

THE MIKADO MESSENGER



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



A leading coupling rod in the advanced stage of machining at Stephenson (Engineering) Ltd - Robert Stephenson/A1SLT

Welcome to edition No. 72 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 underway. As you may have seen there has been lots of recent publicity for the P2 Project in the main railway magazines, *The Sunday Telegraph*, *The Northern Echo* and a section in *Hornby Magazine's* Great Electric Train Show 2020 Virtual Exhibition video <https://youtu.be/MM7dxPJhcqo>. The P2 section is from 1hr 12 to 1hr 27.

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 or 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: around 930 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](#).

The Boiler Club has reached 203 members, leaving just 97 spaces available - passing the two-thirds milestone. 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 slowly, with 86 places taken - 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 frames. Our target for The Tender Club is 250 members, contributing £1,500, so if you would like to contribute towards the tender more information can be found [here](#).

We launched **The Turbogen Club** in July and the fundraising campaign has already 'generated' 23 members - over half 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](#).

Our newest fundraising campaign, **The P2 Support Coach Appeal**, was launched in August 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 22 supporters - almost a quarter of the initial target - and if you would like to contribute towards this appeal more information can be found [here](#).

The Motion Club has now reached our initial 175 members target. As you will see below, the machining of the four coupling rods is underway. You can find more information about The Motion Club [here](#) - help us to fund the manufacture of No. 2007's motion!

The Pony (Truck) Club, has attracted substantial interest and has galloped past its initial target. 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 £2.5m has been spent and more than £3.0m raised of the required £5m 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



Ian Matthews checking bolts in the cab floor plate - *CAG Photography/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: with the tender tank undercoating complete it has been possible to remove the wheelsets from under the engine frames. This has permitted fitting of the remaining driven bolts and cold turned rivets in the outside motion brackets and the spring hangers.

Next steps: the final significant work on the frames is to make and fit the shelf that is located between the outer rear frames under the cab. The detailed design of this has been held back pending the final decisions on the type and location of injectors to be fitted which influences details of the shelf. The shelf also supports electrical trunking and terminal boxes for the umbilical cables between the engine and tender - the design of this is being finalised to enable a profile to be ordered.

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



David Elliott at NVES discussing the progress of the pony truck frame machining; Daniela Filová inspecting the pony truck frame at NVES - A1SLT

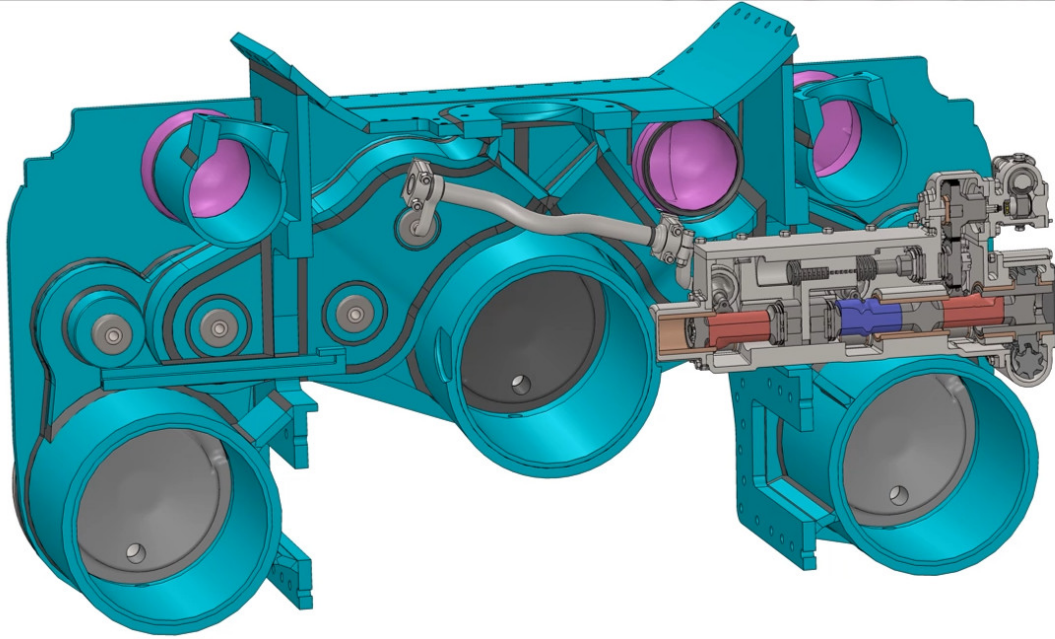
Summary: redesign of the pony truck, using side control springs, has been completed; order for pony truck frame fabrication placed with North View Engineering Solutions (NVES) in Darlington; pony truck wheelset and cannonbox delivered.

Progress update: NVES are making good progress with machining the three main components of the bogie comprising the bogie frame, steering arm and crosshead; the adjustment rings for the pony truck cannon box are being machined to finished size which will enable final assembly of the cannon box onto the axle and bearings.

Next steps: completion of machining of principle components, welding on manganese steel liners to horn blocks, finish machining of liners; manufacture of spring gear details; final assembly of the cannonbox onto the wheelset; machining of the spring planks.

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 have therefore decided to extend the club by a few members to cover the considerable certification costs associated with the modified pony truck design. Please consider joining The Pony (Truck) Club in advance of the frame's delivery to DLW. For further information click [here](#).

CYLINDERS UPDATE



Cylinder and cam box section view in 3D CAD- A1SLT

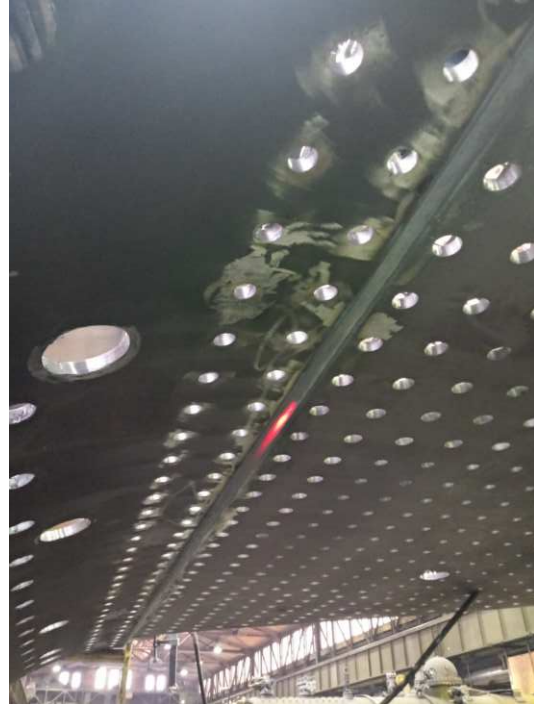
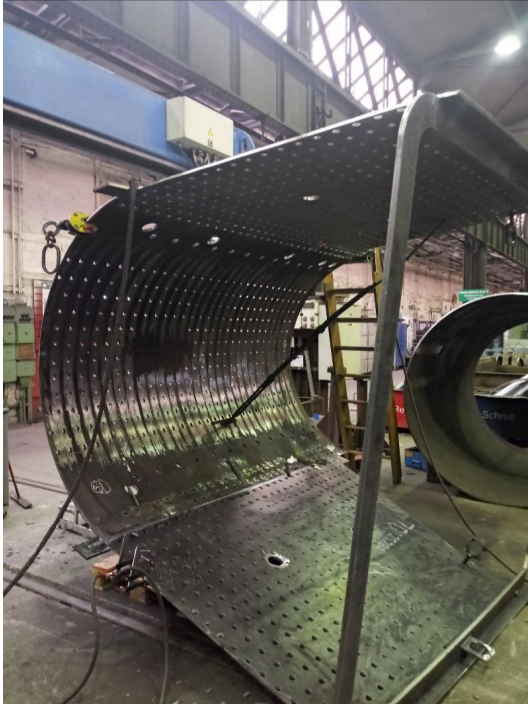
Summary: design studies into cylinder block manufacture and selection of valve gear complete; 3D CAD design of the cylinder block and valve gear substantially complete; further progress has been made in applying the weld details to the cylinder block inside exhaust passages with particular attention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

Progress update: further work on the 1:8 scale 3D model of cylinder block; work is continuing in 3D CAD to create component configurations to pass on to the 2D drawings - this is where a component can be shown in different states, for example with pre-welding machining and then with post-welding machining; progress also continuing in producing the 2D manufacturing drawings, this month concentrating on the middle rear cylinder and steam passages.

Next steps: continuation of detailed 2D manufacturing drawings for the cylinder block; further research into optimising steel grades for the tubes used for the cylinders, valve chests and for cast steam ports; specialist consultants are being sought to carry out a CFD (Computational Fluid Dynamics) modelling exercise on the cylinder block to check that the steam flow through the live steam and exhaust passages and the valves themselves has been optimised for maximum efficiency.

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

BOILER UPDATE



Welding progress on the outer firebox at DBM; proof machining of the stuffing boxes at DLW -
DBM/A1SLT

Summary: boiler design study completed, revised design approved by TÜV Sud notified body and sent to UK authorities for information and comment and no adverse responses have been received; forged foundation ring corners manufactured and machined; regulator castings delivered; superheater header cast and machined; boiler cladding manufactured, trial fitted to frames and now in storage; boiler order placed with DB Meiningen (DBM) for delivery in 2021; foundation ring forgings and regulator castings despatched to DBM; 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.

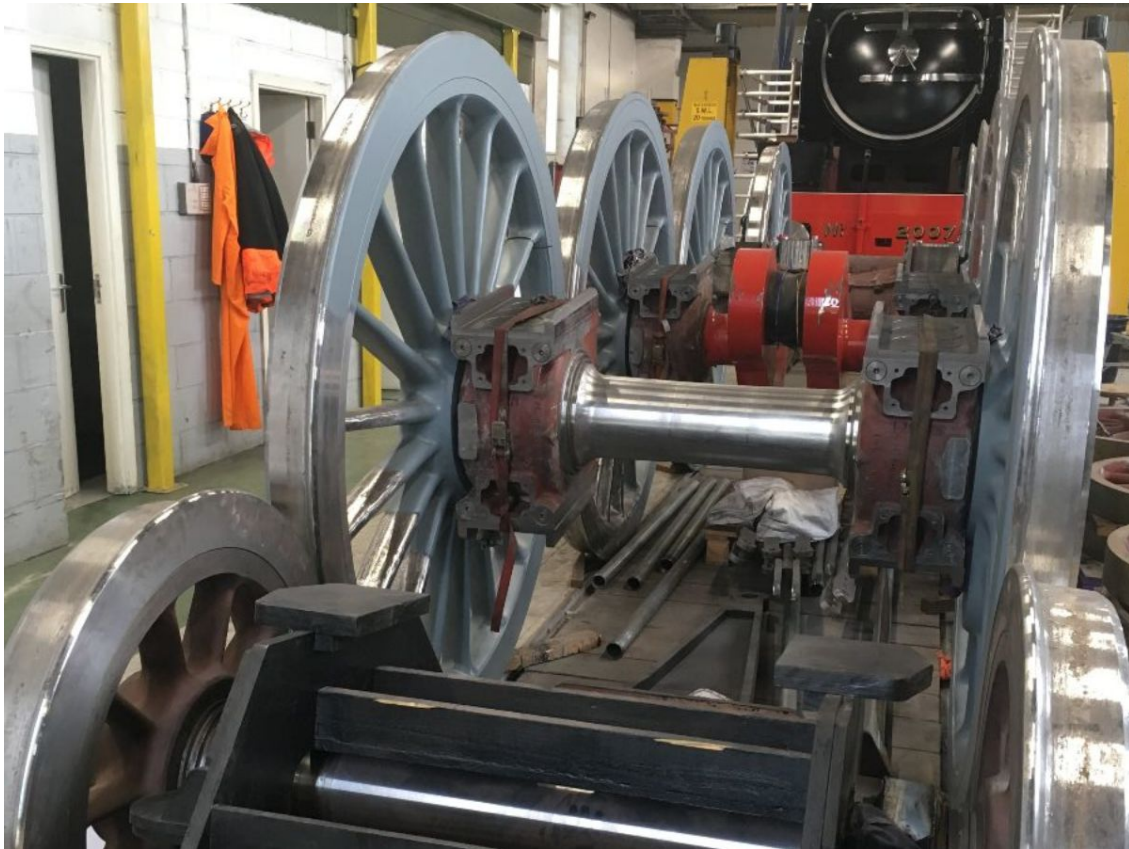
Progress update: DLW is manufacturing the regulator cross shafts and stuffing boxes which will be required to set up the regulator mechanisms inside the boilers and to conduct the hydraulic tests; at DBM, all the basic components have been manufactured so uniting of the main sub-assemblies is underway and the boiler is beginning to look like a boiler.

Next steps: full assembly of boiler barrels and firebox shells.

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 203 members

who have generously donated over £450,000. For further information click [here](#) - we must reach our 300 members target in 2021.

WHEELSETS UPDATE



The engine wheelsets - 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.

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



One of the leading coupling rods in the process of being machined at Stephenson (Engineering) Ltd - partially machined through to an advanced stage - *Robert Stephenson/A1SLT*

Summary: all heavy motion ordered from Stephenson (Engineering) Ltd of Atherton; work started on machining the four coupling rods with the first pair delivered to DLW in September; updated poppet valve gear design almost complete with first components in manufacture.

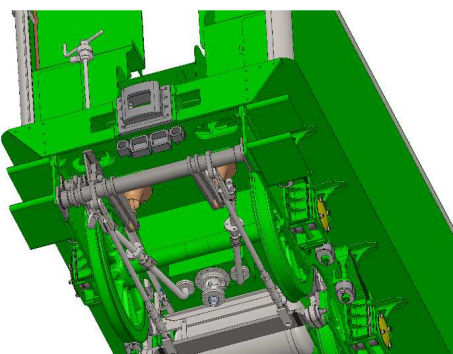
Progress update: intermediate coupling rods (between second and third coupled wheelsets) have been delivered and fettling has started to create a high standard of finish; white metal lined bronze rod bushes have been ordered; machining of one of the leading coupling rods is nearing completion.

Next steps: completion of machining of leading coupling rods and forging of trailing 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 reached the 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



Clockwise - The tender frame at I D Howitt; the tender tank in green undercoat; axlebox slipper blocks and bronze rubbing pads; 3D CAD image of the tender's pipework layout - *Nigel Facer/A1SLT*

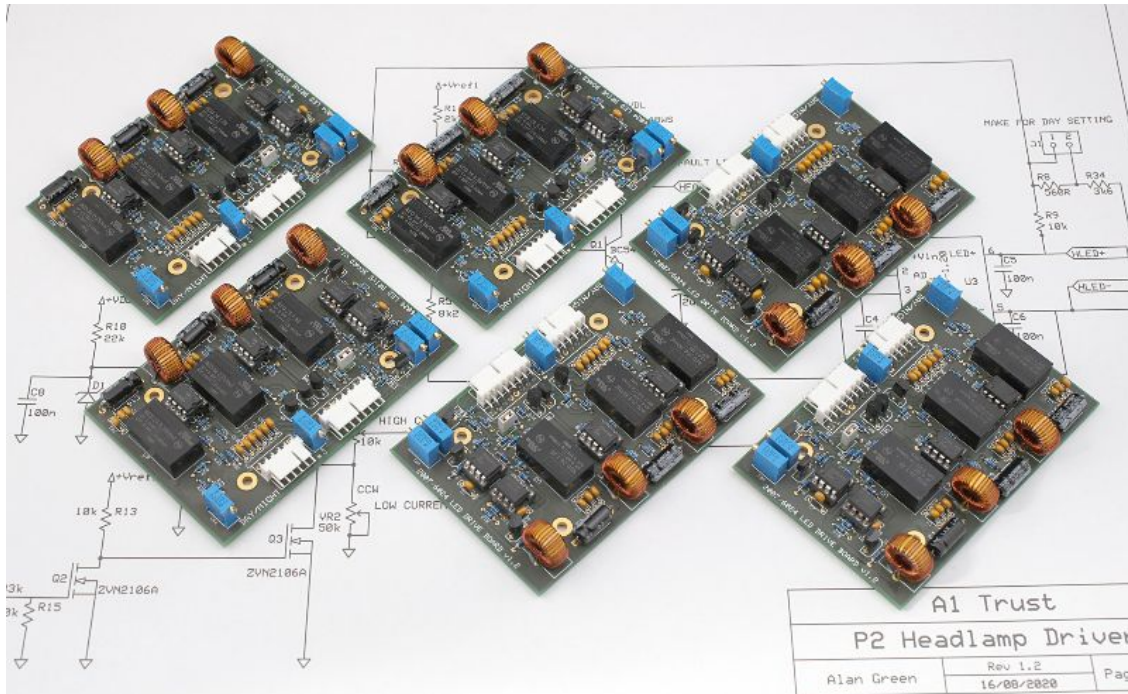
Summary: axlebox and other tender castings produced by William Cook Cast Products; frames being assembled by I D Howitt; tank construction complete, painted in green undercoat by Ian Matthews and now stored outside under a tarpaulin to create more space inside DLW; tender wheelsets at DLW, having been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

Progress update: the sprinkler pipe, water feed pipes, and main water valve have been modelled and added to the 3D CAD assembly to facilitate locating the electrical structured trunking on the frames; Ian Howitt continues to make detail parts including for brakes and hornblocks; the hornblocks have been sent to NVES by Ian Howitt to have the manganese liners welded; intermediate (axles two and three) axlebox slipper blocks and their bronze rubbing blocks have been machined; due to the long wheelbase of the Doncaster eight wheeled tender, the intermediate wheelsets have a total of 1in of side play to assist in negotiating tight curves - the bronze discs sit in the machined depressions in the slipper blocks which in turn sit between the axlebox and the spring.

Next steps: completion of the frames; continue 3D CAD work on tender 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 eight payments of £125. As of today, The Tender Club has so far only attracted 86 members who have generously donated over £130,000 - 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](#).

ELECTRICALS UPDATE



First production batch of assembled head/tail/marker lamp Printed Circuit Boards (PCBs) - Alan Green

A1SLT

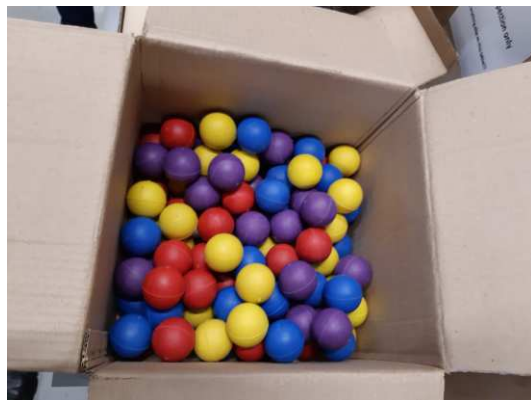
Summary: further good progress on the design of the electrical system; construction of first batch of LED headlamp drivers complete.

Progress update: work continues on the electrical system design with initial investigation of potential turbogen startup circuits to automate the process of bringing a turbogen online from cold; the completed head/tail/marker lamp driver Printed Circuit Boards (PCBs) have been received back from Stevenage Circuits and Alan Green has built and tested the first batch of six boards; 2D manufacturing drawings for the trunking system on the engine are almost complete; work continues on the manufacture of the engine trunking with various lengths of conduits being bent to size and shape; trunking boxes are being prepared for couplers to be welded on; kits have been assembled for all the engine electrical junction/routing boxes ready for customising and are being customised by welding on couplers, internal dividers and mounting lugs.

Next steps: the turbogen startup circuit will be designed and prototyped; work will continue on the tender conduit system; once this is complete the tender elements of the essential and auxiliary systems will be mapped onto the conduit runs and the wiring looms will be specified.

Fundraising: We launched The Turbogen Club in July and the fundraising campaign has already 'generated' 23 members - over a third of our 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](#).

MISCELLANEOUS FITTINGS



Pressure test at 400psi of superheater header; the box of dog balls; David Elliott made a test rig - A1SLT

The regulator stuffing box and cross shaft which are required to enable the regulator mechanism to be finished and tested on the boiler in Meiningen are making good progress at DLW with Ed Laxton machining the components. The cross shaft has bronze deposited on its journal surfaces where it passes through the stuffing box. This is a specialist process and has been contracted out to Locomotive Maintenance Services at Loughborough.

In order to hydraulically test the superheater header, all the holes in it have to be blocked. The biggest problem are the 86 countersunk holes where the ball joints on the superheater elements form joints with the header. The normal practice is to fit a hard rubber dog ball in each hole and with a thick steel plate over all the balls, tighten down the plate until the balls all make a good seal.

We had the balls left over from testing *Tornado's* superheater header, however the effects of them being already used, and with the rubber deteriorating with age, they wouldn't seal properly. Unlike when *Tornado's* superheater was tested, we now have the internet and after visits to a couple of pet shops in Bishop Auckland to find suitable dog balls and test them, the wholesaler, Caldex in Halifax were able to supply eight boxes of 12 balls. These were inspected via our goods inwards procedures to ensure that they were all what we had ordered.

David Elliott made a test rig comprising the shape of a single hole to reassure himself that this type of ball would withstand in excess of 400 pounds per square inch (psi) which it did. It should be born in mind that with 400 psi applied each ball is resisting 491 pounds of force, which is why the balls have to be severely compressed to resist the water. Once satisfied that the balls were up to the job, volunteers Terry Graham and George Bee carried out a successful test of both the “wet” (inlet) and “dry” (outlet) manifolds of the header on 7th October. It will be repeated in the presence of our boiler inspector in the near future.



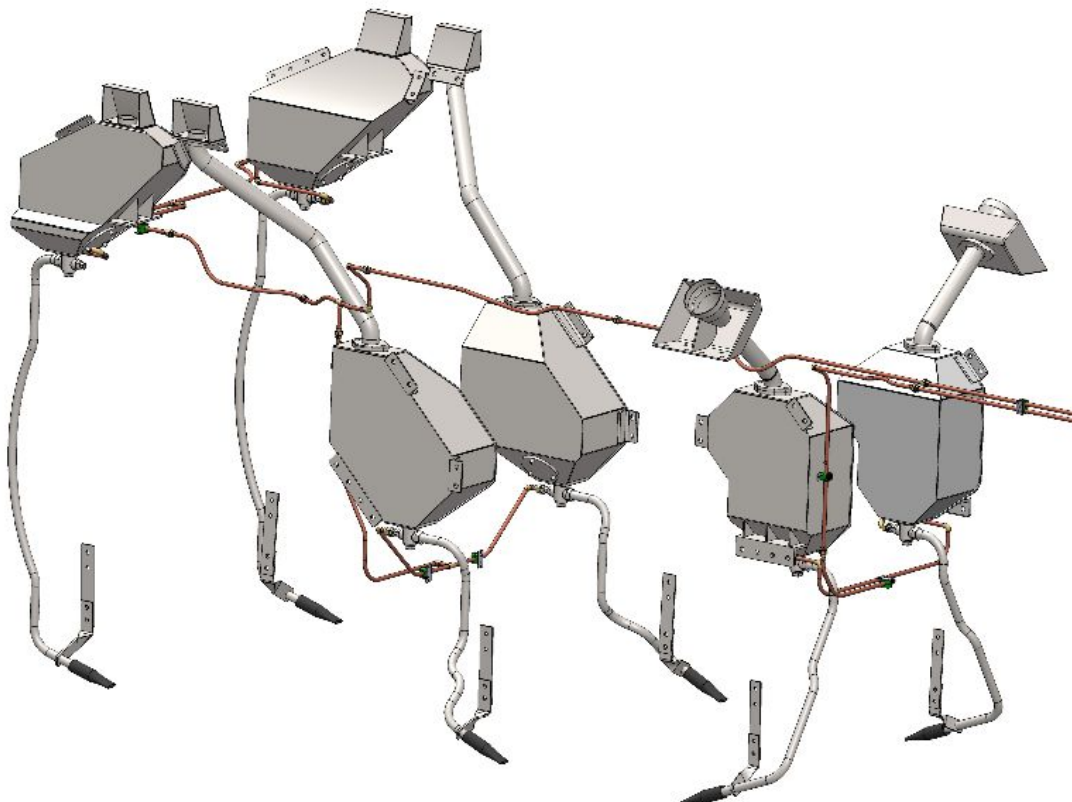
Cylinder drain cock rods fitted - A1SLT

Running Gear

Summary: brake gear fully designed and mostly manufactured, drain cock linkage (based on A1 design) drawn; linkage components made.

Progress update: good progress is being made installing the cylinder drain cock linkage which has been adapted to the very reliable design on *Tornado* to replace the less reliable cable operated system used on the original P2s and the A4s.

Next steps: installation of brake cross shafts further progress on cylinder drain clock linkage.



Pipework

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

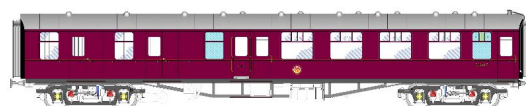
Progress update: Alan Parkin has continued drawing the pipework through the tender.

Next steps: continuation of design of pipework details; ordering of long lead items.

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 and an image of the proposed finish of the support coach - Gordon Best/A1SLT

A unique opportunity has arisen for A1SLT to acquire 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.

The support coach is an essential vehicle for both the locomotive and the support crew, carrying all the tools and consumables needed to manage the locomotive on main line tours and on visits to preserved lines. It also provides the support crew with all the essentials to live away from home for several days whilst looking after the engine. E35457 was inspected by a team from the Trust earlier in June at Holt on the North Norfolk Railway, where it is currently stored. The vehicle is in a good condition and is already registered to operate on the mainline. Plans are underway to move the vehicle to a more central location to allow a further survey to be completed. We would like to add most of the features that make *Tornado's* Support Coach so successful to operate and comfortable to live in.

Fundraising: The P2 Support Coach Appeal was founded in August 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 22 members. For further information on how to become a member click [here](#).



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

TRAVEL WITH *TORNADO*



No. 60163 *Tornado* at Carlisle on 12th September 2020 - *Graham Nicholas/A1SLT*

At our recent Virtual Convention we announced our programme of trains for 2021 and we are pleased to include some highlights here.

In 2021 we will be starting our operating season earlier with two trains over the Valentine's Day weekend before making our first visit to the City of Hull and running to Aberdeen from Glasgow in a variation to our regular summer itinerary. A highlight for many will be *Tornado* and *Flying Scotsman* working together in September and demand is bound to be high for those trains. We are also visiting Liverpool, the Cumbrian Coast and of course our regular summer programme of 'The Aberdonian' from Edinburgh to Aberdeen.

Diary of Railway Touring Company tours hauled by No. 60163 *Tornado* in 2020

- Saturday 14th November - 'The Cheshireman' - Bristol Temple Meads to Chester ([RTC](#))
- Saturday 21st November - 'The Cheshireman' - London to Chester and return ([RTC](#))
- Tuesday 24th November - 'The Gloucester Christmas Market and Cardiff' - London to Cardiff and return ([RTC](#))
- Saturday 28th November - 'The Yuletide Express' - Ealing Broadway to York and return ([RTC](#))
- Thursday 3rd December - 'The Worcester Christmas Fayre' - Norwich to Worcester and return ([RTC](#))
- Saturday 5th December - 'The Lincoln Christmas Express' - London to Lincoln and return ([RTC](#))
- Tuesday 8th December - 'The Bath and Bristol Christmas Express' - London to Bath & Bristol and return ([RTC](#))
- Saturday 12th December - 'The Edinburgh Christmas Market' - York to Edinburgh and return ([RTC](#))
- Thursday 17th December - 'The Christmas White Rose' - Cambridge to York and return ([RTC](#))
- Saturday 19th December - 'The Christmas White Rose' - London to York and return ([RTC](#))

Tornado Railtours 2021 Diary

- Saturday 13th February - [Valentine's Luncheon Circular Tour](#) - from York, Thirsk and Darlington
- Saturday 13th February - [Valentine's Evening Circular Tour](#) - from York
- Saturday 13th March - ['The Ribbleshead Rambler'](#) - Hull to Carlisle and return

- Saturday 27th March - [‘The Fens and Fells Flyer’](#) - Cambridge to Carlisle and return
- Saturday 3rd April - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Monday 5th April - [‘The Clyde Aberdonian’](#) - Glasgow to Aberdeen and return
- Saturday 10th April - [‘The Caledonian’](#) - Birmingham to Edinburgh and return
- Saturday 8th May - [‘The Cumbrian Explorer’](#) - Darlington to Carlisle and return
- Saturday 15th May - [‘The Jorvik Express’](#) - Liverpool to York and return
- Saturday 22nd May - [‘The Pennine Explorer’](#) - Leicester to Carlisle and return
- Thursday 22nd July - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Sunday 31st July - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Thursday 12th August - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Thursday 19th August - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Thursday 2nd September - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Saturday 11th September - [‘The Aberdonian’](#) - Edinburgh to Aberdeen and return
- Thursday 16th September - [Tornado and Flying Scotsman](#) - West Midlands to Carlisle and return
- Thursday 16th September - [Flying Scotsman and Tornado](#) - Peterborough to Carlisle and return
- Saturday 18th September - [Tornado and Flying Scotsman](#) - Middlesbrough to Carlisle and return
- Saturday 18th September - [Flying Scotsman and Tornado](#) - Birmingham to Carlisle and return

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

Railway Touring Company (RTC) tours can be booked through their [website](#) or by calling 01553 661500.



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