Multi Entity Perspective Freight Demand Modeling Technique: Varying Objectives and Outcomes

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ABSTRACT

The importance of freight transportation modeling and forecasting to better address planning issues is well recognized by policy makers. Compared to advancement in travel demand modeling for passenger travel, however, current freight demand modeling methods are not yet in the adequate levels to assess increasingly complex and important planning and policy issues. Three most important players in freight demand modeling are (a) shippers, (b) planners, and (c) policy (decision) makers who have different objectives. Past research is limited in proposing a unified methodology to address the objective of each player and to assess performance of transportation networks under conditions to achieve such objectives.

In this paper, freight demand modeling is designed to address each objective of the three players in a multimodal transportation network. A freight transportation model that combines three geographic scales—national, state, and local—is proposed and developed to capture different characteristics of short- and long-distance freight flows with a focus on state-level modeling in Maryland. Data for the model include freight flows by commodity and by Freight Analysis Framework (FAF) zones, which are further disaggregated to Statewide Modeling Zones in Maryland; a transportation network with detailed link level attributes; user costs in addition to all details needed for the travel demand model. In the modeling framework autos are simulated simultaneously with trucks in a multi-class user equilibrium traffic assignment. The results demonstrate the network performance and key information on travel characteristics for each player. The proposed tool can be used for freight travel demand modeling for analyzing impacts of policies at state, county and local levels.

Key Words: freight demand modeling, freight analysis framework, freight planning, multi-modal transportation modeling

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