

The Bellcord



Maximum traction car Hawthorn Tramways Trust (HTT) 32 after restoration at Bendigo Workshop (2006).

Photo: Mal Rowe

Maximum Traction

Tramway history can throw up terminology that both mystifies and intrigues – ‘maximum traction’ is one such term. In Melbourne it is used to describe many of our early double truck (bogie) tramcars, such as HTT 32 shown in the photo above.

However, the term specifically refers to the type of truck used to power such tramcars. The maximum traction truck has one motor-driven axle and it is this type of truck that is our focus.

Origins

In the 1880s and 1890s as the popularity of electric street tramways increased around the world, so did the demand for longer higher capacity tramcars. To allow these larger vehicles to negotiate the sharp

curves of city streets, engineers adopted swivel trucks, one at each end of the tramcar. Swivel trucks were already in use on some railways and cable tramways. However, electric tramway trucks required the addition of traction motors which were large and costly.

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In the mid 1880s, a maximum traction truck with one powered axle and equal size wheels was used in London. In 1890 the J G Brill Company of Philadelphia, USA patented a maximum traction truck based on unequal size wheels. The motor-driven axle was fitted with larger diameter wheels and the unpowered axle fitted with smaller diameter (pony) wheels.

These tramcars were designed for low-speed street services and various versions were produced. Other manufacturers copied the concept and a number of legal disputes ensued.

Within a decade of their introduction, frequent derailments and inadequate power refocused the attention of designers and operators towards trucks with one motor per axle and equal size wheels.

Nevertheless, maximum traction trucks continued to power trams in cities around the world for many decades due to their favourable purchase price and WW1 shortages.

In Melbourne between 1912 and 1918, the Prahran and Malvern Tramways Trust and the Hawthorn Tramways Trust contracted Duncan & Fraser of Adelaide to supply 43 longer tramcar bodies. The trusts then installed Brill 22E "Eureka" design maximum traction trucks and other equipment sourced through Noyes Bros.

Weight distribution

Key to the maximum traction concept is that the tramcar's weight is directed predominantly over the drive wheels of each truck. While other designs differed in their specifications, Melbourne's Brill 22E trucks notionally distributed 75% of the total weight on the drive (larger) wheels and 25% on the pony (smaller) wheels.

Details of how this was achieved are on page 3.

Orientation

Melbourne's maximum traction tramcars all operated with the pony wheels oriented toward the centre of the car as specified in the Brill 22E truck documentation.

However, later trucks such as the Brill 39E and 62E allowed tramcar manufacturers to fit the maximum traction trucks in different orientations. Many double-ended saloon cars with front and rear entry doors and

steps had the trucks installed with pony wheels on the outer ends. This was because the pony wheels required less clearance and they could pivot more freely without fear of hitting the car body.

Builders and operators debated which orientation better steered the tramcar through points and around curves, and reduced derailments. No definitive answer seems to have resulted.

Limited use

As Melbourne's four-motor W class tram fleet grew in size, the maximum traction cars were allocated to routes with lighter traffic loads. The 1930s Depression and WW2 meant many remained in service. Others were scrapped with a few of their trucks used under CW5 cars. In 1956 the last of these under CW5 trams were replaced by standard M&MTB No 15 trucks.

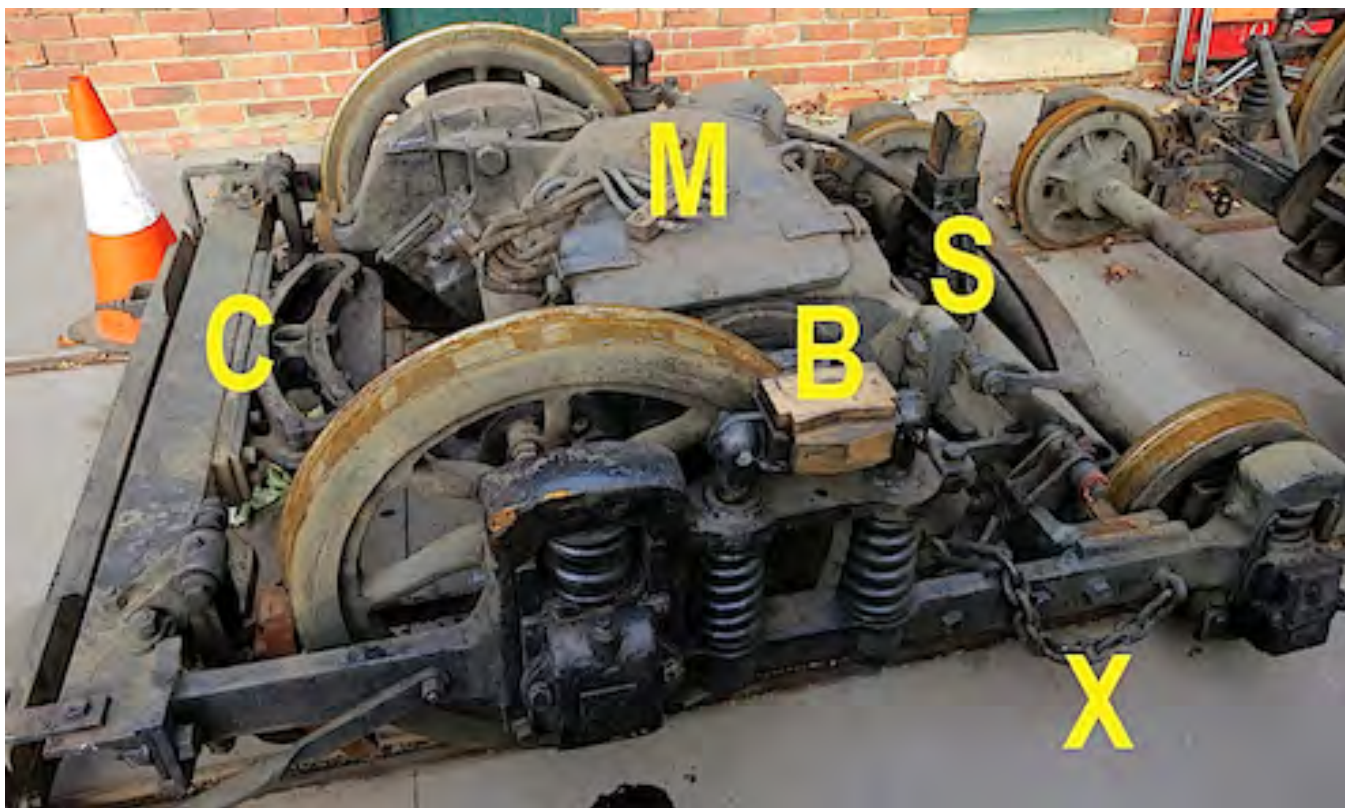
Many maximum traction cars were moved to Victoria's three regional tramway cities after Melbourne's WW2 peak loading passed. These became the backbone of their fleets and a number still live on beyond their centenary in heritage and tourist tramways in Victoria and other states.

All this is remarkable given that the maximum traction design, and especially the odd Brill 22E Eureka design, was found to have inadequate power and was not fit for purpose – thus earning the nickname 'minimum traction' among some tramwaymen.



Originally known as HTT 32, Bendigo 24 became a valued addition to that city's tramway fleet after WW2 (1969).

Photo: Dave Hinman



Maximum traction truck at Bendigo Tramways Workshop showing curved radial slot (C), motor (M), side bearing (B), spring-loaded compression device (S) and side chain (X).
 Photo: Geoff Brown

Brill 22E truck weight distribution

To achieve the required weight distribution, the king pin and supporting bolster should be closer to the drive (larger) wheels. However, this is where the motor is (labelled M in the photo), and a bolster cannot be run through the motor.

Brill eliminated the bolster and instead the tram's weight is directed to side bearings located close to the drive wheels (labelled B). These side bearings run against the inner surfaces of curved angle plates attached to the underside of the side sills of the tram.

A pin attached to the underside of the tram protrudes down through a curved radial slot (labelled C) and transfers much of the drive and brake forces from the truck to the body.

Between them, the curved angle plates (at B) and the pin running in the radial slot (at C) create a 'virtual' pivot point for the truck close to the centre of the drive axle. Thus more weight is on that axle providing 'maximum traction'.

The pony (smaller) wheels carry less weight and are thus more prone to de-railing. To reduce this risk, a

spring-loaded compression device (labelled S) runs against a track attached to the underside of the tram. That track has a notch where the compression device sits when the truck is centred. As soon as the truck moves off-centre, the compression device is pushed down and more weight is applied to the pony wheels – hopefully making them less likely to de-rail.

If the pony wheels do de-rail, there is a risk that the side bearings near the driving wheels may run off the end of the curved angle plates and re-railing would be very difficult. To try to avoid this, the truck is constrained by side chains near the pony wheels (labelled X).

Later designs, including the Brill 39E, returned to using a normal bolster and moved the motor to be 'outside hung', i.e. on the outer side of the driving axle.

Geoff Brown, Mal Rowe

References:

Brill specification pages, COTMA Library

History of the J G Brill Company (2001), Debra Brill



M&MTB conductress selling a Red Cross button to an American soldier in the city (23 June 1944).

Photo: Australian War Memorial

Most Popular Conductress

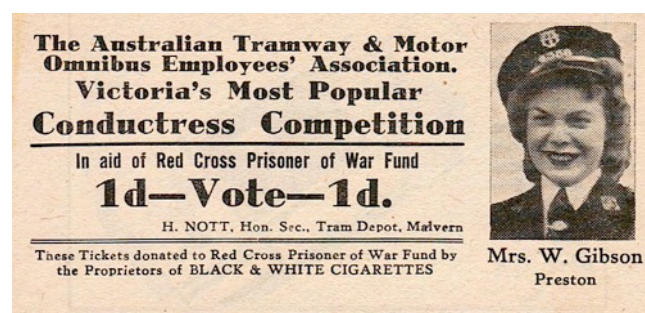
A recent donation of tramway memorabilia from Vicki Wilson has provided another insight into the role of women in the tramways. Vicki's mother, Win (Winifred) Gibson, was a conductress during the Second World War and a contestant in the 1944 'Most Popular Conductress' competition. Below is the story of this competition. A detailed article on wartime conductresses, Stepping into the Breach, is now published on the museum's website.

One of the aspects of the conductresses' employment at the M&MTB was their commitment to social causes, which was most notably represented by the 'Most Popular Conductress' competition held in 1944. This four-month-long event was sponsored by the employees' union, the Amalgamated Tramways and Motor Omnibus Employees Association (ATMOEA). It was designed to raise funds for the Red Cross Prisoners of War Fund. Publicity for the competition was supplied by the proprietors of Black & White Cigarettes.

The M&MTB also announced that the highest Melbourne-based fund-raiser would receive a prize of £10. Note that the average pay per fortnight for a conductress was £13/15/7.

Beginning in May 1944, the competition was held across bus and tram depots of the M&MTB, as well as the depots of the regional tramways in Ballarat, Bendigo and Geelong operated by the State Electricity Commission of Victoria (SECV). The conductresses working from the VR depots at Elwood and Sandringham did not participate, as they were covered by the Australian Railways Union, not the ATMOEA.

Ballots were carried out at each depot, to select a conductress to represent the depot in a competition to raise the most funds. The young woman selected by Preston Depot was Win Gibson.



A penny vote ticket from the 1944 'Most Popular Conductress' Competition, featuring Win Gibson. These tickets were sold by M&MTB conductors and conductresses to passengers to support the Red Cross Prisoners of War Fund.

Ticket courtesy of Vicki Wilson.

Win Gibson

Win joined the M&MTB on 9 July 1942. Married to an AIF soldier on active service, for her first three months 'on the bag' she worked on the Bourke Street double decker buses from the Central Bus Garage at North Fitzroy.

She then transferred to the trams running out of Preston Depot – one of the last M&MTB tram depots to be assigned conductresses – located across St Georges Road from Preston Workshops. She remained a conductress until she resigned from the M&MTB on 23 July 1945. Her Certificate of Service stated that her conduct and service were very good.

Win noted that most of the male conductors, and the drivers, were family men. They had a certain reserve regarding working with the conductresses, as few workplaces of the time were mixed sex, the 'rules of engagement' not being well understood. Over a period of time, the men came to accept the conductresses, and they willingly shared their working knowledge with the women.

One of the great benefits of the competition, according to Win, was it fostered closer working relationships, bringing the conductresses closer to their workmates' families. As Preston Depot was one of the smaller M&MTB depots, they hoped to be able to collect £400 as their contribution for the competition.

Fundraising

The major method of fund-raising was through the sale of penny 'vote' tickets by conductors and conductresses on the trams and buses, while a special Red Cross Button day was held on 23 July 1944. Buttons were sold from stands around the city staffed by uniformed M&MTB employees.

A special event was held at Melbourne Town Hall, where noted Melbourne philanthropist Lady Angliss presented each of the nine Melbourne contestants with an orchid.

Both Bendigo and Ballarat held greyhound race meetings, where the local candidates were sponsored by the racing clubs, with bookmakers and successful punters making generous donations.

One enterprising candidate organised an evening of boxing, wrestling and acrobatic displays at West



M&MTB conductress Miss Charl Round checking clearances of a tram shunting at the Hawthorn terminus in Power Street. Photo :State Library Victoria

Melbourne Stadium (known from the 1960s as Festival Hall). Dances at town halls were a popular fundraising event, while Win Gibson held two benefit concerts at the Gowerville Theatre.

A Gala Ball was held at Melbourne Town Hall on 31 August 1944, where the leading fund-raiser and winner was announced. The winner, Mrs Sylvia Mitchell of Ballarat, raised £3,580. Win Gibson came eighth, with £836

Using the Reserve Bank of Australia pre-decimal inflation calculator, the total amount raised of £15,076 is equivalent to \$1,066,025 in 2017 Australian dollars – a very healthy amount.

Win and her colleagues at Preston Depot were pleased they raised more than double their initial estimate. The cheque for the total amount was handed over to the Red Cross on 10 February 1945.

Russell Jones



The live broadcast of the ABC's Breakfast Program from the museum's display room.

From left: Jacinta Parsons, Sami Shar, Roberto D'Andrea and Adam Chandler.

Photo: David Kemp

Tram Museum Hits the Airways

I made my fastest trip from home to Hawthorn a few weeks ago on my way to a 4:30am rendezvous with museum members Mike Ryan and Adam Chandler, and an ABC Radio technician.

On Wednesday 23 May from 5:30 am, ABC Radio Melbourne (formerly known as 3LO and 774 AM) broadcast its Breakfast Program live from the Melbourne Tram Museum – a first for hosts Jacinta Parsons and Sami Shah and for the museum.

The broadcast marked 20 years since conductors had collected fares on Melbourne trams and was a time to share fond memories. Jacinta had been a tram conductress at Brunswick Depot back then and wore her green connie's outfit to reminisce.

The program featured interviews with our chairperson Adam and former conductors Roberto and Kevin, who still enjoy clipping tickets and giving them to eager children as part of a performance troupe.

There was a feature made of our Karachi-decorated Z1 81 tram, photo opportunities around W5 774, discussion with the voice of Yarra Trams Colin Tyrus, live music, talkback and audience participation.

The early start did not mean we missed breakfast, as ABC staff supplied a great array of croissants, pastries and orange juice for us to enjoy.

TV news

The museum also received television coverage recently. On Saturday 14 April, Channel 9 News reporter Allan Raskall and a cameraman came to film a segment for that night's 6pm news. I was asked to

be the museum spokesperson and assisted with historic details and a few words on camera.

Knowing that he employed a sense of humour in his segments, we found him a conductor's hat, ticket bag and punch for the final sequence.

To Allan's credit, he rang back from the studio to discuss some details to ensure he had his facts right – which he had. I was left hoping that all the facts I had provided were correct.

Allan was genuinely impressed with the museum's operation and spent longer than he had intended – about 2.5 hours for a 1.75-minute segment. He hoped that the gold coin donations would come rolling in.

The museum obtained a web link to the segment if you would like to view it: <https://vimeo.com/267191160>

David Kemp



ABC hosts with members of The Connies performance troupe. Photo David Kemp

From Tram Down Under collection



Bogie car VR 30 stabled north of St Kilda Station tramway terminus (late 1940s). Photo: Trams Down Under collection

About this photo

This photo probably dates from the late 1940s with VR 30 still in its 'blackout paint scheme'. The St Kilda tramway was built to the 1600mm (5'3") gauge to match the railways. From 1913 to 1941 there was a physical connection running north from the tram terminus beside the St Kilda railway station to allow haulage of tramcars to the Newport Workshops. This photo shows these tram tracks (right foreground) – disconnected but still in place.

It is likely that VR 30 had failed and was pushed down the tracks out of the way until it could be towed back to Elwood Depot. Both trolley poles are secured in the down position and the destination reads 'St Kilda Rly'. To the left foreground is the end of the station platform and in the left background is the observation tower of the George Hotel.

Mal Rowe

Tram Tattle

In the 1970s, routes 78 and 79 along Chapel St were my all-time favourite lines. In my second week of conducting, we were doing the first run from St Kilda Beach to North Richmond when the ladies of the night boarded at Luna Park.

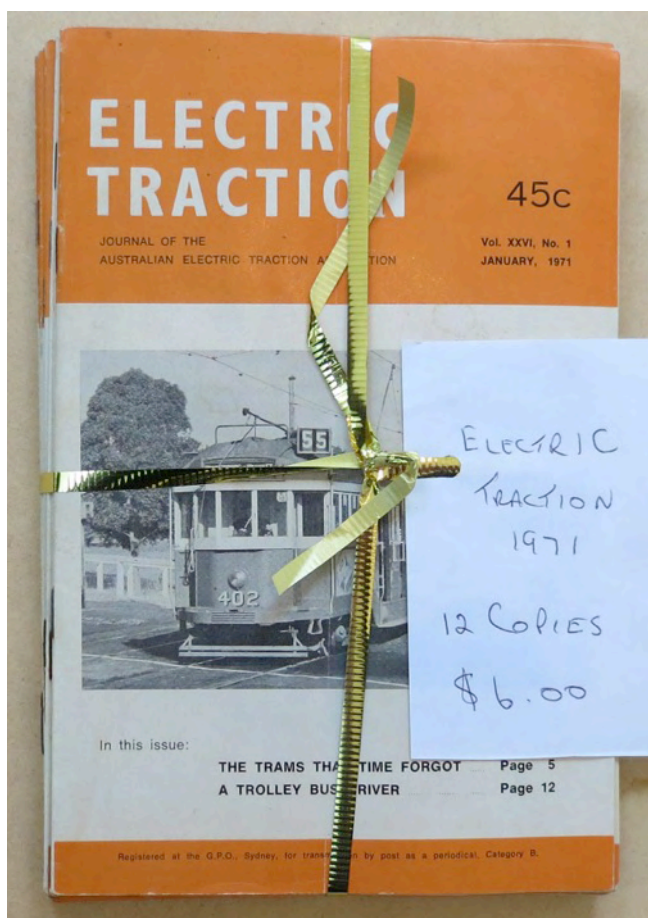
When I asked how they were at that early hour, one quickly retorted: "Connie, if we had had a good night, we wouldn't be going home on the bloody tram, would we girls? We'd be going home in a bloody Rolls Royce."

The wharfies poured on after 5.30am closely followed by the Prahran and Richmond factory workers. Then after 7am it was the office workers bound for routes 8 and 70 towards the city and the school kids after 8am. The last group, the pensioners, boarded after 9.30am when they could purchase off peak concession tickets.

On evening shifts, it was the reverse. And as the evening drew late, the ladies of the night would board the 79. "Connie, this is the night! We won't be seeing you in the morning, will we girls?"

Kevin Tierney is a member of The Connies performance troupe and a museum member

Museum News



Museum Shop Bargains

Our library is overflowing with vintage issues of *Electric Traction*, *Trolley Wire* and *Modern Tramway*. For a limited time we are offering bundled lots at cheap prices.

Drop into the museum shop and pick up a bargain such as 12 issues of *Electric Traction* (1971) for just \$6. Note that bundles cannot be split – at these prices, you can afford to purchase the lot.

Tram socks!

Our colourful tram socks are literally walking out the door! We have four different designs ranging from \$12 to \$14.95 a pair.

These and much more are available at the museum shop during our open days or by emailing us at shop@trammuseum.org.au.

Open House Melbourne: 28-29 July 2018

The museum will again participate in Open House Melbourne on Saturday and Sunday, 28 and 29 July, from 10am until 4pm.

This Melbourne-wide annual event is now into its eleventh successful year and will have a record 224 buildings opening their doors to the public.

We are again seeking volunteers to assist at the museum on one or both days. We don't expect all volunteers to be available on both days, but if you can spare at least one day or a half day, it would be most appreciated.

We expect visitor numbers to exceed last year's total. Volunteers will be providing advice and keeping a watchful eye on our exhibits. Lunch will be provided.

If you can help us, please contact Rod Atkins or Carolyn Cleak at the museum, by emailing info@trammuseum.org.au or by responding to an upcoming mailout.

The Melbourne Tram Museum Inc is open on the 2nd and 4th Saturdays of each month (except the 4th Saturday of December). Normal opening hours are 11am–5pm. It is also open during Open House Melbourne (10am–4pm) and by appointment.

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