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WHITE CIRCLE NEWS

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Summer 2021



Broken window

**No visits this time but
looking good for July**

Although no work was done in the last quarter, we will be back on site in July! Apologies for the lateness of this issue. Be assured that the next issue will be arriving just after this one. Remember that those of you who have the technology and are so inclined can find more up-to-date news on our website and Facebook page.

There is some news from Bo'ness, albeit bad. The toilet window on 51043 is broken—crazed is a better description—but it's thought not to be due to vandalism. Jim Ormiston informed us and supplied the picture on the front page.

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The article below on the integral construction of Swindon-built DMUs is taken from our website. I thought it a good idea to print it here to widen its reach to those not online. It is also the first instalment of an expanded article that will include information and photos that have come to light about the testing of this significantly different method of construction at the SNCF's testing plant at Vitry.

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COVER PHOTOS

Main. A fine display of Swindon 126s at Kyle Street, Ayr in the all-blue era. The carriage sidings and fuelling point were squeezed into the strip of land between the station and Smith Street—not Kyle Street as you would be entitled to assume. It does form a T-junction with Smith Street though. Although Ayr is a through station the sidings were not and had buffer stops at the south end. Here the footpath from the town centre to the station passed so close to the buffers that cab ends could almost be touched. This photo was taken looking over the wall at platform 1—one of three sides that gave good views of the sidings. The sidings were closed on electrification of the Glasgow-Ayr line and the site is now used for car parking and housing.

John Horne collection, April 1977.

Lower. Jim Ormiston alerted us to the fact that the toilet window on 51043 was “crazed”.

Jim Ormiston, 4th June 2021.

Integral Construction and the Swindon DMU

Part One

Andy McConnell

The Swindon Intercity DMU vehicles are historically extremely important: The bodywork, although outwardly similar to contemporary Mk1 designs, uses a semi stressed bodyshell and was a major advance in terms of coach construction and safety on British Railways. The Swindon Intercity vehicles were thus a very important step in the development of the British Railways standard coach types.

Comparison with an ordinary Mk1 passenger coach of the same period reveals that the Swindon vehicles have no underframe truss rods – this was important to the DMU design as it allowed the full underframe area to be utilised for engines, gearboxes and other equipment.

In this respect the Swindon Intercity DMU bodyshell was a significant intermediate step between the first of the British Railways coach designs, the Mk1, and the later Mk2 series.

Swindon's Great Leap Forward

Cutting away the lower bodywork corrosion on Sc79443 – as seen in Image 1 – shows details of the construction techniques.



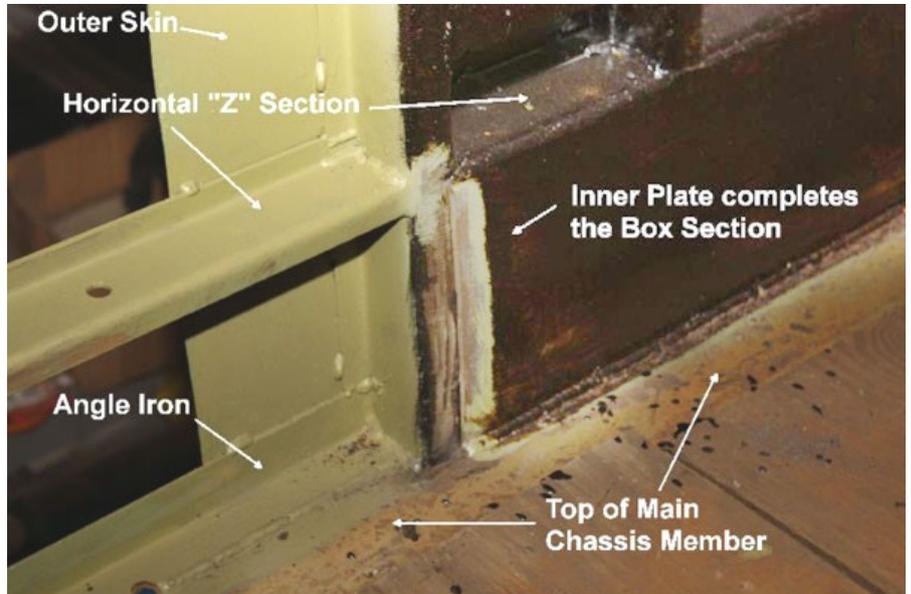
1. Edinburgh-Glasgow Inter-city DMU Buffet Car Sc79443 undergoing major bodywork rebuilding in the SRPS workshops. *Andy McConnell.*

Take a close look at the double skin steel forming the lower bodywork. It may not look like much, but the built up box section at the lower edge of the bodywork was a major improvement in terms of carriage design and it is no exaggeration to



2. Looking upwards at the body to chassis joint on a Mark I coach. *Andy McConnell.*

3. Body to chassis joint of Swindon DMU vehicle Sc79443 during rebuilding. It shows a partially rebuilt section effectively shows the method of construction on the left with a completed section on the right. Note that the frames and body-sides are securely joined to the chassis by the built up Box Section all along the length of the bodyside. This provides a substantial improvement in the structural integrity of the vehicle in terms of its load bearing capacity and in its crash resistance. *Andy McConnell.*



say that the improved structural integrity which resulted has contributed to the saving of many lives.

The Swindon DMU vehicles look outwardly similar to contemporary BR Mk.1 designs, but have a slightly different body profile and window fixing. However when we started body-work restoration we discovered that the differences are even more fundamental.

Traditional British coach building techniques were based on a substantial chassis construction which was strengthened with an underframe of rods or welded angle sections. The body (whether steel or the earlier wooden bodies) was bolted to the chassis, but did not carry any load.

The early BR Mk.1 coach designs followed an amalgam of the best of the Big Four company practices: Construction was based on a substantial steel chassis with welded underframe trussing. The bodywork was made from welded steel hoop sections carried on outriggers, skinned with standard bodywork panels. The bodywork, however, still provided no strength to the vehicle.

Compare close up of the underside of the body to chassis joint of a standard Mk1 vehicle (Image 2) with the Box Sections shown on the two Swindon DMU photographs (1 and 3). On the Mk1 note that the frames (only) are joined to the chassis by outriggers. The body and chassis are effectively completely separate constructions. The underframe simply carries the body which in turn provides no strength to the chassis.

When Swindon Works first looked at the design of the early Modernisation Plan DMU vehicles (the Intercity sets for the Edinburgh – Glasgow service), they faced the challenge in the Design Brief from the British Transport Commission to dis-

pense with the underfloor trussing. This was required to provide enough space for the underfloor power and ancillary equipment and to reduce the weight per unit length of vehicle to within the capabilities of the 150hp diesel engines then available.

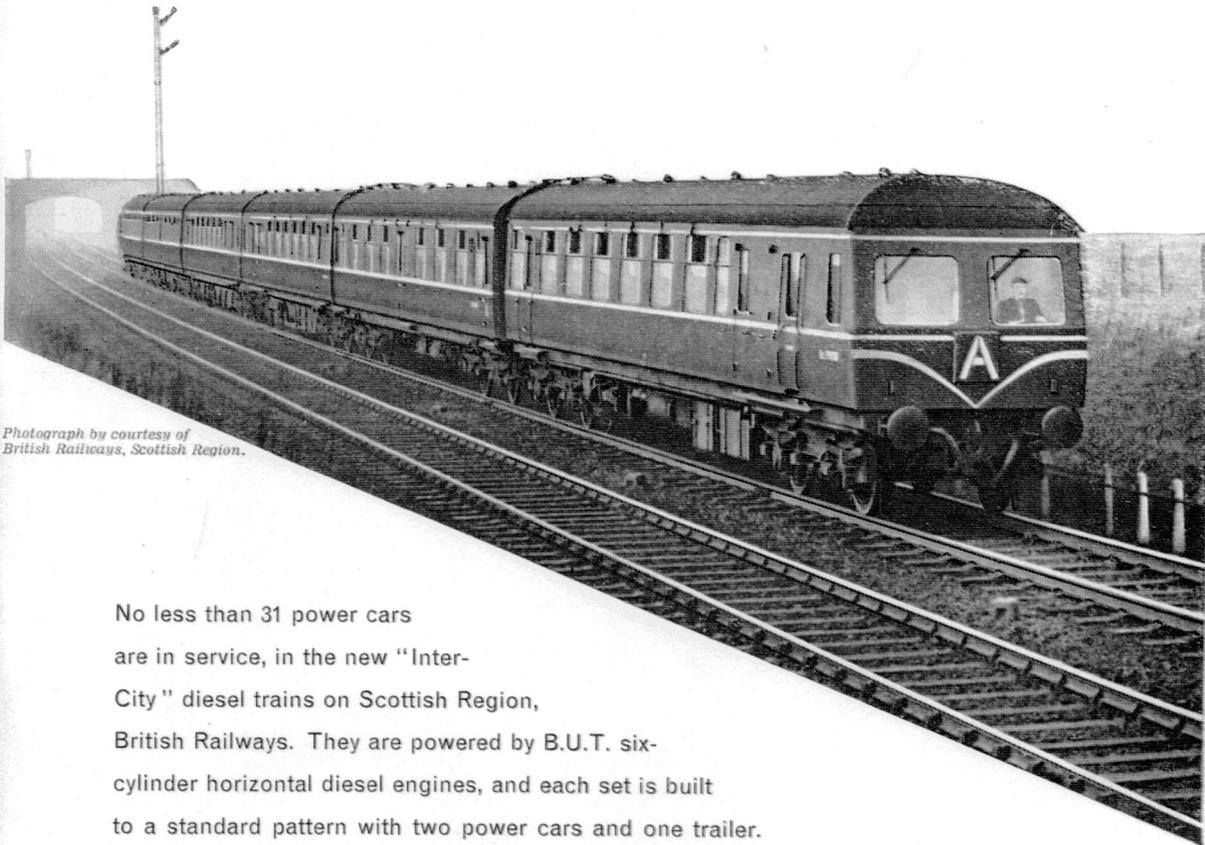
Swindon's solution was to fabricate the chassis from substantial steel frame sections. Crucially the body was solidly welded to the chassis via the box-section. This resulted in a semi-stressed skin with the bodyside fully integral to the construction of the vehicle, allowing the trussing to be dispensed with.

Trailer First vehicle W79470 (initially allocated to Birmingham – South Wales services before joining the rest of the fleet in Scotland) was sent to the SNCF 200ton end loading testing facility at Vitry in France in April 1957 for stress testing during testing of the Swindon DMUs. The tests were successful and the report concluded that although it was not possible to determine the stresses in every single part of the body, that the general levels observed were acceptable under maximum test load.

The same body construction used in the DMUs was used by Swindon during development of the BR Mk.2 carriage prototypes. The prototype Mk 2, W13252 was in fact built on the DMU jigs. With the exception of the additional cosmetic curve under at the bottom of the Mk.2 body hiding the main chassis members, the profile of the Mk.2 coach is almost identical to the Intercity DMU vehicles.

The Swindon DMU vehicles are thus a very important stage in the development of the British railway carriage, with the greater bodyside integrity of the construction first seen on the E&G Intercity railcars providing a substantial improvement in strength and crash-worthiness over its Mk.1 predecessors.

Mobil and the modern railway



Photograph by courtesy of
British Railways, Scottish Region.

No less than 31 power cars
are in service, in the new "Inter-
City" diesel trains on Scottish Region,
British Railways. They are powered by B.U.T. six-
cylinder horizontal diesel engines, and each set is built
to a standard pattern with two power cars and one trailer.
The correct lubrication for the engines of this new fleet is being
supplied by Mobil Oil Company.

... all along the line ...

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