Comeng (Victoria)

Light Rail Vehicles

Comeng (Victoria)

COMENG (VICTORIA)
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Comeng (Victoria)

Comeng (Victoria) is Australia's centre for the design development, and manufacture of light rail vehicles.

As supplier of LRV's to Melbourne's Metropolitan Transit Authority for over 10 years, Comeng (Victoria) has gained an expertise that is unsurpassed internationally.

It has developed particular skills in adapting proven technology to meet the diverse and demanding requirements of the Melbourne system which is the second largest in the free world.

Comeng vehicles have proved reliable in operation and increasingly popular with users.

Nationally, Comeng is Australia's largest and most advanced producer of railway rolling stock. It is a major division of the ANI Corporation Limited and has operating plants in all mainland states.

Although Comeng (Victoria) also produces excellent heavy rail EMU suburban passenger cars, it has built up a unique reputation for its expertise in light rail vehicles.

In recent years the company has produced three distinctive new vehicles for Melbourne's tramway network. Two of these were complete new designs which won national recognition for their engineering skills. The latest, the articulated LRV, won a special commendation from Australia's Institution of Engineers for its design.

On its 17 hectare site at Dandenong, Victoria, Comeng employs a total of 560 people.

The success of Comeng in providing for the sustained upgrading of Melbourne's tram fleet has produced a stability in the workforce that has allowed for the development of a high degree of skill at all levels. It has also enabled sub-contractors and suppliers to similarly build up specialist services, to the benefit of prospective customers.

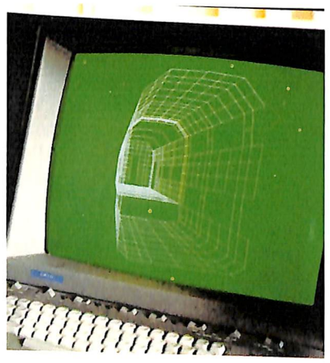
This sound domestic market has enabled Comeng to build in Victoria a base of design and manufacturing excellence that allows it to compete nationally and internationally.

As a result Comeng (Victoria) is now a major world centre for transport design and construction. Its products, its engineering and its manufacturing techniques combine to provide a base for the development of exports from Australia to the benefit of employment in Victoria.

It is now actively competing in markets in Asia, the Pacific and western Europe.

COMENG Engineering and Design

Computer aided design terminals (above and right). CAD allows pre-testing of designs and componentry and permits easy assessment of any modifications. It was widely used in the design of both the 'A' class and the Articulated trams.



Commendation to Comeng from the Institution of Engineers Australia for the design of the Articulated Tram.

THE INSTITUTION OF ENGINEERS, AUSTRALIA

BE IT KNOWN

THAT THE

VICTORIAN ENGINEERING EXCELLENCE AWARDS

COMMITTEE

HAS

HIGHLY COMMENDED

Comeng (Victoria)

FOR

Articulated Tram

IN RECOGNITION OF EXCELLENCE IN ENGINEERING ACHIEVEMENT

PRESIDENT

CHAIRMAN

20th June 1984

Engineering design office.

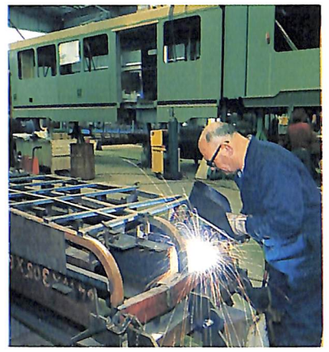
COMENG Production

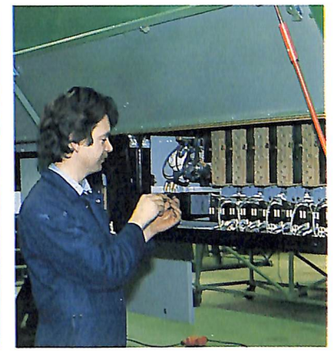
Fabricating tram bogies.

Cab construction on the Z Tram series.

Articulated tram in production.

Volume production of the A-Series trams for Melbourne's Metropolitan Transit Authority.

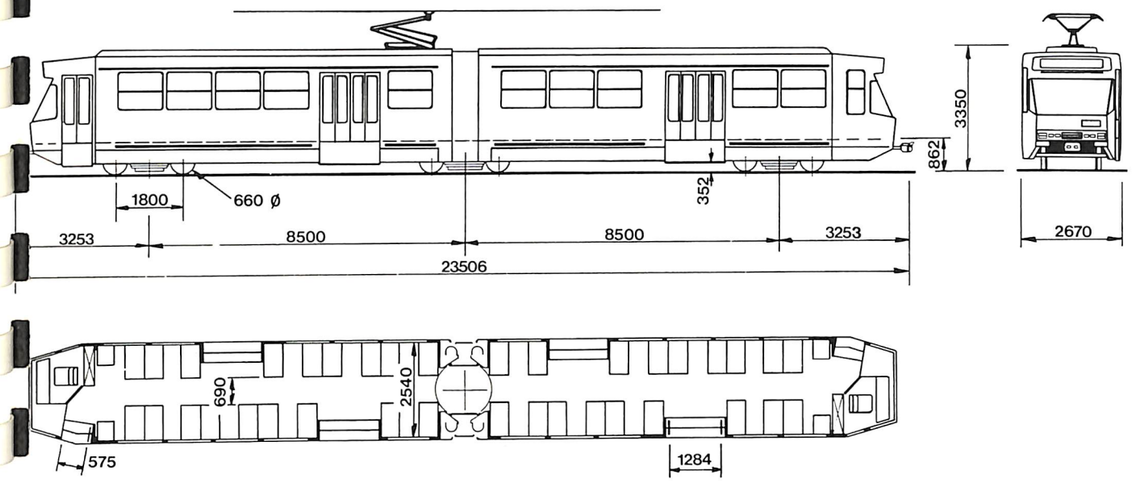




TWO-UNIT TRAMCAR

Double ended two-unit articulated tramcar mounted on two powered bogies, (each with a monomotor driving both axles) and one non-powered bogie under the articulated joint.
Cars are equipped with thyristor (Chopper) control electrical equipment incorporating regenerative braking. The control system features an independant chopper power supply to each outer bogie.
Current collection is by a single-arm pantograph.
The vehicle structure is of a lightweight all-welded steel construction with aluminium outer panels, and glass reinforced polyester ends and roof.
Interior finish is in melamine-faced laminate or aluminium, together with glass reinforced polyester. The PVC covered fire-retardant seating is two plus two abreast in fixed facing bays. Several single fixed seats are provided at the car ends.
Two sets of double bi-folding doors and one set of single bi-folding doors are provided on each side of the car. The automatic doors are all protected by a safety interlock and pressure sensitive step mats.

All steps are power operated dual-height, permitting loading from ground or high-level platforms.
Windows are of the balanced half-drop type, have tinted glass, and are fitted with pull-down roller louvred blinds.
Saloon lighting is fluorescent.
A continuous longitudinal clerestory roof provides ventilation, and air circulation is assisted by a pressurizing fan system.
Thermostatically controlled electric heating is provided under the seats.
The two cabs are designed as bolt-on modules and the complete unit may be replaced in the event of damage in a collision.
The cars are equipped with anti-climber bumper bars, and provision is made for the fitting of multifunction couplers if multiple unit running is required.
Automatically controlled destination indicators are provided at both ends of the vehicle roof.



Gauge:	1435mm
Line voltage:	600V d.c.
Line current (Max):	550 amps
Propulsion equipment:	AEG - Telefunken
Bogies:	Comeng-Duewag Monomotor (2) Comeng-Duewag articulated (1)
Wheel type:	Bochum 54, resilient
Traction motor:	AEG monomotor 195kW per bogie self ventilated
Gear ratio:	1 : 5.666
Suspension:	Primary - Chevron Rubber Secondary - Clouth Rubber
Service brakes:	Electro-dynamic, regenerative down to 8km/h
Low speed, parking and stand-by brake:	Spring applied caliper pads on disc brakes, one per axle, pneumatically released
Emergency brakes:	Electro-dynamic, plus electro-magnetic track brakes
Wheel spin and slip:	Detection and correction provided with automatic sanding

Max speed:	70 km/h
Max grade:	9%
Max acceleration:	1.3m/sec^2
Max retardation:	1.5m/sec^2
Emergency retardation:	3.37m/sec^2
Max jerk during acceleration:	1.0m/sec^3
Max jerk during retardation:	2.0m/sec^3
Transition time from zero to max acceleration:	1.5 sec
Transition time from zero to max deceleration: (Dynamic brake only)	1.5 sec
Air brake system:	Knorr
Capacity:	76 seated 106 standing 182 total

Mass:	Body at tare:	19.286 tonnes
	Two power bogie complete:	9.50 tonnes
	One trailing bogie complete:	3.11 tonnes
	Tare total:	31.896 tonnes
	Gross with crush load:	43.544 tonnes

SINGLE UNIT TRAMCAR — A CLASS

The A-Class tramcar is the most advanced in Australia. Its production superceded the Z-Class in 1983.

The double-ended single-unit tramcar uses thyristor (chopper) control equipment with regenerative braking. An independent chopper power system is supplied to each truck.

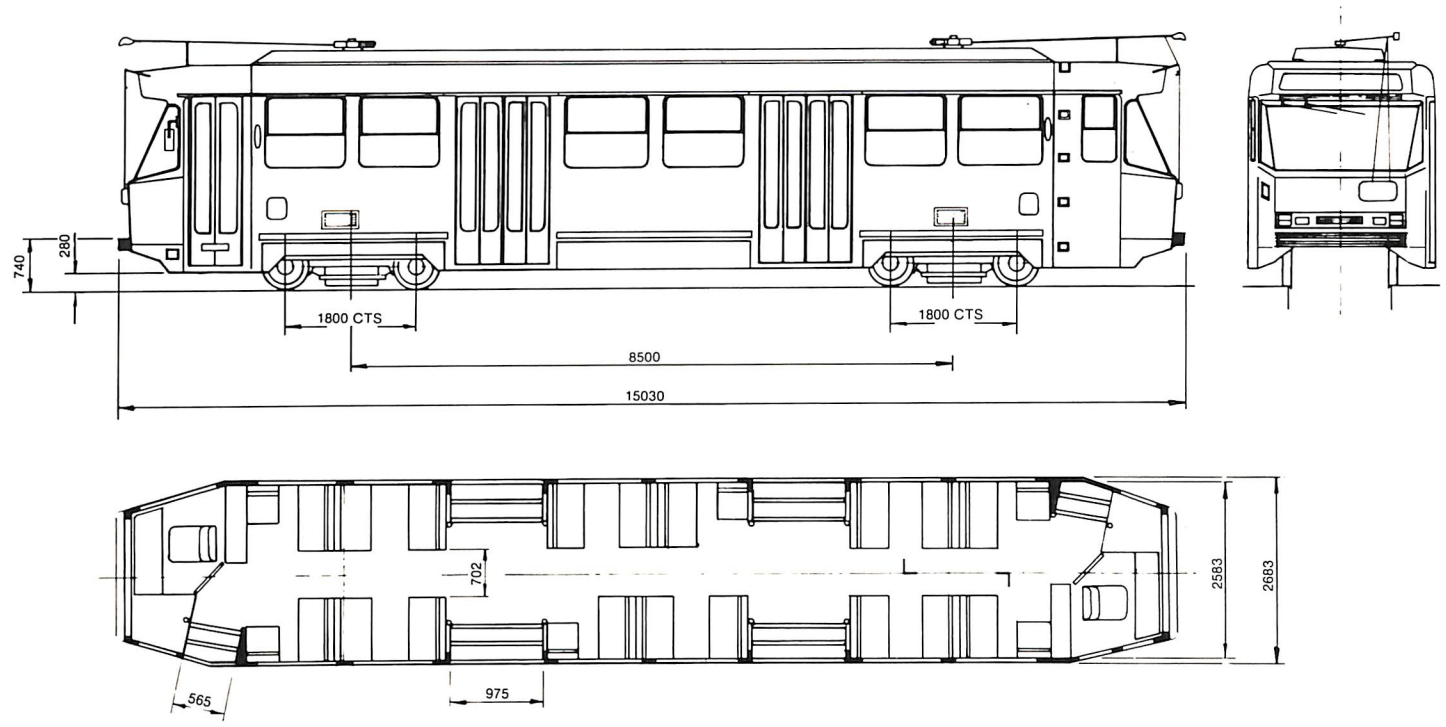
Body design represents a significant advance with improvements in ventilation, cab visibility, crew and passenger environment.

Construction is a welded tubular steel space frame with outer side and end panels of aluminium and laminated fibreglass. The roof is of laminated fibreglass. Interior walls are Melamine faced laminate on aluminium. Seats are PVC covered over fire retardant moulded cushions, generally in 2 x 2 fixed facing format with six singular units placed longitudinally.

There are three doors per side, two double and one single, bi-folding with overhead electrical drive, safety interlock, electric pressure-sensitive safe edges and pressure-sensitive mats.

Ventilation is through two tangential induction fans mounted in a naturally ventilated clerestory roof. Thermostatically controlled heating is provided under seats.

Miscellaneous equipment includes a public address system.

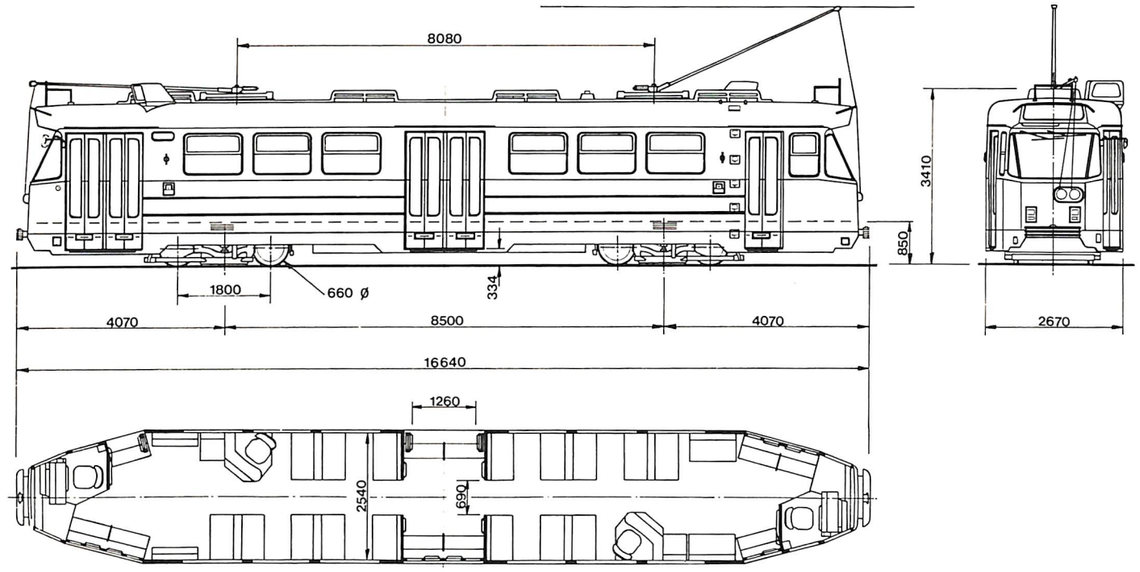


Gauge:	1,435 mm
Line voltage	600V dc.
Line current (max.)	550 Amps.
Electric Control	Siemens electronic control.
Propulsion Equipment	Thyristor (Chopper) AEG. Regenerative braking.
Bogies	Duewag monomotor trucks 2 per car with in-board bearings.
Wheel type	Bochum 54, resilient.
Traction Motor	1 per bogie - AEG monomotor driving 2 axles - 195 kW self ventilated.
Gear Ratio	1: 5.666
Suspension	Primary - Chevron Rubber. Secondary - Clouth Rubber.
Service Brakes	Electro-dynamic, regenerative down to 8 km/hr.
Low Speed, parking and standby brake	Spring applied caliper pads on brake disc, one per axle, hydraulically released.
Emergency brakes	Electro dynamic, plus electro magnetic track brakes.
Wheel spin and slip	Detection and correction provided with automatic sanding.
Max speed	70 km/hr.
Max grade	9%
Max acceleration	1.6m/sec^2.
Max retardation	1.6m/sec^2.
Emergency retardation	3.0m/sec^3.
Max jerk during braking	2.0m/sec^3.
Transition time from zero to max acceleration	1.5 sec^3.
Transition time from zero to max deceler-ation (dynamic brake only)	1.5 sec.
Total rolling resistance	150 N/t.
Body at Tare	11,800 kg.
One Truck incl. motor	4,870 kg.
Tare total	21,539 kg.
Gross (crush load)	30,000 kg.

CAPACITY	Seated	Standing	Total
	42	83	125

SINGLE-UNIT TRAMCAR — Z3 CLASS

Double-ended single unit tramcar mounted on two bogies, each with a Monomotor driving both axles.
Cars are equipped with thyristor (Chopper) control electrical equipment incorporating regenerative braking. The control system features an independant chopper power supply to each bogie. Current collection is by swivelling trolley poles.
The vehicle structure is lightweight all-welded steel construction with inner stressed panels on the bodyside, and outer decorative aluminium finish panels. Front ends and roof are of glass reinforced polyester laminate.
Interior finish is in melamine faced laminate or aluminium, together with glass reinforced polyester.
The PVC covered seats are two plus two abreast, in fixed facing bays. Several fold-up seats are located at the car ends so as to provide space for wheel chairs, pushchairs or additional standee passengers.
Two sets of double bi-folding doors and one set of single bi-folding doors are provided on each side of the car. The automatic doors are all protected by a safety interlock incorporating electric pressure sensitive safe edges and pressure sensitive step mats. All steps are illuminated. The main saloon lighting is fluorescent.
Windows are of the balanced half-drop type, have tinted glass, and are fitted with pull-down roller blinds.
Four ventilation exhaust fans are housed on the roof, and thermostatically controlled electric heating is provided under the seats.
Automatically controlled destination and route number indicators are provided at both ends of the vehicle roof.
The cars do not have couplers, but are equipped with anti-climber bumper bars.



Gauge:	1435 mm
Line voltage:	600V d.c.
Line current (max):	550 amps
Electronic control:	Siemens
Propulsion Equipment:	AEG-Telefunken
Bogies:	Comeng-Duewag Monomotor
Wheel type:	Bochum 54, resilient
Traction motor:	AEG Monomotor 195kW per bogie
Gear ratio:	1:5.666
Suspension:	Primary - Chevron Rubber Secondary - Clouth Rubber
Service brakes:	Electro-dynamic, regenerative down to 8 km/h
Low speed, parking & stand-by brake:	Spring-applied caliper pads on brake disc, one per axle, hydraulically released.
Emergency brakes:	Electro-dynamic, plus electromagnetic trackbrakes.

Wheel spin & slip:	Detection & correction provided with automatic sanding.
Max speed:	70km/h
Max grade:	9%
Max acceleration:	1.6 m/sec^2
Max retardation:	1.6 m/sec^2
Emergency retardation:	3.0 m/sec^2
Max jerk during acceleration:	1.3 m/sec^3
Max jerk during braking:	2.0 m/sec^3
Transition time from zero to max acceleration:	1.5 sec
Transition time from zero to max deceleration:	1.5 sec
Total rolling resistance:	150 N/t

Mass:

Body at tare:	12.3 tonnes
Two bogies:	9.5 tonnes
Tare Total:	21.8 tonnes
Gross (crush load):	30.13 tonnes

Capacity:	Seated	Standing	Total
(with conductor's seats)	42	83	125
(without conductor's seats)	48	83	131

Melbourne's Tramways — New Standards Bring New Passengers

The rise of Comeng (Victoria) as designers and producers of light rail vehicles has been inextricably linked with the upgrading of the great tramway and light rail network in its home city of Melbourne.

It is this solid, but competitive, domestic market that has permitted Comeng to develop its engineering excellence and build the skill base of its employees and suppliers to the highest international standards.

However, the history — and particularly the recent history — of Melbourne's tramway services is instructive in itself, for the bold programme to upgrade the service and modernise vehicles has seen a considerable lift in the proportion of public transport passengers who use trams.

It has also reversed a historic decline in total patronage that had endured for 35 years. Today the trams are winning new passengers, and are expected to rapidly win more as new routes are opened.

Melbourne has a long and affectionate association with trams. As early as 1860 one Francis Clapp sought to operate a horse tramway. He failed, but in 1869 did begin a horse-bus service and founded the Melbourne Tramway and Omnibus Service.

By 1885 he was operating a cable tramway — and by 1891 had 46 miles of double track operating. This was claimed to be the largest cable system in the world.

From 1907 onwards, cable began to give way to electric power. In 1919 a Tramways Board was formed to take over the various tramway trusts and integrate them into an electrical system.

Conversion to electricity was initially rapid, but the onset of the depression slowed activity and it was not until 1940 that the last cable tram ceased operating in Melbourne.

World War II saw the Melbourne system record its peak usage — 354.8 million passengers travelled on the city's trams and buses in 1945.

The post war surge in motor cars saw tram usage decline progressively: By 1970 total patronage was down to 133 million, or about 40 percent of public transport users.

Campaigns to refurbish the transport system are now bearing fruit. New vehicles and new services are winning back patrons.

New light rail lines are being extended further into the suburbs and new multi-car vehicles are being tried.

Unlike many cities, Melbourne has never abandoned faith in its tramways. Today, with new advanced vehicles setting new standards of passenger comfort and operating efficiency, it is reaping the rewards for that perseverance.