ASTT Newsletter No11

Chairman's Piece – John Hind

This newsletter shows the diverse range of activities that we are now involved with – locomotive design aka Revolution, conference organising, help for the Heritage Railway Association, book publication and potentially trialling Bio-coal in the UK. The newsletter contains more details on these activities.

We are doing 'our bit' to see the continuing use of steam locomotives into the 21st Century.

One of the things the committee will be looking at over the coming months is advancement of 'associate members' to 'full members'. The criteria for this, is active involvement in ASTT, which several have shown over the last couple of years. This gives full voting rights at our Annual General Meetings; the downside is that your subscriptions go up!!!

Newsletter Contributions – David Nicholson

I am sure that you have noticed that the ASTT Newsletter has gone from a sizable publication to a much smaller one of only a few pages. We are only a small group and as such, it is difficult to continually ask people to contribute as the work always seems to fall on the same small group of people.

If you would like the newsletter to include articles and papers and not just management notices, we need more of you to contribute!

We have a lot of knowledge and experience in the ASTT and it would be nice to share more of it with the members. Please, could we all make a big effort to make the January 2020 Newsletter the best yet? To give you time to write something over the festive period the press date for the next issue will be Friday 3rd January 2020.

Revolution Progress – Jamie Keyte

To date we have had two engineering meetings at the Stapleford Miniature Railway, which have included a viewing of the locomotives operational there.

The intention is to write brief specifications for design packages which can be adopted by individuals or small groups to work on. As this the first time the AST has attempted a design project using several people working in remote locations there is, inevitably, a certain

amount of background work that needs to be done to ensure the work is properly coordinated.

- A first draft Design Requirement Specification has been completed and distributed to interested members. This is a top-level document which outlines the general form of the locomotive without going into engineering detail.
- Basic design calculations to establish cylinder sizes and steam consumption have been completed against the performance requirements.
- John Hind has set up a set of storage folders on the One-Drive (in a cloud – somewhere!) which enables files and documents to be stored and accessed remotely.
- Several members have now installed Fusion 360 which is a web-based CAD package.
- A drawing numbering system is being developed.

It is also necessary that some initial design work is done in order that some of the principle datums and interfaces are defined prior to completing the design package specifications. An example of this is the frame spacing which clearly has an impact on the boiler and firebox design.

Sufficient design work on the suspension / axle location (presented at the AST October Conference), and the frame has now been done to enable the first draft of the Boiler Specification to be produced. Martin Johnson has agreed to undertake the boiler thermal performance studies using his 'Loco Boiler' programme, with Alex Powell helping with CAD modelling.

A boiler kick-off meeting took place in Edinburgh for 6th November.

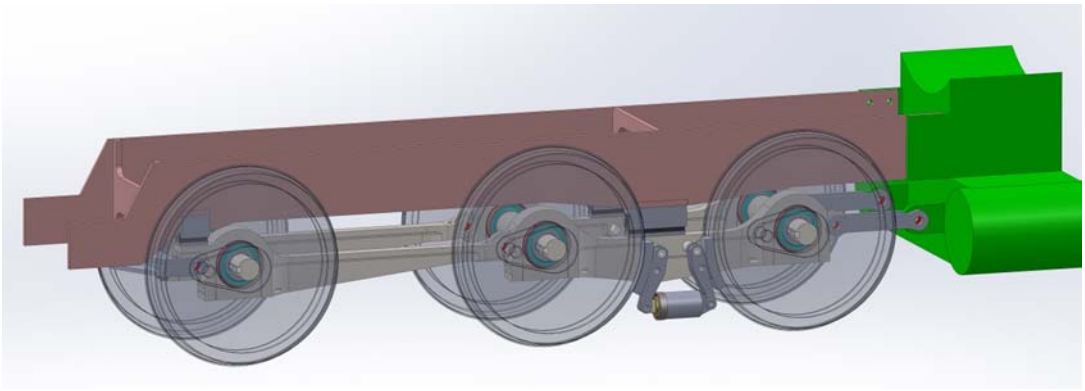


L-R: Martin Johnson; Alex Powell; Jamie Keyte; John Hind at "boiler meeting" in Edinburgh

Following this it is intended that other work packages will be quickly produced to enable work to progress more rapidly. Some work packages will be relatively straightforward design exercises e.g. the design of the driving wheels, whereas others will require research and development at a theoretical level.

Meanwhile……

The suspension assembly progresses and, since the brakes are mounted on the spring beams, some preliminary work has been these also. The brake cylinder on the leading and centre coupled axles can be seen on the CAD image. A similar pair of cylinders will find their way onto the trailing axle in due course.



Richard Coleby has been developing an interesting design for the fabricated Monobloc cylinders incorporating outside admission valves. This is intended to improve and simplify the exhaust passages. More details soon!

And lastly ……..some metal has been cut!



Heritage Railway Association – John Hind

Because of the UK Government's concerns about the use of coal and its impact on the environment we invited Steve Oates, the CEO of the Heritage Railway Association (HRA) to the conference (for which we paid). As a result, we helped the HRA prepare a submission to the Department of Transport on 'Carbon Off-Setting in Transport – A Call for Evidence'.

Until the Government publish the responses, we cannot publish what we prepared, but in a nutshell our submission, was able to put into context the amount of CO_2 produced by the Heritage Sector per year and compare that with the UK's total CO_2 Based on 2018, the

Heritage Sector produces just 0.02% of the UK's CO_2 emissions, yet employs over 4000 people and contributes c£400million to the UK economy. The HRA's overall, submission recognised that opportunities to reduce emissions should be sought and mentioned bio-coal.

Bio-Coal – John Hind

Following on from the presentation by Wolf Fengler on the latest bio-coal trials in the USA, by the Coalition for Sustainable Rail (CSR), we have asked whether they can supply samples for trying in the UK. This will be dependent on whether, they have any left over from the latest trials or if not, when the next batch is going to be produced.

Chris Newman and Richard Coleby are also in discussion with CSR about visiting in 2020 to see the next set of trials first hand and visiting the bio-coal production facility.

At time of writing we have not heard anything back from CSR. We are keeping the HRA updated on our progress on this and they are keen to be there, if we can get a sample to try in the UK.









ASTT Bio-coal Trials 2012

It will be interesting to compare the current product with the samples that we tested back in 2012

Save the Dates – AGM 2020

Our next event is the 2020 AGM, which we plan to hold on Saturday the 7th of March 2020. We will send out further details in the New Year.

Steam Train Britain – John Hind

The 'Yesterday' channel on the Freeview Digital Channels has commissioned a 10-episode series called 'Steam Train Britain'. New episodes are shown at 8pm on Thursday's and there are repeats on Monday at 9pm and Thursday at 12am. It is also available 'on-demand'. The first episode attracted circa 300,000 viewers and was the 10th most watched programme on the channel. In the digital TV world, this is looked on as a good result!!

Details are available on the following link: https://yesterday.uktv.co.uk/shows/steam-train-britain/

The first episode featured our secretary, Cedric Lodge in his role as a Fireman on the Ffestiniog Railway where he was coaching a new firewoman. The last episode will feature the restoration of a Lancashire and Yorkshire saddle tank built in 1881, that last ran 35 years ago. Filming for this took place at the East Lancashire Railway over the last 6 months with the final filming taking place on the last weekend in October.

Your chairman has had a supporting role in helping to restore this engine (my boss is a 21-year-old locomotive fitter, who takes centre stage). In its day it was 'advanced steam' but now is a part of the UK's industrial history. If anyone, spots something missing from the engine – we already know!!!!

Conference 2020 – John Hind

Although, it's just one month since the last conference we have started planning the next one! One of the things that we have learnt is that the combination of the talks, a 'works visit' and a conference dinner works well.

We already have a couple of offers of papers, ***but there is room for more, so if anyone would like to present,*** please get in touch with myself or Chris Newman – sooner rather than later, as we can be oversubscribed with papers.

We are looking different venues, as Howarth, Bury and Crewe have served us well, but we have visited the works at all three locations, so we are looking at other venues that can offer a 'works visit'. Currently we are looking at Darlington with a visit to see the P2 or the Midland Railway Centre at Butterley.

In deciding on a location, we have to take into account; availability of conference facilities, reasonably priced hotels, good transport links and somewhere to hold the conference dinner. That research is taking place, as I write.

If anyone has alternative suggestions please let us know, though, if you do, be prepared to be 'volunteered' to carry out some in-depth research!

We aim to hold the conference on the first weekend in October, which next year would be the weekend of the 3rd and 4th of October, subject to confirmation with the venue.

Membership – Chris Newman

It is pleasing to report a continuing increase in membership. 6 new members have joined since July bringing the current total to 81. We welcome the new members as follows:

- **Graham Shirley** from Coventry, Member of I.Mech.E.. Graham is associated with locomotive equipment and poppet valve gear including 71000. Graham attended AST's 2019 conference in Crewe.
- **Davis Bush** from Latvia: holds Masters degree in Rail Transportation, specialising in rolling stock, and is currently studying for a PhD on Rail Transportation. He has been involved in steam since the age of 16 (2013) and has been interested in modern steam since reading Wardale's book. He has widespread railway experience including on the FR and WHR in the UK, and in several other countries through FEDECRAIL's youth exchange programme. He has acted in a voluntary capacity as project manager and design engineer on various steam, diesel and carriage restoration projects and on a new-build passenger carriage for a 750 mm gauge railway. Davis has won numerous awards including silver and gold national awards for mathematics and physics, and a CAD contest at Riga university. He is the author of several technical papers covering a wide range of subjects ranging from thermodynamics (of steam locos) to carriage suspension systems, and balancing of reciprocating parts. Davis flew over to the UK from Latvia with his wife to attend AST's 2019 Conference in Crewe. In his own words, Davis is "enthusiastic to prove that modern steam is not a subgenre of steampunk, but real technology with its niche application".
- **Terry McMenamin** from Ockbrook in Derbyshire. Terry is a Member of I.Mech.E. and has extensive railway experience, starting as an engineering apprentice in Crewe Works. He was involved in suspension and bogie design (including early use of vehicle dynamics), and in the ill-fated APT Project. He was later involved in the transition from BR to the privatized rail system. Now retired, he is acting as engineer on the George the Fifth locomotive project. Terry presented a paper at AST's 2016 conference on the redesign (to modern standards) of the Joy Valve Gear for the LNWR George V Project.
- **Sam Mackwell** from Christchurch, New Zealand. Sam has spent the last three years designing and building a new 36 tonne 3'-6" gauge 2-6-0 steam loco featuring a novel wood-fired boiler that that he anticipates will reduce maintenance and safety risks associated with conventional boilers, yet looking identical. Sam reports that under test, the new boiler has eliminated smoke and spark emissions and demonstrated high absorption efficiencies. Understandably, Sam has not revealed any details of the boiler, but we look forward with bated breath to learning more about it in the future. For a brief preview and photos see article in WATTRAIN's September newsletter (p11).
- **Tony Biebuyck** from London.
- **Gordon Best** from Darlington, UK: a retired AutoCAD designer in the petro-chemical industry. Currently assisting NELPG in drawing a new tender top for their K1 (62005).

Summary: The current membership base is distributed as follows:

Full Members:	13 (as before)	UK members:	61
Associate Members:	62	EU:	12
Student Members:	6 (as before)	USA	3 (as before)
		Australasia:	4
Total Membership:	81	China:	1 (as before)

2019 Autumn Conference – Crewe – 5/6th October – Chris Newman

ASTT held its 2019 conference in the Crewe Ibis Hotel over the weekend of 5th/6th October. With 50 attendees over the two days, attendance was significantly higher than in previous years, with five countries represented: UK; USA; Holland; Spain and Latvia.

The 10 speakers presented papers on a wide range of topics, one of the most interesting being Wolf Fengler's talk on the development and testing of a bio-coal product in the USA.

The full list of speakers is as follows:

- Mike Horne (ASTT Member): "Electronic Measurement of Locomotive Performance being developed by ASTT "
- Wolf Fengler, (Chief Engineer for the Coalition for Sustainable Rail based in Colorado, USA): "Update on Biofuel Testing"
- Peter Greenwood (Trustee of Locomotive Storage Ltd.): "History of Locomotive Storage Ltd "
- Dr. Jos Koopmans (from the Netherlands and author of "The Fire Burns Better …"): "Calculation of front ends with multiple orifices";
- Jonas Nilender (Student Member from the USA) "Advanced Steam Locomotive Proposals in Review 1933 – 2019";
- Wolf Fengler (see above): "The T1 Project "
- Hendrik Kaptein (also from the Netherlands): "Chapelon's La Locomotive a Vapeur – from 1938 to Today – why it is uniquely important";
- Jamie Keyte (ASTT Member & Director of Keyte Smith Ltd): "Update on the Revolution Project "
- Richard Sant (Secretary, Patriot Project): "Update on the LMS-Patriot project";
- Joe Cliffe (ASTT Member): "Wood Burning Locomotives".

Copies of papers and video recordings of presentations can be accessed by members who have logged-in by going to the 2019 Conference Presentations page.

Of special interest was the attendance of Steve Oates, CEO of the Heritage Railway Association, and the retrospective interest shown by Steam Railway magazine.

It is pleasing to report that AST made a small profit from the conference, attendance having been higher than budgeted.

Website Updates- Chris Newman

Two pages have been added about the 2019 Conference:

- A broad description of the event available to the general public;
- A page with links to presenters' PPT files and video recordings of presentations available to ASTT members only.

Two posts have also been added offering:

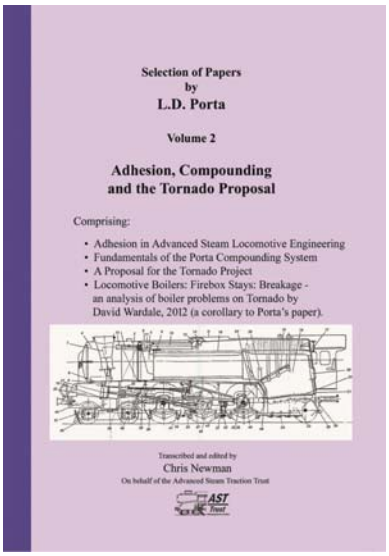
- News about the Conference;
- News of new steam loco construction in China (from Liang Chenyuan).

Book Sales – Chris Newman

Book sales since July were as follows:

- **5AT Fundamental Design Calculations** (pub. ASTT): 1 sold (total sales 190 since 2015);
- **5AT Feasibility Study** (pub. ASTT): 1 sold (total sales 46 since 2015);
- **Volume 1 of Porta's Papers – Tribology and Lubrication** (pub. ASTT): 4 sold (total sales 37);
- **Volume 2 of Porta's Papers – Adhesion, Compounding and the Tornado Proposal** (pub. ASTT): 27 sold (total sales 27);
- **Steam Locomotive Design Specifications and Calculations for New Build Baldwyn 2-4-2T 'Lyn'** (pub. ASTT): 25 sold including 20 copies ordered by Camden Miniature Steam on 1st Nov '19 (total sales 52);
- **Defence of the MR/LMS Class 4 0-6-0 by Adrian Tester** (pub. Crimson Lake): 2 sold (total sales 16);
- **Introduction to Large-Lap Valves by Adrian Tester** (pub. Crimson Lake): 2 sold (total sales 9)

New ASTT Book Release: Selection of Papers by L.D. Porta - Volume 2



In July 2019, ASTT published the second volume of Porta's Papers covering Advanced Adhesion, Compounding and Porta's 1992 proposal for the Tornado project. Since then some 25 members have purchased the book, leaving 56 who haven't yet ordered a copy. This short article is aimed at them!

Porta died in 2003 but some of his legacy lives on, mostly in form of Lempor exhausts fitted to locomotives around the world and in a few narrow gauge locomotives that incorporate other features developed by him. Most notably his legacy is encapsulated in Wardale's *Red Devil and Other Tales from the Age of Steam* which spells out in detail many of the more important engineering concepts that Porta developed through his long career.

So far as we know, Porta never wrote a book, so the only documented legacy left to us are his published and unpublished papers of which we have list of 232 dating from 1945 to 2001. Some were printed in journals, some were typed but the majority are handwritten manuscripts; most are in Spanish and English but a few are in French. ASTT is in possession of some 70 of these papers, of which 7 have been published in ASTT's first two volumes. Chris Newman has another 12 transcriptions (of mostly shorter papers) that only need proof-reading and tidying up before Volume 3 is made ready for publication.

The three papers in Volume 2 cover very different topics. The paper on Advanced Adhesion is so broad-ranging that it is hard to summarise, but it offers insights into both the nature of creep and slippage and also into the causes of slippage – in particular the effects of various

types of track contamination. The Tornado paper offers a glimpse of "what might have been" - though, to be fair, had the A1 Trust adopted the ideas presented in it, they would have raised as many challenges as the 5AT did. The Fundamentals of Compounding is ostensibly a reprint of the paper published by Camden in 2006, however this new version includes a number of important corrections and numerous margin notes made and retrospective comments by Dave Wardale for whom the paper was written in an attempt to persuade him to adopt compound expansion on the 5AT.

The book has a retail price of £27 from which members **are offered a 20% discount**. We believe that this represents good value for 250 A4 pages filled with valuable information that should interest steam enthusiasts including those who are not engineers. Apart from a 10% royalty paid to the Porta Foundation in Argentina, all proceeds from the three volumes will be retained by ASTT. So, by purchasing this and other ASTT publications, members will be giving it valuable support.



DRAFT