



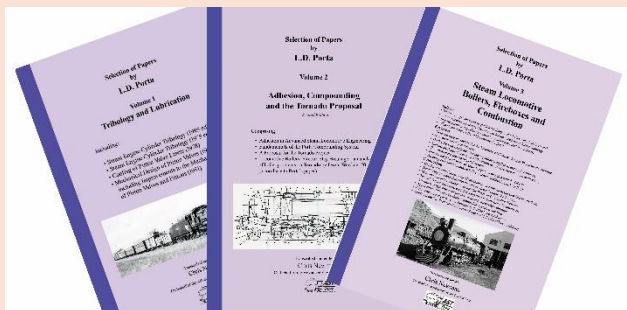
The Advanced Steam Traction Trust

<https://advanced-steam.org>

- Locomotive Design and Manufacture



- Publishing specialist books



- Annual Conferences



Background and Set-Up

The Trust was formed in 2012 on the foundations of the 5AT Project which aimed to design and build a high-performance 100+ mph 2-cylinder simple 4-6-0 locomotive (the 5AT, featured on our logo) that was based on the footprint of the BR Standard Class 5.

The 5AT was conceived by British engineer, David Wardale, who famously rebuilt two locomotives in South Africa in the late 1970s and early 1980s, the first being a 19D 4-8-2 that was lightly modified with a Lempor exhaust and a GPCS combustion system, both inventions of the renowned Argentinian locomotive engineer, **Livio Dante Porta**.

Wardale's second and more advanced rebuild was of a 25NC 4-8-4 which he unveiled in 1981 painted buffer-beam red, after which it quickly became known as "The Red Devil". It was the remarkable performance of this locomotive – a 43% increase in drawbar power output and up to 150% increase in drawbar thermal efficiency – that confirmed the validity of Porta's advanced steam theories, and which inspired the launch of the 5AT Project in 2002.

The Advanced Steam Traction Trust (ASTT) continues to pursue Porta's ideas through the publication of his technical papers and through the development of a 1/5th scale (10¼" gauge) demonstrator loco called "*Revolution*" that features many of his principles.

ASTT carries many of the hallmarks of the erstwhile Institution of Locomotive Engineers.

Following the practice of similar non-profit organisations, ASTT has a commercial subsidiary called Advanced Steam Traction Services Ltd (ASTS) which undertakes commercial activities on behalf of ASTT, including sales of books, conference admissions and consulting commissions.

ASTT Membership

Membership of ASTT is open to all. Professional engineers and technicians are strongly represented amongst the membership, but so too are those whose interests are more general.

There are three classes of membership:

- Full Membership (costing £20 p.a.*)
- Associate Membership (costing £10 p.a.*)
- Student Membership (free to full-time students and apprentices).

* Membership fees will rise by 25% in 2026.

Full membership is by invitation and offers voting rights at general meetings.

Advantages of Membership

ASTT offers several privileges to its members:

- Access to members-only pages of the website.
- Access to ASTT archives including conference presentation files and video recordings.
- 20% discount on ASTT publications.
- Discounted fees to ASTT conferences.
- A triennial PDF Newsletter (or technical journal).
- Opportunities to learn about advances in steam traction technology and the science and engineering that underlie the technology.
- Opportunities to contribute to AST's efforts to maintain steam as an economic and reliable form of traction for both main line and heritage traction.
- Opportunities to meet and get to know like-minded people, and to learn from experts in the field.

ASTT is actively seeking younger members who can, in time, take over the responsibilities and endeavours of the organization.

ASTT Conferences

As did the old Institution of Locomotive Engineers, ASTT organises an annual conference at various railway centres around the country.

Conferences are usually held over a 2-day weekend in early October, and feature eight or nine presentations and conference dinner, plus a visit to a local workshop or place of railway interest.

Past conferences have been held as follows:

- 2016 – Haworth
- 2017 – Bury
- 2018 – Bury
- 2019 – Crewe
- 2020 – held outdoor in Stapleford due to Covid
- 2021 – Loughborough
- 2022 – Darlington
- 2023 – Swindon
- 2024 – Derby.

Admission to ASTT conferences is charged on an “at-cost” basis which usually amounts to around £50 per day to cover room hire, lunches and refreshments, plus around £30 for a conference dinner. Attendance numbers vary from around 25 to over 50.

Presentations usually cover a wide range of topics, often following a conference “theme”. Speakers are often members of ASTT, but non-member specialists are usually invited to speak on subjects of their expertise.

ASTT’s 2025 conference will be held in the Hopetown Museum, Darlington, over the weekend of 4th - 5th October and will feature as part of the Rail 200 celebration in that city. All-comers are welcome to attend.

ASTT Publications

So far, ASTT has published 12 titles, all of which can be ordered through the website’s **Book Sales** page. They include the largest collection of publications by and about **Livio Dante Porta** and his works.

Publications currently available are as follows:

- 5AT Fundamental Design Calculations (David Wardale) - 556 b&w pages, RRP £49.00
- 5AT Feasibility Study (Alan Fozard) – 235 colour pages £35.00
- Steam Locomotive Design Specifications and Calculations for New Build Baldwin 2-4-2T 'LYN' 604 colour pages £52.00
- Selection of Papers by L.D. Porta – Vol 1 Tribology & Lubrication – 250 b&w pages £25.00.
- Selection of Papers by L.D. Porta – Vol 2 Adhesion, Compounding and the Tornado Proposal – 256 b&w pages £25.00.
- Selection of Papers by L.D. Porta – Vol 3 Steam Locomotive Boilers, Fireboxes and Combustion – 290 b&w pages £25.00.
- Selection of Papers by L.D. Porta - Vol 4 Locomotive Boiler Water – Treatment, Circulation and Preheating – 513 pages (colour) £40.00 soft cover (£48.00 for hard cover).
- Selection of Papers by L.D. Porta – Vol 5 Exhaust Systems and Other Aspects of Loco Design, Performance and Operation – 340 pages (inc. colour) £27.00.
- A Compendium of Articles and Papers to celebrate the Centenary of the birth of Livio Dante Porta - Volume 1 – 226 pages (colour) £25.00.
- A Compendium of Articles and Papers to celebrate the Centenary of the birth of Livio Dante Porta - Volume 2 – 331 pages (colour) £27.00.
- Reminiscences of a Trainspotter (David Wardale) - 67 b&w pages £16.00.

Members can claim a 20% discount on these prices.

ASTT “Revolution” Project



Revolution is a 1/5th scale 2-6-0 “demonstrator” locomotive that is currently (2025) 50% complete. The brainchild of ASTT member, Jamie Keyte, with design contributions by Richard Coleby (cylinders, valve gear and motion) and Alex Powell (boiler), it features several Porta-inspired innovations - including:

- Interchangeable exhausts to allow direct comparisons between Lempor and other types.
- Kylala exhaust splitter.
- Under-grate exhaust steam feed.
- Large steam chests and passages.
- Multiple narrow valve and piston rings.

Some of its other novelties include:

- Rocker drive to outside-admission valves.
- Precise (and fixed) horizontal spacing of axles
- Elastomeric springing.
- Traction forces direct from axles to drawbar.
- Pivoted spring beams housing roller bearings.
- Chain drive for static dynamometer testing.
- Disc brakes.

