



The A1 Steam Locomotive Trust

New steam for the main line

The Communication Cord

No 10 Newsletter of *The A1 Steam Locomotive Trust* February 2008

Tornado blows her top!!

Successful steam test on Friday 11 January 2008

After a nervy week of preparation, Darlington Locomotive Works reverberated to the roar of high pressure steam as Tornado's safety valves lifted at around 11.00am

The story of the week starts on Saturday 5th January. After a day hydraulic testing valves and other smaller items to 400psi, fitting them to the boiler and filling it with water, pressure was applied whereupon the stuffing box area leaked profusely. After two hours partial dewatering, a small amount of overmatter on the boiler casting was identified as the cause - thankfully quickly remedied before the boiler was refilled. Thereafter, no leak showed and a happy team retired to bed at 1.30am. Sunday was a quieter day, but late on a leak was found in the relief valve fitted to allow the water in the superheater elements to evaporate when the fire was lit. This was relatively easy to fix, but delayed the boiler hydraulic test by a couple of hours. On Monday 7th January boiler inspector John Glaze and Vehicle Acceptance Body engineer Paul Molyneux-Berry arrived to conduct the hydraulic test which was concluded at 12.20pm when the boiler passed at 375psi. Then the team faced a rush to ensure the boiler was ready for a fire by the end of the following day. A busy Tuesday saw removal of blanking plates and application of appropriate fittings, pipework, etc to enable the boiler to steam. In addition, the steam blower and, as it would be required for the steam test, one of the two live steam injectors owned by The Trust were connected. At 8.00pm Director of Engineering David Elliott confirmed that all was ready and that the team would try to get an early night (not easy with the rising excitement!). On Wednesday the atmosphere in the Works was tense, but a full inspection of the loco ensured that nothing had been overlooked, eg smokebox door shut tight and no sign of any leaks. All was well so the loco and tender were pushed back and prepared for the event itself. Some wood was broken up to help get the fire going and a bucket of paraffin rags was put ready. First a good layer of coal was put under the fire hole door and, to the simultaneous clicking of two dozen cameras, newly-appointed Trust Vice-President Malcolm Crawley (a former Doncaster premium apprentice and Chairman of The Gresley Society) put the first shovel of coal into Tornado's firebox claiming that he hadn't used a shovel since 1952. The technique was there, and the coal was soon filling up the back creating a nice bed. Graeme Bunker added more coal, then a layer of wood and topped it off with some well placed rags. All of a sudden it was 2.00pm. The honour of lighting the first fire could only go to one person, Mrs Dorothy Mather, the Trust's President and widow of designer Arthur Peppercorn. Assisted by Chairman Mark Allatt, Dorothy took a lit



splint and put it to the rag on a shovel held by Graeme Bunker (the glare of TV cameras made this an almost surreal moment). He then helped Dorothy tip the shovel forward and through the door. Almost 18 years since the project was conceived, **Tornado had a fire lit for the first time**, and soon filled the Works with smoke.

As soon as the formalities were over, the locomotive and tender were pushed outside which quickly allowed the smoke to clear in the Works.

When the loco was checked at midnight whilst in the care of Tom Snowball and Brian Swailes it was found that with just the smallest of fires the engine was warming through nicely, the vent pipe from

the superheater elements was doing its job, but, to everyone's surprise, there was 10psi on the pressure gauge! This needed to be zero so a close eye was kept on the fire to ensure it was burning as slowly as possible. (A strong wind across the chimney was drawing the fire but was expected to abate by the next day). An early check on Thursday morning showed that all was well with the pressure back at zero and everyone happy. Soon it was time to bring the pressure up and slowly heat the boiler through by spreading the fire a little and covering the rest of the grate with the shovel. After an hour the gauge read 20psi and in two and a half hours 60psi. The blower was working fine and with the extra heat the water in the superheater elements was evaporating at such a rate that the pipe fitted sounded like a wide open large ejector. With coaxing the pressure reached 100psi allowing a test of the injector. The water feed was turned on and the steam valve opened and happily the injector picked up straight away. It was so quiet that the water gauge gave the only evidence that it was working correctly. The boiler pressure reached 175psi at 4.30pm when all areas were checked. Everything was OK and set for the big day to come. A good rake was put through the fire and it was pulled back under the door to let everything cool down slowly overnight with Terry Greaves on watch (reducing the heat too quickly could have caused variable contraction rates and possible leaks so everything was done as slowly as possible).



Friday 11th January was the biggest day for the Trust so far:

An early check showed that all was well. The boiler still had 35psi on the clock so the fire was cleaned with a big bar and spread with new coal once again to let it come round. The whole warming through and test would use around 2.5 tons of coal with a fair amount going in that morning. The fire and boiler were made ready for the inspectors' arrival. By 9.00am there was 75psi on the gauge and all was looking well with the fire burning through. John Glaze arrived in cheerful mood but there was more than a little nervousness. Despite everything going so well there was a nagging concern that it wouldn't be absolutely spot on. The crowd swelled as the pressure climbed to 200psi. All was in good order and a final check was made before the real test began (but not before a breakfast was cooked on a shovel for the first time)! The fire was made up, the blower eased open a little more, and slowly the pressure rose. At 240psi the front safety valve started to feather and then as the boiler reached 250psi (working pressure) it lifted fully. At 250psi the rear safety valve was feathering so, having established the first test, the pressure was lowered with use of the injector and a minor adjustment was made to the rear valve. Pressure was allowed to rise again and showed that both were now feathering progressively and lifting at 250psi as required. The boiler inspector was happy but now wanted an accumulation test to ensure the safety valves could manage any demand from the boiler. A little more coal was spread in the box, the damper was opened and the blower put on hard to bring the temperature up. Both valves lifted and the steam was allowed to accumulate so that 260psi (the official test rate) was reached and held. John Glaze wanted it held for a defined period after which we eased the blower back, shut the damper and opened the firebox door. All was well and John was satisfied, but even in this situation

the boiler was holding 260psi and both valves were roaring. It has to be remembered that this was with no arch, a thin fire, the door open and the blower all but off. Later John remarked that although this was only a static steaming he had never seen even a Bulleid boiler making steam like that and it could only bode well for main line performance. The test was complete and it was time to let the fire and boiler cool down on their own ready for all the work still needed for *Tornado's* final completion - and deal with the small matter of local Darlington water pressure dropping to nothing at an inopportune moment. Thanks to the local Fire Brigade there was no long term problem but it added to the twists and turns of what had been a once in a lifetime opportunity to see the first new main line boiler for over 45 years through its first tests.

The last word came from Andreas Hartmann. When commenting on the test, he wondered what all the concern was about and said "Meiningen boilers always pass first time". As he built it he was the one to be confident. The skills of the Works in Germany were now evident for all to see. The boiler will next face the commissioning steam test and the first movement by the 50th A1 60163 *Tornado* under its own steam.

The Trust Chairman, Mark Allatt, writes:

Firstly, I wish all of you, the friends of *Tornado*, a happy and prosperous New Year - and what a momentous year it already is! Recent issues of *Top Link* and *The Communication Cord* have reported a spate of major milestones passed by the Trust, but none more dramatic or emotional than the most recent - the lighting of *Tornado's* first fire and steam test on Wednesday 9th and Friday 11th January respectively. There surely can't be any 'it can't be done' doubters now not



munching on their hats!

It was a very strange feeling walking into our Works on the morning of 9th January knowing that the inanimate bulk of *Tornado* that we had seen change gradually over time would, within hours, come alive. And this sense of dramatic change continued throughout the day. First our new Vice-President Malcolm Crawley - a former Doncaster Premium Apprentice who helped to build the original A1s - effortlessly and expertly put the first shovels full of coal into *Tornado's* huge firebox. Then, at 2pm, I passed a lighted splint to our ever elegant President Dorothy Mather - widow of *Tornado's* designer Arthur Peppercorn - who lit the paraffin-soaked rags on the shovel and, guided by Operations Director Graeme Bunker, tipped them through the firebox door, filmed by three camera crews and photographed by many members of the press. And then, slowly it happened... smoke started to appear from *Tornado's* double chimney and gather in the eves of what now seemed more like Darlington MPD than Darlington Locomotive Works. More than a few tears were shed that afternoon!

A little later the team at the Works pushed *Tornado* out into the open air for only the second time in over 10 years. Over the next two days, watched 24 hours a day by our dedicated team, the heat from the fire slowly warmed *Tornado's* boiler. And then it happened on the Thursday, *Tornado* became a steam locomotive. Water remaining in the superheater after Monday's hydraulic test started to boil, turn to steam and exit the venting pipe. The boiler had started to do what it was built to do! The next morning Graeme Bunker, eagerly assisted by Financial Director Barry Wilson, David Elliott and others, started to stoke up the fire and the boiler pressure started to climb. By now our usual BBC film crew had arrived and to give their news report a populist appeal I was able to fulfil a boyhood dream - a bacon and egg roll cooked on the shovel! Delicious! Before long *Tornado's* boiler reached its operating pressure of 250 lb/sq inch overseen by representatives from the Trust's Notified Body Delta Rail and boiler inspector John Glaze and after some adjustment by Peter Neesam, both safety valves were lifting at the required pressure. It was then smiles all round as John Glaze awarded *Tornado* her 10 year boiler certificate. Later, as we pushed *Tornado* back into the works there was a huge sense of pride in what had been achieved by David Elliott and his team and a realisation that the next time *Tornado* slips into the daylight will be to move under her own steam for the first time.

This latest milestone wouldn't have been possible without all the hard work over the preceding weeks (including Christmas) by David Elliott and his team, often working seven day weeks and very late into the night in order to hit our deadline. Thank you gentlemen for your dedication, your inventiveness and especially keeping your sense of humour during those long cold late nights! The success of the steam test is



testimony to all of the planning and care that goes into every aspect of *Tornado's* construction. Our packed works was a very happy place that weekend during its regular open day, with so many smiles from young and old at the progress that we have made. The future of main line steam in the UK isn't just about new locomotives like *Tornado* but it is also about passing on our enthusiasm to those whose parents aren't even old enough to remember steam in everyday service. So please do encourage your children, grandchildren and even great grandchildren to take an interest in *Tornado*.

We are now clearly on the final stretch of the project to build *Tornado*, with barely eight months until she is scheduled to enter main line service. Thanks to your continued support and generosity our funding gap has fallen from £55,000 when we published the last issue of *The Communication Cord* in November to £19,000 at the time of writing! However, we do need to fill this gap as soon as possible to ensure that the project remains on-track and, once this gap has been bridged, the Trust will need to raise approximately £800,000 to service the loans taken out and bond issue taken up to ensure the locomotive's long term operations.



We are keen to encourage as many arms-length supporters as possible to join us by either becoming a Covenantor, making a donation, taking out a dedicated donation to sponsor a part of the locomotive (there are still many components left to support) and/or subscribing to our Bond issue, so if you know anyone who wants to become part of our winning team please encourage them to come on-board. And when you look at the list of components now available as dedicated donations, I am sure that you will find one that grabs your interest and suits the size of your pocket. We still have a huge amount to do in 2008 if *Tornado* is to enter main line service in the autumn - but with your continued support I have every confidence that we can achieve this objective.

Please spend a few minutes looking through the enclosures with this newsletter. Your feedback in the questionnaire will help to better focus our marketing efforts to recruit more covenantors; I'm sure that our first DVD telling the story of the building of *Tornado* up-to and including the steam test is a must-have purchase (why not also buy one for a friend too?); there are also forms for sponsorship of the first turn of the wheel (please be generous) and, finally, also enclosed is the booking form for our Spring Covenantors' Open Day on Saturday 5th and Sunday 6th, April when (with a fair wind) it is planned that you will be able to see *Tornado* in steam and moving for the first time outside Darlington Locomotive Works. I look forward to seeing you there.

ENGINEERING by David Elliott

Since Issue 9 of *The Communication Cord* was published in early December 2007 considerable progress has been made in advancing *Tornado* towards completion. The work carried out included preparation of the locomotive, especially its boiler and ancillaries, for its first steam test which was successfully completed on 11 January (see headline article).

MOTION The motion has taken a back seat whilst the locomotive has been prepared for the boiler steam test. However, Ian Howitt has machined the connecting rod small end bearings and has sent them away for spark erosion of the pockets that contain the felt pads. On return, the oilways will be machined. Work restarted on the motion at Darlington on 22 January.

PIPE WORK AND FITTINGS

All the pipework required for the boiler test was hydraulic tested, and the steam stand and its associated valves have passed their hydraulic test. The hydraulic test of the lower water gauge fittings proved less satisfactory with a pin hole in the neck of each casting causing a small leak. Fortunately we were donated a set of gauge fittings from 60130 *Kestrel* which, whilst very worn, provided us with two serviceable lower castings. These required extensive de-furring as a result of that locomotive having worked in a very hard water area in its last days. This was achieved courtesy of three hours of simmering in a stainless steel saucepan on the Director of Engineering's domestic cooker using kettle de-scaling chemicals. GN Steam assisted in preparation for the boiler test by packing all the valve stuffing boxes and lapping in valves where required. John Haydon has piped up the turbogenerator - with steam pipework complete from the rear of the locomotive to the generator and from the generator exhaust to the fitting on the side of the smokebox. He also continues to make progress with the oil pipework. The oilbox castings have been received and are now at GN Steam where six boxes are now complete and the remaining four are in work. South Coast Steam has returned the vacuum ejector control valve (it arrived the first time with a bent valve spindle), and GN Steam is overhauling the vacuum ejector bought from John Bunch. GN Steam is also making pipe connectors to suit the ejector; and the design for its installation on the side of the smokebox behind the deflector is complete. Steve Wood made adapters to enable the remaining boiler steam fittings to be hydraulic tested before the boiler hydraulic/steam test in January. The new right handed whistle base has been cast by William Lane at Middlesbrough. The existing ex- 60131 *Kestrel* whistle base was sent to GN Steam to assess whether the valve assembly can be re-used. On examination the conclusion is that it is somewhat worn, so new components will be made. New springs for the safety valves (with the correct coil bound length) have been ordered from the Tested Spring Company in Birmingham, along with other miscellaneous springs for the loco.



BRAKE AND SAFETY EQUIPMENT

The ex diesel and electric locomotive brake equipment is being removed from the locomotive to be sent to Railway Brake Services Ltd for overhaul. The small air receivers have been internally inspected and hydraulically tested. Graeme Bunker has negotiated the purchase of a steam loco type AWS sunflower and cancelling lever unit which Mandy Sharpe will adapt for TPWS. Mandy is also ordering long lead TPWS equipment for us.

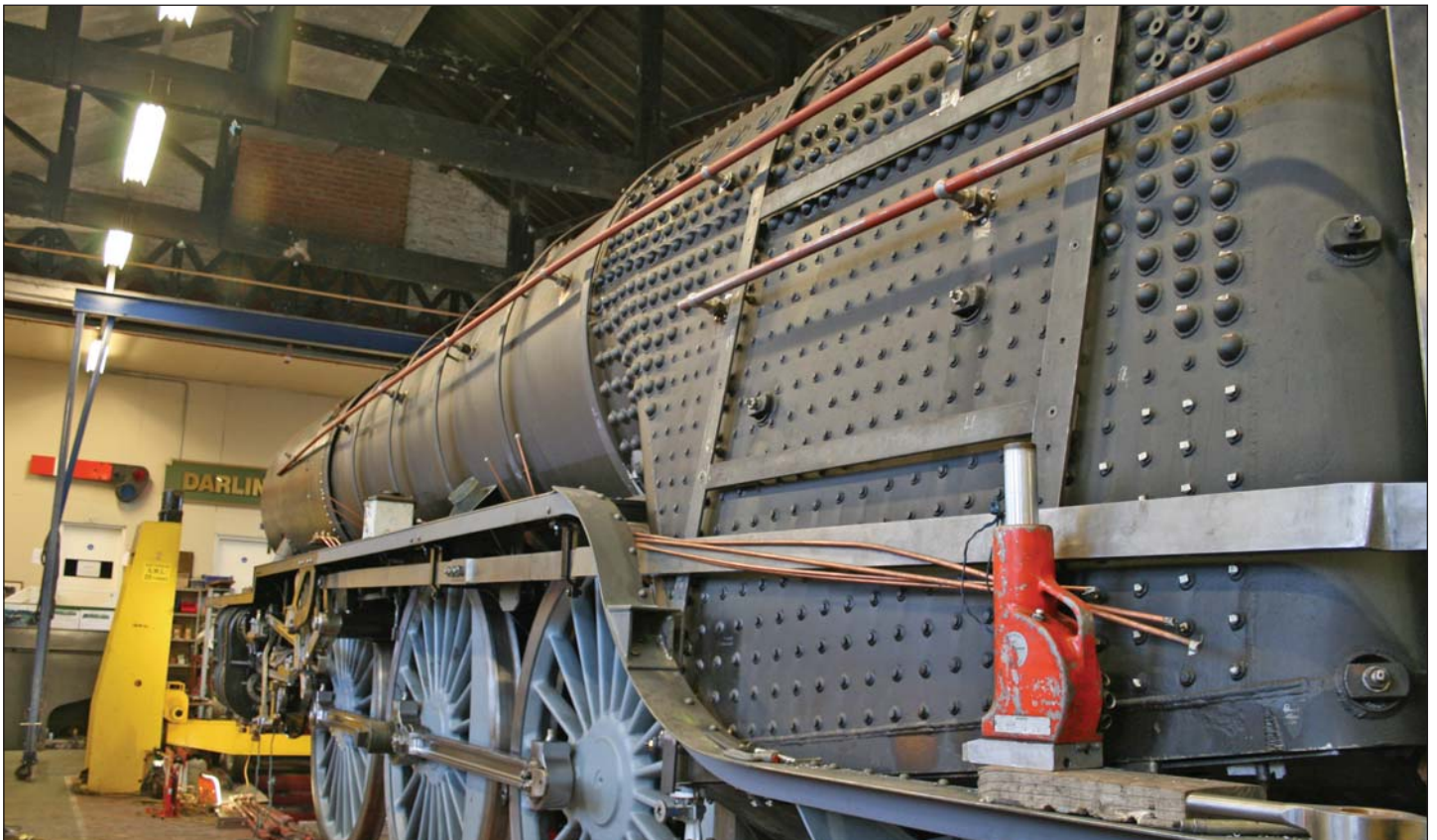


BOILER ANCILLARIES

The blast pipe assembly including blower rings were fitted in the smokebox for the steam test as were the chimney and liner. A large number of gaskets and quantities of packing material have been obtained for the steam test and beyond. The smokebox was partially sealed with mastic to enable the blower to function. The initial effort to find a manufacturer for the smokebox steam pipes had failed so the net was spread wider and responses received from three companies, all offering solutions involving welding together individual bends rather than making the pipes from single pieces of tube. It would appear that there is no longer any capacity to do this work on a "one-off" basis. We have accepted the quote from Induction Pipe Bending Ltd at Sunderland who will make up each pipe in two pieces.

BOILER TESTS

The hydraulic and boiler tests were successfully completed on the planned days, after some late night working. The main problems were in the preparation for the hydraulic test, when on putting pressure on the boiler the regulator stuffing box to boiler joint leaked. This involved draining down the boiler to below the stuffing box to remove same. It was discovered that the joint face of the stuffing box extended beyond the machined pad on the boiler causing it to rest on an adjacent weld. Some use of the angle grinder reduced the weld and removed material from the stuffing box such that a good fit was achieved round the gasket. This cured the problem; however it took nearly three hours to refill the boiler resulting in a very late finish. A second problem was noted, namely that it was almost impossible to shut the regulator once opened. The dome cover was removed, and apart from a slightly sticking pilot valve, no fault was found. At this point it was realised that with the balance chamber in the regulator valve full of water, the main valve was "hydraulic" which prevented it closing. It would close if the regulator handles were moved very slowly to let the water in the balance chamber out through the pilot valve.



The hydraulic test was successfully completed on Monday 7th January 2008 in the presence of John Glaze (Boiler Inspector) and Paul Molyneux-Berry from the DeltaRail VAB. The boiler was lit up for the first time by Dorothy Mather on Wednesday 9th January and allowed to warm slowly. Pressure was raised initially to 100 psi on the following day and the live steam injector tested. This was fed from the DRPS loco water tank in the NELPG end of the building with the aid of several fire hoses kindly lent by NELPG. With the water tank delivery pump running, sufficient water was delivered to the injector to enable it to start first time. Pressure was subsequently raised to 175 psi to further test the injector which continued to function correctly. As detailed elsewhere, on Friday 11th January, the formal steam test was carried out under the direction of John Glaze and Paul Molyneux-Berry and was successful. A minor hitch was use of water at such a rate as to drain the water tank, necessitating calling the fire brigade to enable the test to continue. Some 220 gallons was supplied direct to the injector; the Brigade using the balance of their water to partially replenish the water tank. Since then the loco has been taken back inside the works, the boiler drained once cool, the smokebox, tubes, firebox and grate pressure washed and various fittings removed to enable construction to be resumed.

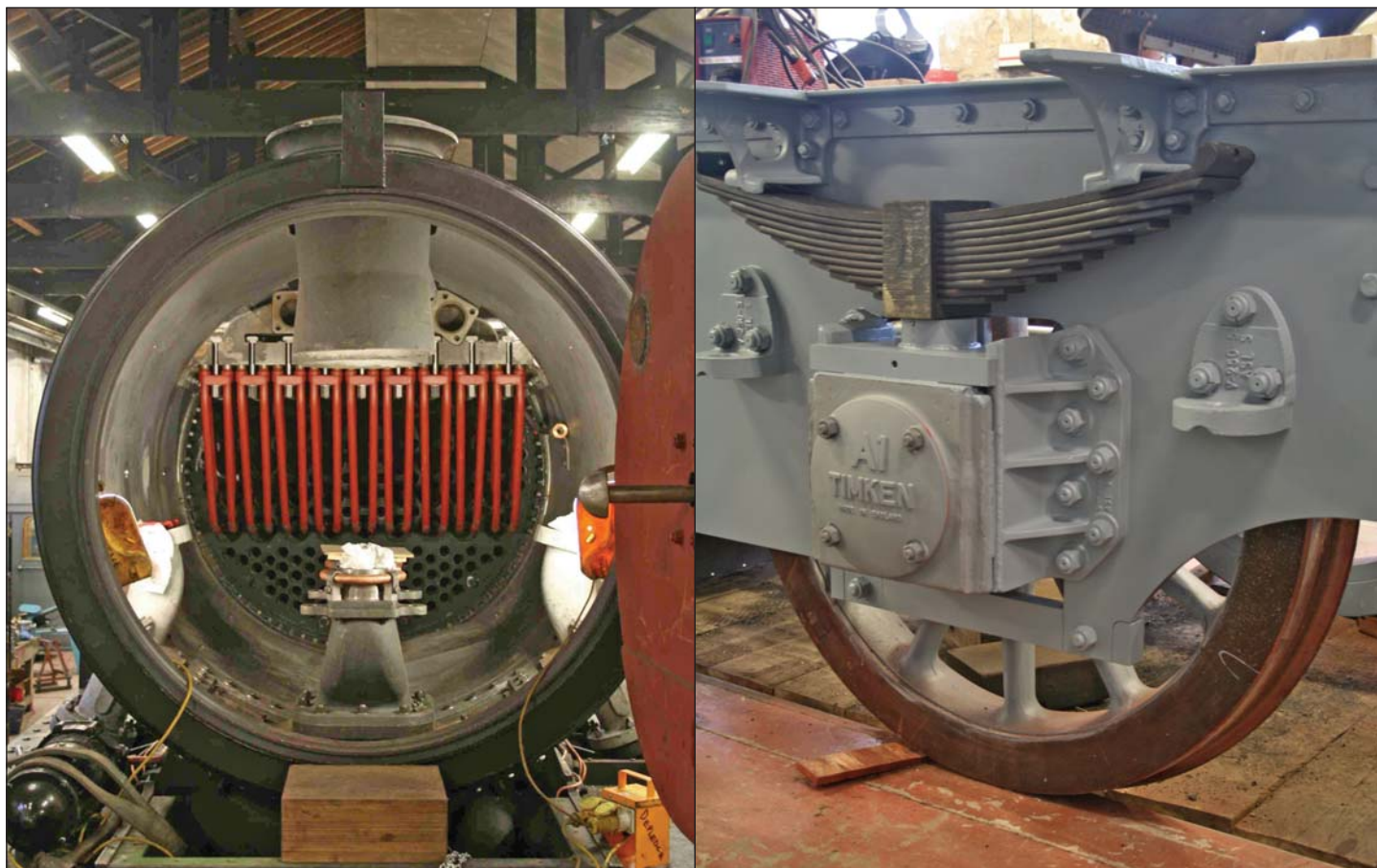
BEARING SPRING GEAR Cartazzi and tender springs have been delivered, the bogie coil springs are expected any day now. Ian Howitt is making steady progress with the locomotive spring gear

CAB William Lane has cast the cab front window frames from patterns produced by Elsfield Patterns. They are now with a specialist CNC machining firm on Teesside for machining. GN Steam is progressing with the modifications to the cab floor and under seat cubicles.

ELECTRICAL SYSTEM Paul Depledge has made good progress at DLW fitting conduit and terminal boxes round the engine for the electrical system. Rob Morland has continued to detail the electrical system with cable being ordered and delivered. David Elliott has spent much time on the layout of the under-seat cubicles to fit in TPWS equipment and main busbar/distribution panels.

TENDER (SPONSORED BY WILLIAM COOK CAST PRODUCTS LTD) The tender wheelsets have been subject to ultrasonic and magnetic particle NDT to comply with the group standard requirements and Timken has pressed on the bearings. The tender frame has been delivered to DLW and is now united with the wheelsets. The air receivers have been re-fitted and Tom Snowball and Paul Depledge are piping the frame for air and electricity respectively. Ian Howitt is completing the last of the brake gear, but still has several spring bolts to make, along with the engine/tender draw gear and the buffers.

WORKS The Works has been repeatedly invaded by TV companies over the last couple of months with *BBC Working Lunch*, and *Tyne Tees North East Tonight* filming Christmas features on the Trust, Marcel from BBC Sheffield filming the tender frame fitting and a local firm producing a video eventually destined for Google Earth. Thanks to the Wensleydale Railway Association Infrastructure volunteers, 74 feet of new concrete-sleepered rail was installed outside the Works ready for the steam test. The track bore the weight of the locomotive and tender frames without difficulty during the test period. The test itself and the warming up period also attracted media crews in plenty.



Covenantors' Diary *prepared by Alexa Stott*

2008 - A Unique and Very Busy Year

Now that *Tornado* has her ten-year boiler certificate 2008 promises to be a truly significant year for the Covenantors of The AI Steam Locomotive Trust. There is still a lot of hard work to be done but also much to celebrate, and we hope that all our supporters, young and old, will join us in that celebration.

There are many dates for the diary but we thought it would be useful to make sure you were aware of the most important ones, namely those planned for the Covenantors. **Please be aware that we cannot guarantee these events taking place on the dates we give below.**

Spring Open Weekend - 5th/6th April

As already mentioned in the Chairman's column, this will be an opportunity to see just how close *Tornado* is to completion, probably in steam and indeed, we hope, moving. This momentous event will coincide with the grand re-opening of the Darlington Railway Museum. Booking forms are included in this mailing and we hope that many of you will be able to join us.

Covenantor Weekend on the Great Central Railway

The details for this are subject to *Tornado* jumping through a lot of hoops (not literally!). But, if all goes well, you will be able to ride behind *Tornado* on the Great Central Railway at Loughborough for the first time on the weekend of 17th/18th May.

Annual Convention and Launch of *Tornado*

It goes without saying that this will be the "must be at" event of the year! Again, the caveat above applies but we sincerely hope to welcome you all to the National Railway Museum in York for what promises to be a spectacular day - Saturday 30th August. Make sure this date is in your diary.

Appeal for Volunteers

But - and isn't there always a but - you will be aware that our job is not complete. Not only is there a, thankfully decreasing, shortfall in funding to complete the construction of *Tornado* but we still have to find £800,000 to cover the repayment of the Bond issue and loans that have been taken out. We must continue to build up the profile of *Tornado* and our supporter base and to this end we are planning to take the *Tornado* exhibition on the road to several events during the course of the year. But for this to be the success I know it can be, I will need a team of volunteers to carry on the excellent job that was started at the Barrow Hill Steam Gala in November last year. These events include:

- The LNER steam gala at the North York Moors Railway on the weekends of 28-30th March and 4-6th April. As the latter coincides with our own Covenantor Open Weekend, we may only have a stand for the first weekend.
- *Steam Railway* magazine reader's day on the Great Central Railway on Monday 19th May.
- "1968 and all that" at the National Railway Museum in York from Saturday 24th May to Sunday 1st June.
- The *Coronation*, also at the National Railway Museum at York on the weekend of 5-6th July, by which time *Tornado* should also be there.

There will no doubt be other events that we would like to be at and, if there are enough volunteers, this should be achievable. If you are interested in helping the *Tornado* project in this way, please contact me by email at alexa.stott@aisteam.com. I look forward to hearing from you all!

Editorial

*This issue of The Communication Cord is a last minute substitute for the planned Top Link which will now be issued shortly after the Covenantors' Works Open Days on 5/6 April. Problems at my end have led to this change, and I am grateful to Mark Allatt and others for help in getting news to you by this alternative means. In addition, my thanks to our printers for their forbearance and help. The milestone reached on 11th January will stay in my memory for a long time. As *Tornado's* safety valves began to lift, I looked around at those who were witnessing the event and noted many a moist eye especially in the faces of those who were old enough to remember the original AIs. I was particularly struck by the use of Kestrel's water gauge casings on *Tornado's* boiler as it added poignancy to the test to know that the first Darlington AI (a profile will be published in the coming Top Link) has 'helped' the (new) last one!*

John Hartley

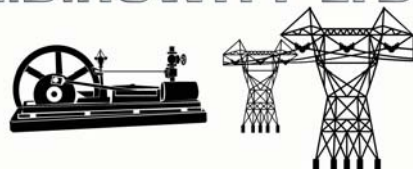
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Darlington Locomotive Works is normally open to the public on the 2nd Saturday each month (11am – 4pm). Free entry to The Works by the Hopetown Lane entrance. Darlington Railway Museum is closed until March 2008.

Charity registration no 1022834

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On Wednesday 6th February 2008 Tornado's tender tank was lowered onto the frames for the first time and was found to be a good fit!! The overall shape of the locomotive is now substantially complete (further work is required between the tender frames before the tank is fixed into position).