

Cutting Canada's Slowest Rush Hour with Public Transportation

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1. Introduction

Transportation is a key issue in Canada. In the province of Ontario, the Greater Toronto Area (GTA) is a victim of poor transportation design. In the past few decades, the region has lost many transit projects. Examples include the Queen St. streetcar subway[1], the Eglinton West subway[2], and in the past two years, the Transit City light rail plan[3]. The lack of rapid transit, with sprawl developments, directly increased car use. Commute times are worsening in the GTA, where the car is being used for interregional trips[4]. Public transportation must be a priority over cars. In the GTA, public transportation is decaying. Commute times are nearly double the time of a car commute[5]. If this does not fit the commuter's needs, they are forced to use the car.

2. Problem Statement

Toronto has repeatedly scored as one of the cities with the highest commute times[6]. The car can be used to travel anywhere and this is an asset. However, this has led to overwhelming traffic on Toronto's streets. It is not safe, in terms of both the environment and the economy[7], to have more cars on streets; therefore, public transportation must become the main form of mass transport. To turn it into a desirable asset, we need to design public transportation to serve the population and increase development of the GTA.

3. Solutions

3.1. Transit Oriented Developments

Public transportation networks maximize ridership in population-dense areas[8]. Transit oriented developments (TODs) capitalize on this by designing and building around transit nodes. TODs are mixed-use residential and commercial areas. In the center of the TOD, the density of buildings is higher and this density lowers as distance from the center increases. Therefore, TODs provide variable population densities to meet different needs.

In the higher density areas, work, and recreation are located together, increasing the need for local travel through transit or recreational transportation (e.g. biking, walking)[9]. Distances to the nearest rapid transit station(s) range from 400 metres(m) to 800m. Developers and transit work together to build communities that integrate public transportation, while reducing car traffic.

An example of a TOD in the GTA is Downtown Markham, which focuses public infrastructure around a bus rapid transit route[10]. Other examples include condominiums and parks being erected along the Sheppard subway line[11].

3.2 Amalgamation and a single fare policy

Another solution is to create a single fare policy between transit systems in the GTA through amalgamation. Currently, the GTA operates with nine transit systems, under Metrolinx, the provincial government agency designated to oversee transit expansion[12]. However, despite provincial oversight, people using multiple systems are forced to pay multiple fares, most of which are based on a flat charge. When compared to using the regional transit network, this is more affordable, but increases trip time.

The inconsistent travel times of smaller transit systems and higher fares for faster travel cause people to use personal vehicles instead. However, the flat fares are not justified for people that travel small distances, while being friendly to those traveling further[13]. Therefore, a possible solution is to amalgamate all transit systems in the GTA, with a single fare policy based on

distance. The merger of these systems allows a move to zone fares. This makes transit affordable for local travel, which increases ridership, while giving people the option to migrate onto other rapid transit routes. An example of ridership migration could be using the Richmond Hill rail line rather than crowding the Viva Blue bus service and Yonge subway line.

For distance calculations, all transit infrastructure must be equipped with technology to determine prices. This requires users of the transit system to have a card which deducts fare upon trip completion. This is similar to the existing PRESTO model on GO Transit[14]. With lower fares for local travel, car trips will be reduced, decreasing suburban traffic.

4. Solution Evaluation

4.1. Transit Oriented Developments

Transit oriented developments are well-planned urban cores. They provide infrastructure for all people; this includes wide boulevards, lighting, bike lanes, rapid and local transit options, and buildings appropriate for living, commercial or retail. They allow recreational and work activities to be accessible, which increases productivity, meaning better economies[15]. This leads to a decrease in car use, meaning better air quality and a reduction in greenhouse gas emissions[15].

People will not have to travel far distances to reach their destination, which reduces traffic on streets and highways[]. However, the design must be planned so pedestrian patterns are easy to predict. The use of land for open centres, buildings and housing means that there is less emphasis on the car, which makes it difficult for some people to enter or exit the area. There are high costs to starting new developments, depending on locations of proposed TODs. This is an identified risk that developers must be willing to take[16]. If successful, these investments are returned to the public, as building TODs gives people homes close to rapid transit options.

4.2. Amalgamation and a single fare policy

A single transit system that bases fares on distance would allow people to flexibly use transit. There are many positives and negatives to amalgamation and fare-by-distance, especially in the GTA. Instead of being set to one route, a commuter can choose any route to a destination and be given the same price. This may cause a migration to regional rail lines, potentially exceeding the maximum capacity of infrastructure. If necessary, an investment into infrastructure, such as grade separation or adding more tracks, will be required - this is costly[17].

Fare-by-distance[18] is usually calculated through fare card and positioning technology. This means an investment to equip all vehicles and infrastructure with global positioning systems and new fare equipment. This is mitigated over time by increased local ridership and fare tracking equipment which provides data on operations such as scheduling and passenger loading. This improves the data that service planning and operations receives, leading to better service.

Regardless, operational issues persist. A significant problem caused by frequent transit service is known as 'bunching', where vehicles catch up to each other largely because of uneven passenger loading and heavy traffic[19]. This is not solved by fare-by-distance. However, commuters will be able to avoid areas with heavy traffic by taking alternative routes. This will require an investment in better marketing to inform commuters of delays.

Another solution to bunching can be dealt with better travel data. With higher ridership in local travel, transit systems can design frequent, shorter routes in areas with high demand so that areas with local travel can have good service. Shorter routes are less likely to bunch, due to reduced headways and vehicles[20]. The amalgamation of multiple systems and design of a single, zone-based fare policy will open different routes for commuters, and allow them to be accommodated through better service.

5. Conclusion

I personally recommend moving towards building transit-friendly neighbourhoods. It is proven that these work. It will allow the GTA to expand its population while reducing existing levels of traffic. New York City was built based on the multiple subway lines buried in the streets of Manhattan[21]. TODs are used in environments where money is being invested into transit expansion[22]. Rapid transit priority is what will move the GTA. However, until we realize the value of TODs and look at the big picture, there is no way the GTA can drive down commute time.

6. References

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