

The future of public mass transit services: Trams

Tram travel is hugely popular in the seven areas that already have a service, achieving a 93% satisfaction rating. Yet only one more tramway is planned in the UK.

Paul Clifton explains what is holding trams back.

Trams are highly successful and hugely popular. But let's face it: there aren't many of them in the UK. New ones are more likely to be extensions of existing lines than entire new systems. In our public transport, it's a niche business. Certainly compared with our European neighbours.

And, while passenger numbers are at a record high, trams still represent only 3% of public transport journeys even though they are widely acknowledged to have enormous economic and social benefits.

By 2050, the UK is projected to be Europe's most populous nation. Of 78 million people, 83% will live in urban areas, placing increasing strain on the public transport system. According to PA Consulting, only 6% of people work nine-to-five Monday to Friday,

so the load is already spread throughout some of the day. And, last year, the UK committed to end its contribution to global warming by 2050, the first major economy in the world to pass a law to achieve this.

Transport Focus recorded a 93% satisfaction rating for trams across Britain, rising to 99% in Edinburgh.

These are figures rail and bus operators could barely dream about.

There are seven tram systems in the UK: Edinburgh, Croydon, Birmingham, Manchester, Sheffield, Nottingham and Blackpool.

Soon another will follow: new tram-trains in Cardiff will include a short street section.

Add two intensively used light rail systems:

3%

of public transport journeys are taken on trams

Docklands Light Railway and Tyne and Wear Metro, which have no street running.

Why no more? A century ago nearly every city and major town had a tram. In the era of their renaissance, France has opened 30 tram networks in three decades.

Trams take up road space. It's a tough sell for local authorities: a new tram means less room for all other road users. They're more expensive than buses, and central Government isn't keen on making up the difference.

Public support for a tram is no guarantee of getting one; Leeds has been asking for trams for decades, and has spent tens of millions of pounds on studies.

So far without success. Think back 20 years to the South Hampshire Rapid Transit, said to have the strongest case of any in the country. A scheme to link Portsmouth and Gosport with a tunnel underneath Portsmouth Harbour. Demand was proven, with a busy ferry. Gosport remains the largest town in the country without a railway. Yet it was cancelled. Instead there is now a bus, running partly along the disused railway corridor once destined for the tram. It is successful, but a tram promised so much more.

Elaine Greenwood, UK representative for tram builder Stadler, says: "Because we don't have many systems, each one is different. There is no template, no common vehicle and no standard infrastructure. We like to complicate it a lot for some reason. We make it difficult for manufacturers. So we end up with a situation in Leeds where it has wanted a tram for 25 years and has ended up with nothing. Leeds is the largest city in Europe without any form of light rail. Which is just ridiculous."

Yet passenger satisfaction with trams is extremely high, according to David Sidebottom, director at Transport Focus. "Manchester has shown that if you just build it, passengers will come. It is very well used, and very well liked," he says. ➤

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Elaine Greenwood, Stadler



ABOUT THE AUTHOR

Paul Clifton is a broadcaster and writer on transport issues. He has been the BBC's transport correspondent for southern England for more than 25 years, appearing across all BBC news outlets.

“In Manchester we measure rail, bus and tram passengers with similar methodology. There is a sense that the trams have better reliability than buses. The key driver is a better on-board environment, with space designed to shift a lot of people over relatively short distances. Trams also score well on passenger value for money. The Achilles heel is always the high construction cost.”

Price is the issue, agrees Martin Fleetwood, who leads the trade association UK Tram. He says: “Buses are cheaper and produce quicker results.”

“But local authorities are looking for more control over the way people move. They want to remove private cars from the city centre as far as they can. After every exit on the M1 as you head into Nottingham there is a tram park and ride site. It is clear you are meant to take the tram.”

City centre car parking is expensive and a workplace parking levy is there to encourage people onto public transport.”

NEW EXTENSIONS

The last new tram system in the UK opened in Edinburgh in 2014, after delays and cost increases. Though it has since proved popular and successful, no other entirely new systems are planned. Apart from a concept for what is being termed ‘Cambridgeshire Autonomous Metro’. It is at the earliest stages of public consultation and would involve a hugely expensive tunnel beneath the city centre with four routes radiating to surrounding towns. There is no funding and no business case has yet been made.

But there continues to be incremental extensions to existing systems – most recently, the Trafford Park extension of Manchester Metrolink. The 5.5km line

£300 Million

cost of an extension in Manchester serving six new stops

serves six new stops at a cost of £350 million. In total, the UK’s largest tram network now stretches more than 60 miles with 99 stops.

Three extensions to the Nottingham Express Transit are being considered by the city council: a 3km route from Nottingham station to the Racecourse park and ride, a 1.5km route to the planned HS2 hub at Toton and on to Long Eaton, and 1.8km from Clifton South to a new development at Fairham Pastures. Together the extensions could cost £275 million.

Fleetwood says: “The problem with a tram system is that you need political buy-in from all the major parties. It doesn’t work if a party in opposition threatens to scrap an idea when it gets into power. It takes at least two cycles of

The issue is always about price. Buses are cheaper and produce quicker results

MARTIN FLEETWOOD, UK TRAM

a local authority to get a tram into place. That happened in Liverpool, too. If you have uncertainty, it is less attractive to bidders.

“Leeds is still keen. There is some interest in Bath. Coventry is looking at a very light form of light rail in conjunction with the University of Warwick. There is a little trial in Preston. Derby might think about it.

“Back around 2000 when Deputy Prime Minister John Prescott said he wanted 25 schemes, a number of cities started putting proposals together. They all got scrapped, after some had spent a lot of money. They are still a little wary.”

TRAM-TRAINS

A notable expansion in the UK has been the tram-train. A vehicle which can run both on-street and along conventional railway tracks.

First, Sheffield. Next, Cardiff. And it is a preferred option for the reopening of the railway line between March and Wisbech, with a business case due to be completed this summer. The route last saw a passenger service in 1968, although freight continued until 2000.

Sheffield’s tram-trains started carrying passengers on Network Rail tracks in October 2018, following a decade of planning. The first had been delivered two years earlier. They have been a success. They carried a million passengers in the first year, exceeding expectations.

It hasn’t all been smooth running; the entire fleet of Vossloh (since bought by Stadler) vehicles has been withdrawn from service three times. In December 2019, it was for nearly a week: the result of vibrations from the track.

The service runs from the Cathedral stop in Sheffield city centre. Three trams an hour run along the Supertram tracks until, near Meadowhall, they turn onto a new chord. They pause for the driver to switch from tram to train mode. The change is also from ‘line of sight’ tram rules for fully signalled movements under Network Rail control as the train accelerates to Rotherham, sharing track space with freight and occasional passenger services. At Rotherham Central, new tram-size low-level platforms are required. The end of the line is Rotherham Parkgate, an out-of-town retail park.

The tram-train is officially for a trial period which ends later this year. But Stagecoach has promised to continue to the end of its franchise in 2024.

“The combination of local and mainline requirements make it complicated,” says Ralf Warwel, Stadler’s UK sales director, speaking from Switzerland.

“Kassel in Germany was the earliest. ▶

CASE STUDY: CARDIFF

A little more than 100 miles of track will be electrified: as it is the central part of a plan to rejuvenate the Valley Lines around Cardiff. Transport for Wales (TfW) is less than two years into a 15-year project that will see more than £5 billion invested, with KeolisAmey holding the franchise.

As part of the £800 million spend on rolling stock, Stadler will provide a fleet of 36 three-car tram-trains for the Treherbert, Merthyr and Aberdare lines from 2022. The Class 398s will run mostly on railways, but also on a short section of street tramway in central Cardiff and will be wired-electric and battery-electric powered. They will have capacity for 257 passengers, with 129 seats, and a top speed of 70mph.

They will return on-street running to Cardiff for the first time in 70 years. They will run in battery mode for a section of 300 yards to a new station opposite the Wales Millennium Centre in Cardiff Bay, known as the Flourish.

“The design is looking good,” says James Price, chief executive of TfW. “Some of the designs have evolved. That was always the process. They will get pinned down now as we move to a construction phase over the next year.”

Alexia Course, director of rail operations at TfW, says: “The on-street running is for 1.5km at the end of the line. So, mostly, the tram-trains will operate as trains. But we are building for the future and if there is funding for more street running, then the vehicles are capable of being more tram than train as well. We would have to build platforms on the streets, because level access is important.”

Stadler’s Ralf Warwel says: “The vehicles will be at home in both worlds. It is only partially a city service. The train-tram has all the features that a tram would have: front lights, rear lights, brake lights, indicators. There is higher crash resistance than a tram. They will have batteries on board to bridge the gaps for the intermittent electrification.”

The tram-trains will be branded as Metro. Altogether there will be more than 600 new TfW jobs, including 200 on-train customer service staff. The current staff total is around 2,000.

Free travel for under-fives will be extended to under-11s, and half-price fares will be extended to 16-to-18-year-olds. There will be funding for all staff who want to learn Welsh.

TfW says the Metro brand will be a world-class transport network to transform people’s lives, improving access to jobs, leisure and other opportunities.

Course says: “This is part of the Welsh Government’s wider strategy to deliver a hop-on, hop-off fully integrated transport system in South Wales.

“While our contribution will initially be on the railway lines, we are taking more direct control of active travel, cycle highways, linking with the road network, to take a more holistic approach to transport.



Hop-on, hop-off swipe ticketing, pay-as-you-go, with a view that we could go fully integrated between rail and bus and active travel as well.”

Veteran rail industry leader Sir Michael Holden says: “If a tram-train approach is to be adopted for the Valley Lines, it ought to include street running from the beginning, and should include running down Queen Street to Cardiff Central through the city centre. Such an approach would improve penetration right into the heart of the shopping and legacy business district, and would release significant capacity at Cardiff Central. There should also be a determination to extend the tram-train operation further into the towns at the heads of the valleys.

“To convert from heavy rail without achieving the main benefits of tram operation seemed to be too much trouble for the prize on offer. The extension into the Cardiff Bay area, while welcome, smacks a little of tokenism.”

He has a further concern about running a tram within a rail franchise: “It is almost inevitable that the new vehicles will end up being operated by two crew members whose roles resemble closely the traditional driver and guard. Whereas a clean break into a separate organisation would have made it much easier to convert to proper tram-style operation as in Manchester or Croydon.”

Price adds: “We are in an unusual place. We are running an old-school heavy railway with some of the oldest rolling stock, while at the same time preparing to run a multi-modal light rail system. No one has done this before.

“One big challenge is the level of ambition following the climate change emergency. We are providing a 65% uplift in capacity, but will it be massive enough? It is difficult to know. We have got 4% modal shift to rail. It’s up to 10% on some corridors, before we start street running.

“The expectations are much higher than they were before, and those expectations are still growing.”

► There are other examples in Germany and in Holland. The mainline infrastructure provides a direct link from the rural areas outside the city to the city centre on one mode of transport. People don't have to change from bus to train or train to tram. They stay in one vehicle. That's the key advantage.

"Introducing them is not easy. You have to combine both worlds – main line regulations and city regulations. Both systems have to compromise in terms of signalling equipment and safety rules.

"But the success of these is proving the idea is a good one."

Elaine Greenwood has worked in the tram business for more than 20 years. "I can see tram-trains taking a bigger place in the UK," she says. "But starting a new system is so difficult. Tram-trains are lighter, quicker, have lower track access costs and can have small extensions of street running on the end of existing lines.

"Fundamentally this is a tram, not a train. It doesn't necessarily have to meet all the standards required by Network Rail to make it safe. If you tick every box for Network Rail you get a train and not a tram. Network Rail needs to come to the table a bit more on this subject; that message needs to be out there.

"What they have in Manchester is, in some respects, a tram-train idea. They stopped heavy rail coming into the city centre, swapped it for a tram and then extended the route. Cardiff tram-train is coming and I think it could lead to other interest. It could work well in other cities."

FUTURE TRAMS

Will there be new schemes? "Yes," says Martin Fleetwood. "If you are looking at reducing not just CO₂ emissions but also particulates, then trams have benefits. With buses, the rubber tyres are being worn down by road surfaces. If you're running steel wheels on steel rails then fewer particulates are being produced.

"The downside of electric buses is that they are generally heavier. Although they have no CO₂ emissions, they create more wear at the road surface.

"A bus will last 10 years but a tram will run for 30. Trams cost a lot up front, but the difference is less over time."

Birmingham has been trialling new ideas. The first section of electrified tramline to have no overhead wires is Phase One of West Midland Metro's Birmingham city centre Westside line.

30 years

is the life
expectancy
of a tram

The CAF-built trams drop their pantographs at the Grand Central stop and run to the Library stop in Centenary Square. They then reverse and continue back to Wolverhampton. By the end of this year, they will also operate without a catenary (overhead wire) to Wolverhampton railway station.

Without the need for overhead wires, the infrastructure costs drop. The overall width of the track alignment shrinks, and the visual intrusion is reduced.

Stadler's Ralf Warwel says: "With the development of self-charging trams, we will have charging stations on the network and battery power through the city centre. In Wales, our tram-trains will have batteries to bridge the gaps for intermittent electrification. That is a step in the right direction. Development of batteries will continue, weight will go down and capacity will grow. That will mean more trams without overhead wires."

Greenwood adds: "You would hope there will be whole new schemes and not just extensions. Environmentally nothing is cleaner nor better. But it is not easy. It is expensive, but we cannot afford the emissions of the alternatives.



"Absolute city-wide support is essential. You need a Transport & Works Act to secure funding. That is done by councils, and they don't often have the right skills. A tram project takes 10 years to get off the ground, and you need people with experience of doing it. Councils don't have that in-house, so they go to consultants.

"And in the UK they vary in quality widely. Some really know their stuff. Others less so. And, because councils have to go out to tender, they usually choose the cheapest. So they don't always get the best consultants, they don't end up with the best advice, and councillors won't necessarily know any different. Advice costs money and takes time.

"So if a city is wanting to start now, it can be very off-putting because of all the steps it has to go through just to get to the point where it puts out a tender for a system or a vehicle."

The key to future trams, agrees Fleetwood, is political rather than technical or environmental change.

"We have seen a move towards mass transport. But outside London, bus services can compete against it. So city regions are looking at controlling the buses through franchising, similar to the way it is done in London.

"Then they can have trams at six-minute headways that have interchanges with bus feeder services. That's what happens a lot in Europe. If we move closer to that model, the tram can be front and centre.

"Nottingham has been successful because the city council runs one of the bus services. The other major bus operator, Trent Barton, is part of the consortium that runs the trams. So it has an incentive to

run buses that support the tram.

"Greater Manchester would very much like bus franchising, using the tram as the spine through the city.

"Part of this is about how much of a command and control Government we are willing to have.

For the railways, there has been too much centralisation and not enough input from the regions. As control is being devolved, this can make trams more likely. The Welsh Assembly is able to look at transport in its totality, and that has encouraged a system that can see people dropped off right in the centre of the city, rather than at a station that is on the edge of the centre."

David Sidebottom at Transport Focus agrees. "We can draw something positive about authority-controlled ticketing and fares, rather than it being left to the purely commercial operation you see on buses.

"Some people cynically see trams as the pet projects of civic leaders in Manchester and Sheffield – local politicians wanting control in a way they can't have with buses. That will change, I think, with city mayors

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DAVID SIDEBOTTOM,
TRANSPORT FOCUS

looking very seriously at bus franchising as a way to develop a system, a network.

"In Manchester and Nottingham you get a sense of people connecting between modes.

Where public money has gone into trams, bus operators decry that money hasn't gone into bus priority measures as well. But from a consumer point of view, wherever a tram network has been extended it has been popular. On the new Manchester extension to the Trafford Centre, one passenger told us it cut half an hour off the journey to work compared with driving or taking the bus.

"If you're a motorist looking for an alternative, you need it to be attractive, rapid, go where you need to go and deliver good value for money. People are more willing to leave the car at home to get on a tram than they are to get on a bus." **ST**

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