Process Flow Analysis of the Final 50’ of the Goods Delivery System

Haena Kim
Research Assistant, PhD Student

PSRC Peer Networking Series on Local Planning & Implementation
September 21, 2017
5-Step Data Collection Process

1. Obtain permission to collect data at 5 prototype buildings
2. Recruit and train data collection team
3. How did SCTL collect the data?
4. Used the data to create high level process flow map
5. Quantify delay, and focus attention on improvement opportunities
Step 1 - Obtain Permission To Collect Data At 5 Prototype Buildings

<table>
<thead>
<tr>
<th>Building Types</th>
<th>Building Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Tower</td>
<td>Insignia Tower</td>
</tr>
<tr>
<td>Retail Building</td>
<td>Westlake Mall/Tower</td>
</tr>
<tr>
<td>Hotel</td>
<td>Four Seasons Hotel</td>
</tr>
<tr>
<td>Office Building</td>
<td>Seattle Municipal Tower</td>
</tr>
<tr>
<td>Historical Building</td>
<td>Dexter Horton Building</td>
</tr>
</tbody>
</table>
Step 2 - Recruit and Train Data Collection Team

Seattle Municipal Tower
*Building Type: Office Tower*
Seattle Municipal Tower

• January 30 – February 17, 2017
• 9:00 am – 4:00 pm
• 700 5th Ave, Seattle, WA 98104
• CBRE building managers:
  • Posted an announcement at every entrance notifying carriers that they would be monitored
  • Informed their staff
  • Provided security badges for the data collectors
Process Flow at the Seattle Municipal Tower

Enter:
1. Park in freight bay
2. Get clearance from security guard
3. Unload goods on to cart
4. Wait for freight elevator

Deliver:
5. Take elevator to receivers’ floor
6. Deliver/pick up goods on receivers’ floor
7. Repeat process steps 5-6 for multiple deliveries
8. Wait for elevator to return to truck

Exit:
9. Take elevator back to freight bay
10. Return security device to guard
11. Load hand cart onto truck
12. Maneuver truck out of freight bay
Step 3 – How Did SCTL Collect the Data?

<table>
<thead>
<tr>
<th>App Button</th>
<th>Time Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Check-In Start</td>
<td>01-30-2017 9:26:06 AM</td>
</tr>
<tr>
<td>Security Check-In End</td>
<td>01-30-2017 9:29:10 AM</td>
</tr>
</tbody>
</table>

- SCTL developed an app that records a time stamp for each goods delivery process step.
- Students entered the data into the app as they walked behind delivery people.
- The app transmitted info to a database in real time.
The Data Collection App Also Records:

- Name of the:
  - Building
  - Data collector
  - Delivery company
- Types of delivery truck and goods being delivered
- Number of delivery people engaged in the delivery
- Additional notes
Step 4 – Used the Data to Create High Level Process Flow Map
### Step 5 - Quantify Delay, and Focus Attention On Improvement Opportunities

<table>
<thead>
<tr>
<th>Percent of Total Time</th>
<th>Enter</th>
<th>Deliver</th>
<th>Exit</th>
</tr>
</thead>
</table>
| 33%  | Enter | Mean: 7 min  
                   sd: 3 min  
                   Range: 2 - 15 min  | 1. Park in freight bay  
2. Get clearance from security guard  
3. Unload goods on to cart  
4. Wait for freight elevator  |
| 41%  | Deliver | Mean: 8 min  
                   sd: 8 min  
                   Range: 2 - 34 min  | 5. Take elevator to receivers’ floor  
6. Deliver/pick up goods on receivers’ floor  
7. Repeat process steps 5-6 for multiple deliveries  
8. Wait for elevator to return to truck  |
| 26%  | Exit | Mean: 5 min  
                   sd: 3 min  
                   Range: 2 - 15 min  | 9. Take elevator back to freight bay  
10. Return security device to guard  
11. Load hand cart onto truck  
12. Maneuver truck out of freight bay  |
Pilot Test: Install Common Carrier Locker System at Freight Bay Level

Results:
1. For firms carrying small-to-medium packages, eliminate:
   A. ‘Deliver’ tasks;
   B. Time spent waiting for, and in, elevators.
2. Large goods would still need to go to the receiver’s location.

Challenges:
1. Will tenants go to this floor?
2. Paying for the new system:
   A. Include in rent, or
   B. Pay a daily or weekly rate?

How Will This Data Drive Better Decision Making?
Pilot Test Option 3 Cuts Up To 61% of Total Time in the Tower

<table>
<thead>
<tr>
<th>Percent of Total Time</th>
<th>Enter</th>
<th>Deliver</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>33%</td>
<td>Mean: 7 min sd: 3 min Range: 2 - 15 min</td>
<td>Mean: 8 min sd: 8 min Range: 2 - 34 min</td>
<td>Mean: 5 min sd: 3 min Range: 2 - 15 min</td>
</tr>
<tr>
<td>41%</td>
<td>1. Park in freight bay</td>
<td>5. Take elevator to receivers’ floor</td>
<td>9. Take elevator back to freight bay</td>
</tr>
<tr>
<td></td>
<td>2. Get clearance from security guard</td>
<td>6. Deliver/pick up goods on receivers’ floor</td>
<td>10. Return security device to guard</td>
</tr>
<tr>
<td></td>
<td>3. Unload goods on to cart</td>
<td>7. Repeat process steps 5-6 for multiple deliveries</td>
<td>11. Load hand cart onto truck</td>
</tr>
<tr>
<td></td>
<td>4. Wait for freight elevator</td>
<td>8. Wait for elevator to return to truck</td>
<td>12. Maneuver truck out of freight bay</td>
</tr>
</tbody>
</table>

100%
Buildings' Delivery Policies Drive Dwell Time

**Retail Building**
Westlake Mall (n = 38)
- Mean: 28 min
- sd: 24 min
- Range: 3 - 107 min

**Residential Building**
Insignia Tower (n = 41)
- Mean: 8 min
- sd: 6 min
- Range: 1 - 23 min
## Types of Delivery Goods by Building Type

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Westlake Mall (n = 38)</th>
<th>Insignia Tower (n = 41)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail Building</td>
<td>- Mails: 8%</td>
<td>- Food: 36%</td>
</tr>
<tr>
<td></td>
<td>- Event Supplies: 21%</td>
<td>- Parcels: 54%</td>
</tr>
<tr>
<td></td>
<td>- Retail Supplies: 8%</td>
<td>- Furniture: 5%</td>
</tr>
<tr>
<td></td>
<td>- Construction Materials: 12%</td>
<td>- Groceries: 5%</td>
</tr>
<tr>
<td></td>
<td>- Food: 7%</td>
<td>- Office Supplies: 6%</td>
</tr>
<tr>
<td></td>
<td>- Furniture: 15%</td>
<td>- Parcels: 5%</td>
</tr>
<tr>
<td></td>
<td>- Office Supplies: 6%</td>
<td>- Mails: 8%</td>
</tr>
<tr>
<td></td>
<td>- Parcels: 23%</td>
<td>- Event Supplies: 21%</td>
</tr>
</tbody>
</table>

### Westlake Mall (n = 38):
- Construction Materials: 12%
- Food: 7%
- Furniture: 15%
- Office Supplies: 6%
- Parcels: 23%
- Event Supplies: 21%
- Retail Supplies: 8%
- Mails: 8%

### Insignia Tower (n = 41):
- Food: 36%
- Parcels: 54%
- Furniture: 5%
- Groceries: 5%
- Mails: 8%
- Event Supplies: 21%
Questions?

Please contact:
Barbara Ivanov
Urban Freight Lab Director
Supply Chain Transportation and Logistics Center COO
University of Washington
ivanovb@uw.edu
http://depts.washington.edu/sctlctr/