Urban Commercial Vehicle Parking in Toronto
Illegal Parking Issues, Impacts, and Policy Interventions

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Outline for Today

- Commercial vehicle parking
- Illegal CV Parking, where and why?
- Impacts on congestion
- Policy opportunities
  - Public Sector solutions
  - Private Sector solutions
66%  Downtown
700,000  Tickets
$23 Million
Congestion

500 Million vehicle-hours / year

Safety

14% of illegal parking leads to unsafe cyclist conflicts
90% of all parking tickets issued to courier vehicles in Canada are issued in downtown Toronto
Data Collection
What Commercial Vehicles are parking?

Data Collection by Justin Kwok, University of Toronto
Locations of Illegal On-Street Parking
Quantifying Impacts

What is the impact of illegal parking on traffic congestion?

Research by Ahmed Ramadan, MASc, University of Toronto
Traffic Microsimulation

Toronto Waterfront Network, Amirjamshidi (2013)
Data

- Microsimulation Model with Existing Travel Demand

- Parking Citations from Toronto Open Data (2011)
  - Date
  - Time
  - Type
  - Location
  - Fine
Research Methodology – Scenario Design

Scenario 1 – Base Case, No Illegal Parking

Scenario 2 – Illegal Parking Added
**Example Simulation – 355 Adelaide St W**

<table>
<thead>
<tr>
<th>Date of Infraction</th>
<th>Infraction Code</th>
<th>Description</th>
<th>Fine Amount</th>
<th>Time of Infraction</th>
<th>Location</th>
<th>City</th>
<th>Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>20110105</td>
<td>5</td>
<td>PARK HWY PROHIBITED TIME/DAY</td>
<td>150</td>
<td>803</td>
<td>355 Adelaide St W</td>
<td>Toronto</td>
<td>ON</td>
</tr>
</tbody>
</table>

*Record from Toronto Open Data Parking Citations database*

Retrieved from Google maps on 24/02/2016
Example Simulation
355 Adelaide Street W

Scenario 1 – Base Case
Scenario 2 – Illegal Parking Added
Example Simulation - Results

- **Base Case**: 10.7 seconds
- **Illegal Parking Added**: 15.7 seconds

The graph shows an increase in link travel time from 10.7 seconds in the base case to 15.7 seconds when illegal parking is added.
Example Simulation - Results

![Graph showing link speed comparison between Base Case and Illegal Parking Added. The Base Case has a link speed of 40.4 km/hr, while the Illegal Parking Added scenario results in a link speed of 27.9 km/hr.]
Example Simulation - Results

![Bar Graph]

- **Base Case**: 1149.6 pcus/hr
- **Illegal Parking Added**: 805.2 pcus/hr
### Summary Results

#### Road Segments on which Illegal Parking Incidents Occur

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Vehicle Delay (sec/veh)</th>
<th>Travel Time (sec/veh)</th>
<th>Speed (km/hr)</th>
<th>Flow (veh/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case</td>
<td>7</td>
<td>16.5</td>
<td>31</td>
<td>660</td>
</tr>
<tr>
<td>Illegal Parking Added</td>
<td>10.5</td>
<td>20.5</td>
<td>27</td>
<td>610</td>
</tr>
</tbody>
</table>

- Vehicle Delay Increase: 50%
- Travel Time Increase: 22%
- Speed Decrease: 14%
- Flow Decrease: 7%
Policy Implications of Simulation Model

- Ignoring illegal parking in traffic models for policy evaluation is unrealistic
- Impacts of illegal parking warrant policy action
  - Increase enforcement
  - Supply for parking should resemble demand, for users with little choice
  - Induce a mode shift for users with a choice
Public Sector Solutions

- Increased Enforcement?
- Courier Delivery Zones?
- Parking Permit System?
Addressing Parking Needs of Commercial Vehicles

Challenges

- Deliveries often occur in dense, congested downtowns
- On-street parking is generally occupied for much of the day
- Off-street parking is more expensive, not conducive to delivery operations (usually very short delivery times)
- Insufficient loading docks in old buildings
- Some companies are legally required to park on site (shredding).
- Night time deliveries not practical for the current courier industry model
Toronto’s Approach

- Introduction of **courier delivery zones** (CDZs) across downtown

- Exploration of **parking permit** program to exempt commercial vehicles from certain parking offenses
Research Objectives

Research by Adam Rosenfield, James Lamers, and Mehdi Nourinejad

- Evaluate feasibility of courier delivery zones (CDZs) and parking permit policies
- Assess municipal fiscal impacts of parking permits under various pricing schemes
- Develop strategies to facilitate legal curbside activity for commercial vehicles in Toronto
Courier Delivery Zones / 2012 CV tickets
Modeling Parking Behavior

Decision to Park

- Permit
  - Permit Cost
- No Permit
  - Illegal Parking
    - Risk of Fine
  - Legal Parking
    - Delays & Cost
Key Findings

- Permit program can legitimize what is currently common illegal behaviour
- Permit program can likely be revenue-neutral below $500/yr per truck
- Permit should be voluntary, but a high adoption rate is important for program success
- Expansion of Courier Delivery Zone (CDZ) pilot project has good potential but a permit program would need a large number of permitted parking locations to be effective
Courier Industry Response

Research by Mehdi Nourinejad, Paul Deng and Mahyar Jahangiriesmaili

- PATH system in downtown Toronto is currently used by a major courier in Canada
- Potential to expand that system
Courier Deliveries

Drop off locations within Toronto

Scarborough Town Centre

Downtown Toronto

Sherway Gardens shopping centre
Downtown Toronto PATH Network

- Underground walkway spanning about 30 km
- Connects
  - 6 subway stations
  - Union station
  - Over 50 buildings/office towers
  - 20 parking garages
  - 8 major hotels
Expanding courier operations on foot in the PATH network to replace truck deliveries
Existing Facility at Adelaide and Potential Facility at Eaton Centre

- **Adelaide Centre (Existing Facility)**
  - 1000 deliveries/day within 700 meters
  - 400 pickups/day within 800 meters

- **Eaton Centre (Potential Facility)**
  - 1000 deliveries/day within 740 meters
  - 750 pickups/day within 650 meters
Cost Analysis of Eaton Centre Walk Network

Terminal Operating Cost = $500/day

$1000/day

$2000/day

Driving - walking cost

Parking cost

Yellow = Yes, develop the facility

Blue = No, facility will be more expensive
Legend

- walkway
- PATHnetwork
- <all other values>
- type
  - above grade walkway
  - enclosed walkway
  - stairs

Stairs
Length of Delivery Routes – Aug 31
Key findings

- **Walk-networks are beneficial when**
  - parking and driving costs are high,
  - walk movements are efficient,
  - facility costs are low.

- **Seems practical, now in the process of refinement.**
Overall Summary

- Commercial vehicle parking is an ongoing challenge
- Demonstrated congestion impacts of parking
- Few options exist for couriers to operate legally
- Viable parking management options exist in Toronto
  - Increased enforcement is probably not sufficient
  - Commercial loading zones show promise
  - Parking permit options could be revenue neutral
- Greater use of walking deliveries in downtown core of Toronto seems to be feasible
Current Research in Parking

- Using a video game approach to assess influences on parking decision making
- Night-time delivery pilot in the Region of Peel
- Optimal parking lot design for automated vehicles
- Logistics of robot deliveries
Student Geniuses

- Mehdi Nourinejad, PhD
- Adam Wenneman, MASc
- Ahmed Ramadan, MASc
- Mahyar Jahangiriesmaili, MASc
- Paul Deng, MASc
- Adam Rosenfield, BASc
- James Lamers, MASc
- Justin Kwok, BASc
- Bo Wang, MASc
- Sina Bahrami, PhD
Relevant Journal Articles


Thank You!