Complete Streets Considerations for Freight
Freight on Complete Streets

• Dangerous collisions
• Pollution
  – Air
  – Noise
• Traffic congestion
• Lane obstructions
• Infrastructure damage
Outline

• Guidebook Development
• 7 Common Challenges and Solution Approaches
• Examples
• Demand Management
Guidebook Development

• Preliminary MetroFreight/VREF research examining truck-bike interactions
• Survey – 10 participating cities
  – Freight experts
  – Street design experts
• Preliminary content presentations
  – MPO Freight Advisory groups: DVRPC, LVPC, NJTPA
  – VREF Urban Freight Conference
• Agency review
Contents

Acronyms

Introduction

1 Fundamentals of Freight
1.1 Freight Demand
1.2 Freight Stakeholders
1.3 Freight Vehicles
1.4 Parking and Loading Infrastructure
1.5 Freight Regulations
1.6 Common CV Challenges in Complete Streets Areas

2 Fundamentals of Emergency Services
2.1 Demand for Emergency Services
2.2 Emergency Service Providers
2.3 Emergency Service Vehicles
2.4 Emergency Response Infrastructure
2.5 Emergency Service Regulations
2.6 Common Emergency Operator Challenges in Complete Streets Areas

3 Street Design and Management Considerations
3.1 Selecting an Appropriate Design and Control Vehicle
3.1.1 Critical Vehicle Dimensions
3.1.2 Design Vehicle vs. Control Vehicle
3.1.3 Existing Recommendations
3.1.4 Selection Criteria
3.2 Providing Adequate Space for Large Vehicle Turns
3.2.1 Curbside Parking Lanes
3.2.2 Curbside Bicycle Lanes
3.2.3 Asymmetrical Median Nose
3.2.4 Recessed Stop Line
3.2.5 Mountable or Flush Curbs
3.2.6 Painted, Striped, or Textured Curb Extensions
3.2.7 Channelized Right Turn Lanes
3.2.8 Vehicle Size Restrictions
3.2.9 Dedicated Signal Phases for Turning Movements
3.3 Reducing the Frequency and Severity of Conflicts Between Large Vehicles and Vulnerable Roadway Users
3.3.1 Bike Boxes and Two-Phase Turn Queue Boxes
3.3.2 Paint and Pavement Texturing to Delineate Conflict Areas
3.3.3 Dedicated or Leading Signal Phases for Non-motorized Travelers
3.3.4 Convex Safety Mirrors
3.3.5 On-Board Blind Spot Mitigation
3.3.6 Truck Side Guards
3.3.7 Education Programs
3.4 Reducing Speeds Without Untended Detrimental Impacts on Operations and Safety
3.4.1 Speed Cushions
3.4.2 Mini Roundabouts
3.5 Providing Network Connectivity and Redundancy
3.5.1 Redundant Networks
3.5.2 Wide Bike Lanes
3.5.3 Mountable Medians

3.6 Providing Adequate Space for Vehicle Parking and Loading, and Delivery or Emergency Operations
3.6.1 Dedicated On-street Loading Zones
3.6.2 Offset Bus and Bicycle Lanes
3.6.3 Mountable Sidewalk or Sidewalk Cutouts
3.6.4 Zoning Regulations
3.6.5 Building Delivery Management
3.6.6 Commercial Meter Pricing
3.6.7 Flexible Curb Regulations
3.6.8 Enforcement

3.7 Providing Safe Access to Sidewalks, Buildings, and Fire Hydrants
3.7.1 Mid-block Curb Cuts
3.7.2 Vertical Clearance Zone
3.7.3 Horizontal Clearance Zone
3.7.4 Shared Streets

4 Demand Management Strategies
4.1 Off-hour Deliveries
4.2 Lockers and Pick-up Points
4.3 Urban Consolidation Centers
4.4 Secondary Referral Services
4.5 Building Sprinklers

5 Additional Resources

6 Credits
Potential Areas of Application

• Urban centers
• Suburban/exurban areas with warehousing/industrial development
• Suburban/small town main streets
• Industrial/commercial campuses
Freight Operator Motivations (Chapter 1)

- Meet customer demands
  - On-time
  - Maintain quality of goods
- Minimize costs
- Provide reliable service
- Meet regulatory requirements
7 Common Challenges

• Selecting an appropriate design vehicle
• Vehicle navigation challenges
  – Providing adequate space for large vehicle turns
  – Reducing conflicts with vulnerable roadway users
  – Safely reducing speeds
  – Providing network connectivity and redundancy
• Curbside challenges
  – Providing adequate space for parking, loading, and emergency response operations
  – Providing curb and building access
7 Common Challenges

• Selecting an appropriate design vehicle
• Vehicle navigation challenges
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• Curbside challenges
  – Providing adequate space for parking, loading, and emergency response operations
  – Providing curb and building access
Freight Design/ Control Vehicle Selection

- Current/expected freight trip generating land uses
- Street functional classes and network designations
- Applicable truck size and weight regulations
- Current/expected freight traffic flows
- Historic incident data involving freight vehicles
Large Vehicle Turns
Design Solutions

1. Asymmetrical median nose provides space for wide turn

1. Space available for wide turning path
2. Painted conflict area

1. Recessed stop line
2. Space available for lane encroachment
Operational Solution: Dedicated Signal Phases

1. Separated turn phases

2. Separated directional movement phases
Regulatory Solution: Vehicle Size Restrictions

- Fixed
- Time-based

- Safety benefits of size restrictions must be carefully weighed against related impacts
  - VMT and congestion
  - Operator costs and industry participation
Conflicts with vulnerable road users
Design Solutions: Bike Infrastructure, Clear Identification of Conflict Zones
Operational Solutions: Dedicated Signal Phases and Roadside Mirrors

1. Leading bicycle phase
2. Vehicle turning phase

![Traffic signal for bicycles and cars]

![Roadside mirror with a bicycle symbol]
Vehicle-Based Solutions

- Mirrors
- Fresnel safety lenses
- Cameras
- Direct vision
- Side guards
Education

- Drivers
- Non-motorized travelers
- General public
Space for parking, loading, and delivery
Design Solutions

1. Loading zone with adequate length for maneuvering and rear loading
2. Access aisle
3. Midblock curb cut

1. Direct curb access for loading
2. Transit bulb
3. Corner bulb
Regulatory Solutions
Operational Solutions

• Building Delivery Management
  – Centralized delivery location
  – Secure storage room
  – Lockers
  – Loading dock appointment system

• Enforcement
  – Commercial vehicles
  – Loading zone obstructions
Curb and building access
Design Solutions

1. Loading zone with adequate length for maneuvering and rear loading
2. Access aisle
3. Midblock curb cut

1. Horizontal clearance zone for loading and delivery
2. 14’ MIN Clearance
3. 13’-6” MAX TYP.
4. Lighting free of overhead power lines
5. Vertical clearance zone free of obstructions
Demand Management

- Change the volume, spatial, or temporal distribution of demands
- May require policy change, infrastructure investment, and/or behavior change by multiple stakeholders
- Will only be implemented if costs are acceptable to decision-makers
# Off-Hour Deliveries

<table>
<thead>
<tr>
<th>Method</th>
<th>Benefits</th>
<th>Challenges/Concerns</th>
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</table>
| Shift deliveries to non-peak hours | • Early morning  
• Late evening  
• Overnight | For operator:  
• Reduce travel time delays, fuel costs, and parking fines  
For business:  
• Receive deliveries when few customers present  
For neighborhood:  
• Reduce congestion impacts  
• Reduce demand for shared curb space | For operator:  
• Increase driver labor costs  
• Increase safety risk  
For business:  
• Additional staff costs for off-hour receipt  
For neighborhood  
• Generate delivery noise at night |
## Consolidation Center

<table>
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| Transfer goods from large freight vehicles to small, green vehicles for final delivery | For operator:  
• Avoid expensive last mile costs | For operator:  
• Increase costs for transloading  
• Lose final delivery visibility |
| Consolidate goods from multiple carriers onto shared vehicles | For business:  
• May provide value added services  
• May improve reliability | For business:  
• May have to pay premium for services |
| | For neighborhood:  
• Reduce large vehicle trips  
• Reduce demand for parking  
• Reduce emissions | For neighborhood  
• May increase local VMT  
• May require public subsidy for start-up, operations |
## Lockers and Pickup Points

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<tr>
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<tbody>
<tr>
<td><strong>Lockers:</strong> Secure locker where package can be accessed via security code; may be located in residential area, public space, or local business</td>
<td><strong>For operator:</strong> • Avoid expensive failed deliveries, repeat trips</td>
<td><strong>For operator:</strong> • Difficult to identify host business</td>
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<td><strong>For residents:</strong> • Provide secure location to leave package</td>
<td><strong>For residents:</strong> • May be at risk during pickup</td>
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<tr>
<td><strong>Pick-up Points:</strong> Staffed delivery points at local businesses (e.g. pharmacy, grocery store)</td>
<td><strong>For neighborhood:</strong> • Reduce delivery trips</td>
<td><strong>For neighborhood:</strong> • May need public space</td>
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<tr>
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<td><strong>For host business:</strong> • Generate foot traffic</td>
<td><strong>For host business:</strong> • May use floor space</td>
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Acknowledgements

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Guidebook can be accessed from: https://www.metrans.org/news/new-metrofreight-publication-a-guidebook-for-considering-freight-in-complete-street-design-

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