Urban Freight Initiatives: State of the Art and State of the Practice

Johanna Amaya Leal, PhD.
Assistant Professor

Supply Chain and Information Systems
Iowa State University
amayaj@iastate.edu
Acknowledgements

- Funded by National Cooperative Freight Research Program (NCFRP)
  - NCFRP Project 38 – Improving Freight System Performance in Metropolitan Areas
- Co-authors: J. Holguín-Veras, J. Wojtowicz, M. Browne I. Sánchez, M. Jaller, C. González, D.G. Haake, and S.D. Hodge
Background Considerations
Congestion problems are not new...

37th Street and 7th Avenue, New York City, 1945
Freight in metropolitan areas is growing...

- In the US, 80% of the cargo transported in the country has origins or destinations in the top 100 metropolitan statistical areas.

- Freight transported varies among metropolitan areas:
  - In average, 20-30 kg/person-day

- More people are moving to urban areas → needs for cargo increase

- Amount of cargo transported increases with income
  - rising incomes → more challenges to the system
What Could the Public Sector do?
A lot, many initiatives underused, many actors...
Planning Guide: Versions

- **Print ready version:**  
- **Interactive version:**  http://coe-sufs.org/wordpress/ncfrp33/
What is known about these initiatives?
We asked experts and practitioners...

- Survey designed and disseminated worldwide
- Conducted in Summer 2017
- Three sections
  - Contact information of respondent
  - Most familiar city
  - Assessment of each initiative
    - Familiar?
    - Implemented?
    - Most positive impact
    - Most negative impact
- Impacts: Congestion, Delivery Costs, Emissions, Safety, Livability
Descriptive Summary

- 48 complete responses (75 in total received)
  - 21% Practitioners/Planners
  - 79% Researchers/Academics
- Information collected from:
  - 19 Countries
  - 37 Cities
- Most represented cities
  - Rome (4)
  - NYC (3)
  - Paris, London, Mexico City, Sydney and Brussels (2)
Countries in the Sample
Cities in the Sample
Most Familiar: Daytime Delivery Restrictions (93%)
Most Implemented: Vehicle Size and Weight Restrictions (84%)

ACCESS AND VEHICLE-RELATED RESTRICTIONS
- Vehicle Size and Weight Restrictions
- Truck Routes
- Engine-Related Restrictions
- Low Emission Zones
- Load Factor Restrictions

TIME ACCESS RESTRICTIONS
- Daytime Delivery Restrictions
- Daytime Delivery Bans
- Nighttime Delivery Bans

TRAFFIC CONTROL AND LANE MANAGEMENT
- Restricted Multi-Use Lanes
- Exclusive Truck Lanes
  (Dedicated Truck Lanes)
- Traffic Control

Define the conditions under which freight vehicles can circulate in the network
Results (2/7)

- Least Familiar: Operational Incentives for Electric / Low Emission Vehicles (45%)
- Least Implemented: Road Pricing (27%)
Results (3/7): Infrastructure Management

- Most Familiar/Implemented: Ring Roads (80%/58%)

MAJOR IMPROVEMENTS
- Ring Roads
- New and Upgraded Infrastructure, Intermodal Terminals
- Freight Cluster Development (Freight Village)

MINOR IMPROVEMENTS
- Acceleration / Deceleration Lanes
- Removal of Geometric Constraints at Intersections
- Ramps for Handcarts and Forklifts
Results (4/7): Parking / Loading Areas Management

- Most Familiar: Freight Parking and Loading Zones (86%)
- Implemented: Loading and Parking Restrictions (69%)

**ON-STREET PARKING AND LOADING**
- Freight Parking and Loading Zones
- Loading and Parking Restrictions
- Peak-Hour Clearways
- Vehicle Parking Reservation Systems

**OFF-STREET PARKING AND LOADING**
- Enhanced Building Codes
- Timeshare of Parking Space
- Upgrade Parking Areas and Loading Docks
- Improved Staging Areas
- Truck Stops/ Parking Outside of Metropolitan Areas
Results (5/7): Vehicle-Related Strategies

- Most Familiar/Implemented: Emission Standards (80%/58%)
Results (6/7): Logistical Management

- Most Familiar/Implemented: UCCs (86%/39%)

**Cargo Consolidation**
- Urban Consolidation Centers

**Intelligent Transportation Systems (ITS)**
- Real-Time Information Systems
- Dynamic Routing
- Vertical Height
- Detection Systems

**Last Mile Delivery Practices**
- Time Slotting of Pick-Ups & Deliveries at Large Traffic Generators
- Driver Training Programs
- Anti-Idling Programs
- Pick-up/Delivery to Alternate Locations
Results (7/7): Freight Demand / Land Use Management

- Most Familiar: Voluntary Off-Hour Delivery Program (86%)
- Implemented: Integrating Freight into Land Use Planning (53%)
What about the impacts?
Analysis of Impacts (1/3)

- **Positive Impacts of Initiatives**
  - 63% → Improve Congestion – Significantly or Slightly
  - 18% → Reduce Emissions – Significantly or Slightly
  - 18% → Improve Livability – Mostly Slightly

- **Negative Impacts of Initiatives**
  - 63% → Increase Delivery Costs – Significantly or Slightly
  - 27% → No negative effect
  - 9% → Detriment in Livability – Slightly
Analysis of Impacts (2/3)

- No Positive Effect → Nighttime Delivery Bans (32%)
- No Negative Effect
  - Real Time Information Systems (94%)
  - Recognition Programs (90%)
- No Negative Effect (Stakeholder Engagement)
  - Educate Elected Officials (100%)
  - Develop Material and Hold Events to Raise Awareness about Freight (100%)
  - Provide Information about Urban Policies to the Private Sector (100%)
  - Designate a Freight-Person at Key Agencies (94%)
  - Provide a Platform for Stakeholders to Identify Problems and Solutions (94%)
Impacts (3/3) – Stakeholder Engagement

STAKEHOLDER ENGAGEMENT

Designate a ‘Freight-Person’ at Key Agencies
Create a Freight Advisory Committee (FAC)
Educate Elected Officials
Create a Technical Advisory Committee (TAC)
Create a Freight Quality Partnership (FQP)
Closing Remarks
Final Thoughts

- Improving freight system performance is needed
- There is a wide range of initiatives
  - Multi-prong approaches are key
  - Every situation is different, local conditions matter...
- Trade-offs must be analyzed. If congestion improves delivery costs may increase. A balance should be reached
- Some under-utilized initiatives have great potential
- Traditional initiatives have not provided the best impacts. Even if practitioners are familiar with them, implementation does not always take place
We Need to ...

- Undertake a holistic transformation of supply chains, inducing changes in behavior at key agents
- Embrace collaborative approaches involving all key stakeholders, there is a space for collaboration
- Transform existing freight policy and embrace innovation in urban freight
  - New trends
  - Technology
- Use the tools available...
Thanks!
Questions?

Reference Materials:
Planning Guide: PDF version

Planning Guide: Interactive version
http://coe-sufs.org/wordpress/ncfrp33

Initiative Selector:
http://coe-sufs.org/wordpress/InitiativeSelector

Freight Trip Generation Software:
https://coe-sufs.org/wordpress/software/fsa-software

amayaj@iastate.edu