



THE COMMUNICATION CORD

60163 TORNADO

New Steam for the Main Line

No. 30 Spring 2013

Flattening the Devon banks, Tornado is seen at Stoneycombe on the 9th March.



Oliver Ridge

THE SUPPORT COACH – THE FINAL PUSH

by David Elliott

The coach is almost finished! As I write this we are down to installing blinds and curtains in the compartments and fittings in the toilet. Following a period of intense activity from our contractors (particularly Rail Restorations North East from Shildon and Mick Robinson) with very useful input from our regular Tuesday volunteer

gang and special volunteer weekends immediately prior to, and over Easter, the coach is substantially complete inside.

Electrical System: Our electrical duo Rob Morland (design) and Paul Depledge (installation) with recent assistance from contractor Steve Clark have excelled themselves with an electrical system even

more complex than on the locomotive, which, for the most part, worked first time. The main problem during testing was the inability to persuade the Fischer Panda generator to start, however the manufacturer came up with new electronic control boards and it is now running well.

The core of the system is a pair of

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Victron Quattro 3kw invertors which work as one and convert 24v DC from the battery to 230v AC mains. When external mains power is available (for example when we are on depot) or the 4kw generator is running the invertors will use up to the rated current from either supply and supplement that with power from the batteries if the demand is more. When the demand is less than the supply, the surplus is used to charge the batteries. When running a 5kw axle driven alternator will charge the batteries.

This enables us to make the coach electrical system for the most part mains voltage and allows the use of ordinary mains lighting and water heaters for the toilet and kitchen. Thus we can provide that most vital service from a support coach, boiled water to enable an on-demand tea supply for the footplate and support crew.

In addition to the 230v AC system, a 24v emergency lighting system is fitted to comply with the modern safety requirements. The compartment reading lights are also on the 24v system as the switches and sockets are not up to modern 230v standards and to change them would spoil their appearance. The culmination of the test programme on the electrical system took place on Friday 5th April (see photos).

Water system: In order to provide a reliable and clean water supply to the kitchen and hand wash basin in the toilet, two stainless steel water tanks are fitted in the roof in the kitchen area. The water

from these passes through a filter and an ultra violet steriliser before feeding an electric water pump which provides the necessary pressure to make the water heaters/boiler work. Although technically the water is of potable standard, as the quality of water used to fill the tanks cannot be guaranteed, however it is a considerable improvement on the normal contents of coach water tanks for washing vegetables and washing up. It should not be drunk without boiling.

The toilet has its own water tank as per the original design, however this tank only provides water to flush the WC. After the normal commissioning tweaks, the water system is working well - the only outstanding problem is a small leak from the original soldered and riveted copper cistern. We have a spare which has been fitted and is OK.

Heating system: The heating system is a conventional pressurised central heating system except that the radiators under the seats and in the corridor are specially made steel pipe elements fabricated by Tom Snowball to fit into the space available under the seats. There are two sources of heat, an 18kw Vaillant LPG boiler for when the coach does not have a steam supply from the loco and, when steam is available, the central heating return pipe incorporates a steam/water heat exchanger. When this is operating the boiler is switched off.

Each of the under seat radiators in the compartments are fitted with thermostatic valves which can be regulated by the

Editorial by Graham Langer



Truman Capote once said that "Failure is the condiment that gives success its flavour", however our stretched engineering team and support crews might be forgiven for feeling that our air pumps are a little "over-seasoned"! In between these struggles with recalcitrant machinery, *Tornado* has clocked up some remarkable runs in the first quarter of this year, notably her first revenue earning trip on the 9th March with a blistering run, unassisted, from Paddington to Plymouth and back; this is all the more remarkable because the locomotive had only just emerged from part two of her annual maintenance cycle, involving the routine replacement of all three cylinder liners. In Darlington a similar effort has been made to complete the support coach with volunteers and contractors working furiously to finish the final fitting out of the vehicle. With £65,850 out of £76,200 raised for this project we still need to continue to raise funds to pay for all this work, thus far we have financed 54' 11" of the vehicle's 63' 6" length.

The common denominator in all this activity is the people doing the work. Without our hard-working volunteers, sales staff, engineers, support crew and administrators, The AI Steam Locomotive Trust would go nowhere and *Tornado* would never turn a wheel in anger. We are incredibly lucky to be able to call on so much talent and it is this that makes the Trust the quality organisation that it is. I am sure the issues with the air pumps will be sorted soon and we can all look forward to an outstanding day with 'The Elizabethan' on the 11th June - you have booked your tickets, haven't you? **TCC**



No. E21249 is seen in the cold light of day for the first time since entering the works.

David Elliott



The immaculate galley, just add chef.



The Lighting mimic panel

David Elliott



This broadside shot shows some of the subtle changes that have been made.

David Elliott

occupants of the compartments. With the improved insulation fitted to the coach, it is hoped that the interior will be rather warmer than the average support coach.

Gas System: To supply the boiler and the kitchen cooker, a total of eight 13kg Calor gas bottles are fitted. These are arranged as two blocks of four with an automatic change over valve fitted so that supply should be continuous. Once one block of four is empty they can be replaced without interrupting the supply.

All these systems have now been tested and commissioned. There are a few items to be addressed including a non-working cooling fan in one of the invertors and an annoying whistle coming from the fan on the boiler. Both should be addressed shortly. Thanks are due to Tom Snowball who has installed the most of the water, heating, gas and air brake systems.

Bogies: A significant problem has been found when the coach body at operating empty weight was first lowered onto the bogies. It had been anticipated that some

adjustment of spring and suspension shims would be necessary to achieve the correct buffer heights; however the fact that most of the bogie springs already have the maximum allowable number of shims under them and the increased weight of the coach means that we need stronger springs. Commonwealth bogies use a total of thirteen different spring sizes and ratings with four different ratings for the primary springs and six different combinations of secondary springs.

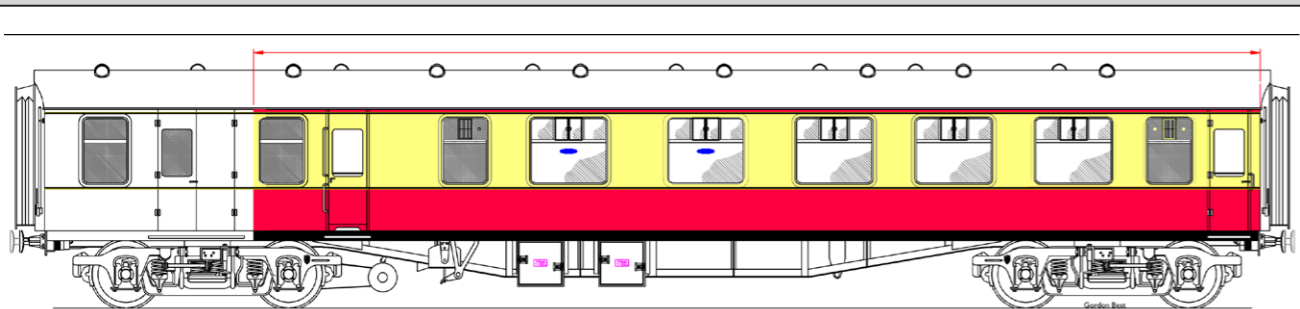
Thanks to Jerry Hawley of the North Yorkshire Moors Railway carriage department we have copies of the spring drawings and the table specifying the correct combination of springs for different vehicle weights. Enquiries amongst the railway supply industry and the heritage railways have found that primary springs are available, however no-one had a full set of the correctly rated secondary springs so efforts are in hand to have new springs made. **TCC**



David Elliott

Further work is carried out on door locks and furniture.

SUPPORT COACH FUNDRAISING



Your support for 'Use your loaf' has now reached 54 feet 11 inches or £65,850. Your help is still urgently needed to help us complete the job.

Although the coach is nearly complete, volunteer help is still needed for the final tasks.

- Volunteers to help with the work are always welcome, but you need to be available at the works during normal working hours. Please email volunteer@alsteam.com for more information
- Make a personal subscription to 'Use Your Loaf'
- Introduce Friends & Family to 'Use Your Loaf' and more people hooked on *Tornado*.

Use Your Loaf: Following the success of our dedicated donation scheme for the construction of *Tornado*, "an AI for the price of a pint" we decided to raise the bread for the support coach in a different way:

'Use Your Loaf':

- The coach is 63ft 6in in length – 762 inches – or 1524 'slices' at 1/2 inch each.
- Each 'slice' can be sponsored for £50; £100 for a 'doorstep'; £1,000 for 'half a loaf'; and £2,000 for a 'loaf';
- If all are sponsored, it would raise £76,200; if we assume 80% of the donations come with Gift Aid, this rises to over £93,000

And, as with the dedicated donation scheme, our 'Use Your Loaf' initiative comes with benefits for those generous enough to take part:

- A certificate recording the details of the sponsorship and a copy of a drawing of the coach noting which slice(s) have been sponsored
- Name inscribed on the official Role of Honour carried on the coach which will

detail the slice(s) sponsored

- Entry into draw for main line footplate ride on *Tornado*
- Opportunity to purchase Bachmann model of E21249 (a perfect companion to the models of *Tornado*) with appropriate one of 1524 certificates produced for sponsors. The model costs £30.00 plus £3.00 postage & packing.

As of May 2013 the 'Use Your Loaf' campaign has raised £65,850 which translates to 54 feet 11 inches of the coach's length, an increase of £3550 since the last *TCC* was published, as illustrated on the diagram. Steady progress but we still have a way to go. We look forward to reporting progress in future *Trust* communications as coloured section grows to the full length of E21249.

ELECTROMAGNETIC TESTS ON THE COACH

By Rob Morland



The electromagnetic test rigs are assembled by the coach.

Rob Morland

In order to conduct electromagnetic compatibility tests on our refurbished support coach, it was necessary to drag it out of its warm cocoon at Darlington Loco Works and expose it to the weather for the first time since its overhaul began.

The team from York EMC visited Darlington to perform the Electromagnetic Compatibility test to the European railway standard EN50121-3-1 and the coach passed the test in full with no problems. With the generator set running and 5.3KW of AC load on the system it was well inside the permitted emissions spectrum mask at all frequencies from 9KHz to 1GHz. York EMC will be issuing us with a test certificate shortly.

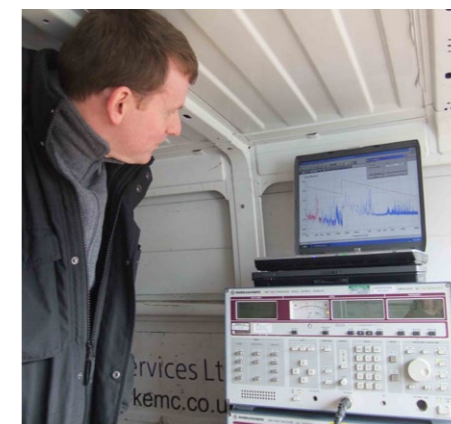
Happily, following no signs of life on initial testing, the support coach diesel generator is now working well. The problem was solved after replacement of the main control board and remote control panel with the new units supplied by Fischer Panda in Germany. Although the generator is formally out of warranty they provided these without charge.

The coach electrical system has also passed its BS 7671 electrical installation tests, and we have been issued with the necessary Electrical Installation Certificate. This testing was carried out by Support Crew member Steve Clark, who runs his own electrical installations business, SCN Electricals Ltd. With the exception of the axle driven alternator (which we can only test when the coach is moving at more than 20 mph) the coach electrical system is now fully tested and working. **TCC**



With the generator running, measurements are carefully taken.

Rob Morland



Bryan Renton of York EMC watches as data is collected and analysed in the van.



The very impressive power mimic panel in the coach.

David Elliott

ENGINEERING UPDATE *By David Elliott*



Above: The Bryn Engineering team insert the centre cylinder liner.

“Detailed inspection of the boiler has shown that it is in reasonable condition for the amount of use it has had.”

General

With completion of what has been a very intensive annual maintenance programme *Tornado's* re-entry into traffic has not been without incident. Notwithstanding problems with the inside crosshead and air pumps, the locomotive has put up some good performances.

Annual maintenance

Fitter Chris Smith was retained for the January/February annual maintenance period to assist Jon Pridmore to carry out the routine inspection and fitting tasks.

The cylinder liner replacement was successfully completed by Bryn Engineering, albeit somewhat later than planned due in part to the severe weather holding up operations. Multi-Tech Engineering of Featherstone restored the pistons to the original diameter and re-ground the piston rods. Multi-Tech also completed the spare inside big end and eccentric brasses - the new big end bearing has been fitted as the original one has completed about 63,000 miles which is a tribute to the quality of the original. Multi-Tech have considerable experience with white metal bearings for power station turbines and recommended J H Richards of Birmingham for the metallurgy work.



John Wilkinson, AISLT Locomotive manager, steadies the hoist while the next liner is prepared for the liquid nitrogen bath.

Meanwhile David Wright and his team assisted by the Great Central Railway at Loughborough have changed all the other white metal rod bearings for the spare set which we keep at Loughborough. The GCR workshops also re-metalled the crossheads which were showing significant wear. The outside valve spindle crossheads were also been re-metalled. The slide bars were re-ground by Multi-Tech to restore them to flat and parallel, thus when reassembled, almost all the working surfaces on the motion have been restored to as new condition.

The rear air pump was replaced by a spare pump bought from Locomotive Services Ltd and overhauled by Meiningen Works in Germany (where our original pair of air pumps were sourced) - of which more anon.

Detailed inspection of the boiler has shown that it is in reasonable condition for the amount of use it has had. However there were significant deposits of water treatment chemicals around the tubes adjacent to the front tube plate. The inner firebox was clean and indicates that the water treatment regime is working to protect it from hard scale. Following consultation with our boiler inspector it was decided to run the locomotive on its first trips with no added treatment to enable the surplus in the boiler to be dissolved. Following successful hot exams by the VAB, VAB boiler inspector and insurance company boiler inspector, the new Engineering Acceptance certificate was issued on 4th March 2013.

With most of the white metal renewed and with new piston rings operating in new cylinder liners, it was felt prudent to have an engine and support coach test run to Westbury and back to help running in. This was concluded without incident.

Return to traffic

The first outing on 9th March was Paddington to Plymouth return. This route is hardly ideal for a locomotive which is almost “ex works” with the high tractive effort at relatively low speed required for the South Devon banks. Nevertheless *Tornado* performed well.

Inside crosshead

However when being prepared for the next trip the inside crosshead was found to have run its white metal. Unfortunately there was insufficient time to remove it, re-metal and machine and refit before the trip, so 35028 *Clan Line* stepped into the breach for Steam Dream Peterborough - Bath trip on Saturday 16th March.

Thanks to the GCR at Loughborough and Craig Stinchcomb in particular, the



The shrunken liner is lifted from the bath and tested before fitting.

crosshead was quickly re-metalled and refitted in time for the next trip on Tuesday 19th March. For this trip and the next one the crosshead was carefully monitored, and apart from some warming during periods of hard work, has settled down nicely.

Air pumps

After performing well on static test and during the proving run, the “new” rear air pump blew out the lower steam cylinder gasket during preparation for the run on 9th March. As there was not time to effect a repair the trip was carried out using the front pump. The gasket was replaced with a stronger type as soon as possible and the pump continued to work satisfactorily until it stopped suddenly at Swindon on the way back from Bristol to Paddington on 21st March. *Tornado* continued using the front pump.

Subsequent investigation showed that the valve spindle had seized into the top cap in the cylinder head - the presence of

oil on the rod and cap suggests that lack of lubrication was not the cause. Attempts were made to repair the pump using parts from the original rear pump which was partially successful. However, the pump subsequently stopped again for no readily identifiable reason. Following trips were undertaken using the front pump only, although that suffered an oil pipe leak at Slough on the outward Paddington to Kingswear trip. Jon Pridmore made a remarkably quick repair on the trackside, however although the loco was able to make up the lost time during the day, some delays were caused to other trains in the Slough area. Efforts were made to do a rapid partial overhaul of the old rear pump which is showing signs of four and a half years of frequent operation,

In the event the repair to the rear air pump was unsuccessful and following the failure at Rhyl both the engine's air pumps and the ‘new’ spare pump have been returned to Meiningen for repair and rectification. **TCC**

LOCOMOTIVE MANAGER'S REPORT

by John Wilkinson



Peter Lovell

All 60163 Tornado emerged from her winter maintenance and made a test run on the 5th March.

This report was drafted in the DB Schenker mess room at Wembley depot, while we were trapped by various engineering work on Network Rail following a run from Kings Cross to York on the 13th April. We were only about six miles from Southall but the railway was closed so no move until the morning.

Through our winter running periods we have experienced problems with various parts of the the loco and Jon Pridmore, *Tornado's* Duty Engineer, has been successful in keeping the locomotive available through this period and on a number of occasions keeping her running until the depot is reached at the end of the day.

The air pumps which supply compressed air to the braking system and the sanders have been troublesome and have had to be dismantled and repaired a number of times. Add into the mix an overhauled air pump which has not performed as expected and been difficult to manage, this is now being investigated. The air pump problems have continued to dog us and action has now been taken to ensure that we get the bottom of all the problems with each pump through the good offices of David Wright's Locomotive Maintenance Services business.

In the midst of this an extensive winter maintenance programme has been carried out and the loco has taken some settling down again after this work. Following the completion of winter maintenance, the loco ran a successful test of around 200 miles in the hands of Devon and Cornwall Railways. 4 days later the first run of the year saw *Tornado* departing Paddington for Plymouth unassisted. A good run ensued in both directions however, during the preparation process for the run on 16th March, we discovered that the white metal bearing surfaces on the middle crosshead had not successfully run in and the bearing had become hot and the metal had run. This firstly meant that we could not work the run on 16th where 35028 *Clan Line*

stepped into the breach. Secondly it necessitated another rapid repair which was achieved with Mick Robinson playing a major role with assistance from our friends in the machine shop at the Great Central Railway along with help in dismantling and re-assembly from colleagues at Locomotive Services Ltd.

Jon Pridmore continues the tale

The culmination of this chapter of woes occurred during the return from Holyhead on the 20th April. The air pump stopped working after a hard brake application before Rhyl and the traction inspector Gareth Jones' quick thinking brought the train to a halt past the signal at the end of Rhyl station because he noticed the air brake reservoir pressure was dropping. This meant at least there were some coaches still on the platform. I examined the pump and tried to restart it but it refused point blank to oblige. At this point we decided to fail the train and call for assistance. We also decided to get the whole train clear of the signal and back onto the platform in its entirety. This involved isolating lots of things on *Tornado* and slowly dropping the train back on the vacuum brake only down the gradient so it was all on the platform.

We managed to find a driver and borrow the class 67 off the Arriva trains Welsh Assembly train which was parked at Holyhead. This involved a lot of wrong line (bang road) running and hand signalling on crossings by NR to get it onto the front of our train because we were in effect blocking the UP road. This is why it took so long to get rescued.

We were then towed as fast as possible to Crewe where *Tornado*, her coach and the 67 were detached. A class 92 electric locomotive was then supposed to take the train on to Euston. Unfortunately this did not happen because the Sunday morning engineering possessions on the WCML had already started. The train went no further and the passengers were returned to London by alternative transport. **TCC**

From the chair by Mark Allatt



As we all know it has been a rather mixed few months for our locomotive – some absolutely outstanding performances contrasting with some very disappointing technical problems and failures. As both sides of the coin are covered elsewhere in this issue of *TCC*, I'd just like to pass on my thanks to all of our volunteers and contractors who have worked so hard in difficult circumstances to get *Tornado* back into traffic and to keep our revenues coming in. There will be lessons to learn from these difficulties and rest assured that the trustees will ensure that they are taken on board and implemented.

The secret of the Trust's success remains the loyalty and support of our covenantors, and the professionalism and dedication of our volunteers - without whom none of this would be possible. We must encourage more people to come on board as covenantors to support *Tornado's* future operations. It is vital for our continued success that we continue to grow our supporter base and I especially urge you to encourage any children that you know who share our passion for our locomotive to join our Tornado Team.

Our volunteers continue to be exceptionally busy in 2013, with packed forward diary of main line trains and heritage railway visits. As usual we are still looking for more volunteers. It takes a lot of people to keep *Tornado* on the rails, not just those who travel with the locomotive as support crew or merchandise team but also those in the engineering team

in Darlington, Southall and elsewhere. Our volunteers with managerial roles have recently been boosted by amongst others Huw Parker (project management), Tracey Parkinson (railtours manager), Tim Beere (marketing & PR), Roy Mears & Janet Hill (merchandise team coordinators) and Sue & Mike Browning (merchandise team rostering). In addition I am delighted that Graham Langer has agreed to add the editorship of *TCC* to the work he already does as our digital content editor and support crew member – this will give me more time to focus on the Trust's forward strategy.

However, there is always so much more that we could achieve with the right volunteers with the right skills and can-do attitude. At the moment we are especially seeking volunteers to help with book keeping, finance & accounting, we need an archivist and an education officer. Please email volunteer@alsteam.com if you think you can help.

In the last *TCC* I mentioned that the first of a series of trains to be promoted by the Trust this year would be a re-run of 'The Elizabethan' on Tuesday 11th June – this time with *Tornado* from London King's Cross to Edinburgh. This train should also be the first revenue-earning outing of E21249, *Tornado's* dedicated service vehicle. If the Trust is to grow its own programme of railtours, filling the gaps in the north and midlands left by the promoters we work with, it is vital that 'The Elizabethan' is commercially successful - so please join us on-board.

Thank you all for your continued support. Your kind letters and emails always help to keep the team motivated. I hope to see as many of you as possible out on 'The Elizabethan'. **TCC**

TOUR DIARY

Below are the future operations *Tornado* is confirmed to be involved in. More details will be published on www.alsteam.com as trains are finalised. Contact details for tour companies appear at the bottom of the page.

- **Tuesday 11th June** – 'The Elizabethan' – London King's Cross to Edinburgh and return (return locomotive to be advised) – promoted by The A1 Steam Locomotive Trust with booking through Pathfinder Tours
- **Saturday 15th June** – 'The Cathedrals Express' – Edinburgh Waverley to Inverness and return – promoted by Steam Dreams
- **Sunday 16th June** – Alloa Circular Tours - promoted by the Scottish Railway Preservation Society
- **Friday 21st June** – 'The Cathedrals Express' - Tunbridge Wells to Ely and return - promoted by Steam Dreams
- **Thursday 27th June** – 'The Cathedrals Express' - Norwich to Salisbury and return – promoted by Steam Dreams
- **Wednesday 3rd July** – 'The Cathedrals Express' – London King's Cross to York and return – promoted by Steam Dreams
- **Friday 5th July** – 'The Cathedrals Express' – Lewes to Salisbury and return – promoted by Steam Dreams
- **Sunday 7th July** – 'The Cathedrals Express' - London to York and return - promoted by Steam Dreams
- **Saturday 13th July** – 'The Cathedrals Express' - London to Beverley and return - promoted by Steam Dreams
- **Saturday 10th August** – 'The Cathedrals Express' - London to Newcastle and return - promoted by Steam Dreams
- **Friday 30th August to Thursday 5th September** – North Norfolk Railway, Sheringham
- **Saturday 7th September** – 'The Cathedrals Express' - London & Salisbury to Bath & Cardiff and return - promoted by Steam Dreams
- **Thursday 12th September** – 'The Cathedrals Express' - Ipswich to Canterbury and return - promoted by Steam Dreams
- **Thursday 19th September** – 'The Cathedrals Express' - Canterbury to Salisbury and return - promoted by Steam Dreams
- **Friday 1st - Sunday 10th November** - The Nene Valley Railway, Peterborough

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

The following tour operators and preserved lines are involved with the operations listed above:

Steam Dreams

Web: www.steamdreams.com Tel: 01483 209888
Email: info@steamdreams.co.uk

Pathfinder Tours

Web: www.pathfindertours.co.uk Tel: 01453 835414/834477
Email: office@pathfindertours.co.uk

MERCHANDISE UPDATE by Gill Lord

We have had a rather quiet time these last three months or so it would seem! Whilst *Tornado* has been undergoing winter maintenance, the merchandise teams have been busy brushing up their sales skills! In my last report, I mentioned that a training day had been arranged for the 19th January, but unfortunately due to snow, the day had to be rearranged to the 23rd February.

We all met at the Hallmark Inn conference rooms in Derby for a prompt start at 10:15 with coffee and pastries; it was rather like a family get together, catching up with each other exchanging news and plenty of laughter! Mark Allatt opened the proceedings thanking all those who had attended for making in some cases rather long journeys to be there, and explaining that this was a day dedicated to merchandise.

My turn next, I introduced myself to the group; we had four new volunteers which was very encouraging. I then proceeded to work through a PowerPoint presentation. The presentation started by showing the figure of £55,000 on the screen and asking what this amount was for. The group eventually realised that this was the amount of profit TML transferred to the AI Trust in December 2012, for the financial year 2011/12. A well deserved round of applause for each other ensued.

I then showed how the Merchandise teams started way back in 2009 and how much it had evolved over the years, from using tick sheets to keep a track of all our sales to the to a state of the art use of PLU numbers and a stock control second to none due to the hard work of Chris Walker. Selling on trains has changed over the last year and this was also explained.

Diana Hurfurt and Janet Hill (the *Tornado* Players!) performed a sketch to show how not to process sales then another to show how sales should be processed, very enjoyable and brought forth a few laughs!

After a lunch of sandwiches and chips, the afternoon session began with Alan Bradstock informing the group about volunteering as stewards on some of the AI run trains. Since the meeting more people have put their names forward to be considered as stewards.

Logistics have always been a problem and never more so than on 'The Elizabethan' last year! Many hours of arranging and re-arranging how we could



Mark Allatt, Gillian Lord, Chris Walker & Tony Lord with the merchandising trainees in Derby.

"It was rather like a family get together, catching up with each other exchanging news and plenty of laughter!"

work this train took place and eventually it went more or less like clockwork! To help all the merchandisers understand the problems we do have, the group was split up into teams and each team discussed how best to work. There were one or two different answers but eventually it was all worked out and the realisation that logistics with *Tornado* is far from straight forward.

After afternoon tea and cake, the final session was designed to provide training on the use of the Chip & Pin machines and the two types of tills used for the trains and event stands. The meeting finished at 16:00 with a few of us repairing to the Hallmark (formally the Midland) Hotel for well-earned refreshment!

Another such event will take place next year (after the snow season!) and also there are discussions at the moment regarding an informal get together later this year.

Items coming soon: As I write, non-covenantor ties are in the process of being made, the design for ladies scarves is in the final stage and I am awaiting the final date in May for the delivery of the Hornby model R3206 *Tornado* in Blue. I am taking reservations for these models, so please do not hesitate to contact me if you wish to reserve one or more.

60163

FOR SALE 9 TORNADO SMOKEBOX NUMBERPLATES

- 21st 22nd August 2010
Mid Hants Railway
- 3rd July 2011
'Torbay Express'
- 10th July 2011
'Torbay Express'
- 17th July 2011
'Torbay Express'
- 9th October 2012
Barrow Hill
- 30th September 2012
'The Cathedrals Express' -
Maidenhead to Kingswear and return
- 1st December 2012
'The Cathedrals Express' -
Ipswich to Bristol and return
- 21st March 2013
'The Cathedrals Express' -
Peterborough to Bath and return
- 23rd March 2013
'The Cathedrals Express' -
London Paddington to Kingswear
and return

To secure your number plate
(all profits to *Tornado*) email
shop@a1steam.com. Please
allow 28 days for delivery. TCC

Covenantors' Diary by Alexa Stott

After a fairly quiet start to the year, things have been getting a lot busier recently.

First of all came a call from the team at Darlington: Could anyone with some time to spare over a couple of weekends at the end of March who was handy with a paint brush or even just a dustpan and brush possibly send in their details as the last push on our service vehicle got underway? The email duly went out and a big thank you goes to those Covenantors who stepped forward to accept our challenge. The progress that was made gave us the encouragement to invite everyone to an 'Open House' at the Works so that you could see for yourselves that we really are nearly there. On a rather chilly Easter Monday it was a great pleasure to see so many of you up at Darlington. We had a few extra visitors who had braved the temperatures to visit Head of Steam and who made their way across the field to see what was happening – and buy one of Gillian Lord's tempting homemade buns! Perhaps those of you who haven't yet been tempted to buy a 'slice' or a 'doorstop' might now reconsider as end of the 'loaf' gets ever closer? Don't forget you get a £10 discount on the specially commissioned Bachmann model of the coach if you buy a 'slice'. A perfect accompaniment to your *Tornado* model – in one of the several colours available!

I had hardly drawn breath before word came through that *Tornado* would be spending a couple of weekends at Crewe in late April and the suggestion was made that this would be a perfect venue for

a Covenantors' Spring Day Out. We hadn't been able to hold this informal but very popular gathering last year as the locomotive was never in one place for long enough to allow it to happen so this was very good news. It was a typical April day - sunny but cool with the occasional hail storm - saw Covenantors

"The *Tornado* team continues to grow steadily"

and *Tornado* Team members making the journey to Crewe to see *Tornado* for the Spring Day Out. Although unfortunately not in steam due to the previously advised issues with the air pumps, the opportunity had been taken to give the locomotive a thorough clean and the now familiar BR passenger blue livery positively glistened in the sunshine, much to the delight of spectators.

Covenantors and Team members were able to visit the footplate and chat to the engineering team and Trustees present. Many also took advantage of the merchandise team's presence to stock up on some of the latest additions to the range. The vintage bus rally taking place on the same day also proved popular. Several Covenantors used the vintage bus shuttle running to the station as an unusual mode of transport. The Trust's thanks go to Crewe Heritage Centre and the team there for their warm welcome, the free entry for Covenantors

David Shrimpton



AI 60163 *Tornado* stands at Crewe Heritage Centre during the Covenantors' Spring Day Out, 27 April 2013.

and *Tornado* Team members and their help during our visit. As a result of *Tornado* not being in steam on this occasion, we are now looking at preserved railway visits later in the year to see if there might be a suitable opportunity to have another informal Covenantor get together.

Our next big event will of course be the 2013 Annual Convention on the 21st September at Barrow Hill Roundhouse and I am delighted to confirm that the *Tornado* Team will again have their own dedicated day the same weekend.

We are now busy preparing for our first Trust tour of the year with a reprise of last year's very popular 'The Elizabethan' with a slight difference as *Tornado* will haul the down leg this time. Our friends from the Deltic Preservation Society have very kindly made D9009 *Alycidon* available once again. I have only one special request; for the sake of my blood pressure I would prefer that we don't do any run throughs at booked stations this year! At the time of writing there were still a few tickets available but they were selling fast so I hope those of you wanting to travel were lucky enough to get some seats. I will once again be walking up and down the train persuading you to either buy a raffle ticket or take part in our 'silent' auction to win one of the two headboards that will be carried by the locomotives during the day. I find that it's a great way of catching up with the Covenantors who are travelling so please do say hello!

My column would not be complete without mention of the very special group of young people who make up the *Tornado* Team. The Team continues to grow steadily and it was lovely to catch up with some of them at Crewe. They were all sporting their new 2013 team badges – in blue of course! Our next big event will of course be the 2013 Annual Convention. A venue and date will be announced shortly but I am delighted to confirm that the *Tornado* Team will again have their own dedicated day the same weekend – so watch this space.

Finally, as always, may I thank those Covenantors old and new for their commitment to, and support of, the work of the Trust; and I and the other Trustees look forward to seeing you at one of our events or on one of our rail tours very soon. TCC

A1 60163 Tornado approaches Crofton beside the Kennet & Avon canal with the London-Plymouth 'Cathedrals Express'. 9 March 2013.

Mick Rogers



TORNADO ON TOUR *by Graham Nicholas*

'The Cathedrals Express', 9th March

London (Paddington) to Plymouth IZ60 charter for Steam Dreams 487 miles run

Her intended first run of the season having been cancelled, *Tornado's* return to the thick of the mainline action was this long day out, unassisted over the South Devon banks. But our locomotive was up for the challenge; highlights included posting preservation 'records' on Rattery and Hemerdon banks with the maximum permitted 10 coach load. Unfortunately, during preparation for the following run on 16th March, the white metal on the middle piston crosshead was noticed to be coming adrift and the sensible decision was taken to effect a relatively simple 'stitch in time' repair.



Jon McDonald



Oliver Ridge

'The Cathedrals Express', 19th March

Tonbridge to Worcester

IZ70 charter for Steam Dreams 414 miles run

Having repaired the middle crosshead, the route of the Western Region's original 'Cathedrals Express' now beckoned as *Tornado* took the modern day counterpart to the dreaming spires of Oxford and Elgar's home town of Worcester. The newly re-doubled Cotswolds route gives plenty of opportunity for entertaining running and 60163 duly gave a great display of its capabilities by allowing her customers an additional 24 minutes to take in the latter destination! A careful watch was being kept on the middle crosshead and, despite initial concerns, it has settled down nicely now.



Peter Lovell



Peter Lovell

'The Cathedrals Express', 21st March

Peterborough to Bath IZ63 charter for Steam Dreams 397 miles run

This was a routine turn of duty, taking in the elegant Georgian splendour of Bath. The day was characterised by exemplary timekeeping throughout. But it was all about to get a whole lot more interesting...

TORNADO ON TOUR *continued*

'The Cathedrals Express', 23rd March
London (Paddington) to Kingswear IZ60 charter for Steam Dreams 451 miles run

What should have been a routine day out exploded into drama as an air pump oil pipe failure made its presence all too apparent shortly after setting out along the Great Western mainline. After a notable repair by Jon Pridmore (involving the support coach's cooker and a blowlamp) in the awkward confines of Slough station, the train resumed its journey 76 minutes late. What followed was quite simply the most remarkable piece of schedule recovery that it has ever been the privilege of this column to report on. Against the unseasonal backdrop of snow over the Berks & Hants route, *Tornado* had recovered half an hour of the deficit by Taunton before blazing over Whiteball summit. Aided by missing out the booked pathing stop at Tiverton and some smart station work at Exeter, the tour was back 'right time' by Newton Abbott, going on to post a nine minute early arrival at Kingswear! Quite extraordinary.



TORNADO ON TOUR *continued*

'The Cathedrals Express', 26th March

Newbury to Canterbury IZ78 charter
for Steam Dreams 438 miles run

Despite great efforts expended on air pump repairs, only the front pump was operational for this run and so a diesel was provided for 'insurance purposes'. In the morning, *Tornado* kept to her schedule admirably over some of the country's busiest railway, heading towards the Garden of England on a dull, overcast day. On the return journey, a succession of reactionary delays (caused by other trains) led to late running and this time there would be no miraculous recovery; only when given a clear road beyond Reading could 60163 show her mettle, recovering 11 minutes of the deficit under cover of darkness on the final leg towards Newbury.



Peter Lovell



Paul Davies

'The Cathedrals Express', 13th April London (King's Cross) to York IZ61 charter for Steam Dreams 416 miles run

By her high standards, this was not our locomotive's happiest day out over her 'home' route. Some late running on the outward journey was nevertheless recovered by arrival at York. However the return journey fell victim to operational problems at the southern end of the ECML and the tour was terminated prematurely at Finsbury Park nearly an hour behind schedule. Having allowed passengers to alight, *Tornado* and some of her support crew then became stranded in Wembley Yard by a midnight engineering possession until Monday morning, finally making it back to Southall two and a half days after they left!

'The Cathedrals Express', 20th April

London (Euston) to Holyhead IZ23 charter for Steam Dreams
393 miles run

As *Tornado* set forth from London's Euston station to trace the route of the Irish Mail, there was no hint of what was to befall her later in the day. On a bright sunny morning, the A1 put in an excellent performance on the old 'premier line' to arrive at the traditional Dublin embarkation point of Holyhead one minute early. Alas, it all came to a shuddering halt at Rhyl station on the return journey as the hitherto reliable front air pump stopped working, rendering the train a complete failure. With the reserve pump out of action, there was no option but to call for diesel assistance. The train eventually made it as far as Crewe a massive 3 hours late (where *Tornado* was scheduled to be detached from the train in any case). 'The train could not go forward due to engineering works closing the line so passengers had to travel home by road transport, somewhat late into the night. A ISLT apologises for any disruption and inconvenience caused to those affected'



Geoff Griffiths

P2 AND VAMPIRE UPDATE PART 4

by Graham Nicholas and Owen Evans

As was reported in TCC28, the feasibility study had reached the stage of creating an initial VAMPIRE dynamic model of the P2 in original 'as built' condition (i.e. with swing link pony truck). Since then the remaining work of the feasibility study has been undertaken, based around three objectives:

1. To check whether there was any obvious reason (in terms of vehicle dynamics) why the Trust should not proceed with the P2 project;
2. Assuming no such reason was found, to estimate the minimum curve radius that could be negotiated by the P2 as built, and how much extra lateral clearance would be required to permit operation on sharper curves;
3. To compare the behaviour of a P2 'as built' to that of a P2 with a V2-style spring control pony truck.

The results of the study were submitted to the Trust by Owen Evans of DeltaRail in report ES-2013-003 at the end of February 2013. The following is a summary of the report and its findings.

The new models of No. 2001 ('as built' P2) and No. 2007 ('improved P2' with V2-style pony truck) include some graphical information to allow much better plots to be produced than for the Tornado model. Here is the complete 'as built' model, showing the suspension arrangement: (below).

The first simulations carried out with these models was to run them round an 'assault course' of smooth, sharply curved sections of track. This begins with a straight, then increasing curvature to a 6 chains radius curve, followed by a further increase to 4.5 chains (with a mirror arrangement back to straight). The models were run round this track at 5 mph, and results were produced for the forces between the wheels and rails, both laterally and vertically.

This simulation enables the study of

the 'track shifting' forces; that is the total force from each wheelset that is trying to 'straighten out' the track. Because the coupled wheelsets are constrained to be parallel to each, they are not all aligned with the curve and have what is known as an 'angle of attack'. In this case, not only do the wheelsets try to shift the track, they also try to spread the gauge, i.e. to force the rails apart. On gentle main line curves with good quality rail fastenings this is not too much of a problem, but in depots and sidings where curves can be much sharper there is a limit beyond which there is a real risk of derailment. There is also a link to the vertical loads on each wheel. If the lateral load (the track shifting force) builds up too much, the effect will be to push the wheel clean off the rail (ie reducing the vertical load to zero) – not a desirable result! Having explained all this, we can look at the results as Tornado, No. 2001 and No. 2007 were run round these curves.

Careful study will show the greater build-up of opposing lateral (green) forces for No. 2001 and that the red (vertical) arrows on No. 2001 are quite uneven from side to side – this is most noticeable on the front pony truck.

This is quite scary- the outer wheel of the third coupled wheelset has actually lifted off the rail, and you can see that the engine is doing its very best to straighten out the curve. No. 2007 actually fared little better.

The work included a certain amount of adjustment of hornguide clearances to achieve the best performance for No. 2007. The conclusion was that *Tornado* can just manage a 4.5 chain curve whereas the minimum radius that could be achieved for No. 2007 with reasonable increases in the lateral hornguide clearances will be about 5.7 chains. It was established (from the original drawings) that No. 2001 already



P2 2001 Cock O' The North leaves Edinburgh Waverley in 1935.

John Clay

had thin flanges on the intermediate driving wheelsets and this feature will be retained with No. 2007.

Given that such sharp curves only appear in yards and sidings, this was deemed not to be a 'show-stopper', so the simulations moved on to more general

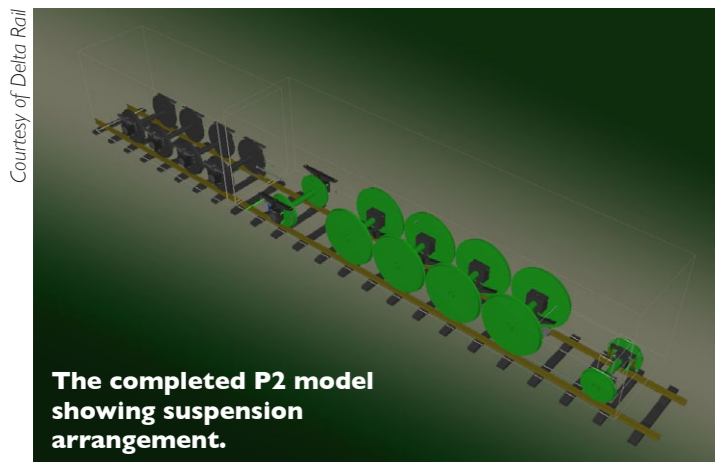
behaviour out on the main line.

These were based around the high speed test run with *Tornado* between York and Newcastle on the evening of 18th November 2008. Much useful data was gathered during that test, mainly in the form of accelerations on *Tornado*

and her tender, as well as a full speed profile for the southbound run. Courtesy of Network Rail, the measured track geometry data for the Up Fast line between Newcastle and York (as recorded by the New Measurement Train about two weeks after the test) was recovered and

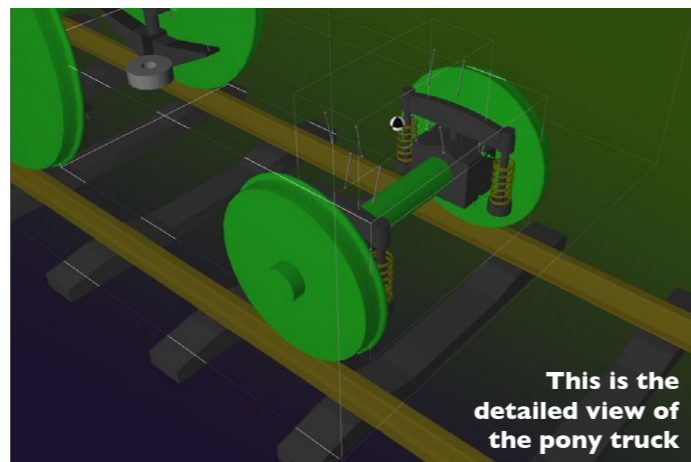
fed into VAMPIRE, and the *Tornado* model adjusted to improve its accuracy. All three models (*Tornado*, No. 2001 & No. 2007) could now be put through their paces over the same track data to provide a true comparison study.

A lot of information was generated,



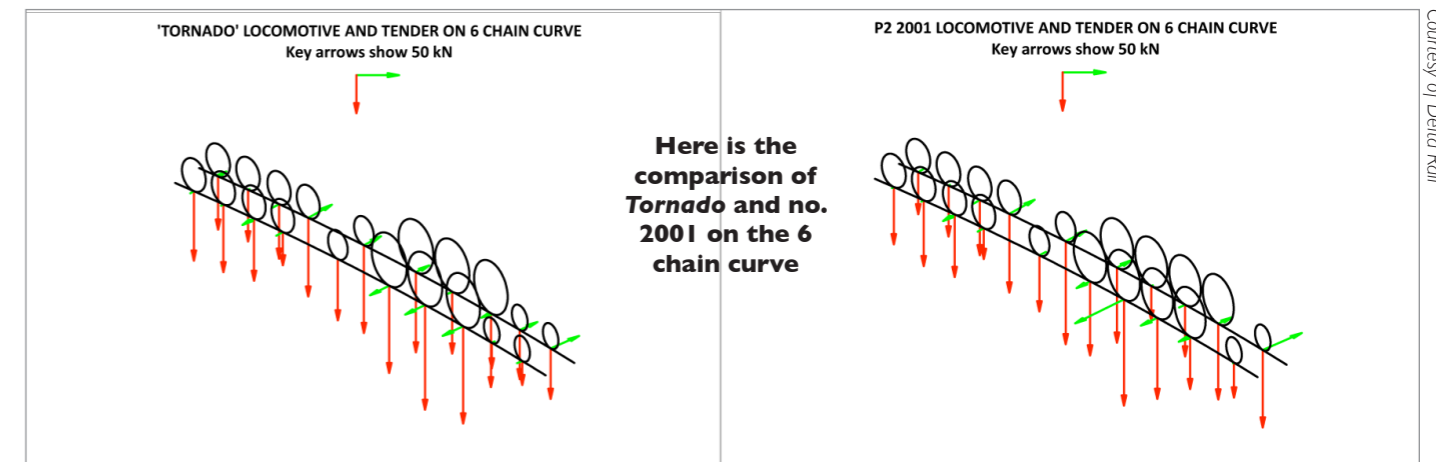
The completed P2 model showing suspension arrangement.

Courtesy of Delta Rail



This is the detailed view of the pony truck

Courtesy of Delta Rail

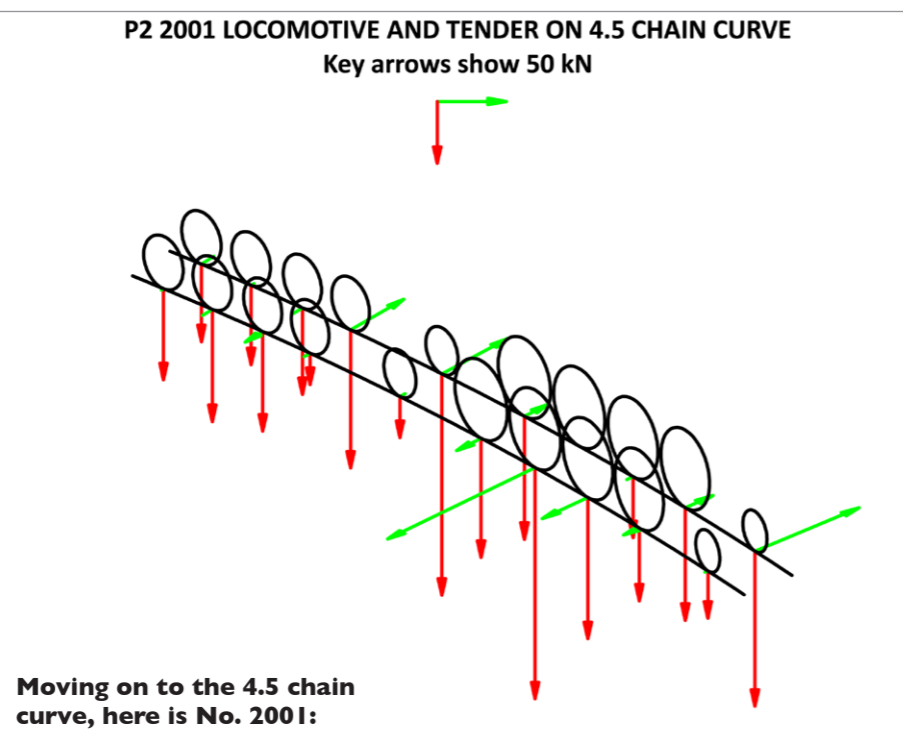


Courtesy of Delta Rail

relating to ride quality, track forces and derailment risk. In some cases the P2s were better than *Tornado*, for example much of the ride (especially for No. 2007) and some of the track forces (remember this route is pretty straight). In some cases No. 2001 was better than No. 2007 and in others the opposite was true. Overall No. 2007 looked better than No. 2001, but would still benefit from further refinement.

One final check was 'peak counting'. This is a somewhat complex calculation (done automatically by VAMPIRE). It looks at the lateral and vertical accelerations on the body of a rail vehicle and uses them to assess whether the vehicle is dynamically unstable. If you have ever pushed a supermarket trolley too quickly and seen the caster wheels start to vibrate rapidly from side to side, or seen a caravan snaking down the motorway, you will have witnessed dynamic instability. You can imagine that a railway vehicle behaving in this way would be quite frightening. Additionally, lack of vertical damping means that a vehicle can build up an increasing 'bounce' in response to features in the track to the point where it can momentarily jump clear of the rails!

Looking at our engines, the vertical behaviour is fine for all of them, even when the section between 75 and 80 mph is analysed. This is an excellent result, borne out by the actual test results from *Tornado*. Looking at the lateral results, some adverse behaviour is predicted, but some of this is caused by the piston thrusts



causing the engine to 'waggle', and this is not the same thing as dynamic instability. Even so, only the fronts of the engines exceed the limits to any significant degree, and the P2s are generally better than *Tornado* (happily, this is an aspect where the longer rigid wheelbase is almost certainly an advantage!). Given that *Tornado* is now accepted as a mainline loco then this is an area where the comparison argument will be a likely way forward in terms of acceptance

Overall therefore, the verdict is that the P2 project should proceed on to the design development phase (involving more detailed dynamic analysis).

Looking back, this has been quite ground-breaking work, as it is almost certainly the first time that VAMPIRE has been used in this way for steam locomotives. Delta Rail have completed an impressive report and we look forward to working with them further on the project. **TCC**

Courtesy of Delta Rail



P2 2001 Cock O' The North stands at Kings Cross in 1934.

C Powell

FROM THE ARCHIVES by Graham Langer

Spring 1993 – An enormous effort by 17 members of The Trust had ensured that over 1,000 drawings had been located and copied at the National Railway Museum, the first time CAD technology had been used in railway preservation on this scale. These plans were supplemented by relevant drawings brought by Gordon Wells and Geoff Drury which were also scanned.

Spring 1998 – *The Pioneer No. 27* recorded that Covenantor numbers had pushed well past 1,200 and continued to grow. On the construction front *Tornado's* smokebox barrel had been delivered to Darlington Loco Works and much effort was being put into finalising and ordering patterns for many parts, William Cook's Burton Foundry had completed casting the last major frame stay and the smokebox door had been finished at Israel Newton. Flying Scotsman services had approached The Trust with a view to purchasing the second tender frames for Bittern.

Spring 2003 – The big news at the start of 2003 was that the board had decided to go ahead with the bond issue, mainly to finance the construction of the boiler. In the works the fit of the Cartazzi wheelset was being fine-tuned and rapid progress was being made in forging and machining motion



1998 - a pile of tyres all of which, apart from the top pair, were destined for *Tornado*.

components. The cannon boxes had been finally fitted to the driving and bogie wheels and these had been replaced under the locomotive. In other news, *Top Link No. 7* announced that Graham Nicholas had been appointed as The Trust's Railway Quality Consultant.

Spring 2008 – The May edition of 'The Communication Cord' reported on the furious rate of activity at DLW following *Tornado's* successful steam test. The tender, sponsored by William Cook Cast

Products, had been fitted with its tank and united with the loco, a huge amount of 'plumbing' was being undertaken and the complex electrical installation, so much a feature of No. 60163, was well progressed. The trust was spending over £60,000 per month on construction and Mark Allatt encouraged everyone to help raise the funds for this. Graham Nicholas presented an update of the certification process, a vital step in gaining access to the main line. **TCC**

ALSLIT

60132 *Marmion* on an up express near St Neots, circa 1951.



Peter Townsend

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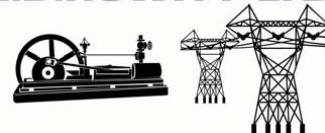
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Darlington Locomotive Works is normally open to the public on the third Saturday each month (11am – 4pm).

Access to the works is via Head of Steam: Darlington Railway Museum where covenantors are entitled to free entry. 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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