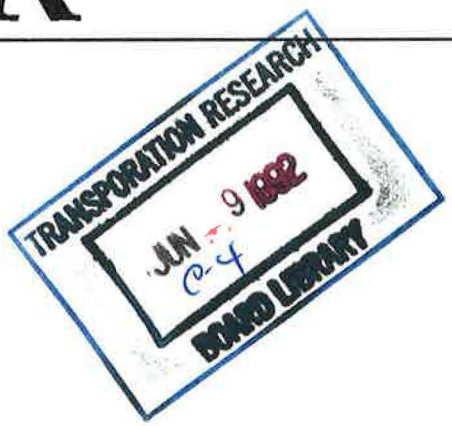
TRANSPORTATION RESEARCH

Number 399, June 1992

CIRCULAR



Truck Research Profiles: 1991 Update

TRANSPORTATION RESEARCH BOARD / NATIONAL RESEARCH COUNCIL

TRANSPORTATION RESEARCH
CIRCULAR

Number 399, June 1992
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TRUCK RESEARCH PROFILES: 1991 UPDATE

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VIII freight transportation

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

PREFACE

The last two decades have been characterized by growing interest in research and legislative initiatives addressing commercial motor vehicle sizes and weights, performance, productivity, and safety. In January 1989, following work by the TRB's Committee on Motor Vehicle Size and Weight (A1B04), the TRB published Transportation Research Circular Number 345, which contained a compendium of recent research and technical studies concerning major aspects of truck operations on highways, and information on the availability of these publications. This Circular represents an update of more recent research on motor carrier operations and truck/highway related topics.

This Circular consists of responses received from a survey sent in 1991 to U.S. state and Canadian provincial departments of transportation, governmental highway agencies, and academic institutions, and others concerned with the subject matter. The objective was to identify from each state, province, or other entity any significant research acivity since January 1988. Further, the respondents were asked to provide the study title, topic area, availability of reports, performing organization, and abstract. The results of the survey were organized into four categories:

- *Safety*
- *Pavement or Bridge Performance*
- *Trucking Productivity, Transport Costs/Savings*
- *Combination Vehicle Operations*

It is hoped that this Circular can serve as a catalyst for identifying other timely research activities and assist in sharing information on research performed or underway by others. If one cannot locate copies of any of the cited reports from the sources indicated, a record copy is maintained by Wm. "Chip" Wood at FHWA. If one wishes to contribute to the next Circular, please provide information consistent with the listing contained in this voume, including a single copy of each report, and send it to:

William M. Wood
Federal Highway Administration, HPP-11
400 7th Street, S.W.
Washington, D.C. 20590
(202) 366-9239

We would welcome all contributions to this endeavor including suggestions for improvements or value of this effort.

C. Michael Walton
Chairman, Committee on Motor
Vehicle Size and Weight (A1B04)

TABLE OF CONTENTS

SAFETY

PAVEMENT OR BRIDGE PERFORMANCE

TRUCKING PRODUCTIVITY

COMBINATION VEHICLE OPERATIONS

SAFETY

STUDY TITLE: Advantage I-75 IVHS Project

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion June 1992

PRICE:

PERFORMING ORGANIZATION:

Kentucky Transportation Center
College of Engineering
University of Kentucky
533 South Limestone Street
Lexington, Kentucky 40506-0043

ABSTRACT:

The goal of this project is to reduce congestion, increase efficiency, and enhance safety of motorists and other users of I-75 through application of advanced highway and vehicle technologies. The first project of ADVANTAGE I-75 will facilitate motor-carrier operations by allowing transponder-equipped and properly documented trucks to travel any segment along the entire length of I-75 at mainline speeds with minimal stopping at enforcement stations. Motorists will benefit from reduced congestion and enhanced safety near enforcement stations. State agencies will benefit by increased effectiveness in their truck monitoring activities. The project began in 1990 with distinct phases to include: system design procurement and installation, testing and evaluation, and operations. The operations phase is expected to begin in mid-1992.

STUDY TITLE: Analysis of Accident Rates of Heavy-Duty Vehicles

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Federal Highway Administration, HPP-11
400 7th Street, S.W.
Washington, D.C. 20590

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Center
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This report presents an analysis of factors associated with the risk of involvement in a fatal accident for large trucks. The data are from the UMTRI surveys on Trucks Involved in Fatal Accidents (TIFA), and a companion travel survey, the National Truck Trip Information Survey (NTTIS). Estimates of the U.S. large-truck population and average annual mileages from the travel survey (NTTIS) are compared with estimates from the 1982 Truck Inventory and Use Survey (TIUS). The factors addressed in the risk analysis are truck type, travel category (road type, rural/urban, and day/night), and gross combination weight (GCW). Aggregate involvement rates by factors such as truck type are often misleading, in that the differences observed are often associated with the travel categories, as opposed to any characteristics of the truck itself. An adjusted-rates method is used to remove the influences of travel differences in the computation of aggregate rates. The results of this method indicate that the risk of fatal accident involvement would be greater for doubles, and for singles weighing over 60,000 pounds, if their travel patterns were comparable to those for all large trucks.

STUDY TITLE: Analysis and Adoption of the Brake Masters Emergency Brake System, Nov. 1990

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Maryland Department of Transportation
State Highway Administration
Traffic Division
7491 Connelley Drive
Hanover, Maryland 21076

PRICE: No charge

PERFORMING ORGANIZATION:

Transportation Studies Center
University of Maryland
College Park, Maryland 20742

ABSTRACT:

This paper presents results of the testing and evaluation of the Brake Masters Emergency Brake System. A total of 11 test runs were made in the field on both wet and dry pavement at speeds of 45, 50, and 55 mph. The stopping distances observed were about 45 percent less than the normal braking distance for heavy trucks.

STUDY TITLE: Analytical Comparison of the Dynamic Performance of a European Heavy Vehicle and a Generic U.S. Heavy Vehicle, DOT-HS-807-187

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB88-201926/XAB
Paper @ $86.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

The project involved measurement of the suspension and inertial properties of a European heavy vehicle compared to those of a typical U.S. tractor-semitrailer and their influence on dynamic performance as determined by simulation with computer models. The U.S. and European vehicles were comparable in turning performance up to 0.3g lateral acceleration. The rollover threshold of the European truck was 9 percent better than that of the U.S. vehicle because of higher suspension roll stiffness and a lower center of gravity height. The European truck exhibited better braking performance than the U.S. truck because of higher front-axle braking levels and also because of the use of load-sensing proportion valves.

STUDY TITLE: Automatic Slack Adjusters for Heavy Vehicle Air Brake Systems

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB91-215814/XAB
Paper @ $86.00; Microfiche @ $34.00

PERFORMING ORGANIZATION:
National Highway Traffic Safety Administration
Office of Crash Avoidance Research
400 7th Street, S.W.
Washington, D.C. 20590

ABSTRACT:

The report presents findings from a large field test of automatic slack adjusters (ASAs), with comparative data on manual slack adjusters used on heavy commercial vehicles. Project data indicated that the use of ASAs can be an efficient and effective means of maintaining brake adjustment. For the 36 ASA\fleet applications tested, the median percentage out-of-adjustment was 4.0 percent. ASAs were, in general, significantly more effective in maintaining proper brake adjustment than manual slack adjusters in similar applications. The ASAs tested were of older designs and most likely understate the performance levels that can be achieved with newer ASA designs. However, in spite of the demonstrated effectiveness of ASAs, they do not preclude the need for brake adjustment inspections.

STUDY TITLE: Big Trucks: A Small Piece of a Larger Problem

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Citizen League
708 South 3rd Street, Suite 500
Minneapolis, MN 55415

PRICE: Unknown

PERFORMING ORGANIZATION:

Citizen League
708 South 3rd Street, Suite 500
Minneapolis, Minnesota 55415

ABSTRACT:

Heavy trucks are involved in somewhat more accidents and cause more incident-related congestion in metropolitan areas than would be expected, on a proportional basis, given their share of total vehicle miles. The study found that although large trucks do not significantly reduce freeway capacity because they represent only a small part of total traffic, a number of small steps each promise to produce marginal improvements and collectively have the potential to alleviate future safety and congestion problems.

STUDY TITLE: Combination Truck Accidents in Minnesota

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE:

PERFORMING ORGANIZATION:

Minneapolis DOT
Transportation Building, Room 810
395 John Ireland Boulevard
St. Paul, Minnesota 55155

ABSTRACT:

This study will compare Twin Trailer and Truck-Trailer combination accident rates for a six year period, 1984-1989. To enable a more meaningful comparison, data will be examined and presented for several functional classes of roads, both urban and rural. Results will give insight into the relative safety of twins compared to semi-trailer combinations on various highway types in Minnesota.

STUDY TITLE: Commercial Motor Vehicle Speed Control Devices

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB91-229732/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

National Highway Traffic Safety Administration
Office of Crash Avoidance Research
Heavy Vehicle Research Division
400 7th Street, S.W.
Washington, D.C. 20590

ABSTRACT:

This study examines the safety issue of truck speeding and considers the merits of mandating the installation of speed control devices on trucks. Fatal crash involvement rates for truck crashes occurring at speeds over 70 mph were investigated by performing several data base analyses. Results indicate that the occurrence of these incidents is low when viewed against the overall problem of highway speeding. Control devices on combination-unit trucks, therefore, do not appear to be justified at this time.

STUDY TITLE: Demonstration of the Safety Benefits of Front Brakes on Trucks, Report No. DOT HS 807 061

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB87-177879/XAB
Paper @ $38.00; Microfiche @ 18.00

PERFORMING ORGANIZATION:

National Highway Traffic Safety Administration
Vehicle Research and Test Center
P.O. Box 37
East Liberty, Ohio 43319

ABSTRACT:

Twelve volunteer over-the-road truck drivers were asked to drive vehicles in various braking maneuvers with four different front brake configurations: full front brakes, limited front brakes, no front brakes, and one front brake only. The fully loaded (80,000 lb.) vehicles attempted straight line braking, braking on a wet, slippery pavement, and braking on dry pavement. Results of the tests indicated that braking performance and control of the vehicles were optimized when full front brakes were utilized.

STUDY TITLE: Development of Turning Templates for Various Design Vehicles

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion Winter 1991

PRICE:

PERFORMING ORGANIZATION:

Kentucky Transportation Center
College of Engineering
University of Kentucky
533 South Limestone Street
Lexington, Kentucky 40506-0043

ABSTRACT:

The objective of this study was to develop the data necessary to produce the turning templates that would represent the minimum turning paths for critical design vehicles. In order for the turning templates used for the various design vehicles to be based on the same procedure, data were produced for design vehicles ranging from a passenger car to a combination truck with a 53-foot trailer. The simulation model used was the Truck Offtracking Model (TOM) developed by the California Department of Transportation. The data obtained from the truck offtracking simulation program show that it can be used to develop turning templates that agree with those developed by AASHTO. The plotting information generated from this study can be used to prepare turning templates that can be used in the design process.

STUDY TITLE: Effect of Brake Adjustment on Braking Performance, Report No. DOT HS 807 287

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB88-244249/XAB
Paper @ $52.00; Microfiche @ 18.00

PERFORMING ORGANIZATION:

National Highway Traffic Safety Administration
Vehicle Research and Test Center
P.O. Box 37
East Liberty, Ohio 43319

ABSTRACT:

Research has shown the stopping performance of vehicles equipped with air brake systems is highly dependent on brake adjustment. The Commercial Vehicle Safety Alliance (CVSA) and the Federal Highway Administration's Office of Motor Carrier Standards (OMCS) have adopted brake adjustment inspection criteria for placing motor vehicles out-of-service for poorly adjusted brakes. This study examined the effect of brake adjustment on braking performance with stopping distance tests on one single-unit truck and two tractor/trailer combinations, brake dynamometer tests and computer simulations. Descriptions of the vehicles, test site, and test procedures are given along with discussions of the test and simulation results. The test results can serve as the basis for evaluating the appropriateness of the current out-of-service criteria for brake adjustment with regard to vehicle safety.

STUDY TITLE: Effect of Larger Trucks on Traffic Safety and Operation

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion March 1992

PRICE:

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

UMTRI is conducting a study to determine the maximum length of long combination vehicles (LVCs) semis, doubles, and triples that can be accommodated on the present highway system. The study will assess the effects of the controlling geometric features of freeways, interchanges, and arterial roadways, and recommend the maximum length of various types of LCVs for each.

STUDY TITLE: European/Australian Experience with Antilock Braking Systems in Fleet Service, Report No. DOT-HS-807-269

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB88-235064/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute 2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This report documents the experience in performance, reliability, and maintainability that European and Australian owners\operators of commercial vehicles have had with antilock braking systems (ABS) of European design in actual over-the-road service. This report provides estimates of the level of usage and reliability of ABS on heavy vehicles, stratified by vehicle.

STUDY TITLE: Evaluation of Electronic Truck Monitoring

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, expected completion June 1992

PRICE:

PERFORMING ORGANIZATION:

Kentucky Transportation Center
College of Engineering
University of Kentucky
533 South Limestone Street
Lexington, Kentucky 40506-0043

ABSTRACT:

The objectives of this study are 1) to determine the reliability and range of accurate operation of state-of-the-art automatic vehicle identification equipment; 2) to determine trucking benefits/costs from on-the-fly detection of properly authorized trucks at truck inspection stations; 3) to estimate agency benefits/costs; and 4) to determine how automatic identification and monitoring equipment can be incorporated into an integrated truck monitoring system. The project is intended to demonstrate the application of automatic vehicle identification in Kentucky.

STUDY TITLE: Evaluation of Highway Geometrics Related to Large Trucks

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Kentucky Transportation Center
College of Engineering
University of Kentucky
Lexington, Kentucky 40506-0043

PRICE: Unknown

PERFORMING ORGANIZATION:

Kentucky Transportation Center
College of Engineering
University of Kentucky
533 South Limestone Street
Lexington, Kentucky 40506-0043

ABSTRACT:

One objective of this study was to determine the extent of highway safety and geometric problems associated with larger trucks using Kentucky's highways. A second objective was to identify criteria that can be used in identifying roadway sections that cannot safely accommodate large trucks.An accident analysis was used to investigate locations that have a high number of truck accidents. The general accident statistics related to trucks identified high-accident locations for factors that may be contributing to the accident problem. The literature review determined the appropriate criteria to use in formalizing truck access criteria. For example, several references gave recommendations concerning lane width and horizontal curvature appropriate for highways that allowed large truck traffic.

STUDY TITLE: Examination of Features Proposed for Improving Truck Safety

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This research addressed three of the action plans recommended by the Michigan Interagency Committee to improve truck safety in Michigan. The three topics analyzed were (1) Improved Truck Identification; (2) Mandatory Use of On-Board Recorders (OBRs); and (3) Maximum 22" Height of Rear Bumpers for Trucks and Trailers. The existing knowledge on each of the three topics was summarized and integrated. The study recommended (1) a mandatory federal rule on truck identification for all Michigan-based exempt carriers and initiating an experimental program for a state-based toll-free number; (2) not to mandate use of OBRs in Michigan; and (3) mandating the 22" guard for all Michigan-based trucks above 10,000 lbs GVWR, following the general form of NHTSA's proposed rule, and paying particular attention to the three types of exempt vehicles: low chassis, wheel-back, and utility trucks.

STUDY TITLE: Examination of Truck Accidents on Urban Freeways, Report# FHWA-RD-89-201, December 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-208901/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Goodell-Grivas, Inc.
17320 West Eight Mile Road
Southfield, Michigan 48075

ABSTRACT:

The objective of this study was to determine the nature and extent of urban freeway accidents involving trucks over 10,000 pounds gross vehicle weight, and their consequences as a function of vehicle type, traffic, and roadway characteristics. The study was limited to urban freeways and expressways with large total volumes (minimum 100,000 average daily traffic) and a significant percentage of large truck traffic (minimum 5 percent). The primary tasks involved a review of the literature and the analysis of accident and operational data from selected urban freeway sites. The study determined the characteristics of truck vehicle accidents and estimated the operational and economic consequences of truck accidents.

STUDY TITLE: Feasibility of Exclusive Facilities for Cars and Trucks, FHWA HPP-11, April 1990

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Transportation Studies Division
Federal Highway Administration
400 7th Street S.W.
Washington, D.C. 20590

PRICE: No charge

PERFORMING ORGANIZATION:

Center for Transportation Analysis
Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, Tennessee 37831

ABSTRACT:

This report describes an analysis format to determine the economic feasibility of separating light vehicles from heavy vehicles on a given section of controlled-access highway by designating existing lanes and/or constructing new lanes to be used exclusively by light or heavy vehicles. The analysis program can be run in either of two modes called Level 1 and Level 2. Level 1 provides a sketch evaluation of alternatives for a given highway section with few user inputs, and Level 2 is used to conduct more thorough evaluations of particular alternatives. Based on test analyses, exclusive vehicle facilities appear to be most warranted for congested highways where truck volumes exceed 30% of the vehicle mix. Assuming moderate traffic growth over an analysis period of at least 20 years, adding exclusive lanes for light vehicles via highway widening can have a greater net present value than designating existing lanes for light vehicles or adding mixed vehicle lanes.

STUDY TITLE: Feasibility Study: Accident Rates of Existing Longer Combination Vehicles, Report# UMTRI-89-19, July 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

Accident rates of longer combination vehicles (LVCs) operating in western states were estimated using accident data and information on the issuance of special permits for these vehicles. The study found that as many as 40,000 LCVs are permitted in the 12-state region. However, the available accident data identified only about 500 to 600 accidents in 1986, only one-tenth the expected number. Additional research is recommended, given the uncertainty of the accident reporting.

STUDY TITLE: Front Axle Placement in Heavy Duty Truck Development - The Effect on Vehicle Performance Characteristics

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Society of Automotive Engineers
400 Commonwealth Drive
Warrendale, Pennsylvania 15095

PRICE: $2.50

PERFORMING ORGANIZATION:

Society of Automotive Engineers
400 Commonwealth Drive
Warrendale, Pennsylvania 15095

ABSTRACT:

The paper analyzes how current size, weight and bridge formula constraints affect front axle placement and reviews the ride quality, maneuverability, entry and egress, and other benefits of the setback axle configuration. Ongoing research activities concerning future revision of the bridge formula offer a positive outlook to eliminating the gross vehicle weight penalties related to the placement of front axles.

STUDY TITLE: Future Configuration of Tank Vehicles Hauling Flammable Liquids in Michigan - Volume I Technical Report; December 1990

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Michigan Department of Transportation
P.O. Box 30049
Lansing, MI 48909

PRICE: No charge

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This study, which was mandated directly by an Act of the Michigan State Legislature, has produced a recommendation for new legislation pertaining to the configuration of tank vehicles having fluid capacities in excess of 9,000 gal. A set of four vehicle configurations are recommended, all consisting of tractor-semitrailers. The specification for each vehicle covers constraints on tank capacity, tank height above the ground, rollover stability, the use of so-called "lift-axles," and the ability of manhole covers to contain the fluid load in the event of a rollover. Analysis of accident risks

has indicated that any of four recommended vehicle configurations would yield approximately one-half of the incidence of rollover, with its potential for fire, that Michigan can expect from the use of conventional tankers having tank capacities around 9,000 gal. Further, the recommended vehicles, because of their higher carrying capacities offer large advantages to the economy and energy efficiency of flammable fluids transportation.

STUDY TITLE: Gearing Up for Safety: Motor Carrier Safety in a Competitive Environment, Report# OTA-SET-382, September 1988

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402-9325

PRICE: Unknown

PERFORMING ORGANIZATION:

Research and Development Division
Wisconsin Department of Transportation
P.O. Box 7910
Madison, Wisconsin 53707

ABSTRACT:

The House of Representatives asked the Office of Technology Assessment to determine how well existing safety policies, regulations, and technologies meet the government's responsibility for ensuring safety in the motor carrier industry. A review of critical intergovernmental issues for the Department of Transportation and State governments has been added to the basic questions about the adequacy of Federal standards and programs. This comprehensive look at motor carrier safety also includes the economic framework of the industry as it affects operations, an analysis of safety data, and a review of research and development needs for safety technologies for both industry and government.

STUDY TITLE: Heavy Truck Fuel System Safety Study, Report# DOT-HS-807-484

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-148024/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Maryland
College of Engineering
College Park, Maryland 20742

ABSTRACT:

This analysis indicates that, although fires involving trucks are rare, they are unusually lethal events, especially for heavy truck occupants. Analysis also suggests that fuel system integrity is clearly not responsible for all the fires in which heavy trucks are involved. This study addresses the physical and chemical aspects of fires involving truck fuel systems and their apparent breach vulnerability. The results of this study suggest that improvements could reduce even further the likelihood of fires that are the result of truck crashes.

STUDY TITLE: Heavy Truck-Road Surface Friction Study

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion 1992

PRICE:

PERFORMING ORGANIZATION:

Geotechnical Branch
British Columbia Ministry of Transportation and Highways
Victoria, British Columbia CANADA V8W 3E6

ABSTRACT:

This study will assess traction requirements for heavy vehicles on steep grades in winter conditions and develop recommendations to reduce the incidents. The study will also bring attention to the issue of standardizing the measurement of the coefficient of friction between tires and pavement surfaces, apart from the British Pendulum Test.

STUDY TITLE: Heavy Truck Safety Study, Report# DOT-HS-807-109, March 1987

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB87-195293/XAB
Paper @ $70.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

National Highway Traffic Safety Administration
US Department of Transportation
400 7th Street, S.W.
Washington, D.C. 20590

ABSTRACT:

This report identifies key vehicle-related factors contributing to the cause of truck accidents (braking and handling/stability) and to the resulting fatalities and injuries (crashworthiness; notably, truck aggressivity in collisions with other vehicles). It also identifies the programs and needs of enforcement agencies responsible for assuring compliance with traffic laws by commercial motor vehicle drivers; summarizes what is known about each of these issues; describes actions that can be taken now in some of the areas to make near-term improvements; and presents research agendas for acquiring information to develop solutions to the long-term issues in the remaining areas.

STUDY TITLE: Heavy Vehicle Size and Weights - Development of Test Procedures for Minimum Safety Performance Standards

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE:

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

Two tilt table test procedures are to be developed to evaluate the rollover propensity of combination-unit trucks: one for tractors, using a "standard reference trailer" that simulates the roll resistance properties of an appropriately selected trailer; and a second for trailers, using a similar "standard reference tractor". The rearward amplification properties of combination vehicles of various configurations will be evaluated using analytical and empirical methods. The results may be used to develop a listing of recommended minimum performance and design requirements for truck equipment, plus empirical test or measurement methods, for determining whether a combination vehicle meets these performance requirements. The research will include demonstrations and documentation of coupling/uncoupling units, low speed maneuvering, backing, and other tests.

STUDY TITLE: Impacts and Effectiveness of Freeway Truck Lane Restrictions, Report #MD88-04, February 1988

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Maryland DOT
State Highway Administration
707 North Calvert Street
Baltimore, MD 21203

PRICE: Unknown

PERFORMING ORGANIZATION:

Maryland DOT
State Highway Administration
707 North Calvert Street
Baltimore, MD 21203

ABSTRACT:

A state-of-the-art study has been conducted to investigate the strategies used by state highway agencies to restrict trucks from certain lanes on urban freeways, and the impacts of such restrictions on traffic operation and safety. The study was based on a review of literature pertaining to truck lane restrictions and a survey of state highway agencies about their experience with such restrictions. The information obtained from both sources was used to assess the objectives and effectiveness of the restriction, current restriction methods, enforcement practices, and procedures for evaluating the restriction. It was found that although truck lane restrictions have been imposed in a number of states for many years, the effects on traffic operation and safety are still not well known, and their cost effectiveness is still in doubt until some comprehensive studies are made. Finally, the study proposes a methodology for predicting the operational impacts of the restrictions.

STUDY TITLE: Impact of Specific Geometric Features on Truck Operations and Safety at Interchanges, Report# FHWA-RD-86-057, August 1990

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
US Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB86-177490/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

The problem of truck loss-of-control accidents on interchange ramps is examined from the viewpoint of the suitability of highway geometric design, given the stability and control limitations of heavy-duty trucks. Accident records were used to identify specific ramps which were over-involved in jackknife, rollover, and run-off-road accidents. Results show that various aspects of the AASHTO policy on geometric design result in slim margins of safety for the operation of heavy trucks on exit ramps. Problem features included side friction factors, superelevation transitions, compound curves, deceleration lanes, ramp downgrades, curbs on curved ramps, and wet surface friction on high-speed ramps. Potential countermeasures for the identified problems are suggested. Recommendations include a careful scoping of the prevalence of "problem ramps," national initiation of efforts by state highway engineers to apply these findings to ramps having a known truck problem, and informing truck drivers of the situations involving slim safety margins.

STUDY TITLE: Improved Brake Systems for Commercial Motor Vehicles, Report# DOT-HS-807-706

TOPIC AREA: SAFETY AND COMBINATION VEHICLES OPERATIONS

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB91-182600/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

National Highway Traffic Safety Administration
US Department of Transportation
400 7th Street, S.W.
Washington, D.C. 20590

ABSTRACT:

The National Highway Traffic Safety Administration (NTHSA) has prepared this report on heavy truck brake system performance in response to Section 9107 of the Truck and Bus Regulatory Reform Act of 1988. This report focuses on air brakes, the predominant type of braking system on heavy trucks. It identifies the principal aspects of air brake system performance that effectively define how well a truck can stop. The report describes what can and cannot be reasonably done to improve heavy truck air brake system performance, given present and anticipated near-term future technology. The report describes current and planned brake system safety performance and discusses issues that require attention if continued progress is to be made. In addition to addressing the braking performance of newly-manufactured heavy trucks this report highlights the importance of in-use maintenance.

STUDY TITLE: An In-Service Evaluation of the Performance, Reliability, Maintainability and Durability of ABS for Heavy Trucks

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion Sept. 1993

PRICE:

PERFORMING ORGANIZATION:

Southwest Research Institute
6220 Culebra Road
San Antonio, Texas 78284

ABSTRACT:

The performance of 200 tractors equipped with ABS plus 25 non-ABS control tractors was monitored in fleet operation over a two-year period ending in mid-1991. All tractors were fitted with data recorders to monitor wheel speeds, treadle valve and brake chamber pressures, and ABS system activity to permit evaluation of system effectiveness in preventing wheel lock-up. The ABS systems tested were of varying degrees of complexity, with some controlling all tractor wheels and others only tractor drive wheels. The trailer portion of the research project will end in mid-1993. Detailed maintenance records for the ABS and non-ABS trucks and trailers were collected to permit comparison of ABS versus non-ABS repair costs for electrical, air system, brake, tire, and wheel components.

STUDY TITLE: Large Truck Safety in Wisconsin, February 1986

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Division of Planning and Budget
Wisconsin DOT
P.O. Box 7910
Madison, Wisconsin 53707

PRICE: Unknown

PERFORMING ORGANIZATION:

Division of Planning and Budget
Wisconsin DOT
P.O. Box 7910
Madison, Wisconsin 53707

ABSTRACT:

In a letter to the Secretary of the Wisconsin Department of Transportation, state senators requested that a report be prepared for the legislature on truck safety in Wisconsin. They were especially concerned about (1) the types of licenses held by truck drivers involved in Wisconsin large truck accidents, (2) the number of deaths and injuries that resulted from such accidents, (3) the kinds of citations issued to the drivers involved in these accidents, (4) Wisconsin's truck safety record compared to other states, and (5) results of the special truck safety inspection program that was begun in Wisconsin in March, 1985. This document is a review of these and related truck safety issues in Wisconsin.

STUDY TITLE: New Methods for Determining Requirement for Truck-Climbing Lanes, Report# FHWA-IP-89-022

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-156928/XAB
Paper @ $34.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Walcoff & Associates, Inc.
635 Slaters Lane, Suite 102
Alexandria, Virginia 22314

ABSTRACT:

To facilitate traffic flow and to improve highway design, engineers have constructed hill-climbing lanes. A recent FHWA-sponsored study found that current guidelines may be leading designers to overdesign highways, adding and maintaining unnecessary hill-climbing lanes. The report summarized here highlights three major findings of the earlier FHWA study: (1) current design guidelines are conservative for single-unit trucks and tractor-semitrailers, and current critical lengths of grade are thus shorter than these two truck types would warrant; (2) single-unit trucks with trailers and doubles do not perform nearly as well as single-unit trucks and tractor-semitrailers, which may indicate that the latter two types should be based on the weight-to-available horsepower ratio of current truck mix, rather than on assumptions about the performance of a 300 lb\hp truck which was typical in 1965; and (3) highway designers need more comprehensive methods for deciding when hill-climbing lanes are warranted. This report also presents tools developed in the study for designing hill-climbing lanes. This report was based on the following study: "Method of Predicting Truck Speed Loss on Grades-Final Technical Report: FHWA\RD-89-059"

STUDY TITLE: An Operational Evaluation of Truck Lane Restrictions on Six-Lane Interstates in Texas

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Federal Highway Administration, HPP-11
400 7th Street, S.W.
Washington, D.C. 20590

PRICE: Unknown

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

With the increased expansion of rural interstates to six lanes, questions have arisen as to the proper operational strategy of those facilities. One approach is to restrict trucks and other large vehicles from one or more of the lanes. This study analyzes the operational effects of three left-lane truck restrictions on six-lane rural interstates in Texas. Although the directional distribution of trucks changed significantly, no effects were found on the directional distribution of cars, the time gaps between vehicles, or the speeds of either cars or trucks that could be attributed to the truck restriction.

STUDY TITLE: Passing Manoeuvres and Passing Lanes: Design, Operational, and Safety Evaluations, March 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Traffic Safety Standards and Research Branch
Roads and Transportation Association of Canada
1765 St. Laurent Blvd.
Ottawa, CANADA K1G 3V4

PRICE: Unknown

PERFORMING ORGANIZATION:

ADI Limited
#5, Suite 200
2100 Thurston Drive
Ottawa, CANADA K1G 4K8

ABSTRACT:

This report was commissioned by the Traffic Safety Standards and Research Branch of Transport Canada to review existing literature on the operations on two lane highways. The report examines safety of existing passing sight distance standards, safety effects of decreasing passenger vehicle size and power, increased truck length with respect to passing operations, and future research requirements.

STUDY TITLE: Reducing Runaway Truck Accidents Through Weight-Based Advisory Speeds
Report# FHWA-IP-89-023, September 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-171240/XAB
Paper @ $34.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Walcoff & Associates Inc.
635 Slaters Lane Suite 102
Alexandria, Virginia 22314

ABSTRACT:

This report gives state transportation officials an overview of the Grade Severity Rating System (GSRS), a program to reduce runaway truck accidents through the use of weight-specific-speed signs (WSS). The report contains adequate information for state transportation officials to decide whether they want to implement GSRS-WSS and also tells potential users where to get the additional information needed for actual implementation. The five steps required to implement WSS signing are summarized in the report, based on the following studies: "Feasibility of a Grade Severity Rating System," FHWA\RD-79\116, "The Development an Evaluation of a Prototype Grade Severity Rating System," FHWA\RD-81\185, "Field Test of the Grade Severity Rating System, (GSRS)," FHWA\RD-86\011, and "Grade Severity Rating System (GSRS) - Users Manual," FHWA-IP-88-015.

STUDY TITLE: Road Class and Large Truck Involvements in Fatal Accidents, Report# UMTRI-87-19, May 1987

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This report examines the relationship between road class and fatal accident involvement using data from the University of Michigan and the Federal Highway Administration to calculate fatal accident involvement rates per mile travelled. These differences in the distribution of accident factors are observed between road classes depending on their urban, rural, divided, and undivided characteristics. The rate is higher on rural non-interstates than on other road types.

STUDY TITLE: Safety Implications of Various Truck Configurations,
Volume 3, Report# FHWA-RD-89-085, January 1990

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB91-174086/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This study examines changes to size and weight limits and their effects on the designs and configurations of heavy vehicles, their performance capabilities, and their ensuing safety implications. The work shows the manner in which size and weight rules influence the safety-related performance of vehicles designed to increase productivity. By treating a number of projected size and weight scenarios, the study has developed a basis for general sets of principles that can be used in evaluating the possible safety consequences of changes in size and weight regulations.

STUDY TITLE: Statistics of Truck Accidents: An Addendum to a Study of Longer and Wider Trucks on the Texas Highway System
TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB88-203427/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

This addendum includes the reported frequency of truck accident involvements and distributions of truck accident involvements on Texas highways. The data source, methodology, and results are presented. These accident statistics are useful as preliminary information for further sensitivity tests or policy analyses concerning truck usage and routing. Such sensitivity tests or policy analyses are not part of this addendum.

STUDY TITLE: Supplemental Electronic In-Cab Truck Displays: An Inventory of Devices and Approaches to their Evaluation, Report# DOT HS 807 411, February 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB89-215081/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Vector Enterprises
Research Division
1930-14th Street
Santa Monica, California 90404

ABSTRACT:

A study of in-cab display devices indicates that over 50 such devices are currently in use, including: single/integrated display systems; vehicle information, navigation, and positioning systems; text communication systems; and vehicle safety systems. Visual, motor, and cognitive processing demand on the driver was estimated, and preliminary indications are that many devices impose a heavy demand on the user. Devices which are designed to be used while the truck is in operation were determined to have a negative impact on truck safety.

STUDY TITLE: Status Report on Truck and Truck Driver Safety

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

California Highway Patrol
Enforcement Services Divisions
P.O. Box 942898
Sacramento, California 942298-0001

PRICE: $8.20

PERFORMING ORGANIZATION:

California Highway Patrol
Enforcement Services Divisions
P.O. Box 942898
Sacramento, California 942298-0001

ABSTRACT:

This report to the California Legislature focuses on truck accident involvement and the primary causes, along with an extensive review of those government and industry efforts that have been undertaken to bring truck accident causation and involvement under control. Interagency cooperation and coordination with regard to heavy commercial vehicle operations and information were also reviewed to identify not only areas to improve commercial vehicle safety, but to also provide a better forum for collecting and exchanging related data. A review was made of the truck accident problem and of the various elements of the truck safety program efforts. The task force made recommendations on those areas of truck and truck driver safety for which there was still concern and for which improvements can be made.

STUDY TITLE: Tractor Semi-trailer Accident Analysis

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE: Unknown

PERFORMING ORGANIZATION:

Oklahoma DOT
Traffic Engineering Division
200 N.E. 21st Street
Oklahoma City, Oklahoma 73105

ABSTRACT:

An accident analysis will investigate collisions in which a tractor semi-trailer was involved. Statistical tabulation will include the severity, types of injuries, and any potentially influential conditions related to these accidents. Also to be examined are the cited cause, possible oversize/overweight implications, and in which vehicle the injuries are occurring. A map of specific locations where these accident types are happening will also be developed. This analysis will provide a more detailed picture of pertinent accident characteristics relating to tractor semi-trailer collisions.

STUDY TITLE: Traffic and Geometric Characteristics Affecting the Involvement of Large Trucks in Accidents; Volume 1. Accident Characteristics and Fault Tree Analysis; Volume 2. Linear, Poisson, and Logistic Regression Models

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Library, Virginia Transportation Research Council
P.O. Box 3817
University Station
Charlottesville, VA 22903

PRICE: Unknown

PERFORMING ORGANIZATION:

Virginia Transportation Research Council
P.O. Box 3817
University Station
Charlottesville, VA 22903

ABSTRACT:

This study investigated the major factors associated with large truck accidents including the effect of highway facility type and highway geometry, and the development of mathematical models relating the factors with accident rates and probability of occurrence. The first volume documents the methodology of the study, the results of a statistical analysis of large trucks' historical accident data, and the results of a fault tree analysis. The second volume gives a detailed description of the development of the regression and logistic models.

STUDY TITLE: Truck Characteristics for Use in Highway Design and Operation, Report # FHWA-RD-89-226

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB91-100982/XAB
Paper @ $35.00; Microfiche @ $12.50

PERFORMING ORGANIZATION:

Midwest Research Institute
425 Volker Boulevard
Kansas City, Missouri 64110

ABSTRACT:

The report reviews existing data for the truck characteristics that need to be considered in highway design, including truck dimensions, braking distance, driver eye height, acceleration capabilities, speed maintenance capabilities on grades, turning radius and offtracking characteristics, suspension characteristics, and rollover threshold. The highway design and operational criteria evaluated include sight distances, vertical curve length, intersection design, critical length of grade, lane width, horizontal curve design, vehicle change intervals at traffic signals, sign placement, and highway capacity. An assessment has been made of the need to change the current highway design and operational criteria to accommodate trucks. The cost effectiveness of proposed changes in design and operational criteria have been evaluated. Volume II of this report (FHWA-RD-89-227) contains appendices documenting the detailed data collection and analysis activities.

STUDY TITLE: Truck Occupant Protection, DOT HS-807-081, December 1986

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB87-183323/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

National Highway Traffic Safety Administration
Office of Crash Avoidance Research
Heavy Vehicle Research Division
400 7th Street, S.W.
Washington, D.C. 20590

ABSTRACT:

Approximately 1000 heavy truck occupants are killed in crashes every year. Most of these occur in accidents involving combination-unit trucks. This report identifies the key vehicle-related factors which play a contributing role in causing those fatalities. They are: rollover and ejection; secondary impacts with cab interior surfaces, especially steering wheels; cab deformation and occupant entrapment; and non-cargo related fires. The report describes research agendas that could be pursued to develop improved: restraint systems; methods to attenuate occupant impacts with interior surfaces, especially steering wheels; cabs, designed to enhance their structural integrity; and methods of preventing post-crash fires.

STUDY TITLE: Trucks Involved in Fatal Accidents, 1980-86, Report# UMTRI-90-023, May 1990

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Motor Vehicle Manufacturers Association
320 New Center Building
Detroit, Michigan 48224

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109

ABSTRACT:

This report provides one-way frequencies for all of the variables in UMTRI's file of Trucks Involved in Fatal Accidents, 1980-1986. This file combines the coverage of the FARS data with the detail of the OMC data. Where no

OMC report could be found for a medium or heavy truck listed by FARS, UMTRI conducted a survey by telephone interview or by mail, to obtain company type information and a detailed physical description of the truck and cargo involved.

STUDY TITLE: Turner Truck Handling and Stability Properties Affecting Safety, Report# UMTRI-89-11, July 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

National Cooperative Highway Research Program
2101 Constitution Avenue
Washington, D.C. 20418

PRICE: Nominal charge for xerox copy

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

Based on a review of large-truck performance and safety literature, discussions with persons involved with manufacturing or using trucks, and computer analyses and limited testing of prototype and baseline vehicles, this study provides findings and recommendations aimed at the following objectives: identify vehicle and/or component parameters and size and weight allowances (that is, "design attributes") that will mitigate the crash and injury risk and enhance the operational safety of Turner trucks; identify the environment traffic, roadway, and weather within which Turner trucks can be safely operated; assess crash and injury risks of Turner trucks in comparison with those of the trucks they would be expected to replace; and establish minimum performance and handling standards for Turner trucks that seek to limit crash risk to tolerable levels while encouraging innovation in new truck and component design.

STUDY TITLE: The Urban Freeway Gridlock Study, January 1989

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

California Department of Transportation
1120 N Street
Sacramento, California 95814

PRICE: Unknown

PERFORMING ORGANIZATION:

Cambridge Systematics
222 Third Street
Boston, Massachusetts 02142

ABSTRACT:

The Urban Freeway Gridlock Study investigated the impact of large trucks on peak-period urban freeway congestion. The study, undertaken for the California Department of Transportation at the direction of the California Legislature, addressed the impacts of large trucks, strategies to reduce congestion, improved traffic management, expanded incident management, mandatory night shipping and receiving, mandatory peak-period truck bans, and the economic impacts of the strategies. The study concluded that the volume of large trucks on the freeways does not have an inordinate impact on peak-period congestion, but truck-involved incidents and accidents do have a significant impact on congestion. Truck traffic makes a relatively small contribution to freeway congestion where truck volumes exceed ten percent of total vehicles.

STUDY TITLE: Weigh Stations Bypassing: Causative Factors and Enforcement Costs

TOPIC AREA: SAFETY

COPIES AVAILABLE FROM:

Underway, estimated completion June 1992

PRICE:

PERFORMING ORGANIZATION:

Kentucky Transportation Center
University of Kentucky
Lexington, Kentucky 40506-0043

ABSTRACT:

The objectives of this study are as follows: 1) to determine the extent of trucks bypassing weigh/enforcement stations, 2) to review bypass studies conducted by other states to determine if patterns exist on a national level that may be of interest when addressing bypass activity in Kentucky, 3) to use data from the study to determine if changes are necessary in the current enforcement programs to more effectively deal with the issue of bypassing, and 4) to evaluate the cost effectiveness of increased enforcement to improve safety and revenue collection efficiency.

PAVEMENT OR BRIDGE PERFOMANCE

STUDY TITLE: Arizona Department of Transportation Port of Entry Weigh-In-Motion Feasibility Study

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Arizona Transportation Research Center
Tempe, Arizona 85282

PRICE: Unknown

PERFORMING ORGANIZATION:

Castle Rock Consultants
18 Liberty Street, S.W.
Leesburg, Virginia 22075

ABSTRACT:

This study examined the feasibility of using slow-speed weigh-in-motion (SWIM) equipment for truck weight enforcement applications. Vehicles pass over a high accuracy, SWIM scale at a constant, minimum speed in bottom gear, allowing a greater throughput of vehicles than static installations. With appropriate equipment and smooth approach aprons, accuracies similar to that of static weighing can be achieved. This study also examined the U.S. legal and institutional position with regard to adopting SWIM equipment for enforcement weighing.

STUDY TITLE: Assessment of Turner Truck Damage to Bridges

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion June 1992

PRICE:

PERFORMING ORGANIZATION:

Washington State Department of Transportation
Transportation Building, KF-01
Olympia, Washington 98504

ABSTRACT:

The economic impact on the bridge structures in the Washington State highway system resulting from the use of Turner trucks is being evaluated. Conclusions derived from preliminary research reports indicate that there are potential positive benefits related to the roadway system, but that there may be detrimental effects with regard to the bridge structures on the system.

STUDY TITLE: Automated Traffic/Truck Weight Monitoring Equipment (Weigh-in-Motion) Demonstration Project #76, Report #FHWA-DP-90-076-001, Oct. 1989

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Office of Safety and Traffic Operation
Research and Development
Federal Highway Administration
400 7th Street, S.W.
Washington, D.C. 20590

PRICE: Unknown

PERFORMING ORGANIZATION:

Office of Safety and Traffic Operation
Research and Development
Federal Highway Administration
400 7th Street S.W.
Wasington, D.C. 20590

ABSTRACT:

This booklet is intended to provide a brief outline of currently available Weigh-in-Motion (WIM) and Automatic Vehicle Classification (AVC) equipment. It is not a complete reference, but it can provide a starting point for those who are interested in learning more about WIM\AVC equipment. The Office of Highway Information Management within the Federal Highway Administration (FHWA) asked each vendor to respond to a series of questions that were most frequently asked by those interested in purchasing WIM\AVC equipment. Those who responded to the questionnaire have had their equipment included in this booklet. This booklet has been divided into two sections. The first section lists WIM equipment that can also classify vehicles, and the second section lists AVC equipment only. The equipment has been arranged alphabetically by vendor name.

STUDY TITLE: Characteristics of Load Equivalence Relationships Associated with Pavement Distress and Performance, Phase I

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Trucking Research Institute
2200 Mill Road
Alexandria, Virginia 22314

PRICE: $25 (full report); $15 (executive summary)

PERFORMING ORGANIZATION:

ARE, Inc.
2600 Delloma Lane
Austin, Texas 78746

ABSTRACT:

The study addresses the axle load equivalency factors derived from the AASHO Road Test equations which show rapid increases in pavement damage with axle loads (approximately to the fourth power of weight) and which have been declared to be valid for direct measurement of pavement damage for cost allocation purposes. The study refutes the existence of a universal fourth power law of pavement damage. While the data are scattered, the damage functions are generally found to be less than the fourth power, in the range of the second or third power in many cases.

STUDY TITLE: Characteristics of Load Equivalence Relationships Associated with Pavement Distress and Performance, Phase II

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Winter 1991

PERFORMING ORGANIZATION:

ARE, Inc.
2600 Delloma Lane
Austin, Texas 78746

ABSTRACT:

The Phase I study of the same title analyzed data from the single-axle loads at the AASHO Road Test. The second phase will develop axle load equivalence factors using data from both the single-axle and tandem-axle lanes. Variations in structural representation and alternative regression methods and models will be employed. Axle load equivalence factors from the study will be compared to the factors from AASHTO and from other studies.

STUDY TITLE: Channelization Guidelines to Accommodate Longer and Wider Trucks at At-Grade Intersections

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB87-234829/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

This report addresses the design of at-grade intersections to accommodate the turning characteristics of the various longer and wider truck configurations that were introduced into the traffic stream by 1982 Federal and State legislation. Information gathered concerning the turning characteristics of the longer and wider design vehicles and turning templates depicting their minimum turning paths are detailed in the first section of the report. The second section contains several tables that detail the interaction of each design vehicle with the degree of turn and curb radius.

STUDY TITLE: Designated Highway System Truck Operation Study "Geometric Considerations", January 1988

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Research Development Division
Wisconsin Department of Transportation
P.O. Box 7910
Madison, Wisconsin 53707

PRICE: Unknown

PERFORMING ORGANIZATION:

Research and Development Division
Wisconsin Department of Transportation
P.O. Box 7910
Madison, Wisconsin 53707

ABSTRACT:

Many highways have been designated by the Federal Highway Administration and the states for use by 48' semi-trailer trucks. Research has been conducted on the theoretical operational and geometric characteristics of these vehicles. However, many intersections on the designated highway system are geometrically inadequate according to current ideal turning templates for long trucks. Concern centers around how to differentiate between the intersections that require only minor modification and those that must be rebuilt to provide acceptable levels of service. This paper presents a methodology that allows decisionmakers to rationalize this process and defend their judgement.

STUDY TITLE: Development of an Integrated Traffic Monitoring System For the State of Delaware, Report# 91-ATC-7

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Delaware Transportation Center
University of Delaware
137 DuPont Hall
Newark, Delaware 19716

PRICE: Unknown

PERFORMING ORGANIZATION:

Delaware Transportation Center
University of Delaware
137 DuPont Hall
Newark, Delaware 19716

ABSTRACT:

The Delaware Transportation Center was asked to study the feasibility of employing new statistical procedures and newly developed hardware for traffic monitoring to update the procedures and enhance the quality of the traffic data obtained. The report examines the following elements that are critical to any traffic monitoring program -- the continuous count element including the Automatic Traffic Recorder (ATR) program, vehicle classification, Weigh-In-Motion (WIM), and the Highway Performance Monitoring System (HPMS).

STUDY TITLE: Dynamic Axle Loads and Pavement Response

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Alberta Research Council
National Research Council
Transportation Association of Canada
Edmonton, Alberta CANADA

PRICE: Unknown

PERFORMING ORGANIZATION:

Alberta Research Council
National Research Council
Transportation Association of Canada
Edmonton, Alberta CANADA

ABSTRACT:

As part of Alberta's Pavement Impact Research Program carried out under the Vehicle Weights and Dimensions Study, an experimental investigation was conducted to explore the effects of heavy truck axle load dynamics on the magnitude of pavement surface deflections. The dynamic axle loads were induced by bumps on the road surface and the magnitude of these axle loads was measured using instruments contained within the road structure. This report describes the experiment, the loading conditions investigated, and summarizes the surface deflection and axle force measurements. Dynamic imposed surface deflections have been compared to those recorded with no perturbations in place.

STUDY TITLE: Dynamic Load Distribution of Axle Suspension Systems on Truck Tractors and Semi-Trailers

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

California Department of Transportation
Division of Structures
1801 30th Street
P.O. Box 942874
Sacramento, California 94274-0001

PRICE: No charge

PERFORMING ORGANIZATION:

California Department of Transportation
Division of Structures
1801 30th Street
P.O. Box 942874
Sacramento, California 94274-0001

ABSTRACT:

An existing weigh-in-motion (WIM) facility was altered to accommodate four additional lanes of WIM pads making a total of six WIM lanes available for this study. The altered facility was used to measure the dynamic pavement loads applied by various types of suspension systems. The hypothesis of the study was that if enough measurements could be taken as an axle traveled over a surface, the trend in dynamic loading could be derived from the gathered data. The study examined three general tandem suspension types: air, fourspring, and walking beam. These suspensions were studied by measuring random vehicles for WIM values, speed, and static weight. The effort was knowingly practical in nature and contributory factors such as tire pressure, tire type, frame stiffness, maintenance levels, load position, etc., were ignored. Results show the air suspension to be the superior performer when compared to the fourspring and walking beam. The fourspring showed the least desirable trends.

STUDY TITLE: Effects of Increased Truck Size and Weight in Illinois, March 1989

TOPIC AREA: PAVEMENT OR BRIDGE PERFOMANCE

COPIES AVAILABLE FROM:

Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, Illinois 62764

PRICE: Unknown

PERFORMING ORGANIZATION:

Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, Illinois 62764

ABSTRACT:

In 1983, the Illinois Department of Transportation was directed to study the impacts of size and weight limits on Illinois highways, and report to the Governor and General Assembly every three years. This is the second of these

reports and covers six basic areas: pavement impacts, bridge impacts, geometric impacts, safety considerations, tax revenue and industry impacts.

STUDY TITLE: Effects of Repeated Heavy Loads on Highway Bridges

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Federal Highway Administration, HPP-11
400 7th Street, S.W.
Washington, D.C. 20590

PRICE: Unknown

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

This study examined damage to highway bridges caused by heavy loads. Deck damage levels, as indicated by type and density of observed cracking are compared, and to the extent possible correlated to the level of truck traffic. In the numerical study, predicted wheel load-induced fracture patterns are identified for various levels of loading.

STUDY TITLE: Effect of Truck Loading on Bridges

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Dec. 1993

PRICE:

PERFORMING ORGANIZATION:

University of Michigan
Department of Civil Engineering
Ann Arbor, Michigan 48109

ABSTRACT:

The effect of truck loading on bridges is an increasingly important topic in the effort to deal with the deteriorating infrastructure in the United States. To avoid high costs of replacement or repair, an evaluation must accurately reveal the present load-carrying capacity of the structure and predict loads and any further changes in the capacity in the applicable time span. The accuracy of bridge evaluation can be improved by using recent developments in bridge diagnostics, structural tests, material tests, structural analysis and probabilistic methods.

STUDY TITLE: Evaluation of Low Cost WIM Alternatives

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-205436/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

Several possible technologies exist for low cost WIM systems. One of these, piezoelectric cable, was investigated in a research effort jointly sponsored by the States of Iowa and Minnesota and FHWA and in other work in the State of Washington and several European countries. A second approach is an inexpensive capacitive weighmat WIM sensor and associated electronics developed for FHWA. A third alternative is a reduced cost configuration of the bending plate WIM transducer manufactured and distributed by the PAT Equipment Corporation. Each of these was evaluated in this study to determine its usefulness in providing effective truck weighing devices at a cost that would allow widespread implementation of in-motion truck weighing programs in Texas.

STUDY TITLE: Evaluation of A Piezoelectric Weigh-In-Motion System

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion July 1993

PRICE:

PERFORMING ORGANIZATION:

Connecticut Department of Transportation
Division of Research
280 West Street
Rocky Hill, Connecticut 06067

ABSTRACT:

This study will evaluate a piezoelectric WIM system to be installed (April 1991) adjacent to each of Connecticut's four General Pavement Study (GPS) sites that have been established for the Strategic Highway Research Program (SHRP). The piezoelectric system has the capability of providing continuous vehicle-classification and weight data over

all travel lanes in the direction being monitored for the SHRP GPS project. Each system will be tested and calibrated and the results will be analyzed. Equations will be derived to convert dynamic weight to static weight. The relative accuracy, reproducibility and survivability will be determined for the system. A final report will be prepared to reflect overall findings of the three-year study.

STUDY TITLE: Fee Schedule for Overweight Vehicles in Montana

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Montana Department of Highways
Motor Carrier Services Division
P.O. Box 4639
Helena, MT 59601

PRICE: No charge

PERFORMING ORGANIZATION:

Montana State University
Department of Civil and Agricultural Engineering
Bozeman, MT 59771

ABSTRACT:

In the fall of 1990, the Montana Department of Highways' Motor Carrier Service Division contracted with the civil engineering unit from Montana State University to prepare an overweight fee chart that considered both weight and distance. This study proposed a fee based on a combined ESAL factor and the total distance traveled. Axle groups are assigned an ESAL factor based on their actual weight that exceeds statutory limits. This factor is then multiplied by the distance and again by a fee, essentially a weight distance concept. This system would induce motor carriers to use more axles and keep loads at their absolute minimum.

STUDY TITLE: Fiscal Effect of the 100,000 Pound General Commodity Vehicle

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Office of Policy Analysis
Maine DOT
State House Station # 16
Augusta, Maine 04333

PRICE: No Charge

PERFORMING ORGANIZATION:

Office of Policy Analysis
Maine DOT
State House Station # 16
Augusta, Maine 04333

ABSTRACT:

The legislature for the State of Maine directed that the costs occasioned by 100,000 pound special commodity vehicles be analyzed for pavements and bridges. The report estimates that approximately $2 million in highway cost savings will be attributed to the use of these vehicles in 1990. Their safety could not be analyzed due to the lack of data, but 100,000 pound vehicles were assumed to be as safe as other heavy vehicles.

STUDY TITLE: Florida's Weigh-In-Motion Program

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE:

PERFORMING ORGANIZATION:

Transportation Statistics Office
Florida Department of Transportation
605 Suwannee Street
Tallahassee, Florida 32399-0450

ABSTRACT:

This report evaluates the performance of the Florida DOT's (WIM) data collection program to collect data on vehicle weights for use in pavement design and to identify an alternative method to calculate traffic load forecasts. This alternative method allows greater consideration of site-specific traffic conditions without increasing data collection requirements. A spreadsheet version of such a traffic load forecasting system is included.

STUDY TITLE: Impact of Heavy Trucks on Delaware Highways, Report# DTC-88-01

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Delaware DOT
P.O. Box 778
Dover, Delaware 19903

PRICE: Unknown

PERFORMING ORGANIZATION:

Delaware Transportation Center
University of Delaware
137 DuPont Hall
Newark, Delaware 19716

ABSTRACT:

This study was undertaken to address two questions: 1) are the total road user revenues in Delaware appropriate for the rate of pavement deterioration, and 2) are road user revenues proportioned equitably among various weights of vehicles? The report recommends reallocation of state highway user fees.

STUDY TITLE: The Impact of Turnpike Doubles and Triple 28's on the Rural Interstate Bridge Network, January 1991

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Center for Transportation Research, ECJ 6.100
The University of Texas at Austin
Austin, Texas 78712

PRICE: Unknown

PERFORMING ORGANIZATION:

Center for Transportation Research, ECJ 6.100
The University of Texas at Austin
Austin, Texas, 78712

ABSTRACT:

This paper examines the impact on the rural interstate bridge system of double 48-ft trailers and triple 28-ft trailers, both of which utilize the investments currently being made by the trucking industry in these trailer types. The paper estimates that LCV operations on the rural interstate system will result in greater bridge damage than conventional vehicles, are likely to be extremely high on key rural structures, resulting in cost predictions that could exceed direct agency costs.

STUDY TITLE: Implementation of Truck Weight and Bridge Behavior Monitoring for Heavy Concentrated Loads in the Toledo Area

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Winter 1991

PRICE:

PERFORMING ORGANIZATION:

BWI Inc.
University Circle
Research Center No. 1
1100 Cedar Avenue
Cleveland, Ohio 44115

ABSTRACT:

Large heavy grain haulers from the State of Michigan are permitted to use the highways in Ohio to travel to the Port of Toledo. These trucks, which may have eleven to seventeen closely spaced axles and weigh up to 154,000 pounds, are commonly called Michigan Grain Trains (MGT) and could cause high stresses in bridges due to the concentrated nature of the load. These vehicles are not required to submit information to Ohio as to vehicular weight, the number and frequency of trips, or even the route traveled. The MGT's may also be returning to Michigan with full loads that sometimes are heavier than the loads they brought to the port. The study will provide the Ohio Department of Transportation with capability to continuously monitor traffic year-round on two routes used by these heavy vehicles in order to determine the frequency of occurrence and the vehicle weights. In addition, four bridges will be instrumented so that the structural response and behavior of the bridges related to these heavy, concentrated loads can be measured for further strength and fatigue analysis by the DOT.

STUDY TITLE: Objective Criteria for Imposing and Lifting Seasonal Load Restrictions on Roads

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Sept. 1993

PRICE:

PERFORMING ORGANIZATION:

Michigan Technological University
Department of Civil Engineering
Houghton, Michigan 49331

ABSTRACT:

Developing objective criteria for imposing and lifting seasonal load restrictions on roads is pertinent to states located in climatic zones with below-freezing weather. A substantial penetration of ground frost into the highway subgrade is not uncommon in these conditions, and the subgrade soils are weakened and the pavement becomes vulnerable to damage from truck wheel loading. The ensuing truck load restrictions, imposed during the spring thaw period, impact on trucking productivity and the local economy. A principal goal of this project is to investigate the scientific basis for load restrictions during these thaw periods. Ground frost conditions and pavement deflection properties of Michigan highways will be measured and analyzed for the purpose of developing more comprehensive procedures for determining what the most appropriate load restrictions actually are.

STUDY TITLE: OECD Full Scale Pavement Test

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

OECD
2 Rue Andre-Pascal
75775 Paris Cedex 16
FRANCE

50

PRICE: 300 FF

PERFORMING ORGANIZATION:

OECD Road Transport Research Programme
2 Rue Andre-Pascal
75775 Paris Cedex 16
FRANCE

ABSTRACT:

This report provides a full account of the OECD Full-scale Pavement Test undertaken in 1989 at the Circular Fatigue Test Track in the Nantes French Central Laboratory of Roads and Bridges (LCPC). The test was financed and implemented by fourteen OECD Member countries and the Commission of the European Communities. Three experimental road pavements -- two flexible and one semi-rigid structure, as well as maintenance overlays applied after significant pavement deterioration -- were tested under 10 and 11.5 tonne truck axle loads. A total of 4.5 million load applications were effected. The report concludes with a summary and future development needs. Information on important aspects of this international experiment is given in five Annexes. The report is rich in research details and constitutes a substantial contribution to advancing pavement technology and assessing the effects of heavy vehicle axle loads. The detailed research data and documentation of various investigations undertaken, are available through OECD and were presented at a special conference in La Baule, France in May 1991.

STUDY TITLE: Pavement and Bridge Impacts of Longer Combination Vehicles

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Trucking Research Institute
2200 Mill Road
Alexandria, VA 22314

PRICE PER COPY:$15

PERFORMING ORGANIZATION:

The Urban Institute
2100 M Street, N.W.
Washington, D.C. 20037

ABSTRACT:

This study assesses the pavement and bridge cost impacts of LCV scenarios as described in "Productivity and Consumer Benifits of Longer Combination Vehicles" completed in June 1990 for the Trucking Research Institute. The analysis shows higher bridge costs and reduced pavement costs, with a maximum net increase in pavement and bridge costs combined of $375 million per year. These costs compare favorably to the annual savings to the economy that would result from the operation of a national LCV highway system.

STUDY TITLE: Pavement Damage Attributable to Four Axle Single Unit Trucks

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-161910/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Arkansas State University
Department of Engineering
P.O.Box Drawer 1080
State University, Arkansas 72467

ABSTRACT:

The objective of the study was to investigate and define the types of pavement damage which may be attributed to four axle single unit trucks. A test plate was developed which measured the resultant tire forces produced by this truck during right turns. Recommendations were made concerning four axle single unit trucks which could reduce the equivalent axle loads associated with these trucks by a factor of two to three. These recommendations would impose minimal economic hardship on the truck owners and operators.

STUDY TITLE: Pavement Vehicle Interaction

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE:

PERFORMING ORGANIZATION:

Washington State DOT
Transportation Building, KF-01
Olympia, Washington 98504

ABSTRACT:

The study is intended to increase the collective understanding of how trucks affect pavements and how pavements affect trucks. It will instrument both a test pavement and test trucks and measure responses (such as strains, deflection, accelerations) to understand how different truck suspensions and different truck tire\axle combinations affect pavement response.

STUDY TITLE: Rationalization of Procedures for Highway Cost Allocation

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Trucking Research Institute
2200 Mill Road
Alexandria, Virginia 22314

PRICE: $25 (full report); $15 (executive summary)

PERFORMING ORGANIZATION:

The Urban Institute
2100 M Street, N.W.
Washington, D.C. 20037

ABSTRACT:

The study assesses alternative methods for conducting highway cost allocation studies, develops guidelines for the conduct of studies, and suggests improvements that should be made in methods and data. Four major methods of cost allocation are investigated: the incremental method developed by the Federal Bureau of Public Roads, a benefits-based analysis which allocates costs in proportion to benefits received, the Federal method which combines the philosophies of the incremental and consumption approaches, and a marginal social cost analysis which seeks to set highway user fees equal to the marginal cost to society of individual trips. The study found that each of the methods has good supporting arguments; that no method is theoretically superior in all respects; and that more than one method should always be applied in highway cost allocation studies.

STUDY TITLE: Reduction of Rutting Under Heavy Vehicle Loads

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Jan. 1994

PRICE:

PERFORMING ORGANIZATION:

Michigan State University
Department of Civil & Environmental Engineering
East Lansing, Michigan 48824-1212

ABSTRACT:

The rutting of asphalt pavements represents one of the most visible and costly mechanisms of pavement wear caused by heavy commercial vehicles. This project is examining the rutting experience in Region V to establish relationships between the properties of pavement materials and rutting under exposure to heavy traffic. Analyses of these relationships will produce a model that can be used to establish proper mix design procedures, upgrade existing material specifications, and design flexible pavements and bituminous overlays.

STUDY TITLE: Reliability of AASHTO Design Equations for Predicting Performance of Flexible and Rigid Pavements in Ohio

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Dec. 1992

PRICE:

PERFORMING ORGANIZATION:

CTL Engineering Inc.
2860 Fisher Road
Columbus, Ohio 43204

ABSTRACT:

This study is attempting to verify the accuracy of the AASHTO design equations in predicting the performance of flexible and rigid pavements in Ohio. It will revise the components of the chance variation in the design-performance process of flexible and rigid pavements, determine the overall standard deviation applicable to flexible and rigid pavements in Ohio, and calculate the design reliability factors for different reliability levels.

STUDY TITLE: A Reliability Analysis of Permit Loads on Bridges

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Dec. 1991

PRICE:

PERFORMING ORGANIZATION:

Case Western Reserve University
Civil Engineering Department
Cleveland, Ohio 44106

ABSTRACT:

The study will use a statistical data base for bridge loadings and simulate the effects of permit overloads. The simulation will include distribution of truck weights, volumes, multiple lane occupancy and vehicle spacings. A reliability model of bridge safety consistent with recent AASHTO code developments will be broadened to cover permit loadings. Three categories of permit trucks will be considered including: a) routine frequent permits, b) special-single passage permits, and c) escorted vehicles. For each permit category, load factors will be derived to produce target reliability levels and examples are to be included with recommendations for reviewing permit loads. The study will review fatigue damage models and will express results on a cost per bridge or a cost per route mile to assess different weight permits.

STUDY TITLE: Super Single Truck Tire Effects on Pavement Performance and Vehicle Regulatory Legislation

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, projected completion Jan. 1992

PRICE:

PERFORMING ORGANIZATION:

University of Kansas
Department of Civil Engineering
Lawrence, Kansas 66045

ABSTRACT:

A comprehensive literature search will be conducted and a survey of the other 49 states will be completed to determine how other state highway agencies plan to address the pavement design and regulatory problems associated with the super single truck tire. Although no analytical or laboratory research is envisioned, the final report would represent the current status of the issue from both technical and regulatory points of view.

STUDY TITLE: Truck Tire Pavement Contact Pressure Distribution; Characteristics for Super Single 18-22.5 and Smooth 11R24.5 Tires

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PRICE: NTIS No. PB90-272196/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

To design pavements capable of sustaining increased truck loading, the actual loading mechanisms and their magnitudes have to be identified. Static testing was performed at the University of Texas at Austin on a specially manufactured smooth tread tire and also on a commercially available wide base, newly recapped super single tire. Increased wheel loads were accommodated by a lengthening of the contact area. Low inflation pressures tended to cause the wheel load to be distributed more heavily to the contact patch's central area for the radial tire and more heavily to the sidewall contact area for the bias tire.

STUDY TITLE: Truck Tire Pressure in Colorado
Report# CDOH-DTD-R-89-1, February 1989

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Research Branch
Colorado Department of Highways
4201 E. Arkansas Avenue
Denver, Colorado 80222

PRICE: Unknown

PERFORMING ORGANIZATION:

Colorado Department of Civil Engineering
University of Colorado at Denver
1200 Larimer St.
Denver, Colorado 80204

ABSTRACT:

A survey of truck tire pressures was conducted on over 1500 tires at 3 truck weigh stations in Colorado. Results of 100 psi overall average tire pressure compared favorably with the literature and other states' studies. The laboratory tests on the pavement sections were compared with the 1986 CDOH study on performance of asphalt pavements.

STUDY TITLE: Truck Weight Effects on Bridge Costs

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Dec. 1992

PRICE:

PERFORMING ORGANIZATION:

Case Western Reserve University
Civil Engineering Department
Cleveland, Ohio 44106

ABSTRACT:

The topic to be addressed in this study is the cost impact for Ohio of permit vehicles and possible higher legal truck weights on bridges. The Ohio inventory of bridges will be reviewed and costs assigned for new design, as well as rehabilitation, upgrading, and loss of remaining lives because of increased truck weights. Estimates of their costs on annual basis will be derived for both evaluating proposed new permit and weight regulations as well as assigning costs to different vehicle classifications.

STUDY TITLE: Truck Weight Limits and Impacts on Minnesota Bridges; Task Force Report

TOPIC AREA: PAVEMENT OR BRIDGE PERFORMANCE

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE:

PERFORMING ORGANIZATION:

Truck Weight Bridge Task Force
Minnesota DOT
St. Paul, Minnesota 55155

ABSTRACT:

In response to the recommendations of TRB Special Report 225, the Minnesota DOT formed a task force to study the impact on Minnesota bridges which may occur if the present 80,000 pound cap were increased to accommodate a special vehicle permit program. The study will estimate bridge replacement costs and certain other associated costs, such as weight and safety enforcement costs, which may be incurred under several Minnesota highway network options. Some costs, such as pavement costs, are not within the scope of this study.

TRUCKING PRODUCTIVITY

STUDY TITLE: Analysis of Port Import/Export Reporting Service (PIERS) Data to Reveal Potentially Overweight Container Movements on America's Highways

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Transportation Studies Division, HPP-11
Federal Highway Administration
400 7th Street S.W.
Washington, D.C. 20590

PRICE: No charge

PERFORMING ORGANIZATION:

Transportation Studies Division, HPP-11
Federal Highway Administration
400 7th Street S.W.
Washington, D.C. 20590

ABSTRACT:

The FHWA assessment of the overweight container problem was initiated in response to a request by the National Motor Carrier Advisory Committee. An intermodal working group with representatives from four USDOT modal administrations was formed to examine the issue of overweight container movements over highways. The FHWA's analysis of the Journal of Commerce PIERS data revealed that maritime shipping containers passing through U.S. ports frequently contain loads exceeding those which could be carried by a highway vehicle in compliance with the Federal Bridge Formula. Based on this analysis, it appears that over 33 percent of maritime shipping containers would cause the trucks that transported them to possibly exceed Federal weight limits, and that the potential for overweight export containers was greater than for import containers.

STUDY TITLE: Commercial Overweight Fine Study

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Policy Branch
British Columbia Ministry of Transportation and Highways
Victoria, British Columbia CANADA V8W 3E6

PRICE: No charge

PERFORMING ORGANIZATION:

Policy Branch
British Columbia Ministry of Transportation and Highways
Victoria, British Columbia CANADA V8W 3E6

ABSTRACT:

This study describes existing fine structures in British Columbia for the threshold weight infractions and fines used by other jurisdictions for comparison purposes. The fine structure was developed in accordance with the Road and Transportation Association of Canada's empirical analysis of pavement damage as a function of weight.

STUDY TITLE: Guidelines for Local Air Districts Considering Transportation Control Measures Directed at Heavy-Duty Truck Operations

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Ms. Sharon Brehmer
California Air Resources Board
P.O. Box 2815
Sacramento, California 95812

PRICE: No charge

PERFORMING ORGANIZATION:

California Air Resources Board
P.O. Box 2815
Sacramento, California 95812

ABSTRACT:

The California Clean Air Act of 1988 required the development of guidelines for California's air pollution control districts to reduce air pollution emissions from truck traffic. The guidelines were prepared by a technical advisory group composed of representatives from the trucking industry, organized labor, shippers and receivers, state agencies and air pollution control districts. A transportation law overview is provided which outlines potential conflicts in federal law between air quality and large truck access provisions. The costs and benefits of the tactics for reducing air pollution emissions from truck traffic are analyzed.

STUDY TITLE: Heavy Vehicle Revenue Study

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Motor Carrier Programs
Maryland Department of Transportation
P.O. Box 8755
BWI Airport Maryland 21240-0755

PRICE: Unknown

PERFORMING ORGANIZATION:

Maryland Department of Transportation
P.O. Box 8755
BWI Airport, Maryland 21240-0755

ABSTRACT:

This study analyzed the impact of 1988 legislative, administrative, and judicial actions relating to heavy vehicles over 26,000 pounds. The Maryland Department of Transportation estimated the total annual loss of revenues from heavy vehicles after joining the International Registration Plan and the 1988 legislation to be $3 million.

STUDY TITLE: Impact Assessment of the Regulation of Heavy Truck Operations

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Underway, estimated completion Winter 1991

PRICE:

PERFORMING ORGANIZATION:

Cornell University
School of Civil and Environmental Engineering
Hollister Hall
Ithaca, New York 14853

ABSTRACT:

This study will determine the impact of heavy vehicle operations under real-world operating and usage conditions, using the New York State divisible-load permit vehicle fleet as the data base. The operating costs under the current permit system and under the Federal legal load limits will be calculated and compared, and the primary and secondary economic impacts assessed. The study will provide information for developing appropriate policy decisions concerning the regulation of heavy vehicle operations.

STUDY TITLE: Integrated Truck Monitoring System

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Underway, estimated completion June 1992

PRICE:

PERFORMING ORGANIZATION:

Kentucky Transportation Center
College of Engineering
University of Kentucky
533 South Limestone Street
Lexington, Kentucky 40506-0043

ABSTRACT:

This study will develop functional specifications for an integrated truck monitoring system in Kentucky by identifying data needs of various agencies involved in truck monitoring. Data will be collected to determine the system's advantages and disadvantages related to items such as enforcement, revenue collection, and time delays at weigh stations. The last objective of the study will be to determine the magnitude of the problem related to trucks using bypass routes to avoid weight-distance tax monitoring.

STUDY TITLE: Long Combination Vehicle (LCV) Hours of Operation on Two Lane Highways

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Underway, estimated completion Fall 1991

PRICE:

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109

ABSTRACT:

The objective of this study is to develop a safe window for hours of operation for LCV's on two-lane highways. The study will evaluate the impact of LCV's on Saskatchewan's two-lane rural highways with traffic volumes ranging from 600 ADT to 6000 ADT. Measures of input will include traffic volumes, geometrics, accident statistics, industry projections of the effects of converting to LCV's compared to 5-axle semi-trailer units, pavement characteristics, and economic benefits to the trucking companies.

STUDY TITLE: Minnesota Highway User Cost Allocation Study

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Charles Sanft
Minnesota DOT
810 Transportation Building
395 John Ireland Boulevard
St. Paul, Minnesota

PRICE: No charge

PERFORMING ORGANIZATION:

Cambridge Systematics, Inc.
222 Third Street
Boston, Massachusetts 02142

ABSTRACT:

This study examines the relationship of highway user charges to cost responsibilities by user class in Minnesota, considering both state-administered roads and local roads, and including the user payments and shares of cost responsibilities incident to federal programs. The study determines the equity of the current road financing structure in Minnesota and recommends changes to bring highway user payments more closely in line with cost responsibilities for each user class. This final report documents the study findings and recommends implementing the resulting cost allocation methoidology in a computer system that enables Minnesota to undertake future updates of this cost allocation procedure.

STUDY TITLE: New Trucks for Greater Productivity and Less Road Wear: An Evaluation of the Turner Proposal 1990, TRB Special Report 227

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Transportation Research Board
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

PRICE: $23.00

PERFORMING ORGANIZATION:

Transportation Research Board
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

ABSTRACT:

In a 1984 address to AASHTO, former Federal Highway Administrator Frank Turner advocated using trucks with lower axle weights and higher gross weights than currently allowed to reduce pavement wear while increasing productivity. The Transportation Research Board studied the proposal and concluded that, nationally, considering pavement savings and added bridge cost (including removal of all attributable primary bridge deficiencies), Turner trucks could reduce annual highway maintenance costs by $326 million.

STUDY TITLE: Overweight Intermodal Containers and Piggyback Trailers

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

California DOT
Office of Truck Studies
1120 N Street
Sacramento, California 95814

PRICE: Unknown

PERFORMING ORGANIZATION:

California DOT
Office of Truck Studies
1120 N Street
Sacramento, California 95814

ABSTRACT:

California legislation required the California Department of Transportation to develop a plan for implementing or identifying new or existing scale facilities at intermodal terminals to enforce road weight limits on intermodal containers and piggyback trailers. The study describes the operational characteristics of the intermodal industry, the drayage of intermodal shipments by truck, reviews the applicable public road vehicle weight limits, examines the available data quantifying the size of the overweight problems, and summarizes existing state and local enforcement efforts and practices. It was recommended that the primary options to be implemented should be those that authorize the access to and use of intermodal industry private weight records.

STUDY TITLE: Productivity and Consumer Benefits of Longer Combination Vehicles

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Trucking Research Institute
2200 Mill Road
Alexandria, Virginia 22314

PRICE: $25 (full report); $15 (executive summary)

PERFORMNG ORGANIZATION:

SYDEC, Inc.
1601 Washington Plaza
Reston, Virginia 22090

ABSTRACT:

This project assesses the potential of a national network of longer combination vehicles (LCVs) to achieve productivity benefits for motor carriers and shippers in general, and translates these benefits into estimates of consumer cost savings. The report concludes that a national LCV highway system could result in annual savings to the economy of $4 billion. Most of this benefit would be passed on from motor carriers and shippers to consumers. Additional safety benefits would result from reduced truck miles of travel and reduced accident rates.

STUDY TITLE: Providing Access for Large Trucks, TRB Special Report 223, 1989

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

PRICE: $25.00

PERFORMING ORGANIZATION:

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W
Washington, D.C. 20418

ABSTRACT:

The Surface Transportation Assistance Act (STAA) of 1982 expanded the federal role in regulating the size of heavy commercial vehicles and introduced the concept of a designated National Network of major truck roads for heavy truck travel. Controversy over the extent of "reasonable access" that could safely be provided off this National Network to longer and wider vehicles authorized by the Act gave rise to the congressional mandate for this study in the STAA of 1987. This Transportation Research Board study considered several policy options including uniform standards for access based on such factors as distance from the National Network, type of highway, and roadway characteristics. It drew upon research studies and information provided by representatives of state and local highway and transportation departments, and from state trucking associations, carriers, and shippers about the effects of travel by large trucks, particularly STAA vehicles, on access roads. The report presents the major findings and recommendations of the study committee regarding reasonable access policies.

STUDY TITLE: Results of Special-Use Truck Data Collection Vols. 1, 2, and Executive Summary

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

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5285 Port Royal Road
Springfield, Virginia 22161

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Vol. 2 NTIS No. PB91-212407/XAB
Paper @ $70.00; Microfiche @ $34.00
Executive Summary NTIS No. PB91-125534/XAB
Paper @ $38.00; Microfiche @ 18.00

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

The principle objectives of this study were to examine the following characteristics of special-use truck traffic: traffic patterns, vehicle axle distributions, axle load distributions, and radius of influence. The commodity movements which are considered in this study are: timber, produce, grain, beef cattle, limestone, sand/gravel, and oil and gas exploration activities. The industries of timber, surface mining, agriculture, and oil and gas field exploration were found to contribute to significant levels of pavement distress.

STUDY TITLE: Truck Weight Limits: Issues and Options, TRB Special Report 225, 1990

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

PRICE: $25.00

PERFORMING ORGANIZATION:

Transportation Research Board
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

ABSTRACT:

Section 158 of the Surface Transportation and Uniform Relocation Assistance Act of 1987 called on the Transportation Research Board of the National Research Council to convene a committee to study various proposals for changes in truck weight regulations. The committee analyzed the effects of a number of specific proposals, including changes to the existing federal bridge formula, no further expansion of grandfather claims for vehicles that exceed existing federal limits, special state permit programs for vehicles exceeding 80,000 pounds, increased truck weight enforcement, and regional cooperation among states in standardizing limits and permit practices.

STUDY TITLE: The Wyoming Weight Study

TOPIC AREA: TRUCKING PRODUCTIVITY

COPIES AVAILABLE FROM:

Wyoming Department of Transportation
P.O. Box 1708
Cheyenne, Wyoming 82002-9019

PRICE: No charge

PERFORMING ORGANIZATION:

Wyoming Department of Transportation
P.O. Box 1708
Cheyenne, Wyoming 82002-9019

ABSTRACT:

In the 1985 General Session, the Wyoming State Legislature directed the Wyoming Highway Department to evaluate the benefits of operating Rocky Mountain Doubles at weights of up to 117,000 pounds under a demonstration project. This report describes the results of this demonstration on fuel conservation, road design, interstate commerce, state enforcement costs, highway maintenance costs, and the corresponding benefits to the State of Wyoming. The major focus of this report is on the economic impacts of the demonstration, with less attention given to questions of enforcement and administrative costs and highway deterioration associated with these vehicles' operation.

COMBINATION VEHICLE OPERATIONS

STUDY TITLE: Analysis of Heavy-Duty Truck Use in Urban Areas; Report# UMTRI-89-31, June 1988

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

The National Truck Trip Information Survey (NTTIS) provides actual data on the urban and rural proportions of mileage for a nationally representative sample of medium and heavy diesel trucks. In addition, NTTIS includes data on mileage by road class, engine characteristics, fuel economy measures, cargo types and weight, and vehicle weights, as well as many other variables that provide a more detailed look at the operation of medium and heavy trucks in urban areas. This project outlined the NTTIS sample and survey methodology and defined variables particularly relevant to urban diesel truck emissions. The bulk of the first report was devoted to tables examining the operations of medium and heavy-duty trucks in urban areas. The tables show the structure of the U.S. truck population, the breakdown of truck travel between urban and rural areas by road type, engine horsepower, and gross combination weight. In addition, truck travel in Los Angeles was examined, and travel in certain specific large urban areas was compared with travel in all large urban areas.

STUDY TITLE: Development of an Anti-Jackknifing System for Tractor Semitrailers (2 Volumes), June 1989

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

Transportation Development Centre 200 Rene Levesque Blvd.
West Tower, Suite 601
Montreal, Quebec CANADA H2Z lX4

PRICE: Unknown

PERFORMING ORGANIZATION:

TES Limited
308 Legget Drive
Kanata, Ontario CANADA KZK 1Y6

ABSTRACT:

This study investigated the feasibility of developing anti-jackknifing systems (AJS), located about the fifth wheel, to control jackknifing and trailer swing of tractor semitrailers. The characteristics of jackknifing and the performance of the various AJS were determined by computer simulation. Several different vehicle configurations representative of the wide range of tractor semitrailers on the road today were used in the analysis. It was concluded that several types of AJS showed merit in controlling jackknifing but had a minimal or negative impact on trailer swing.

STUDY TITLE: Effects of Heavy Trucks' Offtracking on Montana Highways

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

Program Development Division
Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59601

PRICE: No Charge

PERFORMING ORGANIZATION:

Montana Department of Highways
2701 Prospect Avenue
Helena, MT 59601

ABSTRACT:

In the summer of 1990, the Montana Department of Highways Program Development Division conducted an offtracking study on Montana's rural and urban primary routes. The objective of the study was to provide an evaluation of current and future offtracking conditions in Montana. Ultimately, the work shows size and weight rules influence the safety-related performance of vehicles designed to increase productivity. By treating a number of projected size and weight scenarios, the study has developed principles that can be used in evaluating the possible safety consequences of changes in size and weight regulations.

STUDY TITLE: Factbook of the Mechanical Properties of the Components for Single-Unit and Articulated Heavy Trucks, Report# DOT HS 807 125

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

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PRICE: NTIS No. PB87-228433/XAB
Paper @ $52.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

This factbook provides a compilation of the mechanical properties of the components used in heavy trucks. It contains sections describing and discussing geometric layout, mass distribution, tires, suspensions, steering systems, brakes, frames, and hitches. Parametric data on heavy truck components are presented in a form suitable for use in analyzing the braking and steering performance of heavy trucks, including combination vehicles. The influences of component properties on maneuvering performance are discussed.

STUDY TITLE: Fleet Experience of the Prototype Controlled Steering B-Dolly, Report # UMTRI-87-43, December 1987

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

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Transportation Research Institute
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Ann Arbor, Michigan 48109-2150

PRICE: Unknown

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

The purpose of this task report is to provide an assessment of the performance of the CSB-dolly throughout a field service trial program. Primary objectives of overall assessment considered fleet experiences with respect to dynamic stability, offtracking, ease of operation, coupling, loading, backing, and life-cycle costs. Actual experience with the CSB-dolly after 100,000 km has been very satisfactory as regards functional operational considerations. An economic analysis indicates that use of the CSB-dolly represents a cost penalty within the current regulatory environment, except where operational benefits can provide a means for improved productivity and associated cost savings.

STUDY TITLE: Operational Considerations Relating to Long Trucks in Rural Areas; published in Transportation Research Record No. 1256

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

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Transportation Research Board
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

PRICE: $12.00

PERFORMING ORGANIZATION:

Wisconsin DOT
Madison, Wisconsin 53707

ABSTRACT:

This study focuses on the dimensions and turning characteristics of combination tractor-semitrailer vehicles negotiating four rural interchange ramp intersections in Wisconsin. This analysis attempts to determine the adequacy of Wisconsin's intersection and ramp terminal design standards and to evaluate the ability of CALTRANS' theoretical turning templates to describe the actual paths of turning trucks. The study found that Wisconsin's intersection design standards are adequate for existing trucks, but only marginal for the new, longer trucks (in this case, Wisconsin's WB-62 with an overall wheelbase of 61.7 feet). Also, the CALTRANS turning templates did adequately describe the turning path of the most common size truck observed operating at low speeds.

STUDY TITLE: Operational Considerations Relating to Long Trucks in Urban Areas, published in Transportation Research Record No. 1249

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

Transportation Research Board
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

PRICE: $7.50

PERFORMING ORGANIZATION:

Wisconsin DOT
Madison, Wisconsin 53707

ABSTRACT:

Many of the intersections on the Designated Highway System cannot fully accommodate STAA-dimension vehicles with a 62-foot wheelbase. However, truck operators and automobile drivers take numerous compensatory measures which allow the longest vehicles to successfully negotiate most of these submarginal geometrics. With thoughtful traffic engineering analysis and relatively minor physical alterations or changes in traffic handling, significant operational improvements can be effected at large cost savings. The purpose of this paper is to present a methodology that allows decisionmakers to rationalize this process and defend their judgment.

STUDY TITLE: An Overview of the Dynamic Performance Properties of Long Truck Combinations, Report# UMTRI-84-26, July 1984

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

Transportation Research Institute
University of Michigan
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

PRICE: Unknown

PERFORMING ORGANIZATION:

Transportation Research Institute
University of Michigan
2901 Baxter Road
Ann Arbor, Michigan 48109-2150

ABSTRACT:

By means of computerized analysis and a review of existing literature, various aspects of the dynamic performance of long truck combinations were assessed. The vehicles of interest included Rocky Mountain and Turnpike doubles and a triples combination. The performance of each vehicle configuration was examined relative to that of a conventional five-axle tractor doubles combination. Performance was considered in each of the following aspects: backing up, general braking performance, issues related to brake system air delivery, low-speed offtracking, high-speed offtracking, stability issues related to rapid steering maneuvers, roll stability, yaw stability of the power unit, and power requirements. In addition, the matter of alternative devices for coupling multiple-trailer combinations together is discussed. The results of these analyses compare the performance characteristics of the respective configurations in areas thought to have implications for operating efficiency and traffic safety.

STUDY TITLE: Passenger Car Equivalencies for Large Trucks at Signalized Intersections

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

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Department of Commerce
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Springfield, Virginia 22161

PRICE: NTIS No. PB87-233219/XAB
Paper @ $38.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

Texas Transportation Institute
Texas A&M University
College Station, Texas 77843

ABSTRACT:

The objective of this report was to develop passenger car equivalents (PCEs) for trucks traveling straight through a level signalized intersection based on vehicle type and position in queue. A model was developed to estimate PCE values based on total travel time and vehicle type. An equation was developed to predict PCEs for large vehicles based on the number of axles. This research concluded that position of vehicles in queue significantly affects the PCE of the 5-axle trucks but not the value of the smaller single unit trucks. It concluded that the PCE value used to calculate the heavy vehicle adjustment factors (Table 9-6) in the 1985 Highway Capacity Manual is inadequate for the large 5-axle combination trucks.

STUDY TITLE: Recommended Regulatory Principles for Canada Interprovincial Heavy Vehicle Weights and Dimensions

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

Roads and Transportation Association of Canada
1765 St. Laurent Blvd.
Ottawa, CANADA K1G 3V4

PRICE: Unknown

PERFORMING ORGANIZATION:

Roads and Transportation Association of Canada
1765 St. Laurent Blvd.
Ottawa, CANADA K1G 3V4

ABSTRACT:

Following the completion of the Vehicle Weights and Dimensions Research Program, marked by the delivery of the Technical Steering Committee Report in December 1986, the Implementation Planning Subcommittee of the Joint RTAC/CCMTA Committee on Heavy Vehicle Weights and Dimensions was charged with implementing the recommendations of the report. Here, the committee reports on a proposed regulatory environment which provides improved opportunities to safely exploit the available capacities of both the highway system and the motor transport fleet on a national basis.

STUDY TITLE: Truck Kingpin-to-Rear Axle Length State Highway System Evaluation

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

COPIES AVAILABLE FROM:

California DOT
Division of Traffic Operations
Office of Truck Studies
1120 N Street
Sacramento, California 95814

PRICE: No charge

PERFORMING ORGANIZATION:

California DOT
Division of Traffic Operations
Office of Truck Studies
1120 N Street
Sacramento, California 95814

ABSTRACT:

California legislation increased the maximum kingpin-to-rear axle (KP-RA) length of tractor-semitrailer combination vehicles from 38 feet to 40 feet, effective January 1, 1987. The legislation directed the California Department of Transportation to determine which state highways could not, in consideration of public safety, sustain the operation of 40-foot KP-RA tractor-semitrailer combinations. The engineering study compared the turning characteristics of a typical tractor-semitrailer with the existing geometrics of all routes in the State Highway System.

STUDY TITLE: Vehicle Dynamics Handbook for Single-Unit and Articulated Heavy Trucks, DOT HS 807 185

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

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National Technical Information Service
Department of Commerce
5285 Port Royal Road
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PRICE: NTIS No. PB88-134044/XAB
Paper @ $86.00; Microfiche @ $18.00

PERFORMING ORGANIZATION:

University of Michigan
Transportation Research Institute
2901 Baxter Road
Ann Arbor, Michigan 48109

ABSTRACT:

This handbook compiles the effects of the mechanical properties of vehicle components and configurations on the braking and steering of heavy trucks. Its sections describe the braking and steering performance of straight trucks, tractor-semitrailers, truck-full trailers, B-trains, doubles and triples. Performance measures are presented for driving situations involving constant deceleration braking, low- and high-speed offtracking, steady turning, initiation of curved paths, obstacle evasion, and braking while turning. The influences of component properties on braking and steering performance, as quantified by computerized analyses and simulations, are illustrated through the use of parameter sensitivity diagrams.

STUDY TITLE: Vehicle Weights and Dimensions Study, Technical Steering Committee Report, Canada, December 1986

TOPIC AREA: COMBINATION VEHICLE OPERATIONS

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1765 St. Laurent Boulevard
Ottawa, CANADA K1G 3V4

PRICE: Unknown

PERFORMING ORGANIZATION:

Roads and Transportation Association of Canada
1765 St. Laurent Boulevard
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ABSTRACT:

Jurisdiction over vehicle weights and dimensions regulatory practice in Canada falls largely under the provincial and two territorial governments. Due to the fractured nature of regulatory responsibility, along with a disparity of technical viewpoints in individual jurisdictions, a considerable degree of non-uniformity exists in vehicle size and weight regulations across the country. The Canadian Vehicle Weights and Dimensions Study was launched in 1984 to provide a sound technical basis for regulatory reform, with increased uniformity as the ultimate goal. The three year, $2.8 million study focused on two main areas of research: vehicle stability and pavement response. The control and stability characteristics of various tractor/trailer configurations were evaluated using computer simulation, rollover analysis employing tilt table tests, full scale field testing and demonstrations. The results of the extensive research program were presented in a 16 volume set of technical reports. In this report, the key findngs are summarized as they relate to potential regulatory reform. Based on the technical conclusions, a set of candidate principles is developed to serve as the basis for future weights and dimensions policies in Canada.