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**Truck Size and Weight**

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**Modelling Workshop**

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**U.S. DOT Comprehensive**

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**Truck Size & Weight Study**

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**Report No. 3**

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To

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**U.S. Department of Transportation**

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400 Seventh Street, S.W.

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Washington, D.C. 20590

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September 1995

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# Truck Size and Weight Modelling Workshop

U.S. Department of Transportation  
Comprehensive Truck Size and Weight Study  
Report No. 3

Activity II: Task C  
Refine Freight Diversion Models for All Modes

September 1995

Prepared by



The primary objectives of the U.S. Department of Transportation's Comprehensive Truck Size and Weight (TS&W) Study are to:

- assess the potential economic, safety, and environmental impacts of changing existing TS&W limits; and
- identify opportunities to increase the efficiency of freight transportation while preserving safety and highway infrastructure.

Reports which have been completed for the TS&W Study, to date, include the following:

- (1) Synthesis of Truck Size and Weight Studies and Issues
- (2) Analysis of the Truck Inventory and Use Survey from the Truck Size and Weight Perspective for Trucks with Five-Axles or More
- (3) Truck Size and Weight Modelling Workshop
- (4) Truck Size and Weight Performance-Based Workshop
- (5) Western U.S.-Canada Crossborder Case Study.

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This document was prepared for use in the U.S. Department of Transportation's Comprehensive Truck Size and Weight Study. The views expressed are those of the author(s) and are not necessarily those of the U.S. Department of Transportation.

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## Executive Summary

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The Federal Highway Administration (FHWA) sponsored an informal workshop on February 10, 1995, as part of a comprehensive truck size and weight (TS&W) study. The objectives of the workshop were to discuss past work in modeling issues and identify new tools for TS&W analysis. Several experts gave presentations of their models and prior TS&W work which demonstrated different analytical approaches to the TS&W issue. Following the presentations, there was group discussion of future research needs to support TS&W analysis.

Overall, there was wide agreement among the workshop that there is not one tool or combination of tools that is capable of modeling the complexity of all the possible TS&W options that may be considered. Furthermore, it was agreed that it probably will not be possible to design one, all inclusive tool. Consideration should be given to conducting detailed case studies on specific commodities, companies, and regions to supplement (or outright replace) large complex models. Therefore, an integrated approach involving several models and different data will most likely be needed.

One major weakness that applied to all tools discussed was the lack of accurate data bases for model inputs and case studies. Some new data sources are likely to become available in the near-term. The Bureau of the Census' 1992 Truck Inventory Usage Survey (TIUS) and the Commodity Flow Survey (CFS) will hopefully offer a better understanding of commodity flow shipments in the country. In addition, the Bureau of Transportation Statistics (BTS) is making available data on cross-border flow of goods.

One final overall observation from the workshop was that FHWA should consider case studies of industry practices. This approach differs from TS&W modeling, but could be used to build a micro-approach for national TS&W analysis. For example, different specialized models or case studies representing individual commodities, geographic regions or corridors could be developed. This specific information could be combined with other case studies and built up to analyze the overall national situation.

The first workshop presentation discussed the Freight Network Policy Model (FNET) which is a component of the Highway Traffic Forecasting System (HTFS). FNET mathematically estimates the impacts of truck size and weight and highway user fee policy options on changes in vehicle-miles travel (VMT) and payload ton miles (PTM) by various operating weight classes and vehicle types, truck and rail operational costs, and truck-rail modal split.

A less mathematical but more "real world" approach are the Truck Costs issues discussed in four studies of cost diversion effects that were conducted over the last 15 years. These studies dealt with the non-linehaul costs for extra trailers, diversion potential, dedicated service, nondedicated service,

cube-limited versus weight-limited freight, local restrictions, shipper requirements, effects on VMT, and transport costs.

Another approach is to study TS&W issues from the shipper's perspective. The Pennsylvania State University (PSU) conducted a survey of freight shippers. This survey information served as inputs to the Freight Transportation Analyzer (FTA). The FTA is a stochastic model which tries to find the nationwide diversion and the net effects of LCVs on shippers total logistics costs.

The last presentation was the Truck-Rail/Rail-Truck (Rail-Truck) Diversion Model. This model is a statistically disaggregate model which uses a Shippers Logistics cost model. The Rail-Truck Model is aimed at maximizing the receiver's utility while minimizing the total logistic costs. This is done by calculating the receivers utility for each transportation alternative. It also approaches the problem from the perspective of the shipper/receiver.

In addition to the models discussed at the Workshop, several data bases (new and revised data bases) were also discussed. These data bases potentially offer new and better sources of information to address continuing weakness, particularly with truck VMT and freight commodity flows.

There are several recommendations regarding specific tools and data bases needed to support TS&W's analysis. These action items need to be part of the TS&W Management Research Plan.

- (1) The Rail-Truck Model should be reviewed extensively and improved to be ready to measure nationwide rail to truck diversion and rail revenue contribution impacts from changes in Federal TS&W regulations. FHWA needs to have an independent estimate of diversion potential and avoid being in a situation of solely depending on the AAR's ICM model for diversion estimates. This model needs to reflect the latest trends and cost/pricing events from a variety of studies, Battelle Team skills, and other models (FTA).
- (2) The FHWA should investigate the likelihood of using North American Trucking Survey (NATS) and the National Motor Truckload Data Base (NMTDB) from the Association of American Railroads (AAR). Also, the FHWA should address the value of continuing a NATS/NMTDB-type data base collection project. Perhaps, these data could be collected every two years or be combined with other current truck data collection efforts (i.e., TIUS). Related to this decision should be a review of the Reebie data base and a collection method where the trucking industry would provide data at no cost and get national truck flow data for marketing purposes.
- (3) The planned improvements to the NAPCOM need to be completed. Also, future changes to the model should include tire pressure, super single tire, and studded tire impacts on pavement.
- (4) Coordinate the review of the CFS and TIUS with other U.S. Department of Transportation (DOT) offices and other efforts. These data bases will be valuable to the TS&W effort.

- (5) The FNET needs to be reviewed for the data bases containing the different highway networks and the GIS interface capability. Also, we need to better the state regulation data base and its usefulness in TS&W research. Currently, the FNET is being used to estimate the benefits of completing the Alameda Corridor in Los Angeles. This exercise should be a good test case of the ease of use and completeness of the model.