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Final Report

**A SYNTHESIS OF OVERWEIGHT TRUCK
PERMITTING**

**M. K. Bilal
M. Irfan
A. Anwaar
S. Labi
K. C. Sinha**

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A SYNTHESIS OF OVERWEIGHT TRUCK PERMITTING

Introduction

For purposes of safety and system preservation, trucking operations are regulated through federal and state legislation and policies. Under certain circumstances, special permits are granted to truck operators to allow them to exceed the specified operational restrictions. The Indiana DOT bears the responsibility to adopt policies for highway operations and cost allocation that retain and attract heavy industry on one hand but also avoid premature and accelerated highway deterioration on the other hand. Over the decades, the dynamic nature of the national and regional social-economic development translates into changing distributions and patterns of commercial vehicle movements. Thus, there is a need to continually review the truck weight permitting practices in

Indiana in relation to those of neighboring states. This involves documentation, assessment, and comparison of the agency practices on the basis of the simplicity and ease of the permitting process for the permit applicant; convenience of the process (for the applicant) with respect to vehicle attributes, the fee structure for extra legal weights and sizes, and basis for such fees. There is also a need to document the revenue streams from the existing permit process, and to synthesize existing methods that quantify the impacts of additional payloads on pavement deterioration and subsequently, on pavement repair costs. This study addresses these issues.

Findings

The study determined that while the upper thresholds (dimensions and weights) for legal trucking operation are generally the same for each state, those for extra legal dimensions and weights vary considerably across the states. Also, the findings from the literature review, internet search, and phone interviews show that there is a great deal of variability in truck permit fees and permitting criteria across the states. The key criteria include: the extents to which size attributes (length, width, height) are in excess of the legal values, distance traveled by the overweight/oversize truck, type of load carried, and axle spacing. Furthermore, it was observed that no Midwest state has adopted explicitly the weight-distance concept for its overweight trucks. However, in the states of Indiana, Ohio, and Illinois, the fee structures for overweight vehicles includes weight levels and extents of travel; thus their fee structures resemble that of a weight-distance fee structure.

From the perspective of overweight and oversize thresholds and associated permit fees, it was observed that a number of states such as Indiana appear to be

more favorable to trucking because they have relatively high upper thresholds for defining what an overweight truck is, and/or have relatively lower fees for overweight trucks. However, as demonstrated in the excel spreadsheet case studies that accompany this report, the differences in fees incurred by truckers across the state are significantly influenced by factors including the trip circumstances, permitting criteria, and trip frequency and distance. As such, a holistic assessment and comparison across the states can only be carried out on a case-by-case basis.

The study documented the revenue streams obtained from the permits issued for extra-legal trucking operations: these were found to be approximately \$12 million annually. The study also briefly addressed the issue of revenue neutrality: it was seen from the literature and from phone interviews that highway agencies that had switched from a single-trip permit system to an annual flat fee permit system had benefited from cost savings due to reduced monitoring efforts of truck trip but had lost significant revenue overall.

Using data from a past national study, the report provides nomographs with which INDOT can quantify the increase in pavement damage (and hence repair costs) that can be expected due to additional payload increases for a given axle configuration; and

the reduction in pavement damage due to the increase of axles on a truck of a given payload. However, as these relationships between truck load pavement damage costs are based on national level data, there is a need to update these costs using data from Indiana.

Implementation

This study can be used by personnel at a number of divisions, offices, program areas, and units at INDOT to assess the consequences of truck weight policies on the condition and longevity of assets within their jurisdiction. These include the Indiana Toll Road, the Divisions of Freight Mobility, Economic Opportunity, and the Indiana Department of Revenue. These offices have a stake in knowing the potential impact of any changes on vehicle license fees and overweight truck permits on the revenue generated from each of these fee structures, and the impact of pavement damage in response to overweight policy changes. The developed Excel spreadsheets can be used to determine, for a single truck or truck fleet comprised of trucks of various axle distributions, weights, and sizes, the impacts of different hypothetical fee structures in terms of the annual permit fee expenditure incurred by truckers. The spreadsheets can also be implemented by the Indiana Department of Revenue (INDOR) who has a stake in quantifying the potential impact of different fee structures on revenue accrued to that agency. The above-named INDOT offices are interested in quantifying the potential pavement damage impacts of different overweight policies. In this respect, the nomographs developed in this study can be used by the Implementor to determine the pavement damage cost

incurred by various truck loads and axle configurations. The report also presents a methodology that INDOT could use to develop similar nomographs in future, for different problem scenarios. The study also provides a premise for a subsequent comprehensive investigation of the various costs and benefits associated with alternative policies and fee structures for overweight trucks, in terms of pavement and bridge damage, and administration and enforcement efforts.

In sum, implementing the study product is expected to enhance assist the Indiana Department of Transportation to update and streamline its permitting process. The agency is thus expected to be in a better position to monitor the impacts of the use of its highways by overweight/oversize vehicles, update its permit fee structures, and ultimately, preserve its investments in highway infrastructure and to make the state more competitive economically.

A core group of five persons at INDOT under advisement of FHWA can, over the following months, further define and select implementation strategies relative to agency practices. The principal mission of this implementing panel would be to advance and institutionalize the most practicable methods outlined in this research report.

Contacts

For more information:

Prof. Samuel Labi
Principal Investigator
School of Civil Engineering
Purdue University
West Lafayette IN 47907
Phone: (765) 494-5926
Fax: (765) 496-7996

Prof. Kumares C. Sinha
Co-Principal Investigator
School of Civil Engineering
Purdue University
West Lafayette IN 47907
Phone: (765) 494-5926
Fax: (765) 496-7996

Indiana Department of Transportation

Office of Research, 1205 Montgomery Street, P.O. Box
2279, West Lafayette, IN 47906
Phone: (765) 463-1521
Fax: (765) 497-1665

Purdue University

Joint Transportation Research Program
School of Civil Engineering
West Lafayette, IN 47907-1284
Phone: (765) 494-9310
Fax: (765) 496-1105

FINAL REPORT

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A SYNTHESIS OF OVERWEIGHT TRUCK PERMITTING

By

Muhammad K. Bilal
Muhammad Irfan
Anwaar Ahmed
(Graduate Students)

Samuel Labi
Assistant Professor of Civil Engineering

and

Kumares C. Sinha
Olson Distinguished Professor of Civil Engineering

Purdue University

Joint Transportation Research Program
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The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views of the Federal Highway Administration and the Indiana Department of Transportation. The report does not constitute a standard, a specification, or a regulation.

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16. Abstract <p>For purposes of safety and system preservation, trucking operational characteristics are regulated through legislation and policies. However, special permits are granted for trucks to exceed specified operational restrictions. Thus, the Indiana DOT not only seeks highway operations policies that retain/attract heavy industry including those that haul large loads but also seeks to protect the billions of taxpayer dollars invested in highway infrastructure. As such, it is sought to avoid policies that may lead to premature and accelerated deterioration of assets through excess loading or undue safety hazard through oversize loads. This study was carried out primarily to document the state of practice of truck weight permitting in Indiana vis-à-vis those of its neighboring states. This was done on the basis of the fee amounts, fee structure, and the ease of the permit acquisition process for the permit applicant. The study determined that while the upper thresholds (dimensions and weights) for legal trucking operations are generally the same across states, those for extra-legal operations vary considerably. Also, findings from published literature, agency websites, and phone interviews showed that there is great variability in overweight and oversize truck permitting criteria across the states. Furthermore, it was seen that no state has adopted explicitly the weight-distance concept for its overweight trucks. However, in the states of Indiana, Ohio, and Illinois, the fee structures for overweight vehicles include weight levels and extents of travel, and thus operate in a manner similar to a weight-distance fee. From the perspective of overweight and oversize thresholds and associated permit fees, it was observed that a number of states such as Indiana appear to be generally more favorable to trucking because they have relatively higher upper thresholds for defining an overweight truck and/or relatively lower fees for overweight trucking operations. However, as demonstrated in the excel spreadsheet case studies that accompany this report, the differences in fees incurred by truckers across the states are significantly influenced by a variety of factors including the trip circumstances, permitting criteria, and trip frequency and distance. This report also documents the streams of revenue from the permits issued for extra-legal trucking operations over the recent past: approximately \$12 million annually. On the subject of revenue neutrality, the study reports that highway agencies that had switched from a single-trip permit system to an annual flat fee permit system report that they benefited from cost savings due to reduced monitoring efforts of truck trips but had lost significant revenue overall. Using data from a national study, the report quantifies the extent to which each additional payload increases pavement deterioration. The data also suggests that having more axles on a truck reduces pavement deterioration and consequently, damage repair cost, but could decrease the revenue to be derived from overweight permitting. In conclusion, the study recommended the conduction of a cost allocation study to update these load-damage relationships as well as the overweight permit fee structures, to reflect current conditions in Indiana.</p>			
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CHAPTER 1: INTRODUCTION

1.1 Background Information

Efficient and safe truck transportation is critical to a society in meeting its goals of economic competitiveness, social welfare, national defense, domestic security, emergency preparedness, and enhanced quality of life. In this respect, trucking continues to play an important role in the socio-economic development of the state of Indiana. For purposes of safety and system preservation, trucking operational characteristics (speed, weights, widths, heights, etc.) are regulated using federal and state legislation and policies.

Under certain circumstances, special permits (also referred to in certain literature as “extra-legal” permits) are granted to truck operators to allow them to exceed the specified operational restrictions. In this respect, the fiduciary responsibility borne by the Indiana Department of Transportation (INDOT) is dichotomous in nature: on one hand, the agency needs to adopt highway operations policies that retain and attract heavy industry including those that involve haulage of large loads, thereby enhancing economic development; on the other hand, the agency bears the responsibility to protect the billions of taxpayer dollars already invested in highway infrastructure and to adopt policies that do not lead to premature and accelerated deterioration of such assets through excess loading or undue safety hazard through oversize loads.

In Indiana, the Department of Revenue (INDOR), issues the special permits that allow the operation of overweight and oversize vehicles and collects the revenue from the issuance of these special permits. Approximately 270,000 permits are issued every year. According to personnel at Indiana’s Motor Carrier Services Division (MCSD), INDOR retains only a relatively small portion of the collected OW/OS revenue and transfers most of it to INDOT. As is the case at other states, a critical task in Indiana is to ensure up-to-date and appropriate fee structures for these permits. Over the decades, various states have used a variety of approaches for establishing permit fee structures. These include: (i) determining allowable permit axle and/or axle groups weights using federal formula; (ii) developing a permit “design and analysis” vehicle and setting the allowable axle group weights based on the load effects of that vehicle, (iii) using developed methodologies to extrapolate the allowable permit weights from bridge design loading, (iv) using weight and dimension limitations that are based on expert opinion rather than analytical methods based solely on engineering concepts, (v) using basic fee structures or policies of adjacent states with modifications.

The weight policies that were developed at the various states using these approaches have subsequently evolved over the years to accommodate local industry needs and the needs of specialized vehicles and industries. The dynamic nature of social and economic development trends translates into changing distributions and patterns of commercial vehicle movements. Furthermore, freight-intensive industries wishing to relocate from other states to Indiana or mulling a move to Indiana are likely to consider permit acquisition under the state's current single-trip permit structure for truck weights, as onerous, particularly when their operations involve a large number of vehicles and/or trips. For such industries, an annual trip permit would be far more convenient than daily, single-trip permits. However, the highway agency needs to ascertain that annual trip permitting, if adopted, will not lead to lower revenue. For at least one of these reasons, there often arises a need to review and update truck weight permitting practices at each state agency, to study the merits and demerits of alternative fee structures, and to assess the need for policy shifts in truck weight and size permitting.

Against this background, in July 2009, Mr. Leigh Morris, INDOT Deputy Commissioner, expressed the need to review the state of practice of truck weight permitting in Indiana and eight other states in the Midwest region. At the current time, there is an ongoing parallel research effort by the Indiana Department of Transportation Research Division that is developing quick assessment tools (based on structural impact analysis) for overweight truck permits in Indiana. It is expected that this present study will complement the efforts of that study.

1.2 Study Objectives

The objectives of this study have evolved from the original objective that was intended to review, document, and compare the state of practice on the permitting process for special truck weight and size in Indiana in relation to that at neighboring states, on the basis of the simplicity and ease of the permitting process for the permit applicant; convenience of the process (for the applicant) with respect to vehicle attributes, and the fee structure and basis for fees (per vehicle, per vehicle-mile, per ton-mile, etc.). In the course of carrying out this study, the researchers, at the request and/or approval of the SAC, went further to synthesize existing information on various issues related to the permit process including pavement cost damage due to excess loading, and the level (and past trends) of revenue generation in Indiana. Generally, the study is intended to generate information that ultimately can serve as a basis for INDOT to update/streamline its permitting process in the future. It is expected that by doing so, the state can be placed in a better position to monitor the impacts of

overweight/oversize vehicles on highways, update its permit fee structures, and ultimately, preserve its investments in highway infrastructure without sacrificing the competitive position of the state.

1.3 Contents of this Report

This report discusses the state of truck permitting practice in Indiana and presents information on the practice at the neighboring states. This information was acquired from phone interviews and email contact with personnel responsible for truck weight and size permitting at the various state highway agencies, and agency websites maintained by the truck permit divisions of these agencies.

The first chapter of this report first provides a brief background to the study, including the study scope and objectives. Chapter 2 of the report presents the overweight/oversize truck permitting processes and criteria in Indiana and at Indiana's neighboring states: Michigan, Illinois, Ohio, Wisconsin, Iowa, Kentucky, Missouri, and Minnesota.

No study of overweight trucks is truly complete without a discussion of the damage caused by overweight loads on highway infrastructure. Such damage can be measured in terms of the cost of pavement repair that is needed due to such damage. Chapter 3 discusses the cost implications of excess truck weights. This is done for each road functional class, rural/area class, and truck class. The cost is expressed in dollars per miles of travel and per ton-miles of travel of each truck. The ton-mile refers to the payload only and excludes the dead weight.

Chapter 4 provides a brief discussion of the revenue streams from excess truck weight permitting in Indiana. This is done in order to provide a basis for preliminary assessment of whether the costs of damage by excess weight vehicles is commensurate with the revenue derived from excess weight permitting.

As seen in Chapter 2, the different permit fee structures at the different states make it difficult to undertake a really fair general comparison of permitting practices across the states. As such, Chapter 5 presents three case studies to facilitate such comparisons. The first case study assumes an annual permit while the second assumes single-trip permits. The third case study shows INDOT can evaluate alternative fee structures. This is done for a hypothetical annual number of trips and trip-miles on the basis of the current single-trip fee structure. The pavement damage incurred is also studied. Chapter 6 summarizes the report, offers some conclusions, and provides directions for future research.

CHAPTER 2: TRUCK PERMITTING – STATE OF PRACTICE

2.1 The State of Practice in Indiana

As discussed in the Introduction to Chapter 1 of this report, Indiana's roads and highways were constructed to accommodate vehicles of certain attributes (dimensions and weights). For any vehicle whose attributes exceed those established by law, a permit is required. The permitting process also helps ensure that appropriate routes and bridges are used, and enforces the required safety procedures (MCSD-INDOR, 2009A). Also, the permit fee is a way to hold the extra-legal vehicle operators responsible, in a mostly aggregate fashion, for the damage caused by overweight vehicles to the highway bridges and pavements and also for the safety risks posed by oversize vehicles. By imposing such fees, not only is excessive use of overweight/oversize vehicles regulated but also revenue is generated to repair any damage caused by these vehicles and also to upgrade these infrastructure to standards that can better withstand and support such extra-legal operations. In this manner, the investments made in the highway infrastructure and the safety of Indiana motorists, are better safeguarded. Fees collected for the permits are distributed to the State Highway Fund which enables financing of state and local road improvements, maintenance and policing (MCSD-INDOR, 2009A).

An overweight vehicle is generally any vehicle whose overall weight exceeds 80,000 pounds. However, road and bridge stress levels are determined by the distribution of the weight, so it is also important that the weight per axle or sets of tandem axles (or in some cases, weight per tire) is also monitored. The total gross weight for a permit applicant is calculated using federal bridge formula and then compared with the established weight limits (see MCSD-INDOR (2009A)) for details of the federal formula and federal tables). The acronym OSW or OS/OW represents oversize and/or overweight vehicles. In extreme cases, permits may be sought for a "superload" (a load that exceeds certain threshold dimensions and/or threshold weight (in Indiana, the thresholds are 15 ft height, 16 ft width, and 110 ft length; and 120,000 lbs, respectively), or a load that fails the overload analysis. In seeking a permit for a vehicle that violates the given levels, the applicant first confirms that their load is not divisible. Definition of nondivisible loads are stated in 23 Code of Federal Regulations 658.5 (MCSD, 2009A). There is one exception to the rule of nondivisible loads: for the Indiana-designated "extra heavy-duty highways" in northern Indiana, applicants may haul divisible loads with a total gross weight of up to 134,000 pounds, subject to legal axle weights with a special permit commonly known as a "Michigan Train Permit". In Indiana, weights between 80,000 lbs and 120,000 lbs are simply described as "overweight"; those over 120,000 lbs are considered as superloads (ref: Indiana Oversize and Overweight Permitting Hand Book Pages 10 and 11).

Permits for oversize or overweight vehicles are provided through the consolidated efforts of the Indiana Department of Transportation and the Indiana Department of Revenue. The Department of Transportation maintains and safeguards Indiana highways and evaluates particular road conditions and passability. Permits are issued after it has been ascertained that road traffic will not be severely affected and the highway and bridges will not be seriously damaged. The Department of Revenue ensures that the proper permits are issued and the fees paid. In Indiana, there are a number of exemptions from oversize/overweight permits (see Appendix 1). The lists of permit types and fees are provided in Appendix 2.

In Indiana, options for obtaining a permit are the Internet, permitting service, fax, mail, and walk in. Details for each option are provided in Appendix 2. For trucking organizations new to Indiana, the permit applicant visits the Motor Carrier Services page of the Indiana Department of Revenue website to set up an OSW account by clicking the link: “New to Indiana? Apply for an OSW Account”. The applicant enters basic information, account information, USDOT numbers, and address and contact information. For pre-approval, INDOR has in place a process that facilitates the process of superload permit approvals for the benefit of applicants who face time constraints. Indiana’s current permitting system allows the applicant to have the INDOT engineering analysis done ahead of time, well before the time that the permit is needed, and the applicant receives a superload pre-approval number. With this pre-approval number, the applicant (for the next 30 days) can obtain the trip permits using the same vehicle configuration and route without any additional INDOT analysis or delays. “Superload” permits are issued if the load exceeds the threshold dimensions (15 ft height, 16 ft width, and 110 ft length) and/or weight threshold (120,000 lbs).

Any load that fails the overload analysis or is over 200,000 lbs is reviewed by an INDOT engineer, and this typically requires additional processing time. Appendix 2B presents INDOR’s form M-233ST which lists the allowable weights and axle characteristics for a special-weight single-trip application. Also, the 22 extra heavy duty highway routes are listed on the form.

2.2 Comparison of the Practice in Indiana and at Neighboring States

The results of the internet search and phone interviews showed that in the state of Indiana, permitting processes for trucking operations are same as or superior to most other states in terms of the ease and convenience of permit acquisition.

With regard to fee amounts and structures across the states, tables and charts were prepared to compare the special (or, extra-legal) vehicle permitting practices of eight Midwest states on the basis of the fee structure and basis of the actual fee amounts (per vehicle, per vehicle-mile, per ton-mile,

etc.). These states are: Michigan, Illinois, Ohio, Wisconsin, Iowa, Kentucky, Missouri, and Minnesota. A brief summary of the data obtained is presented herein in narrative form. This section includes general observations on the permitting processes, thresholds for legal oversize/overweight permits classification, criteria for fee structures and fee levels, the state of practice of the weight-distance fee concept for extra-legal weights and sizes, revenue neutrality of annual permit fee structures, and the practice of delineating special routes for extra-legal vehicles. To complement these discussions, Tables 2.1 to 2.7 provide more detailed, quantitative information categorized by permitting criteria and by state.

2.2.1 General Observations

The findings from the internet search and phone interviews show that there is a great deal of variability in the truck permitting practices at various states (see Tables 2.1 and 2.2). This finding is similar to those made by Humphrey (1998) who investigated uniformities in oversize/overweight permits (published ten years ago as NCHRP Synthesis of Practice 143). The findings are also consistent with those of Moffett and Whitford (1994). Very few states in the present study were found to have identical permitting practices, even though some general patterns seem to emerge across some states.

With regard to legal size and weights, it was seen that the permitting States have generally uniform thresholds are established by federal legislation: the existing legal Federal maximum GVW (cap) limit for the Interstate System is 80,000 lbs (although some States allow truck combination weights above this cap under Federal grandfathering provisions). This federal cap is what we herein refer to as “upper threshold for legal weights”. Gross vehicle weights that exceed this cap are generally termed “excess loads”, “superloads”, or “extremely overweight”. These are rather loose terms and their exact meanings vary from state to state. For example, the term “superload” may refer to weights that exceed 80,000 lbs at certain states, 90,000 lbs at other states, or even 100,000 lbs or more at yet others. For example, in Indiana, “superloads” refers to weights exceeding 120,000 lbs. Across the states, thus, there are significantly different upper limits (upper thresholds) for what the state classifies as “excess loads”, “superloads”, or “extremely overweight or oversize trucks”. For the purpose of clarification, we herein present Figure 2.1 which illustrates the different general schema for weight permitting across the states on the basis of threshold criteria. Before we proceed to discuss the different schema, it is useful to discuss the different types of thresholds that define the schema.

Figure 2.1 Differences in the General Schema for Permitting (Truck Gross Weights)

[Note: Variations in this diagram may exist for axle-based weights; truck dimensions; permit type (single/multiple/annual), or net weights]

Upper Threshold for Legal Weights (UTLW): As discussed, this is the federally-mandated limit of 80,000 lbs. Beyond this threshold, the truck weight is termed extra-legal and a special permit is required before the vehicle can use the highway.

Upper Threshold for Extra-Legal Weights (UTELW): For extra-legal trucks (i.e., trucks whose weights exceed the federally-mandated limit of 80,000 lbs), there may exist an upper limit (UTELW) that restricts their operations on the highway network. In the state of Wisconsin, for example, a truck seeking multiple-trip permits cannot exceed a weight of 170,000 lbs. In certain states, the UTELW threshold may be applicable only to certain permitting structures; for example, in a particular state there could exist separate UTELWs for single-trip permits, multiple-trip permits, and annual blanket permits.

Upper Threshold for Extra-Legal Weights for use of Special Routes (UTELW-S): As discussed in the previous section, some states may have a UTELW that forbids the operations of extra-legal trucks on all highways in a state. Where the restriction is for only certain highway segments or functional classes, the threshold may be designated UTELW-S. Often, these road segments or functional classes

are those that were built to relatively high engineering standards with or without the anticipation of extra heavy truck operations.

Having explained the different possible weight thresholds that may exist in a state's weight permitting policy structure, we now proceed to describe the different policy schema that are based on these thresholds in the different states. While these schema are herein shown for gross weight thresholds, there could also exist similar schema for axle-based weights. For example, a truck could have weight less than 80,000 lbs but still be considered overweight if one of its axles weigh over 20,000 lbs. In that case, the upper threshold axle weight is 20,000 lbs. Also, in a given state, there could be different schema for different permit types (single/multiple/annual) due to different thresholds for such trip types and the highway classes or routes where they are permitted.

Schema 1

In Schema 1, there exists (as in other schema), an upper threshold for legal weights (as established by the federal government at 80,000 lbs). Then there could be another threshold for extra-legal truck weights, *UTELW*, (for example, 170,000 lbs for multiple-trip permits in Wisconsin). According to this schema, trucks with weights between these two thresholds are allowed to operate with an overweight permit at any highway in the state while those exceeding the upper threshold for extra-legal weights are not allowed to use any highway in the state under any circumstances. This is the simplest of all the schema.

Schema 2

In Schema 2, similar to Schema 1, there is an upper threshold for legal weights of 80,000 lbs. Then, as in Schema 1, there is an upper threshold for extra-legal trucks and trucks with weights falling between these thresholds are allowed to operate on all highways with a permit. Unlike Schema 1, however, there is a third weight threshold, *UTELW-S*, above which trucks may only use specific highway classes, such as Interstates, or specially-designated highway segments. Often, these routes have very high standards of pavement design to accommodate these excessive loads. For example, in the state of Indiana, there exist routes designated as "extra heavy-duty highways" mostly in the northern part of the state, where divisible loads may be hauled with a total gross weight of up to 134,000 pounds, subject to legal axle weights. Truck weights exceeding *UTELW-S* are prohibited from operating at any highway in the state.

Schema 3

Schema 3 is identical to Schema 2 with the exception that only designated routes can be used for extra-legal trucks (that is those with weights exceeding 80,000 lbs).

Schema 4

In Schema 4, which is the most liberal of all the schema, the only restriction is the 80,000 lbs for legal operations. Extra-legal operations (weights exceeding 80,000 lbs), regardless of weight are allowed as long as the trucker pays the appropriate fee.

Another general observation from the data is that while most Midwest states have both permitting structures (fee per single trip as well as an annual blanket fee), there is a great deal of variability in the fee structure details and fee levels across the states. Certain states that have any one of these two fee structures also have an additional charge imposed per distance of travel or per weight-distance (implicitly) of travel. As has been shown in past literature, truckers who typically make many trips per year will find it more economical to use the annual fee option. However, results of data analysis in previous studies show that the annual fee option does not seem to be favorable to the state highway agency from the perspective of revenue generation (Moffett and Whitford, 1994). This is also shown in the case studies presented in Chapter 5 of this report. It is therefore not surprising that several state agencies that switched from single-trip to annual permit fee structures in the eighties and nineties had taken great pains to ensure that the annual fee structures, as much as possible, were revenue-neutral. As the Texas experience shows, their efforts do not seem to have been very successful (TTI, 1988).

2.2.2 Observations I (Thresholds for Legal Oversize/Overweight Permit Classification)

Following up from the general observations in the previous section, permits for extra-legal operations, specifically, oversize/overweight (OS/OW) trucks are generally required when truck characteristics exceeds the legal thresholds of size or weight. With regard to weight for example, an upper threshold for legal weights UTLW (Figure 2.1) may be defined as the limit above which trucking operations need a permit – 80,000 lbs (Gross Vehicle Weight) for Interstate highways. Unlike the case for gross vehicle weights, the upper thresholds for axle weight (for overweight classification) and for vehicle dimensions (for oversize classification) were found to vary significantly across the states. In Indiana, for example, the maximum weight per axle is 20,000 lbs, and the upper bound threshold legal dimensions, UTLD, are: 8'6" width and 40' length for a single vehicle; and 60' length and 13'6" height for a two-vehicle combination (MCSD-INDOR, 2009A)

The upper threshold for legal weights is the point after which extra heavy weights, or extra-legal operations, may be permitted, albeit for a fee. However, there often exists a limit to which the state can tolerate extra-legal weights. As such, a second threshold is established (shown in Figure 2.1

as “Threshold for Extra-Legal Weights”. At certain states, loads that lie between the upper thresholds for legal weights (UTLW) and that for extra-legal weights (UTELW) are referred to as “superloads”.

For the third category of weights that exceed even this threshold for extra-legal weights, certain states prohibit trucking operations or allow them only under very special permits and/or only at specific highway classes or specially-designed road segments, as schematically illustrated in Figure 2.1. But even where it is allowed under such circumstances, there again may exist a limit, UTELW-S, beyond which trucking operations are prohibited. These two upper thresholds, UTELW and UTELW-S, vary considerably across the states.

At certain states, there is no clear demarcation of the thresholds; instead, the permit fee increases in a certain proportion with higher levels of overweight exceeding the federal legal weight.

It is not certain how the upper thresholds were established the various states – it may very well be that they were set up using expert judgments that considered either the design loads or the load bearing capacity of existing pavements and bridges in that state, or both. It is expected that for Indiana, an ongoing parallel study by INDOT’s Research Division will address this issue.

Figures 2.2 and 2.3, developed using the annual/routine/multiple permit fees data in Tables 2.1 to 2.6, presents an approximate picture of the distribution of upper bound weight thresholds for extra-legal trucking operations, UTELW, across the Midwest states. In certain states, the number of axles (or implicitly, the weight per axle) is also considered when the maximum loading thresholds are being established: in Illinois, for example, the threshold of 120,000 lbs indicated in the figure pertains to trucks with 6 or more axles (see Appendix 4C for further details). The figure seems to suggest that generally speaking, Wisconsin and Indiana have the highest threshold for extra-legal truck weights (170,000 lbs and, over 200,000 lbs, respectively), followed closely by Missouri (160,000 lbs), and Iowa (156,000 lbs); the next tier comprises Michigan (150,000 lbs) and Minnesota (145,000 lbs) and then Ohio, Kentucky, Illinois (120,000 lbs). However, it must be noted that (i) some states implicitly or explicitly prohibit highway operations for trucks that exceed this upper threshold; other states allow more load provided a permit is issued for that load, (ii) these thresholds are for permitting structures that differ across the states: some are for routine purposes, others are for annual blanket permits; a complete comparison across states therefore must be done carefully and on a case-by-case basis (iii) the order of weight thresholds are shown in the figure is not necessarily the case when the axle-based threshold (instead of gross weight thresholds) is the criteria for the comparison. In this study, lack of data on axle-weight thresholds precluded a comparison of such thresholds across the states. Secondly, for such comparison there exist several other criteria besides weight thresholds, some of these criteria include fees and trucker perspectives. For example, Wisconsin may have a high

upper threshold (which is viewed favorably by truckers) but a high fee for overweight trucks (which is viewed unfavorably by truckers). Thus, a comprehensive assessment of the comparative favorableness of permitting policies across the states can only be made when all the other contexts are duly considered. In Chapter 5 of this report, we present case studies that help even the playing field for a more holistic assessment of these practices across the states.

Note: Certain states, such as Indiana allow weights above these thresholds but duly impose penalties (e.g., extra fees) for weights exceeding them. See Table 2.4

Figure 2.2 Upper Thresholds for Regular Overweight Permits

Note: For certain states, this refers to the maximum weights for which a “Superload” Permit is issued). Certain states, such as Indiana, allow weights above these thresholds but duly impose corresponding penalties, See Table 2.4

Figure 2.3 Upper Thresholds for Regular Overweight Permits

2.2.3 Observations II (Criteria for Fee Structures and Fee Levels)

In this section, we discuss our observations on the fee amounts (levels) and the criteria for establishing these amounts, at each of the eight states in the Midwest region of the United States.

Figures 2.4 and 2.5 present the states' single-trip permit fee and annual permit fees, respectively, categorized by fee attribute (that is, flat fee only, distance-based fee (\$/mile), or both flat fee and distance-based) and also by truck attribute (overweight only, oversize only, or both overweight and oversize). Further details are provided in Tables 2.1 and 2.2.

Table 2.1 presents the **single-trip** overweight/oversize permit fees for those states that charge fees on the basis of vehicle dimension or configuration (OS fees) or vehicle weight (OW fees) or both. It is seen that most of the states in the study area make available opportunities for truckers to pay fees per single trip. For this, the following states were found to have the simplest fee structures – flat fees that are irrespective of weight or distance traveled: Iowa \$10 per trip; Kentucky \$60 per trip; and Missouri \$15 per trip for oversize-only trucks and \$50 per trip for trucks that are both oversize and overweight. In some other states such as Wisconsin, the per-trip fee structure is not so simple mostly because it is elaborately designed to ensure equity: the per-trip fees (with or without a flat base per-trip fee) are charged for overweight and/or oversize vehicles depending on the extents by which their excess weights, heights, widths and/or lengths exceed the legal limits or depending on the distance they travel.

Table 2.2, similar to Figure 2.4, presents the **annual** permit fees for those states that charge fees on the basis of vehicle configuration (OS) and/or vehicle weight (OW). Table 2.3, similar to Figure 2.5, presents the annual permit fees at states that charge fees based on vehicle weight and/or distance travelled. These tables show that most of the states in the study area have also established annual permits for these vehicles. This reflects a change in the state of practice since 1994 when only a handful of states had annual permits (Whitford and Moffett, 1994). Again, similar to the case for single-trip permits, it is seen that at some of these states, the annual permit fees (with or without a flat base permit fee) are charged for oversized vehicles depending on the excessiveness of their heights, widths or lengths (or any two of these size attributes). At other states, annual permit fees (with or without a flat base fee) are charged for overweight vehicles depending on the excessiveness of their weights. Furthermore, as seen in Table 2.3, some states charge annual permit fees for overweight or oversize trucks depending on the distance they travel. Table 2.4 presents the upper thresholds for extra-legal weights, specifically, what is known as the “superload permits” at some states. It must be noted that some states implicitly or explicitly prohibit highway operations for trucks that exceed this

upper threshold; other states allow more load provided a permit is issued for that load. For example, Indiana allows as much as 200,000 lbs or more but imposes additional fees for such weights.

Both flat-fee and distance	IN ¹ : 20 + \$0.35 per mile (up to 108,000 lbs) *20 + 0.60 per mile (108001 lbs to 150,000lbs) **20 + 1.00 per mile (over 150,000lbs) ⁴ MO=\$15+\$20 per each 10 kips>80 kips +\$ 425 to \$925 based on distance traveled		IN= Greater of Oversize or Over weight Fee ¹
Distance-based only		IL ² = \$ 12 to \$125 (Depending upon truck size and miles)	IL ² = \$ 10 to \$295; (Depending upon truck size, nr. of axles and miles travelled)
Flat-fee Only	IA = \$10 KY= \$60 MI = \$50, MO=\$15+\$20 per each 10kips>80 kips up to 160kips	IN ¹ = \$20 to \$40 IA=\$10 KY=\$60 OH = \$65-\$100 ⁵ MO= \$15 MI= \$15 ³ WI= \$15 to \$25	⁶ OH = \$135 to \$200 MI= \$50, IA=\$10 KY=\$60 MN=\$15+Pavement Damage Fee based on "X number of moves"
	Truck is Overweight Only	Truck is Oversize Only	Truck is Both Overweight & Oversize

¹ See Appendix 2 – List of IN Permits and Fees.

² Add; +\$40 district fee +\$ 1 online transmission fee, See Appendix 4B and 4C for more details on IL fee structure.

Note: Please see Appendices 1 through 4(A to K) for further details about Fee/ permit class.

³ Add \$10 District fee + \$10 Bridge Fee+ \$1 online permit order fee + \$10 pavement damage fee for vehicles >16' width and/or >270kips GVW

⁴ For vehicles over 160 kips GVW

⁵ Add \$250 movement feasibility fee for vehicles >16' wide, >16' high, or 150' long

⁶ Additional fees for vehicles over 120kips based on formula: base rate + 0.04 x[(GVW-120,000)/(2000)]

* Vehicles over 120,000 lbs charged \$10 executive fee.

** Vehicles over 200,000 lbs charged \$10 executive fee + \$25 design and review fee + bridges fees at \$10 per bridge.

Figure 2.4 Single-trip Permit Fees Categorized by Fee Attribute and Truck Attribute

Both flat-fee and distance based	–	–	–
Distance-based only	–	–	–
Flat-fee Only	MO=\$300 to \$624 MI ³ = \$100 MN=\$60 to \$850 WI=\$65 to \$1050 OH=\$500 to \$2970 IL ² = \$10 to \$295	IN ¹ = \$ 405, WI=\$30-\$90 MO = \$128 to \$400 MI= \$45, IL ² = \$100 to \$150 KY= \$80 to \$500 MN= \$24 to \$120 OH=\$250 to \$1170	IA=\$25 to \$300; MI=\$100 MN=\$60 to \$850 KY=\$20 to \$500 IL ² = \$10 to \$295 OH=\$500 to \$2970
	Truck is Overweight Only	Truck is Oversize Only	Truck is Both Overweight & Oversize

¹ See Appendix 2 – List of IN Permits and Fees.

² Add; +\$40 district fee +\$ 1 online transmission fee, See Appendix 4B and 4C for more details on IL fee structure.

³ OS Only: 15 + \$ 30 (renewal/extension fee) = \$45, OW: \$50 + \$ 100 (renewal/extension fee) = \$150

Note: Please see Appendices 1 through 4(A to K) for more details about Fee/ permit class.

Figure 2.5 Annual/Multiple Trip Permit Fee Categorized by Fee Attribute and Truck Attribute

Table 2.1 Single Trip Overweight/ Oversize Permit Fees**(a) Comparison based on Vehicle Configuration (OS) and/or Vehicle Weight (OW)**

State	Fee (\$)	Remarks
IN	OS= \$20 up to 95' in length, 12'4" in width & legal height OS= \$30 up to 96 to 110' length, 12'5 to 16' wide, 13'7" to 15' height OS = \$40, over 110' length, 16' wide, 15' tall and 80,000 lbs OW= \$20 + \$0.35 per mile (up to 108,000 lbs) OW= \$20 + \$0.60 per mile (108,001 to 150,000 lbs) OW= \$20 + \$1.00 per mile (over 150,000 lbs) OS/ OW = Greater of the OS or OW calculated above Special Weight Permit = \$ 42.50 Mobile Home Permit: 12' 4" = \$10.00 ; 14' 4" = \$18.00	Both Flat Fee and Distance Based. Separate Fee Structure for OS only, OW only , OS/OW and Super Loads over 120,000 lbs charged \$10 executive fee. Vehicles over 200,000 lbs charged \$10 executive fee + \$25 design and review fee + \$ 10 per bridge (bridges fees).
IA	\$10	Flat Fee.
MO	OS Only = \$15; OS/ OW permit including pre-issue—\$15 plus \$20 per each 10,000 lbs in excess of legal gross weight; OS permits >16' wide, >16' high, or 150' long—\$15 plus \$250 movement feasibility fee; OW permits >160,000 lbs pounds gross weight—\$15 plus \$20 per each 10,000 lbs in excess of legal gross wt. bridge plus roadway analysis fee of \$425 for each permit for moves from 0–50 miles in length; \$625 for 51–200 miles; \$925 for over 200 miles	Separate Fee Structure for OS only, OW only and OS/OW
OH	<u>ROUTINE</u> OS ONLY: 1 way=\$65; 2way=\$100 OS/ OW 1 way=\$135; 2way=\$200 Steel Coil: 1 way=\$65; 2way=N/A Multistage OS ONLY: 1 way=\$65; 2 way=N/A Multistage OS/ OW 1 way=\$135; 2 way=N/A Emergency: 1 way=\$250; 2 way=\$235 <u>SUPER LOAD (>120,000 lbs; .14 Wide; >14'-6" Ht)</u> OS ONLY: 1 way=\$135+TM ; 2way=\$200+TM OS/ OW 1way=\$135+TM ; 2way=\$200+ TM TM= Ton-Mile =[(GVW-120,000) / 2000*times \$0.04	Separate Flat Fee Structure for Routine and Super loads and also For OS only and OS/OW
MI	OS Only = \$15 OS & OW = \$50	Separate Flat Fee for OS only and and OS/OW
KY	\$60	Flat Fee
MN	OS Only = \$15 +Pavement Damage Fee based on "X number of moves"	Flat Fee
WI	Vehs Exceeding Length Limits: \$15 Vehs Exceeding Either Width or Height Limits: \$20 Vehs Exceeding Both Width and Length Limits: \$25	Add ; \$10 District fee + \$10 Bridge Fee+ \$1 online permit order fee+ \$10 pavement damage fee for vehicles>16' width and/or >270kips GVW
IL	OS Only OS Only (100' <Length ≤ 120', 14<Width ≤ 18' , 15'<Height ≤ 16'): \$30 for 0-90 mi, \$50 for 181-270 mi and \$60 over 270 miles OS Only (Length > 120', Width > 18', Height > 16'): \$50 for 0-90 mi, \$100 for 181-270 mi and \$125 over 270 miles OS and OW(Width ≤ 12') 6 Axles , Max Gross Weight 100,000 lbs : \$55 for 181 to 225 mi, \$115 for 451-495 miles 6 Axles , Max Gross Weight 120,000 lbs : \$130 for 181 to 225 mi, \$280 for 451-495 miles 5 Axles , Max Gross Weight 100,000 lbs : \$130 for 181 to 225 mi, \$280 for 451-495 miles	Both Flat Fee and Distance Based. Separate Fee Structure for OS only and OS/OW Add \$40 district fee +\$ 1 online transmission fee

(b) Comparison based on Fee Type: Flat Fee vs. Flat+Distance Based Fee

	Flat Fee Only	Distance Based	Both Flat and Distance Based
IN	OS= \$20 up to 95' in length, 12'4" in width & legal height OS= \$30 up to 96 to 110' length, 12'5 to 16' wide, 13'7" to " 15' tall OS = \$40, over 110' length, 16' wide, 15' tall and 80,000 lbs		OW= \$20 + \$0.35 per mile (upto 108,000 lbs) OW= \$20 + \$0.60 per mile (108,001 to 150,000 lbs) OW= \$20 + \$1.00 per mile over 150,000 lbs)
IA	\$10		
MO			Fees for vehicles over 160 kips: \$15 + \$20 per ea. 10,000 lbs in excess of legal gross weight plus bridge and roadway analysis fee of \$425 for ea. permit for moves from 0-50 miles in length; \$625 for 51-200 miles; \$925 for over 200 miles
OH	<u>ROUTINE</u>		SUPER LOAD
	OS ONLY: 1 way=\$65; 2 way=\$100 OS/ OW 1 way=\$135; 2 way=\$200 Steel Coil: 1 way=\$65; 2 way=N/A Multistage OS ONLY: 1 way=\$65; 2way=N/A Multistage OS/ OW 1way=\$135; 2way=N/A Emergency: 1way=\$250; 2way=\$235		OS/ OW 1 way = \$135+TM; 2way=\$200 + TM TM= Ton-Mile = [(GVW-120,000)/2000*\$0.04
	<u>SUPER LOAD (>120,000 lbs; .14 Wide; >14'-6" Ht)</u>		
	OS ONLY: 1way=\$135+TM; 2way=\$200		
MI	OS Only = \$15 OS & OW = \$50		
KY	\$60		
MN	OS Only = \$15		
WI	Vehs Exceeding Length Limits: \$15 Vehs Exceeding Either Width or Hieght Limits: \$20 Vehs Exceeding Both Width and Length Limits: \$25		
IL		OS Only (100' <Length ≤ 120', 14<Width ≤ 18' , 15'<Height ≤ 16'): \$30 for 0-90 mi, \$50 for 181-270 mi and \$60 over 270 mi OS Only (Length > 120', Width > 18', Height > 16'): \$50 for 0-90 mi, \$100 for 181-270 mi and \$125 over 270 mi OS and OW(Width ≤ 12') 6 Axles , Max Gross Weight 100,000 lbs : \$55 for 181 to 225 mi, \$115 for 451-495 mi 6 Axles , Max Gross Weight 120,000 lbs : \$130 for 181 to 225 mi, \$280 for 451-495 mi 5 Axles , Max Gross Weight 100,000 lbs : \$130 for 181 to 225 mi, \$280 for 451-495 mi	

Table 2.2 Annual/Multiple Trip/Routine Permit Fees for States that Charge Fees based on Vehicle Configuration (OS) and/or Vehicle Weight (OW)

State	Fee (\$)	Remarks
IN	\$405 (OS Only)	Flat Fee Continuing Annual (365 days)
IA	\$300 (OS/OW)	Flat Fee
MO	Single commodity: \$128 (OS Only) Multiple commodity: \$400 (OS Only)	Flat Fee Annual Blanket (365 days)
OH	Continuing Annual Permit OS Only: \$ 970 (1 way), \$1170 (Return) OS/OW: \$1970 (1 way), \$2970 (Return) Steel Coil: 1 way = \$470; 2 way = N/A Michigan Legal: 1 way = \$470; 2 way = \$470 Annual Blanket Permit Boat: 1way=\$100; Farm Equipment: 1 way = \$100; Construction Equipment: 1 way = \$100; Manufactured Building: 1 way = \$100; Marina: 1 way = \$100;	Flat Fee
MI	OS Only: 15 + \$ 30 (renewal fee)= \$45 OW: \$50 + \$ 100 (renewal fee) = \$150	Flat Fee Annual Extended
KY	Non-divisible-less than 14 ft. wide: \$250 Non-divisible-14 ft. to 16 ft. wide: \$500 Farm-less than 14 ft. wide: \$80 Farm-14 ft. to 16 ft. wide: \$150 Industrial Haul:\$20	Flat Fee Steel load = \$250 (limited to 35 miles)
MN	Construction Supplies: \$120 (OS Only) Construction Supplies: \$ 200 (OS & OW Up to 90M lbs GVW) Farm machinery: \$120(OS Only) Farm machinery: \$200 (OS & OW Up to 90M lbs GVW)	Flat Fee
WI	OS Only 12 Month: \$60 (over length only), \$90 (over length/over width/over height) OW and/or OW & OS 12 Month : \$1050 up to 170 kips GVW	Flat Fee Multiple Permit (from 3 months to 12 months period)
IL	Permits for Limited Continuous Operation (Oversize construction equipment or vehicles) \$100 for OS Only (Length ≤ 70', Width ≤ 10' Height ≤ 14'6") \$150 for OS Only (Length ≤ 85' , Width ≤ 12', Height ≤ 14'6")	Flat Fee Repeated Moves Add \$40 district fee +\$ 1 online transmission fee

Table 2.3 Annual/Multiple Trip/Routine Permit Fees for States that Charge Fees based on Vehicle Weight and/or Distance Travelled

State	Fee (\$)	Remarks
IA	\$ 300 (OS/OW)	OS or OW considered but distance not considered
MO	Emergency OW permit (round trip): \$624 OW well drillers or concrete pump truck permit: \$300	Annual Blanket Permit Distance not considered
OH	Contuing Annual Permit OS/OW: \$1970 (1 way), \$2970 (Return); Annual Blanket Permit Boat: 1 way=\$100; Farm Equipment: 1 way=\$100; Construction Equipment: 1 way=\$100; Manufactured Building: 1 way=\$100; Marina: 1 way=\$100;	Annual Blanket Permit Distance not considered
MI	OW: \$50 + \$ 100 (renewal fee) = \$150	Annual Extended; Distance not considered
KY	Steel. 35 mile limit: \$250 Steel-statewide \$500 Industrial Haul: \$20	
MN	Agriculture/6 Axle up to 90,000 lbs GVW: \$300 Agriculture/7 Axle up to 97,000 lbs GVW: \$500 Construction Supplies: \$200 (OS & OW Up to 90M lbs GVW) Farm machinery: \$200 (OS & OW Up to 90M lbs GVW)	Distance not considered
WI	OW and/or OW & OS 12 Month : \$1050 up to 170 kips GVW	Distance not considered
IL	OS and OW (Width ≤ 12') 6 Axles , Max Gross Weight 100,000 lbs: \$55 for 181 to 225 mi, \$115 for 451-495 mi 6 Axles , Max Gross Weight 120,000 lbs: \$130 for 181 to 225 mi, \$280 for 451-495 mi 5 Axles , Max Gross Weight 100,000 lbs: \$130 for 181 to 225 mi, \$280 for 451-495 mi	Single trip Permit that lasts for 5 Days Add \$ 15 for width > 12' Add \$40 district fee +\$ 1 online transmission fee Other combinations of weight and distance are also available at http://www.dot.state.il.us/road/infoforms.html

Table 2.4 Upper Thresholds for Extra-Legal Weights (Superload Permits)

State	GVW	Remarks
IN	120,000 lbs	For single-trip permit only. Vehicles over 120,000 lbs are allowed but are charged \$10 executive fee. Vehicles over 200,000 lbs are allowed but are charged \$10 executive fee + \$25 design and review fee + bridges fees at the rate of \$10.00 per bridge.
IA	156,000 lbs	Single-trip and annual permits
MO	160,000 lbs	For single-trip permit only. Fees for vehicles over 160 kips: \$15 + \$20 per ea. 10,000 lbs in excess of legal gross weight plus bridge and roadway analysis fee of \$425 for ea. permit for moves from 0–50 miles distance; \$625 for 51–200 miles; \$925 for over 200 miles
OH	120,000 lbs	Additional fees for vehicles over 120 kips based on formula : base rate + $0.04 \times ((GVW - 120,000) / 2000)$
MI	150,000 lbs	Only for extended permits for construction equipments
KY	Not Specified	
MN	145,000 lbs	For multiple-trip permit only
WI	170,000 lbs	For multiple-trip and annual permits only. For single-trip permits, vehicles over 150,000 lbs are charged \$85+ \$10 executive fee for each 10,000 lbs in excess
IL	120,000 lbs	For routine permits. Only for vehicles with 6 or more axles. Lower thresholds for vehicles with 5 or fewer axles. Upper bound threshold for superload permit: 187 kips

Table 2.5 Fees Charged by States that Issue Annual Blanket Overweight Permits with or without an Accompanying Official Route Map

State	Fee (\$)	Remarks
OH	Boat: 1 way = \$100; 2 way = N/A Farm Equipment: 1 way = \$100; 2 way = N/A Construction Equipment: 1 way = \$100; 2 way = N/A Manufactured Building: 1 way = \$100; 2 way = N/A Marina: 1 way = \$100; 2 way = N/A	Accompanying official route map required
MO	Emergency OW permit (round trip): \$624 OS permit (single commodity): \$128 OS permit (multiple commodity): \$400 OW well drillers or concrete pump truck permit: \$300 Thirty (30)-day blanket permit: \$300	Accompanying official route map not required

Table 2.6 Single-Trip Permit Validity that each State Allows to OS/OW Permit Carrier

State	Validity
IN	OS= 1 trip in 15 days; OW= 1 trip in 15 days; OS/ OW = 1 trip in 15 days; Mobile Home Permit: 12' 4" = 1 trip in 15 days; 14' 4" = 1 trip in 5 days
IA	1 trip in 5 days
OH	1 trip in 5 days. Thereafter, extension/ revision can be made with extra fee of \$10 and \$50 for routine and super loads, respectively.
MO	1 trip in 7 days
MI	1 trip in 5 days
KY	10 Days
WI	1 trip in 14 Days
IL	1 trip in 5 days

2.2.4 Observations III (Weight-Distance Fee Concept- The State of Practice)

On the basis of our findings, it seems that with the exception of Illinois, and to some extent, Indiana and Ohio, no Midwest state has adopted explicitly the weight-distance concept as a basis for the permit fee structure for its overweight or oversize trucks. It is noteworthy to mention that the state of Oregon (outside the Midwest region) is the most well-known leader in implementing this policy explicitly for all commercial vehicles (overweight and oversize trucks included) and in monitoring compliance. In general, the trucking industry has voiced opposition to weight-distance taxation. However, as reported by Moffett and Whitford in 1994, trucking companies that deal regularly with overweight trucks were significantly less opposed to weight-distance taxation compared to those who regularly deal with legal weight trucks. It is not certain whether these stakeholders hold such perspectives at the current time.

As indicated in the preceding paragraph, the practice of weight-distance fees has existed at some states even if only implicitly. As seen in Table 2.1, at certain states (Indiana, Ohio, and Illinois), the fees charged for overweight vehicles is different for different weight groups and distances traveled: for a given weight group, a higher fee is charged for a greater distance; and for a given distance, a higher fee is charged for a greater weight. Clearly, at these states, the overweight fee structure shows significant resemblance to the weight-distance concept of permitting practiced in Oregon. This probably explains the 1994 Moffett and Whitford observation (that companies that deal regularly with overweight trucks were significantly less opposed to weight-distance taxation): for such truck operators, such taxation schemes are similar to the status quo of their fee paying structures because weight-distance taxation yields a form of permit fee structure that is similar to the fee structure to which they are accustomed.

2.2.5 Observations IV (Revenue Neutrality of Annual Permit Fee Structures)

In the late eighties and early nineties, a number of highway agencies switched from single-trip permit systems to annual blanket flat fee permit systems. It is reported that while these agencies benefited from enhanced convenience (and possibly, monitoring cost savings) due to reduced monitoring efforts of the single trips, they lost significant revenue overall because commercial vehicle operators had no limit to the number of trips they made in one year on an annual permit (Moffett and Whitford, 1994). It was also pointed out that many trucking companies consolidated their overweight operations from many vehicles that on occasion would obtain a single-trip overweight permit, to a few vehicles with annual overweight permits that were dedicated to handle as many of a company's overweight movements as possible in order to maximize the investment made in permit purchases. Clearly, such practices were favorable to the truckers but unfavorable to the revenue generation efforts of the highway agencies, particularly considering that overweight trucks cause added wear and tear, and that the maintenance of further deteriorated infrastructures requires additional funding. Findings from the Moffett and Whitford survey of commercial vehicle operators showed that officials in states having annual permits complained that their state could not adequately deal with added road and bridge damage done by overweight trucks, a sentiment that was echoed by a subsequent Texas study.

As such, highway agencies interested in annual permitting sought (and still seek) to establish fee levels that are "revenue neutral" in other words, fee levels that would not jeopardize the amounts of revenue generated in comparison to the single-trip permit systems. However, in the case of annual permits, maintaining revenue neutrality in an agency's fee structure may require significant and regular monitoring of the overweight truck movements (number of trips, weights, and distance

traveled) so that the permit fee amounts can be updated as and when necessary. Therefore, there may be a proclivity towards (or for agencies that had switched to annual permitting, nostalgia for) single-trip permit structures, particularly for highway agencies unwilling or unable to undertake the extra monitoring efforts to ensure revenue neutrality.

2.2.6 Observations V (Delineation of Special Routes for Overweight/Oversize Vehicles)

In the highway network of any state, there are roads built to superior standards of pavement design (materials and thicknesses), bridge strength, and geometry (lane widths, curve radii, slopes, etc.) and also there are others built to relatively inferior standards. For overweight and oversize vehicles, the use of the lower class roads would be deleterious to the physical structures as well as the safety of other road users and thus need to be routed to operate only at those highways that can support their excessive weights and/or can accommodate their unconventional dimensions. In this respect, many states have developed maps that identify the routes that should be used by overweight vehicles of certain weights and axle spacing. These specified routes could be an entire system of roads (such as interstates) or specific road sections. In Figure 2.1, we present different permitting schema that incorporate the conditions under which extra-legal trucks are allowed to use certain specified highways (or sections thereof) because of the relatively high design and geometric standards of those highways. Also Appendix 2B presents a list of the roads in Indiana for which overweight trips are allowed and single-trip permits are issued.

2.3 Chapter Summary

This chapter presented tables and charts that synthesize data collected from eight Midwest states to compare their practices and policies for special vehicle permitting practices. This was done on the basis of the fee structure and basis of the actual fee amounts (per vehicle, per vehicle-mile, per ton-mile, etc.). The chapter also discussed general observations on the permitting processes, thresholds for legal oversize/overweight permits classification, criteria for fee structures and fee levels, state of practice of the weight-distance fee concept for extra-legal weights and sizes, revenue neutrality of annual permit fee structures, and the practice of delineating special routes for extra-legal vehicles. This chapter lays a foundation for making a case for a more holistic comparative assessment of the permitting practices across the states. In the two subsequent chapters, we examine the cost and revenue implications of the practice of excess weight permitting.

CHAPTER 3: COST IMPLICATIONS OF EXCESS TRUCK WEIGHTS

3.1 Literature Review of Pavement Damage Studies

There is no question that overweight trucks cause accelerated damage to a highway pavement either directly or together with environmental factors such as rain and freeze-thaw transitions. On a system-wide context, there are several issues relating to the cost of infrastructure damage by overweight vehicles and the relationship between this cost and the revenue generated by overweight permits. There appears to have been no research specifically for overweight permitting cost implications at the Midwestern states. However, a number of studies have been carried out in the United States and abroad to quantify the pavement damage inflicted by heavy vehicles in general. We herein present information from a few of these studies.

The Texas Transportation Institute (TTI) investigated the relationship between pavement damage from truck loading and the revenues that were generated for pavement repair. It is worthy to note that the Texas study found that the revenue generated from the permitting of overweight vehicles in Texas has been inadequate to recover the estimated cost of deterioration of the highway system caused by these vehicles. The TTI estimated the dollar amount of damage to the state highway system caused by overweight vehicles at \$62.8 million dollars per year (TTI, 1988). However, in fiscal year 1990, only \$2.8 million was collected in fees for all the overweight permits and that this amount covered only the program's administrative costs.

Small, Winston and Evans (1989) used data from AASHTO Road Test and other empirical data to examine the relationship between pavement life and number of axle load repetitions to failure. Re-estimated equations suggested a third power (rather than a fourth power) relationship between axle weight and pavement damage. Age and climate were seen to affect pavements through their interaction with axle weight rather independently. The study concluded that the climate does not have an independent effect but renders pavements more vulnerable to damage by heavy vehicles. Small et al. (1989) found that pavement damage cost (\$ per ESAL-mile) varied between 1.48 to 125.45 cents (in \$US 1985) at the existing investment levels (practice being followed by agency); under optimal investment levels the pavement damage cost (\$ per ESAL-mile) was found to vary between 0.33 to 101.30 cents (in \$US 1985) for different road functional classes. The cents per ESAL-mile charges for a 5-axle, semi-trailer with 80,000 lbs gross weight on local or Interstate roads, can be estimated from this table.

Table 3.1 Marginal Pavement Maintenance Cost by Road Classification
(Small et al., 1989)

Road Functional Class	Marginal Maintenance Cost Cents per ESAL-mile (in \$US 1985)	
	Current Investment (1985)	Optimal Investment (1985)
Rural Interstate	1.48	0.46
Rural Principal Arterial	4.38	1.13
Minor Arterial	10.02	2.60
Major Collector	16.49	9.96
Minor Collector	31.18	16.09
Local	101.30	101.30
Urban Interstate	2.38	0.33
Urban Freeway	4.32	0.61
Urban Principal Arterial	10.92	0.87
Minor Arterial	33.92	3.23
Collector	125.45	13.66
Local	40.92	40.92

Vitaliano and Held (1990) estimated the cost of pavement damage by heavy vehicles using data from New York State (Table 3.2). This study used an analytical approach similar to that of Small et al. (1989) and assumed that 50% pavement deterioration is caused by vehicles and 50% by climate (an assumption based on work done by Paterson (1987)). As we show in subsequent parts of this chapter, this load/climate split is not necessary equal. The study found that road damage cost varies across different road classes. The road damage cost was explicitly calculated for a 5-axle, semi-trailer with 80,000 lbs gross weight.

Table 3.2 Marginal Pavement Maintenance Cost of New York Roads
(Vitaliano and Held, 1990)

Road Functional Class	Pavement damage cost (\$ US 1990)	
	Cents per mile for 80,000 lb 5-axle tractor-trailer	Cents per ESAL-mile for 80,000 lb 5-axle tractor-trailer
Rural and Urban Interstate	0.030	0.6
Urban Expressway	0.069	1.4
Rural Expressway	0.064	1.3
Urban Arterial	0.138	2.8
Rural Minor Arterial	0.106	2.1
Urban Minor Arterial/Collector	0.387	7.7
Rural Collector	0.742	14.8

In Canada, Nix et al. (1992) developed pavement damage cost estimates based on typical construction costs in southern Ontario. Using data from that state, the study concluded that road damage cost varies for roads with different traffic volumes. The pavement damage cost ranged from 0.4 cents per ESAL-Mile for low-volume roads to 0.5 cents per ESAL-Mile (in \$ US 1989) for high-volume roads. According to Nix et al. the road damage cost for a 5-axle, semi-trailer with 80,000 lbs gross weight is 1 cent per ESAL-Mile (in \$ US 1989). Over a decade later, the Railway Association of Canada (RAC, 2002) compared the actual annual cash expenditure by the Canadian government on road infrastructure maintenance and the damage costs that were estimated by Nex et al. It was revealed that cost recovery on the basis of Nex et al.'s pavement damage costs would yield only 1.5% of actual total annual expenditure (RAC, 2002; Hiroshorn, 2002).

Hajek et al. (1998), using the marginal cost method, studied the impact of changing truck weight and dimensions regulations on pavement maintenance cost in Ontario. The pavement damage cost was defined as the unit cost of providing pavement structure for one additional ESAL. The study found a marked difference in pavement maintenance marginal cost for different types of roads. Similarly, the truck volume on a given road had significant impact on marginal cost. Hajek et al estimated following models for pavement damage due to vehicle load:

$$EUAC_{\text{New Pavements}} = 1601 + 311 (\text{Log}_{10}\text{ESALs})^2 + 1394N + \varepsilon$$

$$EUAC_{\text{In-Service Pavements}} = 100 + 160 (\text{Log}_{10}\text{ESALs})^2 + 558N + \varepsilon$$

Where: $EUAC_{\text{New Pavements}}$ = equivalent uniform annual cost per lane for new pavements (\$)

$EUAC_{\text{In-Service Pavements}}$ = equivalent uniform annual costs per lane for in-service pavements (\$)

ESALs = annual number of equivalent single axle loads per lane

N = indicator variable (0 for southern and $N = 1$ for northern Ontario); ε = Error

The two ESAL cost functions were differentiated to obtain the marginal cost as follows:

$$MCOST_{\text{New Pavements}} = 622 \left(\frac{2 \text{Log}_{10}\text{ESALs}}{\text{Log}_{10}\text{ESALs}} \right)$$

$$MCOST_{\text{In-service Pavements}} = 320 \text{Log}_{10} \left(\frac{2 \text{Log}_{10}\text{ESALs}}{\text{Log}_{10}\text{ESALs}} \right)$$

Where: $MCOST_{\text{New Pavements}}$ = marginal equivalent uniform annual costs per ESAL for one lane of a new pavement structure (for a specific magnitude of ESALs imposed on the pavement structure)

$MCOST_{\text{In-service Pavements}}$ = marginal equivalent uniform annual costs per ESAL for one lane of an in-service pavement structure (for a specific magnitude of ESALs imposed on the pavement structure).

The details of marginal cost estimated by Hajek et al are summarized in Table 3.3.

Table 3.3 Marginal Pavement Cost – Ontario, Canada (Hajek et al., 1998)

Highway Class	Marginal Pavement Cost per ESAL (\$)		Marginal Pavement Cost per Average 5-axle Truck (\$)	
	New Pavements	In-service Pavements	New Pavements	In-service Pavements
Urban Freeway	0.0025	0.0013	0.004	0.002
Major Arterial	0.0092	0.0047	0.014	0.007
Minor Arterial	0.0158	0.0082	0.024	0.012
Collector	0.01401	0.0206	0.060	0.031
Local	0.5968	0.3070	0.895	0.461

Figure 3.1 shows the marginal pavement cost as function of ESAL both for new and in-service pavements from the Hajek study. The figure clearly depicts that the pavement damage cost varies with the number of annual ESALs. The higher the number of annual ESALs, the lower is the pavement marginal cost (i.e., \$ per ESAL). The Hajek et al. methodology can be used by highway agencies to quantify the cost of pavement damage caused by heavy vehicles under different load scenarios and for different pavement ages (new pavement vs. in-service pavements).

Figure 3.1 Marginal Pavement Cost as function of ESAL (Source Hajek et al., 1998)

For specific road segments or specific truck types, other past studies have also established relationships that determine the damage caused to pavement infrastructure due to each single passage of a legal-weight or overweight vehicle. This has been done using mechanistic stress-strain relationships or empirical data. The US DOT (2000) released a report in 2000 titled Comprehensive Truck Size and Weight Study. That report provided some data on how one could assess the damage

done to the pavement by overweight vehicles. Unit pavement costs and pavement costs per unit of payload-mile by truck classification are shown in Tables 3.4 and 3.5 (USDOT, 2000). However, it can be seen even without critical analysis that the USDOT (2000) report provides unrealistic values for pavement damage cost. Consider, for example, a 5-axle double-trailer with GVW of 80,000 lbs. Table 3.4 suggests that driving this vehicle 1,000 miles on an interstate would cause pavement damage of only 3 cents (or 0.003 cents per mile). Clearly, this is far too low, compared to the findings of past studies that are discussed in this chapter. Further discussion of the information and data in that report are synthesized in Appendix 6 of this report.

Table 3.4: Unit Pavement Cost (\$/1000 miles) (USDOT, 2000).

		Truck Type								
		Single-Unit		Semitrailer		Double-Trailer			Triple-Trailer	
	Weights (Pounds)	3-Axles	4-Axles	5-Axles	6-Axles	5-Axles	7-Axles	8-Axles	7-Axles	
	GVW	54,000	64,000	80,000	90,000	80,000	100,000	105,000	100,000	115,000
	Tare	22,600	26,400	30.49	31,530	29,320	38,600	33,470	41,700	41,700
	Payload	31,400	37,600	49,510	58,470	50,680	61,400	71,530	58,300	73,300
Area Type	Functional Class									
Rural	Interstate	0.09	0.07	0.05	0.05	0.03	0.1	0.05	0.04	0.08
	Prin.Art.	0.17	0.16	0.12	0.11	0.07	0.15	0.1	0.17	0.31
	Min.Art.	0.37	0.33	0.29	0.22	0.32	0.41	0.21	0.39	0.75
	Maj.Col.	1.38	1.35	0.9	0.8	1.17	1.03	0.65	1.46	2.95
	Min.Col.	2.27	2.08	1.49	1.24	1.92	1.69	1.07	2.42	4.87
	Locals	5.9	5.63	3.87	3.23	4.99	4.4	2.79	6.27	12.6
Urban	Interstate	0.06	0.04	0.04	0.04	0.03	0.04	0.02	0.03	0.05
	Freeway&Expressway	0.09	0.06	0.06	0.05	0.04	0.07	0.04	0.09	0.18
	Prin.Art.	0.13	0.12	0.1	0.09	0.11	0.09	0.06	0.13	0.26
	Min.Art.	0.3	0.24	0.22	0.17	0.19	0.18	0.12	0.34	0.7
	Collector	0.66	0.7	0.54	0.49	0.46	0.34	0.25	0.86	1.82
	Locals	2.34	2.53	1.91	1.75	1.64	1.19	0.88	3.06	6.45

Table 3.5: Unit Cost per Payload-mile (\$/1000 Ton-miles) (USDOT, 2000).

		Truck Type								
		Single-Unit		Semitrailer		Double-Trailer			Triple-Trailer	
	Weights (Pounds)	3-Axles	4-Axles	5-Axles	6-Axles	5-Axles	7-Axles	8-Axles	7-Axles	
	GVW	54,000	64,000	80,000	90,000	80,000	100,000	105,000	100,000	115,000
	Tare	22,600	26,400	30.49	31,530	29,320	38,600	33,470	41,700	41,700
	Payload	31,400	37,600	49,510	58,470	50,680	61,400	71,530	58,300	73,300
Area Type	Functional Class									
Rural	Interstate	0.006	0.004	0.002	0.002	0.001	0.003	0.001	0.001	0.002
	Prin.Art.	0.011	0.009	0.005	0.004	0.003	0.005	0.003	0.006	0.008
	Min.Art.	0.024	0.018	0.012	0.008	0.013	0.013	0.006	0.013	0.02
	Maj.Col.	0.088	0.072	0.036	0.027	0.046	0.034	0.018	0.05	0.08
	Min.Col.	0.145	0.111	0.06	0.042	0.076	0.055	0.03	0.083	0.133
	Locals	0.376	0.299	0.156	0.11	0.197	0.143	0.078	0.215	0.344
Urban	Interstate	0.004	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001
	Freeway&Expressway	0.006	0.003	0.002	0.002	0.002	0.002	0.001	0.003	0.005
	Prin.Art.	0.008	0.006	0.004	0.003	0.004	0.003	0.002	0.004	0.007
	Min.Art.	0.019	0.013	0.009	0.006	0.007	0.006	0.003	0.011	0.019
	Collector	0.042	0.037	0.022	0.017	0.018	0.011	0.007	0.03	0.05
	Locals	0.149	0.136	0.077	0.06	0.065	0.039	0.024	0.105	0.176

The 1997 Federal Highway Cost Allocation Study provided the initial estimates of pavement damage by heavy vehicles. An addendum to 1997 Federal Highway Cost Allocation Study was published in 2000; this not only provided marginal pavement cost but also provided estimates of marginal congestion, crash, air pollution, and noise costs. Incremental pavement deterioration cost associated with an extra mile of travel, was found to vary with pavement design and condition. Table 3.6 shows the pavement damage cost attributable to each additional mile of travel, for the different vehicle classes.

Table 3.6: FHWA (2000) Unit Pavement Cost (\$/miles) (FHWA, 2000)

Vehicle Class	Interstate	Marginal Pavement Cost (Cents per Mile)	Marginal Pavement Cost (Cents per ESAL-Mile)
40,000 4-axle Single Unit Truck	Rural	1.0	0.25
40,000 4-axle Single Unit Truck	Urban	3.1	0.78
60,000 4-axle Single Unit Truck	Rural	5.6	1.40
60,000 4-axle Single Unit Truck	Urban	18.1	4.53
60,000 5-axle Combination Truck	Rural	3.3	0.66
60,000 5-axle Combination Truck	Urban	10.5	2.10
80,000 5-axle Combination Truck	Rural	12.7	2.54
80,000 5-axle Combination Truck	Urban	40.9	8.18

Figure 3.2 and 3.3 (horizontal axes not shown to scale) illustrate how increase in payload leads to an increase in pavement damage cost, at rural and urban highways. For example, for single unit trucks at rural roads, a 50% increase in payload (from 40,000 to 60,000 lbs) is found to be associated with a five-fold increase in pavement damage cost (from 10 to 50 cents per mile); for multiple unit trucks at rural roads, a 33% increase in payload (from 60,000 to 80,000 lbs) is found to be associated with a three-fold increase in pavement damage cost (from 32 to 128 cents per mile). At urban roads (Figure 3.3), the increase in damage due to load are even higher.

Figure 3.2: Unit Pavement Damage Cost, Various Truck Types and Loads, Rural Roads
(from FHWA, 2000)

Figure 3.3: Unit Pavement Damage Cost, Various Truck Types and Loads, Urban Roads
(from FHWA, 2000)

3.2 Comparative Analysis of the Results of Past Pavement Damage Studies

A number of studies have been carried out in recent past across the United States and Canada to quantify the pavement damage (and cost thereof) by heavy vehicles. Generally, there is a consensus in the literature that the current license fees for regular vehicles and permit fees paid by oversize and overweight vehicles recover only a very small fraction of actual amount being spent by highway agencies on pavement rehabilitation and maintenance.

Further, in many states, the current fee structure often does not provide the flexibility to assess fees based on vehicle weight or the distance it travels, the two measures of the amount of

damage caused by a vehicle. Of the different fee structures, the most promising alternative to recover the pavement damage by vehicles is the weight-distance fee structure.

Over the years, different studies have established different rates of pavement damage and cost (Table 3.7). Considering that the 5-axle, semi-trailer with 80,000 lbs. weight is the most used heavy vehicle on United States road system, we herein present the comparative analysis across the different studies on the basis of the attributes of this truck type.

After duly correcting for the time value of money, it can be noticed that there is a marked variation in cost of pavement damage that were established by the different studies. The costs were converted to a constant year dollar value using the FHWA Construction Price Index (CPI). The equation used to calculate the dollar value in the constant-year dollars, is given as:

$$C_{AY} = C_{BY} \times \frac{CPI_{AY}}{CPI_{BY}}$$

Where: C_{AY} = Cost in the analysis year;

C_{BY} = Cost in the base year;

CPI_{AY} , CPI_{BY} = the construction price indices for the analysis year and base year, respectively.

Table 3.7 Comparison of Interstate Pavement Damage across Different Studies

Study	Pavement damage cost (Cent per Mile) –Original Study Year	2010 Pavement damage cost (Cent per Mile)	2010 Pavement damage cost (Cent per ESAL-Mile)
Small et al.(1989)	2	4.1	0.82
Vitaliano & Held (1990)	3	6.2	1.24
Nix et al. (1992)	1	2.1	0.42
Hajek et al.(1998)	0.3	0.5	0.1
USDOT (2000)	0.003	0.0045	0.0009
FHWA (2000)	12.7 - 40.9	19.1 - 61.4	3.82 - 12.28

The table shows that there is wide difference in pavement damage cost estimated and proposed by different studies. In particular, the pavement damage cost estimated by USDOT (2000) seems to be far lower than that of the other studies. These are illustrated in Figures 3.4 and 3.5.

Figure 3.4 Comparison of Interstate Pavement Damage across Different Studies (cents/mile)

Figure 3.5 Comparison of Interstate Pavement Damage across Different Studies (cents/ESAL-mile)

CHAPTER 4: REVENUE IMPLICATIONS OF EXCESS TRUCK WEIGHTS

4.1 Overall Discussion

It is important for a state to have knowledge of how much revenue can be generated from a truck permit scheme. Figure 4.1 presents the cumulative monthly revenue streams for Indiana in 2008 and the first part of 2009, from the issuance of overweight and oversize permits. From the issuance of overweight and oversize permits, the figure shows that in 2008, just over \$14 million was collected. The source data is from the Indiana Department of Revenue. The trends for 2009 suggest that a slightly lower amount will be obtained. From a rough extrapolation of the 2009 data, it seems that the state will collect approximately \$12 million by the end of 2009. The difference between 2008 and 2009 could be attributed to the recessive state of the economy in the latter year.

Figure 4.1: Cumulative monthly revenue streams (in \$millions) from extra-legal truck operations in Indiana, Years 2008 and 2009 (partial)

Table 4.1 and Figure 4.2 present the yearly revenue streams from extra-legal truck operations in Indiana from Year 2002 to 2006 and part of 2007. The source data is from the Indiana Department of Revenue. The figure shows that the annual amount collected is approximately \$12 million.

The next step would be to ascertain the extent to which this amount covers the sum of the pavement damage cost and the expenditure incurred in the administration of the permitting process. While the case study in a subsequent chapter provides a methodology for answering this issue only within the context of a single hypothetical trucking company, the analysis could be extended to all truckers in the entire state, in a future research study.

Table 4.1: Yearly revenue streams from Extra-legal truck operations in Indiana, 2002-2009

	2002	2003	2004	2005	2006	2007	2008	2009
January	\$1,258,036	\$1,162,141	\$976,927	\$949,931	\$1,016,483	\$1,142,243	\$1,282,549	\$1,013,324
February	\$695,353	\$578,608	\$687,268	\$1,100,233	\$1,225,636	\$461,664	\$1,189,449	\$920,415
March	\$677,994	\$788,729	\$861,011	\$917,367	\$949,984	\$763,568	\$994,771	\$1,017,590
April	\$1,091,486	\$1,104,585	\$1,164,910	\$907,877	\$834,369	\$660,230	\$1,435,513	\$1,191,024
May	\$1,199,505	\$760,533	\$635,277	\$1,083,217	\$1,556,480	\$819,032	\$1,116,064	\$941,679
June	\$834,912	\$755,190	\$1,184,574	\$951,632	\$963,147	\$565,541	\$1,180,131	\$1,063,284
July	\$1,319,582	\$1,438,807	\$1,330,948	\$1,071,073	\$1,512,325	\$750,370	\$1,391,342	\$1,218,774
August	\$764,280	\$527,309	\$1,033,130	\$1,002,639	\$903,982	\$720,737	\$1,128,387	\$991,070
September	\$643,471	\$1,040,805	\$588,779	\$1,379,288	\$963,212	\$903,312	\$1,163,554	\$988,285
October	\$1,443,616	\$1,156,842	\$1,406,763	\$1,099,095	\$819,670	\$849,997	\$1,485,650	\$1,200,840
November	\$882,074	\$852,140	\$986,319	\$1,037,379	\$1,172,514	\$1,077,313	\$935,437	\$827,099
December	\$838,297	\$972,978	\$834,219	\$865,932	\$1,123,311	\$973,535	\$975,999	\$978,758
Total	\$11,650,607	\$11,140,669	\$11,692,130	\$12,367,669	\$13,043,118	\$9,689,548	\$14,280,855	\$11,373,384

Source: Indiana Department of Revenue

Figure 4.2: Annual Revenue from Overweight and Oversize Truck Permits 2002-2009

CHAPTER 5: CASE STUDIES

5.1 Introduction

In Chapter 2, it was seen that there exist significant differences in the permit fee structures across states. It was also observed that a simple and straightforward comparison of the permit fee structure and fees could yield some useful information to assess, from the truckers perspective, the relative overall “attractiveness” of a state compared to other states. However, at the end of that chapter, it was conceded that for a more conclusive analysis, such inherent, seemingly incompatible (or, probably even irreconcilable) differences in the fee structures across the states seem to undermine the validity of the comparative evaluation, and the use of case studies may be more meaningful.

This chapter first presents two case studies to compare trucking costs borne by truckers for overweight and/or oversize trucks across the different states of the Midwest region of the United States. This comparison was carried out using input data that reflects the agencies OW/OS policies and implemented using a Microsoft Excel spreadsheet. In recognition of the differences in permit fee structures, oversize or overweight criteria (or combinations thereof), loading criteria (GVW vs. axle), and associated fees, appropriate assumptions were duly made. From the temporal perspective, the two major categories of permits used by most of the states are: the annual permit (a form of multiple-trip pricing) and the single-trip permit. As such, the case study presents two broad analysis scenarios based on these two permit categories. Where a state does not have an annual permit for certain categories (for example, Indiana has no annual permits for overweight vehicles), an “annualized permit expenditure” was determined as the product of the single trip rate and the number of single trips per year.

Also, the chapter presents case studies that illustrate how an agency could establish an annual permit for a specific trucker on the basis of (a) the sum of multiple trips using existing single-trip fee structure in order to ensure revenue neutrality (b) the revenue needed to be collected to ensure that it fully covers the pavement damage incurred by OW vehicle operations. It may be noted that the annual permit fee to be established in (b) is expected to be higher compared to that of (a).

The input data for the scenarios are provided below. The specific input data shown below are for illustration only. The Excel spreadsheet has been provided as an addendum to this report. Using the spreadsheet, the analyst can input appropriate values for each data item to generate the corresponding results.

5.2 Input Data for Case Study I and II

Case Study (Scenario) 1: Multiple-trip Permit Expenditures Summed up Over 1 Year

Consider a trucking company with 200 trucks with the following details as provided in Table 5.1.

Table 5.1 Hypothetical Number of Trucks in each Weight and Size Category

Gross Vehicle Weight (lbs)		< 80,000	80,000 to 90,000	90,001 to 100,000	100,001 to 120,000	120,001 to 150,000	>150,000
Size Group	Dimensions (ft.)						
1	Length: < 70'	15	15	10	10		
	Width: < 10'						
	Height: < 13' -6"						
2	Length: 71' - 80'	5	10	20	30	10	
	Width: 10' - 12'						
	Height: 13' -6" - 14' - 6"						
3	Length: 81' - 100'		5	5	5	5	5
	Width: 12' -1" - 14'						
	Height: 14' -7" - 16'						
4	Length: 101' - 120'	5			5	20	10
	Width: 14' -1" - 16'						
	Height: 14' -6" - 15' - 6"						
5	Length: >120'					10	
	Width: > 16'						
	Height: > 15' -6"						

For example, the trucking company has 30 trucks that are of GVW 100,001–120,000 lbs; length 71–80 ft; width 10–12 ft; and height 13.6–14.16 ft.

Assume that the annual Vehicles Miles Traveled per Truck = 600 Miles

Assume that the number of districts crossed during the trip = 5 (for district fees)

Assume that the trucking operator pays an annual permit that is equal to the annual blanket permit amount, or where none exists, the annual sum of the single trips made within the year.

It is assumed that this trucking company operates in each of the eight Midwest states with the above fleet. The overall yearly cost incurred by the trucker in each state, based on the fee structure of the state (see Tables 5.2 to 5.7), is then calculated.

Case Study (Scenario) 2: Single-trip Permits

Input Data are as follows: Consider a trucking company with 200 trucks.

Number of trucks in each category of weight and size is given in Table 5.1.

Vehicles Miles Traveled per Truck per Trip = 300 Miles

Assume that the number of districts crossed during each trip = 5 (for district fees)

Assume that the number of bridges crossed during each trip = 60 (for bridge fees)

It is assumed that this trucking company operates in each of the eight Midwest states with the above fleet. The overall yearly cost incurred by the trucker in each state, based on the fee structure of the state, is then calculated.

5.3 Results of the Case Studies

5.3.1 Case Study I (Scenario I): Annual Blanket Permit or Annualized Multiple-Trip Permits

Using the default data described in Section 5.2, the results for this scenario are provided in the Excel spreadsheets that accompany this report. A synthesis of these results is provided in tables and charts below (see total amount highlighted in bold font (last row) in Tables 5.2 to 5.7 and Figure 5.1. As expected, the total annual expenditure on permits is relatively high at states such as Indiana where there are no annual blanket permits for overweight trucks and thus the total annual permit revenue to the agency (that is, total annual cost to the trucking operator) is equal to the sum of individual single trips made over the entire year.

Table 5.2 Case Study Trucking Costs, INDIANA Operations – Annual Expenditure on Permits

Oversize Only		Over WT. Only		Oversize / Over WT.
Up to 13'-6"	>13'-6"	80-108 Kips	108-150 Kips	
15	10	15	10	140
\$0	\$405	\$230	\$380	\$405
\$0	\$4,050	\$3,450	\$3,800	\$56,700
\$68,000				

Note: for OS, Annual permit rate was used; for OW, single trip rate was used as IN does not have an annual trip rate for OW only category.

Table 5.3 Case Study Trucking Costs, ILLINOIS Operations – Annual Expenditure on Permits

Oversize Only					Oversize / Overweight	
(length≤70',width ≤10, Height≤14'6")	(length≤70',width ≤10, Height≤14'6")	(length≤70',width ≤10, Height≤14'6")	(length≤70',width ≤10, Height≤14'6")	(length≤70',width ≤10, Height≤14'6")	6 Axle up to 100,000 lbs	6 Axle up to 120,000 lbs
15	5	0	5	0	40	100
\$21	\$30	\$40	\$60	\$125	\$130	\$295
\$516	\$351	\$0	\$501	\$0	\$5,350	\$30,400
\$37,118						

Note: for OS, single-trip permit rate was used as IL does not have an annual trip rate for that category; for OW, routine/multiple trip rate was used.

Table 5.4 Case Study Trucking Costs, WISCONSIN Operations – Annual Expenditure on Permits

Oversize Only		Overweight Only		Oversize/ Overweight
Trucks Exceeding length limits	Trucks Exceeding width or height limits	< 90 Kips	90-100 Kips	
15	10	15	20	140
\$0	\$90	\$200	\$350	\$350
\$0	\$900	\$3,000	\$7,000	\$49,000
\$60,200				

Note: Estimates are based on multiple trip permit rate (for 12 months period).

Table 5.5 Case Study Trucking Costs, IOWA & OHIO Operations - Annual Expenditure on Permits

IA	OH	
Oversize/ Overweight	Oversize Only (Routine)	Oversize/Overweight
	Michigan Legal	Super load(Michigan Legal)
130	95	50
\$300	\$470	\$630
\$39,000	\$44,650	\$31,500
\$39,000	\$76,150	

Note: Based on Annual Permit rates

Table 5.6 Case Study Trucking Costs, MONTANA & MINNESOTA Operations – Annual Expenditure on Permits

MO		MN
Oversize Only	Overweight Only	Oversize / Overweight
HT=14'-16'; width=8'6"; Length=65'-150	80-160 Kips	HT>13'6"; width>8'6"; Length>75'; 145kips>Wt>80kips
25	175	160
\$400	\$400	\$120
\$10,000	\$70,000	\$19,200
\$80,000		\$19,200

Note: Based on Annual Permit rates

Table 5.7 Case Study Trucking Costs for MICHIGAN and KENTUCKY Operations – Annual Expenditure on Permits

MI	KY	
Oversize / Overweight	Oversize/ Overweight	
HT>14'; width>14'6"; Length>85'; 145kips>Wt>80kips	Non-divisible < 14' wide	Non-divisible < 14'-16' wide
160	95	45
\$150	\$250	\$500
\$24,000	\$23,750	\$22,500
\$24,000	\$46,250	

Note: Based on Annual Permit rates

Figure 5.1 Results of the Case Study I (Annual Expenditure on Permits)
 (Trucking Permit Costs for Overweight and/or Oversize Trucks Across of Midwest States, for a Hypothetical Trucking Company, see accompanying spreadsheet)

5.3.2 Case Study II (Scenario II): Single-trip Permits

The results for this scenario are provided as defaults in the Excel spreadsheets. A synthesis of these results is provided in tables and charts below (see the “Trucker’s total permit cost” row in the Tables 5.8 to 5.13 and Figure 5.2.)

Table 5.8 Case Study Trucking Costs for INDIANA Operations – Single-trip Permit

Oversize Only		Overweight Only		Oversize / Overweight
Up to 13’-6”	>13’-6”	80-108 Kips	108-150 Kips	
15	10	25	10	140
\$20	\$30	\$125	\$200	\$200
\$300	\$300	\$3,125	\$2,000	\$28,000
\$33,725				

Table 5.9 Case Study Trucking Costs for ILLINOIS Operations - Single-trip Permit

Oversize Only					Oversize/ Overweight	
(length≤70', width≤10, Height≤14'6")	(length≤70', width≤10, Height≤14'6")	(length≤70', width≤10, Height≤14'6")	(length≤70', width≤10, Height≤14'6")	(length≤70', width≤10, Height≤14'6")	6 Axle up to 100,000 lbs	6 Axle up to 120,000 lbs
15	5	0	5	0	40	100
\$62	\$71	\$81	\$101	\$166	\$116	\$116
\$930	\$355	\$0	\$505	\$0	\$4,790	\$12,500
\$19,080						

Table 5.10 Case Study Trucking Costs for WISCONSIN Operations - Single-trip Permit

Oversize Only		
Trucks Exceeding length limits	Trucks Exceeding width or height limits	Trucks Exceeding both width and height limits
75	75	75
\$666	\$681	\$686
\$49,950	\$51,075	\$51,450
\$152,475		

Table 5.11 Case Study Trucking Costs for IOWA and OHIO Operations – Single-trip Permit

IA	OH	
Oversize/ Overweight	Oversize Only(Routine)	Oversize/ Overweight
	Michigan Legal	Super load(Michigan Legal)
140	95	50
\$10	\$100	\$200
\$1,400	\$9,500	\$10,000
\$1,400	\$19,500	

Table 5.12 Case Study Trucking Costs for MISSOURI Operations - Single-trip Permit

Oversize Only	Over WT. Only Oversize / Overweight			
Height=14'-16'; Width <8'6"; Length=65'-150	80-90 Kips	90-100 Kips	100-120 Kips	120-150 Kips
25	15	25	40	45
\$15	\$15	\$15	\$15	\$15
\$375	\$225	\$875	\$2,200	\$3,375
\$7,050				

Table 5.13 Case Study Trucking Costs for MINNESOTA, MICHIGAN and KENTUCKY Operations – Single-trip Permit

MN	MI	KY	
Oversize/Overweight	Oversize/Overweight	Oversize/Overweight	
Height>13'6"; Width>8'6"; Length>75' 145 kips >Weight> 80 kips	Height=14"; Width>14'6"; Length > 85' 145 kips >Weight> 80 kips	Non-divisible < 14' Wide	Non-divisible < 14'–16' Wide
160	160	95	45
\$25	\$50	\$60	\$60
\$4,000	\$8,000	\$5,700	\$2,700
\$4,000	\$8,000	\$8,400

Figure 5.2 Results of the Case Study II (Single-trip Permit)
 (Trucking Permit Costs for Overweight and/or Oversize Trucks Across of Midwest States, for the Hypothetical Trucking Company, see accompanying spreadsheet)

5.4 A Discussion of Issues Relating to the Case Studies I and II

As mentioned in the Introduction to this chapter, due to the diversity across the states of the permit structures, permitting regulations, OS/OW definitions and sub classes, and permit attributes, a straightforward comparison across states is difficult. In response to this challenge, this chapter makes an attempt to carry out a comparative evaluation of permitting fees (as impacted on the trucking operator). This evaluation is designed to accommodate, as much as possible, the nuances, peculiarities, and complexities in the permit fee structures across all states. As discussed earlier in this report, no two states fee structures are identical even though a few states, such as Michigan and Minnesota have some similarities.

In view of these differences in the states fee structures, the case studies were carried out under a number of simplifying assumptions where were stated early in this chapter. It is important to note that any conclusions from the case studies are based on these assumptions.

The explicit consideration of mileage in assessing permit fees is done by relatively few states. The inclusion of that criterion thus further complicates efforts to compare permit fees across the states. This is because for states that consider the distance travelled by the overweight/oversize truck, the total fee to be paid can be calculated only after the distance traveled is known. For the case studies in this chapter, we assumed that each OW or OS truck travels a total distance of 600 miles per year. If the actual distance is higher or lower, the results of the comparative evaluation could be significantly different.

In our case study setting, the trucking company is assumed to have a total of 200 trucks of different sizes and weight classes as shown in the Table 4.1. In a real case or hypothetical situation where the fleet size and the distribution of trucks in each weight and dimension category are different from the defaults in our spreadsheets, the analyst may enter the spreadsheet and change the value accordingly. Also, different permit structure scenarios can be expected to get very different outcomes of the comparison.

For the scenario involving single-trip permits, the comparison is purely based on just one trip per truck. The cost to the trucker (i.e., the revenue generated for the agency) can be calculated by considering the number of trips that each truck will make per year.

In certain states, single permits are valid only for a certain time period such as 5 or 15 days. This can complicate the analysis, particularly when there are significant differences in the number of trips made within this time period. Another confounding issue could be that of permit extension possibilities or acquiring a completely new permit for subsequent trips. Our case studies involve a simplified scenario where the trucker obtains either an annual permit (Case Study 1) or a single permit (Case Study 2).

For states with complicated fee structures, a greater number of assumptions were made in the case study in order to facilitate the comparison. A case in point is the state of Illinois where the permitting criteria and sub-classes are numerous and intertwined: axle loads, distance, type of commodity being hauled, weight, and size are among the several criteria considered. While inclusion of these considerations renders the permit fees more equitable within at the state, it also adds complexity in the comparative evaluation. For the case studies, therefore, a number of simplifying assumptions were made for this state in a bid to arrive at a fair comparison.

5.5 Case Study III: Calculation of Total Annual Permit Amount to be Paid by another Hypothetical Company on the basis of Current Single-trip Fee Structure

A hypothetical trucking company with a number of 134,000 lb trucks wishes to undertake a total of 10,000 trips per year. It is desired to determine the total permit amount to be paid by this company in one year on the basis of current single-trip fee structure in State of Indiana. From the highlighted fee structure in Table 5.14 (see arrow), we have:

$$\text{Single trip expense} = \$ 20 + \$ 0.35 * \text{Truck Miles (up to 108,000 lbs GVW)} \quad (1)$$

$$\text{Single trip expense} = \$ 20 + \$ 10 + \$ 0.60 * \text{Truck Miles (from 108,000 lbs to 150,000 lbs GVW)} \quad (2)$$

$$\text{Single trip expense} = \$ 20 + \$ 10 + \$ 1.00 * \text{Truck Miles (from 150,000 lbs to 200,000 lbs GVW)} \quad (3)$$

Using Equations (1)-(3), the single-trip expenses for different truck-miles per trip and various truck weight categories were estimated (Figure 5.3 and Table 5.15).

This was used to determine the appropriate fee for a hypothetical trucker that has requested annual permits for 10,000 trips per year to be made by 134,000 lb GVW vehicles on the basis of the current revenue structure.

The analysis is as follows:

Truck GVW = 134,000 lbs (GVW Category: 108,000 - 150,000 lbs)

Number of Trips = 10,000

Assuming the OW vehicle is moving 300 miles in each single trip (as highlighted in Table 15.5 and Figure 5.36)

Permit expense for trucks (with GVW of 134,000 lbs and 300-mile trip length)

$$= \$30 + \$0.60 \times 300 \text{ truck miles} = \mathbf{\$210 \text{ per trip}} \text{ (Table 5.15, Figure 5.3, and Equation (2))}$$

Total Permit expense for 10,000 Trips

$$= 210 \times 10,000 = \$ 2,100,000$$

Similarly, single-trip permit expenses for various weight categories and trip lengths can be estimated using Table 15.5 and plots in Figure 5.3.

Note: For purposes of our computations, 10,000 trips in a year is equivalent to:

1 truck making 10,000 trips in a year, or

10,000 trucks making 1 trip each in a year, or

500 trucks making 200 trips each in a year, or

20 trucks making 5,000 trips in a year, etc.

Table 5.14 Permit Fee Structure for Indiana State

Category	Type	Forms	Single Trip Fee	90 Day Fee	Annual Fee
Oversize Permit	Single Trip 90 Day Annual	M-233, Permit M-233, Permit M-233, Permit	\$20: up to 95' in length, 12'4" wide & legal height \$30: between 96' and 110' in length, 12'5" and 16' wide or 13'7" and 15' tall \$40: over 110' in length, 16' wide, 15' tall and 80,000 pounds	\$100	\$405
Overweight Permit	Single Trip (15 Days)	M-233, Permit	\$20 + \$.35 per mile for vehicles up to 108,000 lbs. *\$20 + \$.60 per mile for vehicles over 108,000 to 150,000 lbs. **\$20 + \$1.00 per mile for vehicles over 150,000 lbs.		
Oversize & Overweight Permit	Single Trip (15 Days)	M-233, Permit	Greater of the oversize or overweight fee calculated above		
Special Weight Permit	Multiple Trip (1 Day) Quarterly billing	M-233ST, Permit M-211, Registration M-219, Bond Form	\$42.50		
12'4" Mobile Home Rig Permit	Single Trip (15 Days) Annual Quarterly Dealer's	M-233, Permit M-233DR, Permit	\$10.00	\$250.00	\$1000.00 \$40.00 for dealers.
14'4" Mobile Home Rig Permit	Single Trip (5 Days) Quarterly Annual	M-233, Permit	\$18.00	\$500.00	\$2000.00
Toll Road Gate Permit	Annual	M-233T, Permit			\$20 per gate, per truck.

Fee structure used in Case Study III

* Vehicles over 120,000 lbs charged \$10 executive fee

** Vehicles over 200,000 lbs charged \$10 executive fee + \$25 design and review fee + bridges fees.

Source: *Oversize-Overweight Vehicle Permitting Handbook*, Permit Unit, Motor Carrier Services Division, Indiana Department of Revenue, Indianapolis, IN. <http://www.in.gov/dor/files/osowhandbook.pdf>

Figure 5.3 Single-trip Permit Expenses vs. Truck-Miles Traveled, for Various OW Categories

Table 5.15 Single-trip Permit Expenses vs. Truck Miles Traveled for Various OW Categories

Truck Miles Traveled (VMT) (in miles)	Single Permit Expenses (\$)/ Trip for Various Categories of OW Trucks (GVW in lbs)		
	80000-108,000	108000-150,000	150,000-200,000
0	20	30	30
10	23.5	36	40
25	28.75	45	55
50	37.5	60	80
75	46.25	75	105
100	55	90	130
125	63.75	105	155
150	72.5	120	180
175	81.25	135	205
200	90	150	230
225	98.75	165	255
250	107.5	180	280
275	116.25	195	305
300	125	210	330
325	133.75	225	355
350	142.5	240	380
375	151.25	255	405
400	160	270	430
425	168.75	285	455
450	177.5	300	480
475	186.25	315	505
500	195	330	530
750	282.5	480	780
1000	370	630	1030

5.6 Case Study IV – Determining how much a hypothetical trucker should pay in each given year on the basis of damage done to pavement

In this case study, we determine the appropriate pavement cost for a hypothetical trucker who wishes to manage 10,000 truck trips per year with 134,000 lbs GVW, on the basis of the impact of these trips on the roadway pavement. In order to find a relationship between weight per axle and unit pavement cost, data provided in Table 5.16 were used to develop plots and establish models for Urban Interstate and Rural Interstate highways (as given in Figure 5.4). Data from Table 5.16 were processed and summarized to yield Table 5.17.

Unit Pavement Cost vs. Truck Miles Traveled

Table 5.16 presents the unit pavement cost for various truck types (\$/1000 miles) (FHWA, 2000). Also, Table 5.17 presents the weight per axle vs. unit pavement cost (\$/1000 miles), urban and rural interstates (Reference: Table 3.1 of this report).

Table 5.16 Unit Pavement Cost for Various Truck Types (FHWA, 2000)

Vehicle Class	Interstate	Unit Pavement Cos (Cents per Mile)	Unit Pavement Cost (\$/1000 Miles)
40,000 4-axle Single Unit Truck	Rural	1.0	10.0
40,000 4-axle Single Unit Truck	Urban	3.1	31.0
60,000 4-axle Single Unit Truck	Rural	5.6	56.0
60,000 4-axle Single Unit Truck	Urban	18.1	181.0
60,000 5-axle Combination Truck	Rural	3.3	33.0
60,000 5-axle Combination Truck	Urban	10.5	105.0
80,000 5-axle Combination Truck	Rural	12.7	127.0
80,000 5-axle Combination Truck	Urban	40.9	409.0

Table 5.17 Weight per Axle vs. Unit Pavement Cost, Urban and Rural Interstates

Number of Axles	GVW (lbs)	Weight Per Axle (lbs)	Unit Pavement Cost (\$/1000 Miles)	
			Rural	Urban
<i>(a)</i>	<i>(b)</i>	<i>(b)÷(a)</i>		
4	40,000	10000	10.0	31.0
4	60,000	15000	56.0	181.0
5	60,000	12000	33.0	105.0
5	80,000	16000	127.0	409.0

Since it was required to find the unit pavement cost for various numbers of axles with given GVW of 134,000 lbs, the weight per axle was determined using the following equation:

$$(4)$$

Using the developed models shown in Figure 5.4, the unit pavement cost per 1,000 miles was estimated for each set of axle number and for Urban and Rural Interstate (IS) Highways (Table 5.18). Also, using the unit pavement cost per 1,000 miles in Table 5.18, the pavement cost was calculated for different mile ranges (Tables 5.19 and 5.20).

Figure 5.4 Weights per Axle vs. Unit Pavement Cost, Urban and Rural Interstates
(Developed using data from FWHA, 2000), 134,000 lb GVW Truck

Table 5.18 Unit Pavement Cost, 134,000 lb GVW Truck

# of Axles	GVW(lbs)	Wt Per Axle (lbs)	Pavement Cost (\$/1000 Miles)		Pavement Cost (\$/ Miles)	
(a)	(b)	(b) ÷ (a)	Rural IS	Urban IS	Rural IS	Urban IS
6	134,000	22333.33	2084.64	6101.54	2.08	6.10
7	134,000	19142.86	581.82	1702.93	0.58	1.70
8	134,000	16750.00	223.41	653.90	0.22	0.65
9	134,000	14888.89	106.12	310.60	0.11	0.31
10	134,000	13400.00	58.45	171.22	0.06	0.17

**Table 5.19 Unit Pavement Cost vs. Truck Miles Travelled for Urban and Rural Interstates
(20 to 1000 Miles), Year 2000 constant dollars, 134,000 lb GVW Truck**

Unit Pavement Cost (\$)										
Distance (miles)	Urban IS					Rural IS				
	# of Axles					# of Axles				
	6	7	8	9	10	6	7	8	9	10
20	122.03	34.06	13.08	6.21	3.42	41.69	11.64	4.47	2.12	1.17
50	305.08	85.15	32.70	15.53	8.56	104.23	29.09	11.17	5.31	2.92
75	457.62	127.72	49.04	23.30	12.84	156.35	43.64	16.76	7.96	4.39
100	610.15	170.29	65.39	31.06	17.12	208.46	58.18	22.34	10.61	5.85
200	1220.31	340.59	130.78	62.12	34.24	416.93	116.36	44.68	21.22	11.70
300	1830.46	510.88	196.17	93.18	51.37	625.39	174.55	67.02	31.84	17.55
400	2440.62	681.17	261.56	124.24	68.49	833.85	232.73	89.36	42.45	23.40
500	3050.77	851.47	326.95	155.30	85.61	1042.32	290.91	111.71	53.06	29.25
600	3660.92	1021.76	392.34	186.36	102.73	1250.78	349.09	134.05	63.67	35.10
700	4271.08	1192.05	457.73	217.42	119.86	1459.24	407.27	156.39	74.28	40.95
800	4881.23	1362.34	523.12	248.48	136.98	1667.71	465.45	178.73	84.90	46.80
900	5491.38	1532.64	588.51	279.54	154.10	1876.17	523.64	201.07	95.51	52.65
1000	6101.54	1702.93	653.91	310.60	171.22	2084.64	581.82	223.41	106.12	58.50

Note: To obtain the cost in current dollars, apply the FHWA CPI adjustment factor.

**Table 5.20 Unit Pavement Cost vs. Truck Miles Travelled for Urban and Rural Interstates
(1000 to 30,000 Miles), Year 2000 constant dollars, 134,000 lb GVW Truck**

Unit Pavement Cost (\$)										
Distance (miles)	Urban IS					Rural IS				
	# of Axles					# of Axles				
	6	7	8	9	10	6	7	8	9	10
1000	6102	1703	654	311	171	2085	582	223	106	58
2000	12203	3406	1308	621	342	4169	1164	447	212	117
5000	30508	8515	3270	1553	856	10423	2909	1117	531	292
10000	61015	17029	6539	3106	1712	20846	5818	2234	1061	585
15000	91523	25544	9809	4659	2568	31270	8727	3351	1592	877
20000	122031	34059	13078	6212	3424	41693	11636	4468	2122	1170
25000	152538	42573	16348	7765	4281	52116	14545	5585	2653	1462
30000	183046	51088	19617	9318	5137	62539	17455	6702	3184	1755

Note: To obtain the cost in current dollars, apply the FHWA CPI adjustment factor.

**Table 5.21 Unit Pavement Cost vs. Truck Miles Travelled for Urban and Rural Interstates
(20 to 1000 Miles), Year 2010 constant dollars, 134,000 lb GVW Truck**

Unit Pavement Cost (\$)										
	Urban IS					Rural IS				
	# of Axles					# of Axles				
Distance (miles)	6	7	8	9	10	6	7	8	9	10
20	183.20	51.13	19.63	9.33	5.14	62.59	17.47	6.71	3.19	1.76
50	457.99	127.82	49.08	23.31	12.85	156.48	43.67	16.77	7.97	4.39
75	686.98	191.74	73.62	34.97	19.28	234.71	65.51	25.15	11.95	6.59
100	915.98	255.65	98.17	46.63	25.70	312.95	87.34	33.54	15.93	8.78
200	1831.95	511.30	196.33	93.26	51.41	625.90	174.69	67.08	31.86	17.56
300	2747.93	766.94	294.50	139.89	77.11	938.85	262.03	100.62	47.79	26.35
400	3663.91	1022.59	392.66	186.51	102.82	1251.80	349.38	134.16	63.72	35.13
500	4579.88	1278.24	490.83	233.14	128.52	1564.75	436.72	167.70	79.65	43.91
600	5495.86	1533.89	588.99	279.77	154.23	1877.70	524.06	201.23	95.59	52.69
700	6411.84	1789.53	687.16	326.40	179.93	2190.65	611.41	234.77	111.52	61.47
800	7327.81	2045.18	785.33	373.03	205.63	2503.60	698.75	268.31	127.45	70.26
900	8243.79	2300.83	883.49	419.66	231.34	2816.55	786.10	301.85	143.38	79.04
1000	9159.77	2556.48	981.66	466.29	257.04	3129.50	873.44	335.39	159.31	87.82

Note: To obtain the cost in current dollars, apply the FHWA CPI adjustment factor.

**Table 5.22 Unit Pavement Cost vs. Truck Miles Travelled for Urban and Rural Interstates
(1000 to 30,000 Miles), Year 2010 constant dollars, 134,000 lb GVW Truck**

Unit Pavement Cost (\$)										
	Urban IS					Rural IS				
	# of Axles					# of Axles				
Distance (miles)	6	7	8	9	10	6	7	8	9	10
1000	9160	2556	982	466	257	3130	873	335	159	88
2000	18320	5113	1963	933	514	6259	1747	671	319	176
5000	45799	12782	4908	2331	1285	15648	4367	1677	797	439
10000	91598	25565	9817	4663	2570	31295	8734	3354	1593	878
15000	137396	38347	14725	6994	3856	46943	13102	5031	2390	1317
20000	183195	51130	19633	9326	5141	62590	17469	6708	3186	1756
25000	228994	63912	24541	11657	6426	78238	21836	8385	3983	2196
30000	274793	76694	29450	13989	7711	93885	26203	10062	4779	2635

5.6.1. Illustration of Calculations

Assumption: the hypothetical trucker uses only Rural Interstate Highways

GVW = 134,000 lbs

Number of axles considered = 6

Weight (Wt) per axle = $134,000 \text{ lbs} \div 6 = 22,333.33 \text{ lbs per axle}$ (*highlighted in Table 5.18*)

Therefore,

Unit Pavement Cost per 1000 Truck Miles (with 2233.33 lbs per axle) on Rural Interstate highways
= (*highlighted in Table 5.18*)

This amount is based on the dollar value as of the year of the FHWA (2000) report. Thus, applying the FHWA CPI adjustment factor, this corresponds to ($* 213.3/145.6$) = \$3,056.2 in year 2009 constant dollar.

Calculations of Pavement Costs for Rural Interstate

10,000 truck-miles = $\$3056.2 * 10 = \$30,562$

10,000 truck-trips (1-mile per trip) = \$30,562

10,000 truck-trips (10-miles per trip) = \$305,620

10,000 truck-trips (100-mile per trip) = **\$3,056,200**

Similarly, the pavement cost due to 10,000 trucks-trips (for any number of miles traveled per trip), can be determined.

Further, the pavement cost corresponding to any number of trucks trips (and any number of miles traveled per trip), can be determined.

Assume that the trucks have adjustable number of axles. Then it is useful to present calculations for other axle numbers (that is, from 7-axle to 10 axle in 1 axle increments), knowing the highway class, and truck miles traveled. These were carried out and are presented in Tables 5.18 to 5.20). From these tables, pavement cost nomographs were determined. These are presented as Figures 5.5 to 5.12.

Using Figures 5.5 to 5.8, the analyst can determine, for a given number of axles, the unit pavement cost for different number of truck miles travelled, for urban and rural highways. Also, using Figures 5.8 to 5.10, the analyst can determine, for a given number of truck miles traveled, the unit pavement cost for different number of axles, for urban and rural highways.

Example Use of the Nomographs:

For a 134,000 lb GVW, 10-axle truck that travels 300 miles on an urban interstate highway, the pavement damage cost is approximately \$50 (from Figure 5.5). The exact value may be found in Table 5.19. However, if the truck has only 6-axles, the pavement damage cost is approximately \$2,000 (from Figure 5.5).

Figure 5.5 Unit Pavement Cost vs. Truck Miles Travelled for Urban Interstate Highways (0 to 1,000 Miles), 134,000 lb GVW Truck

Figure 5.6 Unit Pavement Cost vs. Truck Miles Travelled for Urban Interstate Highways (1,000 to 30,000 Miles), 134,000 lb GVW Truck

Figure 5.7 Unit Pavement Cost vs. Truck Miles Travelled for Rural Interstate Highways (0 to 1,000 Miles), 134,000 lb GVW Truck

Figure 5.8 Unit Pavement Cost vs. Truck Miles Travelled for Rural Interstate Highways (1,000 to 30,000 Miles), 134,000 lb GVW Truck

Figure 5.9 Unit Pavement Cost vs. Number of Axles for Urban Interstate Highways (0 to 1,000 Miles), 134,000 lb GVW Truck

Figure 5.10 Unit Pavement Cost vs. Number of Axles for Urban Interstate Highways (Up to 30,000 Miles), 134,000 lb GVW Truck

Figure 5.11 Unit Pavement Cost vs. Number of Axles for Rural Interstate Highways (0 to 1,000 Miles), 134,000 lb GVW Truck

Figure 5.12 Unit Pavement Cost vs. Number of Axles for Rural Interstate Highways (up to 30,000 Miles), 134,000 lb GVW Truck

5.6.2. Comments

1. Increase in number of axles causes a decrease in load per axle.
2. Pavement cost (for a given number of axles) increases (linearly) with increase in truck-miles traveled (Figures 5.5 to 5.8).
3. Pavement damage cost decreases drastically with increase in number of axles for a given traveled distance/ number of miles in a non-linear fashion (Figures 5.9 to 5.12).

Also from the case studies, it is interesting to observe that:

- (i) At states with a blanket annual permit, the permit fee is far lower than states without a blanket annual permit; for the latter group of states, annual permit expenditure is a sum of multiple single trips;
- (ii) For the hypothetical trucker (having a fleet shown in Table 5.1), relatively little total annual permit expenditure is incurred if the trucker operates at states that have a blanket annual permit; on the other hand, the trucker incurs relatively high expenditure at states that lack a blanket permit and thus for which the annualized trucker expenditure is calculated as an accumulated sum of multiple single-trip permit fees. This result suggests that adoption of an annual blanket fee may be unfavorable from the perspective of revenue generation. This is consistent not only with the findings of the Texas DOT but also with the admonitions of Moffett and Whitford;
- (iii) As seen in point (ii) above, for blanket annual permit structures, total annual expenditure (by the trucker) and hence, revenue to the agency, are very low. Thus such revenue cannot be realistically expected to cover the corresponding damage to the pavement structure. At these states that have a blanket annual permit policy for overweight trucks, it is not certain whether the agencies are unwilling or unable (for reasons that may include political pressure) to increase these fees to more realistic levels.

For overweight trucks, INDOT is among the states that lack an annual blanket permit. However, the opportunity exists for INDOT and INDOR to issue special blanket permits to “favored” clients. These include industries and truckers who undertake a large number of OW trips and for whom seeking permits for each trip would be time consuming, laborious, and disruptive to their operations. It is the recommendation of this report that the state can deal with such truckers on a case-by-case basis.

CHAPTER 6: SUMMARY, CONCLUSIONS, AND DIRECTIONS FOR FUTURE RESEARCH

6.1 Summary

This study was carried out to establish an enhanced and updated understanding of the state of practice on the truck weight permitting process in Indiana, in relation to that of neighboring states. The truck permitting practices and policies of eight Midwest states were documented, assessed, and compared on the basis of the ease of the permitting process for the permit applicant; the permit fee amounts; and the permit fee structure or basis for fees (per vehicle, per vehicle-mile, per to-mile, etc.). Also, using data from other state and national studies, the report develops charts that quantifies the extent to which every ton increase in payload increases the pavement deterioration and subsequent repair costs; the extent to which reduction (or addition) of axles increases (or reduces) the costs of pavement deterioration and how this could influence policies for payload increases (at states that have permitting thresholds per axle and not for gross weights).

The study report also presents the revenue streams obtained from the permits issued for extra-legal trucking operations in Indiana and reports that the approximate amount obtained is approximately \$12 million per year. Obviously, this amount falls far short of what is needed to offset the cost of pavement damage due to overweight trucks even without including the cost of reduced safety and mobility due to oversize vehicle operations. However, a definitive assessment and conclusion can only be made after a detailed cost allocation study using data from Indiana.

The study product is intended to help in reviewing and documenting the state of practice in Indiana, from various perspectives including permitting structures and fees, pavement damage cost and cost allocation in the form of appropriate license and permit fees, and revenue generation. Generally, the study results are expected to provide a knowledge base for INDOT as that agency moves forward to update or streamline its permitting processes. The ultimate intention is to help the state preserve its investments in highway infrastructure without sacrificing the competitive position of the state in attracting and retaining entities that foster economic development.

6.2 Conclusions

The study determined that while the upper thresholds (dimensions and weights) for extra-legal trucking operations are generally the same for each state, the upper thresholds for extra-legal operations vary considerably across the states, and in some cases, some states seem to have no limit on weights. Also, the findings from the internet search and phone interviews show that there is a great deal of variability in the criteria for truck permitting practices at various states and these criteria include extent to which a truck's weight or size attributes (length, width, height) is in excess of legal limits; distance traveled, type of commodity carried, and axle spacing. Furthermore, it was seen that no state has adopted explicitly the weight-distance concept for its overweight or oversize trucks. However, in the states of Indiana, Ohio, and Illinois, the fee structures for overweight vehicles includes weight levels and extents of travel and thus are similar to a weight-distance fee structure. The study also discussed briefly the issue of revenue neutrality: highway agencies that have switched from a single-trip permit system to an annual permit system report that they benefited from cost savings due to reduced monitoring efforts of each single trip but lost significant revenue overall.

From the case studies, it is observed that at states with a blanket annual permit, the permit fee is very low and cannot be realistically expected to generate adequate revenue. It is not certain whether the agencies at these states are unwilling or unable (for reasons that may include political pressure) to increase these fees to more realistic levels. In this regard, it was also observed that for the hypothetical trucker (having a fleet of a certain distribution), relatively little total annual permit expenditure is incurred if the trucker operates at states that have a blanket annual permit; on the other hand, the trucker incurs relatively high expenditure at states that lack a blanket permit and thus for which the annualized trucker expenditure is calculated as an accumulated sum of multiple single-trip permit fees. This result suggests that adoption of an annual blanket fee may be unfavorable from the perspective of revenue generation. This is consistent not only with the findings of the Texas DOT but also with the admonitions of Moffett and Whitford (1994). However, the opportunity exists for INDOT and INDOR to issue special blanket permits to "favored" clients. These include industries and truckers who undertake a large number of OW trips and for whom seeking permits for each trip would be time consuming, laborious, and disruptive to their operations. It is the recommendation of this report that the state can deal with such truckers on a case-by-case basis.

From the perspective of overweight and oversize thresholds and associated permit fees, it was observed that certain states appear to be generally most favorable to trucking because they have relatively high or nonexistent maximum-weight thresholds for defining what a superload is and relatively lower fees for overweight trucks. However, it is important to consider other permitting

criteria as well in order to make a general and holistic assessment of this issue. The study shows that due to the peculiarities and nuances across the permitting structures across the states, a case-by-case analysis is the preferred way to compare the permit structures and fees across the states.

Using data from past national and state studies, the report presents a framework by which INDOT could develop nomographs to assess the increase in pavement costs for every ton increase in payload or the decrease in pavement costs for every increase in the number of axles, for any given truck class. This framework has been implemented in this report to develop nomographs for trucks of GVW 134,000lbs. However, it is to be noted that these pavement damage costs are based on past data at other states. There is therefore a need to update these costs to reflect conditions and data from Indiana at the current time. The study also concludes that using data from these studies, it is possible for INDOT to quantify the extent to which the reduction (or addition) of axles (due to, for example, lowering of auxiliary axles by a flexible axle truck, as shown in Figure 6.1) increases (or reduces) pavement deterioration and increases (or reduces) pavement damage cost.

Figure 6.1: Example of a Lift-Axle Truck
(Often the number of operational axles can be increased by lowering extra axles).
 [Image source: www.monroetruck.com]

6.3 Future Research

The conduction of this research opens up a number of directions for future research.

- *Direct survey of the end users.* It may be argued that the complications of the comparative process in this report could be avoided due to differences in permit structures across the states, on the premise that only the end product needs to be evaluated. The end product, in this case, would be the level of truckers' satisfaction with the permit policies at each state. Thus a questionnaire survey could be administered to gage such perspectives of the truckers) of the permit policies at each state. The Indiana Department of Revenue maintains a database

containing the list of permit-using truckers that operate in Indiana. A sample of these truckers could be selected and the list could be narrowed down to include only those that also operate in at least one other state. The questionnaire could gage not only their overall satisfaction but also their perspectives on individual specific attributes of the permit process (fee structure complexity, fee levels, difficulty of securing permits, road conditions, etc.).

- Pavement cost attribution.** For assessing the implications of increasing or decreasing axle loads on pavement damage costs, this report utilizes data from past state and national studies. Future research could use purely Indiana data at the current time to update these cost values. Specifically, a new cost allocation study is needed to update the last (1988) Indiana Cost Allocation study. Such a future study would help restructure fees for legal operations (license fees) and extra-legal operations (permits) to provide an optimal balance between pavement damage and revenues.

In a future cost allocation study (to be possibly sequenced as shown in the figure above), it should be duly recognized that not all damage is due to traffic load, and that climate too plays a role because solar oxidation, precipitation, freezing and freeze-thaw transitions also play a role in the material degradation. The split between load and climate depends on facility type and material types, for example, 28-72% for flexible pavements. The proposed cost allocation study would need to identify the deterioration due to load before fairly allocating fees and permits.

- Focus on relevant infrastructure.** The overweight and oversize trucks often apply for permits to use certain stretches of highway only. The Indiana Department of Revenue possesses a 6,000-page document that lists all such roads. It would be beneficial to identify the road section that are involved, their respective frequencies of permit requests, and the loads requested for (average, maximums) over a 5- or 10-year period, and place such information

on a GIS platform, for monitoring purposes. Further, such information would be useful for identifying stretches of highway that should receive higher priority for rehabilitation or reconstruction in the overall state highway improvement program.

- *Route allocations.* Consistent with the previous point, it is suggested, through future research, to establish an internet-accessible color-coded scheme that shows the specific routes whose location and other issues can be accessed by OW/OS truckers. This would facilitate the identification of permitted routes for the benefit and convenience of the trucking industry.
- *Resolving the “Revenue vs. Cost” Conundrum.* As pointed out in a Texas study, the revenue collected from permit fees are far inadequate to cover the cost of damage done by the overweight vehicles. It is worthwhile to carry out a study to ascertain the extent to which this is true in Indiana. This would serve as a basis for updating the permit fee structures, not necessarily to increase the overall fee, but to introduce greater equity in the permit structure. This can be addressed in a future cost allocation study.
- *Changing thresholds over time.* For a given pavement or bridge in its newly constructed state, the impact of an overweight truck may not be deleterious. However, for that same infrastructure in its advanced age at a future date, overweight truck loads could be particularly damaging because the pavement or bridge has experienced some deterioration and thus is less resilient to external stress. Thus, the overweight thresholds could be considered as dynamic rather than static. For dynamic permitting schemes to work properly, pavement and bridge engineers will need to continually monitor the health of highway assets through regular deflection measurements and load ratings, for example, or to update these indicators of structural condition using appropriate empirical models.
- *Permit fee tie-in to infrastructure condition.* Pursuant to the previous point, permit fees could be increased or decreased depending on the condition (or age) of the infrastructure. Note that the deterioration of infrastructure is not linear but starts gently in early life, accelerates sharply in mid-life, and tapers off gently in old age. As such, lower fees could be charged when the facility is in the middle age and higher fees when it is in its old age. Undoubtedly, such a dynamic pricing scheme could add complexity to the permit fee structure.
- *Axle weights vs. GVW.* Issuance of permits on the basis of axle weights instead of gross vehicle weights would mean a drastic overhaul of the permitting system in Indiana. However, this practice may very well add greater equity to the system, allow trucks to carry greater weights, reduce pavement damage, and yield greater revenue at the same time. Research is therefore needed to determine the appropriate amounts to charge if this system were adopted

by the state, and also to assess the consequences of such a new system in terms of the revenue and pavement damage costs.

- *Compliance Monitoring.* The current truck monitoring system based on blue tooth technology only monitors the location or distance travelled but does not provide information on the number of axles or weights at a given time and location, and thus does not identify instances of weight violations particularly those committed by flexible-axle trucks that raise their axles. Future research will be needed to address this issue so that INDOT and INDOR are provided a mechanism to properly monitor the movements and intensities of extra-legal vehicles on a real-time or at least, near real-time basis.
- *Assessing increases in agency cost.* Changes in truck OW/OS permitting could translate into additional costs of monitoring, such as the purchase of new equipment and administration costs associated with new procedures, recruitment of new technical persons, purchase of new software packages. Future research could establish the extent of such cost increases that would be expected as a result of the implementation of the different possible permit structures.

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APPENDICES

APPENDICES

Appendix 1: Exceptions to OSW Regulations in Indiana

Appendix 2: Methods for Acquiring Permits in the State of Indiana

Appendix 2B: Indiana Special-weight Single Trip Application Form

Appendix 3: List of Indiana Permits and Fees

Appendix 4: States of Practice – Neighboring States

Appendix 4A. Illinois DOT Maximum Weights and Dimensions

Appendix 4B. Illinois DOT Fees for Oversize Permits that fall within the Practical Maximums

Appendix 4C. Illinois DOT Fees for Oversize/overweight Permits that fall within the Practical Maximums

Appendix 4D. Illinois DOT Fees for Overweight Axle Only Permits

Appendix 4E. Kentucky- OW/OD Permit Fees and Specifications

Appendix 4F. Michigan OW/OD Permits and Specifications

Appendix 4G. Ohio OW/OD Permit Fees

Appendix 4H. Minnesota OW/OD Permit Fees

Appendix 4I. Wisconsin OW/OD Permit Fees

Appendix 4J. Missouri OW/OD Permit Fees

Appendix 4K. Iowa OW/OD Permit Fees

Appendix 5: The Special Case of Oregon

Appendix 6: Unit Pavement Costs (Usdot, 2000)

APPENDIX 1: EXCEPTIONS TO OSW REGULATIONS IN INDIANA

There are certain exemptions from oversize/overweight permits. When traveling on any road other than an interstate highway, certain vehicles are exempt from the permitting requirements. They include:

1. A vehicle engaged in the construction of highways, when the movement of the vehicle is confined to highways, roads, or sections that are under construction and not yet open to the public. The only exception to this would be if the authority having jurisdiction over the construction of a public highway gives notice that a permit is needed.
2. Machinery or equipment used in highway construction or maintenance by the Indiana Department of Transportation, or by Indiana counties or municipalities.
3. Implements of agriculture when used during farming operations or when so constructed that the implements can be moved without material damage to highways.
4. The width or height of a farm vehicle loaded with a farm product. This includes a truck hauling unprocessed tobacco leaf.
5. Fire-fighting apparatus owned or operated by a political subdivision or volunteer fire company.
6. The movement of a disabled vehicle or combination of vehicles for a distance that does not exceed fifty (50) highway miles by a registered recovery vehicle or by a vehicle described in MCSD (2008) is exempt from the dimension and weight limits under this article.

Source: Oversize-Overweight Vehicle Permitting Handbook, Permit Unit,
Motor Carrier Services Division, Indiana Department of Revenue, Indianapolis, IN.
<http://www.in.gov/dor/files/osowhandbook.pdf>

APPENDIX 2A: LIST OF INDIANA PERMITS AND FEES

List of Permits and Fees

Any questions that you have regarding information in this handbook should be directed to:

Indiana Department of Revenue
Permit Unit
5252 Decatur Boulevard, Suite R
Indianapolis, IN 46241
(317) 615-7320

All permit applicants must file Form M-203, Transporting Company Permit Application!

Category	Type	Forms	Single Trip Fee	90 Day Fee	Annual Fee
Oversize Permit	Single Trip 90 Day Annual	M-233, Permit M-233, Permit M-233, Permit	\$20: up to 95' in length, 12'4" wide & legal height \$30: between 96' and 110' in length, 12'5" and 16' wide or 13'7" and 15' tall \$40: over 110' in length, 16' wide, 15' tall and 80,000 pounds	\$100	\$405
Overweight Permit	Single Trip (15 Days)	M-233, Permit	\$20 + \$.35 per mile for vehicles up to 108,000 lbs. *\$20 + \$.60 per mile for vehicles over 108,000 to 150,000 lbs. **\$20 + \$1.00 per mile for vehicles over 150,000 lbs.		
Oversize & Overweight Permit	Single Trip (15 Days)	M-233, Permit	Greater of the oversize or overweight fee calculated above		
Special Weight Permit	Multiple Trip (1 Day) Quarterly billing	M-233ST, Permit M-211, Registration M-219, Bond Form	\$42.50		
12'4" Mobile Home Rig Permit	Single Trip (15 Days) Annual Quarterly Dealer's	M-233, Permit M-233DR, Permit	\$10.00	\$250.00	\$1000.00 \$40.00 for dealers.
14'4" Mobile Home Rig Permit	Single Trip (5) Days Quarterly Annual	M-233, Permit	\$18.00	\$500.00	\$2000.00
Toll Road Gate Permit	Annual	M-233T, Permit			\$20 per gate, per truck.

* Vehicles over 120,000 lbs charged \$10 executive fee.

** Vehicles over 200,000 lbs charged \$10 executive fee + \$25 design and review fee + bridges fees.

Source: Oversize-Overweight Vehicle Permitting Handbook, Permit Unit,
Motor Carrier Services Division, Indiana Department of Revenue, Indianapolis, IN.

<http://www.in.gov/dor/files/osowhandbook.pdf>

APPENDIX 2B: INDIANA SPECIAL-WEIGHT SINGLE-TRIP APPLICATION FORM

FORM M-233ST SF# 944 (R6/11-07)	Indiana Department of Revenue Special Weight Single Trip Application	Fee: \$42.50
(1) Name of Transporting Company: _____			
(2) Street Address _____		City: _____	State: _____
ZIP: _____			
(3) Start Date <input style="width: 100px; height: 20px;" type="text"/>	(4) Start Time <input style="width: 100px; height: 20px;" type="text"/>	(5) Fax Number <input style="width: 200px; height: 20px;" type="text"/>	
(6) State Plated <input style="width: 50px; height: 20px;" type="text"/>	(7) Make of Tractor <input style="width: 100px; height: 20px;" type="text"/>	(8) Model Year: <input style="width: 50px; height: 20px;" type="text"/>	(9) Full Vehicle Identification Number <input style="width: 250px; height: 20px;" type="text"/>
(10) License Plate Number <input style="width: 200px; height: 20px;" type="text"/>		(11) Vehicle Type ☐ Truck-Trailer ☐ Tractor-Trailer ☐ Other Towed	
Overall Length: Legal		Overall Width: Legal	
Overall Height: Legal			
<p>Allowable Weights: Single axle weight must not exceed 18,000 pounds per axle; no axle in any axle combination may exceed 13,000 pounds per axle, with the exception of one tandem group that may weigh 16,000 pounds per axle or a total of 32,000 pounds. The maximum gross weight must not exceed 134,000 pounds for routes 1-21 below and 90,000 lbs for route 22 below; axle spacings may not be less than 3'6" between each axle in an axle combination; axle spacings may not be less than 8 feet between each axle or axle combination; weight per inch width of tire measured between flanges of rim shall not exceed 800 pounds.</p>			
<p>The provisions on the reverse side of this form are incorporated by reference into this permit and are as fully binding upon the permittee as if they had appeared on the face of this permit. This permit is void or invalid if the provisions are omitted from the reverse side of this form or are not attached.</p>			
<p>The Permit is Valid Over State Roads: (1) US 41, from 129th Street in Hammond to SR 312, (2) Highway 312, from Highway 41 to State Road 912, (3) Highway 912, from Michigan Avenue in East Chicago to the U.S. 20 interchange, (4) Highway 20, from Clark Road in Gary to Highway 39, (5) Highway 12, from one-fourth (1/4) mile west of the Midwest Steel entrance to Highway 249, (6) Highway 249, from Highway 12 to Highway 20, (7) Highway 12, from one and one-half (1 1/2) miles east of the Bethlehem Steel entrance to Highway 149, (8) Highway 149, from Highway 12 to a point thirty-six hundredths (.36) of a mile south of Highway 20, (9) Highway 39, from Highway 20 to the Michigan state line, (10) Highway 20, from Highway 39 to Highway 2, (11) Highway 2, from Highway 20 to Highway 31, (12) Highway 31, from the Michigan state line to Highway 23, (13) Highway 23, from Highway 31 to Olive Street in South Bend, (14) Highway 35, from South Mott Parkway thirty-four hundredths (.34) of a mile southeast to the point where Highway 35 intersects with the overpass for Highway 20/Highway 212, (15) State Road 249 from U.S. 12 to the point where State Road 249 intersects with Nelson Drive at the Port of Indiana, (16) State Road 912 from the 15th Avenue and 169th Street interchange one and six hundredths (1.06) miles north to the U.S. 20 interchange, (17) U.S. 20 from the State Road 912 interchange three and seventeen hundredths (3.17) miles east to U.S. 12, (18) U.S. 6 from the Ohio State line to State Road 9, (19) U.S. 30 from Allen County/Whitley County Line Road (also known as County Road 800 East) to State Road 9, (20) State Road 9 from U.S. 30 to U.S. 6, (21) State Road 39 from Interstate 80 to U.S. 20, (22) State Road 3 north from U.S. 6 to U.S. 20, U.S. 20 west from State Road 3 to State Road 9, State Road 9 north from U.S. 20 to the Michigan state line.</p>			
<p><i>No other routes, including detours, are authorized by this permit under any condition.</i></p>			
<p>This permit is valid only for transporting commodities under the company name shown above, and if signed by both an authorized company owner or officer, and driver. The driver's signature attests to the fact that the description of the vehicle is accurate and that the provisions on the reverse side of this permit have been read and understood by the driver. Under the penalty of perjury, I have examined this permit, and to the best of my knowledge and belief, it is true, complete and correct. I also understand that all provisions of the Transporting Agreement apply in full force.</p>			
_____ Company Owner or Responsible Officer		_____ Driver's Signature	_____ Date
_____ Company Owner or Responsible Officer		_____ Driver's Signature	_____ Date

APPENDIX 3: METHODS FOR ACQUIRING PERMITS IN THE STATE OF INDIANA

(a) Internet

This is the newest mechanism for permit acquisition. It was designed by INDOR to further facilitate the permitting process and to make it convenient for the trucking organizations. The applicant applies for the permit online. INDOR uses the internet-based Oversize/Overweight Vehicle Permitting System. To register special weights, the applicant visits the OSW webpage, clicks on "Special Weight Vehicle Registration", selects the year they are registering for and add their vehicle information including the full VIN number. After adding all their vehicles, the applicant pays the \$25 registration fee before ordering any Special Weight permits. After entering and registering all their vehicles, the applicant will just need to renew their Special Weight Registration annually. The applicant may also add, edit or delete trucks at any time at no additional cost. To order a special weight permit the vehicle must be registered.

At any time, the applicant may check the status of their permit applications by log into their account and finding a section labeled "My Recent Applications". On clicking that link, the resulting screen will show all the Applicant's recent permit applications and the status of each application, as well as any review needed by the Indiana State Police (for escorting needs) or by an INDOT engineer (for overload analysis).

There are two ways for applicants to check/know that their permits are ready: (i) go to their computer and periodically sign in and check their account. Looking under the "View Approved Permits" screen, the applicant will find all permits that are approved and ready to be paid, issued and printed, (ii) receiving an email message each time one of the applicant's permits is approved. Once the applicant receives the email, they can log into the system, pay for, and print their permit.

(b) Permitting Service

Applicants for trucks permits in Indiana may also go through a number of companies nationwide that offer active permit services. A list of these companies is provided by the Indiana Department of Revenue.

(c) Mail

Applicants may order an Indiana oversize/overweight vehicle permit by first entering into a written agreement with Indiana. They complete form M-203 (Transporting Company Permit Application) and fax the completed form to (317) 821-2336, or mail to Motor Carrier Services, 5252 Decatur Boulevard, Suite R, Indianapolis, IN 46241.

(d) Walk In

Applicants may personally visit the offices of the Permit Unit of the Indiana Motor Carrier Services at 5252 Decatur Boulevard, Suite R, Indianapolis, to apply for a permit.

(e) Fax

Source: Indiana Oversize/Overweight Permitting System – Final Report and User Manual, Permit Unit, Motor Carrier Services Division, Indiana Department of Revenue, Indianapolis, IN.

<http://www.in.gov/dor/files/osw-manual.pdf>

APPENDIX 4 – STATES OF PRACTICE – NEIGHBORING STATES

Appendix 4A. Illinois DOT Maximum Weights and Dimensions

**Illinois Department
of Transportation**

**Maximum Legal
Dimensions & Weights**
On State, Federal & Local Routes

TABLE I: Maximum legal dimensions of motor vehicles

TYPE OF HIGHWAY OR STREET	MAXIMUM LEGAL DIMENSIONS											MAXIMUM WEIGHTS		
	A	B	C	D	E	F ⁴	G	H	I	J	K	SINGLE AXLE	TANDEM AXLE ²	GROSS ³
CLASS I	8' - 6"	13' - 6"	42'	N.S.	53'	45' - 6"	N.S.	N.S.	28' - 6"	N.S.	60'	20,000	34,000	II
CLASS II	8' - 6"	13' - 6"	42'	N.S.	53'	45' - 6"	N.S.	N.S.	28' - 6"	65'	60'	20,000	34,000	II
CLASS III	8'	13' - 6"	42'	65' ¹	53'	42' - 6"	55' ¹	60'	N.S.	N.S.	60'	20,000	34,000	II
OTHER STATE HIGHWAY	8'	13' - 6"	42'	65' ¹	53'	42' - 6"	55' ¹	60'	N.S.	N.S.	60'	18,000	32,000	III
LOCAL ROADS AND STREETS	8'	13' - 6"	42'	55'	N.S.	N.S.	N.S.	60'	N.S.	N.S.	60'	18,000	32,000	III

N.S. indicates legal dimension not specified.

Notes:

- 65 feet overall length (bumper to bumper) and/or 55 feet from center of front axle to center of rear axle.
- Tandem is defined as any 2 or more single axles whose centers are more than 40 inches and not more than 96 inches apart, measured to the nearest inch between extreme axles.
- See tables II and III.
- Applies on semitrailers longer than 48 feet.

Exceptions to WIDTH requirements above:

- Does not include certain safety devices approved by Department.
- Household goods carriers shall have access to points of loading and unloading and may have a maximum width of 8 feet 6 inches.
- A maximum width of 8 feet 6 inches is allowed on any street or highway to any point of loading or unloading for vehicle combinations that include a trailer or semitrailer not exceeding 28 feet 6 inches in length, which was originally part of a truck tractor-semi-trailer-trailer combination (double-bottom).
- Width restrictions do not apply to vehicles transporting implements of husbandry operating in the daytime. Loads of hay, straw or other similar farm products are limited to a maximum of 12 feet.

Exceptions to LENGTH requirements above:

- Length limits do not apply to vehicles operating in the daytime except on Saturdays, Sundays or legal holidays when transporting poles, pipes, machinery or other objects of a structural nature which cannot be readily dismembered, provided the length of the object being transported does not exceed 80 feet and the overall length of the load does not exceed 100 feet.
- Stinger-steered vehicles specifically designed to transport motor vehicles or boats may have an overall length of 75 feet plus overhang of 3 feet in front and 4 feet in the rear on Class I and II highways.
- Conventional auto transporters are vehicles specifically designed to transport motor vehicles or boats may have an overall length of 65 feet plus overhang on these highways. The maximum overall length on all other streets and highways is 60 feet.

General exceptions to above Table:

- All large vehicles operating on Class I highways shall have access for a distance of one mile on any street or highway to points of loading and unloading, and facilities for food, fuel, rest and repair.
- Large vehicles operating on designated state highways shall have access for a distance of 5 highway miles on any other state highway and on designated local streets and highways, to points of loading and unloading, and facilities for food, fuel, rest and repair. (This applies only on local streets and highways specifically designated and posted by local officials.)
- Permits may be issued for overdimensional objects and vehicles if they have been reasonably disassembled. Multiple objects loaded side-by-side, end-to-end, or on top of each other may not cause the overdimension.
- Streets or highways are designated by the Department of Transportation or local officials having jurisdiction.

Continued...

Special Haul Vehicles See Table IV for additional information on Special Haul Vehicles	Type of Highway or Street	Maximum Legal Dimensions											Maximum Weights		
		A	B	C	D	E	F	G	H	I	J	K	Single Axle	Tandem Axle	Gross
		8'6" ^①	13'6" ^①	42' ^①	N.S. ^②	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	60' ^③	20,000 ^③	See ^④	See ^⑤

Special Haul Vehicles

Notes:

- 8' on Class III, Other State Highways, Local Roads and Streets.
- 55' on Local Roads and Streets, 65' from designated State Highway (5 mile access law).
- 18,000 pounds on Other State Highways, Local Roads and Streets.
- Greater than 72" and not more than 96" may carry 18,000 pounds on each axle.
- Gross weight is determined by measuring to the nearest foot between extreme axles. ($\leq 42'$ see Table III, $>42'$ see Table II)

Maps of the designated state truck route system are available by calling 217/782-6271 and at www.gettingaroundillinois.com

TABLE II: Maximum gross weight for vehicles on Class I, II, and III highways of the designated state highway truck route system. Based on federal bridge formula. All special conditions and exceptions are not included on this form.

Maximum load in pounds on any 2 or more consecutive axles						Maximum loading for typical vehicles Vehicle or Combination Maximum Weight - Pounds	
Distance ^①	2 axles	3 axles	4 axles	5 axles ^②	6 axles ^②		
8	34,000	42,000					Axle 1 20,000
9	39,000	42,500					Axles 2,3 34,000
10	40,000	43,500					Axles 1,2,3 54,000
11		44,000					
12		45,000	50,000				Axle 1 20,000
13		45,500	50,500				Axle 2 20,000
14		46,500	51,000				Axles 3,4 34,000
15		47,000	51,500				Axles 1,2 40,000
16		48,000	52,500	58,000			Axles 2,3,4 54,000
17		48,500	53,500	58,500			Axles 1,2,3,4 66,000
18		49,500	54,000	59,000			
19		50,000	54,500	60,000			
20		51,000	55,500	60,500	66,000		Axle 1 20,000
21		51,500	56,000	61,000	66,500		Axles 2,3 34,000
22		52,500	56,500	61,500	67,000		Axles 4,5 34,000
23		53,000	57,500	62,500	68,000		Axles 1,2,3 50,000
24		54,000	58,000	63,000	68,500		Axles 2,3,4,5 68,000
25		54,500	58,500	63,500	69,000		Axles 1,2,3,4,5 80,000
26		55,500	59,500	64,000	69,500		
27		56,000	60,000	65,000	70,000		
28		57,000	60,500	65,500	71,000		Axles 1,2,3 50,000
29		57,500	61,500	66,000	71,500		Axles 2,3,4,5,6 67,500
30		58,500	62,000	66,500	72,000		Axles 1,2,3,4,5,6 80,000
31		59,000	62,500	67,500	72,500		
32		60,000	63,500	68,000	73,000
33			64,000	68,500	74,000		
34			64,500	69,000	74,500		
35			65,500	70,000	75,000		
36			66,000	70,500	75,500
37			66,500	71,000	76,000		
38			67,500	72,000	77,000		
39			68,000	72,500	77,500		
40			68,500	73,000	78,000
41			69,500	73,500	78,500		
42			70,000	74,000	79,000		
43			70,500	75,000	80,000		
44			71,500	75,500			
45			72,000	76,000			
46			72,500	76,500			
47			73,500	77,500			
48			74,000	78,000			
49				78,500			
50				79,000			
51				80,000			

See Table IV
for additional information
on Special Haul Vehicles

Notes:

- Measured to the nearest foot between the extremes of any group of two or more consecutive axles.
- Gross weights for 5 and 6 axles applicable only to a combination of vehicles.
- Two consecutive sets of tandems may carry 34,000 pounds each providing the overall distance between the first and last axles of such consecutive sets of tandems is 36 feet or more.
- If the distance between the centers of the first and third axles in a group of consecutive axles does not exceed 96 inches, the group is a tandem.
- Maximum single axle 20,000 pounds; maximum tandem 34,000 pounds.
- Combinations of vehicles designated as special haul vehicles which include a semitrailer manufactured prior to the model year 2004 and first registered in Illinois prior to January 1, 2005 having five axles with a distance of 42 feet or less between extreme may have a gross weight of 72,000 pounds provided the weight shall not exceed 18,000 pounds on a single axle or 32,000 pounds on a tandem. For such combinations manufactured subsequent to September 9, 1986, the minimum distance between the first and last axles of the two sets of tandems must be 18 feet 6 inches or more.
- Permits may be issued for an overweight load providing it consists of one object that cannot be reasonably dismantled or disassembled.

Continued...

TABLE IV: Special Axle and Gross Weight Allowances for Special Haul Vehicles **Designated Truck Route System (Class I, II & III State Highways)**

- A. 18,000 lbs. on each axle - total of 36,000 lbs.
- B. See Table II
- C. See Table II
- D. Gross weight of 72,000 lbs., provided the weight shall not exceed 18,000 lbs. on a single axle or 32,000 lbs. on a tandem.

* This requirement does not apply to semitrailers manufactured before September 9, 1986.

Note: •Special Hauling Vehicles must meet width, height and length requirements as specified in Table I.

•4-axle concrete mixers are allowed the following maximum weights: 20,000 lbs. on any single axle; 36,000 lbs. on any series of 2 axles greater than 72 inches but not more than 96 inches; and 34,000 lbs. on any series of 2 axles greater than 40 inches but not more than 72 inches.

Other State Highways and Local Roads & Streets

- A. 18,000 lbs. on each axle - total of 36,000 lbs.
- B. See Table III
- C. See Table III
- D. Gross weight of 72,000 lbs, provided the weight shall not exceed 18,000 lbs. on a single axle or 32,000 lbs. on a tandem.
- E. 18,000 lbs. on each axle - total of 36,000 lbs.

Source: Informational Forms, IDOT Oversize/Overweight Permit Office, Springfield IL
<http://www.dot.il.gov/road/infoforms.html>

Continued...

Appendix 4B. Illinois DOT Fees for overdimension-only permits that fall within the Practical Maximums

TABLE 1. OVERDIMENSION FEE CATEGORIES

Category	Dimensions	Distances - Single Trip Fees				Limited Continuous Operation Permit
		0 to 90 mi	91 to 180 mi	181 to 270 mi	Over 270 mi	
a	10' wide or less 14' -6" high or less 70' long or less	\$12	\$15	\$18	\$21	\$100
b	12' wide or less 14' 6" high or less 85' long or less	\$15	\$20	\$25	\$30	\$150
c	14' wide or less 15' high or less 100' long or less Mobile home combinations 85' long or less*	\$25	\$30	\$35	\$40	Not available
d	18' wide or less** 16' high or less 120' long or less	\$30	\$40	\$50	\$60	Not available
e	More than 18' wide** More than 16' high More than 120' long	\$50	\$75	\$100	\$125	Not available

*Mobile home combinations greater than 85' long, use Category d.

**Permits available only for limited distances as indicated in Section 554.505 (d)

Source: Informational Forms, IDOT Oversize/Overweight Permit Office, Springfield IL
<http://www.dot.il.gov/road/infoforms.html>

Continued...

Appendix 4C. Illinois DOT Fees for overdimension/overweight permits that fall within the Practical Maximums

TABLE 2 - OVERWEIGHT FEE CATEGORIES*

Category	f	g	h	i	j	k	l	m	n	o	p	q	r
Total Axles	6 or more	6 or more	6 or more	6 or more	5	5	5	4 or more	4 or more	3 or more	3 or more	2	2
Gross Weight (max)	88,000	100,000	110,000	120,000	88,000	100,000	100,000	72,000	76,000	60,000	68,000	48,000	54,000
Front tandem or axle (max)/axles	34,000/2	44,000/2	44,000/2	48,000/2	44,000/2	44,000/2	48,000/2	34,000/2	44,000/2	21,000/1	21,000/1	25,000/1	28,000/1
Rear tandem or axle (max)/axles	48,000/3	54,000/3	54,000/3	60,000/3	44,000/2	44,000/2	48,000/2	40,000/2	44,000/2	40,000/2	48,000/2		
DISTANCE													
0 TO 45 MILES	\$10	\$15	\$20	\$30	\$20	\$30	\$30	\$15	\$20	\$12.50	\$20	\$15	\$20
46 to 90 mile	\$12.50	\$25	\$32.50	\$55	\$32.50	\$55	\$55	\$25	\$32.50	\$21.50	\$32.50	\$25	\$32.50
91 to 135 mile	\$15	\$35	\$45	\$80	\$45	\$80	\$80	\$35	\$45	\$30.50	\$45	\$35	\$45
136 TO 180 mile	\$17.50	\$45	\$57.50	\$105	\$57.50	\$105	\$105	\$45	\$57.50	\$39.50	\$57.50	\$45	\$57.50
181 TO 225 mile	\$20	\$55	\$70	\$130	\$70	\$130	\$130	\$55	\$70	\$48.50	\$70	\$55	\$70
226 TO 270 mile	\$22.50	\$65	\$82.50	\$155	\$82.50	\$155	\$155	\$65	\$82.50	\$57.50	\$82.50	\$65	\$82.50
271 to 315 mile	\$25	\$75	\$95	\$180	\$95	\$180	\$180	\$75	\$95	\$66.50	\$95	\$75	\$95
316 to 360 mile	\$27.50	\$85	\$107.50	\$205	\$107.50	\$205	\$205	\$85	\$107.50	\$75.50	\$107.50	\$85	\$107.50
361 to 405 mile	\$30	\$95	\$120	\$230	\$120	\$230	\$230	\$95	\$120	\$84.50	\$120	\$95	\$120
406 to 450 mile	\$32.50	\$105	\$132.50	\$255	\$132.50	\$255	\$255	\$105	\$132.50	\$93.50	\$132.50	\$105	\$132.50
451 to 495 mile	\$35	\$115	\$145	\$280	\$145	\$280	\$280	\$115	\$145	\$102.50	\$145	\$115	\$145

*Fee includes all overweight, all overlength, and 12 feet or less in width.
For loads greater than 12 feet wide, add \$15 to the fee indicated in this Table.

p:\winword\table2.doc\cfs2\bha\mad\10\3\96

Source: Informational Forms, IDOT Oversize/Overweight Permit Office, Springfield IL
<http://www.dot.il.gov/road/infoforms.html>

Continued...

Appendix 4D. Illinois DOT Fees for overweight axle only permits

TABLE 3. FEES FOR OVERWEIGHT AXLES (GROSS LEGAL)*

Axle Weight in Excess of Legal	Fees for Each 45 Mile Increment		
	Single Axle	2-Axle Tandem	3-Axle Tandem
1 -6,000 lbs.	\$5	\$5	\$5
6,001 -11,000 lbs.	\$8	\$7	\$6
11,001 -17,000 lbs.	N.A.	\$8	\$7
17,001 -22,000 lbs.	N.A.	N.A.	\$9
22,001 -29,000 lbs.	N.A.	N.A.	\$11

*Fee does not include any over dimension. If load is over dimension, add fee from Table 1.

TABLE 4. MISCELLANEOUS MOVES

Overweight 2-5 axle trucks carrying agricultural commodities including but not limited to corn, soybeans, wheat, oats, grain sorghum, canola, rice, livestock, insilage, fruits and vegetables.

\$5.00 per axle

Repeated overweight and/or over dimension moves directly across a highway, each vehicle.

\$15.00

Revised 4/05

Source: Informational Forms, IDOT Oversize/Overweight Permit Office, Springfield IL
<http://www.dot.il.gov/road/infoforms.html>

Appendix 4E. Kentucky- OW/OD Permit Fees and Specifications

Trip Permit	\$ 60 ea
Annual Permits	
Non-divisible-less than 14 ft. wide	\$250 ea
Non-divisible-14 ft. to 16 ft. wide	\$500 ea
Steel-35 mile limit	\$250 ea
Steel-statewide	\$500 ea
Farm-less than 14 ft. wide	\$ 80 ea
Farm-14 ft. to 16 ft. wide	\$150 ea
Industrial Haul	\$ 20 ea

The following dimensions are legal on Interstate and Designated Highways:

Width:	8ft 6in
Height:	13ft 6in
Length:	53ft trailer or load (overhang cannot exceed 5ft), any size tractor permitted

Once off the Designated Highway System, legal dimensions are:

Width:	8ft 0in
Height:	13ft 6in
Length:	65ft overall (tractor & trailer)

Source: Overweight/Overdimensional Home page, Division of Motor Carriers Home Page
http://dmc.kytc.ky.gov/owod/owod_permits_and_specs.htm

Appendix 4F. Michigan OW/OD Permits and Specifications

MAXIMUM LEGAL TRUCK LOADINGS AND DIMENSIONS

MAXIMUM OVERALL DIMENSIONS

Width	96 inches
Width (designated highways).....	102 inches
Height	13 feet, 6 inches
Length of semitrailer (including load).....	53 feet
Length of a semitrailer (including load) NONDESIGNATED HIGHWAY.....	50 feet
Length of combination of truck-tractor and semitrailer with or without load	No limitation
Length of any other vehicle with or without load (excluding impact absorbing bumpers).....	40 feet
Units permitted in train.....Truck-tractor, semitrailer and trailer or truck- tractor and 2 semitrailers or truck and semitrailer or trailer.	
Length of a combination of truck-tractor, semitrailer, trailer or truck-tractor and 2 semitrailers or truck and semitrailer or trailer with or without load or pickup truck, semitrailer designed for recreational living purposes, and additional trailer/semitrailer (see exceptions) 65 ft	
Semitrailers longer than 50 feet shall have a wheelbase of 37 feet to 41 feet (measured from the kingpin coupling to the center of the axles or to the center of the tandem axle assembly if equipped with 2 axles).	
Semitrailers longer than 50 feet are limited to 3 axles.	
Semitrailers longer than 50 feet shall operate on designated highways only.	
Semitrailers and trailers shall be measured from the front vertical plane of the foremost transverse load supporting structure to the rearmost transverse load supporting structure.	
Length shall not include safety and energy conservation devices including, but not limited to, impact absorbing bumpers, rear view mirrors, turn signal lamps, marker lamps, steps and hand holds for entry and egress, flexible fender extensions, mud flaps or splash and suppressant devices, load induced tire bulge, refrigeration or heating units, or air compressors. A device shall be excluded from a determination of length only if it is not designed or used for the carrying of cargo.	
Projection beyond front of vehicles	3 feet
Overhang beyond rear of vehicles Any amount is permissible if the legal length is not exceeded. However, if this overhang is 4 feet or more, there shall be displayed on the extreme rear of such a load a 12 - inch red square flag in the daytime and a red light or lantern at night.	
Axle limitation	A combination of vehicles shall not exceed 11 axles.

Source: Maximum Legal Truck Loadings and Dimensions – Rules and Guidelines
Michigan Department of Transportation, Lansing, MI.
http://www.michigan.gov/documents/Loads_dim_87014_7.pdf

Continued...

PERMITS BY TYPE**Prefabricated Items (Structural Steel, Trusses, Tanks, Awnings, etc.)****Single Trip Permits**--[Form 2258](#)

Limited to a maximum of:

- 16 feet in width
- 15 feet in height
- 150 feet in overall combination length

Extended Permits – [Form 2266](#)

Limited to a maximum of:

- 12 feet 6 inches in width
- 14 feet in height
- 85 feet in overall combination length

Boats**Single Trip Permits** [Form 2258](#)

Limited to a maximum of:

- 16 feet in width
- 15 feet in height
- 150 feet in overall combination length

Extended Permits – [Form 2266](#)

Limited to a maximum of:

- 12 feet 6 inches in width
- 14 feet in height
- 85 feet in overall combination length

Construction Equipment (Bulldozers, Mobile Cranes, Crawler Cranes, etc.)**Single Trip Permits**

Limited to a maximum of:

- 16 feet in width
- 15 feet in height

Continued...

Extended Permits – [Form 2282](#)

Limited to a maximum of:

- 12 feet 6 inches in width
- 14 feet in height
- 85 feet in overall combination length
- 24,000 pounds per axle and a gross weight limitation of 150,000 pounds.

Empty rubber tired self-propelled scrapers, loaders, dozers, and two axle mobile cranes, limited in weight to the gross limitation of 150,000 pounds only (not to exceed 700 pounds per inch of tire width).

Farm Equipment**Single Trip Permits**

Permits will be required for all movements of implements of husbandry when loaded onto a trailer. A permit is not required when farm equipment is being driven or towed.

Limited to a maximum of:

- 16 feet in width
- 15 feet in height
- 150 feet in overall combination length

Extended Permits – [Form 2270](#)

Permits will be required for all movements of implements of husbandry when not involved in normal farming operations and loaded. A permit is not required when farm equipment is being driven or towed.

Limited to a maximum of:

- 15 feet 6 inches in width
- 14 feet in height
- 80 feet in overall combination length

Continued...

Mobile Home Frames

Single Trip Permits

Limited to a maximum of:

- 16 feet in width
- 80 feet in length of frame, excluding tongue
- 105 feet in overall combination length

The width of the load shall not exceed the width of the widest frame. Staggered loading in length not permitted.

Extended Permits – [Form 2272](#)

Limited to a maximum of:

- 12 feet in width
- 80 feet in length of frame, excluding tongue
- 95 feet in overall combination length

Poles, Pipe & Similar Type Loads

Single Trip Permits

Limited to a maximum of:

- 16 feet in width
- 15 feet in height
- 150 feet in overall combination length

Extended Permits – [Form 2268](#)

Limited to a maximum of:

- 8 feet in width
- 13 feet 6 inches in loaded height
- 85 feet in overall combination length

Continued...

PERMIT FEES

Single Trip Permit – [Form 2258](#) (this form is provided as a convenience-- Single Trip permit applications are submitted electronically via the [MIPARS software](#))

- \$15.00 For a permit which is legal in weight.
- \$50.00 For a permit which is over legal axle weight limits.

Extended Permits

Extended Permit Type	Click to Download Form Number
Agricultural	Form 2270
Mobile Home	Form 2272
Construction	Form 2282
Milk	Form 2285
Logs Raw Forest—w/ Plates Rubbish Snow Removal Wrecker Miscellaneous	Form 2266
Pipe/Pole	Form 2268

Application forms may also be downloaded from <http://www.mdot.state.mi.us/webforms>

Renewal Fees:

- \$30.00 for Legal Axle Weight-- Oversize Only
- \$100.00 for Overweight and/or oversize

New Applications:

Please Call: (517) 373-2120 for Fee Schedule

Extended Permits (annual) are issued by mail from the Lansing office only

Source: Moving Oversize or Overweight Vehicles and Loads – Rules and Guidelines,
Michigan Department of Transportation, Lansing, MI.
http://www.michigan.gov/documents/MDOT_MoveOS_OW_T2_92127_7.pdf

Appendix 4G. Ohio OW/OD Permits and Specifications

OHIO**SPECIAL HAULING PERMIT FEE SCHEDULE**

Effective July 1, 2009

<u>PERMIT TYPE</u>	<u>ROUTINE WEIGHTS / DIMENSIONS</u>		<u>SUPERLOAD WEIGHTS / DIMENSIONS</u>	
	<u>One Way</u>	<u>& Return</u>	<u>One Way</u>	<u>& Return</u>
<u>SINGLE TRIP</u>				
OS Only	\$65	\$100	\$135	\$200
OS/OW	\$135	\$200	\$135 + TM**	\$200 + TM**
Steel Coil	\$65	N/A*	N/A*	N/A*
Multi-State OS Only	\$65	N/A*	N/A*	N/A*
Multi-State OS/OW	\$135	N/A*	N/A*	N/A*
Emergency	\$250	\$365	N/A*	N/A*
<u>CONTINUING (90 DAY)</u>				
OS Only	\$250	\$375	N/A*	N/A*
OS/OW	\$500	\$750	N/A*	N/A*
Steel Coil	\$125	N/A*	N/A*	N/A*
Michigan Legal	\$125	\$125	\$165	\$165
<u>CONTINUING ANNUAL (365 DAY)</u>				
OS Only	\$970	\$1,170	N/A*	N/A*
OS/OW	\$1,970	\$2,970	N/A*	N/A*
Steel Coil	\$470	N/A*	N/A*	N/A*
Michigan Legal	\$470	\$470	\$630	\$630
<u>BLANKET PERMITS (365 DAY)</u>				
Boat	\$100	Included	N/A*	N/A*
Construction Equipment	\$100	Included	N/A*	N/A*
Farm Equipment	\$100	Included	N/A*	N/A*
Manufactured Building	\$100	Included	N/A*	N/A*
Marina	\$100	Included	N/A*	N/A*
<u>REVISIONS***</u>				
All Permits	\$10	\$10	\$50	\$50

***If what you are revising will change the price of the original permit - you are required to apply for a new permit.

* N/A - Not Available
 ** TM - Ton Mile = ((GVW - 120,000)/2000) times \$0.04

Source: Special Hauling Permits Section (Oversize/Overweight Vehicles and Loads).

Ohio Department of Transportation, Columbus, OH.

<http://www.dot.state.oh.us/Divisions/HighwayOps/Maintenance/Permits/Pages/default.aspx>

Appendix 4H. Minnesota OW/OD Permits and Specifications

MINNESOTA

Annual and Seasonal Permit Chart

Permit Types	Permit #	Fee	Width	Height	Length	Weight
Farm Implement Oversize Only Farm machinery moved on one specific truck or truck-trailer combination.	69	\$24.00	14'0	13'6	45'0 Truck or 75'0 combo	Legal
Farm Machinery Oversize Only Farm machinery.	7	\$120.00	14'6	14'0	85'0	Legal
Farm Machinery Oversize Overweight Farm machinery.	Multiple	*	14'6	14'0	85'0	Max 145,000
Forest Products Must be a 6 or more axle combination, consisting of a truck tractor with a minimum 3 axles and a semi trailer with minimum 3 axles or 4 axle truck with 2 axle pup trailer. During Winter Weight Increase period potential GVW is 99,000 lbs with proper axle spacings. No travel on Interstate. Also includes finished forest products such as paper, pulp, oriented strand board, laminated strand lumber, hardboard, treated lumber, untreated lumber, barrel staves	73	\$300.00	8'6	13'6	75'0	90,000
Harvest Weight Increase (sugar beets, potatoes, carrots) First haul from the field of harvest to the first point of unloading up to 88,000 lbs. only on US and TH highways between October 1st 12:01 AM to November 30th 12:00 PM. Vehicle must be registered to haul this increased weight. No travel on Interstate.	3	\$60.00	8'6	13'6	75'0	88,000
Horse/Stock Trailers Must be NEW going from Manufacturer to the dealer. 3 vehicle combo for cargo horse or stock trailers, towed behind a truck tractor, truck or pickup (rated at 3/4 ton or above). All units must be empty. Trailers can not exceed 28'6"long. 1st trailer must have fifth wheel hookup. Travel only on NTN and MN Twin Trailer Routes.	63	\$120.00	8'6	13'6	75	Legal
Job Oversize Only Allows same type of non-divisible objects over one designated route. Must be used by the same permit user, with same vehicle, similar size and weights, with identical restrictions from/to one job site. Issued up to 60 days. Job Oversize Overweight Single Trip Permit. "Damage Assessment Fee" X number of moves + \$15.00 fee	75	\$36.00	Varies	Varies	Varies	Legal
Livestock Overweight is only allowed for the following three types of truck trailer combinations: (1) 3 axle truck tractor with a 3 axle semitrailer, (2) 4 axle truck tractor with a 2 axle "spread tandem" semitrailer, (3) 3 axle truck tractor with a 3 axle "Two- Four-Two" with semitrailer. (Minimum spacing between axle centers of the 1st and 3rd axle of the "two-four-two tridem" 9'1"). Max weights are 12,000 on steer axles 17,000 on each drive axle, and 43,000 total on the "two-four-two tridem" semitrailer with no single axle over 20,000. No travel on Interstate.		\$200.00	8'6	13'6	75'0	88,000

Continued...

Permit Types	Permit #	Fee	Width	Height	Length	Weight
Lowbed Semi trailer that is over 8'6" wide but less than 9'0" wide. Used for transporting farm machinery or construction equipment only.	49	\$120.00	9'0	13'6	75'	Legal
Mobile Crane Does not include truck-mounted crane.	Multiple	*	8'6	14'0	48'	Max 145,000
Mobile Home New and used homes. New homes for hire need a Drive Away-In Transit plate. Used homes within Minnesota require information on when taxes were paid, What county they were paid in, Auditor & Treasurer's name and date. Storage sheds are also included in this annual.	5	\$120.00	14'6	13'6	85'0	Legal
Non-Commercial Boat Hauler Allows the owner of an oversized boat to haul on MN State Trunk Highways. Issued only to the owner of Boat, Trailer & Vehicle pulling the trailer.	79	\$60.00	14'6	14'0	85'0	Legal
Pole Length Pulpwood Transporting pole length pulpwood with a gross vehicle weight of NOT more than 82,000 lbs on six axles and traveling only on non -Interstate Routes.	53	\$60.00	8'6	13'6	75'0	82,000
Rubbish Compactor A 2,3, or 4 axle motor vehicle having a device permanently mounted on the Truck that is used exclusively to compact refuse (22,000 single, 38,000 tandem & 46,000 tridem).	59	\$85.00	8'6	13'6	45'0	62,000
Snow Plow (Seasonal) Allows vehicles with snowplow blades up to a maximum of 10' wide between October 1st and April 1st.	89	\$60.00	10'	13'6	45'0	Legal
Studded Tire/ Mail Carrier (Seasonal) Provides use of studded snow tires for rural mail carriers of the United States Postal Service. They must provide proof they are employed by the US Postal Service, provide a map showing the delivery route, vehicle VIN number, and description of the vehicle. No more than 25% of the total mileage on the applicant's delivery route is allowed to be on paved roads. Permit is valid from November 1st, and expires 12:01 AM April 16th the following calendar year.	29	None	Auto or pickup 8'6	Auto or pickup 13'6	Auto or pickup 45'0	Legal
Ten Percent Winter Weight Increase (Seasonal) 10% weight increase based on the freezing index each winter. For Interstate Route travel only. Vehicle must be registered to haul this increased weight. Can have 10% overweight on Trunk Hwys without permit.	13	\$60.00	8'6	13'6	45'0 truck or 75'0 combo	88,000

Continued...

Permit Types	Permit #	Fee	Width	Height	Length	Weight
Three Unit Permit (Grand Rapids to Duluth Permit) Two 28'6" trailers, 108,000 GVW only on the following Routes - US2 between Grand Rapids to Port of Duluth, MN194 between US2 and US53, US 53 between Virginia and Port of Duluth and US169 between Grand Rapids and US53 at Virginia. No seasonal weight increase allowed.		\$850.00	8'6"	13'6"	45'0 truck or 75'0 combo	108,000
Tow Truck Allows tow trucks to exceed weight & length limitations of MN Statutes, Chapter 169 when towing a disabled or damaged vehicle to a place of repair or safekeeping. Permit covers all tow trucks owned by the applicant.		\$300.00	8'6"	13'6"	Not restricted	Not restricted
Two Unit Permit Semi-trailer not to exceed 53' with 43' kingpin setting. Only on routes - US2 between Grand Rapids and Port of Duluth, MN194 between US2 and US53, US53 between Virginia and Port of Duluth or US169 between Grand Rapids and US53 at Virginia. 90,000 on 6 axles 97,000 on 7 axles 98,000 seasonal weight increase.		\$850.00	8'6"	13'6"	45'0 Truck or 75'0 combo	90,000 on 6 axles 97,000 on 7 axles

* See Annual Overweight list below

90M LBS, GVW = \$200.00
100M LBS, GVW = \$300.00
110M LBS, GVW = \$400.00
120M LBS, GVW = \$500.00
130M LBS, GVW = \$600.00
140M LBS, GVW = \$700.00
145M LBS, GVW = \$800.00

Overweight Permits do not automatically increase vehicle registered weight. Permittee must increase vehicle registered weight with Dept. of Public Safety (Driver and Vehicle Services)

Source: Oversize/Overweight Permits, Minnesota State Permits for Commercial and Private Vehicles,
 Minnesota Department of Transportation, St. Paul, MN

<http://www.dot.state.mn.us/cvo/oversize/annualeasonalpermitchart.pdf>

Appendix 4 I. Wisconsin OW/OD Permits and Specifications

WISCONSIN

Single Trip Permit

Maximum size and weight for which a single trip permit may be granted:

Length - Single vehicle 50 ft. Mobile crane 60 ft.

The overall length, width and height of other loads depends on type of load.

If the spacing between adjacent axles is less than 42 inches, the axle can carry no more than a single axle.

Weight Limitation

Steering Axle
Any Other Axle
Additional weight limitations
may be imposed by route.

**Gross
Weight
In Pounds**
20,000
35,000

Mobile Homes and/or Modular Building Sections

Maximum size for which a single trip permit may be granted:

Overall Length 100 feet
Mobile Home or Modular Only 80 feet
Overall Width limitations
will be determined by route.

Insurance Requirements

The permittee shall have at least the following insurance coverage in full force and effect on the vehicle and load designated in the permit while operating on the public highway.

	Group A		Group B	
Bodily Injury Liability - each person	\$150,000		\$200,000	\$1,000,000
Bodily Injury Liability - each accident	450,000	OR	Combined	600,000
Property Damage Liability - each accident	300,000		Single Limit	400,000
				Combined Single Limit

Group A Applies when the permitted load does not exceed 12 feet in width, 13 1/2 feet in height, or 100 feet in length and does not exceed statutory gross weight limits by more than 25%.

Group B Applies when the permitted load exceeds the size and weight limitations in Group A.

Charges

- The fee shall accompany the application and shall be retained by the Department of Transportation only if a permit is issued.
- No charge shall be made for a change when an error was made by the issuing authority.
- All charges for the transmission of an application or a permit, other than by U.S. Mail, are in addition to the permit fee and are the responsibility of the applicant.
- No charge shall be made to any state department, county, town, municipality, or any branch of the United States Government or the Armed Services for any type of oversize/overweight permit.
- A charge of \$10.00 per district will be made when, by reason of the size or weight of the vehicle or load, the route must be reviewed by a regional highway office.
- A charge of \$10.00 per review will be made when, by reason of the gross weight of the vehicle and load, a review is necessary of specific highway structures.
- Permit fees are established by s.348.25 Wisconsin Statutes and Wisconsin Administrative Code Trans. 250.
- Make check payable to: Registration Fee Trust**

Fee Chart

Overlength Only	\$15.00
Overwidth OR Overheight (may include Overlength)	20.00
Overwidth AND Overheight (may include Overlength)	25.00

Overweight (Includes any oversize)

0 - 90,000 lbs.	\$20.00
90,001 - 100,000 lbs.	35.00
100,001 - 110,000 lbs.	45.00
110,001 - 120,000 lbs.	55.00
120,001 - 130,000 lbs.	65.00
130,001 - 140,000 lbs.	75.00
140,001 - 150,000 lbs.	85.00
150,001 - and up	85.00 plus \$10.00 per 10,000 lbs. or fraction thereof

Continued...

MULTIPLE TRIP PERMIT INFORMATION

For Nondivisible Oversize/Overweight Vehicles/Loads
MV2614 7/2005

Wisconsin Department of Transportation
OS/OW Permit Unit
PO Box 7980
Madison, WI 53707-7980

www.dot.wisconsin.gov/business/carriers/osowgeneral.htm

Direct online self-issuance or renewal of permit types AA and RF is now available.

Contact us at oversize-permits.dmv@dot.state.wi.us for instructions.

Nondivisible load permits issued under s.348.27 Wis. Stats. include permit types Annual (AA), Project (AP), and Mobile Home/Modular Building Sections (MH). Permits will be issued for power units only.

Size Limitations	Nondivisible Loads		
	Vehicles & Loads	Mobile Crane	Mobile Home/Modular Building Section
Single Vehicle Length	50'	60'	80'
Vehicle Combination Length	100'	75'	100'
Overall Width	14'	14'	15' at the Box; 16' at the Roof
Overall Height	16'	16'	15'

Gross Weight Limitations

Single Axle Limit = 20,000 Lbs.; Single Axle (4 Tires) Limit = 30,000 Lbs.; 2 - Axle Tandem (4 or 8 Tires) = 55,000 Lbs.; 2 - Axle Tandem (16 Tires) = 60,000 Lbs.; 3 - Axle Tandem = 70,000 Lbs.; 4 - Axle Tandem = 80,000 Lbs.

The total gross load permitted on any combination of single axles or tandem axle groups shall be reduced in proportion as the spacing between adjacent axles is less than 18 feet. Tandem axle means any 2 consecutive axles whose centers are 42 or more inches apart and which are individually attached to or articulated from a common attachment to the vehicle.

Insurance Requirements

	Group A		Group B	
Bodily Injury Liability - each person	\$150,000	\$750,000	\$200,000	\$1,000,000
Bodily Injury Liability - each accident	450,000	OR Combined	600,000	OR Combined
Property Damage Liability - each accident	300,000	Single Limit	400,000	Single Limit

Group A Applies when a permitted vehicle and load do not exceed 12 feet in width, 13 1/2 feet in height, or 100 feet in length, and do not exceed statutory gross weight limits by more than 25%.

Group B Applies when permit is issued for any dimension in excess of those for Group A.

Permit Fees

<u>If Oversize Only</u>	12 Month	11 Month	10 Month	9 Month	8 Month	7 Month	6 Month	5 Month	4 Month	3 Month
Length Only	\$60.00	\$60.00	\$60.00	\$60.00	\$55.00	\$50.00	\$45.00	\$40.00	\$35.00	\$30.00
Width and/or	90.00	90.00	90.00	82.50	75.00	67.50	60.00	52.50	45.00	37.50
Height and/or Length										

If Overweight OR Overweight and Oversize - Round weight up to the next ten thousand pound increment. For example, if weight is 93,000 pounds, round upward to 100,000 weight increment to determine fees.

Up to 90,000 Lbs	200.00	198.33	181.67	165.00	148.33	131.67	115.00	98.33	81.67	65.00
100,000 Lbs	350.00	335.83	306.67	277.50	248.33	219.17	190.00	160.83	131.67	102.50
110,000 Lbs	450.00	427.50	390.00	352.50	315.00	277.50	240.00	202.50	165.00	127.50
120,000 Lbs	550.00	519.17	473.33	427.50	381.67	335.83	290.00	244.17	198.33	152.50
130,000 Lbs	650.00	610.83	556.67	502.50	448.33	394.17	340.00	285.83	231.67	177.50
140,000 Lbs	750.00	702.50	640.00	577.50	515.00	452.50	390.00	327.50	265.00	202.50
150,000 Lbs	850.00	794.17	723.33	652.50	581.67	510.83	440.00	369.17	298.33	227.50
160,000 Lbs	950.00	885.83	806.67	727.50	648.33	569.17	490.00	410.83	331.67	252.50
170,000 Lbs	1050.00	977.50	890.00	802.50	715.00	627.50	540.00	452.50	365.00	277.50

Procedure to Calculate Fees

1. Choose the effective and expiration dates you want for the permit for which you are applying.
2. Count up the number of months in the desired permit, from the beginning day to the ending day. When figuring "months," do not use calendar months. The month begins on the effective date of the permit. For example, if you want the permit to become effective May 23, then May 23 to June 22 is counted as exactly 1 month.
3. If the number of months in the desired permit is not exact, round upward to the next whole number of months. For example, if you intend the permit to become effective 5-16-2005 and to expire 1-21-2006, it would be valid for 8 months 6 days. Rounding upward, the desired permit would be subject to the 9 month charge in the fee scale.
4. Refer to the fee chart above to determine fees.

Instructions

1. Make checks payable to: Registration Fee Trust.
2. No charge shall be made to any state department, county, town, municipality, or any branch of the United States Government or the Armed Services for any type of oversize/overweight permit.
3. The fee must accompany the application and will be retained by the Department only if a permit is issued.
4. A renewal notice will be mailed to you in month prior to permit expiration.
5. No charge is made for a transfer of permit from one vehicle to another. A new application must be submitted, stating this is a transfer from permit # _____.
6. Submit completed form MV2612 when adding a new vehicle.
7. If you have questions regarding permit applications, call (608) 266-7320.

Source: Oversize-overweight permits, Wisconsin Department of Transportation, Madison, WI.

<http://www.dot.wisconsin.gov/business/carriers/osowgeneral.htm>

Appendix 4 J. Missouri OW/OD Permits and Specifications

MISSOURI

Oversize/Overweight Permit Requirements

Single Trip Routine Move – Valid for 7 days

Refer to Vehicle Route Map available on line at www.modot.org/mcs or contact Motor Carrier Services at 800-877-8499 for legal and maximum permissible limits

Commercial Zones

(Dark Purple – all routes and Light Purple all routes except Interstate)

Dimension	Legal	Maximum Permittable
Width	8'6"	16'
Height	15'	16'
Length – Trailer & Load	53'	N/A
Truck-tractor semi-trailer combination		
Length – Overall	N/A	150'
Truck-tractor semi-trailer combinations		
Length – Truck-trailer combinations	65'	N/A
Length – Auto/boat transporter	75' plus 3' front & 4' rear overhang	N/A
Length – Towed units	65'	150'
Length – Single units	45'	60'
Weight – not to exceed 22,400 lbs per axle	N/A	None

Interstate and Designated Highway System Or Within 10 Air Miles

(Not in a Commercial Zone)

Dimension	Legal	Maximum Permittable
Width	8'6"	16'
Height	14'	16'
Length – Trailer & Load	53'	N/A
Truck-tractor semi-trailer combination		
Length – Overall Truck-tractor semi-trailer combinations	N/A	150'
Length – Truck-trailer combinations	65'	N/A
Length – Auto/boat transporter	75' plus 3' front & 4' rear overhang	N/A
Length – Towed units	65'	150'
Length – Single units	45'	60'
Weight – Truck-tractor semi-trailer combinations	80,000 lbs*	160,000 lbs
Weight – Specialized equipment	See pages 33 – 35	152,000 lbs

*If hauling livestock on US36 between St Joseph and US65 and US65 to the Iowa State Line 85,500 lbs is legal

Continued...

More Than 10 Air Miles Of The Interstate Or Designated Highway System
(Pink colored areas on Vehicle Route Map)

Dimension	Legal	Maximum Permittable
Width	8'6"	16'
Height	13'6"	16'
Length – Trailer & Load	N/A	N/A
Truck-tractor semi-trailer combination		
Length – Overall	60'	150'
Truck-tractor semi-trailer combinations		
Length – Truck-trailer combinations	65'	N/A
Length – Auto/boat transporter	75' plus 3' front & 4' rear overhang	N/A
Length – Towed units	65'	150'
Length – Single units	45'	60'
Weight – Truck-tractor semi-trailer combinations	80,000 lbs	160,000 lbs
Weight – Specialized equipment	See pages 33 – 35	152,000 lbs

More Than 10 Air Miles Of The Interstate Or Primary Highway System
(yellow colored areas on the Vehicle Route Map)

Dimension	Legal	Maximum Permittable
Width	8'6"	16'
Height	13'6"	16'
Length – Trailer & Load	53'	N/A
Truck-tractor semi-trailer combination		
Length – Overall	N/A	150'
Truck-tractor semi-trailer combinations		
Length – Truck-trailer combinations	55'	N/A
Length – Auto/boat transporter	75' plus 3' front & 4' rear overhang	N/A
Length – Towed units	55'	150'
Length – Single units	45'	60'
Weight – Truck-tractor semi-trailer combinations	80,000 lbs	160,000 lbs
Weight – Specialized equipment	See pages 33 – 35	152,000 lbs

Legal Gross Weight is 80,000 lbs. unless specialized equipment. Refer to pages 33 – 35 of the Oversize and Overweight Regulation Handbook for specialized equipment legal and permittable weights. Maximum permitted weight is 20,000 lbs on a single axle, 46,000 lbs on a tandem axle group, 60,000 lbs on a triple axle group and 72,000 lbs on a quadrum axle group.

Requirements To Obtain Single Trip Permit

- Year, make, license number and VIN of power unit and trailer and any other hauling units
- Load description, make, serial number and dimensions of load.
- Overall dimensions and length of trailer & load if a truck-tractor semi-trailer combination.
- Individual or group axles weights
- Individual axles spacings (center to center)
- Origin of route
- Destination of route
- Requested route
- Date of movement
- \$750,000 combined single limit automobile liability insurance

Continued...

PERMITS FEES

1. Single trip oversize permits including pre-issue—\$15;
2. Single trip oversize permits in excess of sixteen feet (16') wide, sixteen feet (16') high, or one hundred fifty feet (150') long—\$15 plus \$250 movement feasibility fee;
3. Multi-stop oversize permit—\$25 (farm implements only);
4. Single trip overweight permits up to and including one hundred sixty thousand (160,000) pounds gross weight—\$15 plus \$20 per each ten thousand (10,000) pounds in excess of legal gross weight;
5. Single trip overweight permits in excess of one hundred sixty thousand (160,000) pounds gross weight—\$15 plus \$20 per each ten thousand (10,000) pounds in excess of legal gross weight plus bridge and roadway analysis fee of \$425 for each permit for moves from 0–50 miles in length; \$625 for 51–200 miles; \$925 for over 200 miles. Identical permit applications with identical vehicle configurations will only be charged one bridge and roadway analysis fee if the original bridge study is less than thirty (30) days old for loads in excess of three hundred thousand (300,000) pounds and if the original bridge study is less than sixty (60) days old for loads weighing less than three hundred thousand (300,000) pounds. An additional four hundred twenty-five dollar (\$425) bridge study fee will be charged if the applicant modifies dimensions or weights on an application and a new bridge analysis is required after the original analysis has been completed;
6. Annual blanket emergency overweight permit (round trip): \$624 (fee will be prorated quarterly);
7. Annual blanket oversize permit (single commodity): \$128 (fee will be prorated quarterly);
8. Annual blanket oversize permit (multiple commodity): \$400 (fee will be prorated quarterly);
9. Annual blanket overweight well drillers or concrete pump truck permit: \$300 (fee will be prorated quarterly);
10. Thirty (30)-day blanket permit: \$300;
11. Project permit: \$125;
12. Highway crossing permit: \$250;
13. Noncommercial building movement (in excess of routine dimensions): \$265;
14. Single Trip Commercial Zone Bridge Analysis \$265; and
15. Permit amendment fee—\$2. Single trip permits may only be amended within two (2) business days of permit start date. The start date and any other component will be amended if permit effective date is in the future. The permittee, origin, destination, and/or commodity being hauled/towed will not be amended if the permit is already in effect. Annual blanket permits may be amended one time throughout the year for truck make and/or license.

Continued...

(F) Fees shall not be required for permits covering the movement of vehicles and loads owned and operated by governmental subdivisions or agencies.

(G) Permits may be applied for and picked up during regular business hours of 7:30 a.m. to 4:00 p.m. Monday through Friday except holidays. Telephone applications are accepted from 7:00 a.m. until 5:00 p.m. at (800) 877-8499 or (573) 751-7100 Monday through Friday except holidays. Internet access is also available twenty-four (24) hours a day, seven (7) days a week.

Source: Oversize/Overweight Permits Regulations, Motor Carrier Services,
Missouri Department of Transportation, Jefferson City, MO.
<http://www.modot.mo.gov/mcs/documents/2009OSOWRegBook-lowres.pdf>

APPENDIX 4K. IOWA OW/OD PERMITS AND SPECIFICATIONS

IOWA

Oversize/Overweight Permits				
Permit Type	Single Trip	Annual		Multi-Trip
Cost	\$10	\$25		\$200
Axle Weight	20,000 lbs. per axle *See exception	20,000 lbs. per axle		20,000 lbs. per axle
Gross Weight	No limit	80,000 lbs.		156,000 lbs.
Height	No limit	13'10"	15'5"	Unlimited
Length	No limit	120'	120'	120'
Width	No limit	12'5"	16'	16'
Interstate Travel	Allowed	Allowed	Allowed	No interstate highway travel over 80,000 lbs.
Routing	MCS routing required	MCS routing not required	MCS routing required when loads over 14'6" wide. MCS routing required when loads are over 50-mile radius unless route continues on at least 4-lane roads.	MCS routing not required
Valid	1 trip in 5 days	12 months from month issued		60 days
Construction Equipment	Allowed up to 36,000 lbs. single axle; 126,000 gross weight with qualifying tires**	Allowed up to 36,000 lbs. single axle; 80,000 lbs. gross weight with qualifying tires.**		Allowed up to 36,000 lbs. single axle; 126,000 gross weight with qualifying tires**
Carrier Route Check	None	None	None	- Construction and embargo maps - Vertical clearance maps - 156 Kip map - Check with DOT to ensure no changes
<small>These permits are valid only for movement on state and federal highways. County and city permits must be obtained separately. *Exception: cranes with pneumatic tires meeting the definition of an indivisible vehicle may have a maximum of 24,000 pounds per axle; single trip permit and round-trip permits only; and travel is allowed on the interstate system. **Exception: Formula for construction equipment with flotation pneumatic tires: Axle weight=20,000 lbs+(tire width-18) X 1,882 pounds. *** Vehicles operating under an annual oversize/overweight permit can operate under annuals with no weight guidelines when they can meet the annual permit requirements with no weight dimensions.</small>				

Source: Truck Information Guide 2008-2009 Edition, Office of Motor Carrier Services and Office of Motor Vehicle Enforcement, Iowa Department of Transportation, Des Moines, IA.

<http://www.iamvd.com/omve/truckguide.pdf>

APPENDIX 5: THE SPECIAL CASE OF OREGON

In Oregon, the Motor Carrier Transportation Division (MCTD) issues single-trip and annual variance permits for overweight, over-height, over-width, over-length, and other unusual truck characteristics. The permits are used with appropriate routing plans, road restriction information, and other permit conditions. Permits and routing cover state and federal highways. The division issues approximately 100,000 complex single-trip permits each year and manages the work of private parties that process requests for about 50,000 continuous, annual variance permits each year (www.oregon.gov/ODOT/MCT/OD.shtml). The state participates in the Western Regional Permit Agreement that makes it possible for truckers to obtain permits for travel in nine other states.

Truckers will need an over-dimension variance permit whenever their vehicle combination exceeds maximum size and/or weight limits. A permit is also needed to haul any single, non-divisible load for which any one of the following conditions apply:

- Width of the load or hauling equipment exceeds 8 feet, 6 inches
- Height of vehicle or vehicle combination and load exceeds 14 feet
- Any single axle weight exceeds 20,000 pounds
- Any tandem axle weight exceeds 34,000 pounds
- Gross combination weight exceeds 80,000 pounds
- Front overhang exceeds 4 feet beyond the front bumper of the vehicle
- Load greater than 40 feet, exceeding 5 feet beyond the end of the semi-trailer, or load less than or equal to 40 feet, exceeding 1/3 of the wheelbase of the combination, whichever is less
- Gross weight of a group of axles exceeds those set forth in the state's legal weight table
- Vehicle combination length exceeds those authorized on state's legal dimensions table.

Road Use Assessment Fees

Table "A" presents the mileage tax rates for weights 80,000 lbs or less. Table "B" presents the same information for all types of fuel for vehicles over 26,000 lbs. Table "C" presents the fees for single-trip, non-divisible loads 98,001- to 900,000 lbs. maximum gross weight. In Table "C", the road use assessment fee takes the place of the weight-mile tax for the loaded portion of non-divisible hauls. The fee is 5.7 cents per equivalent single-axle load (ESAL) mile traveled. These fees are expressed in terms of permit gross weight and number of axles. As with the weight-mile tax rates in Table "B", carriers are assessed a lower per-mile charge if they use greater numbers of axles at any given gross weight.

OREGON DEPARTMENT OF TRANSPORTATION
MOTOR CARRIER TRANSPORTATION DIVISION
550 CAPITOL ST NE
SALEM OR 97301-2530
(503) 378-6699

**RATES EFFECTIVE
JANUARY 1, 2004**

MILEAGE TAX RATES

INSTRUCTIONS FOR TABLE "A":

1. Use these rates only when operating at declared weight(s) of 80,000 pounds or less. Use table "B" rates for operations over 80,000 pounds.
2. To compute the tax, select the weight group that includes the declared weight of your vehicle. Multiply your Oregon taxable miles times the rate listed for the weight group to calculate the amount of tax due. Taxable miles in Oregon includes all miles driven in Oregon on roads accessible to the public. If returning empty, use the same declared weight and rate as when loaded.

You may claim a credit if you paid Oregon state fuel tax on fuel for a vehicle subject to weight-mile tax. The deduction must be for the reporting period that you used the fuel. Credits for previous reporting periods will not be granted until time of audit. You must attach copies of fuel invoices to the highway-use tax report.

See *Instructions for Filing Highway-Use Tax Reports* available on ODOT's Web site for information required to be included on fuel receipts, for claiming fuel tax credit on bulk fuel purchases, other record keeping requirements, and tax reporting information.

www.odot.state.or.us/trucking/regis/forms.htm

TABLE "A" FOR ALL TYPES OF FUEL (OVER 26,000 LBS)

COLUMN A WEIGHT GROUP	COLUMN B MILLS (1/10 OF 1 CENT) PER MILE	COLUMN C DOLLARS PER MILE* DECIMAL FRACTION	COLUMN A WEIGHT GROUP	COLUMN B MILLS (1/10 OF 1 CENT) PER MILE	COLUMN C DOLLARS PER MILE* DECIMAL FRACTION
26,001 - 28,000	40.0	.0400	52,001 - 54,000	66.9	.0669
28,001 - 30,000	42.4	.0424	54,001 - 56,000	69.4	.0694
30,001 - 32,000	44.3	.0443	56,001 - 58,000	72.3	.0723
32,001 - 34,000	46.3	.0463	58,001 - 60,000	75.6	.0756
			60,001 - 62,000	79.5	.0795
34,001 - 36,000	48.1	.0481			
36,001 - 38,000	50.6	.0506	62,001 - 64,000	83.9	.0839
38,001 - 40,000	52.5	.0525	64,001 - 66,000	88.7	.0887
40,001 - 42,000	54.4	.0544	66,001 - 68,000	95.0	.0950
			68,001 - 70,000	101.7	.1017
42,001 - 44,000	56.4	.0564	70,001 - 72,000	108.4	.1084
44,001 - 46,000	58.3	.0583			
46,001 - 48,000	60.2	.0602	72,001 - 74,000	114.6	.1146
48,001 - 50,000	62.2	.0622	74,001 - 76,000	120.5	.1205
50,001 - 52,000	64.5	.0645	76,001 - 78,000	126.3	.1263
			78,001 - 80,000	131.6	.1316
			80,001 AND OVER	USE TABLE B	

*NOTE - Column C converts mills per mile to dollars per mile by moving the decimal point three places to the left. Multiply the decimal fraction by the Oregon Taxable Miles for the amount of tax due for each weight.

	COLUMN A	COLUMN B	COLUMN C	
EXAMPLES:	32,000	44.3	.0443	1000 Miles X .0443 = \$ 44.30
				100 Miles X .0443 = 4.43
	80,000	131.6	.1316	1000 Miles X .1316 = \$ 131.60
				100 Miles X .1316 = 13.16

OREGON DEPARTMENT OF TRANSPORTATION
MOTOR CARRIER TRANSPORTATION DIVISION
550 CAPITOL ST NE
SALEM OR 97301-2530
(503) 378-6699

**RATES EFFECTIVE
JANUARY 1, 2004**

MILEAGE TAX RATES

INSTRUCTIONS FOR TABLE "B":

1. Use these rates only when operating at declared weight(s) over 80,000 pounds. Empty returns are paid at the same declared weights as when loaded. Raising a lift axle is not a change in configuration and does not constitute a change in rate. These rates apply to motor vehicles that are issued or required to obtain an annual highway over-dimension permit to operate with a combined weight of 80,001 pounds or more (extended weight or heavy haul).
2. Your weight should be declared at the highest weight you intend to operate. You must pay the tax for all miles over 80,000 pounds at the tax rate for this weight. You may continue to declare and report tax on multiple weights if you use different trailer combinations. If you have a declared weight over 80,000 pounds, you must also have a declared weight at 80,000 pounds. Each trip operated at 80,000 pounds or under is paid at Table "A" rates.
3. To compute the tax, select the weight group that includes the declared weight of your vehicle, then go to the column with the correct number of axles. The rate where the columns intersect is the tax rate in mills (1/10 of 1 cent). Convert the mill rate to dollars per mile (see examples below the chart). Multiply your Oregon taxable miles times the rate to calculate the amount of tax due. Taxable miles in Oregon includes all miles driven in Oregon on roads accessible to the public.
4. Heavy haul operations over 98,000 pounds pay road use assessed fees (RUAF) separately to the ODOT/MCTD Over Dimension Permits Unit. These rates do not appear on the Table "B" chart. Contact OD Permits Unit, 503-373-0000 for those RUAF rates.

For additional record keeping requirements and tax reporting information, please see *Instructions for Filing Highway-Use Tax Reports* available on ODOT's Web site:

www.odot.state.or.us/trucking/regis/forms.htm

TABLE "B" AXLE - WEIGHT MILEAGE TAX RATES

COLUMN A DECLARED COMBINED WEIGHT GROUPS (POUNDS)	5 AXLES		6 AXLES		7 AXLES		8 AXLES		9 AXLES or more	
	COLUMN B	COLUMN C*	COLUMN B	COLUMN C*	COLUMN B	COLUMN C*	COLUMN B	COLUMN C*	COLUMN B	COLUMN C*
	MILLS	\$ PER MILE DECIMAL FRACTION	MILLS	\$ PER MILE DECIMAL FRACTION	MILLS	\$ PER MILE DECIMAL FRACTION	MILLS	\$ PER MILE DECIMAL FRACTION	MILLS	\$ PER MILE DECIMAL FRACTION
80,000 AND UNDER	USE TABLE A		USE TABLE A		USE TABLE A		USE TABLE A		USE TABLE A	
80,001 to 82,000	135.9	.1359	124.3	.1243	116.2	.1162	110.4	.1104	104.1	.1041
82,001 to 84,000	140.3	.1403	126.3	.1263	118.1	.1181	111.8	.1118	105.5	.1055
84,001 to 86,000	144.5	.1445	129.2	.1292	120.0	.1200	113.2	.1132	107.0	.1070
86,001 to 88,000	149.4	.1494	132.0	.1320	121.9	.1219	115.2	.1152	108.4	.1084
88,001 to 90,000	155.2	.1552	135.4	.1354	123.9	.1239	117.1	.1171	110.4	.1104
90,001 to 92,000	161.9	.1619	139.3	.1393	125.7	.1257	119.0	.1190	112.3	.1123
92,001 to 94,000	169.2	.1692	143.1	.1431	127.7	.1277	120.9	.1209	113.8	.1138
94,001 to 96,000	176.9	.1769	147.5	.1475	130.1	.1301	122.9	.1229	115.6	.1156
96,001 to 98,000	185.1	.1851	152.8	.1528	133.0	.1330	124.9	.1249	117.6	.1176
98,001 to 100,000			158.5	.1585	135.9	.1359	127.2	.1272	119.5	.1195
100,001 to 102,000					138.8	.1388	130.1	.1301	121.5	.1215
102,001 to 104,000					141.7	.1417	133.0	.1330	123.9	.1239
104,001 to 105,500					145.5	.1455	135.9	.1359	126.3	.1263

*NOTE - Column C converts mills per mile to dollars per mile by moving the decimal point three places to the left. Multiply the Oregon Taxable Miles by the decimal fraction for the amount of tax due for each weight.

	COLUMN A	NO. OF AXLES	COLUMN B	COLUMN C	TAX
EXAMPLES:	96,000	5	176.9	.1769	1000 Miles X .1769 = \$ 176.90 100 Miles X .1769 = 17.69
	96,000	6	147.5	.1475	1000 Miles X .1475 = \$ 147.50 100 Miles X .1475 = 14.75

SEE TABLE "A" RATES FOR 80,000 POUNDS AND UNDER.

Source: <http://www.odot.state.or.us/forms/motcarr/reg/9225.pdf>

Table "C"

Oregon
Road Use Assessment Fees
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Oregon Road Use Assessment Fees - Cents per Mile

Gross Weight	Number of Axles															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
98,000 to 100,000	44	25	14	10	8	8	4	2	1	1	1	1	1	1	1	1
100,001 to 102,000	49	27	15	10	9	8	4	2	2	2	2	1	1	1	1	1
102,001 to 104,000	56	29	18	11	9	8	7	3	2	2	2	1	1	1	1	1
104,001 to 106,000	64	31	19	12	10	9	7	3	2	2	2	1	1	1	1	1
106,001 to 108,000	69	34	19	12	10	9	7	3	3	2	2	1	1	1	1	1
108,001 to 110,000	79	36	21	13	10	9	8	4	3	2	2	1	1	1	1	1
110,001 to 112,000	87	42	22	14	11	10	8	4	3	3	2	1	1	1	1	1
112,001 to 114,000	93	43	23	15	12	10	9	4	3	3	2	1	1	1	1	1
114,001 to 116,000	110	45	24	18	12	10	9	4	4	3	2	1	1	1	1	1
116,001 to 118,000	124	49	26	19	13	10	9	7	4	3	2	1	1	1	1	1
118,001 to 120,000	137	53	29	21	14	10	10	7	4	4	2	1	1	1	1	1
120,001 to 122,000		56	31	22	15	10	10	7	7	4	3	2	1	1	1	1
122,001 to 124,000		60	33	24	18	11	10	8	7	4	3	2	2	1	1	1
124,001 to 126,000		66	35	25	19	11	10	9	7	7	3	2	2	1	1	1
126,001 to 128,000		69	37	26	20	12	11	9	8	7	3	3	2	1	1	1
128,001 to 130,000		76	41	29	21	13	11	9	8	7	4	3	2	1	1	1
130,001 to 132,000		82	44	31	22	13	11	10	9	8	4	3	2	1	1	1
132,001 to 134,000		88	47	32	22	14	12	10	9	8	4	3	3	1	1	1
134,001 to 136,000		94	49	34	24	14	12	10	9	8	7	3	3	1	1	1
136,001 to 138,000		104	54	36	25	15	12	10	10	8	7	4	3	1	1	1
138,001 to 140,000		112	57	38	26	18	13	10	10	9	7	4	3	1	1	1
140,001 to 142,000		122	61	42	27	19	14	11	10	9	8	4	3	2	1	1
142,001 to 144,000			66	45	30	20	14	11	10	9	8	7	4	2	1	1
144,001 to 146,000			69	47	31	21	15	12	11	9	8	7	4	2	1	1
146,001 to 148,000			75	48	32	22	18	13	11	10	9	8	4	3	2	1
148,001 to 150,000			79	53	33	23	19	14	12	10	9	8	4	3	2	2
150,001 to 152,000			83	55	35	24	19	14	12	10	10	8	4	4	2	2
152,001 to 154,000			88	58	36	25	20	15	13	10	10	9	7	4	3	2
154,001 to 156,000			92	60	38	26	21	18	13	10	10	9	7	4	3	2
156,001 to 158,000			98	65	43	29	22	18	14	11	10	10	8	7	3	2
158,001 to 160,000			103	67	45	30	23	19	14	12	11	10	8	7	4	3
160,001 to 162,000			106	70	47	32	24	20	15	12	11	10	8	7	4	3
162,001 to 164,000			113	76	49	33	25	21	15	13	11	10	9	8	4	3
164,001 to 166,000			117	79	53	34	25	21	18	13	12	10	9	8	7	3
166,001 to 168,000			124	82	56	36	27	22	18	14	13	11	9	9	7	4
168,001 to 170,000			128	87	59	38	27	24	19	14	13	11	10	9	8	4
170,001 to 172,000			135	90	61	42	30	25	19	14	14	11	10	10	8	4
172,001 to 174,000			141	94	66	44	31	26	20	15	14	12	10	10	9	7
174,001 to 176,000			147	101	68	45	32	27	21	18	15	12	10	10	9	7
176,001 to 178,000			155	105	71	47	34	29	22	19	15	13	11	10	10	8
178,001 to 180,000			160	109	76	48	35	30	22	19	18	13	11	11	10	8
180,001 to 182,000				114	79	54	37	32	24	20	18	14	11	11	10	8
182,001 to 184,000				121	82	55	38	33	24	21	19	14	12	12	10	9
184,001 to 186,000				125	87	57	42	34	25	22	19	15	13	12	10	9
186,001 to 188,000				132	89	59	43	36	26	22	20	15	13	12	10	10
188,001 to 190,000				137	93	64	45	37	27	23	21	18	14	13	11	10
190,001 to 192,000				144	98	66	47	41	29	24	21	18	14	13	11	10
192,001 to 194,000				149	102	68	48	42	31	24	22	19	15	13	12	10
194,001 to 196,000				156	105	70	52	44	32	25	22	19	15	14	12	10
196,001 to 198,000				162	110	75	54	45	33	26	23	20	18	14	12	10
198,001 to 200,000				169	113	78	56	47	34	27	23	20	18	15	13	11
200,001 to 202,000				174	117	81	58	48	35	29	24	21	19	15	13	11
202,001 to 204,000				182	123	84	60	49	37	30	25	21	19	18	13	11
204,001 to 206,000				189	126	88	65	53	38	31	25	22	20	18	14	12

Source: <http://www.oregon.gov/ODOT/MCT/docs/OregonRoadUseAssessmentFees.pdf>

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206,001 to 208,000				195	132	91	67	54	42	32	26	23	21	18	14	12
208,001 to 210,000				202	136	95	69	56	43	33	27	23	21	19	14	12
210,001 to 212,000				209	141	101	71	58	44	34	27	24	22	20	15	13
212,001 to 214,000				218	146	104	76	60	46	35	29	25	23	20	15	13
214,001 to 216,000				226	150	110	79	64	48	37	30	25	23	20	15	14
216,001 to 218,000				232	157	114	82	66	49	38	31	26	24	21	18	14
218,001 to 220,000				240	162	118	87	67	52	42	32	27	25	21	18	15
220,001 to 222,000				249	169	124	89	69	53	43	33	27	26	22	18	15
222,001 to 224,000				259	175	127	92	71	55	45	34	29	26	23	19	15
224,001 to 226,000					182	134	98	75	57	46	35	30	27	23	19	18
226,001 to 228,000					190	139	101	78	59	48	37	30	29	24	20	18
228,001 to 230,000					196	146	105	80	61	49	38	31	29	24	20	19
230,001 to 232,000					205	151	110	82	64	53	41	32	30	25	20	19
232,001 to 234,000					214	158	113	84	66	55	42	33	30	25	21	20
234,001 to 236,000					220	163	118	87	67	57	44	33	31	26	21	20
236,001 to 238,000					230	172	124	90	69	60	46	34	32	26	22	21
238,001 to 240,000					240	181	127	93	71	64	48	35	33	27	22	21
240,001 to 242,000					249	189	130	96	73	66	49	36	34	29	23	22
242,001 to 244,000					258	196	134	100	76	68	52	37	35	30	24	22
244,001 to 246,000					266	204	137	103	78	70	53	38	36	31	25	23
246,001 to 248,000					275	212	140	106	80	72	55	39	37	32	26	23
248,001 to 250,000					284	219	144	110	82	75	56	41	38	33	27	24
250,001 to 252,000					293	227	147	113	84	77	58	42	39	34	29	24
252,001 to 254,000					301	235	150	116	87	79	59	43	41	35	30	25
254,001 to 256,000					310	242	153	119	89	81	61	44	42	36	31	25
256,001 to 258,000					319	250	158	123	91	83	62	45	43	37	32	26
258,001 to 260,000					328	258	162	126	93	86	65	46	44	38	33	26
260,001 to 262,000					337	264	167	129	95	88	66	47	45	39	34	27
262,001 to 264,000					345	272	171	133	98	90	68	48	46	41	35	27
264,001 to 266,000					354	278	175	136	100	92	69	49	47	42	36	29
266,001 to 268,000					363	286	180	139	102	94	71	50	48	43	37	29
268,001 to 270,000					372	293	184	143	104	96	72	52	49	44	38	30
270,001 to 272,000					380	300	189	146	106	99	75	53	50	45	39	31
272,001 to 274,000					389	307	193	149	109	101	76	54	52	46	41	32
274,001 to 276,000					398	315	197	152	111	103	78	55	53	47	42	33
276,001 to 278,000					407	322	202	156	113	105	80	56	54	48	43	34
278,001 to 280,000					415	329	206	159	115	107	82	57	55	49	44	35
280,001 to 282,000					424	337	210	162	118	110	84	58	56	50	45	36
282,001 to 284,000					433	344	215	166	122	112	87	59	57	52	45	37
284,001 to 286,000					442	351	219	169	125	114	89	60	58	53	46	38
286,001 to 288,000					451	358	225	172	127	116	91	61	59	54	47	39
288,001 to 290,000					459	365	230	175	130	118	93	62	60	55	47	41
290,001 to 292,000					468	372	236	179	134	121	95	64	61	56	48	42
292,001 to 294,000					477	378	241	182	137	123	96	65	62	57	49	43
294,001 to 296,000					487	386	248	185	139	125	98	66	64	58	49	44
296,001 to 298,000					497	392	254	189	143	127	99	67	65	59	50	45
298,001 to 300,000					506	399	261	192	146	129	100	68	66	60	52	46
300,001 to 302,000					516	406	267	195	149	132	102	69	67	61	53	47
302,001 to 304,000					526	412	274	198	152	134	104	70	68	62	54	48
304,001 to 306,000					536	419	281	202	156	136	105	71	69	64	55	49
306,001 to 308,000					546	426	287	205	158	138	107	72	70	65	56	50
308,001 to 310,000					556	433	294	208	161	140	109	73	71	66	57	52
310,001 to 312,000					566	440	300	212	163	143	110	75	72	67	58	53
312,001 to 314,000					575	446	307	215	164	145	112	76	73	68	59	54
314,001 to 316,000					585	453	314	218	168	147	114	77	75	69	59	55
316,001 to 318,000					595	459	320	221	171	149	116	79	76	70	60	56
318,001 to 320,000					605	467	327	225	174	151	119	81	77	71	61	57
320,001 to 322,000					615	475	333	228	178	153	122	82	79	72	62	58
322,001 to 324,000					625	482	340	231	181	156	123	84	80	73	64	59
324,001 to 326,000					635	491	346	236	184	158	124	86	82	75	65	60

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326,001 to 328,000					645	499	353	240	187	160	126	88	83	76	66	61
328,001 to 330,000					654	508	360	244	191	162	127	89	86	77	67	62
330,001 to 332,000					664	516	366	249	194	164	129	91	87	78	68	64
332,001 to 334,000					674	525	373	253	197	167	132	92	89	79	69	65
334,001 to 336,000					684	534	379	258	201	169	135	94	90	80	70	66
336,001 to 338,000					695	543	386	262	204	172	137	95	92	81	71	67
338,001 to 340,000					706	551	392	267	207	175	139	96	93	82	72	68
340,001 to 342,000					717	560	399	273	210	179	141	99	95	83	73	69
342,001 to 344,000					728	569	406	278	214	182	145	100	96	84	75	70
344,001 to 346,000					739	578	412	284	218	185	147	101	99	86	76	71
346,001 to 348,000					751	586	419	289	223	189	148	103	100	88	77	72
348,001 to 350,000					763	595	425	295	227	192	150	105	102	89	78	73
350,001 to 352,000					775	604	432	300	231	195	151	106	103	91	79	75
352,001 to 354,000					787	613	438	306	235	198	153	109	105	92	80	76
354,001 to 356,000					799	622	446	311	239	202	155	111	106	94	81	77
356,001 to 358,000					811	630	454	317	243	205	157	113	109	95	82	78
358,001 to 360,000					823	639	461	322	247	208	158	115	111	98	83	79
360,001 to 362,000					835	649	469	328	251	212	160	117	113	99	84	80
362,001 to 364,000					847	657	477	333	255	215	161	119	115	101	86	81
364,001 to 366,000					859	665	485	339	259	218	163	122	117	102	87	82
366,001 to 368,000					871	673	492	344	263	221	164	124	119	104	88	83
368,001 to 370,000					884	682	500	350	266	225	167	126	122	105	89	84
370,001 to 372,000					896	691	508	355	270	228	168	128	124	107	90	86
372,001 to 374,000					908	699	515	361	273	231	170	130	126	109	91	87
374,001 to 376,000					920	709	524	366	277	235	172	133	128	111	92	88
376,001 to 378,000					933	719	532	372	281	238	174	135	130	112	93	90
378,001 to 380,000					946	731	539	377	285	241	176	137	133	114	95	92
380,001 to 382,000					959	742	547	383	289	244	179	139	135	115	96	94
382,001 to 384,000					972	754	555	388	294	248	181	141	137	117	98	96
384,001 to 386,000					985	766	562	394	298	251	183	144	139	118	100	99
386,001 to 388,000					1000	778	570	399	303	254	185	146	141	121	101	100
388,001 to 390,000					1014	790	578	404	307	258	187	148	144	122	103	101
390,001 to 392,000					1028	803	585	410	311	261	190	150	146	124	104	102
392,001 to 394,000					1042	817	593	415	316	264	192	152	148	126	106	103
394,001 to 396,000					1057	830	601	421	319	267	194	155	150	128	107	104
396,001 to 398,000					1071	843	608	426	322	271	196	157	152	130	110	106
398,001 to 400,000					1085	856	616	432	327	274	198	159	155	133	111	109
400,001 to 402,000					1099	869	624	437	331	277	201	161	157	135	113	110
402,001 to 404,000					1115	882	631	443	335	281	204	163	159	137	114	111
404,001 to 406,000					1130	896	639	448	341	284	207	166	161	139	115	112
406,001 to 408,000					1145	909	647	454	345	287	210	168	163	141	116	113
408,001 to 410,000					1161	922	654	459	350	290	214	170	166	144	117	114
410,001 to 412,000					1176	935	662	465	355	294	217	172	168	146	119	115
412,001 to 414,000					1192	948	671	470	360	297	220	174	170	148	121	116
414,001 to 416,000					1207	961	680	476	364	300	224	176	172	150	123	117
416,001 to 418,000					1222	974	688	482	369	305	227	179	174	152	125	118
418,001 to 420,000					1238	988	697	489	374	309	230	181	176	155	127	121
420,001 to 422,000					1253	1001	706	495	378	314	233	183	179	157	129	122
422,001 to 424,000					1268	1014	716	502	384	318	237	185	181	159	132	123
424,001 to 426,000					1284	1027	726	509	388	322	240	187	183	161	134	125
426,001 to 428,000					1299	1040	736	515	392	327	243	190	185	163	136	126
428,001 to 430,000					1314	1053	745	522	398	331	247	192	187	166	138	128
430,001 to 432,000					1330	1067	755	528	402	335	250	194	190	168	140	129
432,001 to 434,000					1345	1080	765	535	407	340	253	196	192	170	143	132
434,001 to 436,000					1360	1093	775	542	412	344	257	198	194	172	144	134
436,001 to 438,000					1376	1106	786	548	417	349	259	201	196	174	145	136
438,001 to 440,000					1391	1120	797	555	421	353	261	203	198	176	147	137
440,001 to 442,000					1406	1135	808	561	426	357	264	205	201	179	148	139
442,001 to 444,000					1422	1149	819	568	431	362	265	207	203	181	149	141
444,001 to 446,000					1437	1164	830	574	435	366	267	209	205	183	150	143

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446,001 to 448,000					1454	1179	841	581	441	371	270	212	207	185	151	145
448,001 to 450,000					1470	1195	852	588	446	375	272	214	209	187	152	146
450,001 to 452,000					1486	1210	863	594	452	379	275	216	212	190	155	148
452,001 to 454,000					1503	1226	874	601	457	384	278	218	214	192	157	150
454,001 to 456,000					1519	1241	885	607	463	388	282	220	216	194	159	151
456,001 to 458,000					1536	1256	896	614	468	392	285	223	218	196	161	153
458,001 to 460,000					1552	1273	907	620	474	397	288	225	220	198	163	156
460,001 to 462,000					1569	1289	917	627	479	401	292	227	223	201	166	158
462,001 to 464,000					1585	1306	928	634	485	406	295	229	225	203	168	160
464,001 to 466,000					1601	1322	939	640	490	410	298	231	227	205	170	162
466,001 to 468,000					1618	1338	950	647	495	414	301	233	229	207	172	164
468,001 to 470,000					1635	1355	961	653	501	420	305	236	231	209	174	167
470,001 to 472,000					1653	1371	973	660	506	425	308	238	233	212	176	169
472,001 to 474,000					1671	1388	985	666	512	431	311	240	236	214	179	171
474,001 to 476,000					1688	1404	998	673	517	436	315	242	238	216	181	173
476,001 to 478,000					1706	1421	1010	680	523	442	318	244	240	218	183	175
478,001 to 480,000					1723	1437	1022	686	528	447	321	247	242	220	185	178
480,001 to 482,000					1741	1454	1034	693	534	453	324	249	244	223	187	180
482,001 to 484,000					1758	1470	1046	700	539	458	328	251	247	225	190	182
484,001 to 486,000					1776	1486	1058	708	545	464	331	253	249	227	192	184
486,001 to 488,000					1793	1503	1070	716	550	469	334	255	251	229	194	186
488,001 to 490,000					1811	1519	1082	723	556	475	338	258	253	231	196	189
490,001 to 492,000					1828	1536	1094	731	561	480	341	260	255	233	198	191
492,001 to 494,000					1846	1553	1106	739	567	486	344	262	258	236	201	193
494,001 to 496,000					1863	1571	1119	746	572	491	347	264	260	238	203	195
496,001 to 498,000					1881	1588	1132	754	578	497	351	266	262	240	205	197
498,001 to 500,000					1899	1606	1145	762	583	502	354	269	264	242	207	200
500,001 to 502,000					1916	1624	1158	770	589	508	358	272	266	245	210	203
502,001 to 504,000					1934	1640	1170	777	594	513	361	274	269	247	212	205
504,001 to 506,000					1953	1657	1182	785	600	518	364	277	272	249	214	207
506,001 to 508,000					1972	1673	1194	793	606	524	368	280	274	252	216	209
508,001 to 510,000					1991	1690	1206	801	612	529	371	282	277	254	219	211
510,001 to 512,000					2011	1707	1219	809	619	534	375	285	279	257	221	214
512,001 to 514,000					2030	1724	1231	816	625	540	378	288	282	259	223	216
514,001 to 516,000					2049	1741	1243	824	631	545	382	290	285	262	225	218
516,001 to 518,000					2069	1759	1255	832	637	551	385	293	287	264	227	220
518,001 to 520,000					2088	1776	1268	840	643	556	389	296	290	267	230	222
520,001 to 522,000												299	293	269	232	224
522,001 to 524,000												301	295	272	234	226
524,001 to 526,000												304	298	274	237	229
526,001 to 528,000												307	301	277	239	231
528,001 to 530,000												310	304	279	241	233
530,001 to 532,000												312	306	282	243	235
532,001 to 534,000												315	309	284	246	238
534,001 to 536,000												318	312	287	248	240
536,001 to 538,000												321	315	289	250	242
538,001 to 540,000												324	318	292	253	244
540,001 to 542,000												327	320	295	255	247
542,001 to 544,000												330	323	297	258	249
544,001 to 546,000												333	326	300	260	251
546,001 to 548,000												335	329	303	262	254
548,001 to 550,000												338	332	305	265	256
550,001 to 552,000												341	335	308	267	258
552,001 to 554,000												344	338	311	270	260
554,001 to 556,000												346	340	313	272	263
556,001 to 558,000												349	343	316	274	265
558,001 to 560,000												352	346	319	277	268
560,001 to 562,000												355	349	321	279	270
562,001 to 564,000												358	352	324	282	272
564,001 to 566,000												362	354	327	284	275

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566,001	to	568,000													365	357	330	287	277
568,001	to	570,000													368	360	333	289	280
570,001	to	572,000													371	363	335	292	282
572,001	to	574,000													374	367	338	294	285
574,001	to	576,000													378	370	341	297	287
576,001	to	578,000													381	373	344	300	289
578,001	to	580,000													384	376	347	302	292
580,001	to	582,000													387	379	349	305	294
582,001	to	584,000													390	383	352	307	297
584,001	to	586,000													393	386	355	310	299
586,001	to	588,000													396	389	358	313	302
588,001	to	590,000													400	392	361	315	304
590,001	to	592,000													403	395	363	318	307
592,001	to	594,000													406	398	366	320	310
594,001	to	596,000													409	401	369	323	312
596,001	to	598,000													412	404	372	326	315
598,001	to	600,000															375	328	317
600,001	to	602,000															378	331	320
602,001	to	604,000															382	334	323
604,001	to	606,000															385	337	325
606,001	to	608,000															388	339	328
608,001	to	610,000															391	342	330
610,001	to	612,000															394	345	333
612,001	to	614,000															397	348	336
614,001	to	616,000															401	350	338
616,001	to	618,000															404	353	341
618,001	to	620,000															407	356	344
620,001	to	622,000															410	359	346
622,001	to	624,000															413	362	349
624,001	to	626,000															416	364	352
626,001	to	628,000															419	367	355
628,001	to	630,000															422	370	357
630,001	to	632,000															425	373	360
632,001	to	634,000															429	376	363
634,001	to	636,000															432	379	366
636,001	to	638,000															435	382	368
638,001	to	640,000															438	384	371
640,001	to	642,000															441	387	374
642,001	to	644,000															445	390	377
644,001	to	646,000															448	393	380
646,001	to	648,000															451	396	383
648,001	to	650,000															454	399	385
650,001	to	652,000															458	401	388
652,001	to	654,000															461	404	391
654,001	to	656,000															464	407	394
656,001	to	658,000															467	410	397
658,001	to	660,000															470	414	400
660,001	to	662,000															473	417	402
662,001	to	664,000															477	420	405
664,001	to	666,000															480	423	408
666,001	to	668,000															483	426	411
668,001	to	670,000															487	429	414
670,001	to	672,000															490	433	417
672,001	to	674,000															493	436	419
674,001	to	676,000															497	439	422
676,001	to	678,000															500	442	425
678,001	to	680,000															504	445	428
680,001	to	682,000															507	449	431
682,001	to	684,000															511	452	433
684,001	to	686,000															514	455	436

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686,001	to	688,000														518	458	439
688,001	to	690,000														521	462	442
690,001	to	692,000														525	465	445
692,001	to	694,000														528	468	448
694,001	to	696,000														532	471	452
696,001	to	698,000														535	474	455
698,001	to	700,000														539	478	458
700,001	to	702,000														542	481	461
702,001	to	704,000														546	484	464
704,001	to	706,000														549	487	468
706,001	to	708,000														553	490	471
708,001	to	710,000														557	493	474
710,001	to	712,000														560	496	478
712,001	to	714,000														564	500	481
714,001	to	716,000														568	503	484
716,001	to	718,000														571	506	487
718,001	to	720,000														575	510	490
720,001	to	722,000														579	513	494
722,001	to	724,000														582	516	497
724,001	to	726,000														586	520	500
726,001	to	728,000														590	523	503
728,001	to	730,000														593	526	507
730,001	to	732,000														597	530	510
732,001	to	734,000														601	533	513
734,001	to	736,000														605	537	517
736,001	to	738,000														608	540	520
738,001	to	740,000														612	544	523
740,001	to	742,000														616	547	526
742,001	to	744,000														620	550	530
744,001	to	746,000														624	554	533
746,001	to	748,000														627	557	537
748,001	to	750,000														631	561	540
750,001	to	752,000														635	564	543
752,001	to	754,000														639	568	547
754,001	to	756,000														643	571	550
756,001	to	758,000														647	575	554
758,001	to	760,000														650	579	557
760,001	to	762,000														654	582	560
762,001	to	764,000														658	586	564
764,001	to	766,000														662	589	567
766,001	to	768,000														666	593	571
768,001	to	770,000														670	597	574
770,001	to	772,000														675	600	578
772,001	to	774,000														678	604	581
774,001	to	776,000														682	607	585
776,001	to	778,000														686	611	588
778,001	to	780,000														691	615	592
780,001	to	782,000														695	618	595
782,001	to	784,000														699	622	599
784,001	to	786,000														703	626	603
786,001	to	788,000														707	630	606
788,001	to	790,000														712	633	610
790,001	to	792,000														716	637	613
792,001	to	794,000														720	641	617
794,001	to	796,000														724	645	621
796,001	to	798,000														728	648	624
798,001	to	800,000														732	652	628
800,001	to	802,000														736	656	631
802,001	to	804,000														741	660	635
804,001	to	806,000														745	663	639

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806,001	to	808,000															749	667	642
808,001	to	810,000															753	671	646
810,001	to	812,000															757	675	650
812,001	to	814,000															762	679	654
814,001	to	816,000															766	683	657
816,001	to	818,000															770	687	661
818,001	to	820,000															774	690	665
820,001	to	822,000															779	694	669
822,001	to	824,000															783	698	672
824,001	to	826,000															787	702	676
826,001	to	828,000															792	706	680
828,001	to	830,000															796	710	684
830,001	to	832,000															800	714	687
832,001	to	834,000															804	718	691
834,001	to	836,000															808	721	695
836,001	to	838,000															812	725	699
838,001	to	840,000															817	729	703
840,001	to	842,000															821	733	707
842,001	to	844,000															826	737	711
844,001	to	846,000															830	741	714
846,001	to	848,000															835	745	718
848,001	to	850,000															839	749	722
850,001	to	852,000															843	753	726
852,001	to	854,000															848	758	730
854,001	to	856,000															852	762	733
856,001	to	858,000															857	766	737
858,001	to	860,000															861	770	741
860,001	to	862,000															866	775	745
862,001	to	864,000															870	779	749
864,001	to	866,000															875	783	753
866,001	to	868,000															879	788	757
868,001	to	870,000															884	792	762
870,001	to	872,000															889	796	766
872,001	to	874,000															893	800	770
874,001	to	876,000															898	804	774
876,001	to	878,000															902	809	778
878,001	to	880,000															907	813	782
880,001	to	882,000															912	817	786
882,001	to	884,000															916	821	790
884,001	to	886,000															921	825	794
886,001	to	888,000															926	829	798
888,001	to	890,000															930	833	803
890,001	to	892,000															935	838	807
892,001	to	894,000															940	842	811
894,001	to	896,000															944	846	815
896,001	to	898,000															949	851	819
898,001	to	900,000															954	855	823

APPENDIX 6: UNIT PAVEMENT COSTS (USDOT, 2000)

The unit pavement costs reported in USDOT (2000) are given in Table 1 and Table 2. It is to be noted that the damage cost estimates from that study are so low that they are unrealistic. Thus, we do not recommend their use in establishing the costs of pavement damage. We herein present them only for purposes of comparison between the effects of truck types, number of axles, and road classes on pavement damage.

Table 1: Unit Pavement Cost For Various Truck Types (\$/1000 miles) (USDOT, 2000).

Unit Pavement Cost for Various Truck Types in \$/1,000 miles										
		Truck Type								
		Single-Unit		Semitrailer		Double-Trailer			Triple-Trailer	
	Weights (Pounds)	3-Axles	4-Axles	5-Axles	6-Axles	5-Axles	7-Axles	8-Axles	7-Axles	
	GVW	54,000	64,000	80,000	90,000	80,000	100,000	105,000	100,000	115,000
	Tare	22,600	26,400	30.49	31,530	29,320	38,600	33,470	41,700	41,700
	Payload	31,400	37,600	49,510	58,470	50,680	61,400	71,530	58,300	73,300
Area Type	Functional Class									
Rural	Interstate	0.09	0.07	0.05	0.05	0.03	0.1	0.05	0.04	0.08
	Prin.Art.	0.17	0.16	0.12	0.11	0.07	0.15	0.1	0.17	0.31
	Min.Art.	0.37	0.33	0.29	0.22	0.32	0.41	0.21	0.39	0.75
	Maj.Col.	1.38	1.35	0.9	0.8	1.17	1.03	0.65	1.46	2.95
	Min.Col.	2.27	2.08	1.49	1.24	1.92	1.69	1.07	2.42	4.87
	Locals	5.9	5.63	3.87	3.23	4.99	4.4	2.79	6.27	12.6
Urban	Interstate	0.06	0.04	0.04	0.04	0.03	0.04	0.02	0.03	0.05
	Freeway&Expressway	0.09	0.06	0.06	0.05	0.04	0.07	0.04	0.09	0.18
	Prin.Art.	0.13	0.12	0.1	0.09	0.11	0.09	0.06	0.13	0.26
	Min.Art.	0.3	0.24	0.22	0.17	0.19	0.18	0.12	0.34	0.7
	Collector	0.66	0.7	0.54	0.49	0.46	0.34	0.25	0.86	1.82
	Locals	2.34	2.53	1.91	1.75	1.64	1.19	0.88	3.06	6.45

Table 2: Unit Cost per Payload-mile for Various Truck Types (\$/1000 Ton-miles) (USDOT, 2000).

Unit Cost per Payload-mile for Various Truck Types in \$/1,000 Ton-miles										
		Truck Type								
		Single-Unit		Semitrailer		Double-Trailer			Triple-Trailer	
	Weights (Pounds)	3-Axles	4-Axles	5-Axles	6-Axles	5-Axles	7-Axles	8-Axles	7-Axles	
	GVW	54,000	64,000	80,000	90,000	80,000	100,000	105,000	100,000	115,000
	Tare	22,600	26,400	30.49	31,530	29,320	38,600	33,470	41,700	41,700
	Payload	31,400	37,600	49,510	58,470	50,680	61,400	71,530	58,300	73,300
Area Type	Functional Class									
Rural	Interstate	0.006	0.004	0.002	0.002	0.001	0.003	0.001	0.001	0.002
	Prin.Art.	0.011	0.009	0.005	0.004	0.003	0.005	0.003	0.006	0.008
	Min.Art.	0.024	0.018	0.012	0.008	0.013	0.013	0.006	0.013	0.02
	Maj.Col.	0.088	0.072	0.036	0.027	0.046	0.034	0.018	0.05	0.08
	Min.Col.	0.145	0.111	0.06	0.042	0.076	0.055	0.03	0.083	0.133
	Locals	0.376	0.299	0.156	0.11	0.197	0.143	0.078	0.215	0.344
Urban	Interstate	0.004	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001
	Freeway&Expressway	0.006	0.003	0.002	0.002	0.002	0.002	0.001	0.003	0.005
	Prin.Art.	0.008	0.006	0.004	0.003	0.004	0.003	0.002	0.004	0.007
	Min.Art.	0.019	0.013	0.009	0.006	0.007	0.006	0.003	0.011	0.019
	Collector	0.042	0.037	0.022	0.017	0.018	0.011	0.007	0.03	0.05
	Locals	0.149	0.136	0.077	0.06	0.065	0.039	0.024	0.105	0.176

With due attention to the caveat stated in the introduction to this Appendix, Tables 1 and 2 also illustrate how the addition of axles allows for increased payloads and at the same time reduces pavement deterioration (or conversely, how the reduction of axles at a given payloads could increase pavement deterioration). It is particularly interesting to see the comparisons between the 3- and 4-axle single unit trucks; the 5- and 6-axle semitrailer combinations; and the 5- and 8-axle double trailers. As seen in the results, the cost (\$/payload ton-mile) for the 4-axle truck is approximately 75% of that for the 3-axle truck even though its gross weight is 10,000 pounds more than the 3-axle truck. Also, a comparison of the 6-axle semitrailer with the 5-axle is very similar on non-Interstate highways. It is also seen that the costs for the 8-axle double-trailer are less than half those for the 5-axle double-trailer. The data also suggests that triple trailers do not compare well with double trailers. While additional axles cause less damage to the pavement, truck owners seem to be opposed to adding axles because this increases the tare weight of the vehicle and causes increases in the cost of vehicle operation.

Table 3 presents the pavement damage cost implications of increasing the number of axles. It can be seen that adding even just one axle has significant reduction of pavement damage cost. While the decrease in pavement cost for adding more than one axle is not expected to be linear, one nevertheless can expect a very drastic impact on pavement damage costs.

Table 3: Increase in Axle Load for Rural Interstate Operations (USDOT, 2000).

	Change from	To	Impact on Pavement Damage Cost
Double Trailer GVW 100-105K lbs	7 axles	8 axles	50% reduction
Semi-Trailer GVW 80-90K lbs	5 axles	6 axles	40% reduction

Figure 1: Unit Pavement Cost For Various Truck Types (\$/1000 miles), Rural Roads

Figure 2: Unit Pavement Cost For Various Truck Types (\$/1000 miles), Urban Roads

Figure 3: Unit Cost per Payload-mile for Various Truck Types (\$/1000 Ton-miles), Rural

Figure 4: Unit Cost per Payload-mile for Various Truck Types (\$/1000 Ton-miles), Urban