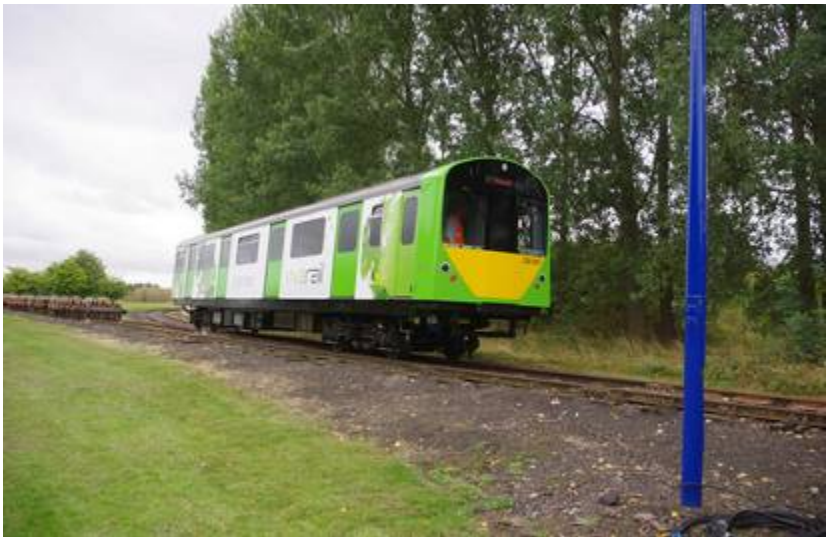
railfuture

# Visit to Vivarail at Long Marston



Railfuture is the UK's leading independent voluntary organisation campaigning for a bigger, better railway for passengers and freight, to which many rail user groups are affiliated.
This report was produced by our rolling stock design panel which is a part of our national passenger group.

# VIVARAIL D STOCK CONVERSION REPORT

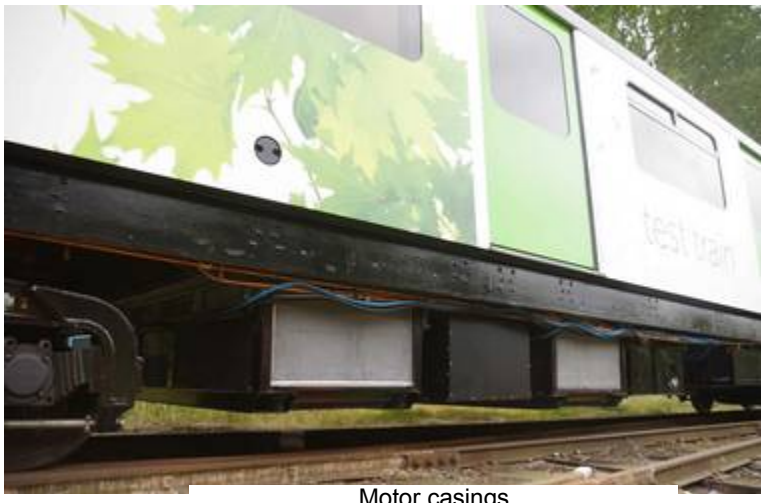
Railfuture Rolling Stock Design Panel visit to Vivarail workshops at Long Marston on Friday 21st August.

Present: Norman Bradbury, Keith Dyall & Nick Lewis for Railfuture and Adrian Shooter, Alice Gillman, David King, Neil Bates, Ian Wenman, Andy Hamilton and several others for Vivarail. Other guests included Mark Hopwood, MD of First Great Western.

INTRODUCTION: In common with many other people the Railfuture team were highly sceptical about this project when it was first announced but changed our minds following this visit and the demonstration of a converted vehicle. We were impressed by the ingenuity embodied in the engineering which had clearly been carried out to a high standard.

The objective is to produce an affordable independently powered train at a fraction of the cost of a new DMU and which could be procured very much quicker than new build. This would help to meet the urgent need for more rolling stock to reduce overcrowding and to cater for growth.

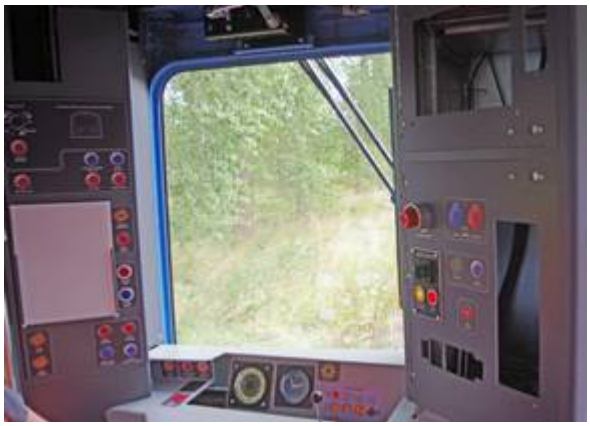
TECHNICAL DESCRIPTION: It is intended that 2 or 3 car variants of the train could be produced. The centre car in the 3 car train would be a trailer with only the outer cars being powered. Each power car would be provided with two 200hp Ford diesel engines which will have stop/start capability enabling one engine to be switched off when full power is not required.



Motor casings

The engines are encased in boxes or rafts which can be replaced very quickly (Vivarail say 10 minutes) if needed and we noted how quiet they seemed compared to the larger engines commonly found in most DMUs`. Generators will supply current at up to 750 Volts to power the existing traction motors. The control gear will be all new using modern solid state technology. The existing bogies will also be reused as they ride well, even on the rudimentary test track at Long Marston, and we were informed they are still available new from Bombardier.

The cabs will be much modified to improve crash resistance and driver protection and we were shown film of a staged crash to demonstrate this. The D stock body, which is aluminium and therefore comparatively light and free from corrosion, has been raised 73mm to comply with Network Rail standard platform height.



Partly reconstructed cab and controls

Standard buffing gear and couplings will be fitted enabling the trains to be rescued in the event of a mechanical failure. However, with four engines and generators per unit, the high degree of redundancy should make such an event unlikely.

BI MODE: Since the train retains its original DC traction motors, it will be possible to engineer the train for bi mode operation on the third rail DC network.

INTERIOR OPTIONS:
A number of seating options were displayed. These were designed to cater for a variety of journey types from Metro style retaining the current D stock seating to rural services where typical journeys might be expected to be up to 40 to 50 minutes duration. Two of the four doors per side provided in D stock trains would be closed off on all but the Metro variant but any door combination could be provided. Some of the seats were laid out in bays with options for tables or shelves of different sizes according to need. The seats shown in bay style for longer journeys were comfortable but the seat squab needs to be lengthened a little.

Except for the Metro longitudinal seats, all the seat options displayed were noticeably more comfortable than the seats being installed in the new class 700 Thameslink trains.

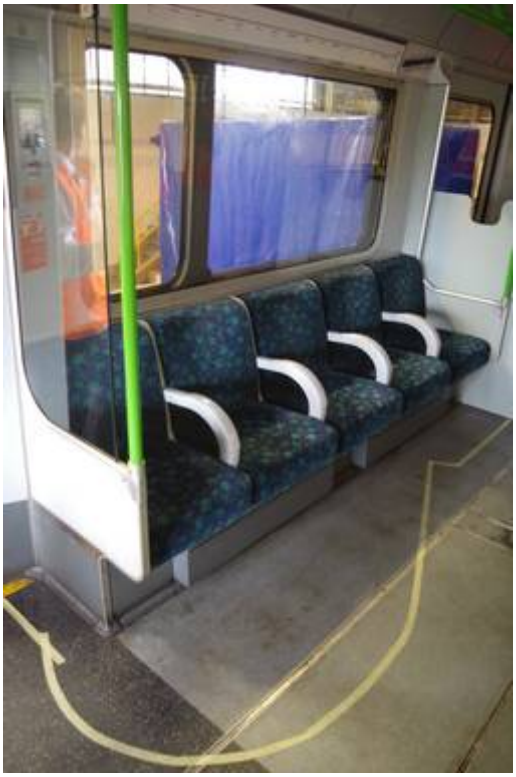
A unique feature showed how the space between seat backs could be fitted with a compartment for stowing folding bicycles or luggage with space on top for helmets or small bags etc. Some of the seating options showed most seats arranged in bays with reasonable seat to window alignment.

Plans to provide air conditioning or air cooling are being developed but this facility may be offered as an optional extra.

All D-Trains will comply fully with 2020 PRM TSI regulations.

Picture on left shows the standard universal toilet unit to be used when specified

Picture on right shows the location of the toilet marked out on the floor in an unmodified interior with seating as used with London Underground.



TOILETS: A universal access toilet was displayed and it was very similar to those provided in the class 166 Turbo DMU.

PERFORMANCE & ECONOMY: The trains will have a maximum speed of 60mph but acceleration is good and it is anticipated that when used on journeys with frequent stops journey time could be reduced. If used on branch lines where speed is restricted to 60mph or less anyway,

maximum speed will not be an issue.

A comparison of anticipated costs and fuel economy was provided as follows:

| | New Regional DMU | Current DMU (class 150) | D-Train |
|---|---|---|---|
| Lease Rental per car per month (£): | 15k | 7.5k | 7k |
| Depot maintenance per car per mile: | 60p | 70p | 40p |
| Fuel consumption per car per mile: | 0.8L | 0.75L | 0.5L |

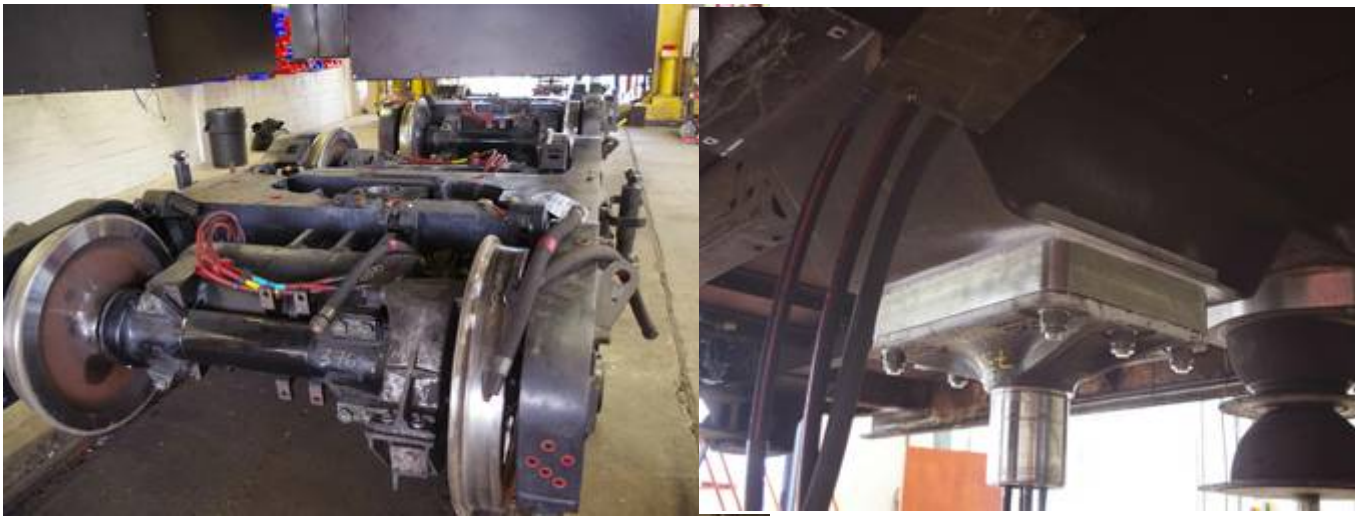
It is anticipated that the trains would not need to refuel more than once every 3 days with average use (Vivarail considered battery power as an alternative to diesel but ruled it out due to the very limited range of 40 to 50 miles on a full charge).

REGENERATIVE BRAKING: It is technically possible for the D-Train control gear to provide regenerative power for auxiliary services and it would be the first DMU in the world to do this.

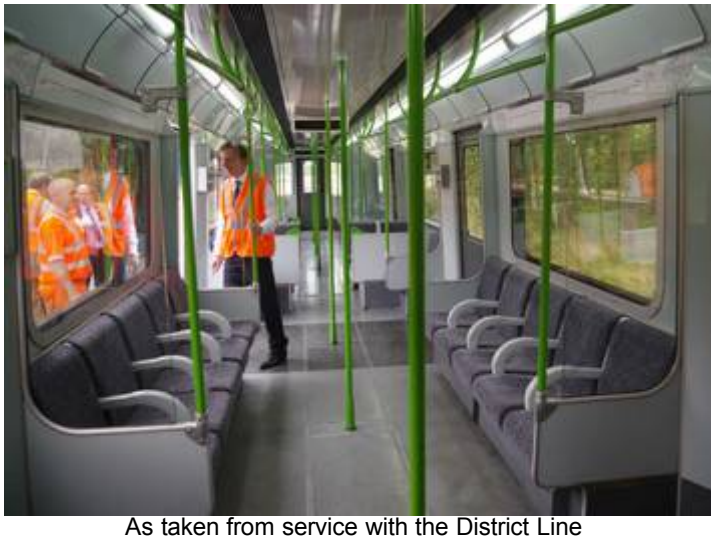
OTHER APPLICATIONS: With the technology proved, there could be opportunities for conversion of other trains.

CONCLUSION: The Railfuture Rolling Stock team came away from Vivarail workshops much impressed by what we saw and feel confident the D-Train will fill a need on many routes such as those currently operated with Pacers and class 150`s and provide an improved passenger environment in the process. We were also impressed by the design team whose understanding of passengers needs such seat comfort, seat to window alignment and luggage space closely aligned with our own views.

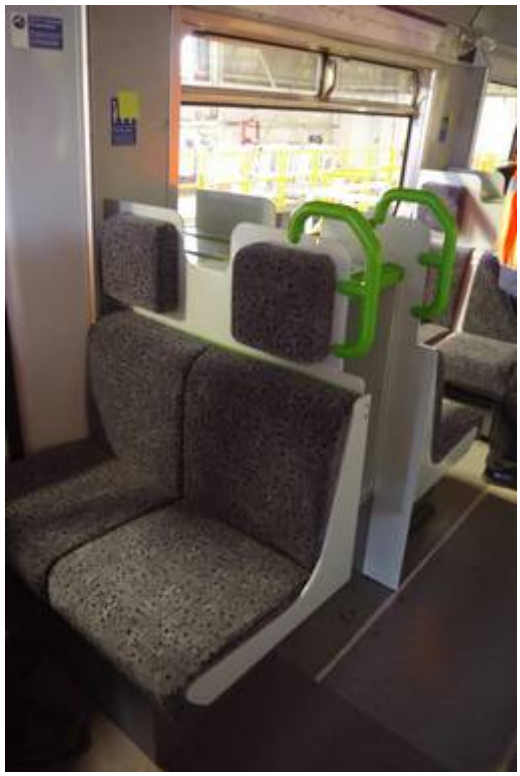
The low operating costs of the D-Train could help to improve the viability of many services and might be just what Community Rail Partnerships have been looking for.



Existing bogie and pivot



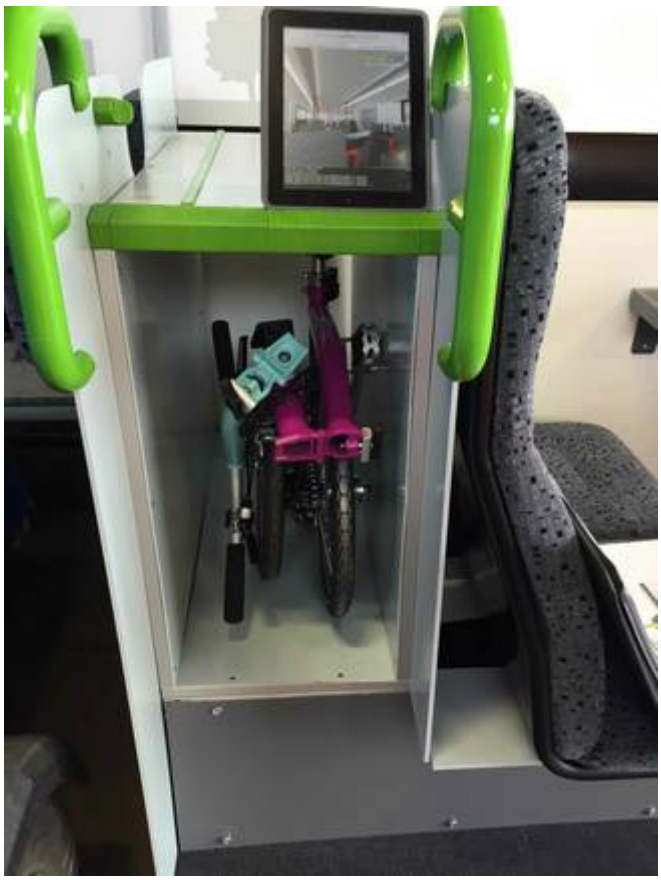
As taken from service with the District Line



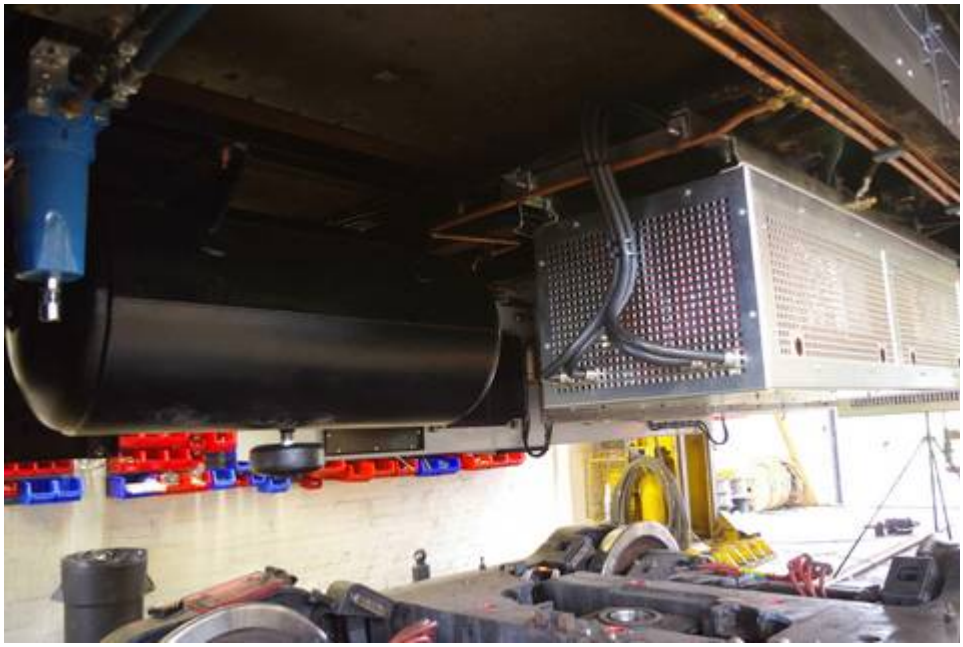
Some of the new seats in place

Work in Progress

Space ffor Brompton Bike / Luggage



Space with Brompton and as an ipad desk on top



engines being mounted

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