Vehicle Considerations

In addition to studying signalling technology, Gibbs & Hill Inc. developed two proposals related to the vehicle fleet which have potential to reduce station dwell time and increase subway capacity. These proposals offer the advantage of being independent of signalling options for increasing train frequency.

The first proposal relates to the width of vehicle doors. Gibbs & Hill reviewed the characteristics of other North American rapid transit vehicles and found that many have wider doors than those of the TTC (although TTC vehicles have more doors than vehicles on most other transit systems). Implementation of wider doors on existing vehicles was found to be impractical, hence, Gibbs & Hill has recommended that wider doors be specified on future car orders, and that the Y/U/S subway be given priority for, such wide-door cars. Gibbs & Hill suggested that doors be 4'6" wide, an increase of 9" over the present width of 3'9", in order to achieve a reduction in station dwell at heavy usage stations due to improved passenger flow through vehicle doorways. Although re-design of certain vehicle components would be required (e.g. door panels, door operators, door frames, seating layout, underseat equipment), no major technical problems are anticipated. A small reduction in seated capacity may however, result, and vehicle cost and procurement time would likely be increased. This proposal is, of course, a long-term option, as it would be many years before a substantial portion of the Y/U/S fleet would be equipped with wider doors.

Gibbs & Hill's second proposal regarding vehicles involves procurement of special new cars in order to increase subway capacity. All existing subway platforms are approximately 500 feet in length, while a 6-car train is only about 450 feet in length. Gibbs & Hill has therefore proposed that new 50 foot cars be acquired in order to increase train length to match platform length. One 50 foot car would be added to each Y/U/S service train in order to achieve an increase in capacity estimated by Gibbs & Hill to be about 11%. Conversely, a reduction in station dwell of about 12% could be realized, for a given level of demand.

In order to maximize the capacity of the 50 foot cars, operator cabs would not be provided. However, hostler controls at each end of the car would be required to facilitate yard shunting. The new cars would be designed to be fully compatible with existing M and H series vehicles.

Introduction of 50 foot cars would have several implications for Y/U/S operations. Increased station stopping accuracy would be required, and re-training of operating personnel may be needed, in order to ensure that train doors are not opened beyond platform limits. Also, minor signalling modifications would be required in certain areas, where signals are located within station limits (e.g. Union Station). In addition, yard operations would be complicated due to the requirement for a 50 foot car in the middle of each 450 foot train. Incorporation of a cab at each end of the 50 foot car would partially alleviate this problem, but would add further cost. Yard capacity would be reduced somewhat, due to the need for more vehicle shunting. It is also evident that the use of 500

foot trains would result in more passengers being unloaded at station platforms, thus potentially contributing to the overcrowding problem presently being experienced at certain stations.

As an alternative to separate 50 foot cars, Gibbs & Hill suggested that consideration be given to procurement of "triplets". A "triplet" would consist of three semi-permanently coupled cars having an overall length of 200 feet (e.g. two 75 foot cars with one 50 foot car between). No control cab or hostler control would be required on the centre car. Trains composed of, one "triplet" and two married pairs (in any order) would be 500 feet in length.

A further alternative worthy of consideration would be to procure separate 50 foot cars without cabs or hostler controls. Existing married pairs could be separated, and the new 50 foot cars inserted, to effectively produce a "triplet".

A 50 foot car is estimated to cost between 80% and 90% of the cost of a regular 75 foot car. The procurement period for 50 foot cars would probably be slightly longer than for 75 foot cars, due to the additional development work required.

The foregoing proposal to increase train length from 450 feet to 500 feet is conceptual in nature. Detailed study and analysis would be required in order to determine the optimum train configuration, to examine the effect on station capacities and to quantify costs and benefits associated with the operation and maintenance of 500 foot trains.

Exhibit 3.3.6 presents a summary of the foregoing proposals related to the Y/U/S vehicle fleet.

EXHIBIT 3.3.6
SUMMARY OF VEHICLE CONSIDERATIONS

WIDER DOORS

PROPOSAL

- specify wider doors on all future subway car orders (4'6" instead of 3'9")

BENEFITS

- reduction in station dwell due to improved passenger flow through vehicle doorways.

IMPLICATIONS

- long term proposal, as a substantial portion of Y/U/S fleet must be composed of wide-door cars to obtain benefit

IMPLEMENTATION

- about 5 years to procure new cars

ESTIMATED COST ($1988)

- cost of new car ($1,800,000 for new cars similar to existing, $1,900,000 for new ATC equipped car), plus development costs for wider doors

50 FOOT CARS

PROPOSAL

- acquire new 50 foot cars, compatible with H and M series cars, and operate 500 foot trains alternatively, acquire 200 foot "triplets"

BENEFITS

- increase in capacity of about 11%

OR

- reduction in station dwell time of about 12%, for a given level of demand

IMPLICATIONS

- increased stopping accuracy required in stations and in tail tracks
- re-training of operating personnel required
- complication of yard operations
- reduced yard capacity
- minor signalling impact in isolated areas
- 500 foot trains could not be accommodated in some existing tail tracks
- may contribute to overcrowding of stations due to larger volume of passengers per train.

IMPLEMENTATION

- further detailed study required to determine optimum 500 foot train configuration, to examine the effects on station capacities, and to quantify costs and benefits

ESTIMATED COST ($1988)

- $1,440,000 to $1,710,000 per 50 foot car (dependent upon control capabilities)
- one 50 foot car required for each Y/U/S train, plus 12% spare cars

Impact on Traction Power System

A study was carried out to examine the effects of the proposed decreased headways on the traction power supply and distribution system. The increased loading on the existing traction power substations resulting from the additional trains required for the various levels of headway reduction was considered. The results of this study are detailed in Appendix II, and are summarized in Exhibit 3.3.7. Consideration was also given to the changes required to be carried out on the negative cabling to the running rails necessitated by some of the options for headway reduction.

EXHIBIT 3.3.7

SUMMARY OF IMPACT ON TRACTION POWER SYSTEM

OPTION	ACTIVITIES REQUIRED TO ACHIEVE OPERATION AT		COST IN $1988
	STANDARD RATE	HIGH RATE	
1A	None	None	Nil
1B	None	None	Nil
1C	None	Revise Fairholme substation.	Nil (Standard rate) $850,000 (High Rate)
2	Revise Fairholme substation, reconnect negative cabling	Revise Davisville, Casa Loma, Glenayr, Park Hill and Fairholme substations, reconnect negative cabling	$1,150,000 (Standard Rate) $5,840,000 (High Rate)