Potential Impacts of Emergent Technologies on Freight-Related Land Uses in Urban Areas

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Portland, Oregon
May 9, 2019
Tracking Freight Flows

- Traditional fleet-based management systems
  - Telematics
  - Communications with individual trucks
  - Global Positioning Systems (GPS) feeds
- Modern communications
  - App-based
  - Machine-learning algorithms
  - Real-time management
  - Archived data streams
Understanding Where is the Freight Coming From and Going To?

- Evolution over time:
  - Early interest – 1970s Conference on Urban Commodity Flows
  - Deregulation of trucking – 1980s
  - Just-in-time deliveries – 1990s – 2000s
  - E-commerce w/rapid delivery - current

- Traditional Land Use Planning
  - Little attention to freight activities
  - Local focus with individual jurisdiction regulations
Traditional Land Use Planning

• Euclidean Zoning
  • Broadly describes industrial activities that produce truck trips.
  • Limited opportunities to facilitate freight activities, particularly in commercial and residential areas.

• Comprehensive Plans
  • Solicit public input for a community-wide vision of the future.
    • Often exclude freight activities from discussions.
Regional Land-Use Data Program

- Jurisdiction-specific codes aren’t useful for regional analyses
  - Analysis between regions does not sync, therefore, supply chain analysis can’t be done.
- Land-Based Classification Standards (LBCS).
  - Developed by FHWA, APA and other federal agencies in late 1990s.
    - Five harmonized dimensions with codes and definitions based on parcels:
      - Activity
      - Function
      - Structure Type
      - Site Development Characteristics
      - Ownership
  - Available at https://www.planning.org/lbcs/

Goes on top of regular zoning
Tools to Add Estimated Freight Movements

• NCFRP Reports 19 and 37 provide estimation parameters for freight generation (FG), freight trip generation (FTG), and service trip generation (STG) using NAICS codes.

• Cross-walk NAICS code information (from commercial source e.g., Dunn & Bradstreet, InfoUSA) to LBCS function codes.

• Use LBCS + Truck Trips to create parcel-based FG, FTG, and STG estimations across the landscape, tied to local jurisdictions.
LBCS+Freight Data Program

- Jurisdictions can add estimated freight activities (using freight production/attraction estimation equations) based on land use functions by parcel across an entire region.
When Freight Is Not Integrated into the Urban Fabric
Freight Integrated into the Urban Fabric

https://www.minnpost.com/minnesota-blog-cabin/2015/10/want-make-our-transportation-network-more-efficient-create-bustruck-only/
Proactive Land Use Planning Tools

• Research focus on land use practices and freight
  • Overlays with specific adaptations for freight behaviors
  • Form-based/Hybrid codes
  • Special Districts
  • Logistics Zones

• Need for “model language” to facilitate adoption
  • Will require evidence-based data support
Overlay Zones

• Easier to enact or amend than Euclidean zoning, but still require local legislative action.
• Less subject to court action.
• Designed to cater to explicit needs.
• Used to successfully address freight issues.
Form-Based Zoning

- Disappointment with traditional zoning prompts attempts to control outcome of development through descriptions and illustrations.
  - Illustrated in three dimensions.
  - Requires intensive public outreach to adopt, but reduces need for legislative actions going forward.
  - Relies on a transect concept that marginalizes freight activities.
Hybrid Zoning

• Creates a mix of traditional and form-based zoning.
• Has been successfully used to describe and illustrate freight activities.
  • Albany, New York
• Requires intensive public outreach to adopt, but reduces need for legislative actions going forward.
Hybrid Zoning for Active Freight Functions

Table 375-2-30: I-1 Light Industrial
See Section 375-4(A) for more details

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<th>B</th>
<th>Impervious lot coverage, maximum</th>
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<tr>
<td></td>
<td></td>
<td>Side, minimum</td>
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<td>Building Standards</td>
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<td>Height, accessory buildings, maximum</td>
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Table 375-2-32: I-2 General Industrial
See Section 375-4(A) for more details

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<td>Height, accessory buildings, maximum</td>
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</table>

Designated Logistics Zones

- Port-centric Logistics Zones
- Logistics Support Zones
- Urban Distribution Centers
- Urban Consolidation Centers
- Freight Villages

Data Traces from Freight Flows

- Current technologies generate data traces from on-board operations at a fine grain.
- Harvesting, post-processing and anonymizing data traces:
  - National Performance Management Research Data Set (NPMRDS)
    - 5-minute average speeds from trucks on National Highway System
    - Additional of local roads (available from commercial vendors)
Assistive Intelligence (AI) Programs

• NCFRP Report 29 – ‘Making Trucks Count’ describes mobile apps to aid truck activities.

• Use two-app communications to control:
  • Scheduling, transactions and reservations
    • Which trucks arrive on-site at what time
    • Length of time they can park

• Leverage app information:
  • Conduct analysis on app “traces” to determine program effectiveness and policy modifications, when needed.
  • Require monitoring and cumulative impact analysis as part of land use applications for new development or redevelopment.
Freight Efficient Land Use Planning

• Form new partnerships between Metropolitan Planning Organizations (MPOs) and local planning agencies to address freight.

• Enhance Hybrid Zoning by incorporating performance monitoring and truck trip generation aggregations into ordinances.

• Conduct outreach to the freight community members to identify benefits (e.g., higher productivity for carriers).
Questions?

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