National Cooperative Highway Research Program
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Tools to Facilitate Implementation of Effective Metropolitan Freight Transportation Strategies

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Presentation Overview

• Background
• Project Objective
• Approach
• Tasks
• Guidance Documents
  • Strategy Resource Matrix (SRM)
  • Taxonomies
  • Urban Freight Implementation Tool (UFIT)
  • Fact Sheets
• Pilot Studies
• Conclusions - Research Contributions
• Growing metropolitan areas
• Increased freight travel
• Limited research on implementation factors for urban freight transportation strategies
• Need for a sketch-planning tool that incorporates this information for practitioners

Photos source: TTI Photo Library
To develop guidance for transportation practitioners that identifies and evaluates:

- Facilitators;
- Barriers; and
- Recommendations

...related to the adoption of effective strategies in metropolitan freight transportation.
Approach

- State-of-the-practice literature review
- Survey to freight transportation professionals
- Peer-exchange workshop
- Pilot studies

Photo source: Fehr & Peers
<table>
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<tr>
<th>Citation</th>
<th>n.d.</th>
<th>Synopses</th>
<th>Keywords</th>
<th>Problem</th>
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<tbody>
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<td>1</td>
<td>n.d.</td>
<td>Strategy Resource Matrix (SRM)</td>
<td>Documents the literature search; and Powers the Urban Freight Implementation Tool (UFIT)</td>
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**SRM**

- Documents the literature search; and
- Powers the Urban Freight Implementation Tool (UFIT)

The SRM provides detailed information by reference, of key implementation items for metropolitan freight strategies.
Taxonomies

A strategy resource matrix (SRM) of all metropolitan freight strategy literature and keys to implementation.

A taxonomy of 30 metropolitan freight strategies, and a taxonomy of 16 facilitators and barriers for strategy implementation.

Fact sheets of all strategies with implementation notes to enhance facilitators and overcome barriers for implementation.

A sketch planning Urban Freight Implementation Tool (UFIT) to assess strategies, which includes user-adjustable default weights from practitioner input on the facilitators and barriers.

**Taxonomy of Metropolitan Freight Strategies**

**Taxonomy of 16 Facilitators/Barriers for Strategy Implementation**
Urban Freight Implementation Tool (UFIT)

- Sketch-planning assessment tool
- Recommends strategies to meet the needs of specific problems
- Graphical outputs:
  - Fact sheets
  - Citation notes
What Can I Expect from UFIT?

- It selects strategies based on their relation to one or more of 9 problem groups.

- It sorts selected strategies based on the importance (i.e., user weights) of their implementation factors; therefore, strategies at the top of the list offer more opportunities for the user to influence the implementation of those strategies.

- It creates a list of selected strategies (based on the importance of their implementation factors) and relevant information for the implementation of the strategies, including recommendations and notes for implementation.
Additional Tool Clarifications & Future Research Opportunities

- UFIT DOES NOT recommend strategies based on effectiveness.

- There is no system in place in the literature that measures the effectiveness of strategies.

- Selected performance measures are occasionally (and inconsistently) used to capture some conditions.
  - Results are not always causal/correlated from/to the strategies.
Additional Tool Clarifications & Future Research Opportunities

- UFIT DOES NOT offer quantitative information on the likelihood of successful implementation.

- As with “effectiveness,” this information is not available in the literature.

- Successful implementation is a needed condition, but not a sufficient condition for the effectiveness of the strategy.

- One needs a successful implementation for a strategy to be effective; but you also could successfully implement, and the strategy simply does not work.
Use Case Options

• Option 1:
  • I need implementation recommendations for a specific strategy.

  “I am interested in learning more about implementing a drop-off facility.”

• Option 2:
  • I have a problem and need specific strategies to address it.

  “My city hosts several high demand entertainment activities in downtown. There are lots of mixed used developments, and the demand and competition for curb space is very high. This causes additional delay due to double-parked delivery vehicles and drivers waiting or circling around for curbside parking.”
Option 1 Start
Option 1:
• I need implementation recommendations for a specific strategy.

“I am interested in learning more about implementing a drop-off facility. What are the important factors to implement it successfully? How can I overcome implementation barriers?”

The Urban Freight Implementation Tool (UFIT) is a sketch-planning tool to assess urban freight strategy implementation factors (barriers and facilitators) based on expert survey input and user inputs. It compares and identifies promising urban freight transportation strategies based on these implementation factors.
Option 1 Input

• Select strategies to view Strategy Fact Sheet and Citation Notes

![Strategy Groups Diagram]
Option 1 Output

- Strategy Fact sheets and Citation Notes

Alternate Pickup/Delivery Locations

At a Glance

DESCRIPTION
A "last-mile" pickup and delivery strategy offering alternative, usually cost-effective, solutions for delivery and pickup.

OTHER STRATEGIES IN THE SAME GROUP
• Freight Demand Management
• Multimodal Urban Distribution
• Inland Port Infrastructure
• Urban Consolidation Center (UCC)
• Urban Freight Vehicles
• daar: Delivered anywhere, anytime

PROBLEM ADDRESSED
• Logistics Operational costs

TRANSPORTATION MODE
• Multimodal
• Flash delivery

Implementation Notes
Alternate pickup and delivery locations depend on utilizing infrastructure to increase efficiency in freight flow. Implementation requires specific loading zone guidelines, signage, and adoption of new methods and technology changes in operations, including specific truck routes and truck lanes. It is beneficial in efficiency and convenience, encouraging the participation of stakeholders. Comprehensive logistics measures help establish benefits of centralized locations and justify public subsidies.

Opportunities & Constraints

FACILITIES
• Improved logistics efficiency
• Higher traffic congestion
• Improved environmental sustainability

BARRIERS
• Expectations management issues
• Public perception issues among stakeholders

RECOMMENDATIONS FOR IMPLEMENTATION
• Quantity savings from picking, docking, and transit reliability
• Identify public benefits from economic solutions, less cash, traffic flow
• Established or innovative economic system
• Minimize overall logistics costs
• Expected future costs

Examples
Controlling home deliveries by offering residents before the package arrives at a central location or the request of a specified location, such as a nearby grocery store, Amazon or DHL delivery.

Selected References

Sources:

UFIT

Information source: Case Study

Citation
Wendt, Y., & Teljer, E. (2016). Framework of the Urban Freight Transport Management (UFTM) including plan and individual measures that are implemented in different metropolitan areas. The study aims to understand the overall picture of UFTM design and case studies. The study is divided into a description of high transport management, comprehensive development of plans and measures among many public and government bodies and private sector, and legal aspects, and provides case studies that have been introduced.

Keywords:
Urban Freight Transport Management (UFTM) Study

Strategy

Infrastructure
Traffic management
Logistics
Routing

UFTM includes plan and individual measures that are implemented in different metropolitan areas. The study aims to understand the overall picture of UFTM design and case studies. The study is divided into a description of high transport management, comprehensive development of plans and measures among many public and government bodies and private sector, and legal aspects, and provides case studies that have been introduced.

UFIT

Strategy

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UFIT
### Alternate Pickup/Delivery Locations

**At a Glance**

**DESCRIPTION**
A "last mile" pickup and delivery strategy offering alternate, centralized, or localized delivery and pickup.

**PROBLEM ADDRESSED**
- Logistics Operational Issues

**TRANSPORTATION MODE**
- Multimodal
- Roadway

**OTHER STRATEGIES IN SAME STRATEGY GROUP**
- Freight Demand Management
- Multimodal/Intermodal Urban Consolidation
- Intermodal Logistics Center (ILC)
- Urban Consolidation Center (UCC)
- Urban Freight Villages
- Urban Logistics Services
- Certification Programs
- Low-Cost Delivery
- Shared-Road Delivery
- Remote/On-Demand Delivery
- Advanced Delivery Systems
- Alternative delivery modes

### Implementation Notes

Alternate pickup and delivery locations depend on utilizing infrastructure to increase efficiency in freight flow. Implementation requires specific loading zone guidelines, storage, and adoption of new methods and technology. Changes in operations including specific truck routes and truck lanes are beneficial. Efficiency and convenience encourage the participation of stakeholders. Comprehensive logistics measures help establish benefits of centralized locations and justify public subsidies.

### Opportunities & Constraints

#### FACILITATORS
- Improve logistics efficiency
- Mitigate traffic congestion
- Improve environmental sustainability

#### BARRIERS
- Expect lower distribution time
- Expect higher labor costs
- Require high-level coordination among stakeholders

#### RECOMMENDATIONS FOR IMPLEMENTATION
- Quantify savings from parking, dock saturation, and sustainability
- Identify public benefits from emission reductions, land use, traffic flow, and congestion
- Understand factors that influence system access
- Modify infrastructure regulations and zoning to facilitate change
- Adopt new technology, operations, and methodology

### Selected References

Option 2:

- I have a problem and need specific strategies to address it.

“My city hosts several high demand entertainment activities in downtown. There are lots of mixed used developments, and the demand and competition for curb space is very high. This causes additional delay due to double-parked delivery vehicles and drivers waiting or circling around for curbside parking.”

The Urban Freight Implementation Tool (UFIT) is a sketch-planning tool to assess urban freight strategy implementation factors (barriers and facilitators) based on expert survey input and user inputs. It compares and identifies promising urban freight transportation strategies based on these implementation factors.
Option 2 Input

- Select the “Urban Freight Problem” category related to your problem.

- If your problem could belong in multiple categories, clarify the problem definition, and select one relevant category at a time.

- For our “lack of curb space” problem, we select “Infrastructure Problems”
Option 2 Output

- This is the ranked list of potential strategies to address our “lack of curb space” problem.
- Select the strategy that you would like to learn more about.

<table>
<thead>
<tr>
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<th>Strategy Name</th>
<th>Fact Sheet</th>
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<tbody>
<tr>
<td>1</td>
<td>Urban Freight Villages</td>
<td>View</td>
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<tr>
<td>2</td>
<td>Parking Restrictions</td>
<td>View</td>
</tr>
<tr>
<td>3</td>
<td>Geometric Modifications</td>
<td>View</td>
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<tr>
<td>4</td>
<td>Intermodal Logistics Center (ILC)</td>
<td>View</td>
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<tr>
<td>5</td>
<td>Intelligent Transportation Systems (ITS)</td>
<td>View</td>
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<tr>
<td>6</td>
<td>Multi-vehicle Type Urban Distribution</td>
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<tr>
<td>7</td>
<td>Contractual Freight Partnerships</td>
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<td>Designated Truck Routes/Lanes</td>
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<td>10</td>
<td>On-street Parking and Loading Zones</td>
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UFIT
Up 2

Implementation Notes

Implementation should be directed at reducing parking conflicts and delay. Balancing the restrictions between the freight and public communities is important. Stakeholder engagement is needed to support changes in operational schedules and rearrangements. Locations where the infrastructure and the composition of the freight flow fit the strategy.

Opportunities & Constraints

Opportunities

- Reduced freight parking
- Multiple trees per zone
- Reduced parking availability
- Increased visibility
- Reduced infrastructure issues for local facilities

Constraints

- Limited parking availability
- Large tree coverage
- Limited view windows
- Increased parking enforcement by local facilities

Recommendations for Implementation

- Identifying parking by strategy
- Identifying parking by location
- Identifying parking by view windows
- Identifying parking by local facilities

Examples

- Strategic walkway for outside parking
- Strategic walkway for inside parking
- Strategic walkway for hybrid parking
- Strategic walkway for mixed parking

Selected References


Strategy Fact sheets and Citation Notes
Option 2 Output

- At first glance, these strategies may not appear to address our specific problem of “lack of curb space.”
- The tool allows for the selection of additional criteria to refine our search.

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Option 2 Input

- We can go back to the “Urban Freight Problem” screen to refine our search criteria for a more targeted search.
Option 2 Additional Criteria

- For example, we can select the “Strategy Group” to refine search criteria by strategy groups.
Option 2 Additional Criteria

• Then we select the specific strategy group we want to explore.
Then we select the “Spatial Scope of Problems” to narrow down our geographic scope of our specific problem.

Options include:
- City - any
- City - large
- City - medium
- City - super
- Country - large
- Global
- Metropolitan Area
- MPO - medium
- MPO - small
- Coastal
- Area - Australia - South
- Area - America - Central
Option 2 Additional Criteria

• Then we select a search method, either “all” or “any” of the selected criteria.
Option 2 Additional Criteria

- This is the list of potential strategies under the “Traffic Management” Strategy Group and “City - any” Spatial Scope to address our “lack of curb space” problem.
- Notice that “Off-street Parking and Loading Requirements” was not on the earlier list of strategies.

![Strategies by Importance of Factors to Implementation](image-url)
Option 2 Output

- Strategy Fact Sheet and Citation Notes

UFIT
Objectives

• Test the UFIT in real situations confirming UFIT output to be plausible freight strategies to address real and current urban freight problems, and

• Identify top facilitators and barriers to implementation based on UFIT-recommended strategies.
Dallas, Texas Pilot Study

- Off-peak-hour delivery to hospitals being considered in Dallas area to maximize efficiency of freight deliveries to the medical center.

- UFIT identified the Freight Demand Management strategy as a possible response to the freight congestion problem, and the off-peak-hour delivery strategy is an example strategy within the Freight Demand Management strategy.

- Summarized facilitators and barriers to implementation for all strategies identified by UFIT.
• Freight challenges identified in the *St. Louis Regional Freight Study* were input into UFIT.

• Nine (9) strategies were identified and ranked by importance of factors to implementation and researchers documented the primary facilitators and barriers associated with those strategies.
Tampa, Florida Pilot Study

• SR 580/584 in Hillsborough and Pinellas Counties in Florida serves multiple users and modes, including freight.

• Entered challenges into UFIT to obtain and assess recommended strategies.

• Eight (8) strategies were identified and ranked, and researchers documented the primary facilitators and barriers associated with those strategies.
1. State-of-the-practice literature review
2. Updated taxonomy and definitions of 30 freight strategies
3. Defined taxonomy of 16 factors impacting implementation
4. Practitioner input on the factors weights (facilitators and barriers)
5. Strategy Resource Matrix (SRM)
6. Sketch-planning tool (UFIT) “prewired” with default facilitator and barrier weights.
7. Comprehensive citation notes
8. Fact sheets of 30 strategies
9. Pilot study investigations

Conclusions - Research Contributions to Metropolitan Freight Movement
Thank you

Questions?

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