Light Rail (UK)

All Party Parliamentary Light Rail Group

House of Commons
London SW1A 0AA

"The past we inherit, the future we build

Trams – Catalysts for Jobs, Renewal & Regeneration

All Party Parliamentary Light Rail Group (APPLRG)

Report of a meeting held at the House of Commons on Tuesday 5th November 2013

Chairman: John Leech MP (Chairman APPLRG)
Acting Chairman until 16:10: Jim Harkins

The meeting opened at 15:00 with Jim Harkins as Acting Chairman in the temporary absence in the House of John Leech.

Jim Harkins:
John has asked me to start the meeting as he is down in the Chamber at the moment on the Gambling Bill and is expecting to be speaking on it. He will be back here as soon as he can to take over.

The Minister has limited time but when she has spoken, there will be about ten minutes for questions. So I should like now to introduce the Minister, Baroness Kramer.

Baroness Kramer (Minister of Transport)

Thank you very much indeed and I am delighted to come to the APPG on Light Rail. I apologise for not being able to stay longer but, because coming in to this very wonderful post was unexpected, I am trying to integrate two diaries, the old commitments and the new commitments, which makes life slightly tricky. I am very conscious that Norman Baker, and I pick up the cudgels for Norman, cast a very long shadow and it is going to be a hard role to follow. He was a real champion for light rail and I intend to continue to be a champion for light rail. As you know, Norman commissioned a review in 2010 looking at ways to cut the costs of light rail and the follow-on report to that, *Green light for light rail*, was published in September 2012. Coming out of that he built an excellent relationship with UKTram and I suspect there are various component parts of the UKTram family here today. I want to take that up now and one of the things that I am going to do is a high-level summit with the various stakeholders so that I can fully understand what the issues are and see where we can go forward and build on the work that Norman did. I am happy to make that commitment today.

Clearly light rail is popular, we see increased usage. I have some direct experience with it because I was one of the founding members of the Board of Transport for London and light rail played a very large part. I

was quite closely involved with the extensions to the DLR and with Croydon, now London, and Tramlink. It made me very aware that while light rail is an incredibly appropriate transport system in some parts of the community, there are other areas where it does not work so well. I was very much involved with the attempt to do a West London Tramlink and it clearly would not work because it went through certain high streets and the impact on the community was not right. So my experience comes from some very powerful examples where it was exactly the right answer, absolutely crucial in opening up linkages in East London and providing linkages down in Southeast London, but also recognising that it is not always the answer and work needs to be done in each individual case.

The Coalition, as you know, has been very supportive of light rail, schemes in Nottingham and Birmingham that the Government has supported with extra finance. I am looking with great interest at the work in Manchester who are progressing extensions to Metrolink and I think that along with everybody here I recognise that the role of light rail is not just to give a good service to passengers, which it does - it is a flexible service, it provides sufficient transport in a sustainable way when bus is not able to cope with the burden - but I am also aware that it is a very big boost to the community. I was looking with interest at how Birmingham is integrating the extension to the Metro line 1 to help to put together a package that will boost the economy of the West Midlands, I think the estimates are by about £50m a year, creating up to about 1,300 sustainable jobs. So I am very conscious of the economic benefits that come from light rail.

This APPG is going to be looking at these economic aspects in some of the work that it intends to do. If I may, I would ask if I could follow that work and that, if we could work closely together, we can make sure that the momentum for light rail, which Norman Baker drove forward in his period of time, continues to travel forward during mine.

I will be delighted to take questions. I warn you that I am new enough to this arena that I may often have to answer a question by saying I will write to you. If you were to speak to me a few months from now, I do not think that that will be as true but at this time I am still beginning to grasp detail and information. It has been a real pleasure to be here.

Questions

Paul Rowen (LRTA)
First of all, Susan, I am delighted that you have taken over from Norman. I cannot think of anyone better. The CFDC published a report in September on the new funding structure which showed that predominantly what the local transport boards have done is adopted road schemes rather than public transport schemes and there are only two tram schemes in the list. Is the Department going to be looking

at that? I know that the Select Committee are doing an inquiry into this, but do you have any initial views on how that process is working?

Baroness Kramer
There is a real tension here in that I, as many others, am really committed to the idea of devolution. Whitehall is usually not the best place to be making decisions; it is the local community that is best positioned to make the decisions. I do not want to claw that back and say: hang on a minute you should be doing this project that we like, not that project. Local communities do know those issues better. What I will do, generally, is go back and take a closer look to see if we are communicating as much as we should with local authorities so that they are conscious that light rail is an area to be aware of and has serious potential. It is one of the reasons that I am so interested in the work that the APPG is going to be doing in terms of underscoring what the economic growth can be so that it is not looked at just in terms of the transport silo but in the much broader context of how you can regenerate a community or advance an area that is already doing well. Devolution is an underlying commitment of the coalition and it does transfer the argument back to the people who should be having the debate but I will see if we can do more to enhance their awareness of what the potential is.

Peter Crispin (LRTA)
I am the LRTA Regional Officer for the Bristol area. I do not know what you know about Bristol and what is not going on in Bristol but I would like to say that we have been struggling to try to get LRT on the agenda of whatever the current body is that is supposed to be running transport in Bristol with not much success. What we are looking for is some political input to say: what are you doing in Bristol? Why is it taking longer to get from South Bristol to North Bristol than it did ten years ago? This morning it took me an hour to do two and a half miles into Bristol from my house. I want to raise the point that there seems to be a total lack of looking at the problem. You made the point that we should all be looking at our areas and this is not happening in Bristol.

Baroness Kramer
I will take your point on board but I cannot speak to the situation in Bristol, it is not one that I am aware of. But as I said there are significant areas where it has to be the local community, local authorities, local transport bodies and local people who are involved in this discussion. I will take away the point that you make.

Mary Bonar (LRTF)
We are extremely pleased that you are taking the role and carrying on where Norman Baker left it and your knowledge from London of where light rapid transit works or it does not is very helpful for us in the

industry. What I would like you to take away is an inquiry as to where the Department has got to in relation to utilities

Baroness Kramer
I am very conscious of the whole of the utilities issue and anyone who has dealt with light trail has got to be. I cannot give you an adequate answer on that but it is now stored in the mind.

Paul Dawkins (GHD)
I should like to make you aware of an article in the December Tramways and Urban Transport which will explain where I am coming from. I would also like to draw your attention, following the comments about Bristol, to the situation in Leeds where there is currently a trolleybus scheme. I want to draw a parallel to a project I am working on in Qatar where the Qataris are building a light rail scheme for their university. In Leeds there was a tram scheme going up towards Headingley which would serve both universities but which, unfortunately, did not get underway and this is one of the schemes I refer to in the article at which we should look again.

Baroness Kramer
We will take note of that article. Sometimes people bring up examples of how fast things can go in the Middle East compared with the UK. This is a comparison between two very different constitutional systems.

Roger Harrison (Nottingham Tramlink)
LRTF did a lot of work on the business case for the stations for HS2 and we concluded that the business case would be much improved if, at the same time as you are building the stations you make sure that you have a good urban transport network. It will drive the development of cities around those stations as it did in France and elsewhere. The two are linked, light rapid transit or urban transport in its broadest sense and HS2.

The other point is about the localism agenda. LRTF understands that some of the enterprise zones that the government has set up are struggling to attract inward investment in spite of tax advantages and one of the reasons often given by potential investors is the lack of a fixed rail extension. They are often offered a bus but when you have a choice of cities you can invest in you go for the one which offers the greatest advantages. So we are looking at a possible extension in the Nottingham area to the enterprise zone. I suspect that this is a national problem and enterprise zones have a serious issue.

Baroness Kramer
The issues you raise are absolutely fascinating. On HS2 Lord Deighton is taking a look at HS2 local connectivity as part of a much broader approach: seeing, when we have put in major systems of any kind, how we make sure that they offer the maximum possible benefits to the broader community. Integrating both forms of transport clearly plays a very key role in that, as does integrating both of those with the broader schemes and goals of the area.

My own transport views are somewhat shaped by London where this is the obvious way to look at a particular project and I want to bring that perspective to what we do. It does not always match with the authorities' views so it is going to require discussion and negotiation and debate. I do not know whether the solution in a particular case is light rail or not but providing appropriate transport linkages in areas where you are building a new opportunity has to be something to look at if you are going to maximise the benefits

I have not looked at the enterprise zones specifically to see whether there is a transport barrier that has limited their development. I think it is an interesting area that we might go back and talk with some colleagues about. One of the reasons I am fascinated by transport is that it so often unlocks all kinds of potential, so it is breaking down this looking at it in terms of silo – just moving people – and understanding that it is part of the broader picture. Let me go back and look some more at that.

Dave Halliday (STRAIL (UK))
With one hat I represent the supplier of a system for building tramways that is used in Europe but not in the UK because we do not quite fit the specifications. I get frustrated at times when I read a specification which says for example "factory-encapsulated rail" when the rail we do is not factory-encapsulated but does the same job. The construction methods seem to be faster and simpler than some of the methods used in the UK. So I would like to have a look at that in some way.

The second hat is a cyclist's one. The catchment of tram routes is greatly improved by being able to travel four times the distance to the stops. All over Europe cycles are carried on the trams off-peak. In 2007 TfL commissioned a report which is sitting in a drawer from experts TTK [?] which said that bikes could be carried on Croydon trams and now we are four months into a trial on DLR. So I would like to see how we can integrate cycling with trams and make them work more effectively

Baroness Kramer
One of the things I am looking at is how we can help develop British businesses with all that that means in terms of jobs for young people, development of skills etc. around the new infrastructure that we have

created. Also I want to see these businesses able to export their products as well as provide it locally. If we have got technical barriers, I find that rather interesting and that is something I will take away and look at

In terms of the cycling report, let me see if I can find the drawer and the key.

Dave Halliday
I will send you a copy.

Andrew Braddock (LRTA)
I should like to dwell briefly on the interesting combined themes of Qatar and Bristol. Of course we are different in terms of governmental systems to Qatar but we are not that different from France – it is a democracy, it has devolution (it had devolution long before we started to think about it) but it is real devolution and what I urge the Minister please to start doing is to move funding down to the local level. The huge success of modern tramways in France is built very significantly on the Versement Transport. It is a method of local fundraising and the beauty of it is that over time the people who provide those funds – largely local businesses – get to like what they see. They like the economic regeneration effects of modern tramways, they like the transformation of city centres that modern tramways bring.

I am afraid I disagree with you about West London. I believe that TfL handled that scheme very badly and actually what those small towns – they are almost towns – need is a tramway. TfL handled the consultation badly, they wound the boroughs up and the whole result was a disaster.

When it comes to Bristol, I do think that what the government still need to do is give a lead. Interestingly, although the whole thing is devolved in France and a lot of the money is raised locally, it is still the transport ministry that says to cities: What are you doing? What are you doing about the appalling fact that it takes Pete an hour to do a journey that should take twelve minutes? Why are you not looking seriously in the Bristol area at a decent, modern, street-based transport system rather than depending totally on buses that get in each other's way along with cars and lorries? I think it is a tragedy that we do not have that kind of leadership. Norman tried very hard to bring it in and I hope you will follow in his footsteps on both these themes. Give a lead to cities and please give them the means to raise money themselves.

Baroness Kramer
I will take on board you recommendation about following Norman's footsteps; that is something I am already keen to do. In terms of the funding, we have devolved a significant amount of grant funding down to the local areas and there is a broader issue about local communities being able to raise their own funds.

Some of that has happened at the core cities level and there are a complex set of issues around that. But I get the thrust of where you are going.

Ian Souter (Independent Consultant)
My colleague has already appealed for better integration of cyclists and public transport/light rail operation. May I appeal on behalf of the bigger majority who are pedestrians, non-car users, for a similar degree of integration? Such integration is common in London because you have a unitary authority with overall command and it takes responsibility for that command. Outside London that does not exist and there is a major problem in trying to get light rail schemes in when you have so many competing bus services which intend to remain competing.

Baroness Kramer
Let me just put it this way: I take your point.

John Leech MP (Chairman APPLRG) (via Jim Harkins)
Earlier you were talking about trams bringing about urban regeneration. In the past a number of schemes have tried to do this – Liverpool for example – and have come up against the problem that the Department see it as a transport project and does not take in the other benefits that come with it. Trams are reengineering the city but costs are tied down to purely transport benefits. Is there a possibility you could look at this.

Baroness Kramer
There is a fundamental set of questions on things like benefit-cost ratios and value for money. You can never find a perfect proposal around them. I take the view that they are tools to help make a decision but not a substitute for the decision. Given the time I have left, trying to take Treasury down the roads of re-examining those schemes is difficult because they need to ensure that there is at least consistency across different projects. But I will try to push the notion that these are informing tools and not a substitute for the decision itself.

Jim Harkins
That ends the session. I should like you to thank the Minister for her attendance and we look forward to working with her in the days to come.

Baroness Kramer left the meeting at this point.

Jim Harkins
The next meeting is here in the House of Commons on 21st January. I will come back to you with the details. That is followed by one on 18th March. As soon as I get the questions from Mr Leech, I will be sending you out a call for evidence on sustainability and about jobs before and after the coming of the trams.
Hopefully we will have a meeting here like a public enquiry where those who have submitted written evidence can come and talk. That will be in either February or April subject to parliamentary dates. The highlight of the year is the Parliamentary tea on 11th June, again subject to confirmation. We are waiting for Baroness Kramer's confirmation that she can speak and we will have a speaker from Vossloh. We have a change of sponsor in the pipeline as we are moving from Vossloh-Kiepe in Düsseldorf to Vossloh Rail Vehicles. We are hoping to organise a trip to see Vossloh Rail Vehicles in Valencia by which time TramTrain will be under construction. We also have a number of other invitations: from CAF to visit the factory in Zaragoza and to discuss the next stage of TramTrain; from the Catalonian Minister to visit the regional parliament in Barcelona, which has been organised by Carles Salmeron, our speaker today; from Vossloh-Kiepe to visit the Düsseldorf system; and finally Manchester Metrolink. That is what is in the pipeline following our recent successful visit to Taiwan.

Susan Evans (Alstom)
I should point out that 11th June is in the middle of the Light Rail Conference.

Jim Harkins
Thanks for that. It is only a provisional date and can be changed. (Now scheduled for 18th June 2014)

I would like now to introduce Mr Ian Foley, MD of Williams Hybrid Power, who are developing flywheel technology. If this can be perfected it will make a significant reduction in costs for trams and particularly TramTrain where the high cost of installing overhead on non-electrified lines might be avoided.

Ian Foley (Managing Director, Williams Hybrid Power)
This address was accompanied by a visual presentation.
Thank you for the opportunity to speak. Williams Hybrid Power is a subsidiary of the Williams Formula One Team. The whole group employs about 600 people and Williams Hybrid Power about 60. Although, as an engineer, I am very excited about this technology, the real USP of the technology is the ability to get costs down and this energy-storage technology will facilitate the next step in hybridisation.

We call our flywheel a mechanical battery. It is an electrically driven device which stores the energy by spinning a composite motor at very high speed. The power goes in and out of the device electrically and is stored mechanically. The picture you see there is of the production flywheel which is about 400mm in

diameter and 300mm high. One of those is big enough to do a London bus application which I will come on to later. Our device effectively replaces the battery in either a hybrid system for a bus or a car or in an electrically driven vehicle such as a tram. That is a picture of the flywheel itself, it is a carbon-fibre disc which has a magnetic core and this is inside the container that we saw in the last picture. Our production device spins up to 36,000rpm, we have a smaller motor-supported device which is 45,000rpm, and it is a very efficient electrical machine. That is one of the USPs of this technology because efficiency of the electrical machine is core to getting a good round-trip efficiency, which gives us energy saving, which gives us a business case.

One of our earlier projects was with the Porsche Factory Motorsports group and this is a schematic of the flywheel in the vehicle and here is the flywheel (no.4) we just saw which is sitting next to the driver. The flywheel is driven by an electrical inverter (no.5). Porsche themselves developed the front axle (no.2). This car raced very successfully for two years.

Why use the flywheel and not batteries? The flywheel has a very high density and a very high cycling capability. One of the issues, particularly with a tram or bus application, is that what is required is very high power, hundreds of kilowatts, continuously cycling, and conventional technology, such as batteries or ultra caps, is not suited to this particular duty cycle. The flywheel is specifically suited to these very high stop-start duty cycles. It has a low production cost. The flywheel is fundamentally a mechanical device. This means that for our production we can use automotive supply chain for a lot of the components. The carbon-fibre itself is an automated process, low-cost per volume, and the rest of the flywheel is forged aluminium, copper, steel etc. using existing processes and tooling. Whenever a new battery factory is built, there is talk of hundreds of millions of investment but we do not need that because we are leveraging the existing automotive supply chain.

This is one of the reasons why we can deliver the device so cost-effectively. Also, when we look at the whole-of-life costs, another area which is often not talked about is the disposal cost of lithium-iron batteries. There is a cost-effective way of recycling lead-acid batteries but nobody has worked out a cost-effective way of recycling lithium-iron batteries, so somebody has to pay for their disposal. With the flywheel, the composite part can be ground down and used in aggregate materials and the rest is metallic and completely recyclable. Therefore, the whole-of-life cost is lower, plus the flywheel itself will last the life of a vehicle. Later on, I shall talk about our partnership with Alstom and we are talking there about a 30-year life. During that life there will be service items.

The flywheel has high-speed bearings, which will need replacement but with alternative technologies the core asset, which is more expensive to start with, will need replacing multiple times during the life of the vehicle. So looking at whole-of-life costs including disposal, it is significantly cheaper than the alternative

technologies. Additionally the technology is also lighter. If you look at, for example, 120kW continuous cycling, which is the size of our flywheel, to do that with lithium iron batteries would be a couple of hundred kilos. It is actually heavier in the case of ultra caps because they have thermal issues, which means you have to oversize the capacitors. The flywheel is significantly smaller and lighter that translates into cost because ultimately it is material costs and processing which drives the price but it has the added benefit that on these transport applications where space is always limited we get more power and energy combined into a smaller space which makes it ideal for something like the tram application.

Safety is a very important consideration and we have led the way in terms of developing our own safety case and also a safety standard for the industry. Williams Hybrid Power is sponsoring the British Standards Institute to write a safety standard. We have invited our competitors and the industry to come up with a new design and manufacturing standard for flywheels which will be published by the end of the year. We then expect that to be converted into a European Norm and following that an ISO standard. Additionally we have done a significant amount of work on safety internally and that includes failing a number of flywheels to ensure there is a safe failure

We were founded initially to develop a flywheel for the Williams Formula One Team, although always with an eye to commercialisation for the future. In 2010 and 2011 we had a very successful racing programme with Porsche supporting 24-hour racing. We got within two hours of winning the first 24 hour race when the Porsche engine failed which was rather unfortunate. For the last two years we have won the Le Mans 24-hour race as the energy storage supplier for the Audi hybrid Le Mans car. Something like a manufacturer Le Mans programme is a very high budget programme similar to a Formula One team and Audi have chosen the technology because it is the highest power density technology bar none. They would have chosen it even if there were a more expensive battery solution but we can also manufacture that technology at a very low cost

So coming on to markets, which may be more interesting, over the last couple of years we have been working on a retrofit programme with Go-Ahead for a London bus application and that is about to go live. So in about two week's time, I believe it is route 468 Croydon to Elephant and Castle, one of the buses on that route will be retrofit hybridised with the technology. We also have a programme with Alstom. Additionally we have a market for our technology in a premium automotive vehicle but our technology is not really suited to automotive that is looking for ultra-low cost but much lower performance, we are focussing more at higher performance but at a cost-effective level.

The programme with Go-Ahead involves retrofitting the technology on to a London bus. As I am sure you know, one of the main issues with hybrid buses is that the current technology is not cost-effective. A standard double-deck bus costs around £200,000 and a hybrid bus is an additional cost of around £100,000

which has about a ten year pay-back. So one of the reasons why out of the 6,000 double-deck buses in London only a few are hybrid is because the current technology is too expensive. We have a retrofit solution that is offering the operator pay-back within three years based on fuel saved. This has led to the programme with Go-Ahead and after a successful trial should lead to hundreds of vehicles on the roads within the next year or two. We are getting 20-30% fuel saving based on proving ground tests using real route data. When the bus goes on trial we expect to get more than 20% average on a real route. This is a picture of the installation on the bus. What we have is the flywheel and its associated ancillaries mounted in two boxes that go under the seats. Underneath we have developed, in collaboration with GKN, a transfer gearbox and electric motor solution.

Because the technology is so small and so light we can take an existing bus that was not designed for it and retrofit the solution. Having successfully developed this we also now have significant manufacturing interest so that we expect to see a similar solution fitted to OEM buses in the future. The picture on the left-hand side is a cut-away of the flywheel itself. There are about twenty main components in the flywheel. It is fundamentally a very simple device – it does not feel that way when you spend six years trying to develop it - but ultimately there is a very low park count which again translates into low cost

This is some validation work we did at Millbrook. As you may know, to get green bus certification a bus has to go through a qualification test at Millbrook. Because the test is easier than real life - there is no opening and closing of the doors and there are much lower hotel loads - we actually achieved a 35% fuel saving on the Millbrook certification test

A thing which may be of more interest today is our work with Alstom. About two years ago we started a programme of work with Alstom. Alstom recognised that, although they had an ongoing ultra cap solution for trams, it did not give them the right balance of power and energy. When they saw the specification of our production flywheel, they realised that it would give them a step forward in terms of their objectives particularly for catenary-free travel. So we have developed a system which has eight of the flywheels that you have just seen in parallel which are mounted on the roof of the tram.

We are rig-testing that solution at the moment and we expect it to go on field trial at the end of next year. Although there is energy saving it is very difficult to get a business case based solely on the saving of electricity – electricity is too cheap compared with the technologies. The real win is when you look at the benefits of catenary-free travel and therefore the reduction in infrastructure costs - we have talked about the issue of moving utilities etc and the infrastructure required, particularly in town centres. We believe that there is a significant business case for enabling partial catenary-free travel, reducing costs, and we understand that more and more new systems are demanding catenary-free rather than overhead cables.

So Alstom chose our technology because of the balance of power and energy – the flywheel has much less energy density than batteries but is much higher power and with the cycle life which means that the asset lasts up to the thirty-year life of the vehicle. This means that the business case is significantly better which means that we have a more cost-effective solution. Alstom already have a third-rail system for catenary-free travel, Bombardier have the inductive system, but again the reason why there is not significant uptake of those systems is because of the cost and our system, we feel, offers a very cost-effective solution.

We also have interest from some train operators for retrofitting our bus-type system on diesel multiple units and just recently we started looking at putting the installation on the existing 750 volt system in London. These are at early stages of discussion but have led on from the work we have done with Alstom

In terms of technology readiness, we have proved the concept in our motorsport work. Whilst 24 hours does not sound a long time to you who are looking at thirty years, 24 hour racing is a very arduous environment and what it proved to us was the fundamental robustness of the technology. We have been productionising the technology for the last couple of years and we are currently undertaking design validation testing including to rail standards and we expect to be starting production at the end of 2014.

Thank you very much.

Jim Harkins
Thank you Ian, it gives us a lot of hope for the future, the technology, although, there are some of us who would be unhappy at the demise of the overhead wire. We will now take questions from the floor.

Questions

Ian Souter
I am of a heavy rail background and heavy rail has a bad habit of smashing things. It is inevitable that at sometime someone is going to smash something no matter how shiny it is when it is new. The worry with a flywheel is that you have considerable energy stored up in there so if your vehicle comes to an unfortunate event how is that energy dissipated without scything through the community?

Ian Foley
One or two years ago one of the drivers went head on into the barriers at about 200mph, which was quite a good test of survival. But you are absolutely right, in a failure event with the flywheel the flywheel needs to be very well bolted down and the structure has to support that. As part of the validation testing we have undertaken crush tests, which involves crushing the containers to simulate an accident. So the answer to the question is that the way it dissipates the energy is by rubbing. The flywheel we saw has a

skate on the inside so that if it got crushed or came off its mountings it processes around and takes a few seconds to dissipate that energy.

Ian Souter
Effectively a friction brake?

Ian Foley
Effectively, yes. That event we test for a lot. We have a method of deliberately failing the rig, so that, if one of the events you mentioned causes the flywheel to have a failure event, the container gets very hot and the flywheel comes to a halt.

Dave Holladay
Would this technology have an application in smaller vehicles, such as mobility scooters, where you have quite a weight of batteries?

Ian Foley
I do not think so because that application needs a lot of energy compared to the power. Our technology is suited to applications where you want continuous cycling in a few seconds. For example with that flywheel on a bus one braking event would charge you up to about three quarters full and then after a few seconds it would discharge in an acceleration event and then that would be it. Our niche is for high power continuous cycle rather than low power and maximum energy.

[**John Leech** arrived at 16:10 and took over as Chairman of the meeting.]

Jim Harkins
We have a number of tram systems now which are starting to cascade vehicles, T68s on Manchester Metrolink come to mind.
Have you been in discussion with these operators about using this technology sooner rather than later for, say, a TramTrain from Altrincham up to Chester?

Ian Foley
Not yet, because we are at quite an early stage with the Alstom programme. We are quite advanced with our bus application but we want to get the trials finished before launching into the market.

Jim Harkins
You say you have done trials with Alstom. Is there a danger that they will take it in but because they have got other systems which they may want to promote that yours may be slowed down put on a shelf? Do you have exclusivity with Alstom?

Ian Foley
There is early exclusivity. They have an exclusive option in tramway but not all light rail, but that would lapse if they parked the technology. We are very confident that because the other technologies are so expensive that it will not happen but should it happen the agreement would lapse.

Mike Flynn
I have been involved in the tram industry for about seventeen or eighteen years and for as long as I can remember people have been talking about flywheels, so it is not new. What I am not clear about is why your solution is any better than solutions that have been about for some time and what the advantages are over supercaps for tram applications.

Ian Foley
There are other flywheel technologies that look similar but use solid magnets. Ours uses a different technology developed in the nuclear industry where the magnet is incorporated into the composite and this means much lower losses and means you can cycle it a lot harder, so that results in a much smaller, lighter solution for the same power cycle, so you can get more on the tram. So you are right that there are similar technologies but we believe that one of the reasons they have not taken off is because none of them is cost effective.

At the moment, supercaps are being developed because there no better alternative but they do not meet all the needs for catenary-free travel. If you look at the data sheets for supercaps you will see that if you run that capacitor at its maximum operating temperature its life is 1500 hours which is patently no good. That means that in order to run supercaps you have to run a lot more capacitors than you think you would need to keep the temperature down. So that is why a flywheel installation is about 60 kilos while a supercap installation is about 300 kilos. So there have been other flywheel solutions but there have not been any with this particular advantage, and we have been developing it for six years and are just about getting to the point of commercialisation

Martin Thorne (LRTA)
I understand that there is a Greater Anglia Class 379 which has been retrofitted for battery operation. Is it worth contacting Bombardier to try to get one of your flywheels in a similar unit to give a direct comparison with battery operation?

Ian Foley
It may be of interest. I did not know about that particular project.

Ian Ambrose (Network Rail)
Network Rail are doing the battery trial with the 379 and until that trial is proven I do not think there will be the opportunity to consider any other sort of energy storage. However, clearly we are interested in that kind of technology as we demonstrated through the Alternative Solutions RUS published earlier in the year. So watch this space

John Leech thanked Ian Foley. He apologised for missing much of the meeting but as his party's spokesman on culture and media has just had to speak in the second reading of the Gambling Bill. He then introduced the final speaker Carles Salmeron, the Director of the Centre d'Estudis del Transport in Barcelona, a leading institution with many publications about European public transport.

Carles Salmeron (Director, Centre d'Estudis del Transport, Barcelona)
[His address was read by John Bennett (Consultant and Translator) and was accompanied by a visual presentation.]

Our thesis is that the urban centres and traditional shops of many European cities run the risk of falling into decay, on the one hand because of new social tendencies, like shopping on the internet or in big commercial centres on the outskirts, and on the other hand because of the lack of an efficient public transport system connecting the suburbs with the city centre. If politicians want people to continue going to the centre of the city, they must offer them an easy journey in a comfortable light rail vehicle which can be combined with many park-and-ride areas at the suburban stops. Regrettably, in many cities existing tramway systems have been closed and a bad example is Los Angeles where the closure of the Pacific Electric interurban tramway created a car-only city with enormous traffic problems. An extreme example is Detroit, where people left the city centre, the buildings fell down or were demolished leaving a whole central district empty.

All Party Parliamentary Light Rail Group

House of Commons
London SW1A 0AA

"The past we inherit, the future we build

Trams – Catalysts for Jobs, Renewal & Regeneration

Light Rail (UK)

This is a photograph of a Worcester newspaper on the 23rd September last where we see that the situation of American cities is arriving now in Europe. In some continental cities the degradation of the city centre has been combated through the installation of a new light rail system, as in Paris. Trams should return to many European cities as a tool to revitalise and regenerate the city centre, and this is the modern tramway in Barcelona. The first modern urban tram route in Europe was in Nantes in 1985 and this table is a good example: it shows that one hundred European tram networks will have been established between 1985 and 2014-16. One city can make a mistake but not one hundred.

We can identify four tram models in Europe: the German model, which is also found in Switzerland, Benelux and Scandinavia, these are networks which have survived and been modernised (we see here a new tram in Berlin); The French model, which is found also in Spain and other Western European countries, where trams are use to regenerate the city, especially the downtown area and in the suburbs (we see here a tram in Bordeaux); the Eastern European model is where some networks have been saved with classic second-hand cars imported from Western Europe while others have already started their modernisation (this is a tram in Iaşi in Romania); the fourth model is the Russian and CIS model, which are classical Soviet-type networks which in the future are to be modernised (here is a tram in the Ukraine).

The new Barcelona tramway is a good example of how the new trams have permitted the urban regeneration of the underdeveloped parts of the city. This is an example of institutional publicity from the past celebrating the closure of the old tramway network. This is an example of the substantial urban development in Barcelona, the city of Cornellà (which is next-door to Barcelona) then and now. There are two tram systems in Barcelona, Trambaix and Trambesòs. The new section of the Trambesòs along the Diagonal has promoted the growth of northeast Barcelona with new big company buildings. In the photo we can see the new headquarters of the telephonic company. There are new hotels and new residential areas along the tram route as well. Here is a brochure published by the tram company, new enterprises and the trades unions all promoting the mobility of workers in the Besòs Llobregat area. Go to work by tram it says. This graph shows the growing number of riders in Barcelona and that the trams have the best satisfaction index of all the public transport in Barcelona.

Then in 1995 came the new model, the TramTrain, and, if the role of the new tram was in structuring the cities, the role of the new TramTrains is in linking the suburbs with the hinterland of the cities and the city centre. What is a TramTrain? It is a tram that also uses a portion of the rail network to link the city centre with the surrounding region. Karlsruhe was the first TramTrain in Europe and here we see it in the city centre, is it a tram or is it a train on the street? Here we have Rastatt station on the Karlsruhe system on the same platform where the TramTrain has to stop, three minutes later there is a high-speed ICE train

This meeting 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 & Trams.

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The Light Rail Transit Association supports this meeting with volunteers and complimentary copies of Tramways and Urban Transit magazine

Now we will take a brief tour of European TramTrain systems. Carles' thesis is that each TramTrain is a model adapted to different places and situations. In Oporto, for example, the TramTrain is a tram. In the city centre, however, it goes underground, so it becomes a metro. Alicante was the first ever narrow gauge TramTrain. Its success has led to new urban sections of tramway being built. In Majorca, this shows a TramTrain on the future Manacor-Artà line, which will be reconstructed and reopened. At present it is in use in railway service between Palma and Inca. This is the Aulnay-Bondy line in Paris, the TramTrain is using a transformed suburban railway line. This is a new TramTrain service recently introduced on the rural railway line from Esbly to Crécy. This is an SNCF regional TramTrain from Nantes to Clisson at the moment. Next year it will be extended to Chateaubriand. In Mulhouse the regional TramTrain on the right utilises the tracks of the urban trams to reach the city centre. The TramTrain in Lyon directly connects the city centre with the Lyon Saint Exupéry Airport.

The second TramTrain of Lyon shares regional SNCF lines with diesel railcars. A TramTrain on the successful new extension to Santa Maria di Pisa using the Sardinian narrow gauge railway line. Saarbrucken was the first transnational TramTrain linking towns in France and Germany, crossing the frontier and it is seen here traversing an industrial area. In Karlsruhe the TramTrain network is already 450km and they are buying new TramTrain from Vossloh, the sponsors of this meeting. In Kassel the regional and urban network is shown here, a hybrid TramTrain for non-electrified lines. In Nordhausen, the city TramTrain uses the tracks of the Hartz narrow gauge network, which have not been electrified, so the trams are equipped with diesel engines. In the former Karl-Marx-Stadt, now Chemnitz, the TramTrain fleet is expanding with new Vossloh hybrid electro-diesel TramTrains to serve non-electrified lines. This is a different way of looking at the subject, the Zwickau TrainTram the diesel regional trains enter the city centre using the tram route where a third rail has been laid to cater for standard and metre gauge vehicles on the same route. The Den Haag TramTrain shares the tracks of the Randstad-Den Haag-Rotterdam system with the trains of Rotterdam metro. Sheffield and Rotherham will be the first pure TramTrain in the UK because it will use the tracks of both the city trams and Network Rail. The photograph is taken near the future junction of both systems.

The new Vossloh TramTrains for the Sheffield-Rotherham line will look like this. The Paris Grand Ceinture, here we see the abandoned rails of the Paris Grand Ceinture orbital line on which TramTrains will soon circulate to connect the banlieues, the suburbs. TramTrains are the future says Carles as they require much less investment which makes them ideal in situations such as those of the economic crisis because they can utilise underused infrastructure. In the UK and across Europe there are many semi-abandoned lines that can be used in this way. In consequence our thesis is that trams and particularly TramTrains are a beneficial experience with a future. Thank you.

Questions

John Leech
I will start by asking whether you have a view on which type of light rail system is most likely to bring about the regeneration of a particular area or whether you feel it would depend on the particular circumstances of the area.

Carles Salmeron through John Bennett
There are many continental cities where trams have regenerated the city centre while TramTrains have improved transport links in the whole hinterland of the city. One example is Karlsruhe which started with one line and now there are 450km. Barcelona is a good example of how a tram has regenerated areas of the city and Alicante is a good example of how a TramTrain has been used to regenerate the whole coastal strip. The success of the Alicante TramTrain led to the implantation of a network of trams in the city centre.

John Leech
That was not quite my question. [Referring to a slide of the Barcelona tramway] If that had been a metro rather than a street runner would it in your view still have created the same regenerative benefits?

Carles Salmeron through John Bennett
A metro would cost ten times as much. The implantation of the tram has actually increased the speed at which motorists can drive and has improved the lot of the shopkeepers. It has also encouraged new building along the route. Possibly all of this would not have happened with a metro. This was a particularly run-down part of the city centre which has seen a lot of new building because of the trams. The trams were put in first and then people started building along the route.

John Leech
Why would a metro not have created the same sort of regeneration benefits? Is it a passing trade element of people seeing businesses as they ride past them on the trams?

Carles Salmeron through John Bennett
The tram is more visible, it is its own publicity. The tram in Barcelona has a satisfaction index of eight out of ten which is higher than all the other systems. A metro is underground, a tram is there and you step across the grass on to the tram. It is rather like a flying lawn.

Roger Harrison
Sometimes I hear in the UK that the TramTrain is a very expensive vehicle and is seen as a replacement for existing [heavy rail] rolling stock. Is it really the right vehicle; is it a tram going on to the main line railway of the other way round?

Carles Salmeron through John Bennett
There are economies of scale. In the last few years twenty systems have been developed and more are coming. The technology is becoming cheaper

John Leech
I do not think that is the experience we have in the UK where it seems to become more expensive.

Rachid Meftah (Vossloh Rail Vehicles)
With the UK TramTrain trial we are talking about a fleet of only seven units. At present all the development costs are loaded on to those seven units If we can talk about a fleet of twenty or fifty units then the price would be much better and would be much closer to a conventional tram

John Leech
So, if another UK operator came up with a similar scheme and were to take the same model, it would then work out significantly cheaper?

Rachid Meftah
This involves some technical issues. This kind of vehicle is dual voltage, 750V within the city and 25kV outside. There are examples in Germany with a diesel engine as well as 750V overhead. All of these things affect the price. For instance, in Karlsruhe, the price of 25 vehicles was very similar to the price for conventional trams

Ian Souter
I confess that since the age of four I have been very curious to understand why the first generation tramways in Britain were zapped so early in comparison with the rest of the world except the USA. Amongst all the other factors is the social effect of the spread of population. What I find is that the spread of population in Britain has had the consequence of lowering the density on quite a lot of our public transport operations and this has meant that we have lost much more in the way of passengers than any other country that I can find data a for in the northern hemisphere. We have lost something like two thirds to three quarters of the passengers. In Germany they are still going up from the 1950 level hence

perhaps the interest in trams The significance of all this is that TramTrain has the ability to carry people in bulk to where they have moved to in a way that conventional rail cannot, while bus and alternative modes have clearly demonstrated that they cannot. Coming back to the point of city centre degeneration, the USA realised that it had serious trouble on this count in the 50s and 60s and it acknowledged at that time that there was not really a commercial case for operation of public transport on a conventional profit and loss basis. So you started getting subsidies coming in realising that transport was critical to the operation of society.
My question is: how much is it realised, this effect of the spread of population and the change of journeys on public transport provision?

Carles Salmeron through John Bennett
TramTrain services have a basic advantage in these times which is that it does not cost very much to put one in because the infrastructure is already there, even if the vehicle is a little more expensive. An example in Paris is the Grand Ceinture, which is an orbital route which has not been used since the 1970s and is going to be restored and put back into service as a TramTrain connecting all the banlieues around Paris. So people can travel between suburbs without having to go into the city centre and out again.

Bernard Gambrill (Freelance Consultant)
I was interested to hear about the effect of putting trams into a busy shopping street: the visibility of the trams and the trade that they bring and that they speed up the other traffic. The three reasons that the West London tram scheme was abandoned were that it would restrict the number of people who could travel along the Uxbridge Road, the speed of the traffic would be reduced and it would have a deleterious effect on the shops and other businesses along the route. I was please to hear that the opposite effect happened and I look forward to the West London tram being picked up again at some stage.

Carles Salmeron through John Bennett
The Barcelona system was built by a public-private partnership which involved a big marketing effort before it was built getting everyone involved: all the shopkeepers; the trades unions. This is what has contributed to its success. Public transport can win but it will only win if it is a good product

John Leech
We as an All-Party group have been to Budapest. There is decent public transport there but some of the trams are in a poor state but they are still well used. So, when you say it has got to be good, do you mean individually on a route by route basis or it has to be good in general?

Carles Salmeron through John Bennett
Budapest has started to modernise its tram system. In my experience people prefer to use trams rather than the metro where both are available.

John Leech then thanked the speakers and closed the meeting wishing all a Merry Christmas and a Happy New Year, looking forward to meeting them again at the next meeting 21st January 2014

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