Data Assessment Methods for Truck-Sea Vessel Flow Analysis

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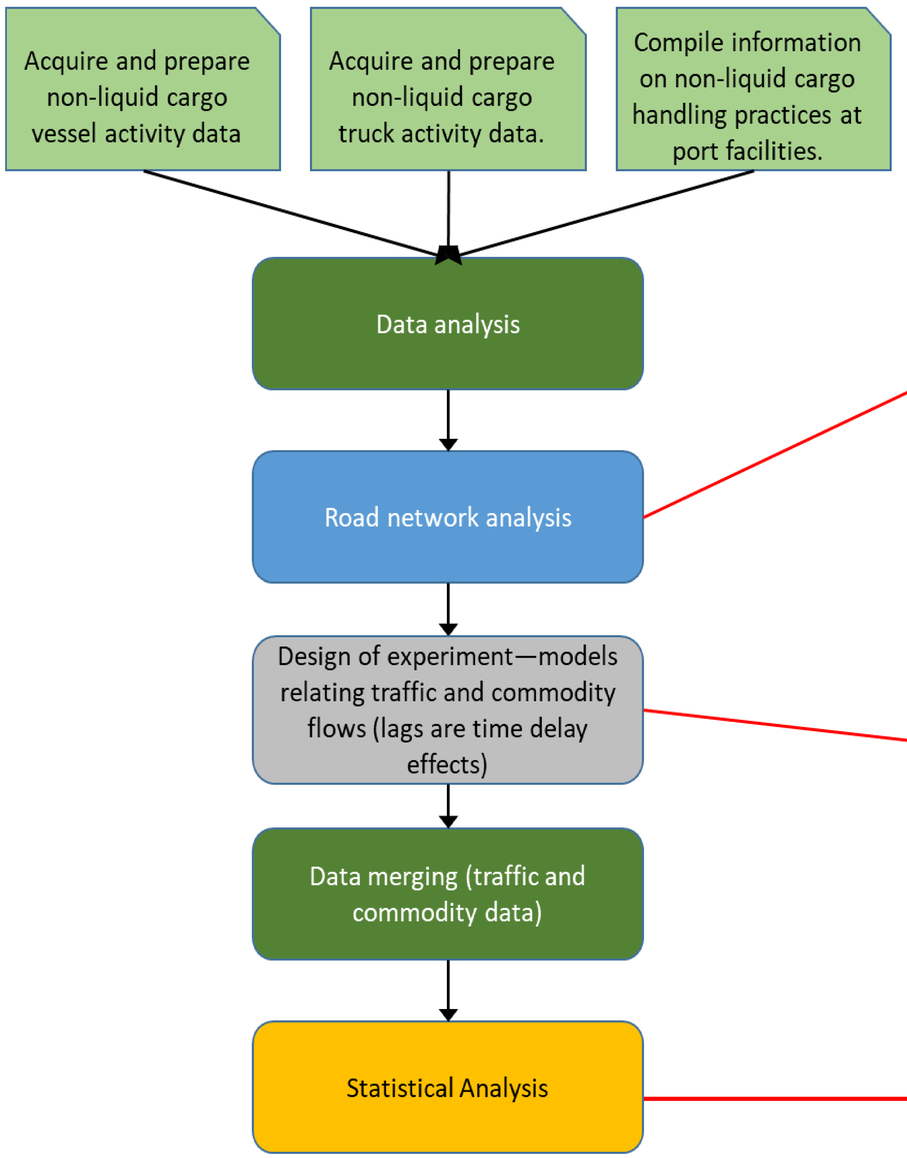
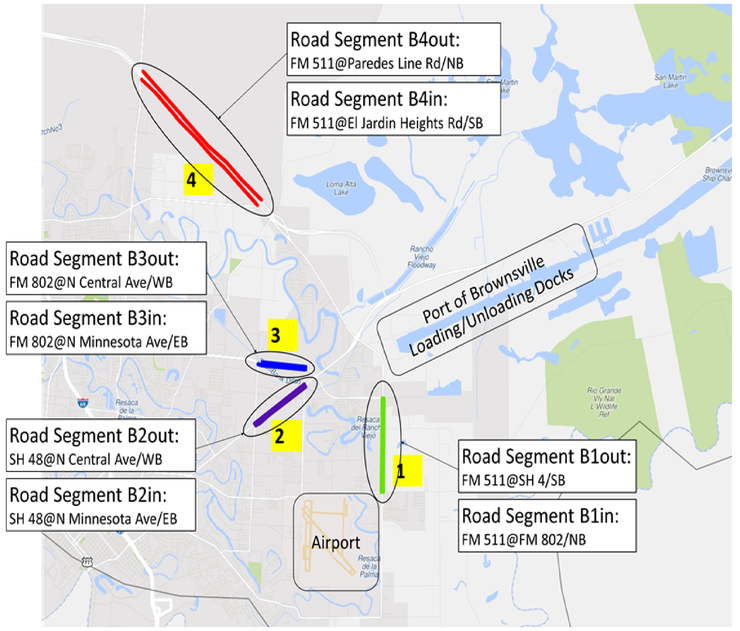
Research Objective Develop and apply a freight fluidity methodology to analyze the relation between truck and ocean-vessel activities.

Methodology Steps



Outcomes of Methodology Steps



Variables:	Dependent = Truck traffic volumes per road segment Independent Variables = Commodity Volume Lags	
Model	Import	Export
1	0,1,2,3	
2		0,-1,-2,-3
3	0,1,2,3	0,-1,-2,-3

	Model 1	Model 2	Model 3
B2in	Import_lag0 (0.0008146) Import_lag3 (0.0008823)	-	Import_lag0 (0.0007257) Import_lag3 (0.0009187) Export_lag-3 (0.0056968)
B2out	Import_lag0 (0.0009541) Import_lag2 (0.0007017)	Import_lag-2 (0.0049319)	Import_lag0 (0.0008241)
B4in	Import_lag3 (0.0020105)	-	Import_lag3 (0.001458)
B4out	Import_lag3 (0.0020496)	-	Import_lag3 (0.0015552)
B1in	Import_lag2 (0.0008123) Import_lag3 (0.0007133)	-	Import_lag2 (0.000776)
B1out	Import_lag3 (0.0007679)	-	-

Data Sources

- Truck volume data: National Performance Management Research Data Set (NPMRDS)
- Vessel call data : PortVision and Port of Brownsville Harbor Master's Office
- Commodity data: Census and vessel visit data from PortVision and the Ports of Brownsville and Freeport

Results

Coefficient values representing the impacts of sea flows on ground transportation, specified by road, direction and delay time (lag). For instance:

In Model 1 - SH 48 (B2)

- A unit of sea cargo arriving at the Port of Brownsville, is expected to increase outgoing truck traffic from the port in the same week by 0.095% ("lag0"),
- And after two weeks by 0.070% ("lag2").

Practical Implications

This analysis provides *accurate estimates of changes in traffic flows, which can be converted into number of trucks,* by specific roads, and directions of traffic flows and the time when those changes will occur. This is a powerful tool for planning any activity or change in road infrastructure that is relevant or linked to port operations.

Future Research

Assessments using these coefficients as simulation parameters to provide a dynamic tool for traffic evaluation.