Iconic

DEVELOPMENT OF THE DROP CENTRE TRAMCAR IN AUSTRALASIA

MAL ROWE COTMA CONFERENCE2025

1881
Low floor for easy access

In some cities low floor came easily.

The Dunedin, Melbourne and Sydney cable trams had easy access to the grip car – comparable to the floor height of modern low floor trams.

Once electric trams came into use, the underfloor space to accommodate motors raised the platform dramatically.

Simple solutions

With early single truck electric trams one approach was to lower the car floor at the ends, but the operator didn't always do this – straight frames were simpler and cheaper.

Bogie cars – what to do?

Bogie cars carried more passengers and so needed more access to limit dwell time.

Sometimes they tried to be ‘all things to all passenger needs’.

Adelaide D and E type trams have different step heights at each end.

Photo: Keith Kings

1906
An innovative, but expensive solution

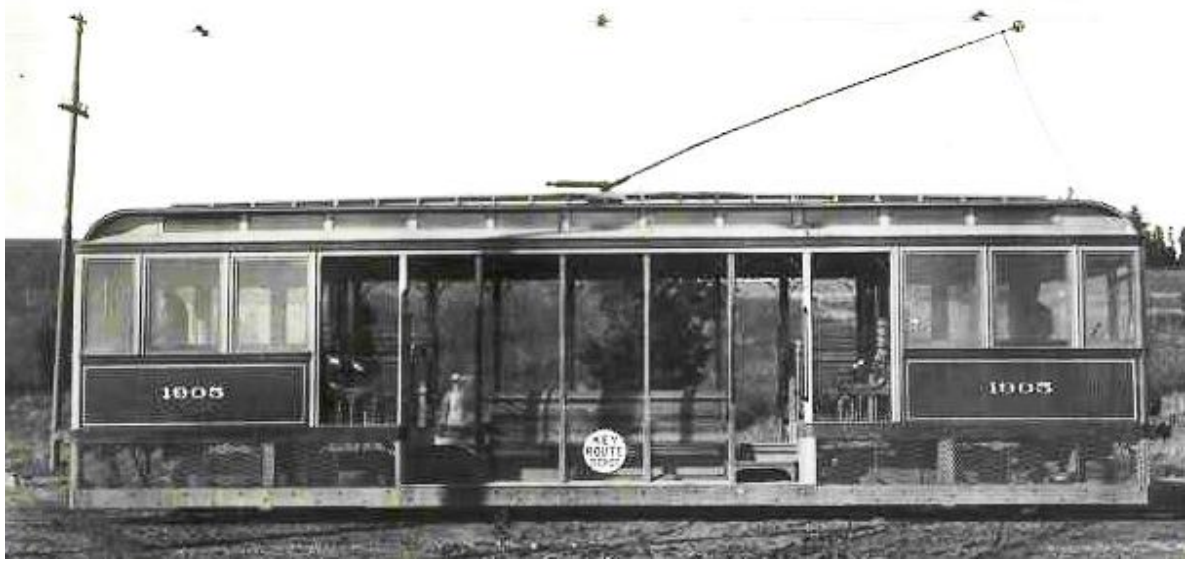
Christchurch car builder Boon & Co are generally credited with building the first drop centre tramcar – starting in 1906.

I gave a better step height and wide access so that multiple passengers could board at the same time.

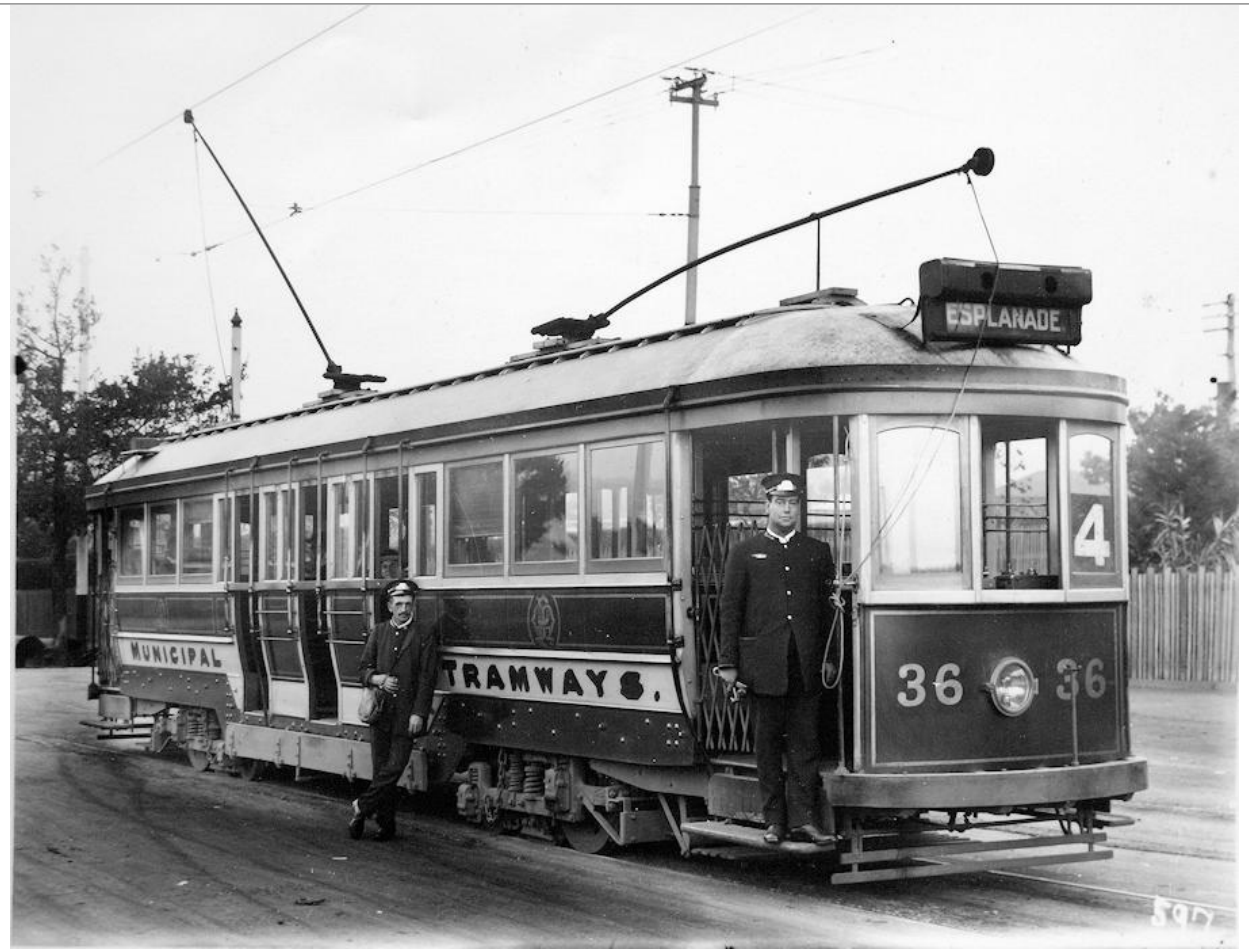
1905
… but was it the first?

Car 1905, below, was built for the Key system in the US – probably in 1905. It was clearly a drop centre design, a one off that was later re-built with a high floor throughout as No 309.

The cars at right, from a later date in the US, look like drop centre cars but just had inset steps with a straight sill through the car.



1913
Australian drop frame trams



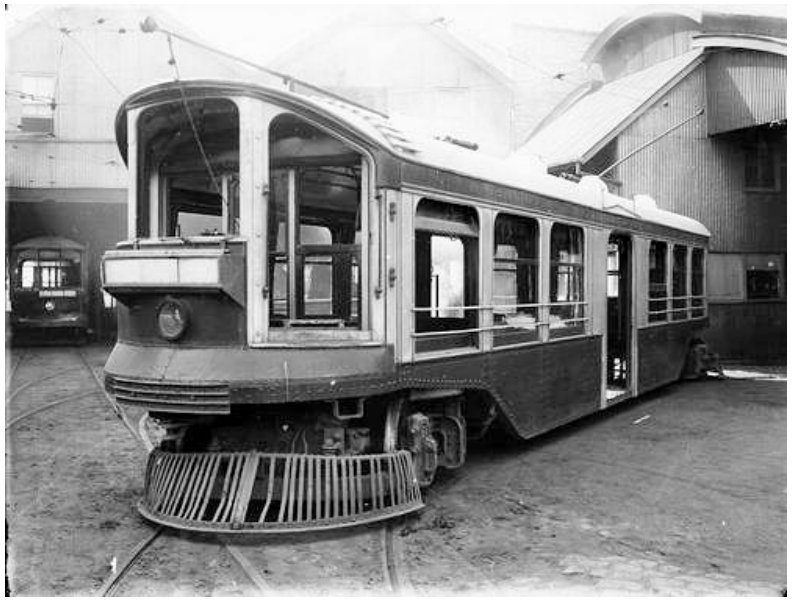
The Prahran & Malvern Tramways Trust started design of a “Drop Frame Tram” in 1912 and took delivery of 10 of them from Duncan & Fraser of Adelaide in September 1913.

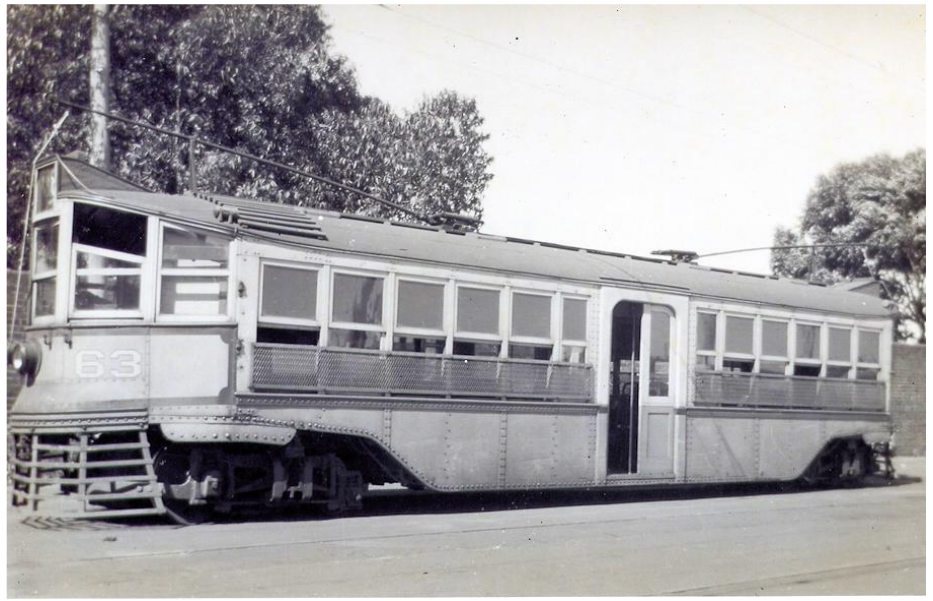
These cars had drop ends as well as a drop centre giving a total of five doorways at a level lower than the car sills.

It is likely that the design was influenced by the Boon design, but the American Hedley Doyle “Stepless Cars” were being developed over the same period.

Use of Brill 22E trucks gave it a lower step height than the Boon cars.

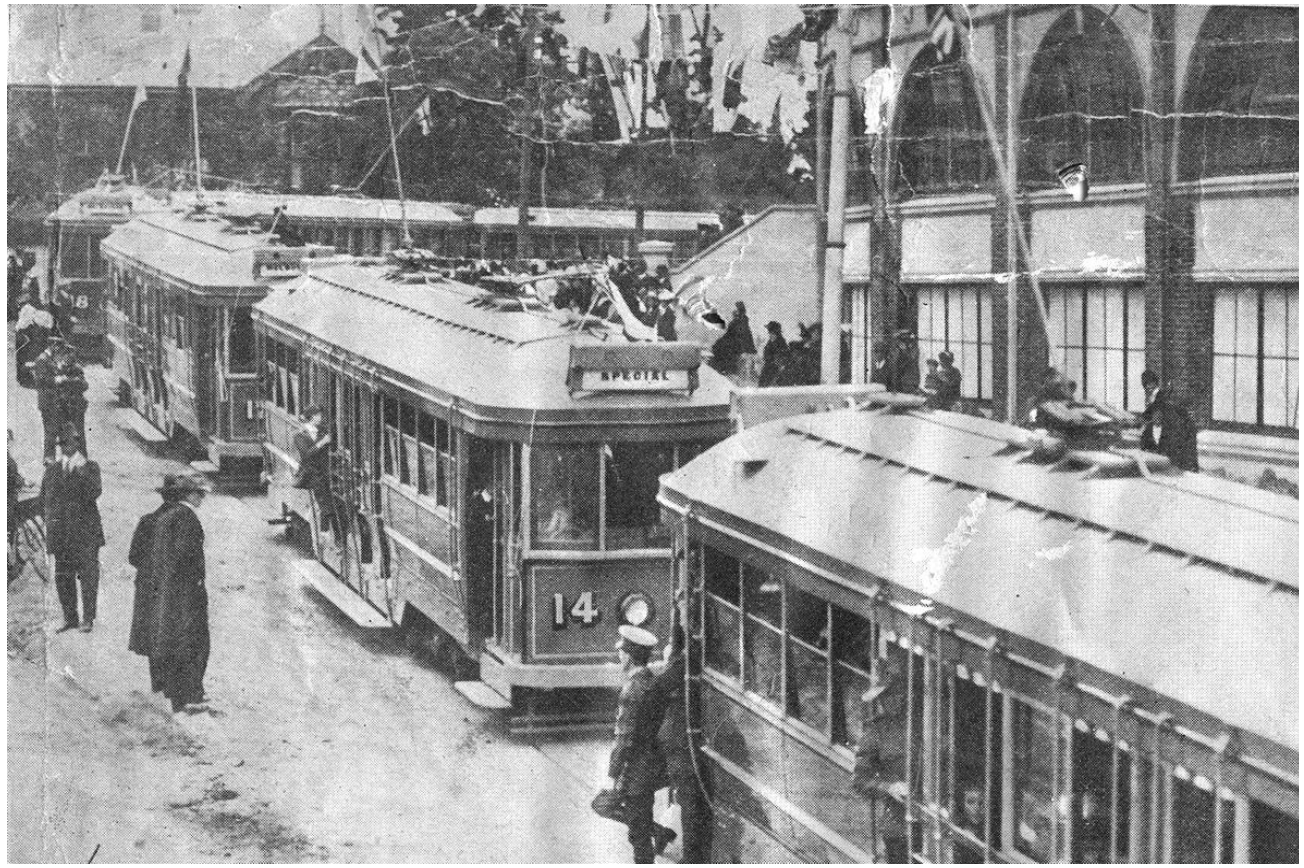
1913
Australian “stepless” cars





Brisbane imported a ‘Stepless car’ from the US in 1913. It had a short period of service. Perth’s car arrived the year later and served for many years. The low clearance of the drop centre was a common problem with this design with the trams often ‘bottoming’ especially when carrying a heavy load.

1916
Hawthorn Tramway Trust embraces the PMTT design



The Hawthorn Tramways Trust purchased 10 drop centre trams to the PMTT design for their opening in 1916.

However, they altered the centre section layout resulting in 6 entrance/exit doorways instead of 5.

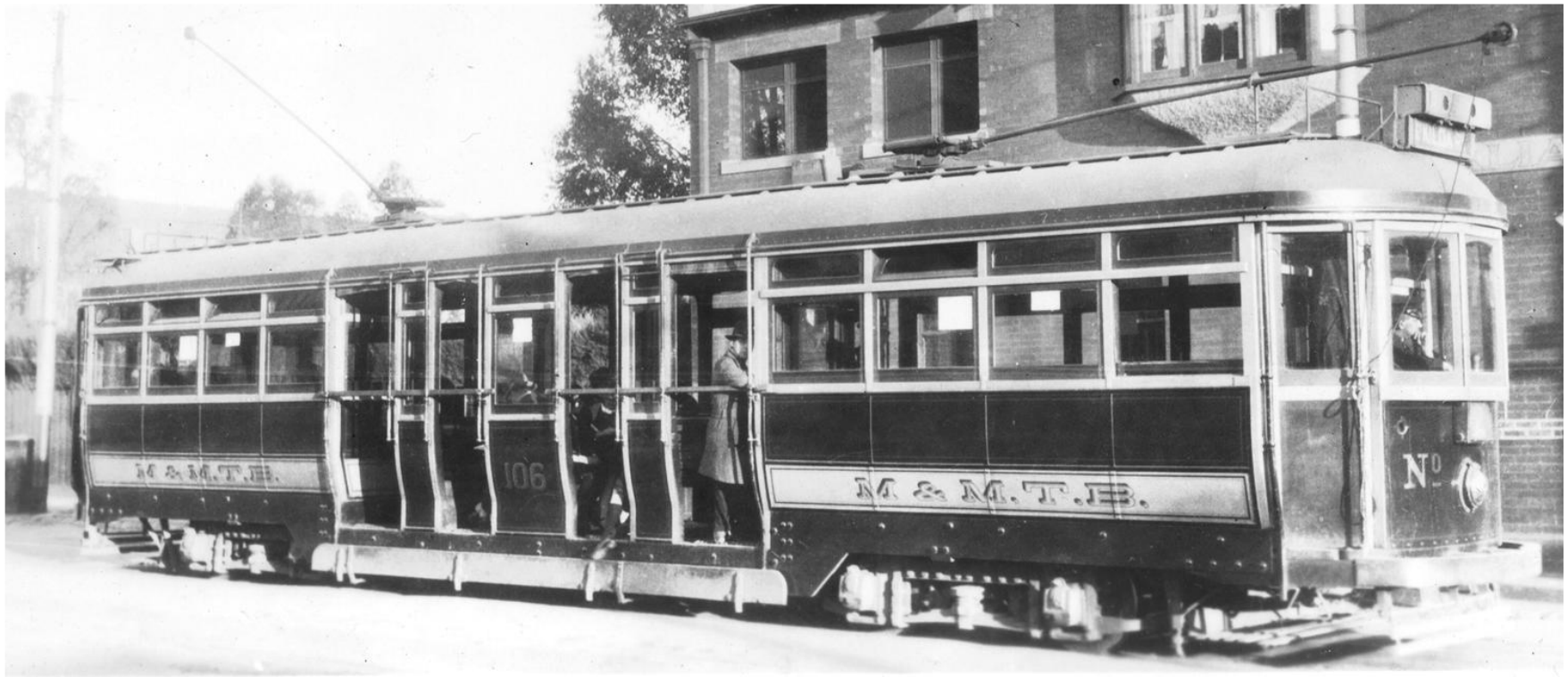
1917
The Victorian Railways design a tram

The Victorian Railways operated a couple of tramways bayside in the south of Melbourne. Both were extensions of railway lines and thus subject to heavy loading when a train arrived at the transfer point. They initially used standard Brill designs, then copied the Sydney J class. None were suitable, so in 1917 they designed and built their own tram based partly on the HTT version of a drop centre tram.

- Substantially stronger construction.
- 4 centre doorways like HTT – but posts instead of panels for some dividers because of closer bogie centres.
- No doorways or dropped platforms at the ends.
- 4 motor cars with Brill 77E trucks.

1921
One more try by the P&MTT

The final design by the P&MTT was clearly influenced by the successful VR design.



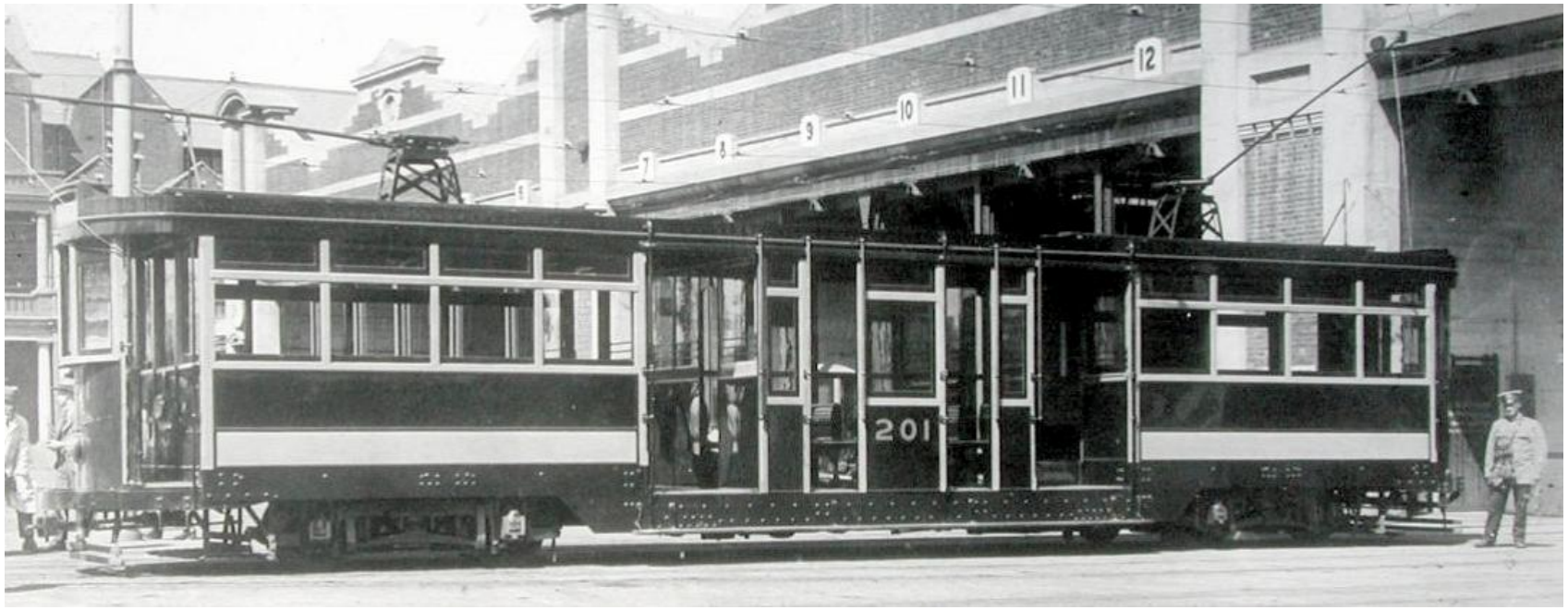
It had similar features, door layout and equipment to the VR bogie cars but replaced the centre section posts with panels like the HTT version because the tram had slightly longer truck centres.

The trams were built by James Moore and Co and delivered to the MMTB in 1921.

1921
Adelaide joins in

In 1921 Adelaide looked at the VR and L class trams in Melbourne and designed their own version. The F type had a similar layout to the Melbourne L class and even had the same Brill 77E trucks.

It had a simplified body without curved sides.



A significant difference was bulkheads enclosing the drop centre section

1921
Dunedin goes drop centre

The Dunedin “Sydney Bogies” look rather like the 1906 Christchurch Boon cars but were built by the Meadowbank Manufacturing Co of Sydney – hence their nickname.

They used the more modern Brill 39E maximum traction truck.

Dunedin’s climate lead to a convertible style to give better protection in Winter.

1923
The W class

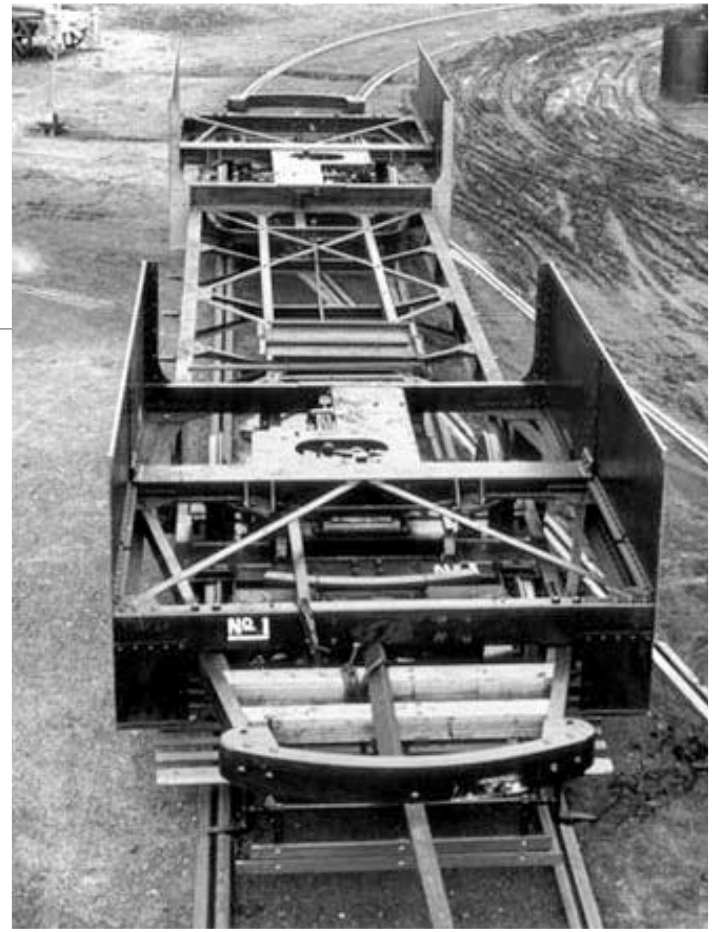
The MMTB needed a lot of trams to replace the large cable tram network. Virtually none of the Tramway Trust cars were suitable so the MMTB designed a large bogie tram based on the general design of the successful L class (and by extension the VR bogie trams).

The W went back to the P&MTT idea of only three centre doorways, simplified windows and eliminated curved panels to simplify and speed up construction. Over 400 were built between 1923 and 1929 with variations to the door arrangement but not much else in terms of general body design.

1925
Brisbane joins in

Brisbane developed a drop centre design in 1925, with design help from Sydney.

It featured drop platforms at the ends. 4 large central entrances gave easy access.



The cab front mimics the Sydney P class, but the choice to use a drop centre is clearly influenced by Melbourne. The saloon panels are part of the car structure – a feature inherited from Brisbane's stepless tram.

1930
Launceston – a late starter

The Launceston Municipal Tramways built three drop centre cars in 1930.

They seem to be influenced by the Adelaide F type but had unusual trucks – Launceston seemed to value diversity!

1933
Sydney sees the light

By the 1930s it was clear that Sydney needed to move on to enclosed trams with an internal corridor.

Sydney invited a Melbourne engineer to assist in the design and ended up adopting a drop centre design and a variation of Melbourne's hornless bogies. Four dropped entrances were provided on each side – making 8 in all as loading and unloading was allowed on either side.

Sydney preferences demanded lateral tip-over seats, so the seating capacity was a lot less than the older cross bench cars and total capacity less than Melbourne trams of the period. The R1 design partially addressed that by removing one of the centre doorways to allow more seats.

1936
Melbourne goes wide

In 1936 after some fiddling with W3 and W4 designs Melbourne settled on a wider framed body on hornless trucks designed by the MMTB in 1930.

The wider body allowed a wider corridor and reduced dwell time.

The basic design was built for the next 20 years with the only significant change being the addition of air operated sliding doors.

Three doorways were provided in the centre, later reduced to two doorways for cars still in service after the 1970s.

1937
Brisbane goes streamlined

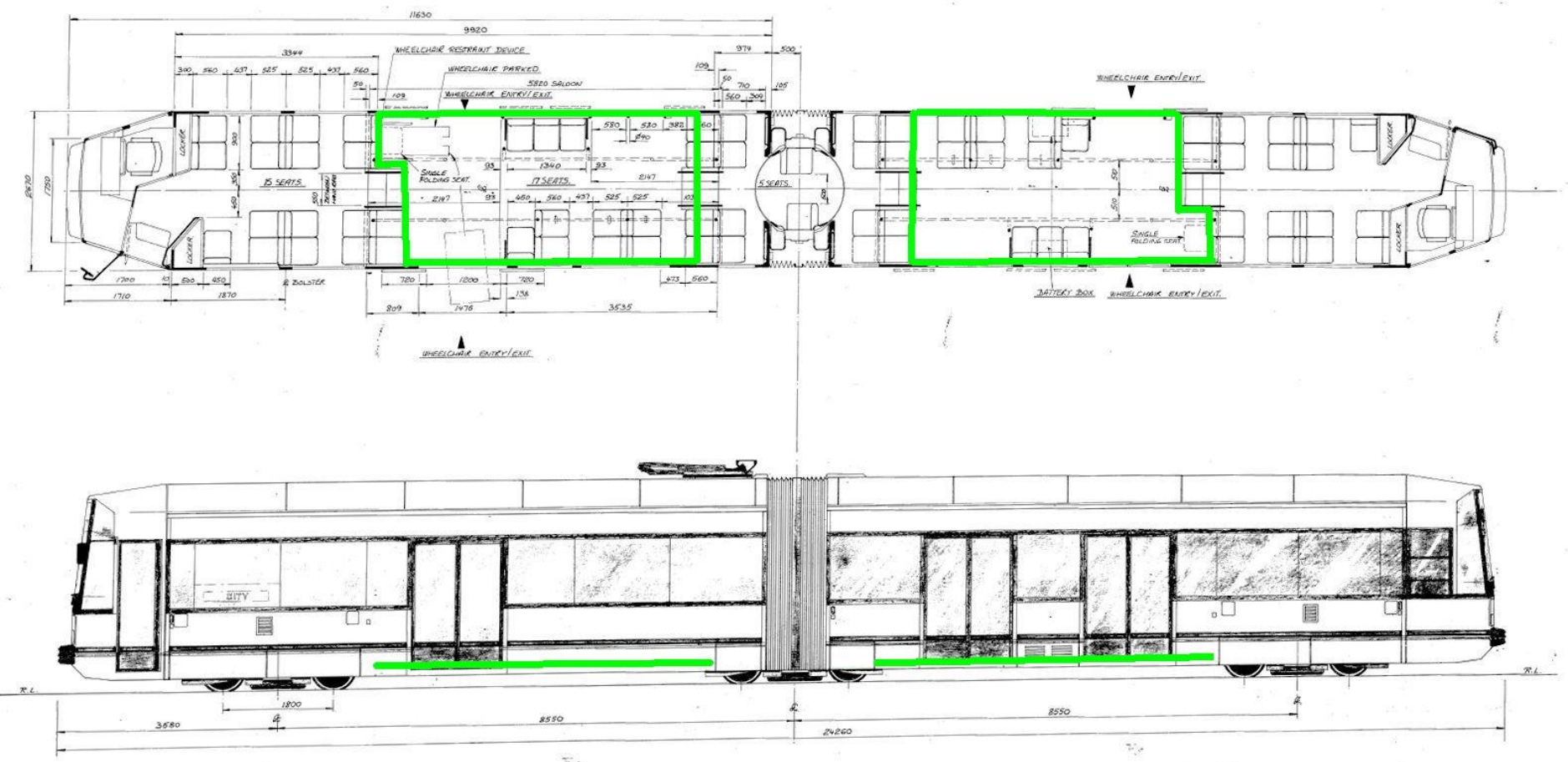
Brisbane's Four Motor (FM) trams were clearly influenced by the Sydney R class with the same number of doors and drop platforms at the ends as well as in the centre.

Narrow track centres meant that Brisbane bogie trams had to have tapered ends. Brisbane turned that to an advantage by producing a striking streamlined design.

Brisbane's 554 was the very last drop centre tram built in Australasia.

But wait – there's more …

1989
An Aussie drop centre articulated tram?



There was a proposal in 1989 for the Melbourne B2 class trams still to be constructed to have drop centres in each section. It got as far as a concept drawing and construction of a full size mock-up by ComEng.

Green lines mark the proposed drop centre area.

2006
Still being built …

The CKD Tatra T3 was the tram that gave many of us hope for the future when it appeared in the 1960s.

In the 21st century new versions of this classic tram were built as a bogie drop-centre tram.

Thanks

This has been an interesting small research project.

It is quite remarkable to see how in this case and many others ideas and lessons were circulated fairly quickly across borders.

Perhaps with more open acceptance than we see today?

I'm grateful to Peter Hyde and Warren Doubleday for checking (and correcting) some of my notes.

Any remaining errors are all mine.