Don’t Be Scared:
Small and Medium-Sized Communities can do Freight Planning, too!

Champaign-Urbana Region Freight Plan
2019 AMPO Annual Conference

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Champaign County Regional Planning Commission
Champaign Urbana Urbanized Area Transportation Study (CUUATS)
The Champaign-Urbana region

- **Location**
  135 miles south of Chicago in central Illinois

- **Land area**
  180 square miles

- **Population**
  148,000

- **Home to the University of Illinois**
  50,000 students
Champaign-Urbana Region

FREIGHT PLAN

Plan funded by
- Illinois Department of Transportation (IDOT)

Plan prepared by
- CUUATS Staff at the Champaign Urbana Urbanized Area Transportation Study (CUUATS)
- a program of the Champaign County Regional Planning Commission (CCRPC)

In cooperation with
- Champaign County
- Champaign County Chamber of Commerce
- Champaign County Economic Development Corporation
- City of Champaign
- City of Urbana
- Federal Highway Administration (FHWA)
- IDOT Central Office, IDOT District 5
- Mid-West Truckers Association
- University of Illinois
- Village of Savoy
Plan Objectives

Build awareness
Linkage between the region’s economy and key infrastructure components.
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**Identify freight movement patterns**
Commodity tonnage and value by mode and direction.
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- **Establish an understanding**
  How the transportation system is utilized by freight generators and carriers
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How the transportation system is utilized by freight generators and carriers.

**Identify current and future needs**
Stakeholder interview and survey
Develop a commodity flow database and a regional freight model.
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  How the transportation system is utilized by freight generators and carriers

- **Identify current and future needs**
  Stakeholder interview and survey
  Develop a commodity flow database and a regional freight model

- **Identify and prioritize opportunities**
  Create performance measures
  Planning and policy decisions
Why Plan for freight?
Why Plan for freight?

Who generates, attracts, & carries freight?
1. Why Plan for freight?

2. Who generates, attracts, & carries freight?

3. What is transported on the freight system?
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1. Why Plan for freight?

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5. How is the key freight infrastructure used today?
What are the needs?

• Stakeholder surveys
• Roundtable discussions
How are the freight movements and needs likely to change in the future?

- Freight demand modeling
- Other trends
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Why Plan for freight?
Why Plan for freight?

Who generates, attracts, & carries freight?
Freight Intensive Sectors
33% of the businesses and 29% employment of Champaign County

Employment

71%
Non-Freight Intensive Industries

29%
Freight Intensive Industries

Agriculture* includes agriculture, forestry, fishing and hunting, and mining

Data Source: 2015 American Community Survey 5-year estimates, US Census Bureau
1. **Why** Plan for freight?

2. **Who** generates, attracts, & carries freight?

3. **What** is transported on the freight system?
FAF4 data

- U.S. Department of Transportation
- Commodity Flow Survey
- 42 broad commodity groups

Limitations:
- Latest data available: 2012
- 132 FAF zones instead of county level
- Limited information on pass-through flows
- Does not capture some in-house fleet movements, and certain commodities
Champaign County, 2017

20.7 million tons

$20.9 billion
Leading commodity types by tonnage (truck)

Cereal grains: 27.1%
Gravel: 11.3%
Other foodstuffs: 9.5%
Other ag products: 8.4%
Gasoline: 5.7%
Nonmetal min. products: 4.5%
Waste/scrap: 4.1%
Mixed freight: 3.8%
Natural sands: 3.5%
Fuel oils: 3.1%
All other commodities: 18.8%

K Ton, 2017
Inbound, Outbound, Internal
Top truck trading partners by tonnage, 2017

In 1,000 tons
Top truck trading partners by value, 2017

In million dollars
1. Why Plan for freight?
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Roadway Network
Pavement Condition

More than 19 percent of the roadways in the MPA were rated Poor and Failed in 2017.
Truck Routes

Designated Truck Routes in the Region

Truck Route Type

- **Class One**
- **Class Two**
- **Class Three**
Truck Traffic

Average Daily Truck Traffic (2018)

- 7,501 - 10,450
- 5,001 - 7,500
- 2,501 - 5,000
- 1,001 - 2,500
- 501 - 1,000
- 251 - 500
- 101 - 250
- 0 - 100
Bridge Condition

- Structurally Deficient Bridge
- Scheduled for Improvement
- Serious Condition
- Poor Condition
- Fair & Satisfactory Condition
- Good Condition & Better
- No data / Not Applicable
1. Why Plan for freight?
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Safety
Number of truck crashes (Champaign-Urbana MPA, 2005-2016)
Safety
Type and Reason of truck crashes (Champaign-Urbana MPA, 2012-2016)

- Sideswipe: 20%
- Same Direction: 9%
- Rear End: 18%
- Turning: 14%
- Fixed Object: 13%
- Angle: 7%
- Parked Motor Vehicle: 7%
- Other: 22%

- Driver reasons: 87%
- Environment reasons: 9%
- Vehicle reasons: 5%
Safety

Truck crash density
(Champaign-Urbana MPA, 2012-2016)
Mobility

- Data Source: 26 million truck GPS records from ATRI
- Time period: February, April, July, and October of 2017 (two weeks per month)

  The week of October 17 to 24, which contains a total of 2.9 million GPS records for more than 33,000 unique trucks, was selected for more detailed analysis.

- Data limitations:
  - Onboard communications equipment installed on commercial trucks only (agricultural trucks and some logistics providers trucks not represented)
  - Various GPS data stream frequencies
  - No activity information included
High Truck Traffic Roadways & Locations

- The interstates (I-57, I-72, I-74);
- The U.S. routes (U.S. 45, U.S. 150);
- The state routes (IL 10, IL 47, IL 130);
- Staley Road (U.S. 150 - Curtis Road);
- Olympian Drive (I-57 - Apollo Drive);
- Bradley Avenue (Staley Road - Lincoln Avenue);
- Mattis Avenue (Bloomington Road - Windsor Road);
- Duncan Road (Bradley Avenue - IL 10/Springfield Avenue);
- Prospect Avenue (Bloomington Road - Interstate Drive);
- ...
Mobility Analysis

Areas of Interest
- Major industrial land use areas
- Logistics and distribution centers
- Major retail businesses
- Downtown Champaign
- Downtown Urbana
- University of Illinois campus district
e) Route Analysis

Trucks accessing the retail businesses near the Interstate Drive and Prospect Avenue intersection

Major access roadways
- I-57, I-74, I-72, U.S. 45
- West Olympian Drive, North Prospect Avenue, Bradley Avenue, Mattis Avenue, Church Street, and East and West University Avenue

Daily number of trucks

<table>
<thead>
<tr>
<th>Day</th>
<th>Trucks</th>
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</thead>
<tbody>
<tr>
<td>Monday</td>
<td>22</td>
</tr>
<tr>
<td>Tuesday</td>
<td>31</td>
</tr>
<tr>
<td>Wednesday</td>
<td>28</td>
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<tr>
<td>Thursday</td>
<td>31</td>
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<tr>
<td>Friday</td>
<td>26</td>
</tr>
<tr>
<td>Saturday</td>
<td>21</td>
</tr>
<tr>
<td>Sunday</td>
<td>0</td>
</tr>
</tbody>
</table>

27% of the truck movements were concentrated between 7 a.m. and 8 a.m. and between 12 p.m. and 1 p.m. on weekdays
e) Speed Analysis

Trucks accessing the retail business area near the Interstate Drive and Prospect Avenue intersection

Slow Speed:
- near the retail businesses area
- Interstate exits

Truck GPS Records
- Speed <= 10 mph
- 10 mph < Speed <= 25 mph
- 25 mph < Speed <= 45 mph
- 45 mph < Speed <= 65 mph
- Speed > 65 mph

Source: American Transportation Research Institute (ATRI)
e) Speed Analysis

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What are the needs?

- Stakeholder surveys
- Roundtable discussions
Stakeholder outreach
Surveyed businesses profile

- Non-fleet owning stakeholders, 56%
- Fleet-owning stakeholders, 44%

- 17%
- 17%
- 10%

- Carrier or third-party logistics provider
- Shipper or receiver operating private fleet
- Other

Map showing distribution of stakeholder outreach across the United States.
Stakeholder outreach
Key freight system issues and needs

- Traffic congestion: 18.2%
- Roadway condition: 16.7%
- Roadway geometry issues: 10.6%
- Bridge condition: 7.6%
- Bridge geometry: 7.6%
- Delivery/loading zone: 7.6%
- Rail system condition: 7.6%
- Regulatory: 7.6%
- Intersection: 4.5%
- Truck wayfinding/signage: 4.5%
- Other: 7.6%
Transportation issues affecting freight movement

- Traffic congestion
  1. Neil Street
  2. Prospect Ave
  3. Route 45
  4. University Ave to Prospect Ave
  5. I-74 (Champaign and Danville)
  6. Route 150 and I-74 ramp
  7. I-74 and I-57 Interchange
  8. I-74 from Mahomet during commuter hours
  9. Route 150 (Route 130 to I-74)
  10. Route 150, huge quantity of additional traffic due to I-74 construction
  11. East University Ave, Urbana
  12. Downtown Champaign
  13. Champaign
  14. Urbana
  15. Savoy
  16. North/South access roads to/from Champaign/Urbana
  17. Campus streets difficult to maneuver

- Bridge condition issues
  1. Springfield Ave
  2. Green St
  3. CN rail crossing over Bradley Rd
  4. Bradley Ave
  5. Prospect Ave
  6. Neil St
  7. State St
  8. Randolph St

- Truck wayfinding/ signage issues
  1. Walnut Street northbound, where the one way exists is not marked adequately to note left lane needs to turn left. Two way traffic ahead.

- Delivery loading zone issues
  1. Campus
  2. Parking in downtown Champaign
  3. Parking in downtown Urbana

Legend
- Metropolitan Planning Area
- Interchange
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Minor Collector
- Local Road

Source: Champaign County Freight Study Stakeholder Survey, Champaign County GIS Consortium
What are the needs?

- Stakeholder surveys
- Roundtable discussions
How are the freight movements and needs likely to change in the future?

- Freight demand modeling
- Other trends
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## Modeling Freight vs Passenger Travel

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<th>Passenger Movements</th>
<th>Freight Movements</th>
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<tbody>
<tr>
<td>• Persons trips</td>
<td>• Complex chain of interregional trips carrying commodities &amp; services</td>
</tr>
<tr>
<td>• Less intermodal in nature</td>
<td>• Often more intermodal</td>
</tr>
<tr>
<td>• Less infrastructure impact</td>
<td>• Heavier vehicles have greater infrastructure impacts</td>
</tr>
<tr>
<td>• Trip generation and attractions well understood and predicted</td>
<td>• Freight movements sensitive to market forces; difficult to forecast demand</td>
</tr>
<tr>
<td>• Plenty of publicly available data</td>
<td>• Fewer sources of publicly available data</td>
</tr>
<tr>
<td>• Stakeholders easily identified</td>
<td>• Freight stakeholders harder to identify and more challenging to engage</td>
</tr>
<tr>
<td>• Vehicle trips proportional to demand (vehicle occupancy rate)</td>
<td>• Truck trips not proportional to demand (carrier cargo consolidation)</td>
</tr>
<tr>
<td>• Variables: Land use, car ownership, activity concentration, network supply</td>
<td>• Variables: Economic activity, business size, land use, logistics decisions, additional network constraints</td>
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Freight Demand Modeling

- Model: Commodity-based freight demand model
  Cube Cargo
- Base year: 2015
- Horizon year: 2045
- Modes: truck & rail
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Freight Demand Modeling

Champaign County Population

- 2015: 208,000
- 2045: 253,500

Champaign County Employment

- 2015: 103,500
- 2045: 139,050
Freight Demand Modeling

Champaign County Population
- 2015: 208,000
- 2045: 253,500

Champaign County Commodity Flow Tonnage (million tons)
- 2015: 20.7
- 2045: 29.7

Champaign County Employment
- 2015: 103,500
- 2045: 139,050

Champaign County Daily Truck Trips
- 2015: 19,516
- 2045: 23,905
Freight Demand Modeling

Champaign County Population

Champaign County Commodity Flow Tonnage (million tons)

Champaign County Employment

Champaign County Daily Truck Trips

Champaign-Urbana MPA Truck VMT

Champaign-Urbana MPA Congested Lane Miles
How are the freight movements and needs likely to change in the future?

• Freight demand modeling
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The Champaign-Urbana Region Freight Plan envisions the Champaign-Urbana area as a vibrant region with a thriving economy connecting people and goods to regional, national, and global markets by providing safe, efficient, and reliable transportation connections.
Goals

- Improve safety
- Preserve existing infrastructure
- Improve efficiency
- Expand freight-supporting services and grow the economy
- Improve quality of life

- National Highway Freight Program Goals
- Illinois Strategic Highway Safety Plan (ILSHP) Goals
- Illinois Freight Plan Goals
- LRTP 2040 Sustainable Choices 2040 Goals
- 43 Literature reviewed
Goals

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✓ National Highway Freight Program Goals
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✓ LRTP 2040 Sustainable Choices 2040 Goals
✓ 43 Literature reviewed
The Champaign-Urbana area will ensure the safety of the transportation system for all people, goods, and services, and in the long term, achieve the state's "Zero Fatalities" goal and reduce heavy-vehicle-involved serious injuries.
Goals: Improve safety

Objectives

Eliminate all heavy-vehicle-involved fatalities by 2025

Performance Measure

Total heavy-vehicle involved fatalities (five-year rolling average)
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<td>Explore the feasibility of requiring freight vehicles operating under IDOT/municipal/the University contracts to have truck side guards installed, where appropriate.</td>
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<td>Support the development, maintenance, and communication of a regional truck route system and a truck wayfinding plan with consistent truck route signage.</td>
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<td>Enhance air cargo services</td>
<td>Provide support to the development of the Willard Airport Master Plan to encourage new and enhanced air cargo services.</td>
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<td>Curbside management study &amp; Improved truck delivery zone</td>
<td>Develop a curbside management study/plan that inventories existing curbside spaces, private loading bays, current municipal curbside usage, regulations on permitting, pricing, signage, truck loading zone designation and hours, and the relationship between truck loading zones and traveling lanes, parking lanes, transit stops, bicycle and pedestrian facilities.</td>
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<td>In preparation for the emerging technologies such as autonomous/connected vehicles and truck platooning, continue maintaining roadway striping to keep roadways detectable for sensors; participate in discussions about pilot programs in the state to be aware of emerging opportunities; initiate studies to coordinate and build consensus among stakeholders on the requirements for operating autonomous trucks on local streets.</td>
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<td>Funding advocacy</td>
<td>Continue to identify federal, state, and other funding sources and work with public agencies, the private sector, and elected officials to identify local projects eligible and suitable to apply. Continue to advocate for adequate funding and investment to maintain and improve the freight transportation system.</td>
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<td>Safety data analysis</td>
<td>Continue monitoring and analyzing heavy-vehicle involved crashes to identify areas that have problematic or crash-inducing patterns and work with the state and local agencies to investigate safety solutions.</td>
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<td>Alternative fuel freight fleet</td>
<td>When purchasing new or replacing old municipal truck fleets, consider alternative fuel trucks and educate truck drivers in eco-driving practices to conserve fuel while driving.</td>
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<td>Public outreach &amp; education</td>
<td>Develop and distribute education materials for trucking companies on the freight network, local municipal regulations, preferred routes parking, low bridges, online information system, and other resources. Educate the public on the importance of freight in regional economy and safety information when sharing a road with trucks.</td>
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Goals: Improve safety

Strategies & Projects

Vision Projects
- New Roadway Construction Projects
- Bridge Replacement/Rehabilitation Projects
- Roadway Reconstruction Projects
- Congestion Mitigation Projects

Legend:
- Interstate
- Other Principal Arterial
Vision
Goals
Objective
Performance Measure
Strategies & Projects
Moving forward

Responsible parties, time frame, & funding sources

- State Road Fund
- State Construction Account Fund
- Surface Transportation Block Grant Program (STBG)
- Illinois Grade Crossing Protection Fund
- Truck Access Route Program (TARP) Funds
- Highway Safety Improvement Program (HSIP)
- Economic Development Program (EDP)
- Rail Freight Local Program
- Illinois Transportation Enhancement Program (ITEP)
- Airport Improvement Program
- BUILD
- National Highway Performance Program (NHPP)
- National Highway Freight Program
- INFRA
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