Viva Vivarail - a train transformation!

There have long been calls for more diesel multiple units (DMUs). And, with the recent Invitation To Tender for the Northern franchise promising “at least 120 new carriages and the phasing out of Pacers by 2020”, those calls are going to start getting much louder very quickly.

Last year, the Long Term Passenger Rolling Stock Strategy said that rail would require fewer than 100 new diesel vehicles (not in the present decade). Now, the Government is talking of “a potential requirement for 550 to 580 non-electric vehicles for a variety of urban stopping, rural stopping and inter-urban express services.”

It is no secret that there is a shortage of available DMUs, and increased pressure to replace the much-maligned Pacers means that the industry will need to find some units from somewhere.

But just what is going to reduce the shortage? And where are the Pacers replacements going to come from?

The man who ordered the last DMUs bought in the UK (the Class 172s for London Overground and Chiltern Railways) thinks he has a solution.

Adrian Shooter was chairman of Chiltern for 38 years (retiring in 2012), and has worked on the railway for over 40 years. But retirement has not been a relaxed affair for Shooter – he is now chairman of Vivarail, the company that has bought 156 Driving Motor Cars and 70 Trailers of retiring D78-Stock from the London Underground, to transform into DMUs (diesel multiple units) for the national network.

What made Shooter decide to buy a “job lot” of Underground trains?

“It didn’t all happen absolutely overnight. I had been aware for quite some time that there was going to be a big shortage of DMUs, having bought the last ones in this country. I know what they cost as well, which is a lot of money!

“So I could see that there was going to be a shortage, and got talking to a school friend of mine, Malcolm Dobell, who retired as a chief engineer at LU in September 2014.

“Malcolm and I went to school together, we ran a railway society. He was actually part of the engineering team when the D78s were ordered brand new, so he told me about them. He explained that the bodyshells were nearly all aluminium, and there is no corrosion on them. They’re as good as the day they came out of the factory in Birmingham, 30-40 years ago.

“That was when Shooter enlisted the help of Neil Bates, director of Midlands-based, Automotive Design, which (among other things) designs and develops railway vehicles. Shooter and Bates first worked together in 1996, when Bates designed the exterior lively and internal layout of Chiltern’s new “Walk Through” trainset. They rehired together on the Mk 3s and 186s, and several other things in between.

“Shooter: “I took some advice from Ricardo (the site at Long Marston in the Midlands) who have an instrumented test bed that has been used to certify the engine to 3B.

“Shooter signed a contract with Revolve [Vivarail’s supplier], who have an off-the-shelf, the Ford engines cannot just be put in a D-train – they need to be customised for use in the new type of vehicle. Shooter’s supplier, Revolve, is a British company that has a franchise for converting small numbers of Ford engines for different applications, such as in buses. It has carried out similar projects in the past. Shooter signed a contract with Revolve last summer to produce the engine modules for the D-train, and the first one is due to arrive at Vivarail’s site at Long Marston in the next couple of weeks.

“Shooter said: “A two- or three-car train will have four of those [200hp engines], so 800hp, which gives us a higher power-to-weight ratio than the existing older DMUs.”

“The maximum speed of the D-train is 60mph, which is the same as that of the donor D78. This is 15mph slower than a Class 142, 143 or 144 Pacer or a ‘158’ Sprinter, and 40mph slower than the maximum speed of a ‘172’ Turbotrain. Surely that is going to cause some problems if the D-train cannot keep up with other DMUs on the network?

“Yes, they do have to comply with the same requirements as any other NEW train. They already comply with an automotive requirement that is more stringent.

“An engine has recently been on test at Revolve [Vivarail’s supplier], who have an instrumented test bed that has been used to certify the engine to 3B. As it stands, no DMU has yet been built with a 3B-compliant engine. Would that make the D-train the first?

“It is certainly likely to be the first DMU with 3B engines,” replies Shooter, although he doesn’t believe it will be long before someone else builds a compliant DMU. “When there is a demand for a product, the market usually finds a solution.”

Shooter explains that the trains will not be suitable for every route: “You wouldn’t, for example, take one of those trains and go from Laxtonington to London on Chiltern, max. 15mph slower than a Class 142, 143 or 144 Pacer or a ‘158’ Sprinter, and 40mph slower than the...”
Vivarail Chairman Adrian Shooter explains the significance of the Ford Duratorq automotive engines that are being used in the D-train.

Invitations To Tender (ITT) for the Northern and TransPennine Express franchises containing obligations to withdraw all Pacer vehicles by 2020 and to bring into operation a minimum of 120 new-build vehicles” (see Network News, pages 14-15).

Rutnam says the benefit:cost assessment suggests this represents “poor value for money” to bring the replacement forward to 2020, and reasons that “new-build vehicles will be much more expensive than Pacers”.

He continues: “There may be better ways...”

Two ‘donor’ D79 London Underground trains sit outside Vivarail’s site at Long Marston. There are now 24 vehicles on site ready to be converted.

Because it’s a 100mph railway it wouldn’t be the right train for that.

“But there are lots of branch lines where you actually never really exceed 60mph. And even where it is, trains don’t get up to it because you’ve got curves, or there are big restrictions at the stations.

“We’re not by any means saying this train is suitable for everything, because it’s not. But there are quite a number of applications where it is.”

So are there specific lines or branches for which the D-trains would be perfect?

“Oh yes. We’re talking to two or three customers who I can’t reveal at the moment, in other parts of the country. But what I can say is that we’re talking to all of the three bidders for the Northern franchise, and they’re all very interested.

“I can’t actually give you any more specific detail on that because we have non-disclosure agreements with all of them, because obviously they’re all competing. But what we can say is that the train is suitable for a lot of lines in the North - there are lots of branch lines. The one we did the simulation on (Huddersfield to Sheffield) is an example.”

RAIL visited Vivarail shortly after the publication of the Northern franchise Invitation To Tender, which promised that 120 new-build carriages would be acquired by the new Northern franchise and that the Class 142 and ‘144’ Pacers would be phased out by 2020 (RAIL 770).

The ITT stipulates: “These must be newly-built (not re-using components from existing rolling stock)”, which indicates quite clearly that the D-trains are not an option for that requirement.

Rail Minister Claire Perry then compounded its chances further by telling BBC North East journalists that the 120 carriages cannot be “London’s cast-offs”, while the BBC’s One Show on March 31 quoted the Department for Transport as saying they could not be “converted London Underground trains”.

Isn’t that a pretty clear message that the D-train will not be heading north?

“It is quite specific in the ITT - yes,” acknowledges Shooter. “There’s a huge amount of politics in the Northern franchise. I presume you’ve seen the exchange of letters which is on the public record between Philip Rutnam [Permanent Secretary of the DfT] and the Secretary of State [for Transport, Patrick McLoughlin]?”

Shooter is referring to a letter Rutnam sent to McLoughlin on February 26 in his role as Accounting Officer, in which he expresses his “reservations about the proposal to issue

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*Note: Simulations run using information derived from initial design data so results are indicative at this stage. More accurate simulations will be undertaken.
They have a maximum speed of 60mph, but they have acceleration which is much more rapid than some of the older DMUs - well, certainly the Pacers or Class 150s, things like that. We have done computer simulations of some of the routes, which shows that over about an hour's journey, we actually get there about four and a half minutes quicker.

Adrian Shooter, Chairman, Vivarail

- of achieving value for money than the precise stipulations in the ITT?

McLaughlin directed Rutnam to release the ITT, including those specifications in particular, because of the Pacers’ “negative impact on the reputation of rail services in the Northern area”. He said that he believes “it is right for us to require bidders to introduce new-build diesel vehicles” because “the railway needs a long-term solution that will secure continued provision of services on lines that are never likely to be electrified”.

Ultimately, doesn’t that still mean the D-train is out?

Shooter responds: “The reasons why we’re actually very pleased with the ITT as it follows. Number one: They’re going to scrap 214 Pacers vehicles. Number two: We know that there is excessive overcrowding on a lot of the routes anyway, which is what half of the political problem has been about. So some of the existing trains are going to have to be longer.”

“Next point, when my colleague Alan Dale [Vivarail marketing director] read the ITT in great detail, it reveals an enhanced frequency of electric trains, but electrification is not going to suit all the Northern area, around Preston. And others like Lancashire which had the hopper lights and things with it - people thought they were new. Chiltern Class 165s. At that stage they were about 14 years old. They were OK, but we would have a perception based on fact when they actually travel on the train.”

Says Shooter: “Well, you can understand their point, can’t you? The public will only have a perception based on fact when they actually travel on the train.”

Is that going to put off potential buyers in the meantime - the fear that passengers won’t like them?

“No. The view that I’m getting from potential [Northern] bidders and others, including leasing companies who are prepared to lease them, is that it looks an entirely credible train.”

Shooter is keen to emphasise that the D-train is not a ‘cast-off’ - that it all intents and purposes it will be ‘new’.

“We're just doing some more speed simulations at the moment in the Southport area, around Preston. And others like Newcastle to Fasham onto Carlisle, another series of lines that would be suitable, as would the Cumbrian Coast ones. All those places where the flat-out maximum speed is not the issue.”

“Wherever the D-trains might end up, would Vivarail maintain them over their life? Shooter estimates that the trains would be fit for operation until at least 2035.

‘Well that depends on the customer. We’ll overhaul the engine power packs and bogies. We will possibly transform those. We will offer maintenance - very happy to do that - but if they want to do it themselves, that’s their privilege. But there are a number of other things that you can do with this train.”

Shooter explains that community railways are another area Vivarail is exploring. “There are lots of very enthusiastic people who have improved stations, put flowers in the gardens, painted them, distributed leaflets and that sort of stuff, and some of them have seen a 100% increase in passengers.

“When community railways first came out, that was all part of it, but the other very important part was reducing the cost. Here is a way where the biggest part of the cost - the train - is lower. “One of the things that we are especially doing is configuring this train so that if you have an isolated branch (which there are in quite a number of parts of the country, miles from anywhere, you don’t have to take the train in some cases 150 miles back to the depot [for maintenance]. Because we will build a little mini depot, and the train could be maintained there for ten years. “We will change the engine modules on the bogies, which are the only bits really where things need an overhaul. We’ll change those on site and do it overnight, which means that the train can stay locally.”

“Mat the meaning that you’d be able to work early morning services - I know quite a bit of branches where that is not the case now, because the train is coming back from being fuelled overnight from miles away. So that’s another angle for the product.”

Cost is one of the major selling points for the D-train. Shooter says they cost roughly a third of the price of a totally new train (although he won’t be drawn on the exact figures)

“Yes, the cost for buying the trains is roughly a third of the price, but there are some further benefits beyond that, because these trains will use less fuel - certainly less than the existing trains, but also than a modern equivalent train.”

“And the maintenance costs will be lower than the Pacers. The maintenance costs for these will be certainly less than half what something like the Class 150 would be, similar to other trains that are running, and the fuel consumption will be of that order.”

“The reason for the fuel consumption being less is: first of all, the vehicle is lighter - driving motor cars are going to be 31 tonnes, compared with about 36 tonnes on a Class 150.”

“They’ll have start-stop technology like you get in cars [technology that has also recently been trialled on Class 90s], so when the train is coasting, braking or standing at a station, most of the engines will be stopped most of the time.”

Of course, public perception is still going to be an issue that Shooter will need to address. The D-train has attracted a ‘London’s cast-offs’ stigma that he’ll need to shake.

Shooter is looking at several possibilities for suitable routes.

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