

Melbourne's Latest Tramcars

Comfortable Accommodation and Modern Traction Equipment

THE latest electric tramcars built by the Melbourne and metropolitan tramways board have been designed with the special objects of giving improved riding comfort and higher schedule speed. These cars, which are known as the W5 class, have been built to the same general outline as the other W class cars, but have been made more roomy, and the saloons have been fitted with upholstered cross seats in leather on sponge rubber cushions. These cars have been designed and built under the supervision of the board's chief engineer, Mr. T. P. Strickland, at the tramway workshops, Preston.

board to vestibule floor, 1 ft. 1 $\frac{1}{4}$ in.; vestibule to saloon floor, 6 in.

The bodywork of the cars has been built of steel, electrically welded, the woodwork being used only for interior facings on the steel. The design has been developed along simple straight lines to permit of easy fabrication of the steelwork. Considerable strength combined with lightness has been obtained with this design. The sills are 3 $\frac{1}{2}$ in. by 2 $\frac{1}{2}$ in. by $\frac{5}{16}$ in. angle steel, the belt rail 2 in. by 1 $\frac{1}{2}$ in. by $\frac{3}{16}$ in. angle, and the cant rail 2 $\frac{1}{2}$ in. by 2 in. by $\frac{3}{16}$ in. angle. The corner posts are 2 $\frac{1}{2}$ in. by 2 $\frac{1}{2}$ in. by $\frac{1}{4}$ in. angle,

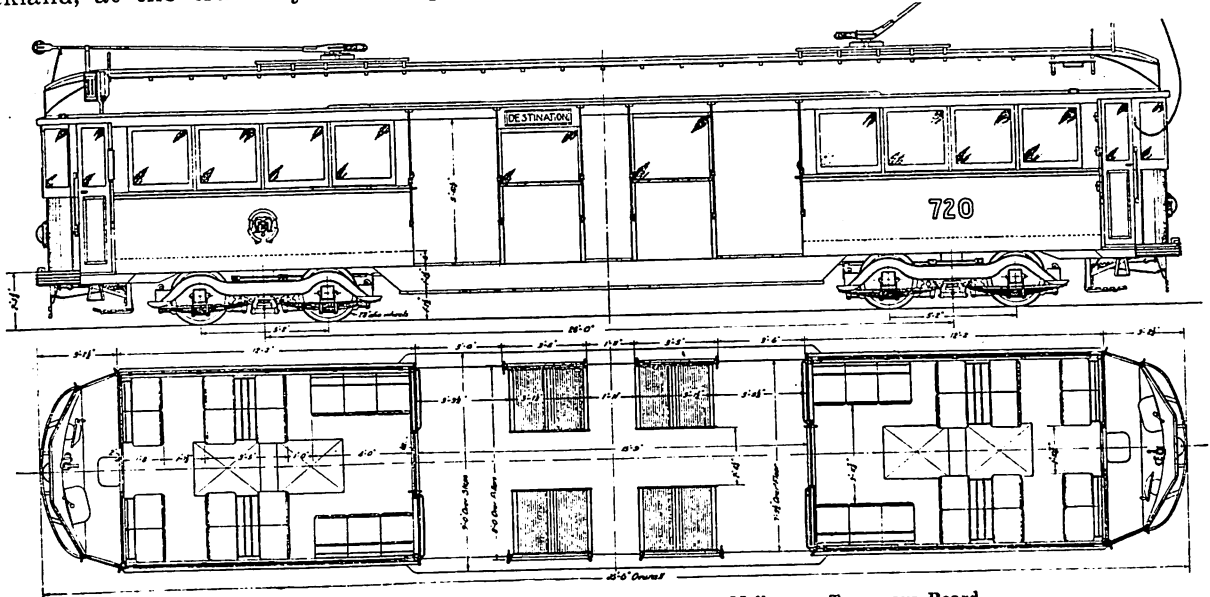


Fig. 1. Elevation and Plan of Class W5 Bogie Car for Melbourne Tramways Board.

The drawing and photograph illustrate the new car mounted upon its trucks. The car is 46 ft. 6 in. long, 8 ft. wide over pillars and 9 ft. over footboards, and 10 ft. 4 in. high from rail to roof, and weighs 15 tons 16 cwt. The car is designed for a seating capacity of 52 and a crush load of 150 persons. There are three entrances along each side to the loading vestibule, which has cross seats to accommodate 16 persons. This vestibule provides for smoking accommodation. Saloons open off either end of the vestibule through sliding doors, and at the end a communicating door connects to the motorman's compartment, which is totally enclosed. The step heights are as follows:—Rail to footboard, 1 ft. 2 $\frac{1}{2}$ in.; foot-

the saloon pillars 1 $\frac{1}{2}$ in. by 1 $\frac{1}{2}$ in. by $\frac{3}{16}$ in. tee section, and the roof ribs 1 $\frac{1}{4}$ in. by 1 $\frac{1}{4}$ in. by $\frac{3}{16}$ in. tee section. The pillars of the centre vestibule are of wood. The bolsters which are 10 in. wide by 7 $\frac{3}{4}$ in. deep at the centre, are of the box type built up with $\frac{1}{2}$ in. top and bottom plates and $\frac{1}{2}$ in. web plates strengthened with ribs, all held together by electric welding. The cross members are 4 in. by 2 in. by 7.09 lb. channel section, and the end sills 5 in. by 2 $\frac{1}{2}$ in. by 10.22 lb. channel. Panels are 14 g. special panel steel electrically welded to the pillars, and rivetted to the sill plate and belt rail.

The roof is of $\frac{3}{16}$ -in. ply wood covered with cotton duck laid in white lead and supported on

roof sticks of Australian blackwood. T. and G. Baltic pine $\frac{3}{4}$ in. thick forms the flooring. The bulkhead framing, saloon lining and doors are made of Tasmanian mountain ash panelled with Queensland maple, while pillar facings and mouldings are of Australian blackwood. The interior finish of the car is all in the natural color of the wood.

The saloon seats are built of blackwood supported on light metal framework. They are fitted with special soft sponge rubber cushions and backs, and are fully upholstered in brown leather. The cross seats in the smoking vestibule are of the slatted type, and are built of Tasmanian mountain ash and blackwood, and supported on light pipe framework.

The interior lighting of the car has been improved by fitting three lamps in each saloon and five in the smoking vestibule. The headlight, which is of the board's own manufacture, is cast in aluminium and fitted with polished nickel parabolic reflector and condenser lens. The lamps are all 100 volt 60 watt gas-filled traction type.

The exterior finish of the car is in chrome green and cream enamel decorated with gold lining and the board's monogram and car number in gold. The roof is of stone color and the trucks are sprayed with black enamel.

The trucks follow the lines of the board's recent design, which has been found to possess many desirable features. These trucks have

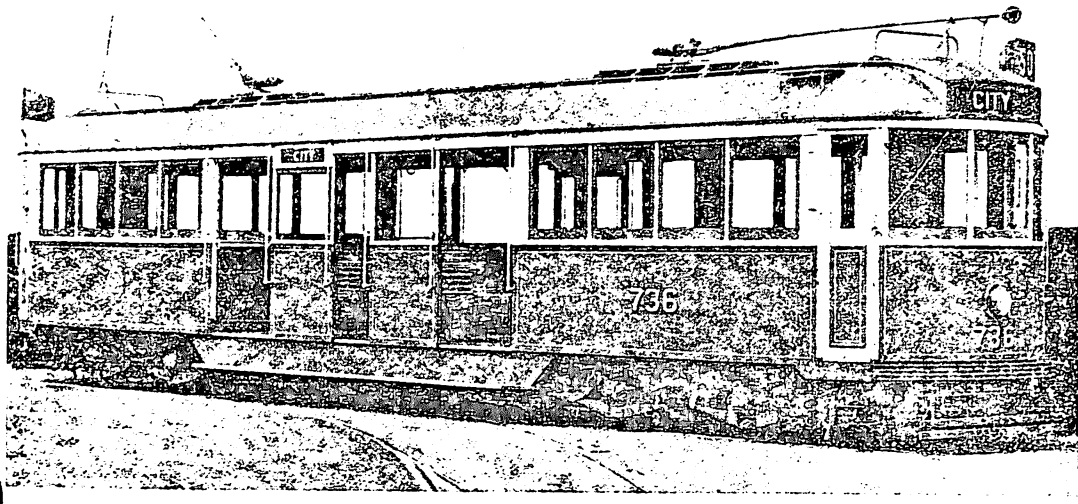


Fig. 2. Exterior View of Class W5 Bogie Car.

The floors in the saloons have been covered with Ormonoid roofing felt, and the floor of the smoking vestibule with hardwood slats. Aluminium anti-slip angle finishing pieces are fitted to all doorways and along the footboards. Polished plate-glass, $\frac{3}{16}$ in. thick, is used for the end windscreens, while on the remainder of the car 26 oz. mechanically drawn glass is used. The windows are provided with sashes supported on window balances, and louvred blinds which open their full depth and run in extruded brass sections screwed to the pillars to form the sash guides. The entrances are provided with canvas weather blinds fitted on spring rollers, for use in wet weather. The barrier rails are of a new design, made of steel tube, and run in slots on the inside of the pillars. The grab handles are all made of stainless steel and the strap hangers of bakelite.

steel section side frames supported on long semi-elliptic springs rigidly attached to the axle boxes, and joined to the side frame by a pin on one end and a sliding shoe on the other. The bolster is of box section, built up of mild steel plate, electrically welded, and supported on helical springs carried on a spring plank swung on links $12\frac{5}{16}$ in. long. The wheels, which are 28 in. diameter, are of the one wear solid rolled steel type. The truck wheelbase is 5 ft. 2 in., and the trucks are placed at 28-ft. centres.

The truck brake gear is of the clasp type, equalised throughout. It is hung on cone shaped brake hanger links and applied through a radial brake beam. The truck leverage is 6.3 to 1, and the foundation brake gear leverage on the car body 1.96 to 1, giving a total overall leverage of 12.41 to 1. The brakes are operated by compressed air applied by means of a self lapping

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type of motorman's brake valve. With this type of valve, the pressure corresponds to the position in which the handle is placed. Any desired pressure up to the maximum can be obtained and held in the brake cylinder. A relay valve is provided to give speedy application of the brake.

The cars are equipped with four 40-h.p. General Electric 247A motors with 15:58 gear ratio—the free running speed is 30 m.p.h., and the schedule speed 12 m.p.h. with seven stops of 6 sec. per mile. The control equipment consists of two hand-operated controllers of a new type. These are cam operated and have six series and four parallel notches; they work in conjunction with an English Electric type 6, form C line breaker and cast iron grid resistances. The brake equipment consists of a Westinghouse D.H. 16 compressor, an 8-in. by 12-in. brake cylinder, a 60-in. by 16-in. air reservoir, Westinghouse type W self-lapping motorman's brake valve, and a Westinghouse type E relay valve. All of the motors, gears, control and brake equipment, were manufactured in Australia. The hand brakes, trolley bases, destination signs and route numbers are of the board's own design and manufacture.

Four of these cars have been fitted with special equipments for trial purposes. Two have been supplied by the American Westinghouse Co., and two by the General Electric Co. of America.

The equipment supplied by the American Westinghouse Co. consists of four 300, 600-volt, 50-h.p. motors with W.N. double reduction gear drive, and variable automatic control consisting of two motor controllers, sequence switch, contactor group and strip wound resistances. In this equipment the motors are grouped in two sets, each set being permanently connected in series and arranged for parallel control for each group through 21 resistance steppings and two field shunt steppings. Four rates of acceleration, varying from 2 to 3½ m.p.h.p.s., are obtainable, each rate corresponding to the position in which the handle of the master controller is placed.

The equipment supplied by the General Electric Co. of America is their PCM automatic control, consisting of two master controllers, contactor group, reverser, and strip wound resistances. This operates four 40-h.p. standard 600-volt motors through 18 resistance steppings in series-parallel operation, and one field shunt step, and is set to give an accelerating rate of 3 m.p.h.p.s.

The object in both these equipments is to obtain smooth acceleration at high rates, and higher schedule speeds. The results obtained with both the hand-operated cam type control and the experimental equipments, and the riding qualities and comfort of the new cars, provide decided improvement over the older rolling stock.