

2009 National Urban Freight Conference

Track Summary

In addition to the plenary sessions, the National Urban Freight Conference featured papers in seven different tracks designed to explore the various aspects of freight movement within metropolitan areas. Each track was composed of different sub-tracks around which the presentations were organized.

Track 1 comprised seven sub-tracks: Urban Vehicle Routing; Rail and High Speed Transport Technologies; Freight Data Models 1 & 2; Freight Terminal Operations; Models for Freight Movement; and Impact of Highways.

Urban Vehicle Routing 1-1 featured three papers, the first of which explored the problem of emissions and energy minimization in vehicle routing and whose research focuses on the minimization of emissions as the primary objective which leads to the formulation of an Emissions Vehicle Routing Problem (EVRP). The second session examined performance characteristics of goods delivery tours in urban areas, suggesting a methodology for assembling data and assessing the characteristics of the actual pickup and delivery tours that comprise urban goods movement. The final session focused on tour-based origin-destination synthesis formulations of urban commercial vehicle movements, breaking down the typical assumptions of traditional trip-based demand models.

Rail and High-Speed Transport 1-2: Three presentations were made; the first considered simulation modeling in developing plans for on-dock rail support facilities at the Port of Long Beach, suggesting herein that a simulation model of the port rail activities offers the powerful ability to filter these alternatives and determine which ones are feasible and to determine “what needs to be built” to support projected volume scenarios. The second paper was on the impact of a national, high-speed, alternate technology transportation network for container transport. Results show that a high-speed network for freight distribution will have a significant impact on freight transit times and highway congestion and will address challenges facing transportation. The final paper proposed a genetic algorithm procedure to solve the railway routing and scheduling problem, the objective being to dispatch trains along routes that minimize travel delays, which addresses the effects of network topology, train characteristics and interactions between trains on the overall delay across given networks.

Freight Data Models 1-3 contained four paper presentations. The first paper, issues and approaches to the utilization of highly aggregated databases in freight planning and modeling, described the approaches, processes and methodologies in utilizing available data, and developing additional sources to provide the freight info needed to model

transportation systems at the local Metropolitan Planning Organization and statewide levels. The second presentation provided data for freight decision making. The next considered a binary logit model for grain movement by truck and rail in the U.S. and finds the distance, value, weight, cost, fuel and mode characters such as, speed, load and fuel factor. All are important in determining mode shares. A final paper discussed truck trip generation in small and medium-sized urban areas. Results from the study indicate that employees are a statistically significant predictor and explanatory power in predicting the number of truck trips produced and attracted to businesses.

Freight Terminal Operations 1-4 comprised three presentations. The first two presentations dealt with modeling and analysis of door layouts at crossdock facilities and the scheduling of trucks to a cross-docking facility; minimizing tardiness and earliness and maximizing throughput. The problem formulation has the objective of minimizing the total service time of all inbound and outbound trucks. The third paper considered the implications for logistics developments of accessibility and exclusive truck facilities in the greater Toronto area. The study finds not only is proximity to major highways essential, but the relationship between access and commercial land development is also a consideration.

Models for Freight Movement 1-5: The first of three papers addressed movement modeling for engineering, logistics and distribution. This presentation describes the freight movement model for the State of Oklahoma. The second paper discussed modeling demurrage costs in container shipments. To find out which containers will incur demurrage charges a model was developed to carefully track all containers arriving and when they will leave based on demands for goods and trucking capacity. The final paper looked at models and modeling issues of freight flow movement which reviews widely used freight movement models in operations research, geography, transportation, logistics, trade and economics.

Freight Data Models 2 – 1-6: Three papers were presented, starting with the presentation of an application in which the Freight Analysis Framework Version 2 (FAFV2) port data was incorporated into a traditional urban transportation planning model for small/medium-sized communities. The next paper provided results obtained modeling freight transportation in an urban area using a highly aggregated, publicly available, freight flow database, known to have limitations. The concluding paper looked at international freight flows in Southern California giving an overview of the California-Baja, California border crossing.

Impact on Highways 1-7: Two presentations were made, the first of which addressed TransNIEMO, a model of interregional trade with explicit consideration of highway network effects. This paper illustrated an application of the first operational multi-

regional input-output model for the U.S., NIEMO (the National Interstate Economic Model), which models trade among 47 economic sectors and 50 states plus the District of Columbia. Another paper looked at determining regional network boundaries (RNBs) for sub-state regions from U.S. highway network nodes data. This research takes the first step in addressing the problem of developing a practical methodology for establishing appropriate regional network boundaries based on plausible analysis of a selected number of intersection nodes.

Track 2 consisted of a single segment regarding Port Operations: Simulating and Measuring Productivity. The initial paper examined the potential for Southeast Michigan to expand on its current freight gateway status, using globalization to its advantage. Another proposed a framework to measure mathematically the intensity of ports in regional markets on port operational efficiency. A third paper presented evaluates the impacts of a marine terminal gate appointment system using simulation. The final paper discussed, analyzed, and compared EDI and XML based communication between agencies at the Los Angeles and Long Beach Ports.

Track 3 contained five sections regarding Corrective Policy Analysis; Urban Delivery Industry Response to Cordon Pricing, Time-Distance Pricing and Carrier-Receiver Policies; Bad Trucks and Good Trucks – Economic Linkages and Externalities of Truck Activities; Accident Rates; and Safety Policies for Trucks Serving the San Pedro Bay Ports:

Corrective Policy Analysis 3-1: One paper explored accident rates and safety policies for trucks serving ports. The increase of truck flows on freeways increases the chances of accidents. Another paper sought to develop analytical formulations to study carrier-receiver interactions and their joint responses to pricing and comprehensive policies.

Freight Flow & Regional Impact 3-2: The paper assessed the sources of lost volume as well as the impact of lower import volumes on regional transportation GDP and labor markets. It also dealt with the assessment of the key drivers and trends in the air freight industry, the contribution of these to the global and regional supply chain, and the impact on regional distribution.

Infrastructure & Improvements 3-3: One paper discussed the determinants of capacity and examines the robustness of the U.S. environmental impacts. A second paper looked into the potential for highway lanes that are specifically designated for truck travel and develops tools and methods for assessing benefits and impacts. The final paper in this track talked about the railroad and goods movement from the Ports of LA and Long Beach. The system needs significant investment and operational improvements to be able to move half of the containers from the two ports by rail.

Demand Modeling 3-4: One paper explored the Model of Price and Frequency Competition in Freight Transportation. The model framework can be used to analyze changing industry -outsourcing in the face of globalization, adoption of just-in-time production processes and changing tax and toll structures' responsiveness to oil price changes. Another paper focused on how to develop an approximation model to estimate the joint carrier-receiver response to off-hour delivery policies.

Vehicle Scheduling & Allocations 3-5: Two papers were included in this track. The first looked into the assessment of the overall economic performance of different vehicle types (small and large trucks) used for urban deliveries in term of congestion and their environmental impacts. The second paper aimed at building a joint discrete choice model of urban commercial vehicle daily tour schedule, which will provide insights on the effects of land use, shipment demand, and shipment type the urban areas.

Track 4 comprised of four sub-tracks: Measurements and Assessments; Mitigation Processes and Techniques; Freight Transport, Inventories, and Logistics and Environmental and Health Impacts.

Measurements and assessments 4-1: All papers dealt with particulate emissions at sea, and passing diesel trucks especially in the Southern California Air Basin.

Mitigation Processes and Techniques 4-2: All three papers in this track explored mitigation emissions for goods movement with modern marine engines and cleaner fuels. This included assessing a ring injector for reducing diesel NOx emissions and developing and assessing humid air systems for diesel NOx reduction.

Freight Transport, Inventories, and Logistics 4-3: The first of three papers described the different methodologies used for preparation of a port emission inventory. It focused on mobile emission sources at ports including oceangoing vessels, harbor, crafts and cargo handling equipments. The second paper described a model of air-toxic emissions from large scale bio-fuel production, with a focus on the impact of freight transport. The third paper is a study with detailed analysis of using zero emission alternative transportation technologies for moving goods (containers) along the I-710 freeway.

Environmental and Health Impacts 4-4: All four papers analyzed the environmental and health impact of transport operations. Topics include chassis pools in terminal operation and port related emissions, train emissions in California's Alameda Corridor, night time urban freight logistics policies and impacts of increased truck loads on pavement supply-chain emissions.

Track 5 included 3 sub-sections: Politics and Institutions; Policies and Institutions and Technologies.

Politics and Institutions 5-1: This track featured four papers. The first paper examined current efforts in privatizing maritime port infrastructure, the implications of such efforts, and suggests a resource development framework for understanding the future impacts of these new developments. The second paper focused on the effects of containerization, and related changes in transportation regulation, on port-logistics worker earnings in U.S. port cities since 1975. A third paper compares two projects that were developed under different leadership and institutional frameworks but functionally deal with movement of goods from the ports of LA and Long Beach. The final paper explored the implications of the lack of dedicated maritime research funding on the nation's transportation policies, transportation planning process, government agencies, and universities.

Policies and institutions 5-2: The papers focused on evaluating emission reductions and trade-offs in urban pickup and delivery systems, and constructing a regional multi-sector CGE (Computable General Equilibrium) model for Southern California to evaluate the impacts of various climate change scenarios on economic activity across the region. One paper looked at a case study of a the vessel speed programs at the Ports of L.A. and Long Beach and another focuses on the issues in siting of a truck rail intermodal facility.

Technology 5-3: There were four presentations in this track. The first paper focused on four main areas including freight technology testing results, recent developments in ITS/CVO technologies, assessing green freight technologies, and leveraging commercial vehicle GPS technologies to support freight planning. The second paper explored the benefits of using the LIM (linear indication motor)-driven PCP (pneumatic capsule pipeline) for container shipment above or below ground from any major seaport. The third presentation discussed the need for building GPS information databases to analyze truck data from commercial in-vehicle fleet management systems. The last paper examined the use of the major urban rail system in the Bay Area, BART (Bay Area Rapid Transit) for air freight movement as an alternative to the use of truck transport.

Track 6 consisted of two sections: Impact Mitigation and Impact Assessment.

Impact Mitigation 6-1: The first two papers looked into the disruption to freight flows due to natural or human-induced disasters to the transportation system and commodity movement and the high costs that arise as a result. The papers focused on the collapse in 2002 of the I-40 Bridge and Hurricane Katrina. The last paper investigated methods of modeling and evaluating port disruptions and develops mitigation strategies to reduce the impacts of anticipated or unanticipated disruptions.

Impact Assessment 6-2: The first of three papers focused on estimating and understanding the cost and causes of transportation related supply chain disruptions. The second paper developed and tests the National Interstate Economic Model (NIEMO) to explore how the coefficients of the model perturbed in response to major economic shocks. The third paper focused on software defined (SDR) concepts as a

universal communication architecture for the current and future communication systems in the port and metropolitan areas.

Track 7 contained sub-tracks "Best Practices" and "Best Practices and Urban Goods."

Best Practices 7-2: The first Best Practices paper discussed the leadership of the San Pedro Bay ports in moving toward the use of green technology as manifested in the Clear Air Action Plan (CAAP) and the Water Resources Action Plan (TAP). The green port program serves as a model and is expanding statewide and nationally. The second paper talked about improving urban freight mobility by properly assigning functional classification of roadways, utilizing vehicle classification and traffic count data, and identification of urban truck roads. The third paper looked into the successful completion of the ITS integration Plan for Goods Movement in 2008. The presenter addressed some of the lessons learned including the fact that an ITS working group of multiple public agencies and private companies is a vital factor for successful ITS implementation, and a more detailed definition of ITS projects is needed in a subsequent ITS implementation.

Best Practices: Urban Goods 7-3: One paper examined the impediments and prospects of application of short line rail to freight operations in metropolitan areas. The research focused on four metropolitan areas-Chicago, Miami, New York-Northeastern NJ and Portland. The second paper explored the operation of Foreign Trade Zones (FTZ) and the advantages they provide for importers. Typical activities that occur within a zone include product storage, testing, assembly, processing, manufacturing and distribution. The third paper used innovative concepts for urban distribution and "the last mile" that have significant positive impacts on logistics performance. The last paper discussed community participation in the proposed freight project infrastructure improvements for the I-710 freeway in Southern California.