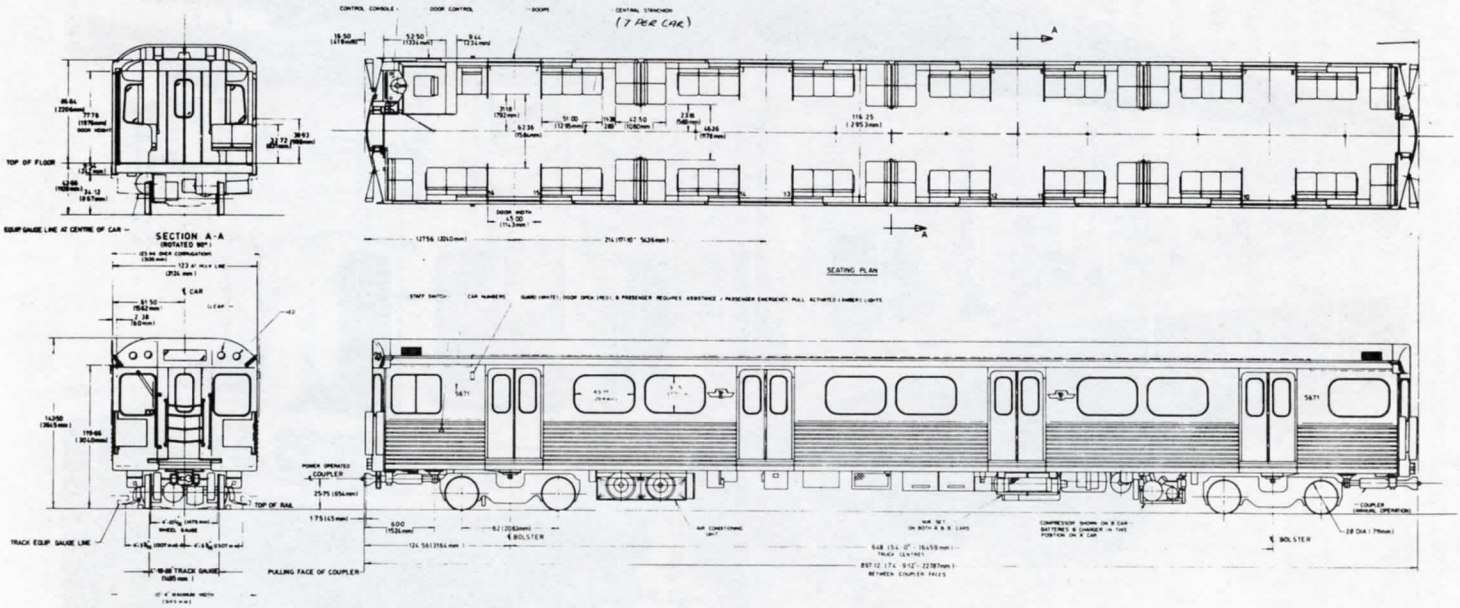


CLASS H-5 CAR

SUBWAY CAR

75 FOOT ALUMINIM CLASS M & H CARS

AUGUST 1982 (RFC)

Subway Route Data: (Continued)

LINE	SECTION	REVENUE OPERATION	MILES	KM
Yonge	York Mills to Finch	March 30, 1974	2.73	4.393
Spadina	St. George to Wilson	Jan. 28, 1978	6.17	9.930
Bloor-Danforth	Warden to Kennedy	Nov. 22, 1980	1.72	2.768
Bloor-Danforth	Islington to Kipling	Nov. 22, 1980	0.92	1.481
	TOTAL		**36.36**	**56.906**

Principal Specifications:

Fleet Class	M-1	H-1	H-2 (& H-3)▲	H-4	H-5
Fleet Numbers:	5300-5335	5336-5499	5506-5575 (& 5505-05)▲	5576-5663	5670-5807+
Seating	84	83	→	77	76
Length over anti-climber	74'5⅝"	→	→	→	→
Width over side sheets	10'3 7/16"	→	→	→	→
Height to top of roof	11'11½"	→	→	→	→
Turck centres	54'0"	→	→	→	→
Truck wheelbase	6'10"	→	→	→	→
Wheel diameter	28"	→	→	→	→
Track gauge	4'10⅞"	→	→	→	→
Weights: W1 (tare)	59,900 lbs	56,515 lbs	56,425 lbs▲	57,724 lbs	67,110 lbs+
(average of A & B car) W4	94,550 lbs	91,165 lbs	91,075 lbs	93,124 lbs	102,510 lbs
(service)	(230 psgrs)	→	→	(235 psgrs)	→
W5	106,400 lbs	103,015 lbs	102,925 lbs	105,724 lbs	115,110 lbs
(crush)	(309 psgrs)	→	→	(319 psgrs)	→
Control	CGE SCM-1 Camshaft	CWL XCA248 Camshaft	CWL XCA248 Camshaft	CWL XCA248 Camshaft	Garrett Chopper
Motors — Type (4)	CGE 1251PA1	ACEC ES548A	Brush TMC38-42	→	Garrett 2000622-1
—HP (1 hour rating)	120	121	116	→	126
Gear Ratio	→	→	→	→	→

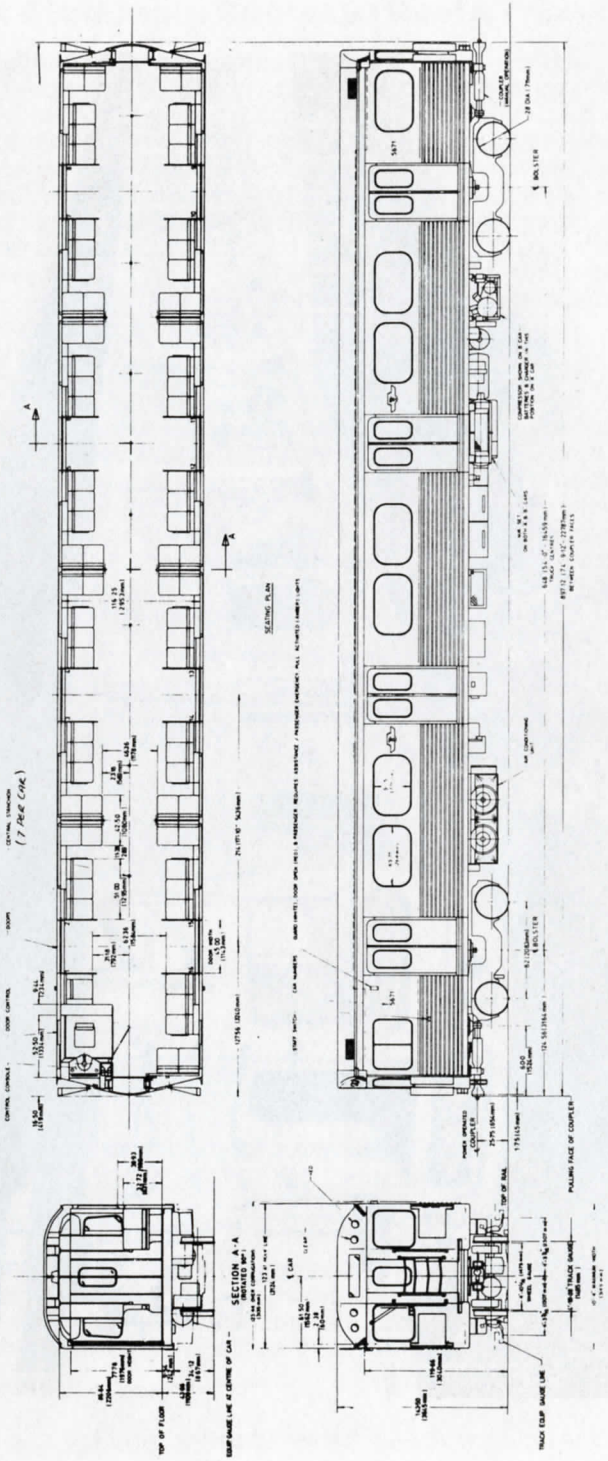
Initial Acceleration Rate: 1.9 MPHPS to 20 MPH (Low rate)
2.5 MPHPS to 20 MPH (High rate)

Maximum Speed: 55 MPH

Braking Rate: Service: 2.8 MPHPS
Emergency: 3.0 MPHPS

▲ Class H-3 5500-5505 have Hitachi chopper control; W-1 weight 65,240 lbs

\+ Class H-5 5804-5807 have MAN trucks; W-1 weight 64,260 lbs.



CLASS H-5 CAR

75 Foot Aluminum Subway (Rapid Transit) Car

The Commission's (and Canada's) first subway (i.e. rapid transit) line was opened on March 30, 1954, extending 4.6 miles from Union Station up Yonge Street to Eglinton Avenue. Initially the concept was a 45′ to 48′ "PCC type" rapid transit car (similar to those then in use in Chicago) so that a ten car train would "fit" the standard 500′ platform, but this was changed to a longer car, with 8 car maximum train length. Service was thus initially provided by one hundred 57′ cars (in married pairs) built by the Gloucester Railway Carriage and Wagon Company of England in 1953 and 1954. As traffic increased, forty more cars were delivered from the same builder from 1954 and 1959, all designated as class "G".

In 1960, procurement of cars for the 2.4 mile extension up University Avenue commenced, with higher performance, and reductions in weight, body maintenance and energy consumption, as objectives. Subsequent discussions with manufacturers and vendors, combined with a review of subway dimensional clearances, developed the practicality of a 75′ aluminum body car, where 6 car (maximum) trains would provide the same capacity as the present 8 car consists, but with considerable weight and installed equipment reduction. Moreover, operations could readily utilize 4 or 6 car consists to match line loading patterns.

The first order, for 36 cars (also in married pairs), designated class M-1, was placed with Montreal Locomotive Works Limited (MLW) and delivered in 1962-63. These vehicles featured a number of "firsts" in the industry:

- First built in Canada.
- Main structure of full length, one piece, aluminum extrusions.
- Longest rapid transit cars in the world.
- Highest load/tare ratio
- Lowest weight per linear or per square foot

} of any rapid transit car in the world.

For the Commission, there were a number of new features:

- Electro-dynamic rheostatic service brake (experimented with on 1959 "G" cars).
- "Westcode" digital electro-pneumatic brakes (a development by the supplier of the system on the "G" cars).
- Air suspension and load weighing for performance control.
- Dual performance mode (low rate to match "G" car trains, and high rate for the future dedicated train operation. While the new cars are not required to multiple with the G cars, the line performance of trains of either type is matched).
- Waste heat recovery.
- Fluorescent lighting, with 400 Hz AC power from an MA set

When the first section of the Bloor-Danforth (east-west) route was opened, 164 cars were required and the successful bidder was Hawker Siddeley Canada Ltd. (HSCL) who delivered essentially identical vehicles, with several improvements based on TTC experience and mock-up construction:

- An advanced single-handle controller (developed jointly by TTC, Westinghouse Brake & Signal and Canadian General Electric).
- Backlit interior (fluorescent) advertising light fixtures.
- Restyled front end cap.
- Larger operator's cab.

As the years progressed, the design and the equipment evolved until by 1979 a total of 498 cars had been purchased, although 4 of these were lost in a train fire on October 15, 1976.

It is noteworthy that all cars, of six different classes (orders), with either camshaft and chopper propulsion controls from 4 different manufacturers, and traction motors of 4 different types, all can be trained in multiple unit in any consist.

Among the later developmental milestones were:

- Re-equipping (by TTC) of six H-2 cars (as class H-3) in 1973 with Hitachi chopper controls with regenerative electro-dynamic braking (to evaluate its operational, energy and maintainability aspects).
- Reduction of seating (H-4 and subsequent classes) to improve passenger movement. Additional aisle stanchions were also provided, and subsequently retrofitted on earlier cars.
- Chopper controls, air conditioning and modular seating on all 138 H-5 class cars.
- Progressive refinement of Dofasco truck design. Also class H-5 cars 5804-5807 were built with experimental MAN trucks.

The Commission, ably assisted by the manufacturers of the cars, and of the equipment sub-systems, pioneered the design and development of the 75 foot rapid transit car concept which has since become accepted by several transit systems.

Subway Route Data:

LINE	SECTION	REVENUE OPERATION	MILES	KM
Yonge	Union to Eglinton	March 30, 1954	4.60	7.403
University	Union to St. George	Feb. 28, 1963	2.38	3.830
Bloor-Danforth	Keele to Woodbine	Feb. 26, 1966	8.00	12.875
Bloor-Danforth	Woodbine to Warden	May 11, 1968	2.72	4.377
Bloor-Danforth	Keele to Islington	May 11, 1968	3.44	5.536
Yonge	Eglinton to York Mills	March 31, 1973	2.68	4.313