Large Urban Freight Traffic Generators: Opportunities for City Logistics Initiatives

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Acknowledgments

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- Prof. José Holguín-Veras, Ph.D.

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Outline

1. Urban freight large traffic generators
2. Opportunities for city logistics
3. Identification methods
### Ports, airports, intermodal terminals, etc…

<table>
<thead>
<tr>
<th></th>
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<td>7,980,729</td>
<td>12,923,547</td>
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<td>6,574,300</td>
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<td>3,068,935</td>
<td>18,815,988</td>
<td>6,720</td>
<td>9,407,500</td>
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<tr>
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<td>2,616,126</td>
<td>1,458,135</td>
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<td>1,359</td>
<td>180,300</td>
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<td>1,102,545</td>
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<td>1,005,273</td>
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<td>5,413,212</td>
<td>6,137</td>
<td>2,848,700</td>
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<td>599</td>
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<td>27</td>
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<td>245,459</td>
<td>140,405</td>
<td>2,175,113</td>
<td>6,684</td>
<td>1,161,000</td>
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<tr>
<td>29</td>
<td>NEW ORLEANS</td>
<td>235,336</td>
<td>153,709</td>
<td>1,134,029</td>
<td>3,755</td>
<td>528,300</td>
</tr>
</tbody>
</table>
Large buildings/establishments

Grand Central Terminal
More than 180 establishments
Between 150-200 truck trips per day

Source: NYU Wagner /NYCDOT
Shipment size vs. vehicle type vs. distance

- Q (Small Trucks)
- Q (Midsize Trucks)
- Q (Large Trucks)

Payload estimates not reliable due to lack of data

Source: Holguín-Veras, 2002
Freight trip generation

Urban establishments’ FTG vs. Port’s FTG

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Establishments</th>
<th>Estimated employment</th>
<th>Estimated daily FTA</th>
<th>Percentage of total FTA per day</th>
<th>Estimated daily FTP</th>
<th>Percentage of total FTP per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Manhattan</td>
<td>1,537,195</td>
<td>102,597</td>
<td>2,062,079</td>
<td>182,427</td>
<td>49%</td>
<td>161,144</td>
<td>47%</td>
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<tr>
<td>2. Brooklyn</td>
<td>2,465,326</td>
<td>44,043</td>
<td>521,992</td>
<td>75,865</td>
<td>20%</td>
<td>73,431</td>
<td>21%</td>
</tr>
<tr>
<td>3. Queens</td>
<td>2,229,379</td>
<td>41,551</td>
<td>518,953</td>
<td>71,447</td>
<td>19%</td>
<td>68,883</td>
<td>20%</td>
</tr>
<tr>
<td>4. Bronx</td>
<td>1,332,650</td>
<td>15,528</td>
<td>224,179</td>
<td>26,320</td>
<td>7%</td>
<td>26,838</td>
<td>8%</td>
</tr>
<tr>
<td>5. Staten Island</td>
<td>443,728</td>
<td>8,376</td>
<td>100,975</td>
<td>14,464</td>
<td>4%</td>
<td>12,910</td>
<td>4%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>8,008,278</td>
<td>212,095</td>
<td>3,428,177</td>
<td>370,522</td>
<td>100%</td>
<td>343,206</td>
<td>100%</td>
</tr>
</tbody>
</table>

About 2.6% of Manhattan FTG

The urban freight traffic is generated by the 100k+ establishments in the Manhattan
Large urban freight traffic generators (LTGs)

- Specific facilities housing businesses that individually or collectively produce and attract a large number of daily truck trips.
- Large Buildings and landmarks: those that house scores of establishments which generate a large aggregated freight truck traffic
- Large establishments: those, that because of their size, generate significant amounts of freight
Opportunities for City Logistics Initiatives
Off-hour deliveries and receiving stations

- Off-hour deliveries at a centralized receiving station and then distributed to the different stores, offices, restaurants

(+ ) reduce freight trips attracted
(+ ) reduce parking needs
(- ) requires coordination efforts
(- ) space may not be available
Pick-up/drop-off points/ unattended deliveries

- Pick-up/Drop-off: local collection and distribution depots, or boxes, from which consumers can pick up ordered goods (e.g., locker banks)
  - These systems can be installed in or near LTGs
- Unattended Deliveries: strategies that do not require staff for pick-up or drop off
  - Double door systems
  - Virtual cages
  - Video or alarm monitored equipment
Parking and loading/unloading initiatives

- Parking is a major issue in large urban areas

- Alternatives:
  - Parking pricing
  - Reserved parking
  - Low-scale nearby delivery areas
  - On-street loading bays

  (+) low capital investment
  (+) reduce congestion
  (+) reduce double parking
  (-) conflict with pedestrians / cyclists
  (-) require enforcement
  (-) limited space availability
Identifying Urban Freight Large Traffic Generators
Identification: Complementary procedures

- Buildings/landmarks that have their own ZIP code
  (+) These are buildings/landmarks that in opinion of USPS generate a lot of mail (and maybe deliveries)
  (+) Accurate geolocation
  (-) Includes unknown mix of freight /non-freight related est.

- Large buildings
  - Parcel areas (top 1%)
  - Establishments with more than 250, 500 and 1000+ employees
    (+) Comprehensive
    (-) Some industries with constant FTG per establishment
    (-) No accurate geolocation (only at ZIP code level)
### Landmark buildings (unique zip codes)

<table>
<thead>
<tr>
<th>Zip Code</th>
<th>Description</th>
<th>Daily FTA</th>
<th>Daily FTP</th>
<th>Total daily FTG</th>
<th>Zip Code</th>
<th>Description</th>
<th>Daily FTA</th>
<th>Daily FTP</th>
<th>Total daily FTG</th>
</tr>
</thead>
<tbody>
<tr>
<td>10118</td>
<td>Empire State Building</td>
<td>594</td>
<td>460</td>
<td>1,014</td>
<td>10152</td>
<td>Seagram Building</td>
<td>88</td>
<td>55</td>
<td>101</td>
</tr>
<tr>
<td>10164</td>
<td>Lincoln Building</td>
<td>462</td>
<td>373</td>
<td>835</td>
<td>10178</td>
<td>101 Park Avenue</td>
<td>73</td>
<td>36</td>
<td>89</td>
</tr>
<tr>
<td>10193</td>
<td>1 Penn Plaza</td>
<td>382</td>
<td>245</td>
<td>627</td>
<td>10115</td>
<td>475 Riverside Drive</td>
<td>66</td>
<td>38</td>
<td>102</td>
</tr>
<tr>
<td>10170</td>
<td>Graybar Building</td>
<td>300</td>
<td>235</td>
<td>535</td>
<td>10111</td>
<td>355 Riverside Drive</td>
<td>1014</td>
<td>58</td>
<td>102</td>
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<tr>
<td>10123</td>
<td>450 Fashion Avenue</td>
<td>240</td>
<td>337</td>
<td>577</td>
<td>10109</td>
<td>1290 Avenue of the Americas</td>
<td>67</td>
<td>39</td>
<td>86</td>
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<tr>
<td>10176</td>
<td>Met Life Building</td>
<td>130</td>
<td>200</td>
<td>330</td>
<td>10171</td>
<td>West Vaco Building</td>
<td>52</td>
<td>26</td>
<td>78</td>
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<tr>
<td>10182</td>
<td>---</td>
<td>227</td>
<td>273</td>
<td>496</td>
<td>10101</td>
<td>55 Water Street</td>
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<td>19</td>
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<td>10112</td>
<td>General Electric Building</td>
<td>130</td>
<td>232</td>
<td>562</td>
<td>10114</td>
<td>1290 Avenue of the Americas</td>
<td>58</td>
<td>29</td>
<td>87</td>
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<tr>
<td>10158</td>
<td>Fish Building</td>
<td>222</td>
<td>239</td>
<td>461</td>
<td>10105</td>
<td>521 Madison Avenue</td>
<td>40</td>
<td>21</td>
<td>61</td>
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<tr>
<td>10120</td>
<td>112 W 34th Street</td>
<td>68</td>
<td>99</td>
<td>167</td>
<td>10154</td>
<td>Bristol Myers Building</td>
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<td>26</td>
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<tr>
<td>10169</td>
<td>Helmsley Building</td>
<td>227</td>
<td>265</td>
<td>532</td>
<td>10172</td>
<td>Chemical Bank Building</td>
<td>57</td>
<td>23</td>
<td>80</td>
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<td>10103</td>
<td>Tishman Building</td>
<td>103</td>
<td>200</td>
<td>303</td>
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<td>20</td>
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<td>Pennsylvania Building</td>
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<td>235</td>
<td>464</td>
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<td>915 Broadway</td>
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<td>14</td>
<td>44</td>
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<tr>
<td>10168</td>
<td>Grand Central Station</td>
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<td>241</td>
<td>425</td>
<td>10174</td>
<td>342 Madison Avenue</td>
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<td>19</td>
<td>49</td>
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<tr>
<td>10110</td>
<td>500 5th Avenue</td>
<td>177</td>
<td>226</td>
<td>453</td>
<td>10175</td>
<td>521 Madison Avenue</td>
<td>30</td>
<td>14</td>
<td>44</td>
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<tr>
<td>10155</td>
<td>Architect &amp; Design Building</td>
<td>140</td>
<td>253</td>
<td>496</td>
<td>10176</td>
<td>521 Madison Avenue</td>
<td>30</td>
<td>14</td>
<td>44</td>
</tr>
<tr>
<td>10111</td>
<td>International Building</td>
<td>164</td>
<td>208</td>
<td>412</td>
<td>10177</td>
<td>521 Madison Avenue</td>
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<td>14</td>
<td>44</td>
</tr>
<tr>
<td>10166</td>
<td>688 Fashion Avenue</td>
<td>118</td>
<td>182</td>
<td>364</td>
<td>10178</td>
<td>521 Madison Avenue</td>
<td>30</td>
<td>14</td>
<td>44</td>
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<tr>
<td>10121</td>
<td>12 Penn Plaza</td>
<td>86</td>
<td>134</td>
<td>218</td>
<td>10162</td>
<td>Pavilion Building</td>
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<td>10</td>
<td>27</td>
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<tr>
<td>10174</td>
<td>Chrysler Building</td>
<td>125</td>
<td>149</td>
<td>378</td>
<td>10169</td>
<td>342 Madison Avenue</td>
<td>30</td>
<td>14</td>
<td>44</td>
</tr>
<tr>
<td>10153</td>
<td>General Motors Building</td>
<td>101</td>
<td>126</td>
<td>332</td>
<td>10190</td>
<td>GPO Official Mail</td>
<td>5</td>
<td>3</td>
<td>8</td>
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<tr>
<td>10167</td>
<td>Bear Sterns Building</td>
<td>118</td>
<td>147</td>
<td>294</td>
<td>10102</td>
<td>Radio City BRM</td>
<td>9</td>
<td>4</td>
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<tr>
<td>10279</td>
<td>Woolworth Building</td>
<td>117</td>
<td>132</td>
<td>264</td>
<td>10107</td>
<td>Philip Morris</td>
<td>5</td>
<td>2</td>
<td>7</td>
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<td>103</td>
<td>143</td>
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<td>Bache Halsey Stuart St</td>
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<td>21</td>
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<td>10175</td>
<td>521 5th Avenue</td>
<td>92</td>
<td>129</td>
<td>228</td>
<td>10181</td>
<td>JP Morgan Bank</td>
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<td>18</td>
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<td>10</td>
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<td>10151</td>
<td>545 5th Avenue</td>
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<td>103</td>
<td>206</td>
<td>10287</td>
<td>Bear Sterns Building</td>
<td>7</td>
<td>3</td>
<td>10</td>
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</tbody>
</table>

**Total**: 4,912 | 7,030 | 6,761 | 13,791
### Large establishments (employment)

<table>
<thead>
<tr>
<th>ZIP Codes</th>
<th>Establishments</th>
<th>Estimated employment</th>
<th>Estimated daily FTA</th>
<th>Estimated daily FTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Establishments</td>
<td>-</td>
<td>24,667</td>
<td>1,732,875</td>
<td>43,224</td>
</tr>
<tr>
<td>250-499 employees</td>
<td>65</td>
<td>13,542</td>
<td>706,010</td>
<td>25,796</td>
</tr>
<tr>
<td>500-999 employees</td>
<td>52</td>
<td>6,203</td>
<td>493,294</td>
<td>10,982</td>
</tr>
<tr>
<td>1000+ employees</td>
<td>53</td>
<td>4,922</td>
<td>533,571</td>
<td>6,446</td>
</tr>
</tbody>
</table>

Map layers:
- 5-Digit ZIP Code
- Sum of est
- Establishments

Miles:
- 0
- 0.5
- 1
- 1.5

VREF CENTER OF EXCELLENCE FOR SUSTAINABLE URBAN FREIGHT SYSTEMS
Large buildings (parcel area)

Top 1% parcels in terms of area in the city
**Key findings**

- They produce highly concentrated traffic impacts

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Establishments</th>
<th>%***</th>
<th>Estimated employment</th>
<th>%***</th>
<th>Estimated daily FTA</th>
<th>%***</th>
<th>Estimated daily FTP</th>
<th>%***</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Manhattan</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landmarks*</td>
<td>56</td>
<td>5,994</td>
<td>5.84%</td>
<td>196,497</td>
<td>9.53%</td>
<td>7,030</td>
<td>3.85%</td>
<td>6,761</td>
<td>4.20%</td>
</tr>
<tr>
<td>Large Establishments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>250-499 employees</td>
<td>24,667</td>
<td>24.04%</td>
<td>1,732,875</td>
<td>84.04%</td>
<td>43,224</td>
<td>23.69%</td>
<td>40,274</td>
<td>24.99%</td>
<td></td>
</tr>
<tr>
<td>500-999 employees</td>
<td>13,542</td>
<td>13.20%</td>
<td>706,010</td>
<td>34.24%</td>
<td>25,796</td>
<td>14.14%</td>
<td>24,093</td>
<td>14.95%</td>
<td></td>
</tr>
<tr>
<td>1000+ employees</td>
<td>6,203</td>
<td>6.05%</td>
<td>493,294</td>
<td>23.92%</td>
<td>10,982</td>
<td>6.02%</td>
<td>8,866</td>
<td>5.50%</td>
<td></td>
</tr>
<tr>
<td>Large Area Parcels</td>
<td>4,922</td>
<td>4.80%</td>
<td>533,571</td>
<td>25.88%</td>
<td>6,446</td>
<td>3.53%</td>
<td>7,314</td>
<td>4.54%</td>
<td></td>
</tr>
</tbody>
</table>

* More than 5 establishments
** No models available
*** Percentage from total values for Manhattan

FTA = Freight Trips Attracted
FTP = Freight Trips Produced
Key findings

**Advantages:**
- Easy to identify
- Concentration of a large number of establishments in a reduced set of locations
- They generate a significant share of daily truck traffic
- Their close spatial location allow for green last mile distribution strategies
- Size and economy of scales/ cargo consolidation

**Disadvantages:**
- Lack of storage space for large volumes of goods
- Security management
- Limited loading facilities lead to increased scheduling complexities
City Logistics

- PIARC (2011) "Public Sector Governance of Urban Freight Transport."
References

Off-Hour Deliveries


Freight Trip Generation

References


Parking

Thank you!
Questions!
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