

Later Years

The experience of less than a decade of subway equipment design and operation was forming the basis for a new breed of vehicle — the 75 foot car for which specifications were already being written — and the 140 G cars settled down to another quarter century of service.

Changes to the fleet since 1960 can be summarized as follows:

March 27, 1963 — A southbound train comprising 5005-5204-5205-5059-5058 (led by 5005) was destroyed by an electrically originated vehicle fire after arrival at Union Station spare track. Parts were salvaged and bodies scrapped in the fall of 1963.

1966-1967 — Electro-dynamic braking equipment removed from Class G4 cars, and motors transferred to new service cars; outshopped:

5112-13 — April 2, 1966
5111-14 — November 19, 1966
5110-15 — March 14, 1967

and remarshalled as:

4 car: 5028-5113-5112-5029
4 car: 5030-5111-5114-5031
2 car: 5110-5115

July 1967 — 5033-34 had driving controls removed (for service car duty) and remarshalled as:

5032-33-34-35.

Performance

While not subject to the rigours of electro-dynamic braking, and "heavy" in weight and energy, the 'G' cars have had an enviable record, performing reliably and consistently, with mean miles per defect running equal or better than their newer counterparts half their age! The BTH (née GE) type PCM control was the progenitor of the cam control systems on the later M & H cars, while Westinghouse Brake & Signal Company's venerable electro-pneumatic system gave way to their newly-developed "Westcode" system used with load-weighing on the 75 foot vehicles. With 1.7 million miles on each of the original 100 (G-1) vehicles, the "G" cars are excellent examples of a sound investment in reliable transportation for Toronto.

Principal Specifications:

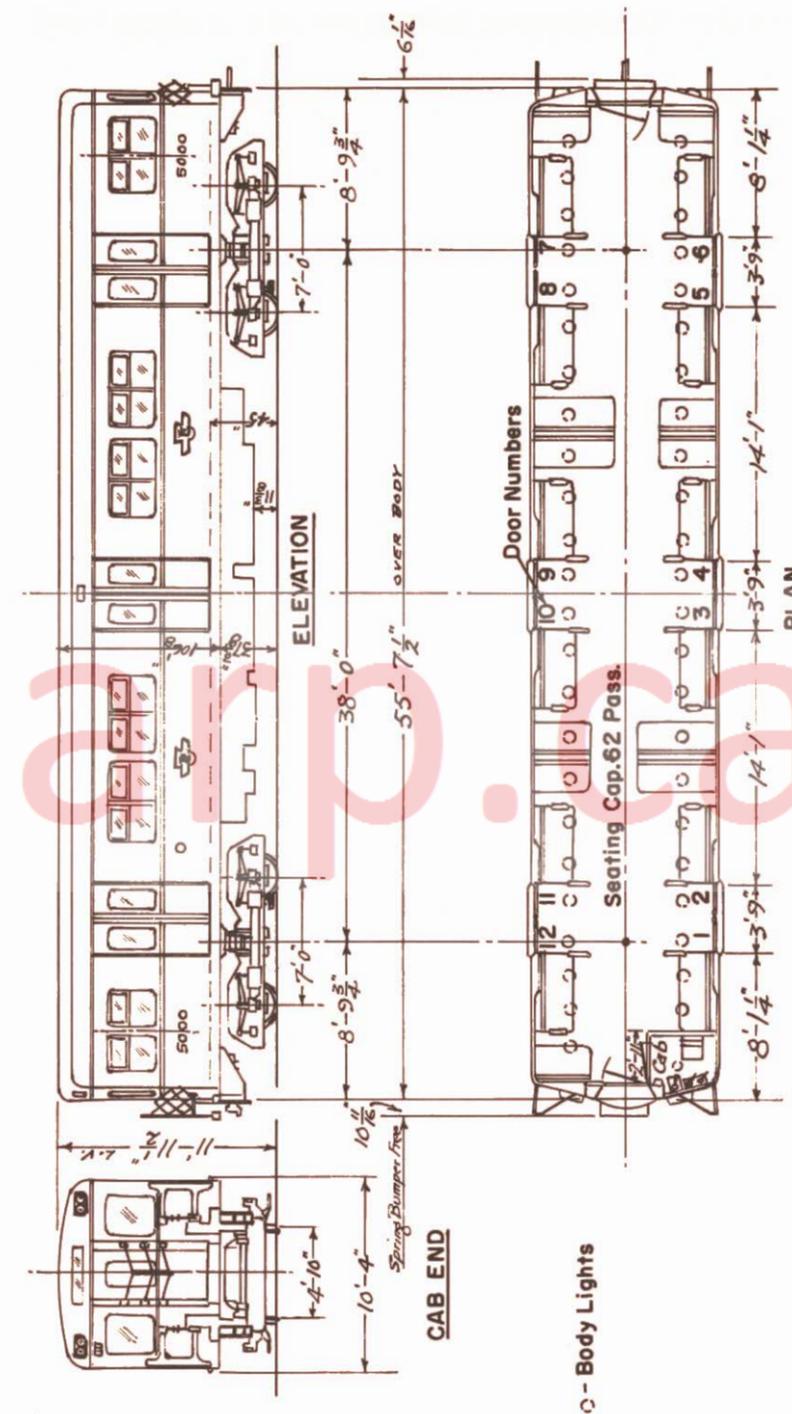
Fleet Class	G-1	G-2	G-3	G-4
Fleet Numbers:	5000-5099	5100-5105	5200-5227	5110-5115
Seating	62	→		
Length over anti-climber	57'0¼"	→		
Width over side sheets	10'3¾"	→		
Height to top of roof	11'11½"	→		
Truck centres	38'0"	→		
Truck wheelbase	7'0"	→		
Wheel diameter	30"	→		
Track gauge	4'10⅞"	→		
Weights: W1 (tare)	▲ 85,525 lbs	73,452 lbs	76,720 lbs	82,776 lbs
(average of A & B car) W4	▲ 111,625 lbs	99,552 lbs	102,820 lbs	108,876 lbs
(service)	(173 psgrs)	→		
W5	120,475 lbs	108,402 lbs	111,670 lbs	117,726 lbs
(crush)	(232 psgrs)	→		
Control	BTH	→		
	PCM 14A1	→		
	Camshaft	→		
Motors — Type	C-P	→		C-P
(4)	C95	→		C112A1
—HP (1 hour rating)	68	→		70
Gear Ratio	52/7	→		
	(7.43:1)	→		

Initial Acceleration Rate: 2.3 MPHPS to 12.5 MPH
1.9 MPHPS to 20 MPH

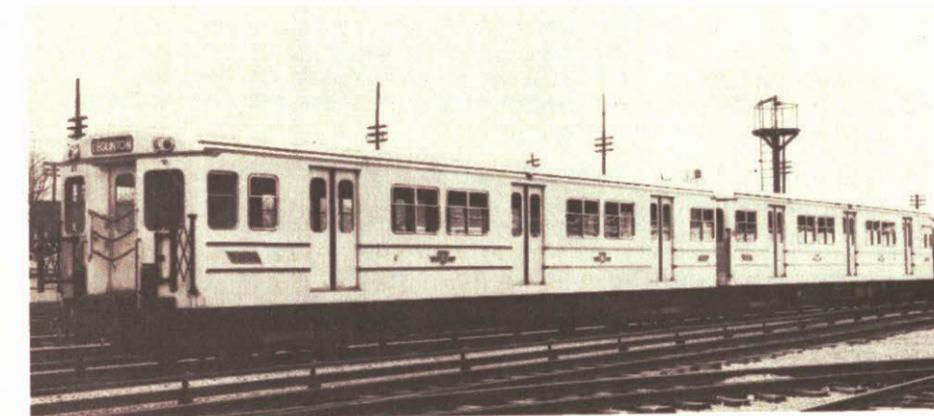
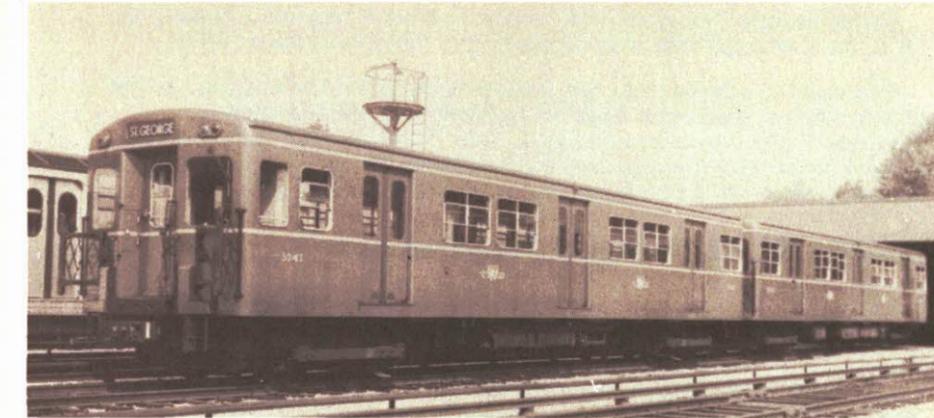
Maximum Speed: 55 MPH

Braking Rate: Service: 2.8 MPHPS
Emergency: 3.0 MPHPS

▲ For cars 5000-5029; cars 5030-5099 average 83,468 lbs., with W4 & W5 weights proportionately less.



CLASS G-1 CAR



Toronto Transit
Commission



SUBWAY CAR
57 FOOT CLASS G CARS

AUGUST 1984 (RFC)

The Yonge Subway

Canada's (and Toronto's) first subway had been proposed as early as 1910, but it was not until over 40 years later that it became a reality.

Proposals to construct subways were made by the Commission to the City in 1942, and again in 1945, which resulted in over-whelming approval by the voters on January 1, 1946 to proceed. Of the two-line system proposed (Yonge & Queen alignments) Yonge was most urgently needed and construction commenced on September 8, 1949.

Rolling Stock Design & Procurement

In keeping with the post World War II trends in light weight rolling stock design, the Commission seriously studied the PCC type rapid transit car concept promoted by the Transit Research Corporation (successors to the Electric Railway Presidents' Conference Committee) and subsequently successfully pioneered by the Chicago Transit Authority (utilizing salvaged components from surface line PCC cars). From 1945 through 1947 almost a dozen designs were developed by the Commission (some in conjunction with Canadian Car and Foundry of Montreal) ranging in length from 45 to 49 feet ("derived" from the surface PCC car length), 10 feet wide, with alternative 2 or 3 door arrangements per side, and various seating plans. The "final" design (in 1951) was for a 3 door, 48 foot long and 10'4" wide car, weighing 45,000 lbs. All units were to be operated in 2 car "married pairs", up to a maximum of 10 cars (in a 500 foot station platform length).

A full size mockup, complete with seating, outside hung doors and lighting, was constructed in Hillcrest Shops for evaluation. The original specification reflected the mock-up and prices were called for in February 1951. Prices received (in April) from Canadian and Americal carbuilders were judged "outrageous" by the standards of the time and the Commission decided to seek car supplies elsewhere. The quest led to the Gloucester Railway Carriage and Wagon Company of England (GRC & W) who proposed a longer 57 foot car weighing 60,000 lbs., based on a derivative of London Transport surface stock designs and equipment. It was argued that the longer cars would be more cost effective in reduction of both capital and operating costs while maintaining the same length, approximate weight, and passenger capacity in a "maximum" train of 8 cars, while reducing the number of maintainable components. Thus the TTC rapid transit (now designated "subway") car took its first "jump" in size, with the philosophy to be enunciated again in 1960.

Operation of 2, 4, 6 or 8 car configurations was acceptable in passenger traffic projections; the vehicle design was mature and the fleet cost attractive. The sole disadvantage was that electro-dynamic (rheostatic) braking was not offered, with the attendant loss of braking waste heat recovery for car heating, and production of brake shoe dust in the tunnels. The impact of the latter was not fully realized until operations started.

The Original (G-1) Cars

An order was placed with GRC & W in November, 1951 for 104 cars, to be delivered in the 9 months from July 1953 to March 1954, at a contract price of \$11,500,000.

When the first 2 cars were weighed at the factory, the weight estimate was gravely exceeded — by 40 percent (to a total of 85,000 lb.). Hurried arrangements were made to "beef up" the electrical power system to handle the increased current and energy demands. Traction motor capacity was re-checked and mechanical adjustments (fortunately available) were made to the brakes. Some weight reduction measures were implemented immediately by GRC & W, resulting in a one ton weight decrease after the first 30 cars were built.

The first two cars were delivered by rail to Hillcrest on July 30, having been transferred from a ship to flat cars by a floating crane at Montreal (the St. Lawrence Seaway not yet having been opened). Through an assumption they were routed to the (new) Davisville subway yard, but were re-routed to Hillcrest Shops.

The cars were off-loaded on the ramp at the west side of the Hillcrest property, using temporary track to enter the shop. After clean-up, the cars were taken, again on temporary track, out to the north end of the property for display to the press and officials.

After the Hillcrest preview, the cars were taken back into the shop to have modified "Brill" street car trucks substituted for towing the cars over the surface tracks to the Canadian National Exhibition, on the night of August 24-25, where they were re-trucked on their own trucks.

The exhibit, just south of Exhibition Loop, included imitation station platforms for visitors to access the cars and one of the trucks (together with a track switch and line signal) was placed on display.

Following exhibiting from August 28 to September 12 inclusive, the cars were towed on the night of September 14-15 via Bathurst, St. Clair and Yonge into the Davisville yard by a temporary track connection at the point where Yonge St. and the yard had a common level.

Car 5001 was first up Yonge St. but it became derailed at the temporary track causing a loss of time so the second car, 5000 was stored for the day in Lawton Loop, (now a triangular park) just north of St. Clair Avenue, and then taken into the yard the following night.

All remaining cars were delivered on the Canadian National Railways' "Belt Line" direct to the Davisville shops, where shunter Y-2 (specially modified for the task) switched the cars off the flat cars and into the shop area.

Cars 5005-5004 made the first trip under power (with temporary connections only) at very slow speed, with officials and newsmen aboard, from Davisville to Bloor Street on September 20, 1953. In October the cars continued south to Union Station on a trip with clearance staff only on board.

Cars were tested only on a short section of electrified track at Davisville until December 5, when the whole route was electrified and test runs could commence.

With 100 cars delivered by March 5, opening ceremonies for the subway were held on March 30, 1954. A VIP train (comprising the last 8 cars) proceeded at 11:50 a.m. from Davisville to Eglinton (5092 leading), then reversed and (with 5099 leading) ran non-stop to arrive at Union Station at 12:10 p.m. At 1:30 p.m. revenue service commenced on the entire 4.5 mile line.

The cars were equipped with a 3 position (Low, Medium, High) acceleration "rate" switch. Since no load weighing was provided, it was intended that the switch could be used by the motorman to keep acceleration at about 2.3 MPHPS (on level track) to 12.5 MPH, or 1.9 MPHPS to 20 MPH, with "sensed" variations in load, in the "averaged" ranges of 89,000, 100,000 & 110,000 lbs. total weight. In subsequent practice, not only did the methodology prove impractical but also the control was permanently set in "High" due to the high average loaded weight. Rate switches have since been removed.

The car bodies were painted in the traditional Commission "red", with striping, numbering and insignia in yellow-gold. (When the unpainted M & H cars later appeared, the "G" cars, including the G-2 Class, were often referred to as the "Red Cars".) Roofs, underframes and trucks were finished in black.

While the cars were numbered consecutively, within each "married pair" trainset the "even" car carried the M-G set while the "odd" car had the air compressor and the coupling controls. All even cars were kept at the north (Eglinton) end of the pair, since operable coupling is impossible between a normal and a reversed pair.

GRC & W commissioned an excellent 1/16 scale model of a 2-car subway unit, built in 1953-54 by Bassett Lowke of England, which is complete to the smallest detail. The model, complete with display case, was presented to the Commission at the luncheon on March 30, 1954, by Sir Leslie Boyce, Chairman of GRC & W, and is still on exhibition.

The Aluminum (G-2) Cars

An organization called "The Aluminum Development Association" in England (ADA) became active in promoting aluminum for railway car construction. Their efforts, accelerated by the overweight condition of the steel cars, led to the last four of the 104 car order being changed in August, 1954 to be made almost entirely of aluminum, with unpainted bodies. The result was a rewarding weight reduction of 6 tons below the first G-1 cars, with reduced exterior carbody maintenance. Costs for this project were shared by ADA, Gloucester and the Commission. During 1954 it was decided to extend the 4 cars in aluminum to 6 (the last two making use of the generous quantity of spare units ordered), to permit evaluation of a complete 6 car train; which was the normal peak-hour consist at that time.

It was the completely successful operation of these aluminum cars that led to the subsequent decision to employ aluminum in the 75 ft. M & H cars.

Car 5104 has a plaque installed to record its inspection by H.M. Queen Elizabeth II and H.R.H. the Duke of Edinburgh at GRC & W on May 3, 1955.

The Non-Driving (G-3) Cars

With ridership increasing rapidly, experiments were run at the end of May, 1955 which confirmed the advantage of moving to 8 car trains in peak hours. 34 additional cars were ordered in June 1955 to increase the length of 17 peak hour trains from 6 to 8 cars. Since these were "supplemental" cars, and since a 4 car train was the minimum length operated, the 34 units were built as "non-driving motors" — identical to 5000-5105 in layout and equipment, but with no driving controls in the cab (which was retained for use by the guard).

In addition, to further reduce weight & energy consumption, roofs were constructed of aluminum, so that the cars "weighed in" about 4 tons less than the G-1 class.

Numbered in the 52XX series, the cars were then marshalled with their mating numbers of the G-1 series (e.g. 5000-5201-5202-5001).

The Experimental (G-4) Cars

Of the original 34 car purchased, only 28 cars were delivered as ordered. As an experiment in the application of electro-dynamic (rheostatic) braking, and in alternate truck suspension, the last 6 cars were built as an "integral" train comprising:

- 5110 & 5115 as driving motors, with 5111 to 5114 as non-driving.
- electro-dynamic braking on all cars, with higher rated traction motors. Braking was controlled by the "regular" E.P. brake wires (to train with all other "G" cars).
- "Metalastik" suspension in 2 cars.
- "heavy duty" SKF pinion shaft bearings in David Brown traction gear boxes of 4 cars.
- "Salisbury Transmissions" traction gear boxes in 2 cars.
- hostler's control in 5112.
- W.B. & S. Co. brake controllers in 5110 & 5115, with poppet valves.

Due to the changes, these cars were not delivered until 1958-59.

Their experimental features earned them the nickname "Sputniks", since their delivery coincided with launching of the first USSR satellite.