The new Paris urban freight survey

Method, main results and potential use for urban freight research elsewhere

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An urban goods movements survey for Paris

Aims of a UGMS:
• Understanding the behavior and the organizational aspects of freight transport
  ➞ *Simulate the existing situation*

• Providing a modelling tool that does not require costly data collection for local
decision-makers interested in urban freight (cf. FRETURB model)
  ➞ *Short, medium and long-term forecasts*
  ➞ *Decision support*

Few freight generation surveys at a regional scale

Interest of the Paris region:
• Update the knowledge of UGM in France
• Broaden the range of surveyed cities to a megacity
French UGMS methodology: a nested survey based on an original observation unit

1 - Establishment survey
   (general information questionnaire and log book)

2 – Driver survey

3 – Haulier survey

The movement as the observation unit
The movement as the observation unit

The movement:
*service provided to a given establishment by a given vehicle, to make a delivery or a pickup (or both at the same time)*

- **Goods**
- **Urban environment**
- **Vehicles**
- **Management mode (third party/own account)**
- **Distances**
- **Time and duration**
- **Organisation mode (direct trip/rounds)**
- **Parking conditions**
Three combined surveys...

Establishment survey

General informations
- Phone contact

First visit

Second visit

Description of pick-ups and deliveries

Log book (1 week)

Pick-ups /deliveries

Goods

Driver survey

Driver questionnaire

Route

Stops

Trip sections

Haulier survey
• **Establishment surveys**
  – Description of the activity and size (employment) of the establishments
  – Identification of all freight operations linked to the characteristics of establishments and their environment

• **Driver surveys**
  – Description of the trips and the conditions of freight operations

• **Haulier surveys**
  – Understanding the logistics organization of hauliers
  – Link between intra-urban flows and exchanges of the area
## The Paris region

### Key figures

<table>
<thead>
<tr>
<th></th>
<th>Paris region</th>
<th>Entire France</th>
<th>Paris /France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>11,853</td>
<td>63,070</td>
<td>19%</td>
</tr>
<tr>
<td>Jobs</td>
<td>5,660</td>
<td>25,752</td>
<td>22%</td>
</tr>
<tr>
<td>No of establishments</td>
<td>822</td>
<td>4,081</td>
<td>20%</td>
</tr>
<tr>
<td>No of municipalities</td>
<td>1.3</td>
<td>36.4</td>
<td>4%</td>
</tr>
<tr>
<td>Area (km²)</td>
<td>12</td>
<td>552</td>
<td>2%</td>
</tr>
</tbody>
</table>

All figures in thousands (except %)

Density of establishments in the Île-de-France Region
Sampling the Paris region

How is it possible to survey such a vast and atypical territory:

- with the same methodology as the previous French surveys (in order to allow comparisons) ?
- and
- without huge costs ?
  - with a € 1,200,000 budget allocated (1500 establishments, 1300 drivers surveyed)

Solution :
- Selecting the most « representative » municipalities according to UGM
- Typological analysis of the 1,300 municipalities composing the Paris Region taking into account:
  - Density
  - Distance to nearest highway infrastructures;
  - Distance to Paris city center
  - Contribution of 8 main sectors of activity to goods flows.
  - Land Use mode: Individual housing, group housing, wharehouses.
Paris urban typology

Choice of clusters of municipalities concentrating the largest possible number of different types
### Establishment sample

<table>
<thead>
<tr>
<th>Activity</th>
<th>No of establishments surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape activities - agriculture</td>
<td>12</td>
</tr>
<tr>
<td>Crafts-services</td>
<td>194</td>
</tr>
<tr>
<td>Industry</td>
<td>228</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>123</td>
</tr>
<tr>
<td>Hypermarkets</td>
<td>54</td>
</tr>
<tr>
<td>Small retail</td>
<td>333</td>
</tr>
<tr>
<td>Offices-services</td>
<td>199</td>
</tr>
<tr>
<td>Warehouses-transport</td>
<td>45</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,188</td>
</tr>
</tbody>
</table>

Paris survey main results

Weekly movements/km²

Mouvements hebdomadaires
Carroyage de 1000m/1000m
- de 0.1 à moins de 1000 mouvements
- de 1000 à moins de 3900 mouvements
- de 3900 à moins de 10300 mouvements
- de 10300 à moins de 25700 mouvements
- de 25700 à 39900 mouvements

Fonds cartographiques : Corine Land Cover 2006, Insee GeoFla 2009
Données : Enquête Transport de Marchandises en Ville Région Ile-de-France, 2011
Paris survey main results

A large variety of results:
- Parking conditions
- Vehicle fleets
- Freight movements duration
- Handling equipment
- Storage facilities
- ...

Parking conditions in the city of Paris

<table>
<thead>
<tr>
<th></th>
<th>Authorized</th>
<th>Forbidden</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articulated</td>
<td>42%</td>
<td>46%</td>
<td>12%</td>
</tr>
<tr>
<td>Rigid trucks</td>
<td>24%</td>
<td>75%</td>
<td>1%</td>
</tr>
<tr>
<td>Vans &lt;3.5t</td>
<td>33%</td>
<td>64%</td>
<td>2%</td>
</tr>
<tr>
<td>Vans &lt;2.5t</td>
<td>49%</td>
<td>47%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Stopping time: vehicles and movement type

<table>
<thead>
<tr>
<th></th>
<th>Delivery</th>
<th>Pick-up</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vans &lt;2.5t</td>
<td>10</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>Vans &lt;3.5t</td>
<td>10</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Rigid trucks</td>
<td>22</td>
<td>34</td>
<td>20</td>
</tr>
<tr>
<td>Articulated</td>
<td>37</td>
<td>34</td>
<td>53</td>
</tr>
</tbody>
</table>

Age of the vehicles for hauliers

- Articulated
  - 0-5 years
  - 5-10 years
  - 10-15 years
  - > 15 years
- Rigid trucks
- Vans
Paris survey main results

Distance between two stops vs. no of stops

Stopping time vs. no of stops
Paris survey main results

Distribution of movements during the day

Distribution of movements during the day (craftsmen)
## Paris survey main results

<table>
<thead>
<tr>
<th>Activity</th>
<th>Employment structure</th>
<th>Weekly movements</th>
<th>Movements /job/week</th>
<th>Movements/job/week (Bordeaux survey)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- agriculture</td>
<td>0.4%</td>
<td>0.5%</td>
<td>0.86</td>
<td>0.49</td>
</tr>
<tr>
<td>Crafts-services</td>
<td>15.8%</td>
<td>14.7%</td>
<td>0.69</td>
<td>1.24</td>
</tr>
<tr>
<td>Industry</td>
<td>12.4%</td>
<td>17.8%</td>
<td>1.06</td>
<td>0.95</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>5.1%</td>
<td>19.1%</td>
<td>2.79</td>
<td>2.86</td>
</tr>
<tr>
<td>Hypermarkets</td>
<td>2.4%</td>
<td>1.7%</td>
<td>0.52</td>
<td>0.71</td>
</tr>
<tr>
<td>Small retail</td>
<td>10.3%</td>
<td>23.8%</td>
<td>1.70</td>
<td>2.19</td>
</tr>
<tr>
<td>Offices-services</td>
<td>52.8%</td>
<td>17.5%</td>
<td>0.25</td>
<td>0.33</td>
</tr>
<tr>
<td>Warehouses-transport</td>
<td>0.7%</td>
<td>4.8%</td>
<td>4.99</td>
<td>3.83</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>5,753,281</strong></td>
<td><strong>4,258,762</strong></td>
<td><strong>0.74</strong></td>
<td><strong>0.86</strong></td>
</tr>
</tbody>
</table>

Is urban freight transport more efficient in bigger cities?
Paris survey main results

Similar organizations ...

<table>
<thead>
<tr>
<th>Survey</th>
<th>Third party transport</th>
<th>Own account (reception)</th>
<th>Own account (shipper)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris</td>
<td>51%</td>
<td>15%</td>
<td>34%</td>
<td>100%</td>
</tr>
<tr>
<td>Bordeaux survey</td>
<td>52%</td>
<td>15%</td>
<td>33%</td>
<td>100%</td>
</tr>
</tbody>
</table>

(Number of movements)

<table>
<thead>
<tr>
<th>Survey</th>
<th>Receptions</th>
<th>Expeditions</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris</td>
<td>54%</td>
<td>35%</td>
<td>11%</td>
</tr>
<tr>
<td>Bordeaux survey</td>
<td>53%</td>
<td>33%</td>
<td>13%</td>
</tr>
</tbody>
</table>

(Number of movements)

...but a slightly different use of the vehicles

<table>
<thead>
<tr>
<th>Survey</th>
<th>2-3 wheels</th>
<th>Cars and small vans</th>
<th>Vans (&lt;3.5T)</th>
<th>Rigid truck</th>
<th>Articulated vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paris</td>
<td>4%</td>
<td>26%</td>
<td>31%</td>
<td>31%</td>
<td>8%</td>
</tr>
<tr>
<td>Bordeaux survey</td>
<td>2%</td>
<td>38%</td>
<td>29%</td>
<td>23%</td>
<td>9%</td>
</tr>
</tbody>
</table>

(Number of movements)
Updating the FRETURB model

- Movements generation model
- Created in 2001 by the LET through the results of the mid-90s surveys (Bordeaux, Dijon, Marseille)
- Used in more than 40 cities in France (and Europe)
- Using the new surveys to update the main functions
### Transferability of the surveys

(All figures in thousands)

<table>
<thead>
<tr>
<th></th>
<th>Bordeaux</th>
<th>Paris region</th>
<th>Los Angeles CSA</th>
<th>Seoul Capital area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>824</td>
<td>11,853</td>
<td>18,550</td>
<td>25,600</td>
</tr>
<tr>
<td>Employment</td>
<td>438</td>
<td>5,660</td>
<td>7,849</td>
<td>12,965</td>
</tr>
<tr>
<td>No of establishments</td>
<td>63</td>
<td>822</td>
<td>1,992*</td>
<td>1,735</td>
</tr>
<tr>
<td>Area (km²)</td>
<td>0.98</td>
<td>12</td>
<td>88</td>
<td>11.49</td>
</tr>
<tr>
<td>Megacity world rank</td>
<td>N/A</td>
<td>29</td>
<td>16</td>
<td>3</td>
</tr>
</tbody>
</table>

*Including non employer establishments

Sources: Institut National de la statistique et des études économiques, United States Census Bureau, Korean Statistical information service
Limits in a megacity context

A complex and costly survey

- Budget: 1.2 million euros (Paris)
- Sampling process and representativeness
- Analysis (sample expansion, weighting)

Difficulties

- Contacting store-keepers and business owners
- Poorly motivated respondents

... which require

- A preliminary information and promotion campaign
- A competent contractor to ensure the recruitment and management of experienced and trained pollsters
- Incentives for each survey completed (drivers)
Limits in a megacity context

• What about high density environment?
  – High buildings with many establishments
  – Consolidation effect: one stop can generate several movements (several establishments delivered)
  – Difficulty to translate a number of movements into a road occupancy (overestimation)
  – Necessity to develop specific methodology for high density context: the building as a sampling unit
Building based surveys

• Two case studies in the CBD of Lyon, France (pop 1.4 million)
  • Shopping Mall
    – 220 shops, 3000 employees
    – 179 stops, 630 mvts
    – 3.7 mvts/stop
• Office building
  – 4 establishments, 250 employees
  – 28 stops, 33 mvts
  – 1.1 mvts/stop

• Hypothesis:
  – Number of establishments as the main explanatory variable
  – What influence of the diversity of activities?
Thank you for your attention

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More results soon available on:
http://tmv.let.fr