



## All Party Parliamentary Light Rail Group

House of Commons  
London SW1A 0AA  
Light Rail & Trams, Affordable & Sustainable Transport

*"The past we inherit, the future we build ourselves"*



*"TramTrain does it Greener and Cheaper on lightly used railway lines and in the streets"*

**Meeting on TramTrain at the House of Commons, Tuesday, 11th October 2016**

Chairman: **Greg Mulholland** MP

### Speakers:

Paul Maynard MP  
*Cleveleys & Blackpool North*  
*Parliamentary Under-Secretary, Department for Transport*

TramTrains, a catalyst for Jobs & Growth

Tim Kendell  
*Retired Chartered Engineer, Department For Transport*  
*TramForward*

A personal insight to some of the issues with TramTrain

Martin Lax  
*Head of Development (Rapid Transit),*  
*Transport for Greater Manchester*

Is TramTrain part of the future for Greater Manchester?

**Greg Mulholland** welcomed the audience to the meeting which would tackle the issues surrounding TramTrain in the UK. TramTrain being a technology used successfully all over the world, while in the UK there are delays to the Sheffield trial holding up plans for implementation in other areas. He looked forward to some concrete statements about what the hold-ups are and what can be done to move the pilot forward and to progress other schemes. He suggested that, following the discussion, a letter be sent to the Minister challenging the Department to expedite completion of the pilot scheme.

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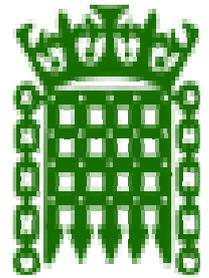
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Pending the arrival of the Minister, he then introduced Tim Kendell to speak first.

Tim Kendell spoke to a PowerPoint presentation entitled

*A personal insight to some of the issues with TramTrain.* The presentation can be found at

<http://www.applrguk.co.uk/media/files/LR-Applrg-Tim-Kendell-TramTrain-Presentation-11-October-2016pdf>

Tim stressed that what he had to say should not be taken to represent the views of the Department for Transport.

He began by asking what a TramTrain is. Is it a tram or a train, or is it both? Is it "a general panacea to local transport problems" or "an abomination that should not be let near real railways"?

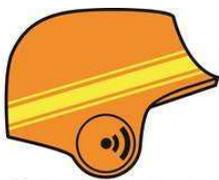
He described TramTrain's origin in Karlsruhe where they had a problem with local transport and road congestion. They had a tram system and they had a run down and failing heavy rail commuter line, the Albtalbahn. So, in 1961, they came up with the concept of the tram that could run on the main lines as well as on the city's tram network. This led to a dramatic increase in ridership. But this was a conversion of a heavy rail branch to a tramway, not a proper TramTrain. That came in 1992, when the line to Bretten was incorporated. This was a diesel operated heavy rail line with a few intermediate stops and terminating in Karlsruhe Hauptbahnhof, which is some distance from the commercial and retail centre of the city. This was then linked to the city tramway network so that TramTrains could reach the city centre, while interworking with heavy rail services at the far end of the line. The result was an eight-fold increase in ridership. Other lines followed, all showing ridership increases.

Since then the TramTrain concept has spread to Kassel, Nordhausen and Saarbrücken in Germany, to Alphen aan der Rijn and Randstat Rail in the Netherlands, to Alicante in Spain and various places in France.

So a TramTrain can run on city tramways, for which it must be fitted for road operation, with headlights, rear view mirrors/CCTV and directional indicators, transponders to activate tramway S&C, tramway comms equipment, track brakes and 750/600V DC OLE traction. But it can also run on the main line, for which it needs rail headlights, AWS & TPWS (ERTMS), GSM-R communication system and diesel, 25kV AC OLE or other traction.

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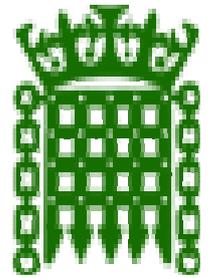
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A TramTrain service runs as a tram on city street tramway, uses the main line for part of its route and inter-operates with heavy rail trains. If it doesn't run on the street, then it is just another form of light rail and if it doesn't interoperate with main line trains it only needs to be a tram.

What makes a Tram Train special? Crashworthiness, train detection and protection against heavy rail vehicles, a wheel profile to suit both tramway and heavy rail running. It has to be compatible with heavy rail infrastructure, platforms, track and electrification.

DfT has exempted TramTrains from some TSI (Technical Specification for Interoperability) requirements, 750 V dc, for example, is not a TSI standard voltage, and in respect of some tram specific equipment.

The devil is in the detail and you need to talk to Network Rail and to UKTram about a whole list of potential problem areas.

Infrastructure works:. Heavy rail (and Manchester Metrolink) is high platform (915mm) whereas most of our tramways are low-floor, 300-400mm platform height, so low platforms must be provided. In the UK there are track modifications required (very few in Germany) and upgrade. Structure gauge clearance must be checked, particularly platform clearances.

Signalling modifications. The TramTrain must be protected from other rail vehicles. We do not have the Automatic Train Protection System that they have in Germany, so we may need TPWS on every signal. 750V DC electrification will probably be required with the possibility of future upgrade to 25kV.

Track issues. Rail inclination is normally 1 in 20 on the main line but 1 in 40 on a tramway (vertical on a street tramway). The wheel profile has to cope with this. The flange on the standard heavy rail wheel is almost twice as wide as that on a typical tram and deeper. To cope with the different TramTrain wheel profile on the main line raised check rails will be required at switches and crossings (standard practice on German railways). To avoid riding up on heavy rail switch tips, a flange depth on the TramTrain at least 6mm deeper than the typical tram flange is required. Street track on the tramway may need replacement to provide deeper flangeways to cope with this.

People sometimes ask: isn't Manchester already a TramTrain system? It runs on former main-line railway lines and runs in the City Centre. But it does not inter-run with mainline trains and the trams are not fitted with mainline systems. It is, therefore, much easier to manage with no external interfaces.

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A case study for TramTrain is Leeds to Leeds-Bradford Airport, where there is some potential funding available after the cancellation of the trolleybus scheme. Leeds City Centre currently has no tram system and Leeds Bradford Airport has no rail connection and relies on buses and taxis for public transport plus plenty of car park space.

A suitable mainline exists in the Leeds to Harrogate line which passes quite close to the airport. A TramTrain solution would require a new street tramway in Leeds city centre, together with a short branch from the Harrogate line to the airport. Mainline capacity has to be considered. Current line speed is 60 mph which is within TramTrain capability. Low platform extensions will be required.

Electrification at 750v is required, unless mainline electrification to Harrogate is being considered, as well as additional TPWS and traction immune track circuits.

The line must start at the airport terminal but there are two possible routes to join the Harrogate line. At the Leeds end the tramway should leave the mainline before Armley Junction to avoid the more intensive service and the 25kV electrification, possibly south of Burley Park.

The route into city would need to be determined, possibly Burley Road, Burley Street, Park Lane, over the motorway, Westgate into The Headrow and then with a loop around the city centre via Vicar Lane or Brigade, Boar Lane and Park Row.

This would bring it not too far from Leeds University and the infirmary as well as serving the city centre and the main station.

This all requires an in depth study and some decisions on what places in the city should be served by the tram.

Why did there have to be a pilot and not a just desktop exercise? Why not just get on with it? Some of the problems with UK operation have been outlined. A physical pilot identifies the issues and allows appropriate standards to be agreed with industry and tested in practice.

This has now largely been achieved.

The available technologies can be trialled to quantify the benefits and identify barriers to development.

Future policy will now be evidence based and minds will be focused on real, not perceived risk.

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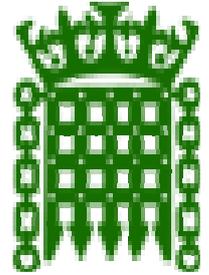
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The objectives of the pilot were to: understand the changes to costs of operating a lighter weight vehicle with track brakes on the rail network; determine the technical standards both to allow inter-running of lighter weight tram vehicles with heavy rail passenger and freight operation and to gain maximum cost benefit from TramTrain operation;

Gauge passenger perception and acceptability of the light rail TramTrain service; determine the practical operational issues of extending TramTrain from heavy rail to on street running.

In conclusion, Tim Kendell believed that TramTrain has the potential to provide a new passenger rail transport offering, whilst reducing overall costs to UK plc.

It may increase upfront costs but deliver lower whole-life costs. But it will only be delivered if the both heavy and light rail industries work in partnership to make it happen.

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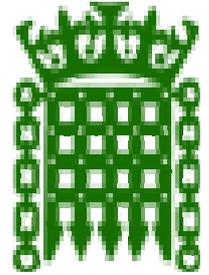
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Greg Mulholland thanked the speaker and then introduced the Minister.



**Paul Maynard** MP said that as MP for Blackpool he clearly has an interest in trams and on his recent visit to Birmingham for the Party Conference he had seen what a difference trams were now making to the city centre. He had also been struck by the number of people attending the Light Rail Awards.

We should not underestimate the size of the UK light rail industry or the number of cities who have light rail or who are considering it.

Growth in ridership and the high passenger satisfaction rate are impressive.

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The Government is keen to ensure that light rail is a viable option for any area that is considering it.

Viable meaning that there is a proper understanding of what the cost drivers are and that Network Rail is in a position to deliver if their network is involved.

Ultimately it is a decision for a local area to take if they believe light rail is the right option for them.

They can only do that if they are aware of the positives that light rail can bring. By driving down the costs and making it as cost effective as possible we can make light rail a sensible option for more areas to take.

There have been discussions about light rail for Liverpool, Bristol, Portsmouth and Southampton as well as the Isle of Wight. Light rail remains an option for many areas and DfT's role is in asking those difficult questions of all the sectors that have a stake in light rail why it is a cost-effective option for those areas to consider.

So DfT is well-disposed towards light rail but recognises that there is more work to do, particularly with UKTram, to ensure that they understand what is working well what is not working well and what the Department can do to improve things.

The Minister thinks that light rail is going to expand further, not just trams but TramTrain and shares the frustration that TramTrain has been less speedy than it might have been.

There are going to be a significant number of lessons to learn about the entire length of that project from beginning to end after it is completed That is a piece of work the Minister is very keen to do being aware that other parts of the country need to learn from TramTrain and whether it is the right option to pick for parts of their network.

Hopefully TramTrain will reach a successful conclusion but more important will be what lessons can be learnt from that process. What lessons can Network Rail derive, what lessons can the sector derive and how can it continue to bring down costs. With that we can ensure that we build a UK based tram industry.

The Minister is always encouraging tram manufacturers to build in the UK and is confident that that can happen in the future because with expansion in Manchester, Birmingham and elsewhere there is now a domestic market for trams.

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Summing up, the Minister said that what he saw at the Light Rail Awards was immensely encouraging. It is a vibrant sector, a successful sector; it has the potential to grow.

There is a role for government in ensuring that it is as viable an option as possible for all the local areas that are looking into it.

He is looking forward to any suggestions about what more the Department can do that would make a difference and make this a more viable option for local areas to take into account.

**Greg Mulholland** thanked the Minister and invited questions

### Questions

**Greg Mulholland** said that one objective of the meeting was to get a better sense of why the TramTrain project has been so bogged down, what blockages there are and how the Minister sees the role of DfT in trying to overcome some of those obstacles and getting the project finished.

**Paul Maynard** said that there are a number of challenges in TramTrain. One is funding and he has been working hard to find some funding certainty to make sure that the project reaches its conclusion. The technical requirements were perhaps not judged accurately by Network Rail and not every consequence of running light rail on heavy rail was foreseen at the start of the project, so there has been a gradual scope creep.

About a year ago Peter Hendy took a close personal interest in the project to bring it to a conclusion and that has helped greatly in focussing local minds in NR on delivering a successful outcome but there are still some technical challenges to overcome but we are getting there.

**Ian Ambrose** (Network Rail) said that it was his responsibility to collate the learning from the pilot.

He said that last year DfT had commissioned UKTram to produce a peer review of the project but it was never published.

Some understand what the problems are but there are others who will not listen. The report needs to be published to inform APPLRG and others what has been happening.

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**Paul Maynard** said it was tempting in his job to bash Network Rail but that is something he tries to avoid. It does not help to set groups against each other and everyone wants this project to reach its conclusion.

He heard what Ian had said but queried whether there would be more learning on completion than there was now.

He understood that there was already a strong evidence base that could help inform future projects but by the time the project is finished more still will have been learned.

**Ian Ambrose** agreed but said it should not stop people moving into the initial phases of their system design

**Paul Maynard** said DfT would take advice on the issue of the publication of the report.

**John Parry** (PPM Ltd) said that the railway network was very large but it all worked to the same standards. It is difficult to produce something different like a tram and then want to run it on the railway and change the railway to accommodate it, particularly as the various tram systems so far built in the UK have no consistent standards as regards, for instance, wheel flanges. When the People Mover was to be operated on a railway line it was adapted to meet the railway's standards.

In the USA there are many instances of heavy rail running on street track. Should we not have started with a vehicle that is built to railway standards and then adapt it for street running.

**Paul Maynard** said that we are not the first country to do this so it is not an impossible dream. What we do in the UK may be somewhat different but it is quite possible to do. It is important to learn from Sheffield what we should not do as much as what we should do.

He had noted at the Light Rail Awards that an American tram manufacturer was looking to use UK expertise to drive innovation in the US

**Martyn Bolt** (Kirklees Council) asked if all former railway lines could be safeguarded for light rail or other transport use.

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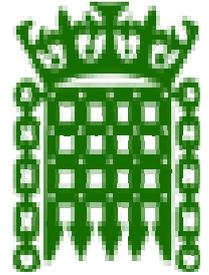
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**Paul Maynard** agreed that there were many ex-rail lines around and there were many schemes for their use for different forms of transport. He was nervous about having a blanket national rule as there will always be local reasons why it is or is not appropriate but there is a strong argument for, wherever possible, a sensible local council retaining the potential for particular pieces of infrastructure, not least because it is there already and can have so many uses, of which light rail would be one.

One reason for progressing TramTrain is that it provides another option for local councils or transport authorities for using local infrastructure.

Sensible local authorities would look to bring as many of these old lines back into operation as possible.

**Martyn Bolt** said that local councils did not always act sensibly and that is why national guidelines would encourage them to do the right thing.

**Paul Maynard** was surprised to hear a local councillor arguing for more central direction and said it was current government policy to trust councils to get it right and that they would be judged by the local electorate if they did not.

There might, however, be a case for guidelines at a strategic national level and he would consider it.

**Reg Harman** (Interface) mentioned the concept of Swiftrail, that he and Nicholas Falk had been working on, looking at the use of light rail vehicles on Network Rail and abandoned lines, complementing the work done by John Parry on the Stourbridge Town branch, and using this as a tool in wider development.

A couple of dozen lines have been identified where this might work. He felt, however, that the current means of assessing schemes, such as WEBTAG, did not take into account the effect of tramways or light rail on demand.

Had the Minister looked at this?

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**Paul Maynard** agreed that he had not seen a valid model for predicting increases in demand from building or extending light rail, which would be a useful tool to have.

He emphasised that any investment in light or heavy rail must put passenger interest first.

What he wanted to hear about any scheme was how it would benefit the passenger not how technically innovative it might be.

Labour mobility was particularly important – how does a scheme help people get from where they live to where they can get a job. That is where light rail can be really transformative and add real value and he would like a model that can capture that.

**Greg Mulholland** referred to Tim Kendell's outline of a possible TramTrain line in Leeds.

Leeds, as the largest city in Europe without a light rail system, was the obvious place for investment.

There was now an opportunity with the £173m from the defunct trolleybus scheme but if the decision was to use this funding for TramTrain how can that be initiated before the pilot project has been completed?

**Paul Maynard** agreed that this would be a problem and he would take it away and look at it. It would, of course, depend on Leeds making that choice

**Greg Mulholland** then thanked the Minister for his attendance at the meeting. The Minister left at this point.

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House of Commons  
London SW1A 0AA  
Light Rail & Trams, Affordable & Sustainable Transport

*"The past we inherit, the future we build ourselves"*



*"TramTrain does it Greener and Cheaper on lightly used railway lines and in the streets"*

**Greg Mulholland** introduced the third speaker.

**Martin Lax** distributed a paper version of his presentation *Is Tram Train part of the future for Greater Manchester?* A copy of the presentation can be found at

<http://www.applrguk.co.uk/media/files/LR-Applrg-Martin-Lax-TramTrain-Future-for-Greater-Manchester-11-10-2016pdf>

**Martin Lax** said he had been with Manchester for about ten years and became HoD for TfGM ten years ago. His remit covers everything from HS2 through Northern Powerhouse rail to TramTrain, Metrolink and BRT.

The transport strategy to 2040 had been out to consultation in July which had just closed. There had been a good number of responses which will now go to the Combined Authority.

Spatial themes are an important aspect, from global connections to connections between neighbourhoods. The reason for this planning is the projected growth of Greater Manchester. It is predicted that there will be around 350,000 additional jobs, supporting growth of population to 3m+, and requiring an additional 200,000 homes, and leading to 800,000 additional trips per day on the transport network.

A quality, high capacity transport system is needed to cope with this.

Manchester will continue to be the hub of the region with development concentrated in specific corridors of high demand and activity which suits the business cases for rapid transit.

Airport City, in particular, is planned to develop which will provide a starting point for orbital connectivity based on rapid transit.

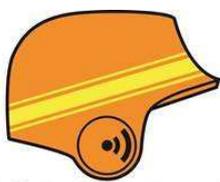
Development of the transport system is based on capacity, connectivity and reliability. Metrolink has tripled in size in recent years and further expansion is in hand with TramTrain also in mind. BRT has also been very successful.

Work underway includes corridor studies, working round the conurbation looking at the rail corridors, including disused lines, and determining which are suitable for rapid transit and what the business cases for them might look like and what adjustments would be needed to the infrastructure.

Subsequent technical assessment looks at power, infrastructure, asset management and operation.

These meetings are by invitation only, where MPs, Stakeholders etc., within the Light Rail industry and invited members of the Public will have a chance to discuss debate and raise questions concerning Light Rail.

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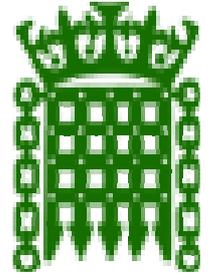
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Overhead electrification is the standard system, used everywhere, tried and tested and easily deliverable but also enormously expensive on a "Greater Manchester scale" if rolled out across the conurbation. So TfGM is looking at alternative and new technology: batteries and supercapacitors, regeneration, hydrogen, embedded third rail.

Key considerations on infrastructure are that the vehicles should be compatible with existing Metrolink infrastructure, that double units with around 400 capacity will be need to meet expected demand, and that, in terms of accessibility, they need to cope with Metrolink and heavy rail platforms.

In terms of planning and construction, TfGM will be building on its experience with Metrolink expansion. Operationally TfGM will need to liaise closely with Network Rail to solve the problems of route sharing etc. and also with Sheffield as well as other potential TramTrain operators such as Cardiff and Glasgow.

He suggested that joint development with other operators would be beneficial.

The potential programme for TramTrain development envisages preliminary studies from 2016 through 2017, by which time the elected mayor of Greater Manchester should be in position.

The report on the Sheffield project is expected in 2019/20 and development work along with Network Rail might be expected from then to 2024 with delivery 20124 to 2029.

## Questions

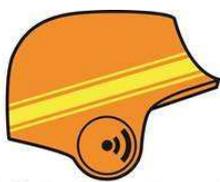
**Ian Ambrose** Picked up Martin Lax's suggestion about joint working and suggested a joint working group with UKTram to help all interested parties focus on common issues and manage learning from the TramTrain trial.

**Tim Kendell** said that it had been the intention that the learning from the trial should emerge as it went on and it is a pity that this has not happened as it would be important for Manchester and anywhere else to be able to move forward as soon as possible.

**John Parry** congratulated Martin and TfGM for their focus on research and development. He thought that many of the problems bedevilling TramTrain were those of electricity supply and that alternative power sources should be considered.

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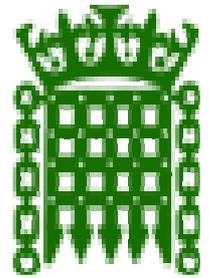
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**Martin Lax** said that they were looking at all possible alternatives.

**Dave Halliday** (STRAIL UK) suggested that less emphasis should be laid on type of vehicle and more on effective movement of passengers and freight.

He thought cargo trams might lead to a better use of space in city centres than delivery lorries. Planning of major schemes such as hospitals should be done in parallel to transport planning.

**Martin Lax** felt that freight on trams would be something worth looking into.

**Natalie Maye** (Carillion Rail) asked how the decision on the form of electrification for the TramTrain trial was reached.

**Ian Ambrose** said that it was originally intended to be normal tram overhead power but then a retest for 25kV compatibility was made and that was when complications set in.

**Tim Kendell** said that he had proposed tram-style electrification throughout, which would have been relatively cheap. If and when the local heavy rail network was then electrified the 25kV equipments could have gone in as part of that process.

In the end, costs would have been much less than installing the hybrid system. He added that Network Rail prefers systems and equipment that they are used to.

**Ian Ambrose** agreed and said that one of the barriers was getting product approval for innovations.

**Greg Mulholland** thanked the speakers and the audience. He said he would liaise with Jim Harkins on getting letters out to DfT and Network Rail.

The proposed APPLRG meeting in London in November has been cancelled but he said he was very keen to arrange another meeting to take the Leeds proposal forward.

The meetings best wishes were expressed to Jim Harkins for a full recovery from his recent illness in Germany.

The meeting closed at 17:00.

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