

**RAILWAY DIVISION
AGM
ANNUAL REPORT
2022-2023**

**Institution of
MECHANICAL
ENGINEERS**

Railway Division 53rd Annual General Meeting

15/05/2023 HYBRID – Agenda

Time and place: 15th May 2023 after 18:30, during the judging break of the online Young Members event 'Final of The Future of Rail Presentations'.

1.	MINUTES OF THE LAST MEETING		
	Review of the minutes of the last AGM		All Corporate Members
2.	SUMMARY OF ANNUAL REPORT		
	Chair to summarise key points of his report and to introduce the new Chair		Chair
3.	ELECTION TO RAILWAY DIVISION BOARD		
	Constitution of Board 2023-2024		All Corporate Members
	Announcement of retiring Board Members and confirmation of elected new Members		
4.	CLOSE OF MEETING		Chair
	Annual General Meeting to be formally closed		

MINUTES OF LAST ANNUAL GENERAL MEETING

Minutes of the 52nd Annual General Meeting of the Railway Division of the Institution of Mechanical Engineers, held online on Monday 16 May 2022, during the judging break of the final of the Young Members' Future of Rail Presentation Competition.

James Collinson was in the chair with Noel Travers (deputy chair) in attendance.

1. MINUTES OF THE 2021 MEETING

The minutes of the last Annual General Meeting were reviewed and accepted as a true record of what had been discussed and approved.

2. SUMMARY OF ANNUAL REPORT

The Chair provided a brief summary of his Annual Report. The Annual Report had also been made available on the Railway Division website. The Chair gave thanks to everyone who had assisted him during his term, especially during these challenging times.

3. ELECTION TO RAILWAY DIVISION BOARD

The Chair announced newly elected Railway Division Board Members and thanked those retiring from their positions.

4. CLOSE OF MEETING

The Chair formally closed the Annual General Meeting at 18:50 and the final of the Future of Railway Engineering – Young Members' evening continued.

James Collinson

James Collinson
Chair
Railway Division

Railway Division Annual Report
Q2 2022 to Q1 2023

RAILWAY DIVISION CHAIR'S INTRODUCTION

Noel Travers

Railway Division Chair

Institution of Mechanical Engineers

May 2023

RAILWAY DIVISION MEMBERSHIP

The membership numbers continue to reduce. The Railway Division did not gain any members in the 2022-2023 period.

Table 1 Development of the Membership of the Railway Division of the IMechE

Membership Grade	2019	2020	2021	2022	2023
Affiliate	492	494	464	419	379
Associate Member	1,541	1,524	1,446	1343	1264
Companion	1	1	0	0	0
Fellow	834	838	823	830	829
Honorary Fellow	3	3	3	3	3
Member	2,968	3,077	3,114	3143	3117
Total	5,839	5,937	5,850	5738	5592

BOARD ADVISORY FORUM

The Railway Division's Board Advisory Forum (BAF) was created in 2022, the purpose being to ensure no talent and enthusiasm is lost when RD Board members complete their tenure; drawing from the talent pool of ex Board Members who can be called upon to assist the Division Chair and Board in any relevant matter.

As the Immediate Past Chair, James Collinson has chaired the BAF and regularly updated the forum members on RD Board matters as well as drawing on their experience and expertise to contribute to various Institution matters. Examples include:

- Opportunities for filling Institution vacancies on other boards and committees e.g. Council, Technical Strategy Board and Trustee Board
- Contributing to and commenting on Birdcage Walk building plans
- Supporting matters of Institution governance such as ways of working and management systems.

RAILWAY DIVISION HQ EVENTS

The 2022-23 Railway Division HQ events have moved to be face-to-face events at 1 Birdcage Walk or hybrid events which can be attended either in-person or online. The events delivered and planned in 2022-23 are summarised in Table 2.

The resumed in-person events have proven to be popular, particularly as they facilitate professional networking in a way which has been impossible to replicate online. As a consequence, no online-only events have been planned for 2022-23 because of the importance of being able to interact and network during the event.

Hybrid events have been offered for free evening lectures, allowing many more people to join online via MS Teams than attending in-person, demonstrating the continued popularity of this option. Engagement of the online audience, through asking questions of the speaker via the chat option, continues to be high. So far, we have yet to attempt a paid-for hybrid event, and none are planned for 2022-23.

The Events Committee has a new Chair, Matt Prosser and several new members, including two new young members have been recruited over the last year. Unfortunately, last autumn the decision was taken to cancel the YEARS (Young Engineers and Apprentices Railway Seminar) owing to very low bookings. This year early planning has started following a lessons-learned and the two new young committee members have taken a lead in organising this year's event planned to take place in Sheffield in November.

Planning for 2023-24 seminars has commenced and some excellent topics have been identified by the committee.

The primary challenges facing RD events are:

- Moving back to face-to-face seminars for paid for seminars.
- Financial constraints on Network Rail and Train Operating Companies limiting their funding of staff to attend. This is being mitigated by offering paid for seminars that are relevant and of interest to professional railway engineers.
- The key priorities for Railway Division's events over the coming year are:
- To enable Railway Division to positively influence the future of railway engineering at a time of major changes

- To fulfil our duty as a learned society and maximise the relevance of Railway Division to IMechE members, by providing key information and opportunities.

Headquarters Events organised by Members of the Railway Division

Date	Event Type	Title and Speaker(s)	Delegate Numbers
12/09/22	Hybrid In-person/online	Railway Divisions Chair's Address – speaker Noel Travers	22 in person / 90 online
21/09/22	Online	Depots 2022	80
14/11/22	Hybrid in-person/online	Sir Seymour Biscoe Tritton Lecture – The ABC of Scotland’s Railway Strategy - speaker Bill Reeve, Director of Rail, Transport Scotland	21 in Person / 77 online
24/02/23	Luncheon	Railway Division Annual Luncheon	863
26/01/22	Lecture	George Ramshaw Curry Memorial Lecture – Global Centre of Rail Excellence – Speaker Professor Andy Doherty, Chief Technology Officer, Global Centre for Rail Excellence	33 in person / 122 online
28/03/23	In-person seminar at 1BCW	Railway Gauging and Clearance: Present and Future	50

RAILWAY DIVISION CENTRE ACTIVITIES 2021-2022

SCOTTISH CENTRE CHAIR’S REPORT BY GARETH EARLE-PAYNE

Following a change of Chair, Vice Chair and Secretary this year, I would firstly like to express my thanks to the previous incumbents for handing over the baton with the centre in such good shape having done an excellent job of navigating the challenges of continuing through the challenges presented by COVID as well as to the committee for their invaluable support throughout the year, particularly Aimee MacDonald for keeping me on the "straight and narrow". This year has also seen a change of our usual "in person" venue and we are extremely grateful to Scotrail for allowing us the use of their fantastic venue.

We continue to champion the use of "hybrid" meetings and all but two of our events have been in this style with further tweaks being made to the setup as our experience grows. We did however take the decision to keep both our "Future of Rail" competition and a Panel Discussion joint event with the IRSE as "in person" only as it was felt that the nature of these events required it.

27/09/22	Malcolm Dobell	<i>Getting a Grip</i>	A look at wheel adhesion	Hybrid presentation	28
12/10/22	Andrew Gainsbury TfW Rolling Stock Manager	<i>Transport for Wales Rolling Stock Fleet</i>	Rail developments in Wales since operation by Transport for Wales	Hybrid presentation	50
17/11/22	Noel Travers XRail Group, RD Chair	<i>Chairman's Address</i>	Not a very good engineer! The fallacy and effect of this mindset	Hybrid presentation	30
08/12/22	Paul Riley Independent Rail	<i>Charging Batteries, Charging Ahead & Charging Customers</i>	The use of batteries in locomotives Combining new technology with existing traction equipment	Hybrid presentation	27
19/01/23	Andrew Halls Chief Inspector RAIB	<i>A Day in the Life of RAIB</i>	What it is like to work for the Rail Accident Investigation Branch	Hybrid presentation	40
09/02/23		<i>Future of Rail</i>	Presentation competition for aspiring railway engineers	In Person Meeting	40
20/04/23	Lynsey Hunter, Ross Moran, Stephen Wright, Bill Reeve, Graham Taylor	<i>Scottish Rail Strategy</i>	Discussion about rail strategy in Scotland(Joint Event with IRSE)	Joint meeting	55
04/05/23	Andrew MacFarlane SPT	<i>Subway Modernisation</i>	An update on The Subway Modernisation Project	Hybrid presentation	40

he day of the Chair's address where, following a similar format to last year a varied programme of events was devised to allow our younger members the opportunity to spend time with Noel including a fantastic tour of Glasgow Central station.

Special Mention must also go to the "Future of Rail" competition which had the highest number of entrants ever (7) and was brilliantly organised by Chipo Madzikwah who I am also delighted to note has been elected to the RD board.

After an uncertain start to the season attendance wise, it has been really encouraging to see larger numbers of attendees in person at the last few sessions and I hope this number continues to increase into next year.

NORTH-EASTERN CENTRE CHAIR'S REPORT BY ANDY BATTERS

This has been another positive year with a varied programme for the North Eastern Centre there have been some challenges with finding new locations and venues I thanked our regular membership for bearing with us until we establish these.

Some of this year’s highlights included a thought-provoking Scottish decarbonisation strategy, the fantastically researched industrial railway in and around York, the Future of Rail competitions, where Jason McNulty from Sabre Rail won our NE heat and the very enthusiastic talk on parcel traffic by Varamis Rail, Phil Read.

We still have our last presentation of this session with a talk from our own committee member Steve Hoather on the ‘Early years of the HST on the ECML’ and finally in June a technical tour of the WH Davis manufacturing facility.

Next season 23/24 we unfortunately have some budgetary challenges, which despite a return to face to face meeting this year, there will be a return to some virtual meetings, to make economies on the cost of room hire. We are still trying to find sponsored venues, but with no success currently.

Finally, we are in need of new committee members, the current demographic is imbalanced towards retired members, which makes connections with the industry ever challenging. We have sent out several messages to local railway companies, including Northern, Hitachi, Wabtec, Network Rail. Frustratingly, to date, Hitachi are the only organisation to make any contact, we shall keep trying to get local industry engagement.

I’d like to thank our speakers for giving up their time, and our audiences for the contributions and questions, and my colleagues on the Centre Committee for all of their support and enthusiasm in running a packed and interesting programme. Looking forward to our next programme, we’ll be running a mix of in-person and virtual events. Any requests on subject matter, please drop it into the chat or get in touch with us, contact info is on IMechE Near You.

North East Centre 2022/23 Meetings, Attendances

Date	Topic	Speaker	Attendance
15th September 22	Scottish Rolling Stock - decarbonising smartly	Scott Prentice	27
13th October 22	Chairman’s Address	Noel Travers	14
8th November 22	Improving Air Quality on the class 800s	Sam Marchant	28
8th December 22	Industrial Railways in and around York	Derek Rayner	42
19th January 23	Weed Spray Train	Adrian Marston + PWI	43
17th February 23	Future of Rail Competition	Thomas Kay from Ricardo Jason McNulty from Sabre	19

		Rail	
21st March 23	Green parcel logistics modified Class 321 and AGM	Phil Read	12
12th April 23	WH Davis Wagon Repurposing	Les Bryant	12
9th May 23	Early years of the HST on the ECML	Steve Hoather	TBC
14 th June 23	WH Davis Wagon Manufacturing Facility	Technical Tour	TBC
		Average	25

NORTH-WEST CENTRE CHAIR'S REPORT BY LYNDON PLATT

This year we have returned with a full programme of face-to-face events primarily delivered at our complimentary location Manchester Metropolitan University in Manchester. In a progressive move to widen the lectures for our members and colleagues we introduced a simple method of delivering the lectures online as hybrid meetings. This has been well received and increased the audience numbers in total and we have not seen the in-person numbers decline in response. The centre does benefit from a stalwart of regular attendees. This hybrid situation will continue and if funds permit enhance the equipment that is used. This delivery of hybrid meetings fulfils the commitment made at our report submission last year and aligns with other centres and the HQ strategy.

Due to financial constraints the ubiquitous Chairman's evening meal convened after the chairman's address was cancelled this year to allow funds to be used in an alternative and more inclusive manner. Given the recent budget allocation the centre needs to look at the costs of providing refreshments at the MMU as the MMU catering costs are higher than we can sustain. Alternatives are being proposed for next year's session and that includes sponsorship or alternative catering providers.

The table below shows the number of attendees at our lectures in the 2022-2023 session.

Date	Title	Speaker	Online	Total
13 th September	The Class 93 Tri-Mode Locomotive	Karl Watts	N/A	39
16 th October	Railway Division Chairs Address – Case Study Session	Dr Hamidreza Faham, Daniel Basher, Dr Yousif Muhamedslih & Simon Fung	N/A	25
16 th October	Railway Division Chairs Address – 'Not a very good	Noel Travers	N/A	39

	Engineer!' – the fallacy and effect of this mindset			
8 November	The Revolution Very Light Rail Programme	Tim Burleigh	N/A	28
13 th December	Delivering the HS2 Rolling Stock Design Version	Maria Griffin	31	53
10 January	Crossrail Trains	Joe Bednall	41	71
14 February	Class 390 Refurbishment	Matthew Spurr	19	58
14 March	Future of Rail Presentation	Anna Gray, Jordan Short & Aaron Nowell	18	39
11 April	Cybersecurity – Impact of TS50701 & NIS Regulations	Professor George Bearfield	17	38
9 May	Integrated System Modernisation – Glasgow Subway	Andrew MacFarlane		

The visit to Alstom Widnes facility in February was well attended and received good feedback from the participants. Thanks to Alstom for hosting this visit and allowing the attendees to see the Pendolino refurbishment underway in the workshop. The Young Engineers competition was held in March and this NW centre heat was won by Anna Gray of Porterbrook, who goes through to the final on the 15th May.

Total attendance figures:

Online	126
In person	390
Average in person	43

We benefit from a strong and supportive committee and currently have 17 active members. Joe Brown has recently stepped down as a full committee member but remains as a supporter for certain topics. The majority of members are active in industry with a balance of experienced retired rail industry engineers. We continue to look for and want to attract more members, especially to enhance the diversity of the committee. We continue to market our events far and wide on social media.

MIDLANDS CENTRE CHAIR'S REPORT BY DAVE COXON

The Midlands Centre ran 8 events in the 2022-2023 session, all live, with a technical visit arranged for May 2023. This session's topics have been largely rolling stock related but also included signalling, see table below. We have continued to hold joint meetings and this year have included a meeting with Derby Railway Engineering Society (DRES) in December (Hybrid meeting) and live with the PWI in March. The programme had an average attendance of circa 40, and a peak attendance of 60. Having found a suitable venue at the beginning of the session we have now had to seriously reconsider as the hotel has been taken over by the Home Office. We have found an alternative venue for our last meeting of the session, but we need to investigate a better option during the summer months. We have also set up a sub-committee to investigate sponsorship. Unfortunately, the technical visit to Statfold Barn Railway had to be cancelled.

Midlands Centre September 2022-2023 Events

Date	Event Title / Topic	Speaker	Delegate
7 th September 2022	HybridFLEXX - delivering a rolling stock hybrid re-engineering project	Max Ordish and Ian Hyde	35
12 th October	Chairman's address 'Not a very good engineer-the fallacy and effect of this mindset'	Noel Travers	40
9 th November	Managing cracks on trains - a retrospective	Neil Dinmore	60
7 th December	Merseyrail class 777 - The story so far	David Powell	19 IMechE / 31 DRES
11 th January 2023	Steep railways challenge gravity!	Felix Schmid	28
8 th February	Future of Rail Presentation competition + AGM	Various	35
22 nd March	Cost effective rural line re-signalling	Robin Lee	38
12 th April	Trainborne monitoring at Network Rail	Kevin Hope	33

MILTON KEYNES CENTRE CHAIR'S REPORT BY TOM SCARAMUZZA

SOUTH-EAST CENTRE CHAIR'S REPORT BY TOBY JOHNSON

The aim of the southeast centre was to deliver all talks using a hybrid format, allowing both in-person and virtual attendance. This makes our talks more inclusive and improves members' ability to attend. The centre achieved this aim apart from one event which was held virtually due to the impact of strike action on public transport.

The centre's talks are now hosted free of charge at the offices of the Rail Safety and Standards Board, who also supply tea and coffees for attendees. This has improved the centre's financial sustainability and supplied a regular base for events. The centre's events were moved from third Monday to third Thursday of the month in response to post-COVID working patterns in an effort to attract more in-person attendees.

We responded to feedback from online attendees to improve the audio quality by buying microphones using surplus funds from 2022. This equipment improves the audibility of the speaker for online attendees and allows the room audience to be heard. We have experienced reliability issues at one event which we intend to improve for 2023-24.

Engagement has improved, with average event attendance at 42, up from 39 in 2022-23. Our most popular event attracted 60 attendees with an approximately 50:50 split between in-person and online attendance. We can record our hybrid and online events making them available to watch on-demand. Viewing figures show that these are watched hundreds of times.

Commitment within the committee stays high and changes are limited to one resignation and the transfer of the secretary and communications roles to existing committee members. No nominations were received from outside of the existing committee.

An overview of the activities is provided in the table below.

Date	Event Title	Speaker / Delivery Method	Delegates	Partner
15/09/22	WRI: Lessons learned from London Underground	Andy Vickerstaff, Principal Engineer TfL (Transport for London)	58	No
20/10/22	Stadler Trains for Greater Anglia	Steve Mitchell, Head of Fleet North, Greater Anglia	60	No
17/11/22	Re-signalling the Underground (postponed)	Sam Etchell, London Underground	0	No
19/01/22	P2 Steam Locomotive	Robert Morland, Director - Electrical Engineering, A1 Steam Locomotive Trust	47	No
23/02/23	Future of Rail Presentation Competition	Noel Travers, Railway Division Chair	26	No
16/03/23	UCL's Person-Environment- Activity Research Laboratory	Nick Tyler, Director of the UCL (University College London) Centre for Transport Studies	20	No
20/04/23	Rolling Stock and the Road to Delivery	Andrew Tilson, Managing Director Meridian Generic Rail	38	No
26/05/23	Technical visit to PEARL (Person Environment Activity Research Lab)	Nick Tyler, Director of the UCL Centre for Transport Studies	TBC	No

SOUTH-WESTERN CENTRE CHAIR'S REPORT BY THOMAS MOORE

INDORE, INDIA CENTRE, CHAIR'S REPORT BY LALIT CHANDRA TRIVEDI

There have been a number of activities conducted by the India centre, some of which are listed below.

- Collaboration with IISc Bangalore (Indian Institute of science) in mentoring startups in Railway Technology area
- Collaborating with M/S RITES India for membership drive
- Jointly working with Jindal stainless steel in replacing under frame of LHB High speed coaches with stainless steel to prevent corrosion and bring down weight
- Chair India centre addressed senior delegates from African countries on development of Railways in India and explored jointly how some of that can be replicated in Africa
- Chair India addressed representatives from Afro -Asian countries in an online conference to develop strategies bring down logistics cost by Rail
- Chair India was invited by National Academy of Indian Railways to share India's experience in developing Railways with a multinational group
- Annual meeting was organised in Goa
- Mr Ravi Kochak addressed future technology leaders about HVAC system in Railways
- Gati Shakti Vishwavidyalay (India's new logistics university) invited Chair India centre for an interactive discussion with MBA students of Logistics and Supply Chain Management

The Vice Chair is Mr Rahul Mithal, and the Secretary is Mr Amit Ramteke.

RD YOUNG MEMBERS' ACTIVITIES, REPORT BY DAVID PEARCE

As the committee continues through this period of reinvention, great strides have been made in creating and fleshing out new ideas and workstreams for the RDYM as members explore what they can offer which makes RDYM different to the wider RD Board. This report summarises the past 12 months as far as is reasonably practicable.

Exec Update

RDYM has one new member of the exec, with Alice Callaghan assuming the position of Vice Chair in January 2023. Paul Burkitt-Gray vacates the role and will now be focussing on arranging the London Rail Trail. As defined in the ToR, after a year of holding the role of Immediate Past Chair, May-Ann Lew rolls off the exec, however, will remain an active member of the Committee. The role of Chair Elect remains vacant, and a search is actively ongoing to find a successor to the current Chair to enable a timely handover.

Whilst not strictly an RDYM update, we are delighted that former RDYM chair, Emil Tschepp, has been elected Chair of the Young Members Board, assuming position as of May 2023.

Events

Unfortunately, the 2022 edition of Young Engineers and Apprentices Railway Seminar had to be put on hold due to the lack of sign-ups. This has been attributed to a combination of a reluctance for employers to pay for the event, a lack of publicity but also simply trying to manage too much by too few people. As such the event is now

being co-organised with the RD Events Committee and is gaining traction to be held in November 2023, again in Sheffield.

The RDYM continues to support the Railway Challenge both in terms of finance for the social event and providing volunteers to support operations and judging. A small delegation will be supporting the expansion of the railway by helping with construction works during the late-May bank holiday.

Young Rail Tours remains a key investment of the RDYM with a recent successful tour to Cardiff being led by Alice Callaghan. A forthcoming tour is being co-organised by RDYM members visiting Switzerland including the Stadler factory in Bussnang. Larger intercontinental tours are being held for when further confidence is regained post-COVID and if the cost-of-living crisis eases.

Board/Committee Support

As always, the RDYM continues to ensure it has a presence on a wide range of boards and committees within the IMechE. These include but are not limited to: Prizes & Awards; Communications; Learning & Development; Skills Task Force; Young Members Board; Events; Railway Division Board and the Railway Challenge steering group.

Whilst membership has increased, we desperately need new members to continue to drive for RDYM's offerings to be better, therefore the committee calls upon the board to encourage young people to become involved.

ANNUAL LUNCHEON COMMITTEE, REPORT BY JAMES COLLINSON

Following a successful event in 2022, the 2023 Railway Division Annual Luncheon was back to full strength with over 1,200 industry colleagues and friends attending "probably... the biggest railway event in the calendar".

This is due to the well thought out approach taken by the organising committee chairs Rebeka Sellick (2020 to 2022 events) and James Collinson (2023 event) when they were first faced with the challenge of a pandemic world back in 2020.

This year, we also introduced the 'winners' table, recognising the successes of some of our members, with representatives from the winning teams of Railway Challenge, Prizes and Awards and Young Member's Future Rail being joined by rail industry talent leads from organisations committed to investing in developing engineers.

Key facts and figures:

Finance

With some substantial effort being applied to refresh the sponsoring organisations list – regulars and some new to the UK – the overall result was better than budget:

- Delegate revenue: £177,151 (Budget was £190,000)
- Sponsorship income: £78,250 (Budget was £50,000)
- Expenditure: £145,491 (Budget was £148,000)
- Gross Profit: £109,910 (Budget was £92,000)

Participants

With 120 tables filling the venue, 15 organisations hosting sponsored bars in the Ballroom and over 1,200 people in the Main Room, we returned to the classic "full" atmosphere.

Feedback

Overwhelmingly positive feedback was received, with some valuable learning points to be considered too; reverting to the 'first Friday of March' date to enable long term planning by regular attendees and organisations as well as some venue conditions to investigate e.g., generally quite warm with limited options for respite.

Thankyous to everyone involved:

- Event Sponsors & Supporters – Rail Reliability, Atkins, Frazer-Nash, TXM group, Enotrac, Stadler, PTM Design, Global Centre of Excellence, Matisa, Infinitive Group, Enigma Seven, FISA, Train FX, Siemens], RSSB.
- Guest Speakers – Noel Travers (as RD Chair) and his guest the Rt Hon Lord Patrick McLoughlin (Chair of Transport for North).
- Table hosts and the IMechE staff.

this year. It is clear that the Luncheon is very much easier to make happen in reality than online – and for all to enjoy and profit from (in every sense).

RAILWAY CHALLENGE CHAIR REPORT, BY SIMON IWNICKI

Overview

The Railway Challenge continues to be one of the main features in the Railway Division Calendar. Its reputation is growing with more international participation and a spin off event planned in Germany this year. It continues to have exceptional support from academic and industry leaders and over 500 young people have taken part in the event with many of these going on to have successful careers in the railway industry.

Financially it has been a struggle to break even especially after the setback due to Covid, but the expansion plans are now progressing well and once in place these will allow up to 30 teams to participate which should provide additional income.

The 2022 Event

The 2022 Railway Challenge took place as planned on 23rd to 26th June at Stapleford. There were 7 teams present although many (most!) of them had technical problems and only 1 or 2 operated 'out of the box'. It was though a great event with a real buzz all weekend and it was clear that all the teams got a huge amount out of it (even those who struggled most). The IMechE CEO and Deputy President and many other key industry colleagues and friends and family attended. Overall winners were Fachhochschule Aachen for the second time with a very impressive battery powered locomotive.

We had exceptionally good media coverage this year with a podcast produced for the IMechE 'Impulse to Innovation' series and large articles in Rail Engineer and Rail Business Daily amongst others. In particular it was good that all of the sponsors were acknowledged in all of the media articles. This should help with getting more sponsorship in future.

Unfortunately, the Railway Challenge has made a loss of £6,719.68 this year. This is

partly due to a lower-than-expected income from entry fees and sponsorship but also some increased expenditure connected with fixed elements such as the marquee and toilet block hire and hotel accommodation for staff and volunteers. We are reviewing this for next year and will try to increase sponsorship but otherwise will have to reduce expenditure.

The 2023 Event and Future Plans

Registrations for the 2023 Railway Challenge have now closed with 11 teams registered:

- Cardiff University
- Fachhochschule Aachen
- Network Rail
- Newcastle University
- Poznan University of Technology
- The University of Birmingham
- The University of Derby / Alstom
- The University of Huddersfield
- The University of Sheffield
- The University of Warwick
- Transport for London

A site meeting was held on 8th February for teams to familiarise themselves with the location and all UK teams attended. There was also a virtual briefing session held on 1st February.

A new 'Entry level' challenge has been included where teams entering for the first time can choose to submit a CAD design rather than a physical locomotive. Several potential new teams have been contacted and information about the challenge has been circulated widely.

A draft operational schedule has been drawn up for the final which runs from Thursday 22nd to Sunday 25th June and volunteer judges and scrutineers are in place. Detailed arrangements are now being made for the event.

Work on the expansion of the Railway Challenge has accelerated in the last few months with the focus on a turntable which will allow stabling of and quick access to up to 30 locos. Cliff Perry has secured a budget of £25k (requires matched funding) from the Institution and this has allowed us purchase track and to hire machinery and dig the turntable foundations and the linking chord (see pictures). Network Rail have provided design support for the turntable itself and have provided ballast for the chord. Richard Coleby has led the work from the FSMR side, and we have had several weekends of activity including a very welcome visit by a group from Aachen and Huddersfield Teams and from RD Young Members and Young Rail Professionals.



Foundations for the new turntable now in place



The new turntable being painted by members of the Huddersfield team



RD YMs installing the new chord linking the turntable to the existing track

RAILWAY TECHNICAL TOUR (RTT), REPORT BY FELIX SCHMID

No Railway Technical Tours were possible in 2020 and 2021, due to the Covid 19 situation across the world. Plans had been made for a tour of Wales, England, the island of Ireland, and Scotland to be held in October 2020, but this had to be postponed first to 2021 and then to spring 2022.

This report covers two technical tours (i) the 2022 Great British Railway Technical Tour (GBRTT) that started in Cardiff and (ii) the first two days of the 2023 Great Scandinavian Railway Technical Tour (GSRTT) that started in Helsinki and is in progress, at the time of writing this report.

The GBRTT22 attracted 29 participants from Great Britain and Switzerland (2). Given the timing at the end of the COVID 19 pandemic, it was constrained to visits in Great Britain, crossing the sea to Ireland having presented too great a risk to the success of the Tour.

The first visits of the tour were in and around Cardiff, where we were based for three nights. On Sunday, we spent time at the depot facilities of Great Western Railway (GWR) and of Transport for Wales (TfW) at Cardiff Canton, and we travelled on the Brecon Mountain Railway (the obligatory heritage visit!). We also walked on the Pen-y-Darren Iron Road, where Trevithick's first locomotive hauled iron ore trains at 3 mph, a most historic excursion!

On Monday, the participants were introduced to the exciting future plans of TfW and were allowed a look at the mock-ups of the new trains, supplied by CAF and Stadler, as well as the big depot construction site at Taff Wells. They also visited the TATA steel making plant where they saw the new Clayton battery locos that haul the trains with the molten iron. This was followed by a visit to the CAF works in Newport, on Tuesday, and both the Railway Operations Control Centre and Pullman works in Cardiff. Two overnight stays followed in Shrewsbury.



On Wednesday, Eversholt Leasing demonstrated their Revolution Light Rail Vehicle in motion, also the depot and modular station, at the Build was power station site. This was organised in two groups: while one group had the train demonstration, the other

group enjoyed a guided tour of the historic Ironbridge Gorge and the Jackfield Tile Museum. On Thursday, the group moved to Liverpool for a visit to the Merseyrail system and to view its new trains. Both the introduction about the plans of Mersey Travel and the new trains were most impressive. In the evening, the group travelled to Glasgow in one of Transpennine's new CAF trains. The participants were almost unanimous in the view that Tuesdays journey on the 'old' Mk4 coaches was more comfortable than that on the latest generation of trains.

On Friday, the group was introduced to the rail strategy of Transport for Scotland and then travelled to Bo'ness to view the Scottish Hydrogen Train project, combined with a visit to the Scottish Railway Preservation Society's Museum at the site. For the people still eager to see more, the RD's Scotland Centre put on Canal Boat trip that took in the Falkirk Wheel, the very impressive boat lift on the Scottish canal system.



The GBRTT22 was very generously sponsored by Angel Trains, Dobell Associates, Eversholt Leasing, Manchester Rail Consultancy and XRAIL. The sponsorship covered the opening and closing dinners of the tour, two luncheons, coach travel and support for young members. Both dinners were held in most prestigious venues, namely, in Shrewsbury's Drapers' Hall and in the Glasgow Transport Museum on to the River Clyde. The Tour was cost neutral for the Railway Division.

The GSRTT23 attracted 36 participants from Great Britain and Switzerland (1). It has just started in Helsinki, with visits to a software house that produces railway control system tools for EuroLynx. In the afternoon of the first day, the group enjoyed a visit to the Finnish Railway Museum in Hyvinkää and, in the evening, the participants were treated to an excellent dinner in a wonderful restaurant with a good view of the city. A visit to the metro workshops at Itäkeskus and the metro control centre was followed by a long train journey to Kajaani, where the next visit was to Skoda Transtech's Otanmäki works, which produce trams and double-decker trains for the harsh Nordic climate. The journey north passed snow and iced-up lakes!

The GSRTT23 is very generously sponsored by Angel Trains, Dobell Associates, Eversholt Leasing, Manchester Rail Consultancy, Beacon Rail and Noel Travers. The sponsorship covers the opening and closing dinners of the tour, a dinner and a luncheon, coach travel and support for young members. The Tour is again cost neutral for the Railway Division.

The RTT committee wishes to thank the big-hearted sponsors, the visit hosts and last, but by no means least, all the brave participants in the GBRTT22 and the GSRTT23!
Felix Schmid

On behalf of the Tour Committee of Andrew Skinner, Bridget Eickhoff, Emma Armstrong, Richard Lockett and Felix Schmid

RAILWAY ENGINEERS FORUM REPORT BY ANDREW SKINNER

Meetings

The Chair of the Railway Engineers' Forum [REF] rotates between the participating Professional Institutions on a two-yearly cycle. The IMechE RD have held the Chair since July 2021 with Andrew Skinner Chairing the Forum. In July 2023 this passes to the IET. There have been four meetings of the REF since the last RD AGM. These were held on 14th July 2022, 13th October 2022, 12th January 2023 and 20th April 2023.

During the year the ICE representative stood down and has not been replaced. The RCEA and YRP put forward new representatives and the CILT are still to nominate one. Graeme Clark (RD Board) has been nominated to provide RD representation from July 2023 with Andrew Skinner moving to RD Chair.

The REF were keen to maintain links with the Great British Railways [GBR] Transition Team which had commenced last year. The REF were able to provide a holistic voice and single point of contact with the rail professional institutions. Initially Graham Richards (responsible for the design of Business Services which includes HR, procurement, legal and training) attended meetings. He acknowledged our joint response with the IRSE and CIRO in early 2022 to the call for evidence that will inform the rail industry's Strategic Plan, which was itself an enabler for 'the UK government to set a clear and unified direction for the railway in support of long-term priorities, assisting with problem solving, and aligning the rail sector behind a common vision and with joined-up decision making.'

He provided detail on the process for the GBR location and the transition of Network Rail colleagues from NR Infrastructure Limited. There was discussion around devolvement of activities to regions and how GBR will become (in old money) the "franchising" authority and what that would mean. Graham had move on from GBRTT and during a REF event the Chair had some discussion with Rufus Boyd (Programme Director Passenger & Freight) around future involvement. Rufus was keen and discussions are on-going.

REF Events

It was felt that currently there was insufficient definition of GBR to consider an event linked to its formation.

The Global Centre of Rail Excellence (GCRE) had approached Noel Travers and were keen to promote their plans and how they see the facility being used to the professional institutions. This became the George Ramshaw Curry memorial lecture held on 27th March and was badged as a REF event. Other institutions advertised this.

The IET London Network also held a REF badged event on 12th April. Again, the REF was promoted when Rufus Boyd (GBRTT) made a presentation on the forward plan (as known) for Great British Railways. Again, other institutions advertised this.

The Combined Events ILst

Difficulty had been experienced with the labour-intensive nature of providing this listing of all professional institution rail related events for a coming two-month period. Workload precluded this being produced by the IMechE staff. However, the Young Rail Professionals [YRP] representative was able to write some script in Microsoft Power BI that could pull event details from all the professional institution websites in just a few seconds. This has now been passed to one of the Chair's team who is turning the output into a formatted document that will be made available on the REF website and for the professional institutions to publicise.

YRP Rail Week (<https://www.railweek.com/>)

The YRP are already promoting Rail Week in February 2024. It is a week-long pan-industry collaborative effort aimed at bridging the rail sector's looming skills gap and inspiring the next generation of rail professionals by giving young people, parents, teachers and careers advisors the opportunity to see, first-hand, the brilliant projects, facilities and range of jobs in the rail industry.

Next Meeting of the REF

The next meeting of the Railway Engineers' Forum will be held on 6th July 2023.

RAILWAY DIVISION PRIZES AND AWARDS 2021, REPORT BY EMIL TSCHEPP

The Railway Division Prizes & Awards Committee made two awards for Part F Proceedings Papers (Journal of Rail and Rapid Transit) published by Sage in the Institution's name, which were announced at the annual luncheon in June and the details of which are contained in appendix 1. Our congratulations go to all the worthy winners.

These prizes and the main prize for the Future of Rail presentation competition are funded from the Institution's trust funds, which are administered by the Trustee Board Awards Committee (TBAC) and have come under significant pressure in recent years. The Railway Division has several awards that it is also not able to make effective use of due to these constraints on the Institution's Trust Funds and developments in the Railway Sector since most of these awards were created. The Committee has brought forward proposals to refresh its stable of awards to make them more effective and relevant. The intention of these reforms is to:

- Increase the value of awards for Young Members by accessing alternative sources of funding
- Consolidating existing awards for research, innovation, and industry achievement into two new prizes with up-to-date awarding conditions

These reforms have been approved by the Railway Division Board; however, the Trustee Board Awards Committee are yet to consider the proposals due to a prolonged period of uncertainty around the funding available for such awards. This uncertainty has also resulted in a significant delay to the RD Prizes & Awards Committee's ability to award prizes in 2023, which will now be awarded with certificates only and without any monetary prize attached to them.

The committee's membership has been stable since the end of the Covid Pandemic,

however I have been chairing the committee for several years and I have since gained other responsibilities within the Institution. We are always looking for new volunteers for the Prizes & Awards committee to bring fresh perspectives and enable us to develop a rolling succession plan.

SKILLS TASK FORCE, REPORT BY JOHN REDDYHOFF

The Skills Task Force continues to provide a focus on skills for the Railway Division at a time when there is a potential skills gap across all railway engineering disciplines due to the age profile of the workforce and the need to develop new digital skills. This is becoming a significant issue as fewer graduates have been recruited on the national network due to financial constraints, although recruitment is being maintained in other rail industry sectors.

The Skills Task Force now reports into the Railway Division Exec and meets four times per year, with strong support from across the rail industry sectors, the RD Board and the full-time staff of the IMechE. Several new members have joined this year to broaden that representation and there is a particular focus on bringing further Young Members into the group to ensure that it continues to reflect the needs of the Railway Division.

The Engineering & Manufacturing T Levels started in September 2022, so the first students will qualify in summer 2024. Even at this stage, there are unresolved questions about the relationship between T Levels, employment, and further academic training. Their success depends on a significant input from employers as the course requires a minimum of 45 days industry placement over the two-year duration. The funding arrangements from the Department for Education are complex but there is now some financial support for expenses incurred by employers during industry placements. The Skills Task Force is working with the IMechE to ensure that information can be circulated as it becomes available.

Where there is an overlap between T Levels and BTEC qualifications, the funding for BTECs is being withdrawn.

The Teachers in Residence scheme has been relaunched with support from the IMechE. This scheme is run by the Design & Technology Association and seeks to place teachers in industry for three days' work experience to improve their knowledge of modern practices.

Placements are normally during school holidays and the Skills Task Force is disseminating information within the Railway Division to identify rail industry engineering opportunities.

Lord Knight, a former Labour education minister, and Lord Willetts, former Conservative universities minister, have launched an inquiry into the decline in engineering, manufacturing, and technology apprenticeships. They have urged employers, training providers and young people to get involved in a call for evidence. The IMechE has collated a response to the inquiry, including from the Railway Division. There are 9% fewer engineering-related apprenticeship starts in England compared to 2014/15. This varies by subject, but engineering and manufacturing technologies have seen a 34% decline. This differs from engineering graduate recruitment where numbers are gradually increasing in contrast to the reduction in recruitment seen generally in the rail sector.

The railway engineering apprenticeship standards at Level 5 (HND), Level 6 (BEng) and Level 7 (MEng) are now established, which means that funding is available for the training element of these apprenticeships. There are now approved training providers at all three levels although numbers are still limited, with only one provider at Level 7 (MEng).

LEARNING AND DEVELOPMENT ACTIVITY REPORT BY IAIN RAE

During 2022/23, there continues to be a significant growth for in-company training for non-rail engineers entering the industry. This is covered either through L&D's non-technical and technical based courses to help these engineers make the transition into industry a smoother one. Recently a Rail firm had an engineering specific Engineers Leadership programme designed for them by L&D, and its delegates were both rail and non-rail engineers. L&D have also recently been moving to deliver in-company training to rail firms internationally in a face-to-face setting.

Some public courses were also run, though the demand for these is still low, as in recent years. The number of uptakes on public programmes since covid has seen a drop.

All the public courses are now in person this year. In-company the trend is very much for our training now to be delivered face to face across all our sectors, in 2023 95% of our training has been covered face to face.

We had initially discussed offering the public courses in a programme format. This is to be re-visited in Q3 this year to attract new customers.

The 5 areas where RSG support L&D are:

- Review of existing material – advice and guidance
- Validation of new trainers that we on-board
- Industry insight
- New opportunities we should focus on- e.g., digital with a new Objective that I wish to focus on
- How to get more engagement from rail engineers on and greater promotions of the L&D events

Check Question to L&D: Does the Steering Group still help, and arrangements were working well.

"Yes, the steering group has provided great insight into the state of the industry and areas we should be focusing on -e.g., digital skills including cybersecurity. The steering group is also good source of validation for new trainers that we onboard."

RAILWAY DIVISION P&L 2022

Budget	Actual
£86,428	£61,536

As you can see from the P&L the Railway Division made a loss of just over 24K. This

was largely due to the Railway Division events programme still recovering from Covid. The Division anticipated this and cut as much expenditure but ensured that funding was still available for the remaining activities.



Noel Travers

Railway Division Chair
Institution of Mechanical Engineers

May 2023

Appendix 1. 2022 Prizes and Awards

W A Agnew / C N Goodall Award

Award conditions: "An award for a meritorious paper on the subject of Railway Engineering or for a contribution or for achievement in that field. Open to members and non-members of the Institution."

A prize in the sum of £500, (to be divided equally between authors), is made to **C Moreno, S Reid and T Williams**

for their Paper:

'Experimental and numerical assessment of oblique loading quasi-static testing of railway anticlimbers'

(Proceedings volume 235 Issue 2, 143-154)

Citation:

"One of the great benefits of railways is their inherent safety. However, accidents do happen, and rail vehicles incorporate several safety features designed to mitigate and reduce damage and prevent catastrophic outcomes in the event of an accident. A major safety feature of train design is the fitting of anti-climbers. An anti-climber is required to prevent overriding and absorb and dissipate collision energy. The validation process for anti-climbers is described in the British European standard BS EN 15227. Additionally, manufacturers have adopted recommendations from a European Union Train Crashworthiness for Europe project (SAFETRAIN). There are, however, some collision accidents where vehicles with anti-climbers do override, with catastrophic and fatal results.

This paper looks at railway anti-climber and considers the suitability of a testing methodology to demonstrate compliance with the industry requirements. It includes experimental and numerical simulation methodologies applied to an anti-climber design. It concludes that an anti-climber's ability to prevent overriding is determined by the maximum bending moment that can be absorbed before collapse. And the test, which is devised to demonstrate compliance with resistance to a transverse force (as specified by the standard), underestimates the bending moment, and is thus considered unsuitable for measuring the anti-climber's resistance to overriding.

Anti-climbers are important safety features of a train design. This paper highlights a difficulty in performing a test on anti-climbers, to meet the industry requirements, and demonstrate adequate resistance to overriding. It recommends an alternative arrangement and notes that the standard does not fully define the working requirements for railway anti-climbers.

This paper is an excellent example of the need to stay vigilant and review engineering standards to ensure that engineering practice maintains safety expectations."

T A Stewart-Dyer Prize / Frederick Harvey Trevithick Prize

Award conditions "Awarded for the most meritorious paper on the subject of Railway Engineering presented in the preceding session by a Corporate Member or Graduate Member of the Institution or for a contribution or for achievement in that field. Open to members and non-members of the Institution."

A prize in the sum of £500, (to be divided equally between authors), is made to **Tim J Harrison, William JB Midgley, Roger M Goodall and Christopher P Ward**

for their Paper:

'Development and control of a rail vehicle model to reduce energy consumption and carbon dioxide emissions'

(Proceedings volume 235 Issue 10, 1237 –1248)

Citation:

"Over the coming decades, one of the greatest engineering challenges for the railway industry worldwide will be the drive towards reducing emissions within the industry whilst electrification projects are cancelled or scaled down. In the UK, the current targets for the industry is for the removal of vehicles using diesel as the sole power source from the UK's railway infrastructure by 2040 and for the UK's railways to be net zero carbon by 2050. The railway industry needs therefore to be considering innovative methods for reducing fossil fuel usage whilst providing a viable and cost-effective alternative to other modes of transport.

The paper considers multiple approaches for the reduction of the carbon footprint of a widely operated class of bi-mode unit in the UK. It analyses the effect of practices such as selective engine shutdown in non-electrified areas and the modification of parameters such as torque limits, outlining the percentages in carbon reduction without affecting the current timetable. The percentage in carbon reduction generated by electrifying an analysed section of the UK's rail infrastructure is also considered and outlined, re-emphasising the importance of not abandoning electrification projects.

The paper was particularly well regarded by the assessing panel because of the relevance of the topic for rail industries across the world as well as the detailed analysis and comparison of the parameters linked to vehicle emissions and performance of a bi-mode vehicle. It was deemed that the paper was well structured and presented the findings clearly, outlining throughout the logic and thought process followed by the authors."

The Viscount Weir and Stanley Whitelegg Prize

Award conditions "Grants to be made for the encouragement of the study of locomotive engineering. Available to young members and to be awarded to the winner of the Railway Division Young Members Presentation Competition."

A prize in the sum of £1000 was awarded to **Muhammad Sarvar**, for his presentation on **Driver Advisory Systems** at the 2022 Future of Rail competition final.

APPENDIX 2. THE RAILWAY DIVISION BOARD AS OF 1 MAY 2023

Position/Role	Name	Organisation
Chair	Noel Travers	XRail Group
Deputy Chair	Andrew Skinner	Great Western Railway
Vice Chair	Howard Parkinson	Digital Rail Ltd
Annual Luncheon	Rebeka Sellick	Sellick Rail
Vice Chair	Iain Rae	Brodie Engineering
Annual Luncheon Chair	James Collinson	Consultant
Communications Chair	Howard Parkinson	Digital Rail Ltd
Events Committee Chair	Matthew Prosser	Angel Trains
Finance Committee Chair	Stephen Thompson	Sabre Rail
Learning & Development Chair	Iain Rae	Brodie Engineering
Prizes & Awards Chair	Emil Tschepp	Transport for London
Railway Challenge Chair	Simon Iwnicki	Huddersfield University
Railway Challenge Representative	Tim Poole	London Underground
Skills Task Force Chair	John Reddyhoff	Consultant
Young Members Committee	David Pearce	MTR
India Centre Chair	Lalit Chandra Trivedi	Consultant
Midlands Centre Chair	Dave Coxon	
Milton Keynes Centre Chair	Tom Scaramuzza	Network Rail
North-East Centre Chair	Andy Batters	Aegis Engineering
North-West Centre Chair	Lyndon Platt	Siemens
Scottish Centre Chair	Gareth Earle Payne	
South-East Centre Chair	Toby Johnson	RSSB
South-West Centre Chair	Tom Moore	TE Connectivity
Immediate Past Chair	James Collinson	Consultant
Past Chair (2020/21)	Felix Schmid	University of Birmingham
Past Chair (2019/20)	Graham Neil	Consultant

Ordinary Members		
2022-2025	Aimee MacDonald	Tilt Consulting
2022-2025	Farzana Hampshire	Atkins
2022-2025	Ben Ackroyd	Porterbrook
2022-2023	Gareth Tucker	Huddersfield University
2021-2024	Jason Groombridge	Porterbrook
2021-2024	Graham Taylor	Advisor
2021-2024	Matt Prosser	Angel Trains
2020-2023	Graeme Clarke	Siemens
2020-2023	Ben Parry	Greater Anglia
Co-opted	David Clarke	Railway Industry Association
Co-opted	Bridget Eickhoff	RSSB

