

(Z1 & Z2 Class Trams)

NEW NON-ARTICULATED TRAMCAR FOR MELBOURNE.

CLASSIFICATION : Light Rail Transit

OTHER NAMES : D.C. Tramcar

DEVELOPER : Commonwealth Engineering (Vic.) Pty. Ltd.
Frankston Road,
Dandenong, Victoria, Australia.
Tel: Melbourne 792 0171
Telex: 33253
Telegram: "Comeng" Dandenong.

In conjunction with -

Allmanna Svenska Elektriska
Aktiebolaget (ASEA),
S-721 83 Vasteras,
Sweden.
Tel: Vasteras (021) 10 00 00
Telex: 4720 aseava 5
Telegram: ASEA Vasteras.

DESCRIPTION :

A specifically designed tramcar for use in Melbourne, Australia. The vehicles can be operated as single units only and are not equipped to be coupled. The vehicle is non-articulated with 4 axles in 2 bogies. The car may be driven from either end and current collection is via trolleys. The vehicle incorporates the latest technological improvements in tramcars, including electronic wheel slip control. The cars are being built by Commonwealth Engineering (Victoria) Pty. Ltd. incorporating ASEA control equipment and motors.

DEVELOPMENT HISTORY :

Designed to replace some of the existing fleet of tramcars of the Melbourne and Metropolitan Tramways Board. The first unit was delivered in December 1974. The car is a new design based upon M28 bogies and traction control equipment previously supplied by ASEA for Gothenburg.

DEVELOPMENT STATUS :

115 - DELIVERY COMPLETE.

SYSTEMS USING VEHICLE :

Melbourne and Metropolitan Tramways Board - 100 vehicles on order.

COSTS :

Contract Price - A\$12 million for 100 cars (signed March 1973).

WARRANTY :

Basic vehicle - 12 months.

VEHICLE PERFORMANCE :

Max. Velocity	.....	45 mph, 72 km/h
Max. Grade	.....	± 8.9%
Service Acceleration	.....	5.74 ft/s ² , 1.75 m/s ²
Service Deceleration	.....	4.92 ft/s ² , 1.5 m/s ²
Emerg. Deceleration	.....	12 ft/s ² , 3.7 m/s ²
Max. Jerk	.....	6.89 ft/s ³ , 2.1 m/s ³
Minimum Horizontal Turn Radius		
Single Vehicle	.....	53 ft, 16.3 m
	
Minimum Vertical Turn Radius		
Single Vehicle	.....	600 ft, 138 m
	
Design Capacity	.....	48 seats 77 stand
Area per Standee	.....	1.72 ft ² , 0.16m ²

DIMENSIONS :

Length	.....	54.3 ft, 16560 mm
Width	.....	8.75 ft, 2667 mm
Height, Rail Over Roof	.....	11.64 ft, 3550 mm
Height, Rail to Floor	.....	2.78 ft, 850 mm
Empty Weight	.....	19,000 Kg
Gross Weight	.....	27,000 Kg
Inside Width	.....	8.33 ft, 2540 mm
Headroom, Centre Aisle	.....	6.88 ft, 2105 mm
Width, Centre Aisle	.....	2.23 ft, 690 mm
Doorway Width	.....	5.08 ft, 1550 mm
Clear Opening	.....	4.36 ft, 1330 mm
Doorway Height	.....	7.61 ft, 2320 mm
Step Height	.....	11 ins, 285 mm

SUSPENSION, PROPULSION & BRAKING :

Truck (Bogies)	.....	Frames by Commonwealth Eng., Sydney
"	.....	Assembly - M.M.T.B.
Truck Centres	.....	27.88 ft, 8500 mm
Wheel Base	.....	5.89 ft, 1796 mm
Wheel Diameter	.....	2.23 ft, 680 mm
Track Gauge	.....	4.708 ft, 1435 mm
Motors, No. & Type	.....	4, one each per axle; by ASEA Electric (Aust.) Pty. Ltd.; Series field
Rating per Motor	.....	52 kw, 75 HP
Voltage per Motor	.....	300 vdc
Gear Ratio	.....	1 : 7.24
Type Drive	.....	Motor connected to double reduction gear via a resilient double coupling
Service Brakes	.....	Electric dynamic & motor shaft disc brakes, spring applied, hydraulically released.
Emergency Brakes	....	Same disc brakes & magnetic rail brakes
Emergency Brake Reaction Time	.....	0.5 sec

ELECTRICAL & CONTROL SYSTEMS :

Line Voltage	.....	600 vdc
Power Collection	.....	Trolley with height range of 12.6 - 19.5 ft. 3860 mm - 5944 mm
Exterior Lights	.....	Each end equipped with dual headlights, tail-lights & turn signals
Interior Lights	.....	40W Fluorescent tubes operating on 600V DC
Type Control	.....	Electronic "TRAMIAC" with 41 starting steps and 17 braking steps
Instruments & Controls	.....	3 separate pedals (braking, accelerating, and safety), speedometer, indicator lights, battery voltmeter

BODY SPECIFICATIONS :

Frame	.....	Steel - all welded
Exterior Walls	.....	Aluminium sides, fibreglass roof
Interior Walls	.....	Stressed steel covered with teak finish laminate
Insulation	.....	2 in (51 mm) thick fibreglass insulation throughout
Floor	.....	Covered with cork and neoprene
Doors	.....	2 four-leaf folding doors each side, electrically operated
Windows	.....	7 per side with upper portion on slides for ventilation
Heating	.....	Resistor box exhaust heat-forced air
Ceiling Fans (6)	.....	6000 cfm blown in above 24°C ambient
Seats	.....	Upholstered over high resilience polyurethane foam