



ASTT Newsletter No10

Chairman's Piece – John Hind

At our AGM's I always ask for anyone to come forward and join us to help run our small group. James Conway, one of our young members has taken on board my challenge and we have co-opted him on board as Young Members/Student Members Representative, with this brief: -

- Recruiting new Student Members
- Engaging with existing Student Members and encouraging involvement in ASTT activities
- Recommendations on outreach to potential Student Members
- Recommendations on how ASTT can serve its Student Members better

In addition, James will be shadowing Paul Hibberd on filing Companies House returns.

James is from Pickering, North Yorkshire and currently our youngest member, but already a director of "Conway Rail Solutions Limited", offering consulting services on air brake and AWS/TPWS system design and fitment, CAD design and compliance with group standards for locomotive registration and certification for running on Network Rail infrastructure. His current projects include: design of the air brake system for 4079 Pendennis Castle and for 3672 Dame Vera Lynn; and CAD design for the Standard Steam Locomotive Company building 72010 Hengist. In addition, he volunteers for the Essex Locomotive Company and the NYMR.

One of my recurring themes has been sustainability of ASTT and having James on board is a step in the right direction. James and our other Student members are at the core of sustainability and it's been great to see them at the meetings we have had on the Revolution project, which will be a unique learning experience for them at the start of their careers.

Our annual conference will soon be on us. As organisers, one of our worries is whether enough of us will turn up, to make all the effort in organising worthwhile for the speakers and ourselves. To encourage early bookings, we introduced a small discount for early bookers. The offer closes on 31/7/19, so to take advantage of it, make sure you book and pay by then.

A Challenge - Terry McMenamin

One of the most significant risks to continued operation of main line steam must be the delays caused by loss of adhesion. This was always a problem with steam, partly inherent in the Stephenson locomotive, with driver skill a significant factor. As the main line railway gets more congested, with higher expectations of reliability, the railway will become less tolerant of delay. It is already much less equipped to deal with a stalled train as there is very seldom any nearby power to provide a short boost. At the same time, drivers are used to simple controls, sometimes one control for power and braking, with automatic sanding and fine traction control to maximise adhesion.

A possible project for AST would be to extend knowledge and understanding of wheel slip. Such a project might comprise:

- Review Steam loco adhesion control generally – tread conditioning with cast iron brake blocks, trickle sanding, steam sanding, braking to control slip, etc. Does regulator position (dome or header) have a significant effect?
- Review developments in modern traction control since, say the arrival of the CI59 which had such an impact (one loco hauling 10,000 tons on one occasion, 5,000 normally). On that basis even a 4-coupled engine should walk away with 1,000 tons, but that won't happen.
- Review recent RSSB work on adhesion, aimed at braking but possibly modern sanders may be helpful. Testing of variable-rate sanders in braking seems to show promise, see <https://www.rssb.co.uk/research-development-and-innovation/research-project-catalogue/T1046> and several other related projects, which can all be viewed on the RSSB website.
- Develop a mathematical model, incorporating all reciprocating and rotational inertias, piston forces etc and maybe considering more advanced throttle control (pressure control) systems with modern automated sanding driven by creep measurement, and any other suggestions that might come up. Human factors come into it too – how fast and how usefully can the driver react? Would early warning of slip usefully reduce response time?
- Review the output and identify the options for improving traction control.

If anyone is willing to accept this challenge then please contact John Hind (john.hind@advanced-steam.org) who will pass your details onto Terry.

Note: Chris Newman will shortly be publishing Porta's paper on "Advanced Adhesion" which may be relevant to such a study – see page 6.

Revolution Project Update – John Hind

Following on from March's 'Kick Off Meeting', we held a full day Engineering Meeting on Tuesday 4/6/19 at the Stapleford Miniature Railway, nr Melton Mowbray.

Geoff Ayres, Nigel Barnes, Chali Chaligha, Richard Coleby, James Conway, Chris Corney, Paul Hibberd, Iain Jack, Jamie Keyte, Alex Powell, Andrew Taylor and myself came along for what was a full day starting at 10.15 and finishing for 17.30.

Topics covered included: -

Locomotive Performance & Specification - Richard Coleby and Jamie Keyte took us through the proposals on locomotive specification and performance, which is based on operating at the Stapleford Miniature Railway (SMR) and hauling a fully loaded train of 9 car train (8100 kg) at a maximum speed of 10 mph on the flat and at 7 mph on the 1/40 ruling gradient with the ability to restart a fully loaded train on the 1/40 gradient.

- **Leading dimensions** -
 - 2-6-0 tender locomotive
 - Boiler Pressure – 14.61 Bar
 - Driving Wheel Diameter – 330 mm
 - Cylinders – 80 mm x 150 mm
 - Loading Gauge – 850mm x 600mm (approximately 1/5 Continental)
- **Alternative Fuels** - given the current debate on coal availability and climate change, at some stage the locomotive needs to be capable of being used as a test bed for trialling alternative fuels and the chapter on Alternative Fuels in 5AT Feasibility Study is being looked at for relevance (this was written in 2009 before the current debates started and before bio-coal was heard off!)
- **CAD Systems** - A number of members of the group have access to the SolidWorks CAD, but additional copies will be needed for other members willing to do CAD design. As one copy can cost a couple of thousand pounds, research is underway to see whether copies can be made available at low or no-cost for charities.
- **Boring Things** – we also discussed a number of non-locomotive related issues, but nevertheless important as working ground rules; drawing numbering systems, drawing and document control, remote working and file storage on the cloud.
- **Locomotive Viewing** – we also took time out to look at the SMR's fleet of locomotives, so we could get a sense of scale and proportion (see photos overleaf).
- **Next Meeting:** - is going to be Tuesday 20/8/19 at the Stapleford Miniature Railway and will be an Engineering Meeting to follow up actions from the last meeting.



S160 Testing – John Hind

On Tuesday 13/5/19, Mike Horne and John Hind were at the Churnet Valley Railway at the request of the owner of 6046 to measure the smokebox vacuum that the engine develops. The test was part of the owner's tests to check all systems on the engine before it went out on hire to the Paignton and Dartmouth Railway for the summer. While they can check out systems like the brakes and statically check the function of the pistons and valves, they cannot check the pistons and valves in operation. Looking at the pulses in the vacuum is an indicator of piston and piston valve condition. After a short run up the Cauldon Lowe branch we were able to confirm that there were no issues with piston or piston valves.



6046 at Cheddleton



At Leekbrook Junction

Membership – Chris Newman

Once again it is pleasing to report a continuing increase in membership which has now reached 75.

We welcome the following who have joined us since April:

Dr. Louis Wibberley B.Met PhD (Chem. Eng.) from NSW, Australia: Louis is Principal Technologist at CSIRO (Commonwealth Scientific and Industrial Research Organisation), and leader in emission-less electricity and transportation using ammonia, and leader in DICE development. He is passionate about energy efficiency, reducing environmental impacts, and using fossil fuels more effectively to underpin a much higher penetration of renewables. Current projects include zero emissions electricity and transportation using ammonia produced from renewable energy, and ultra high efficiency electricity from coal and biomass using adapted diesel engines. The last 30 years have been devoted to industrial R&D to both improve existing processes and assess new technologies – mostly for iron and steelmaking, and electricity generation.

David Nash C.Eng. M.I.E.T. B.Tech. (Mech Eng) from Caerphilly, Wales: retired director of an engineering company and footplate volunteer since 1972; now a staff driver and maintenance fitter on a local steam railway.

Marcus Harriott from Banstead, Surrey: works in small business and company takeovers, and is a long-servicing army reservist. A supporter of several heritage projects.

Dr. Richard Mellish B.A. Ph.D. Physics from Harrow, Middlesex: worked mostly in the Dept. of Health dealing with medical device safety with active participation in the development of International and European standards. No steam experience.

Jordan Leeds from Colne, Lancashire: Jordan has had extensive training in machining, fitting and boiler smithing at the Kirklees Light Railway, Llangollen Railway and LNWR Crewe; he has volunteered at the KWVR in their loco & traffic dept. He has spent 3 years working as volunteer Liaison Officer and Operations Director for the LMS Patriot Project and two years as Project Leader for the Gigantic Locomotive Company, which aims to recreate a lost Bassett-Lowke 15in gauge steam locomotive “Colossus” – the second Pacific built in the UK (after Churchward’s Great Bear) of which he is a founder

Dennis Bräuer from Germany: no information yet available.

Summary: The current membership base is distributed as follows:

Full Members: 13 (as before)	UK: 57 members.
Associate Members: 56	EU: 11 (Spain, France, Germany, and Netherlands).
Student Members: 6 (as before)	USA: 3 members (as before).
	Australasia: 3 members.
Total Membership: 75	China: 1 student member (as before).

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

Booking forms for the conference were distributed to members (and several non-member) last month. Early bookings have been slower than had been hoped, so members are urged to sign up for attendance while the “early-bird” prices remain in place. Prices will be raised after 31st July by £10 or more depending on what is needed to cover the conference costs.

Members are asked to circulate copies of the booking form to friends and acquaintances who might be interested in attending.

Anyone who hasn't received a booking form, please contact Chris Newman at info@advanced-steam.org to ask for one.

Book Sales – Chris Newman

Book sales since March have continued to disappoint. Sales were as follows:

5AT Fundamental Design Calculations (pub. ASTT): 1 sold (total sales 189 since 2015);

Volume 1 of Porta's Papers – Tribology and Lubrication (pub. ASTT): 3 sold (total sales 30);

Steam Locomotive Design Specifications and Calculations for New Build Baldwin 2-4-2T 'Lyn' (pub. ASTT): 1 sold (total sales 26);

The Red Devil and Other Tales from the Age of Steam by Dave Wardale (pub. Camden): 1 sold (total sales 22 + 233 sold previously by 5AT Group);

New Titles: Chris Newman is still working on Porta Papers Vol 2 covering:

- Adhesion in Advanced Steam Loco Engineering;
- Fundamentals of the Porta compounding system for steam locomotives (corrected version);
- A Proposal for the Tornado Project.

The Adhesion paper takes the place of Porta's Water Treatment paper, work on which has been suspended pending feedback from Shaun McMahon.

It is hoped that sales these three fascinating papers will exceed those of Volume 1 which have been disappointing despite the importance of the papers contained in it.

Members are encouraged to take advantage of the 20% discount offered on in-house publications!

Website Updates- Chris Newman

Little work has been done on the website. Only two pages have been updated:

- the “Technical Terms” (FAQ) page on the subject of Tractive Effort has been updated with the correction of an error;
- the 2019 Conference page has been updated with the inclusion of a link to the Booking Form

