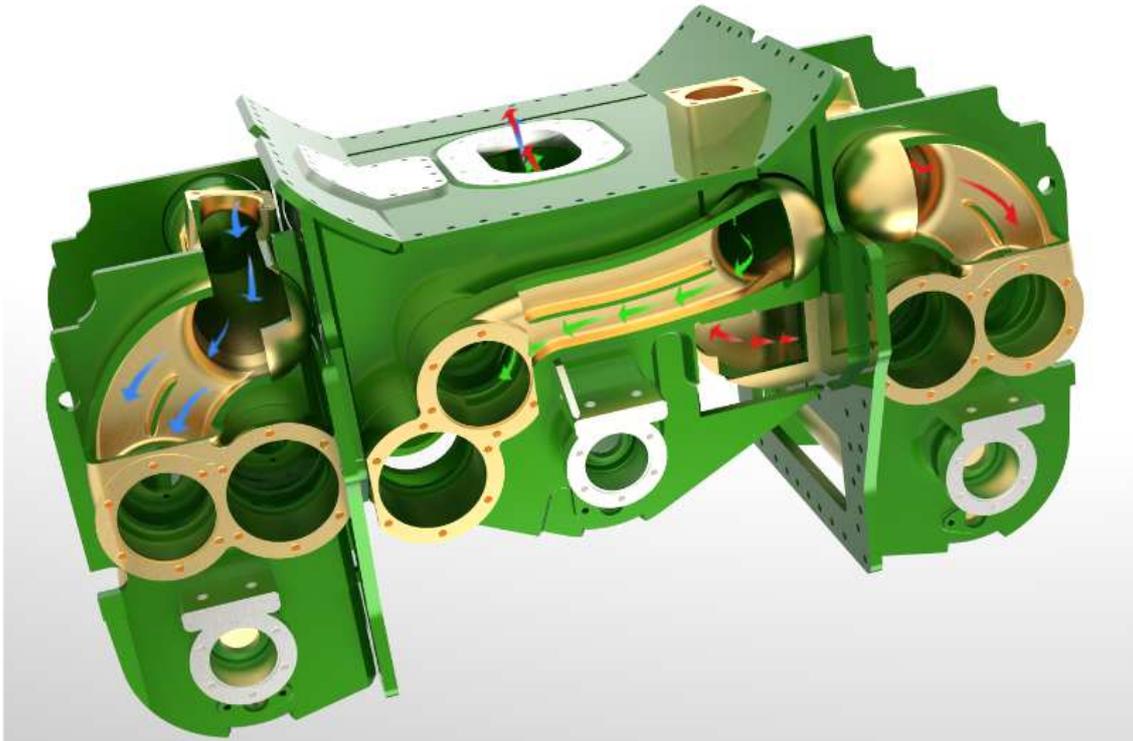
**Progress update:** the dimensional check of the pony truck frame, steering arm and crosshead is complete; the crosshead has required some fitting into the frame to ensure as perfect fit as designed; the spring cross beams have been CNC machined to a high degree of accuracy and surface finish, and have been primed; Ian Matthews has machined various profiles for the side control fabricated components and prepared them for welding; the spherical side bearers and cups have also been CNC machined and the finish is just extraordinary which has resulted in a perfect fit.

**Next steps:** continuing FEA study for approval of the new design; completing machining of principal components; manufacture of spring gear details such as spring cross beams; sending various side control components for welding - this will be followed by final machining; trial fit of cannonbox onto the

wheelset; ordering bronze strips for pony truck cross head bearing surfaces.

**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 have signed up 32 members to-date. Please consider joining The Pony (Truck) Club - for further information click [here](#).

## CYLINDERS UPDATE



3D image of the cylinder block - *Frewer & Co Engineers Ltd/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; the prospective supplier has been selected and detailed technical and contract negotiations have started.

**Progress update:** Alan Parkin has produced the few remaining detailed drawings and tweaked a couple of areas where the Computation Fluid Dynamics (CFD) study by Frewer & Co Engineers Ltd (Frewer) indicated improvements could be made; Frewer 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; minor modifications arising from the work completed by Frewer have been incorporated into the cylinder block model and the manufacturing drawings updated to reflect these.

**Next steps:** meetings with preferred supplier to finalise technical and contract details.

**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 initial target in March 2018 and will be re-opened once manufacturing costs have been finalised.

## BOILER UPDATE



One of the two new boilers in the X-ray room at DB Meiningen for analysis of its welded seams -  
*DBM/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 and uniting of the main sub-assemblies is underway with the first boiler 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); regulator handles have been polished and end squares on both regulator shafts machined to a precise fit; both regulator stuffing box assemblies have been hydraulically tested; new gaskets have arrived and together with boiler blanks both assemblies are ready to be sent to DB Meiningen.

**Next steps:** full assembly of barrels and fireboxes; send finished regulator stuffing box assemblies together with gaskets and boiler blanking plates to DBM 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 227 members who have generously donated over £450,000, 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<sup>®</sup> 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; sourcing a contractor to balance the pony truck and Cartazzi wheelset.

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

## MOTION UPDATE



Progress at Stephenson (Engineering) Ltd:

forged outside connecting rod; machined outside connecting rod; at DLW - intermediate couplings rods with bushes inserted; polished leading coupling rods - *Robert Stephenson/A1SLT*

**Summary:** all heavy motion ordered from Stephenson (Engineering) Ltd; leading, intermediate and trailing 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; Ian Matthews has started lapping tapered holes in the rods to achieve a perfect full contact with the plug gauge; 3D data for middle connecting rod has been sent to Stephenson (Engineering) Ltd.

**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. We may have passed the initial target of 175 members of The Motion Club but there is still an opportunity to come on-board if you haven't already whilst the motion is being manufactured as there have been a couple of dropouts. **For further information on how to become a member click [here](#).**

## TENDER UPDATE





The tender tank in green undercoat at DLW; the tender frame under construction and the tender brake turnbuckle nut being machined at ID Howitt - A1SLT

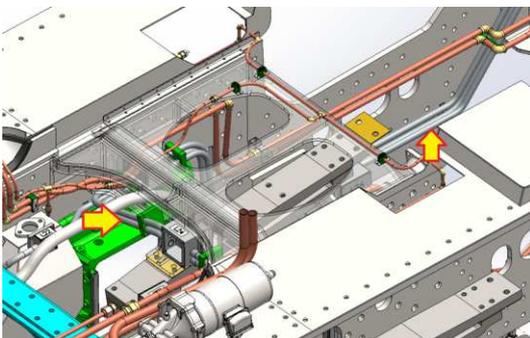
**Summary:** axlebox and other tender castings produced by William Cook Cast Products; frame being assembled by I D Howitt; tank construction by NVES Ltd complete, painted in green undercoat by Ian Matthews and now stored outside under a tarpaulin to create more space inside DLW; tender wheelsets at 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 concentrating 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 the axleboxes; brake cylinders trial fitted to frame.

**Next steps:** completion of the brake gear and machining 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 104 members who have generously donated just over £155,000 plus Gift Aid - 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 Tenderness: help us to reach 125 members by August.

## ELECTRICALS UPDATE





3D CAD image of the additional conduits between the turbogen and control box; Edward Laxton machining the oil seal recess in the axle driven alternator (ADA) end bearing housing; a castellated nut for the ADA; ADA test rig almost complete - *Alan Parkin/A1SLT*

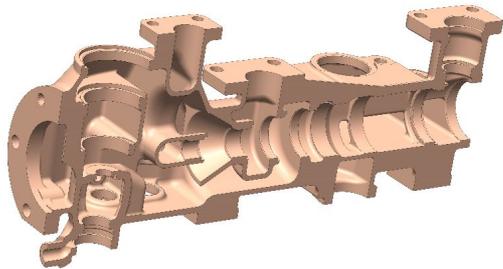
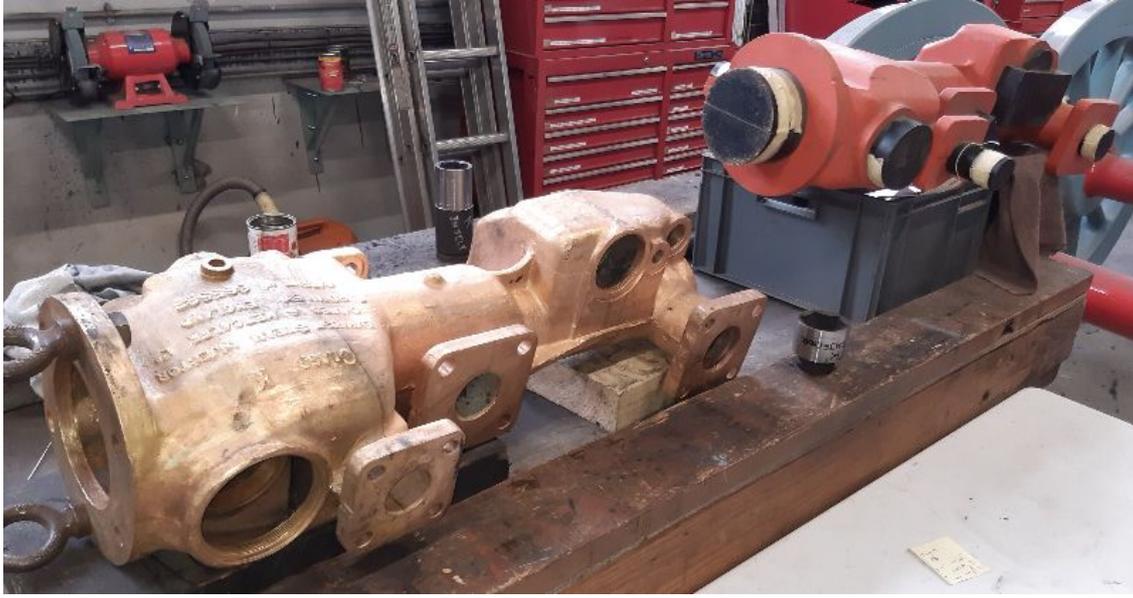
**Summary:** detailed design of the smaller electrical circuits is ongoing; the electrical system parts list is approaching completion; quotations for components are being sought.

**Progress update:** design work continues on the smaller electrical circuits; the electrical system parts list is now substantially complete - all the components required for the main panels are included, along with engine wire requirements, all connectors and many auxiliary lighting components; most of the electrical component suppliers have been successfully put through our Supplier Qualification process; an additional conduit run has been designed for the front of the engine to ensure we have enough space for all the required wiring; quotations for the required MIL connectors have been sought; an extra trunking run has been designed to go from around the centre of the engine, all the way to the front- the drawings to manufacture this trunking are being produced; axle driven alternator (ADA) test rig almost complete.

**Next steps:** work will continue on assembling parts lists for the electrical system, including specification of specialist tooling, connectors and wire requirements; finish ADA assembly and test rig completed ready to begin testing; review the Standards and Hazard Log and incorporate any required changes into the documents; 2D manufacturing drawings for the trunking continuing.

**Fundraising:** We launched The Turbogen Club in July 2020 and we are delighted to announce that this fundraising campaign has 'generated' 40 members - reaching our initial target. If you would still like to contribute towards the turbo-generator more information can be found [here](#).

## MISCELLANEOUS FITTINGS



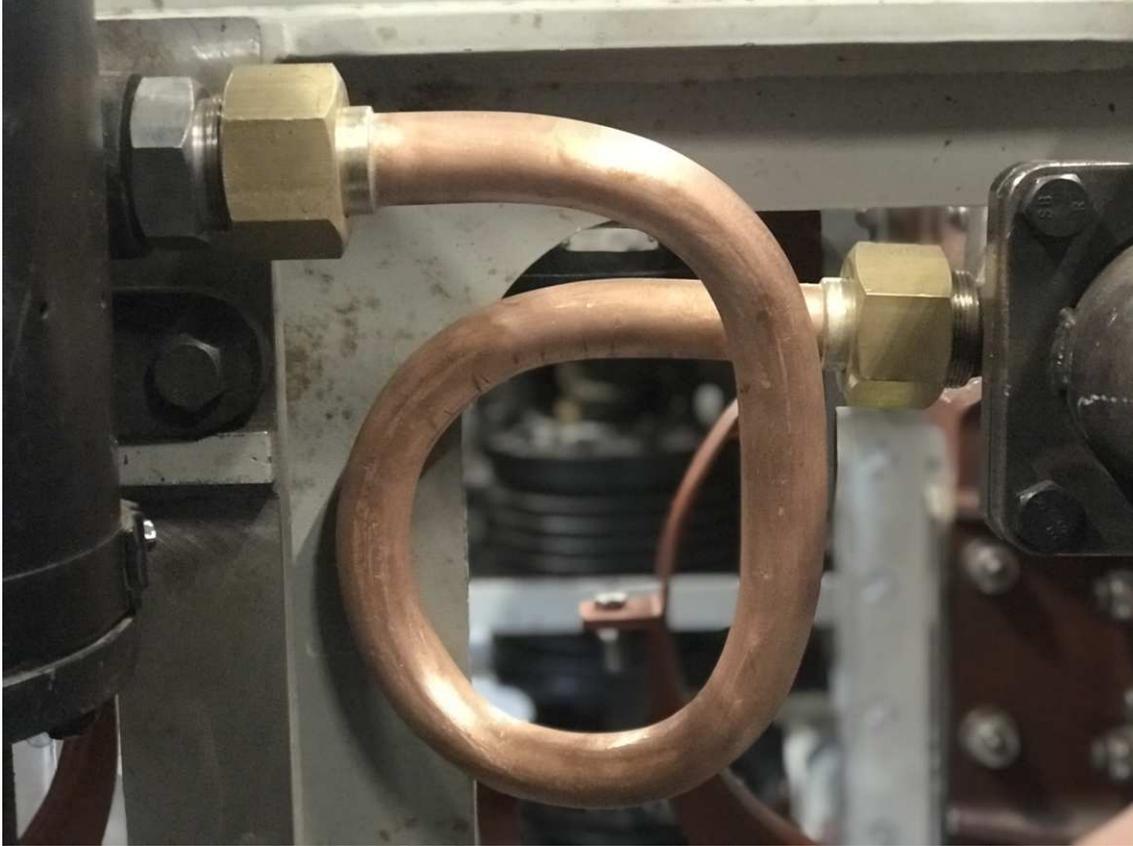
Class K exhaust steam injector body with pattern; machined cylinder draincocks; 3D CAD image of a cross section of the injector body - A1SLT

## 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 the interior components have been drawn as 3D CAD models by Martin Shepherd whilst David Elliott has almost completed the 3D modelling of the injector body; Edward Laxton has machined all 18 bushes needed for the CNC machined brake hangers and these have been pressed in; brake hangers have been trial fitted on the frame; David has 3D printed patterns for the bronze parts of the anti-vacuum valves which will be fitted to the upper sides of the smoke box at the rear end; six cylinder drain cock castings machining at DLW completed - Edward Laxton has produced a special tool to maintain a correct depth of a valve seat in respect to an outer surface.

**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; machine and press bushes 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; drill locating mounting holes on all drain cocks and produce a cone and thread to accept pipe cone joint fittings.



Air pump compensation loop - 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; a special air pump exhaust steam compensation loop has been bent to allow for thermal expansion and movement when in use; extended couplings for air inlet pipes to air brake governors have been machined and fitted; exhaust ejector has been fitted in CAD along with bracketry to support it.

**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; exhaust pipework and inlet pipework for the ejector will be designed.

## 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 continues to reside at the Great Central Railway and may be pressed into service as a passenger-carrying vehicle when the railway reopens. In addition to a thorough Fitness To Run (FTR) examination by the GCR C&W team, a small band of determined A1SLT volunteers visited recently to conduct further technical inspections of the internal electrical installation and the general mechanical condition. We are pleased to report that the findings were all good and planning continues to identify the work required to make best use of E35457 as a support coach for No. 2007 *Prince of Wales* when it begins operational service. In the meantime, work continues to overhaul a pair of Commonwealth Bogies for use with both support coaches: four wheelsets are currently being retyred and a set of roller bearings has been ordered from Timken. We are now seeking the air brake equipment required to reinstate the brake system to make it dual braked and identifying the correct design and fit for a vehicle of this type.

**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 51 members - over half of the initial target. For further information on how to become a member click [here](#). **Help us to fill this club!**



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

**TRAVEL WITH *TORNADO***



No. 60163 *Tornado* hauling 'The Pennine Explorer' 22<sup>nd</sup> May 2021 - John T Bamber/A1SLT

It has been a difficult 12 month, 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. 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 26<sup>th</sup> June - ['The Fens and Fells Flyer'](#) - Cambridge to Carlisle and return
- Saturday 3<sup>rd</sup> July - ['The Cumbrian Explorer'](#) - Darlington to Carlisle and return
- Tuesday 20<sup>th</sup> July - ['The Viking Venturer'](#) - Linlithgow & Edinburgh to York and return
- Thursday 22<sup>nd</sup> July - ['The Aberdonian'](#) - Edinburgh to Aberdeen and return
- Saturday 31<sup>st</sup> July - ['The Aberdonian'](#) - Edinburgh to Aberdeen and return
- Thursday 12<sup>th</sup> August - ['The Aberdonian'](#) - Edinburgh to Aberdeen and return
- Saturday 21<sup>st</sup> August - ['The Clyde Aberdonian'](#) - Glasgow to Aberdeen and return
- Thursday 2<sup>nd</sup> September ['The Aberdonian'](#) - Edinburgh to Aberdeen and return
- Saturday 11<sup>th</sup> September - ['The Aberdonian'](#) - Edinburgh to Aberdeen and return
- Thursday 16<sup>th</sup> September - [The Jorvik Express](#) - Liverpool to York and return
- Saturday 18<sup>th</sup> September - ['The Caledonian'](#) - Birmingham to Edinburgh and return
- Thursday 30<sup>th</sup> September - ['The Ribbleshead Rambler'](#) - Hull to Carlisle and return
- Wednesday 20<sup>th</sup> October - [Tornado and Flying Scotsman](#) - Tamworth to Carlisle and return
- Thursday 21<sup>st</sup> October - [Flying Scotsman and Tornado](#) - Birmingham to Carlisle and return
- Wednesday 27<sup>th</sup> October - [Tornado and Flying Scotsman](#) - Middlesbrough to Carlisle and return
- Thursday 28<sup>th</sup> October - [Flying Scotsman and Tornado](#) - Peterborough to Carlisle and return

Tornado Railtours trains can be booked through the links above, our [website](#) or by calling 01325 488215.



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