

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM
REPORT

80

OVERSIZE-OVERWEIGHT
PERMIT OPERATION ON
STATE HIGHWAYS

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OVERSIZE-OVERWEIGHT PERMIT OPERATION ON STATE HIGHWAYS

ROY JORGENSEN AND ASSOCIATES
GAITHERSBURG, MARYLAND

RESEARCH SPONSORED BY THE AMERICAN ASSOCIATION
OF STATE HIGHWAY OFFICIALS IN COOPERATION
WITH THE BUREAU OF PUBLIC ROADS

SUBJECT CLASSIFICATION:

TRANSPORTATION ADMINISTRATION
TRANSPORTATION FINANCE
TRANSPORTATION ECONOMICS
ROAD USER STUDIES
LEGAL STUDIES

HIGHWAY RESEARCH BOARD

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1969

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Bureau of Public Roads, United States Department of Transportation.

The Highway Research Board of the National Academy of Sciences-National Research Council was requested by the Association to administer the research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose as: it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; its relationship to its parent organization, the National Academy of Sciences, a private, nonprofit institution, is an insurance of objectivity; it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

The program is developed on the basis of research needs identified by chief administrators of the highway departments and by committees of AASHO. Each year, specific areas of research needs to be included in the program are proposed to the Academy and the Board by the American Association of State Highway Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are responsibilities of the Academy and its Highway Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

This report is one of a series of reports issued from a continuing research program conducted under a three-way agreement entered into in June 1962 by and among the National Academy of Sciences-National Research Council, the American Association of State Highway Officials, and the U. S. Bureau of Public Roads. Individual fiscal agreements are executed annually by the Academy-Research Council, the Bureau of Public Roads, and participating state highway departments, members of the American Association of State Highway Officials.

This report was prepared by the contracting research agency. It has been reviewed by the appropriate Advisory Panel for clarity, documentation, and fulfillment of the contract. It has been accepted by the Highway Research Board and published in the interest of an effectual dissemination of findings and their application in the formulation of policies, procedures, and practices in the subject problem area.

The opinions and conclusions expressed or implied in these reports are those of the research agencies that performed the research. They are not necessarily those of the Highway Research Board, the National Academy of Sciences, the Bureau of Public Roads, the American Association of State Highway Officials, nor of the individual states participating in the Program.

NCHRP Project 2-10 FY '67

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FOREWORD

By Staff

Highway Research Board

This report will be of interest primarily to the officials who are responsible for administering the oversize and overweight permit operations for State Governments. In addition, parties responsible for obtaining these permits will find the report useful in determining whom to contact and how to make the application. A sample of permits in the 48 contiguous states for the year 1966 was surveyed to determine the characteristics of oversize-overweight permit operations on state highways in the U.S. Recommendations to change some of the permit practices are presented.

There has been an urgent need for a complete investigation and evaluation of the highway transport situation pertaining to oversize-overweight vehicles operating over state highways of the U.S. under the privilege of a special permit. Past cursory studies indicated a complete lack of uniformity among the states with respect to permissible axle and gross weights, issuance of permits, regulations, fees, and registration costs associated therewith. Further, the extent of current activities in this phase of highway transportation was not fully known, and factual information as to future needs and their economic justification had not been determined on a national basis. Because of the physical and economic aspects of oversize-overweight vehicles in relation to present and future highway needs, a need existed for immediate development of basic information for use in coping with this problem.

The objective of this project was to conduct a nationwide study in relation to oversize-overweight permit operations in all states whether by statutes or administrative authority, including all types of vehicles permitted under such regulations. Accomplishment of this objective by Roy Jorgensen & Associates involved a complete inventory and a summary of operating permits in the 48 contiguous states, including total numbers for a one-year period; and the determination of purpose of permit, type of carriage, commodity, length of haul, relation of the state's standards of size and weight, and other permit characteristics. Permit characteristics were obtained using sampling techniques.

From these data, the researchers determined the extent and nature of reciprocity and compact agreements in relation to permit operations, and the foreseeable needs of industry for extension or alteration of permit operations.

Another objective of the researchers was to determine the economic benefits to be realized from both social and private viewpoints for different commodities and for various levels of overweight-oversize permit operations. Because many state permit offices could provide only limited cooperation in obtaining permit samples, the cost of completing the inventory of all the states precluded complete realization of this objective.

Much information appears in this report about the use of oversize-overweight permits by industry and the military, and about the benefits that accrue to individual users and, in many cases, the general public. Recommendations are made for changes in permit practice, and for the research necessary to complete the study of economic benefits and other aspects of this broad problem.

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ACKNOWLEDGMENTS

Acknowledgment is due the personnel of many agencies representing state governments, the nation's military organizations, and private industries for assistance in gathering the vast quantities of data on oversize-overweight permit operations assembled to meet the objectives of this project.

Among the principal contributors were the permit administration agencies in each of the states. Personnel of these agencies not only gave time to detailed discussion of permit operations and to answering questionnaires, but also provided invaluable assistance in drawing permit samples, reproducing these in many cases, and coding forms for data processing in others.

The most notable contributions were made by the states of Iowa, North Dakota, and Wisconsin, which drew samples of permits from their files and coded these for data processing.

The following state permit offices drew samples from their files and reproduced the permits at their expense and transmitted copies, or sent original permits to the project for coding:

Alabama, Arkansas, California, Colorado, Delaware, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Minnesota, Missouri, Nevada, New Hampshire, New Mexico, North Carolina, Oklahoma, South Dakota, Tennessee, Virginia, Washington, and West Virginia.

The permit offices of Pennsylvania and Wisconsin reproduced taped permit records, entirely at the state's expense.

The following state permit offices provided access to files, helped project personnel who drew samples, and reproduced permits at their expense:

Connecticut, New York, South Carolina, and Vermont.

These state permit offices drew samples at their expense and reproduced permits at nominal cost:

Arizona, Idaho, Michigan, Montana, Nebraska, Ohio, Oregon, Utah, and Wyoming.

All other permit offices provided varying degrees of assistance

in helping to draw samples and, in some cases, helping to secure personnel to perform coding. Acknowledgment is gratefully made to the states of:

Maine, Massachusetts, Mississippi, New Jersey, Rhode Island, Texas, and the District of Columbia.

Also among the principal contributors of data was the Heavy-Specialized Carriers Conference of the American Trucking Associations. Member companies of this organization logged permit trips for a period of three months, greatly expanding information on origins and destinations and types of long- and short-distance hauls. Special credit is due Allan Shirley of A.T.A. for making arrangements. A.T.A. contributed the printing of log forms.

Acknowledgment is gratefully made to the Oilfield Carriers Conference, whose membership made similar logs of oversize-overweight permit movements. Credit is particularly due Charles T. Stamp, Director of Safety and Compliance.

The Military Traffic Management and Terminal Service, Department of the Army, made a log of most oversize-overweight military movements in the 48 contiguous states for a period of six months. These included movements made by all branches of the military, as well as commercial moves certified by the military. Special credit is due D. K. Chacey, Special Assistant for Transportation Engineering, and his staff.

Credit is due to weight enforcement officers, including members of the state police in many states, who gave generously of their time to discuss enforcement aspects. The help of other state agencies associated in some way with oversize-overweight permit operations in some states also is acknowledged.

Acknowledgment is given to the Frank W. Hake Company, of Philadelphia, which contributed pictures for the project.

And, finally, acknowledgment is given to the large number of individual companies and industry associations that answered questionnaires on multiple-trip permit operations and industry needs.

OVERSIZE-OVERWEIGHT PERMIT OPERATION ON STATE HIGHWAYS

SUMMARY

Major objectives of this research were: (1) to study in depth the characteristics of oversize-overweight permit operations on U.S. highways, including characteristics of laws, procedures, and permit movements; (2) to develop a national inventory of permits issued during a one-year period, with appropriate breakdowns of permit features; (3) to determine the extent and nature of reciprocity relative to permit operations; (4) to determine foreseeable needs of industry for extension or alteration of permit operations; and (5) to make a start in evaluating economic benefits of oversize-overweight permits.

A sample of 61,065 oversize-overweight permits, representing the 2,151,282 permits issued in 1966 by the 48 contiguous states and the District of Columbia, were collected as a result of personal visits to each state. All practices in connection with permit administration were reviewed during these visits.

To identify characteristics of a significant part of the permit spectrum, special samples of oversize-overweight trips were logged by the Heavy-Specialized Carriers Conference, the Oil Field Haulers Conference, and the Military Traffic Management and Terminal Service.

Investigations disclosed numerous variances among the states in permit laws, procedures, and administration.

The most important problem is the variance in laws, regulations, and philosophies that govern whether permits will be issued for different kinds and configurations of movements. Conditions imposed on movers also are important and vary considerably with respect to where and how permits can be obtained, systems on which certain moves are permitted, bonds or insurance requirements, protective measures which must be followed, privileged movements, number of trips permitted, permit time limits, enforcement tolerances, and fees.

It is not unusual for very large (unusually heavy) loads of considerable general economic importance to have a permit refused in one state after having traversed, or made arrangements to traverse, a neighboring state with no problem.

Needs for permits in some states are reduced by exceptions to legal limits. For example, one state has cut permit issuance approximately in half by exempting all mobile homes up to certain dimensional limits. It is recommended that to reduce paperwork, other states consider this in lieu of multiple-trip permits.

The major users of permits are the construction and mobile-home industries, which, respectively, accounted for 39.90 and 31.53% of the permit issuance in 1966.

Other industries that rely heavily on permit operations are the aerospace, agriculture, forest, boating, mining, oil and gas, and public power industries, and the military.

The transportation needs of both the mining and public power industries more often than other industries involve the movement of extraordinarily large and heavy loads. The largest load moved in 1966 was a 1,600,000-lb strip mining shovel. Nuclear reactors and large transformers and circuit breakers can involve gross weights of from 100 to 500 tons.

Generally, the greatest number of permits is issued for overwidth movements. Of the total 1966 issuance, 85.05% was for overwidth. Except for houses and buildings, significant numbers of overwidth permits were required for widths up to 20 ft.

Of the 1966 permits, 58.18% were for overlength. Structural members were the longest items moved, often requiring an over-all length (vehicle and commodity) in excess of 120 ft. Ironically, the longest beams often are destined for clear-span highway bridge structures.

Overheight is not involved in a large proportion of movements—only 18.65%. However, because of limited vertical clearances, the few moves that exceed normal clearances must be routed carefully to avoid costly damage to both highway facilities and load and vehicle.

Commodities most affected by vertical clearances are military, heavy industry, and public power related. Because these commodities are generally important to the public welfare, it seems reasonable to establish and adopt a network of interconnected interstate highways to allow their carefully supervised movement. The Department of Defense has made a proposal for designation of limited mileage on the National System of Interstate and Defense Highways.

Overweight permits accounted for 33.14% of the 1966 issuance. Overweights are associated largely with machinery of all types and public power and military items. Non-uniformity in legal weight limits and methods of determination of safe loads on bridges create many problems for movers of overweight commodities.

Analyses described in this report indicate that weight-law enforcement varies widely in effectiveness. Research is needed to determine types and levels of enforcement necessary to optimize use of enforcement resources and benefits.

Projections of industry trends indicate that most industries' needs for permit operations will continue to grow—notably aerospace, mobile home, and public power industries. Assuming no change in permit regulations or legal limits, it is estimated that oversize-overweight permits issued in 1975 will number approximately 3,808,000.

Some recommendations for changes in permit practices, and recommendations for further research, are included in this report.

Further research on economic impacts of permit requirements and limitations are needed as a basis for rational evaluation of the variances in current practice. Economic studies should be directed toward (1) values of commodities moved under permit, (2) cost and time factors relative to movements under permit and alternative methods of transportation, (3) problems associated with alternative transportation methods, and (4) changes in value and other effects of limitations on moves or inability to make moves.

Information also needs to be developed on highway costs, such as (1) incremental construction and maintenance costs related to oversize and overweight movements, and (2) costs of additional physical provisions (such as vertical clearances) to provide more extensively for certain types of movements.

CHAPTER ONE

INTRODUCTION AND RESEARCH APPROACH

OBJECTIVES AND BACKGROUND

The establishment of uniform practices governing legal sizes and weights of vehicles operating on state highways, and exceptions to these limits, have been frequently discussed by both highway administrators and highway users. Legal limits, with the possible exception of the limit for width, are not uniform in either established numerical limits or methods of measurement. Laws, regulations, and procedures governing the issuance of special permits to exceed these limits are even less uniform. Past efforts to reconcile differences and develop uniform permit operation practices have not been successful. In part, this lack of success has been due to inadequate data regarding the scope and economic impact of oversize-overweight permit operations. The project that this report represents, NCHRP Project 2-10, was initiated to obtain data necessary for further objective study of the permit operations problem.

Research Problem Summary

The Problem Statement for this project was as follows:

There is an urgent need for a complete investigation and evaluation of the highway transport situation in relation to oversize-overweight vehicles operating over the highways of the nation under the privilege of a special permit. cursory studies indicate a complete lack of uniformity between states with respect to axle and gross weights, issuance of permits, regulations, fees, and registration costs associated therewith. Further, the extent of current activities in this phase of highway transportation is not fully known, and factual information as to future needs and their economic justification is not available or has not been determined on a national basis. Because of the physical and economic aspects of oversize-overweight vehicles in relation to present and future highway needs, it is timely that basic information be developed as soon as possible for use in coping with this problem.

The objectives of Project 2-10 are:

1. To conduct a nationwide study in relation to oversize-overweight permit operations in all states whether by statutes or administrative authority, including all types of vehicles permitted under such regulations. Accomplishment of this objective involves, but is not necessarily restricted to: (a) an inventory and summary of operating permits in the contiguous states, including total numbers for a one-year period; and (b) the determination of purpose of permit, type of carriage, commodity, length of haul, relation to the State's standards of size and weight, and other permit characteristics. The inventory shall be on a complete basis. Permit characteristics may be obtained using generally accepted sampling techniques.
2. To determine the extent and nature of reciprocity and compact agreements in relation to permit operations.
3. To determine the foreseeable needs of transportation by industry groups in regard to the extension or alteration of permit operations.
4. To determine all the economic benefits to be realized from both social and private viewpoints for different commodities and for various levels of overweight and oversize permit operations.

This Problem Statement was supplemented by the following note: "The first three objectives are to be completed and as much progress made on objective four as possible within the funds available."

Because many state permit offices were able to provide only limited cooperation in obtaining permit samples, the cost of completing the inventory for all states precluded any substantial accomplishment of objective four. Nevertheless, much was learned of the use of oversize-overweight permits by industry and the military, as well as the benefits derived from them by both individual users and, in many cases, the general public. All other objectives have been attained; the findings are included herein, together with data that are pertinent to the accomplishment of objective four.

Variances Between States

Some variances in permit operations between states can be found for almost all observable or measurable characteristics. The primary objectives of permit operations, however, are relatively uniform. These are:

1. To provide for movement over the highways of commodities exceeding legal weight or size limits when such a movement can be justified as being in the best interest of the community, and there is no feasible alternative.
2. To control such movements in the interest of (a) the structural integrity of the highway, (b) the safety of all highway users, and (c) the efficient operation of traffic.

To these primary objectives, can be added a third—the collection of revenue. Application of this objective, however, is not particularly uniform. Fee rates vary from no charge for oversize-overweight permits in some states to substantial charges in others based on flat fees or weight-distance formulas. Some states seek to recover permit operation costs; others apparently seek to derive additional revenue or discourage oversize-overweight operations by fee charges.

Exceptions to Legal Limits

There are two methods by which exceptions to the general legal limits are extended—limited legal-limit extensions and permit operations. Limited legal-limit extensions are granted legislatively and require no administrative regulation other than enforcement. These extensions generally are granted to military, agricultural, and local industry moves. However, extensions are no more uniform between states than are legal or permit provisions. Control is limited to the terms of the legislation, which in many cases includes only the type of commodity and the dimensions. Some examples of these extensions are as follows:

1. In Alabama there is no weight limit on tank trucks carrying refrigerated milk for human consumption.

2. In Colorado there are no weight or size limits on implements of husbandry. Farm tractors are legal up to a width of 120 in., as compared with the normal legal width of 96 in.

3. The legal width of buses is 102 in. in several states.

4. Utility pole moves and, in some timber states, movements of logs often are granted legal length limits well in excess of those granted other commodities.

Table 30 gives a summary of exceptions to legal size and weight requirements in the states.

Permit operations accomplish the same purpose. However, with the use of permits, control can be maintained over individual movements. Because some industries routinely require the same kind of permit for repetitive movements that are judged acceptable, most states issue multiple-trip permits.

In some cases, multiple-trip permits and routinely issued single-trip permits can be replaced with limited legal-limit extensions. As an example, in most states the application for and receipt of a permit to move a mobile home combination within the dimensional limits of 12 ft wide and 75 ft long is routine. Only one state (Alabama) has chosen to extend the legal limit for such moves to obviate the need to obtain a permit. Where permit procurement has become routine, it would seem reasonable to extend the legal limits to reduce permit processing. Variance between states in volume of permit issuance is affected to some extent by the provisions of extensions in lieu of requiring permits.

Between the states, control over movements by permit varies widely. The means of control can be summarized as follows: type of permit issued, size and weight limits, route specifications, place issued, method of issuance, method of payment, and enforcement.

Multiple-Trip Permits

Permits are of two general types—multiple-trip and single-trip—although there are variances of each. Without exception, all states issue some sort of blanket permit allowing multiple movements of a specified vehicle or commodity over a specified time period. Pennsylvania, which believes in strong control over every trip exceeding legal limits, issues an extremely limited number of multiple-trip permits, either for agricultural moves with a 20-mile limit or quarry product hauls with a ½-mile limit. These account for less than 0.4 percent of Pennsylvania's permit issuance.

Several states issue multiple-trip permits but require individual trip approval, usually by phone. Most multiple-trip permits specify only size, weight, route, and time limits, and require no further communication with the permit officer. Activity under multiple-trip permits is an unknown quantity in most states. Examples of types of commodities to which multiple-trip privileges are extended are:

1. Construction equipment, mobile homes, pipes, power poles. These commonly are extended the privilege with no regional patterns.

2. Oil-field equipment, logs, pulpwood, tanks. These commonly are associated with states where related industries are indigenous.

Single-Trip Permits

Control over single-trip movements by permit also varies widely. The major variables are the limits above which a permit either will not be issued or requires extensive analysis of routing and loading before issuance. Generally, these limits fall around 100,000-lb gross weight, 14-ft width, 90-ft length, and 14-ft height. One state, except in a few extremely isolated past cases (which now are regretted by the permit issuing authorities), does not issue permits for gross vehicle weights in excess of 55 tons. Another state considers gross weights up to 75 tons routine and does not require analysis until the weight exceeds this amount. Still another state (Michigan) has no gross weight legal limit and, therefore, no gross weight permit limit at all. Many states make every effort to accommodate the heaviest and largest moves and work with the mover to prepare a plan for the movement that will be workable according to the objectives and finances of both the mover and the state. These variances in philosophy, ranging from flexible to inflexible, are one of the major problems faced by industries that rely on permit moves.

Route Specifications

Most states specify the route over which a movement under a single-trip permit is to be made. In most cases, this is the route requested by the permittee which—by virtue of the permit issuance—has been approved as satisfactory for the move. The variance occurs in the regulations (and sometimes laws) controlling state approval of different routes for different types of movements. Several states maintain maps delineating routes approved or disapproved for different classes of movements. For example, maps will show a network of highways built to width standards permitting over-wide movements. Several other states have no specially designated "systems" for different classes of movements, but evaluate each route proposal individually based on design characteristics. A few states make no route specifications, but specify only origin and destination.

For multiple-trip permits, several states specify routes, several do not. A few have specially designated systems over which specified types of multiple-trip permit moves may be made. Often the restriction specifies a designated system within a county or within a radius of a given city.

Enforcement

Another area of permit control where there is considerable variance between states is enforcement. Weight enforcement is a minor activity when viewed in the total law enforcement spectrum. Consequently, its effectiveness generally varies inversely to the extent that responsibilities for weight enforcement are merely added to the other duties of regular law enforcement officers. Also, the weight enforcement in states with general-purpose state police tends to be inferior to that in states where specific units of the state police or separate weight enforcement agencies have been established. Although it was not possible to make objective measurements, there were many indications that where enforcement was lax there were more illegal moves. In one

state, the permit officer indicated that he knew of a large piece of oversize and overweight construction equipment that has been moved numerous times, but never under permit.

On the other hand, there are states that through an extensive port-of-entry, scalehouse, and weight-patrol system make non-permitted extralegal hauls virtually impossible.

Public Protection

Several requirements that permittees must fulfill to protect the traveling public while making moves vary widely between states.

Most states require one or more escort vehicles for movements over 12 ft wide on a two-lane highway, and over 14 ft wide on a multi-lane highway. In a few states, the requirement for escort vehicles is discretionary for some movements, spelled out for others. Some states require escort vehicles for extreme dimensions other than overwidth, others do not.

In some states where escort vehicles are required, they must be furnished by the permittee. In other states, only the state police are allowed to provide escort. In some states, only one escort vehicle is required, preceding or following. In other states, for the same move, two vehicles are required.

Requirements for signs and other markings for different dimensions and types of movement also show considerable variance.

Place of Issuance

The place of issuance, to a degree, influences the control of permit operations. In nine states, permits are obtained only from the headquarters of the responsible state department. In other states, district offices are required to obtain approval from headquarters before issuing each permit. Other states have delegated to or share permit issuance authority with district offices, maintenance residencies, scalehouses, police officers, ports of entry, and private permit agents. Major reasons for central issuance given by permit authorities are: (1) ability to assure uniform control throughout the state, and (2) ability of headquarters to maintain current knowledge of road conditions throughout the state. On the other hand, it is much more convenient for permittees to obtain permits at local offices or ports of entry.

Methods of Issuance

Methods of issuing permits have variances. Application can be made in all states by mail or in person. Most states provide for application by wire. Several states provide for telephone applications. In this case, the actual issuance is done only by wire, mail, or in person. In a few cases, telephone permission is granted, but usually under special circumstances or to permit a movement to the nearest office where a permit can be secured.

Methods of Payment

Methods of payment, where payment is necessary, also

vary. Some states grant charge accounts to regular customers. More conservative states allow customers to establish escrow accounts with the issuing department. When used in conjunction with telegraphic-type permits, these accounts expedite permit issuance. Some states require payment by cash, check, or money order with the application. Most states accept cash, money order, or checks, although there are a few exceptions (New York, for example, does not accept cash because of accounting regulations).

Effects of Variances

The variances between states in oversize-overweight permit practices, including, in particular, the variances in philosophy governing the issuance of oversize-overweight permits, present serious problems to permit users—particularly those involved in interstate commerce. Philosophies of permit issuance vary from an intent to accommodate all movements in the public interest to an intent to prevent all movements exceeding limits considered detrimental to the highway or the traveling public.

Examples have been cited of states that were “passed up” for important installations of significant potential economic value because of inflexible regulations stemming from the official attitude. Examples are plentiful of permit moves which can be made with ease in some states and only with difficulty, or perhaps not at all, in others. These moves are all economically important—at least to the industry that is making them.

There seems to be little justification for the general variances between states. Most states seek to accomplish the same objectives by means of permit issuance; namely, (1) to protect the highway and the safety and convenience of the traveling public, and (2) to provide for exceptional movements on the highway which can be justified economically. Variance probably occurs in large part because of professional pride in individual permit operations, lack of meaningful communication between industry and responsible officials, and lack of realization by authorities of the impact of variations.

Following is an example of the problems encountered on a mythical but entirely realistic permit move involving several states.

A Typical Interstate Permit Move

This example covers the movement of an industrial machine which when loaded weighs 89,000 lb, has a length of 75 ft, a width of 14 ft 2 in., and a height of 13 ft 8 in. The discussion is based on the actual requirements en route. The move crosses eleven states from California to New York by way of Arizona, New Mexico, Texas, Oklahoma, Missouri, Illinois, Indiana, Ohio, and Pennsylvania.

The cost of the necessary permits will be about \$166.45. California and Ohio do not charge for a permit. The fees for the other nine states range from \$2.00 in Illinois and Missouri to Oklahoma, where the charge is \$5.00 for over legal dimension plus \$5.00 for each 1,000 lb over legal weight.

In all of the states covered by this example, permits can be obtained from both headquarters and district offices.

However, the number and convenience of locations varies considerably. Illinois issues permits from the headquarters office in Springfield and two district offices (Chicago and Effingham), whereas Texas issues permits from 158 locations including maintenance offices, district offices, resident engineer offices, and travel information bureaus.

Permit applications can be made in all cases by telegram, by letter, or in person. Six of the states permit telephone applications.

Insurance requirements vary considerably from state to state, from what appear to be a complete lack of concern in some instances to rigid stipulations in others. Texas requires that every person operating an oversize or overweight vehicle over Texas highways must have a surety bond on file with the department; the required minimum is \$1,000 for a single trip and \$5,000 for an annual permit.

Generally, in all of the states encountered on this trip, if the load exceeds 12 ft in width on a two-lane highway or 14 ft in width on a four-lane highway, at least one escort vehicle is necessary. In the majority of states escort vehicles may be provided by the permittee. However, in one of the states all escorting is done by the state police.

Signing and flag requirements are quite varied for these states. Flags need be only 12 × 12 in. in two states, but can be no smaller than 24 × 24 in. in most others. The signs vary from 6 ft to 9 ft wide, with lettering requirements ranging from 6 in. to 12 in. high. The sign colors must be black on yellow in some of the states and red on white in others. Variably, they must say either "OVERSIZE LOAD," or "CAUTION, WIDE LOAD AHEAD" (or FOLLOWING), or "WIDE LOAD."

IMPACTS OF PERMIT OPERATIONS

Although many industries and commercial enterprises which transport goods over the highways undoubtedly could gain financially from the ability to make larger and heavier movements, only a limited number are dependent on the ability to make moves exceeding normal limits to the extent of continued economic progress. Most concerns can operate within the normal legal limits.

Nevertheless, the smaller number of enterprises which are dependent on exceptions to normal limits for significant on-the-highway moves are among the most important in the country in providing for the general economic welfare. For example, special provisions, by means of permits or other exceptions, allow the construction industry generally to provide major works at lower unit prices, which is of advantage to everybody (see "Construction Industry," Chapter Four).

Sometimes, moves requiring permits are important to an industry or other enterprise that is of singular economic importance in a limited number of states. These states may feel justified in making special provisions for this industry's movements without extending the same privileges to other movements of the same general kind.

Reasons for restricting the numbers of oversize-overweight permits are the negative effect of these moves on the economics of providing and maintaining highway facilities and on the convenience and safety of the traveling public. With respect to weights of loads, for example, highways

usually are designed to withstand numbers of repetitions of the legal maximum axle load. They possibly will withstand a limited number of repetitions of some heavier load without damage. Bridges and other structures are designed for certain maximum loads and spacings. Other combinations of load and spacing may produce stresses for which the bridge is not designed. However, bridges are designed with a factor of safety which may provide some flexibility in safe loading.

Thus compromises are possible in the case of a limited number of extra-heavy movements which could not be extended generally without fear of damage or increasing the cost of providing the facilities.

Compromises are possible also in the case of dimensions—provided the physical capacities of the facilities are not exceeded. Such compromises must take into consideration safety and convenience of the traveling public. A few extra-wide loads, properly marked, traveling at reasonable speeds, may be judged by traffic experts not to have serious effect on safety or convenience.

Thus, in the case of special moves of particular economic warrant, it is reasonable to make compromises with respect to normal legal requirements, and most authorities are so inclined. Considerations governing the number of these moves are (1) the economic equation, (2) considerations of safety and convenience, (3) absolute physical limitations of highways and structures, and (4) general fairness to all who request accommodations. The problem is not an easy one.

There also are liable to be considerations other than those mentioned. There is, for example, the consideration of national defense. Many present movements on the highways throughout the country are required or justified for this purpose which would appear to override most other considerations. Most states give special consideration to accommodating these movements.

There are problems, however, faced by the military which relate to inability to obtain permits but which have nothing to do with the disposition of any state to grant the permits. These are problems of physical limitations (notably bridge clearances) of the highways themselves. The problem is particularly acute on the Interstate System, where many bridges provide only 14-ft clearance although present standards specify 16 ft. Fourteen feet is not sufficient for important military moves—particularly in time of national emergency.

As a consequence, military transport authorities have pointed to the need for a special network of interstate routes providing for 16-ft clearances. Undoubtedly, such a network also would produce economic benefit in allowing freer movement of important overheight commodities.

With respect to other physical limitations of the highways, many states provide for their engineers to work with industry representatives in making provision for extraordinary moves. Sometimes the provision is made by means of special moving equipment, approved by the engineers. At other times special protection is provided to the highway or structure at industry expense. For example, a 1,600,000-lb strip-mining shovel was moved on a "bridge" of 5 ft of earth

fill over one highway. In many cases, falsework has been used to provide extra support for bridges.

Permit regulations and practices have a significant impact on industries which are dependent to some extent on permits. On the other hand, industry requirements and actions are capable of significant influence on permit operations and practices. The mobile home industry presents an excellent example.

Before the 12-ft-wide mobile home became the largest selling item of that industry, permit regulations generally did not allow their movement except under very restricted conditions. The impact on the industry—as history shows—was not to discourage the manufacture of 12-ft-wide mobile homes. In some cases, interstate movement of the 12-ft units necessitated detours around certain states. Inconvenience to the hauler and additional cost to the consumer were the major by-products of the restrictions.

As the industry continued to produce and sell 12-ft units, restrictions gradually were eased in many states. Presently, movement of a 12-ft mobile home poses few problems to the hauler in almost all states. It appears that by properly assessing the market for 12-ft mobile homes, and manufacturing accordingly despite highway movement restrictions, the mobile home industry has won concessions from the states. Objectionable features of this commodity were—and still are—its width, length, and unwieldiness in strong winds. All of these have been dealt with by the permit issuing agencies through routing, weather restrictions, and pilot car requirements.

The mobile home industry now is building a few 14-ft-wide units. One midwestern state indicated receiving three requests in as many weeks for permission to move 14-ft units. In these cases, permits were not granted. The story of the 14-ft unit may be different from that of the 12-ft unit, primarily because in most states maximum lane widths are 12 ft on most highways. Although commodities with a width in excess of 12 ft are moved over the highways, these movements are far less numerous than mobile home movements. A general refusal by the states to allow the transportation of 14-ft mobile homes certainly will have an impact on the course of this industry. However, it may not preclude the further manufacture of these units if there is sufficient public demand.

It is significant that the changes in permit requirements illustrated by the foregoing example were not accomplished through effective communication between industry and the responsible government agencies. Several permit authorities have complained that industry often designs and constructs a commodity before asking whether it can be moved over the highways. On the other hand, industry asks why it should be limited by the inefficiencies of small equipment because larger equipment cannot be moved over the highways under present regulations.

It seems reasonable to assume that strict adherence to legal limits would not have killed the mobile home industry. There are, however, some transported commodities that definitely would become unmarketable because of inability to deliver. House moving, for example, would not be possible. Commodities related to public power, such as pressure vessels for nuclear reactors, would be restricted

from movement on the highways. As a result the industry would necessarily be more limited in its selection of possible plant sites, being dependent solely on the availability of water transportation.

Examples of this situation are available in a few states. Because of state denial of permission to move a large transformer to a new power plant, the owner had to obtain temporary easements from local landowners along the 9- to 10-mile route to allow the move to be made across private property. The property was agricultural, thus limiting the move to a time after the harvest. This move was costly in terms of both time and money, costs which probably were passed on to the public.

The impacts on industries of the ability to obtain permits for oversize-overweight movements can be summarized as follows:

1. Enables production of larger, more marketable goods.
2. Enables savings through less field assembly.
3. Gives heavy industries a greater latitude in site selection.
4. Enables production of more efficient machinery, thus increasing general productivity.
5. Extends the flexibility of the total inter-modal transportation system and its ability to serve the public.

EARLIER STUDIES AND DEVELOPMENTS

Several national and regional studies have been conducted in the past to develop information on permit operations. Most of these have been studies of the different state laws and regulations, or of permit effects on specific types of movement. Few developed any significant data on numbers and types of permit movements as related to more than one state's operations. (A few states have researched their own operations, to some extent.)

Probably the most extensive data were developed in 1961-1963 for the Transport Committee of the American Association of State Highway Officials (AASHO). The studies were conducted by a pilot group of state representatives of AASHO's Region Three under the chairmanship of Robert E. Murray, of Michigan. They sometimes are linked with the late W. E. Chastain, of the Illinois Division of Highways, who also played a primary role in the development and presentation of data and findings.

The purposes of the studies were summed up aptly by R. E. Nelson, of the Minnesota Highway Department, as directed toward "adoption of a uniform transportation permit form and the possible acceptance of an enabling act to allow all states taking proper action required by their laws, to enter into agreement with all other states so participating, to authorize the issuance of transportation permits allowing movement through other states."¹

These studies contributed toward the permit provisions of the "Policy on Maximum Dimensions and Weights of Motor Vehicles to be Operated over the Highways of the United States," which was recommended by the Transport Committee and adopted by AASHO in October 1963. This

¹ From a letter dated May 10, 1967, from R. E. Nelson, Road Information and Permit Officer, Minnesota Highway Department, to Lawrence F. Burns, Highway Permit Agent, New York State Department of Public Works.

Policy contained a recommended uniform permit application (Fig. 1). The major permit provisions of the 1963 Policy were shortlived, however, and were eliminated in the Policy adopted in 1964 (see Chapter Five).

In 1964, the National Highway Users Conference (NHUC) conducted a survey of requirements for motor vehicle excess size and weight permits. This survey did not result in either a report or recommendations. It is used by NHUC as an in-house reference document.

In 1965, a Special Joint Subcommittee of the American Association of State Highway Officials and the American Road Builders' Association reported on a questionnaire survey to develop basic facts concerning the problems involved in the highway movement of road construction machinery. This subcommittee first met in 1961 and, at that time, determined the need for basic data.

The report contains information regarding exceptions for road machinery, legal limits, permit limits, permit types and how these are obtained, liability, other limitations, and fees. Recommendations were not forthcoming from this study.

With regard to the problem of vertical clearances, the Bureau of Public Roads and the Department of Defense have made inventories of structures on the Interstate System that have a vertical clearance of less than 16 ft and analyses of the effects of highway vertical clearances on defense transportation. These studies resulted in the recommendation that "future controlled-access Federal-aid highways and highways of the Federal-aid primary system, except those in highly developed urban areas, be constructed to provide a minimum vertical clearance of 16 feet over the main traffic lanes."²

A report³ prepared by Aerospace Corporation dealt with the subject of vehicle-highway relationships. This report differs from the previously mentioned studies in that it goes beyond summarizing the outward characteristics of legal-limit exceptions and permit privileges and discusses basic philosophies and fallacies of size and weight restrictions. The major conclusion appeared to be that empirical limits rather than actual physical limits presently tend to determine the ability to move oversize-overweight commodities. The report recommends that future research be conducted to (1) define actual physical highway limitations, (2) investigate vehicle characteristics with regard to possible new designs capable of transporting large or heavy commodities without exceeding highway capacities, and (3) organize a coherent legal approach (that is, one based on actual physical limitations).

Most recently a subcommittee of the Southeastern Association of State Highway Officials has studied and summarized restrictions imposed by the member states on the movement of permitted loads. The Committee presently is developing recommended restrictions or regulations under which permitted moves can be made, with uniformity between states as the ultimate goal.

Other related studies include unpublished summaries prepared by a few individual permit officers for the purpose of

assessing their own operations, and studies by the U.S. Bureau of Public Roads in the area of size and weight regulations.

RESEARCH APPROACH

Two basic types of data were gathered to accomplish the objectives of this study, as follows:

1. Data on permit operations and their relation to legal limits, including: (a) laws and regulations—legal limits and permits; (b) permit operations procedures; (c) permit issuance volume and characteristics; (d) sizes and weights of movements; (e) commodities moved; (f) equipment used; and (g) characteristics of movements, including origin-destination, trip length, etc.

2. Data on industry needs and trends, including: (a) present use of permits, (b) growth trends, and (c) problems related to the use of permits.

These types of data were obtained from various sources, including questionnaires, personal interviews, state permit samples, annual reports from affected industries, annual reports from state permit agencies, loadometer studies, tabulations of trips prepared by industrial groups and the military, and miscellaneous summaries provided by affected industries.

Data Collected From State Authorities

Data were collected from the state oversize-overweight permit agencies as follows:

1. An initial questionnaire (see Appendix A) was sent to all states to determine what data were available.

2. A questionnaire was sent to independent toll road facilities to obtain an estimate of permit issuance and copies of laws and regulations governing permit operations on toll roads.

3. A personal visit was made to agencies responsible for permit issuance and enforcement in each of the 48 contiguous states and the District of Columbia to observe and discuss permit operations.

4. A sample of permits was collected from each state and the District of Columbia by methods determined during the state visits.

5. Truck weight studies—loadometer studies—were collected from each state and the District of Columbia.

6. Weight law enforcement statistics, when available, were collected from state truck weight enforcement agencies.

The initial questionnaire was sent to the 48 contiguous states and the District of Columbia in December 1966. Returns were received from all states and the District of Columbia. The quality and general character of each state's annual permit issuance were determined from the questionnaire.

Pilot Study

Prior to conducting the general state visits, four states (Mississippi, Montana, Nebraska, Pennsylvania) were selected

² From a letter dated March 8, 1966, from Col. Fred C. Allen to Rex M. Whitton, Public Roads Administrator.

³ Maddock, Robert K., "Vehicle-Highway Relationship Study Report." Aerospace Corp. (Aug. 1966).

as pilot states to test the procedures for interviews and collection of permit data. The subsequent visits with permit issuing and enforcement authorities in each of these states, exploration of problem areas, and analysis of questions asked these authorities, helped in the establishment of standardized procedural and question guides. This was necessary because the study plan called for several different researchers to follow up in completing the state visits.

The pilot studies also demonstrated the need for flexibility in the sampling procedures to obtain data on permit characteristics. Sampling techniques were developed to take into consideration different volumes of permit issuance, places of issuance, and methods of filing.

State Visits

Following modification of procedures as a result of the pilot studies, all of the 48 contiguous states and the District of Columbia were visited. The purposes of these visits were: (1) to observe and document the policies, procedures, and operations—including weight enforcement—related to oversize-overweight permit operations; (2) to discuss permit operation problems; and (3) to arrange for the collection of data from a reasonable sample of permits and other available sources.

The conduct of state visits was broken down into two phases—interviews and data collection. The interview was conducted according to a standard set of questions covering the general categories of (1) organization and procedures; (2) laws and enforcement; (3) permit characteristics; (4) permit records; (5) economic effect; (6) state toll facilities; (7) data collection; and (8) insurance. The interview questions are contained in Appendix B.

State visits often resulted in interviews with more than one agency. For example, in some states the state police, the highway department, and the toll road agency were interviewed. The information obtained during each state interview was reduced from notes to an outlined text following the interview format. Copies of data summaries, policies, procedures, and other pertinent documents were obtained.

Collection of the permit sample was accomplished in several ways, depending on the state permit agencies' ability and desire to cooperate in this effort. The majority of states provided a sample of either original or reproduced permits. In these cases the permit data were coded by the research agency. In five states the data were coded by state personnel. In some cases this was necessitated by restrictive policies concerning state records, but in all cases it represented a substantial contribution by state permit personnel. The method of coding state samples is detailed in Appendix C.

Sampling Procedures

There were several important factors to be considered in the collection of the state permit samples, including (1) sample year, (2) sample size, (3) form and location of permit records, and (4) availability of permit records.

The calendar year 1966 was selected as the basic sample year because permit data generally were available for this

time period. However, some states keep their permit records by fiscal year—July 1 through June 30—which made it impossible or economically unfeasible to obtain a sample for calendar year 1966 in every case. In some cases, the most recent and complete fiscal year's data were sampled, resulting in samples covering July 1, 1965, through June 30, 1966, or July 1, 1966, through June 30, 1967. Early analysis of trends in numbers of permits issued indicated that a 6-month overlap either backward or forward in time would not result in significant estimating errors.

It was determined that approximately 3 percent of the annual national permit issuance would be collected. However, application of a single percentage sample size to all states provides a wide range in statistical significance between states. For example, the state universes for 1966 ranged from 1,311 to 234,514. Collection of a straight 3 percent sample from the extremes would have resulted in sample sizes of 39 and 7,035, respectively. Although these sample sizes satisfy the national sample size criteria, they provide two state samples of widely varying statistical significance when a permit attribute is expressed as a percentage of the state universe.

On the other hand, a straight 3 percent sample provides relatively constant degrees of error about a similar number. For the previously mentioned universes and samples the expected variance in the estimate of an actual number (500) would be ± 197 and 248, respectively, in 95 percent of the cases. The problem is that 500 is 38 percent of the state universe in one case and only 0.2 percent of the state universe in the other. This is significant in analyzing data from an individual state.

This problem was dealt with by establishing sample size limits which the visiting researcher could use as a guide in collecting the sample. The limits were developed by determining the sample size for a 3 percent sample and the sample size based on the "hypergeometric" model.⁴ The hypergeometric model provides a "sample size required for finite populations for confidence limits and specified reliability limits in sampling attributes." In this case it was desired to draw samples with an error not exceeding 2.5 percent and a confidence limit of 95 percent.

The sample size limits, desired and acceptable, are shown in Figure 2, together with the actual collected samples. In a few states the minimum sample size was not obtained; conversely, in several states the maximum was exceeded. There were several reasons for these variations.

Filing systems, regulations pertaining to permit records, or in some cases lack of available state personnel, required that the sample be coded in the permit offices. Efforts were made to hire local coders or to gain access to the records in the evening. Where such efforts were unfruitful the visiting researcher was required to do all the coding. In a few cases, compromise for the sake of data collection costs resulted in a smaller sample.

Another factor leading to reduced sample sizes was the repetitiveness of certain permit moves. Sample sizes could be reduced in such cases without losing any accuracy. This was particularly true in states with complete summaries of

⁴ Hodges, J. L., Jr., and Lehman, E. L., *Basic Concepts of Probability and Statistics*. Holden-Day, San Francisco (1964).

10
APPLICATION MUST BE
TYPED IN DUPLICATE

Received

Do not write here



STATE OF _____

APPLICATION AND PERMIT
TO TRANSPORT OVERSIZE OR OVERWEIGHT VEHICLES AND LOADS
OVER THE INTERSTATE HIGHWAY SYSTEM AND OTHER DESIGNATED HIGHWAYS

Permit No. _____

Fee Paid:
Amount _____
Tender _____
Effective Dates of Movement:
Beginning _____
Expiring _____ (inclusive)
Excluding _____

Do not write here

APPLICANT

Name and address of vehicle owner (or lessee) _____
Phone _____
If permit is issued, send to (give name, street, city, state, zip code) _____

ROUTE OF TRAVEL

Origin (city, state) _____ Destination (city, state) _____
Over routes _____ Total mileage _____
Proposed inclusive dates of movement _____

OBJECT OR LOAD

Owner _____ Address _____
Object to be moved _____
state capacity, size, attachments, etc.
Method of movement _____
state whether object mounted on, towed by, under own power, etc.

Check which and supply information } ☐ TRUCK ☐ SEMITRAILER **OBJECT OR LOAD**
☐ TRUCK-TRACTOR ☐ FULL TRAILER **TO BE MOVED**

Make _____
Model No. _____
No. of Axles _____
Type and No. of Brakes _____
Gross Wt. (lb) _____
Serial No. _____
License No. (State) _____
Registered Tonnage & Class. _____
H. P. of Power Vehicle _____

Overall Dimensions	
Vehicle and Load	Load
Width _____ ft _____ in.	_____ ft _____ in.
Length _____ ft _____ in.	_____ ft _____ in.
Height _____ ft _____ in.	_____ ft _____ in.
Overhang:	
Front _____ ft _____ in.	
Rear _____ ft _____ in.	

In Contact with Pavement	Front	Axle 2	Axle 3	Axle 4	Axle 5	Axle 6	Axle 7	Totals
Gross Wt. (lb): Empty								
Loaded								
No. of Wheels								
Tire Sizes								
Axle Spacing (ft & in.)								

COVERAGE AND AUTHORITY

Bonding Co. _____ Address _____ Amount _____
Insurance Co. _____ Address _____
Policy No. _____ Expiration Date _____ Amount PL _____ Amount PD _____

I.C.C. Cert. No. _____
(State) C.C. Cert. No. _____

**APPLICANT'S CERTIFICATE OF REDUCTION OF LOAD TO
MINIMUM SIZE AND/OR WEIGHT**

Name _____ signature _____
Official Capacity _____

APPROVAL OF PERMIT

Permission is hereby given to the above applicant to transport the vehicle and/or object described over the designated highways subject to the conditions stated on the reverse side of this permit.

State Agency _____
Address _____
By _____ signature in full _____

GENERAL PROVISIONS

1. Special permits shall be issued only for single trips for a specific vehicle or a specific vehicle and load, for a designated continuous route of travel over specified routes between predetermined points of origin and destination. The specified period of movement shall be limited to the time required to make the move.
2. A special permit will be issued only to the owner or lessee of the vehicle involved in the oversize and/or overweight movement.
3. When applying, the applicant for a special permit for an oversize and/or overweight movement shall certify that the vehicle or loaded vehicle will be reduced to the minimum practicable dimensions and weight before the movement takes place.
4. The acceptance of a special permit by the permit applicant is his agreement that the vehicle or loaded vehicle covered by the permit can and will be moved in compliance with the terms set forth in the special permit.
5. When a permit has been or is being acted upon by a permittee, such action will be deemed a guarantee by the permittee that he has complied with all operating, licensing, and financial responsibility requirements, both in the State of issuance and in all the States involved if the permit authorizes movement in more than one State.
6. The special permit must be carried in the vehicle during the movement and shall be shown on demand to any police officer or authorized representative of a State highway department.
7. The permittee shall bind securely the components of the vehicle and load with appropriate load-holding devices to prevent creating any hazards.
8. A special permit shall give the permittee the right to move over only the highways and bridges under the jurisdiction of the issuing State highway department, or covered by Interstate agreement. The right to use other highways is neither implied nor granted.
9. The proposed movement shall be made so that the traveled way will remain open for traffic at all times. In movements over two-lane pavements, provisions shall be made for continuous movement of opposing traffic and for frequent passing by vehicles traveling in the same direction. If necessary, the load shall be removed from the traveled way at frequent intervals to allow traffic to pass.
10. The movement of oversize and/or overweight vehicles shall be limited to daylight hours, from one-half hour after sunrise to one-half hour before sunset, and shall be prohibited on Saturdays, Sundays, and holidays (New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day). There shall be no movements under special permit from 12 noon on the day before a holiday to 12 noon on the day after a holiday. Movements also shall be prohibited on "long holidays" from 12 noon Thursday to 12 noon Monday when a holiday falls on Friday, or from 12 noon Friday to 12 noon Tuesday when a holiday falls on Monday. Movement by special permit may at any time be delayed when traffic, weather, or other conditions are determined to constitute a hazard by the State highway department or policing agency having jurisdiction over such highway.
11. The vehicle involved in oversize and/or overweight movement shall not be loaded nor unloaded nor parked, neither day nor night, upon the roadway of any Interstate highway except in an emergency, without specific permission or by the direction of the State highway department or policing agency having jurisdiction over such highway.
12. The extremities of the oversize vehicle or load shall be marked with flags, having the following basic characteristics: in color, they shall be bright red with no wording, emblem, symbol, or insignia inscribed thereon; in size, they shall be a minimum of 16 inches square; in condition, they shall be completely clean and not torn, faded, nor worn out; in location, where possible they shall be fastened on the vehicle or load with a staff or bracket so as to wave freely--at the front fastened on each bumper in a staff or bracket, at the rear fastened on each corner at the rearmost part of the vehicle or load not less than 7 feet above the highway surface or at the top of the load, whichever is higher, and at the sides fastened on each side of the vehicle or load at the middle or widest part.
13. The movement of vehicular overloads shall not be made upon highways or across bridges that are posted temporarily for emergency conditions.
14. The permittee shall assume all responsibility for injury to persons or damage to public or private property caused directly or indirectly by the transportation of a vehicle or loaded vehicle under special permit, and he shall hold harmless the State of issuance and the State in which the injury or damage has occurred and all their officers, agents, employees, and servants from all suits, claims, damages, or proceedings, of any kind, as a direct or indirect result of the transportation of the vehicle or vehicle and load. Such security and/or indemnity as required by the States in which the movement occurs shall be provided by the permittee.
15. The special permit will be effective only insofar as the State highway department has authority for its issuance, and does not release the permittee from complying with other existing laws, local ordinances, or resolutions which may govern the movement.
16. Misrepresentation of information set forth in the application for the permit or noncompliance with limitations in weight and dimensions, route of travel, or other provision as stated in the special permit shall render it null and void, and the permittee and/or vehicle driver shall be subject to all penalties provided by law with respect to the provision violated. The movement shall not proceed from the point of apprehension until all penalties have been satisfied and a new or supplemental permit is obtained. The permit shall be void if limitations or provisions are exceeded.
17. The permittee shall check structures for available clearance in overweight movements. The issuance of a permit shall not constitute any guarantee by the issuing State of the adequacy of the highways or structures thereon to support and accommodate the passage of the vehicle and load.
18. A registerable vehicle shall be licensed for the maximum permissible load in the State of registration in order to be eligible for issuance of an overweight special permit.
19. If the permittee finds before or during the period covered by his special permit that the movement cannot be completed during that period, one extension of time may be permitted upon request by telegram or in writing. Time extension permits will be issued by telegram, or in writing as requested by the permittee, by the State highway department which issued the original permit if the movement has not yet begun, or if it has begun, by the State in which the need for change occurs. The time extension permit must be attached to the original special permit. Only one such extension permit will be issued.
20. In the event of any change from the conditions authorized in the original special permit, such as change of route, second or more extension of time, increased weight, or correction of errors, the permittee shall apply to the State where the delay develops for a supplemental permit. All regulations governing the issuance and use of an original special permit shall also govern for a supplemental permit.

permit types. These summaries made non-uniform sampling possible because they provided the actual data from which adjustment factors could be calculated (see discussion of sample adjustment in Appendix C).

One objective of the data collection procedure was to isolate and collect, where possible, a 100 percent sample of permits for movements exceeding 100,000 lb gross vehicle weight. This additional sample when added to the regular sample naturally increased sample size.

Several states, because of a policy of not keeping permits on file beyond a certain period, simply bundled up all the available permits and sent them to the research agency.

The national sample finally collected totaled 61,065 permits representing state samples varying from 100 percent to 0.5 percent. This sample represents a total of 2,151,282 permits issued in 1966.

Supplementary Data

Truck weight studies were collected during the state visit or by correspondence. Law enforcement data were collected as a result of interviews with weight enforcement officers. The quality of statistics on weight enforcement, in general, and permit violations, in particular, varies widely.

Toll facilities often operate independently of the regular road systems, issuing their own permits for oversize-overweight movements on their facilities. To determine the number of such movements and to obtain copies of the governing regulations, a questionnaire similar in design to

the initial state questionnaire was sent to all independent toll authorities. In several cases, visits were made to the offices of these authorities. Because most movements made on toll facilities necessarily are required to operate under permit when on adjoining free state systems, no attempt was made to gather a sample of toll facility permits.

Data Collected from Industry

Data were collected from various industries which (1) supplemented the state permit sample and (2) indicated past trends and future projections of oversize-overweight permit activities. These included special reports by trucking conferences of their permit moves, special questionnaires submitted by users of multiple-trip permits, correspondence, and annual reports.

Special Industry Samples

Because of characteristics of the data recorded on the permits, data from the state samples are deficient in several respects. Origins, destinations, and trip lengths are not available for trips extending beyond the boundaries of the state in which the permit was issued. For example, it can be determined from a Nebraska permit that a trip originating in Nebraska is going at least to Wyoming if the permit cites the Nebraska-Wyoming border as the destination. However, there is no way to determine if this trip will terminate in Wyoming or continue on to another state.

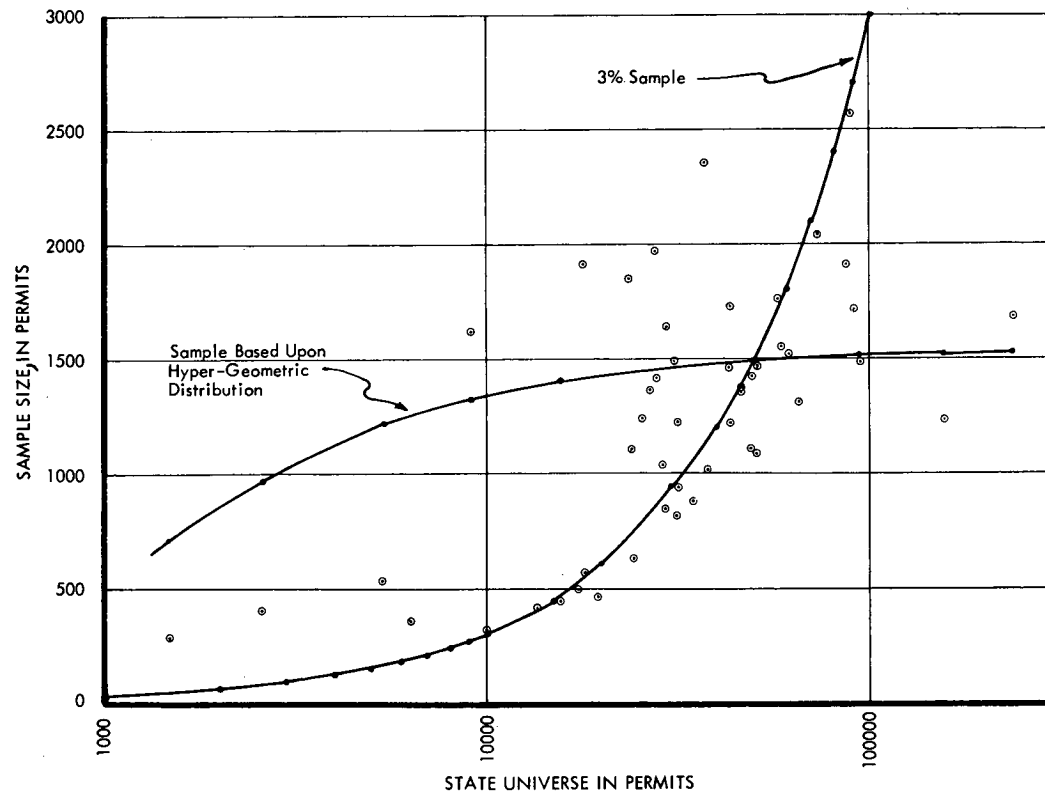


Figure 2. Size of state samples versus state permit universe.

This is true in the case of information recorded on the permits and permit applications in all states.

Because of the lack of data in state records, two major users of oversize-overweight permits were contacted to obtain information on interstate movements; namely, the Heavy-Specialized Carriers Conference (H-SCC) and the Oil Field Haulers Conference (OFHC) of the American Trucking Associations (ATA). These organizations arranged to log their permit movements during the months of June, July, and August 1967. A total of 74 members of the H-SCC membership of 199 firms responded, logging 6,922 trips. The OFHC logged 4,327 trips. The data logged on permit movements included: commodity, origin-destination, trip length, gross weight, length, width, height, states where permits were obtained, and answers to two "yes-or-no" questions concerning routing over the Interstate System and local roads (see Appendix D for log sheet).

Multiple-Trip Permit Survey

The survey of multiple-trip permit holders was conducted because the state samples in most cases did not provide adequate data on the number of movements covered by the permit, or the origin, destinations, and lengths of the trips. To supplement the state permit samples, letter-questionnaires were sent to 1,346 holders of multiple-trip permits in 37 states; 224 responses were received.

Supplements—Industry Data

Data on such things as trends in industry development and information on uses of permits were obtained from the following industry-related groups through correspondence and personal visits:

1. Aerospace Industries Association of America.
2. American Petroleum Institute.
3. American Pulpwood Association.
4. American Roads Builders' Association.
5. Mobile Home Manufacturers' Association.
6. National Association of Engine and Boat Manufacturers.
7. National Highway Users Conference.
8. American Trucking Associations.
9. U.S. Coast Guard.
10. U.S. Bureau of Mines.
11. U.S. Forest Service.
12. U.S. Bureau of Public Roads.
13. Oil and Gas Journal.
14. Edison Electric Institute.
15. Federal Power Commission.
16. Atomic Energy Commission.

Data Collected from the Military

Because of the importance of military movements, more detail was desired than could be provided from the state samples. The Military Traffic Management and Terminal Service provided a complete log of military permit operations for the 6-month period between May 1 and October 31, 1967. An estimated 3,723 trips on 9,136 permits were logged. These included movements made by military

personnel in military equipment and moves made by commercial haulers.

In addition to collection of this special sample, data were collected on special features of oversize-overweight movements and permits as they pertain to the military (such as exceptions granted by the states) and special problems of military moves (such as bridge clearances).

Analysis of Data

The state permit samples and the permit movement samples obtained from the H-SCC, the OFHC, and MTMTS were tabulated using electronic data processing equipment. The state permit samples data were arrayed nationally and by state in the following tabulations:

1. Total permits issued.
2. Number of permits issued by place issued.
3. Number of permits issued by method issued.
4. Number of permits issued by type of oversize.
5. Number of permits issued by type of overweight.
6. Number of permits issued by permit type and time limit.
7. Number of trips by type of permit.
8. Number of permits issued by route specification.
9. Number of permits issued by type of hauling vehicle.
10. Number of permits issued by commercial class of hauler.
11. Number of permits issued by commodity.
12. Number of permits issued by state of origin and destination.
13. Number of permits issued by intrastate, interstate, and through state (state summaries only).
14. Number of permits issued by state of hauling vehicle license.
15. Number of permits issued by month.
16. Total vehicle mileage and vehicle mileage by commodity.
17. Number of permits issued by axle weight group by number of axles in axle group.
18. Number of permits issued for various commodities by type of permit.
19. Total and average permit fees by commodity.
20. Total and average fee—nationally and by state.
21. Number of permits issued for various commodities broken down by over-all length groups.
22. Number of permits issued for various commodities broken down by over-all width groups.
23. Number of permits issued for various commodities broken down by over-all height groups.
24. Number of permits issued for various commodities broken down by over-all gross weight groups.
25. Number of trips by state of origin and destination (state summaries only).
26. Number of trips by intrastate, interstate, and through state (state summaries only).

The haulers' and military samples were arrayed in tables relating number of trips to commodity, origin and destination, trips length groups, and size and weight groups by commodity.

To estimate the actual number of movements, as opposed to number of permits, the special industry sample and the survey of multiple-trip permits were used. From the sample, the average number of permits obtained during an interstate trip was ascertained. From the multiple-trip permit survey, an estimate was made of the number of trips per permit of this type. These values were used as adjustments to numbers of permits to obtain numbers of trips.

Analysis of trip length characteristics was limited to the special sample. However, analysis of desire lines for origins and destinations and interchanges of permit moves between states was made with both the special samples and the state samples.

The number of permits required in the future was estimated by projecting the number issued for various commodities in accordance with projections of activity within

the related industry. Individual industry and gross national product trends were utilized to make these projections. It was assumed that permit issuance will increase or decrease for various commodities in proportion to the activity within the related industries.

An analysis of weight enforcement was conducted to determine what relationships exist between numbers of permits issued, weight violations, percentage of overloaded trucks, and truck vehicle mileage. This analysis utilized loadometer studies, violations statistics, state permit samples, and unpublished vehicle mileages provided by the U.S. Bureau of Public Roads.

Other analyses of a relatively simple comparative or subjective nature also were made and are presented in this report. Funding limitations precluded any economic impact analyses.

CHAPTER TWO

NATIONAL INVENTORY

The major objective of this study was the national inventory of permits from which most characteristics of permit operations can be measured for analysis. The inventory provides summaries of the permits issued in each state as related to each of the following characteristics: place, month and method of issuance, fee, over-limit dimensions and weights, type of permit, time and routing limits, type of vehicle, commercial class, commodity, origin and destination by bordering state, license of hauling vehicles, and trip length. In addition, cross tabulations have been prepared relating commodities to dimensions, gross weights, vehicle mileage, types of permit, and fees, and relating axle weights to number of axles per axle group.

It is estimated that 2,151,282 oversize-overweight permits were issued in 1966 in the 48 contiguous states and the District of Columbia. The values presented in this report are estimated with a 95 percent confidence within the following ranges:

1. An estimate of 1,100,000 is accurate to within $\pm 8,300$.
2. An estimate of 660,000 is accurate to within $\pm 7,600$.
3. An estimate of 22,000 is accurate to within $\pm 1,600$.
4. An estimate of 1,100 is accurate to within ± 370 .
5. An estimate of 55 is accurate to within ± 52 .

Varied sample sizes cause some variation about these levels of accuracy. Coding errors have been edited and corrected within these limits of accuracy.

Because the data on some permit samples were insufficient or ambiguous, unknowns are found in most data categories.

CHARACTERISTICS OF PERMIT OPERATIONS

Place of Issuance

Table 1 indicates where oversize-overweight permits are issued and the degree to which the authority to issue permits is centralized in each of the 48 states and the District of Columbia.

In ten states and the District of Columbia permits are issued by central headquarters only. In four other states the district offices are authorized to issue certain permits, but, in fact, all or most permits are issued from central headquarters. At the other extreme, three states issue virtually all permits through district offices. The remaining 32 states issue permits through central headquarters and a variety of other locations, including district headquarters, ports of entry, scalehouses, roving officers, highway maintenance shops, private permit agents, field permit offices, highway patrol stations, and state-operated travel information bureaus.

Ports of entry issue permits in seven states. In Utah, where telephone permission is granted to proceed with an over-limit load to the nearest port of entry, the ports of entry issue more than 60 percent of the permits.

In seven states, permits are issued at scalehouses. In none of these states does scalehouse issuance exceed 42 percent of total state issuance. In Maine, scalehouse issuance is limited to mobile home permits issued at the Kittery scale, the only scalehouse on the Maine primary system.

Although roving patrolmen or scalemen are authorized to issue permits in a few states, the sample did not show

TABLE 1
PLACE OF PERMIT ISSUANCE AND LIMITS OF AUTHORITY

STATE	PERMIT ISSUANCE		OTHER	LIMITS OF AUTHORITY
	CENTRAL ONLY	CENTRAL AND DISTRICTS		
Alabama	x			
Arizona				
Arkansas			Central, districts, ports of entry.	
			Central, ports of entry, weight stations, roving crews, larger municipalities.	Only central office can issue overweight permits.
California			11 district offices and 27 field offices.	
Colorado			Central, districts, and patrol.	Field offices normally issue permits only for their immediate area. Districts clear with each other. Overwidth permits over 14' wide need approval by district engineer or maintenance superintendent.
Connecticut	x			
Delaware			Central and 3 county offices of highway department.	Control maintained by Dover; all out-of-state permits must come from Dover; two offices can only issue permits on local basis. Districts check with home office for extraordinary loads.
Florida		x		The 5 district offices issue building moving permits only within their respective districts.
Georgia	x			
Idaho			Central, 6 district offices, and various maintenance stations.	Equal authority.
Illinois		2 districts in Chicago and Effingham.		Cities limited to general area around offices; Chicago district can issue both oversize and overweight, but Effingham is limited to oversize. No statewide or 90-day permits issued from districts.
Indiana		x		All permits are authorized by central office.
Iowa			Central, district offices, and local authorities.	
Kansas			Central, ports of entry, highway patrol, 24 maintenance offices and 20 weight stations.	Central must authorize all permits except specified limited oversize loads. All overweight loads must be issued by central.
Kentucky		12 districts.		Central office generally has final word on an extremely overweight load.
Louisiana			Central permit section of State Police and 13 police troop headquarters.	Municipalities issue permits for moves on state highways entirely within corporate limits.
Maine			7 districts, central and Kittery scale (for trailers only).	
Maryland			Central, districts, and Baltimore City.	For statewide moves, districts are limited to 90,000 GVW; 12' W; 75' L; 15' H. For a divisional move only, may go to 120,000, 4 axles; 130,000, 5 axles; 140,000, 6 axles; 167,000 on 7 axles.
Massachusetts	x			100% control over district moves. City of Baltimore issues its own permits. State authority ends at city line.
Michigan		x		Districts issue single-trip permits only, not exceeding 12' W; 75' L; 14' H; 110,000 GVW; 25,000 on any axle.

TABLE 1 (cont'd)

Minnesota		Headquarters and 16 area maintenance engineers.	
Mississippi		Central, all ports of entry, and field representatives.	Control is tight, but each representative can issue permits at least up to 108,000 GVW.
Missouri	10 districts.		Districts can issue only over-dimension, not overweight or blanket.
Montana		Central, GVW, and district offices.	Central and divisional (district) offices have almost equal authority; division will ask for advice in some cases.
Nebraska	x		
Nevada	x		
New Hampshire	x		
New Jersey	x		
New Mexico	x		Annual, multiple-trip, and loads over 14' W, 130,000 lb, 80' L, 25' rear overhang, 15' front overhang, or 15' H must be obtained from headquarters.
New York		10 districts only, no central issuance.	Central office has final word in extraordinary cases and can overrule district decisions.
North Carolina	34 districts, 14 divisional.		Central office retains final word in all questionable moves.
North Dakota	7 districts.		District engineer has authority to issue permits equal to central office.
Ohio		Central, division offices, and highway patrol.	Divisions and patrol can only issue permits for intra-divisional moves. Only central office can issue statewide or mobile home permits.
Oklahoma		Central, highway patrol, various courthouses and city halls.	Equal authority.
Oregon		Central and 23 other offices including division, district maintenance, resident engineer, and PUC field offices.	Headquarters must issue those permits that exceed bridge formula. Permit offices may issue both single-trip and multiple-trip permits.
Pennsylvania	11 districts, 56 county offices.		Districts and counties do not need approval of central office for their moves.
Rhode Island	x		
South Carolina	x		Cities can only issue intra-city moves on state highways. Central office, otherwise, has absolute control.
South Dakota		Central, district offices, highway patrol, ports of entry.	Equal authority.
Tennessee	x		
Texas		158 locations, including maintenance division, maintenance district offices, resident engineers' offices, travel information bureaus.	Loads over 100,000 GVW, or over 75' L; 12' W are approved by headquarters.
Utah		Highway patrol at headquarters or ports of entry.	
Vermont		Central mainly, but towns do issue permits.	Towns issue permits for state highways within their corporate limits.
Virginia	8 districts, 45 residencies.		Central office retains close control over other issuing offices.

TABLE 1 (cont'd)

STATE	PERMIT ISSUANCE			LIMITS OF AUTHORITY
	CENTRAL ONLY	CENTRAL AND DISTRICTS	OTHER	
Washington			Central, 25 maintenance offices, and 20 issuing agencies.	Central and maintenance offices issue permits for state highways except extensions in cities; agents issue permits for city moves. Headquarters approves all overweight permits by phone.
West Virginia ^a			Issued only by the 10 districts and a very few by the counties.	Central office still gives approval for weights over 22,000, 38,000, 43,000 and 90,000 GVW.
Wisconsin			Central, districts, counties, and municipalities.	Authority decentralized; however, counties and municipalities are limited to routes within their jurisdictions.
Wyoming			Central, 11 ports of entry, 12 district highway shops, 90 highway patrol stations.	All manned by DMV clerks.
Dist. Columbia	x			

^a Permit issuance divided between Maintenance Division and Safety, Claims and Weight Enforcement Division. Maintenance Division can issue oversize and overweight single-trip permits, but Safety, Claims and Weight Enforcement Division issues blanket overdimensional permits and single-trip mobile home permits.

many issuances of this kind. The reason probably is inherent in the limitations of data shown on sampled permits, which often do not indicate particulars of "place issued." In only a very few states does the permit indicate whether or not an officer was a roving officer or attached to a district office. For this reason, the quality of data on place of issuance in Arizona, Kansas, North Carolina, and Wisconsin is unknown and data for these states are not given in Table 2, which gives percentages of permits issued nationally at various places of issuance.

Method of Issuance

Table 3 gives the methods of application and issuance for oversize-overweight permits in the different states. In all states, a permit may be applied for and issued by mail or in person. Except for Colorado and Wyoming, all states issue permits by wire. Telephone applications are accepted in 33 states and the District of Columbia, although in a few states this method is practiced only in case of emergency. Only three states (Utah, Arkansas, Mississippi) actually great permits by telephone. In Utah, as indicated previously, permission granted by telephone is temporary and limited to allow the mover to proceed to a normal place of issuance.

TABLE 2

PLACE OF PERMIT ISSUANCE

PLACE	PERMITS ISSUED (%)
Roving officers, port of entry, and weight station	3.10
Central headquarters	39.31
District headquarters and maintenance shops	56.02
Field permit office	0.76
Private permit agent	0.81

TABLE 3

METHODS OF APPLICATION AND ISSUANCE

METHOD	STATES WHERE APPLICABLE
Application:	
In person	All
Mail	All
Telegram	All except Colo.
Telephone	All except Calif., Colo., Conn., Del., Idaho, Ill., Me., Minn., Miss., Mont., Nev., N. Mex., Ohio, S. Dak., Wyo.
Issuance:	
In person	All
Mail	All
Telegram	All except Colo. and Wyo.
Telephone	Ark., Miss., ^a Utah ^b

^a Oversize only.

^b Permission granted to proceed to place of permit issuance.

It is estimated that 61.34 percent of all permits issued nationally during 1966 were issued by mail or in person prior to the move; 37.84 percent were issued by wire; and 0.81 percent were issued by phone or in person after the move had commenced. Figure 3, representing 27 states because of unknowns in other samples, demonstrates the variance between states. As in other cases unknowns are due to limitations of recorded information.

Figure 4 is a scatter diagram relating place of issuance to method of issuance. This shows that the more permit issuance is centralized, the fewer the number of permits issued in person or by mail. Apparently the convenience of obtaining a permit in person has a significant influence on the mode of issuance.

Type of Over-Limit

Tables 4 and 5 give the numbers of permits issued for various types of oversize and overweight moves. Approximately 94.7 percent of all permits were issued for over-limit dimensions, whereas 30.4 percent were issued for overweight, indicating that many moves are both overdimension and overweight. In most cases an overweight load exceeds at least one dimensional limit.

Approximately 43 (42.9) percent of all oversize permits nationally were issued for combined overlength and overwidth. However, this relationship does not hold true in all states. In 18 states and the District of Columbia more permits were issued for different combinations of overdimensions or for exceeding individual dimension limits. Nationally, other percentages of oversize permits for different excess dimensions and combinations are as follows: overwidth only, 29.3; overlength, overwidth, and overheight, 11.5; overlength only, 8.0; overwidth and overheight, 6.9; overheight only, 1.0; overlength and overheight, 0.5.

In 1966 Nevada did not have legal limits for height or length. Consequently, overwidth was the only oversize category in Nevada. In Texas, permits for overwidth, overlength and overheight outnumber permits issued for every other oversize category. This is a reflection of the active oil

industry, which needs to move extremely large oil-well equipment.

Type of oversize logically is associated with commodities. For example, the large number of permits for overwidth and overlength is associated with the high percentage of permits issued for the movement of mobile homes.

Table 5 breaks down overweight permits into four categories: exceeds gross weight limit only; exceeds axle weight limit only; exceeds both gross and axle weight limits; and exceeds legal weight, type of excess unknown. These data were difficult to determine in some respects. Some states did not indicate whether or not a load was overweight, although the gross weight was given. In several states, axle weights were not given at all. In these cases, when the gross weight exceeded 75,000 lb it had to be assumed that the axle weight limit was exceeded also, unless the permit indicated the addition of axles to obtain legal axle weights.

In several states the permit indicated the movement to be overweight but did not specify the weight or the type of overweight. In Mississippi, no permits are issued for over-axle limit loads except in the case of permits issued to a violator en route. Michigan has no legal limit for gross weight. Because gross weights of many permit moves in Michigan would have been coded as overweight in any other state, a separate category was established to indicate comparable Michigan gross weight "overloads."

Single- or Multiple-Trip Permits

Table 6 gives the number of permits issued by each state by type of permit—single- or multiple-trip. The multiple-trip permits are broken down further by time period—30-day, 90-day, 6-month, and 12-month. Of all permits issued,

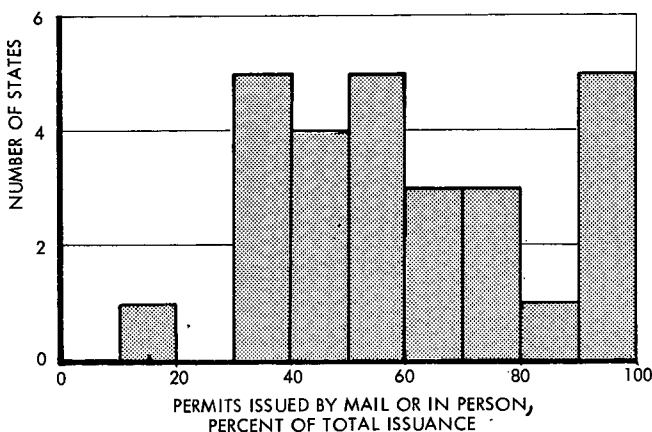


Figure 3. Variance between states in method of permit issuance.

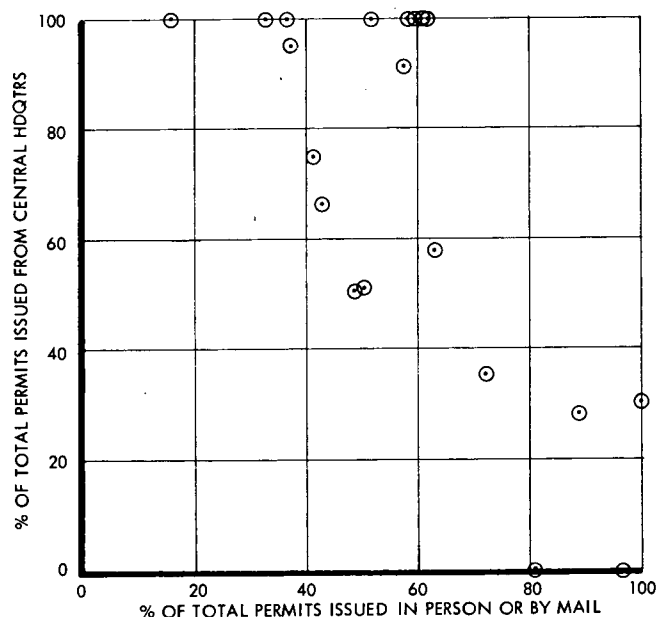


Figure 4. Place of issuance as related to method of permit issuance.

TABLE 4

NUMBER OF PERMITS, BY OVERSIZE CLASS AND STATE

STATE	OVERLENGTH ONLY	OVERWIDTH ONLY	OVERHEIGHT ONLY	OVERLENGTH AND OVERWIDTH	OVERLENGTH AND OVERHEIGHT	OVERWIDTH AND OVERHEIGHT	OVERLENGTH, OVERWIDTH, OVERHEIGHT	OVERSIZE DIMENSIONS, NOT SPEC.	TOTAL OVERSIZE
Alabama	333	5,966	300	900	67	700	1,966	0	10,232
Arizona	2,948	10,640	631	16,182	74	2,881	1,715	0	35,071
Arkansas	3,597	18,893	167	18,407	0	1,904	2,115	0	45,083
California	3,405	33,273	2,739	16,461	336	18,563	13,319	59	88,155
Colorado	3,248	17,151	664	16,138	210	6,322	4,820	0	48,553
Connecticut	2,106	10,549	527	10,753	32	1,222	2,110	0	27,299
Delaware	2,662	5,780	70	8,127	0	175	420	0	17,234
Florida	3,099	3,733	293	27,085	27	1,584	5,622	0	41,443
Georgia	1,436	12,665	248	22,365	0	957	5,210	0	42,881
Idaho	749	7,577	101	13,163	21	962	1,690	0	24,263
Illinois	2,272	29,906	603	24,687	115	3,348	2,444	231	63,606
Indiana	1,907	10,726	270	29,466	356	1,570	13,372	140	57,807
Iowa	1,334	5,963	333	600	100	1,364	4,878	33	14,605
Kansas	1,195	12,340	533	24,929	36	6,851	5,428	0	51,312
Kentucky	2,009	7,812	50	16,401	0	715	1,287	0	28,274
Louisiana	8,392	22,415	952	31,886	250	5,473	14,250	0	83,618
Maine	1,318	6,229	27	6,646	60	363	346	0	14,989
Maryland	1,745	607	36	39,664	213	71	759	0	43,095
Massachusetts	1,301	3,366	0	8,602	0	1	3	0	13,273
Michigan	6,572	14,687	173	36,078	180	1,016	4,406	0	63,112
Minnesota	5,211	11,157	169	14,117	104	1,697	1,874	34	34,363
Mississippi	474	18,691	344	13,701	104	1,442	1,778	0	36,534
Missouri	7,327	21,485	362	23,015	70	2,467	1,830	0	56,556
Montana	304	22,223	562	2	29	0	14	0	23,134
Nebraska	841	6,221	315	10,928	42	10,896	1,594	19	30,856
Nevada	0	5,359	0	0	0	0	0	0	5,359
New Hampshire	644	2,731	0	5,242	6	83	254	0	8,960
New Jersey	5,011	19,695	543	17,459	97	2,115	3,795	0	48,715
New Mexico	1,322	9,009	379	12,047	194	2,512	2,892	0	28,355
New York	1,874	11,143	68	29,280	0	238	1,798	753	45,154
North Carolina	202	4,755	126	23,288	25	683	1,846	0	30,925
North Dakota	532	3,903	342	5,477	157	1,888	2,295	0	14,594
Ohio	1,163	20,150	499	27,656	259	5,345	5,805	0	60,877
Oklahoma	8,134	22,922	1,991	28,687	198	10,651	15,080	0	87,663
Oregon	3,833	6,082	274	12,095	137	1,283	6,698	0	30,402
Pennsylvania	244	45,506	122	87,352	3,904	366	14,030	0	151,524
Rhode Island	137	555	15	579	4	77	65	0	1,432
South Carolina	1,095	3,090	81	19,361	60	1,130	226	0	25,043
South Dakota	757	7,596	62	7,488	24	1,056	527	19	17,529
Tennessee	1,850	7,736	82	16,054	112	135	873	692	27,534
Texas	34,926	48,614	3,638	55,799	882	26,096	61,132	0	231,087
Utah	3,999	2,128	81	2,280	365	285	5,227	0	14,365
Vermont	160	1,115	19	2,906	9	47	19	0	4,275
Virginia	4,858	10,646	531	25,584	143	570	3,329	0	45,661
Washington	8,636	26,487	355	19,326	0	4,069	3,905	0	62,778
West Virginia	2,626	9,986	311	9,946	289	1,714	2,036	14	26,922
Wisconsin	6,791	5,566	66	5,658	66	924	4,585	0	23,656
Wyoming	2,833	12,699	1,033	7,733	533	4,000	1,567	0	30,398
D. Columbia	243	196	39	316	136	179	874	0	1,983
All	157,655	607,724	21,126	851,916	10,026	137,990	232,108	1,994	2,020,539

TABLE 5
NUMBER OF PERMITS, BY OVERWEIGHT CLASS AND STATE

STATE	GROSS WEIGHT ONLY	AXLE ONLY	GROSS AND AXLE	UNKNOWN	ALL
Alabama	0	0	0	0	0
Arizona	5,050	0	0	0	5,050
Arkansas	67	0	7,452	34	7,553
California	103	0	45,068	0	45,171
Colorado	1,362	35	35,140	12,889	49,426
Connecticut	272	111	11,555	32	11,970
Delaware	—	—	—	—	—
Florida	0	0	7,514	0	7,514
Georgia	0	0	7,073	0	7,073
Idaho	19	21	4,403	20	4,463
Illinois	29	57	20,097	1,000	21,183
Indiana	5,903	5,933	1,201	273	13,310
Iowa	4,435	33	0	4,393	8,861
Kansas	325	36	13,131	0	13,492
Kentucky	0	0	8,392	615	9,007
Louisiana	53	0	8,502	351	8,906
Maine	0	0	3,899	0	3,899
Maryland	108	0	12,810	36	12,954
Massachusetts	—	—	4,240	—	4,240
Michigan	—	—	0	27,632	27,632
Minnesota	414	419	3,314	—	4,147
Mississippi	5,615	184	54	456	6,309
Missouri	4,835	0	0	0	4,835
Montana	249	1,110	3,724	7,060	12,143
Nebraska	2,085	63	2,039	0	4,187
Nevada	0	107	1,117	176	1,400
New Hampshire	6	0	4,247	21	4,274
New Jersey	11,793	0	38	295	12,126
New Mexico	46	0	3,475	0	3,521
New York	77	0	22,081	753	22,911
North Carolina	5,690	607	2,124	0	8,421
North Dakota	3,954	124	0	2,607	6,685
Ohio	0	30	31,273	0	31,303
Oklahoma	88,696	0	0	0	88,696
Oregon	10,500	0	7,200	478	18,178
Pennsylvania	100	100	29,700	0	29,900
Rhode Island	118	0	184	0	302
South Carolina	0	21	179	0	200
South Dakota	251	12	2,380	0	2,643
Tennessee	42	66	4,307	692	5,107
Texas	789	4,703	86,071	0	91,563
Utah	0	0	12,253	81	12,334
Vermont	0	0	658	12	670
Virginia	0	0	12,225	0	12,225
Washington	22,209	909	15	0	23,133
West Virginia	2,474	86	6,682	0	9,242
Wisconsin	233	6,558	3,906	0	10,697
Wyoming	500	0	9,232	0	9,732
D. Columbia	56	0	1,539	20	1,615
All	178,458	21,325	440,494	59,926	700,203 + 12,803 ^a
Grand total					713,006

^a Michigan issued 12,803 permits that exceeded axle limits, and that, in other states, would have exceeded gross limits.

TABLE 6
NUMBER OF PERMITS, BY TYPE AND STATE

STATE	SINGLE-TRIP PERMITS	MULTIPLE-TRIP PERMITS			
		30-DAY	90-DAY	6-MONTH	ANNUAL
Alabama	0	8,699	1,500	100	0
Arizona	32,446	3,530	19	434	2
Arkansas	45,947	0	0	0	54
California	79,792	3,422	452	180	6,675
Colorado	36,047	8,347	210	35	0
Connecticut	24,438	589	65	32	614
Delaware	16,534	0	841	0	0
Florida	36,808	5	0	0	6,082
Georgia	18,028	3,192	4,020	17,351	24
Idaho	24,234	232	0	0	0
Illinois	60,932	0	10,387	0	2,157
Indiana	42,769	5,601	0	0	8,967
Iowa	15,240	132	33	0	3,793
Kansas	51,491	0	0	0	0
Kentucky	26,917	0	1,254	489	33
Louisiana	83,306	1,683	158	53	0
Maine	14,566	660	287	27	0
Maryland	42,243	604	213	0	36
Massachusetts	10,106	3,267	0	0	0
Michigan	81,908	12,191	0	0	0
Minnesota	30,538	3,781	0	0	79
Mississippi	37,754	0	0	0	307
Missouri	54,231	1,009	242	470	1,754
Montana	13,368	0	0	0	— ^a
Nebraska	29,959	279	20	721	0
Nevada	5,534	0	0	0	107
New Hampshire	8,880	40	0	0	169
New Jersey	48,913	38	0	0	0
New Mexico	26,421	162	47	244	2,789
New York	38,581	4,959	182	59	0
North Carolina	25,816	2,074	101	0	885
North Dakota	18,472	0	0	0	0
Ohio	61,174	626	0	0	2,816
Oklahoma	81,783	5,349	202	0	1,367
Oregon	26,480	654	0	0	0
Pennsylvania	151,524	0	250	—	—
Rhode Island	1,350	47	4	61	5
South Carolina	24,888	194	0	0	0
South Dakota	16,168	829	0	299	36
Tennessee	25,720	496	37	1,455	—
Texas	207,748	23,096	2,951	0	719
Utah	15,994	269	7,299	0	1,978
Vermont	3,861	12	108	144	1,224
Virginia	34,439	0	0	0	15,863
Washington	58,792	1,855	4,049	358	352
West Virginia	27,071	17	0	68	591
Wisconsin	19,230	0	0	0	3,894
Wyoming	31,430	0	100	0	0
D. Columbia	1,605	0	0	20	726
All	1,871,476	97,940	35,031	22,600	64,098

^a Montana issued 6,255 9-month permits not included in totals.

excluding unknowns, 89.4 percent were single-trip permits. (Single trips were defined to include single round trips as well as one-way single trips.) The remainder were multiple-trip permits, including permits prepared in the manner of single-trip permits but for multiple movements. Excluding unknowns, 30-day multiple-trip permits account for 43.5 percent of the 225,565 multiple-trip permits issued. Annual permits are the next most numerous, accounting for 28.4 percent. Ninety-day, 6-month and 9-month permits account for 15.4, 10.0, and 2.7 percent, respectively, of the multiple-trip permit issuance.

Thirty-five states issue 30-day multiple-trip permits (MTP); in nine of these this is the predominant MTP. Twenty-six states issue 90-day MTP; in only five could this be considered the predominant MTP. Twenty states issue 6-month permits; in two this is the predominant MTP. Thirty states issue annual permits; in nine this is the predominant MTP. Montana is the only state that issues a significant number of 9-month MTP.

The proportion of all multiple-trip permits to all single-trip permits for all commodities is 0.119. Between commodities this proportion varies widely. Table 7 gives the number of permits for selected commodities by permit type and the proportion of multiple-trip to single-trip permits. It is significant that more multiple-trip than single-trip permits were issued for logs and poles; multiple-trip permits for the movement of poles are granted to electric utility companies in a number of states.

It is surprising that the proportion of multiple-trip to single-trip permits for mobile homes was less than average for all commodities. A higher proportion might have been expected, considering the relatively uniform dimensions of mobile homes and the routine nature of mobile home movements.

Commodities such as transformers, houses, tanks, and buses, as indicated by the low proportion, tend to be moved primarily under single-trip permit.

Routing

Most permit movements are made over specified highway routes. Routes are specified in different ways, generally using route numbers, highway systems, or combinations of the two. Most states specify the route number but not the system. Where systems are specified, this is done in several ways. Oregon, for example, issues a coded route map that indicates restrictions and limitations for the various routes. In Iowa, permits specify the state primary system excluding the Interstate System. Table 8 gives a breakdown of the routing requirements; "identified routes" refers to a specified route number.

Very small numbers of permits shown in Table 8 (such as for "limited to secondary roads" and "toll road only") may be attributable to undetected coding errors rather than being representative of actual numbers of these permits.

Issuance of permits to vehicles for "routes in vicinity of toll booth" is a feature exclusive to permit operations in Indiana. This is intended to allow "double bottoms" to

travel 7.5 miles one-way from a toll booth to truck yards for reassembly into two-unit combinations.

The "physical limitations" category refers to route specifications that give the mover the freedom of the state highway system, excepting those routes that will not accommodate the dimensions of the load. Generally, the responsibility for determining this is placed with the hauler.

TABLE 7

RATIO OF MULTIPLE-TRIP PERMITS TO SINGLE-TRIP PERMITS FOR SELECTED COMMODITIES

COMMODITY		PERMITS (NO.)		RATIO ^a
		SINGLE-TRIP	MULTIPLE-TRIP	
CODE	DESCRIPTION			
01	Mobile homes	586,940	33,827	0.058
11	Construction equipment	593,627	78,390	0.132
13	Structural members	76,682	12,426	0.162
15	Piling	3,162	1,491	0.472
23	Oil-well equipment	88,203	2,906	0.329
33	Logs	1,814	2,860	1.577
43	Agricultural equipment	35,096	3,619	0.103
51	Industrial equipment	38,924	2,228	0.057
62	Boats	35,084	2,299	0.066
71	Transformers	4,209	225	0.053
74	Pipes	21,282	11,531	0.542
75	Poles	5,520	11,941	2.163
81	Military equipment	7,195	1,244	0.173
82	Missiles	1,134	188	0.166
91, 92	Houses, buildings	54,165	1,955	0.036
93	Tanks and bins	97,163	3,670	0.038
95	Autos and other vehicles	14,930	3,382	0.227

^a Ratio = $\frac{\text{Multiple-trip permits}}{\text{Single-trip permits}}$

TABLE 8

NUMBER OF PERMITS, BY ROUTE SPECIFICATION

ROUTING	NUMBER OF PERMITS
Identified routes	1,696,922
State primary system, including Interstate	6,981
State primary system, excluding Interstate	4,574
Limited to state secondary roads	431
Toll road only	353
Routes in vicinity of toll booth	8,261
Physical limitations	55,541
State systems generally	157,188
Not specified	159,082
Unknown	61,949

The "state systems" category refers to the specification of all state highways in a given geographical area. The majority of "specified route" permits were in this category. Geographical boundaries were given by radius or by jurisdictional boundaries, usually county lines.

As given in Table 8, a significant number of permits were issued with no route specification other than a general limitation to state highways.

To add to information gathered in the state sample, the Heavy-Specialized Carriers Conference and the Oil Field Haulers Conference logged some information on the routing of permit movements. This showed 5,518 (79.8 percent) of the H-SSC trips and 1,427 (32.9 percent) of the OFHC trips were made, in part, on the Interstate System. These data, however, do not reflect routing specifications of the state permit agencies.

The H-SSC and OFHC also indicated that 466 (6.7 percent) and 273 (6.3 percent) of their moves, respectively, were made on local roads because of state restrictions.

Type of Vehicle

Table 9 gives the type of vehicles used for oversize-overweight movements, as indicated by the permits, for each state. Truck-semitrailers, truck-tractor-semitrailer, and truck-tractor-semitrailer-full-trailer combinations were indicated as hauling vehicles in 1,170,192 (56.80 percent) of the permit issuance cases, excluding unknowns. The truck-tractor-semitrailer-full-trailer combination accounted for only 6,478 of this number.

Truck-mobile home combinations where the mobile home was on its own wheels and not on a flat-bed semitrailer were coded separately and accounted for 30.91 percent of the total issuance.

Self-propelled vehicles such as motor cranes, combines, and scrapers accounted for 5.64 percent of the issuance. These same types of vehicles are sometimes moved under tow. Movements of this type accounted for 1.39 percent of the issuance.

Single-unit trucks were the hauling vehicle indicated on 3.67 percent of the permits. Many of these moves involved oversize only movements.

Special house and building moving vehicle combinations, rollers and skids accounted for 1.19 percent of the indicated vehicle types.

Commercial Class of Permittee

Table 10 gives for each state the number of permits issued to each commercial class of permittee. Excluding unknowns, 797,257 permits (39.06 percent) were issued to private individuals or companies, other than dealers or manufacturers, for the movement of their own goods. The movement of construction equipment accounts for a large number of these private moves.

Commercial movers and dealers or manufacturers obtained 32.57 and 26.98 percent of the permits, respectively. Rentals (that is, permittees using rented equipment) obtained 0.57 percent of the permits. This item was difficult to determine accurately because permits contain informa-

tion concerning ownership or lease agreements in only a few states.

The Armed Forces obtained only 5,455 or 0.27 percent of the issuance. Other government agencies obtained 0.55 percent of the issuance.

Commodity Hauled

Table 11 gives for each state the number of permits issued for each commodity. Table 12 summarizes the results of Table 11, nationally, to show percentages of permits issued for the leading commodities. At the other end of the magnitude scale, livestock, nursery products (trees), nuclear reactors, and portable medical equipment are moved under permit very rarely.

In 28 states, more permits are issued for construction equipment than for any other commodity. In 21 states, mobile homes claim this distinction. In Arizona, Idaho, Iowa, Kansas, Maine, Minnesota, Nevada, South Dakota, Nebraska, and Wyoming, agricultural equipment was one of the top five commodities in the number of permits issued. In New Hampshire, Delaware, Illinois, Kentucky, Maryland, North Carolina, New York, Rhode Island, South Carolina and Tennessee, boats were one of the top five commodities. Houses and buildings were in the top five in 20 states. In Montana, Washington, and Oregon, logging equipment or logs were in the top five. Industrial equipment was one of the top five commodities in Connecticut, Florida, Illinois, Indiana, Massachusetts, Ohio, Pennsylvania, and West Virginia. Structural members were one of the top five in 26 states.

Oil-well equipment was one of the top five commodities in Colorado, Kansas, Louisiana, Mississippi, New Mexico, North Dakota, Oklahoma, Texas, and Wyoming. Tanks and bins were in the top five categories in 29 states and the District of Columbia. These always appear to accompany oil-field equipment when the latter is one of top five commodities.

Pipes were one of the top five commodities in Georgia, Louisiana, Oklahoma, and Texas. In the last three states, movements of this commodity probably are associated with the oil and gas industry.

Month of Issuance

Figure 5 shows the distribution of permit issuance by months for the total number of permits issued in 1966 nationally and in three regions (the Gulf States, including Mississippi, Louisiana, Georgia, and Florida; the Northern Plains States, including North Dakota, South Dakota, Minnesota, and Iowa; and the Northeastern States, including New York, Maine, Massachusetts, and Connecticut). As expected, the northern regions have a more peaked distribution.

Because multiple-trip permits are issued mainly during one or two months in some states, the annual distribution of permits by months for these states often has a second peak around January or February, as shown in some of the distributions in Figure 5.

TABLE 9
NUMBER OF PERMITS, BY TYPE OF VEHICLE * AND STATE

STATE	SINGLE UNIT	MOBILE HOME COMB.	OTHER COMB.	SPECIAL TRUCK	SELF PRO- PELLED	HOUSE AND BUILD- ING MOVING	TOWED UNIT
Alabama	67	33	10,199	0	0	0	0
Arizona	2,136	15,450	16,061	0	1,449	375	903
Arkansas	638	17,240	24,198	0	2,141	1,057	640
California	3,793	8,908	62,310	4,089	7,268	2,623	1,238
Colorado	3,598	13,378	28,154	0	2,131	210	1,956
Connecticut	4,753	3,322	15,335	97	5,219	272	104
Delaware	210	6,621	9,633	35	736	140	0
Florida	135	25,605	13,933	0	1,992	0	297
Georgia	1,774	16,251	19,388	0	5,091	87	347
Idaho	505	11,965	10,857	0	1,086	74	21
Illinois	29	18,464	42,104	0	2,560	275	1,211
Indiana	434	25,846	28,416	38	1,955	159	239
Iowa	465	3,645	9,130	0	500	233	1,333
Kansas	34	21,871	28,970	0	435	36	146
Kentucky	2,478	11,535	13,746	0	798	33	116
Louisiana	543	24,944	52,620	105	3,287	3,628	53
Maine	530	5,106	7,792	249	1,499	0	363
Maryland	179	15,744	23,682	44	2,986	143	355
Massachusetts	367	2,466	9,003	4	1,133	200	200
Michigan	240	29,546	30,000	508	4,960	621	806
Minnesota	768	10,726	19,255	0	1,839	673	1,137
Mississippi	954	11,404	21,251	0	2,600	297	735
Missouri	2,134	20,573	30,002	158	2,232	386	2,276
Montana	1,106	2,559	8,598	0	2,426	1,031	353
Nebraska	546	11,075	17,968	0	123	60	1,230
Nevada	0	2,256	3,545	0	17	0	0
New Hampshire	268	3,302	5,070	0	0	43	460
New Jersey	513	7,203	40,740	0	124	48	237
New Mexico	874	14,446	12,287	23	1,296	0	284
New York	2,314	17,179	21,177	0	4,105	4,139	1,034
North Carolina	126	20,025	9,585	0	632	607	0
North Dakota	1,127	2,806	5,504	0	0	342	0
Ohio	0	24,153	31,253	0	3,596	0	2,862
Oklahoma	4,346	25,500	57,129	0	1,688	34	0
Oregon	4,829	7,782	17,256	0	975	357	0
Pennsylvania	610	53,070	84,058	0	12,444	244	1,098
Rhode Island	0	374	1,016	0	51	17	4
South Carolina	61	19,441	5,516	0	0	41	0
South Dakota	221	7,086	9,254	0	866	158	279
Tennessee	15	11,807	13,880	0	0	452	1,561
Texas	12,272	29,862	160,618	2,519	18,979	5,138	4,113
Utah	1,472	3,343	19,454	0	535	39	0
Vermont	231	2,532	2,248	0	248	9	0
Virginia	6,748	15,638	23,877	123	3,774	61	82
Washington	5,827	14,727	36,931	90	7,113	311	257
West Virginia	3,186	7,513	15,570	28	1,485	0	0
Wisconsin	331	5,556	16,796	32	1,183	129	0
Wyoming	1,133	6,933	23,064	33	133	0	167
D. Columbia	571	69	1,402	39	415	0	20
All	75,491	636,880	1,169,835	8,214	116,105	24,782	28,517

* 91,453 unknowns not included.

TABLE 10

NUMBER OF PERMITS, BY COMMERCIAL CLASS OF PERMITTEE ^a AND STATE

STATE	PRIVATE	FOR HIRE	DEALER OR MFR.	RENTAL	MILITARY	OTHER GOVT.
Alabama	3,766	4,333	1,633	0	0	0
Arizona	14,267	9,905	8,814	2,502	190	678
Arkansas	16,910	15,193	13,410	0	165	34
California	40,289	33,470	14,098	120	722	1,622
Colorado	30,389	7,405	10,933	0	384	314
Connecticut	12,786	6,847	9,301	104	0	0
Delaware	5,079	3,853	6,866	1,226	35	315
Florida	7,706	9,211	15,261	0	80	218
Georgia	23,916	5,788	12,606	0	349	278
Idaho	12,292	4,798	6,900	0	67	62
Illinois	13,552	36,242	14,043	546	0	259
Indiana	14,850	15,738	26,100	131	64	0
Iowa	7,428	6,584	1,094	233	67	33
Kansas	25,661	10,215	15,543	0	0	36
Kentucky	12,637	9,333	6,752	0	0	0
Louisiana	31,051	25,188	28,804	53	0	0
Maine	7,370	3,730	3,881	82	27	184
Maryland	25,198	7,232	10,093	355	178	72
Massachusetts	4,266	4,972	3,233	100	1	33
Michigan	5,755	13,285	43,043	2,308	640	221
Minnesota	11,465	11,138	11,308	105	143	239
Mississippi	12,719	9,897	13,081	0	74	223
Missouri	31,501	9,165	15,206	1,171	236	345
Montana	10,760	2,679	2,558	75	0	2
Nebraska	17,527	4,826	8,223	0	42	384
Nevada	3,459	1,267	759	0	0	107
New Hampshire	3,659	2,875	2,556	0	46	6
New Jersey	15,184	24,893	7,844	38	0	0
New Mexico	10,523	9,382	8,824	0	46	420
New York	24,824	7,152	12,982	30	170	685
North Carolina	6,348	4,552	19,949	0	152	51
North Dakota	6,700	5,307	3,749	401	230	62
Ohio	319	37,385	22,273	0	0	35
Oklahoma	47,177	19,910	21,206	0	268	101
Oregon	14,363	10,340	6,403	0	0	95
Pennsylvania	25,620	78,812	45,506	244	0	1,342
Rhode Island	179	753	433	4	18	0
South Carolina	4,136	7,742	13,224	0	0	0
South Dakota	8,933	3,033	5,587	0	48	253
Tennessee	14,013	4,042	9,624	0	36	0
Texas	107,863	108,690	16,988	0	0	140
Utah	16,444	5,368	2,375	0	60	100
Vermont	1,428	1,656	2,160	0	0	24
Virginia	15,950	19,645	13,606	41	409	653
Washington	33,305	14,921	13,961	1,752	103	1,416
West Virginia	7,839	5,904	13,746	15	202	68
Wisconsin	6,615	13,851	0	0	135	32
Wyoming	22,364	5,633	3,533	0	0	0
D. Columbia	872	587	680	74	68	70
All	797,257	664,727	550,752	11,710	5,455	11,212

^a 110,169 unknowns not included.

TABLE 11
NUMBER OF PERMITS, BY COMMODITY AND STATE

STATE	TRAILERS, TYPE UNKNOWN	MOBILE HOMES	MOBILE OFFICES	EMPTY SEMI- TRAILER	CONST., GENERAL	CONST. EQUIP.	CONST. MATERIALS	STRUCT. MEMBERS	BOOMS	PILING	MINING, GENERAL	MINING EQUIP.	MINING PRODUCTS	OIL-WELL EQUIP.	FOREST, GENERAL	LOGGING EQUIP.	LOGGING SPANS	FOREST PRODUCTS	AGRIC., GENERAL	AGRIC. PRODUCE	LIVESTOCK	AGRIC. EQUIP.	HAYSTACKS	NURSERY PRODUCTS	INDUST., GENERAL	INDUST. MACHINERY	INDUST. PRODUCTS
Alabama	300	—	—	—	—	2,900	—	600	67	—	—	400	—	—	—	67	—	—	—	—	—	167	33	—	—	233	333
Arizona	0	15,814	0	455	37	11,771	465	1,020	336	22	0	209	0	56	19	95	0	56	0	19	37	740	0	19	37	648	37
Arkansas	338	17,172	0	0	0	16,120	0	2,911	0	511	0	234	0	368	34	34	0	0	0	68	0	1,251	34	0	0	333	34
California	482	10,040	43	1,164	43	44,994	277	5,683	118	32	0	58	126	830	67	127	0	634	338	295	0	1,277	0	278	179	1,633	804
Colorado	70	13,413	35	35	0	22,111	0	2,655	0	0	0	35	0	2,480	0	140	0	35	0	0	0	1,223	0	0	35	0	0
Connecticut	176	3,283	32	65	1,195	15,323	305	1,161	79	123	0	32	65	0	32	118	0	0	0	0	0	0	0	0	32	3,418	355
Delaware	0	6,551	35	490	0	3,328	981	1,506	—	911	—	—	70	—	—	—	—	—	—	—	—	35	—	—	50	280	35
Florida	106	25,605	0	27	0	7,580	0	1,659	0	53	0	106	0	27	0	0	0	318	0	0	0	366	0	57	0	1,157	0
Georgia	143	16,192	0	52	0	15,066	907	686	0	0	0	0	0	125	0	0	0	33	0	1,481	0	121	0	0	67	0	176
Idaho	62	11,975	0	144	0	8,290	60	401	0	0	0	0	0	0	0	32	0	0	21	0	0	643	0	0	0	80	121
Illinois	29	18,406	0	29	0	28,597	345	747	29	0	0	201	0	201	0	57	0	0	0	0	0	373	0	0	0	4,223	1,235
Indiana	902	26,327	0	482	124	10,937	1,020	2,212	264	0	35	100	111	451	28	33	0	0	133	0	0	1,301	128	0	0	1,331	179
Iowa	0	3,645	33	0	0	5,669	67	667	100	233	0	233	0	0	0	67	0	0	0	0	0	934	0	0	0	334	534
Kansas	140	21,869	73	0	218	10,844	36	437	0	0	0	0	0	8,959	0	0	0	0	36	0	0	983	0	0	0	255	73
Kentucky	32	11,440	33	0	79	9,165	258	441	33	17	79	—	—	—	—	—	—	—	—	473	—	115	—	—	79	320	474
Louisiana	21	24,838	0	158	0	27,447	0	4,058	105	146	0	0	53	5,401	0	0	0	0	105	0	53	935	0	0	684	1,008	62
Maine	0	5,106	0	27	0	7,329	27	1,144	—	1	—	—	—	—	—	157	—	—	—	—	—	292	—	—	—	27	152
Maryland	71	14,926	640	0	36	16,633	462	1,816	249	0	0	142	0	0	0	0	0	0	36	0	0	71	0	0	36	356	463
Massachusetts	0	3,766	0	33	0	5,466	—	901	67	100	—	—	—	—	—	—	—	—	—	—	—	—	—	33	—	400	267
Michigan	0	29,539	52	0	0	21,110	522	5,764	223	0	0	52	53	8	0	39	0	0	207	0	0	884	0	0	0	1,635	342
Minnesota	36	10,726	0	0	34	11,910	0	3,951	33	34	0	205	69	0	34	0	0	0	34	0	0	1,815	0	0	0	374	34
Mississippi	56	11,404	0	0	0	15,489	35	355	0	0	0	0	0	2,237	0	64	0	0	53	0	0	872	0	0	0	297	308
Missouri	0	20,818	162	0	31	20,040	2,492	1,788	131	51	0	260	0	149	0	49	0	79	40	0	0	1,441	0	30	198	760	613
Montana	2	2,458	0	0	0	6,504	12	132	0	2	2	14	8	20	2	60	0	1,185	2	0	0	608	302	0	7	13	4
Nebraska	0	11,135	20	21	0	7,197	41	147	0	0	0	42	0	126	0	0	0	0	0	0	0	9,854	0	0	21	126	126
Nevada	283	2,256	0	0	0	1,333	0	2	0	0	0	5	0	2	0	0	0	0	0	0	0	1,133	0	0	283	2	3
New Hampshire	19	3,302	0	0	0	3,796	6	619	43	49	0	49	0	0	0	27	6	0	0	0	0	51	0	6	19	56	62
New Jersey	226	7,138	32	309	161	10,639	6,982	5,797	124	992	75	0	0	0	0	0	0	0	0	0	0	344	0	113	264	2,351	2,893
New Mexico	148	14,361	23	28	0	5,761	118	539	0	0	0	0	0	1,217	0	24	0	59	0	23	0	610	0	0	31	282	46
New York	34	16,782	401	157	0	17,003	679	1,068	34	34	34	0	0	0	0	0	0	0	0	0	0	136	0	0	102	645	840
North Carolina	25	20,000	0	25	0	5,210	51	506	0	0	0	25	0	0	0	51	0	0	0	51	0	177	0	25	177	126	51
North Dakota	0	5,095	0	21	124	5,575	0	283	0	21	186	21	0	655	0	0	0	0	0	20	0	358	113	0	0	99	41
Ohio	0	24,099	0	0	0	28,352	259	796	—	37	—	—	—	—	—	—	—	—	—	—	—	70	—	—	45	4,239	678
Oklahoma	0	24,457	1,181	458	607	17,670	34	1,896	788	0	67	0	0	10,873	0	67	0	0	299	0	0	133	0	0	1,721	2,558	64
Oregon	0	7,509	0	137	0	13,594	0	2,869	137	34	0	34	0	68	0	512	102	999	34	34	0	615	0	0	0	547	68
Pennsylvania	122	53,192	0	0	0	59,536	2,684	10,004	—	—	—	366	—	244	—	—	—	—	—	—	—	366	—	—	—	8,174	3,538
Rhode Island	0	412	0	22	9	379	4	96	12	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	15	64	56
South Carolina	684	18,878	62	0	82	203	20	670	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	41	654	0
South Dakota	48	7,038	72	96	0	5,963	36	505	0	0	12	37	0	24	0	12	0	0	0	60	0	1,257	287	0	48	37	13
Tennessee	0	11,654	149	235	22	9,923	47	1,245	0	0	21	0	0	0	0	0	0	0	0	0	0	116	0	0	0	147	124
Texas	140	29,667	0	420	140	69,726	530	9,896	140	670	0	0	0	54,084	0	0	0	195	0	0	0	3,888	0	0	0	1,259	0
Utah	551	3,207	20	0	0	2,464	420	282	0	0	0	0	0	163	0	0	0	0	0	41	20	343	20	20	0	0	120
Vermont	9	2,514	9	0	60	1,232	67	206	9	9	72	9	141	0	36	9	0	0	79	12	0	12	0	0	0	33	21
Virginia	0	14,943	0	0	0	15,425	2,684	2,818	0	285	0	981	1,243	0	0	41	0	0	695	570	0	184	123	0	0	1,225	82
Washington	52	14,672	151	1,921	0	28,726	551	4,118	968	257	0	552	50	0	0	1,832	152	916	50	0	0	1,377	0	0	0	150	150
West Virginia	59	7,541	29	0	13	11,591	94	1,695	43	57	0	896	0	201	0	29	0	102	0	0	0	79	0	0	16	979	635
Wisconsin	0	3,114	0	1,464	0	10,063	1,060	1,868	32	65	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	229	1,161
Wyoming	67	6,999	0	0	100	9,332	67	433	67	0	0	0	0	5,733	0	0	0	333	0	0	33	1,233	67	0	67	33	33
D. Columbia	20	10	29	0	20	1,128	571	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20
All	5,453	635,288	3,316	8,475	3,135	686,444	25,276	91,239	4,231	4,746	583	5,298	1,989	94,702	272	3,775	260	4,944	2,162	3,152	143	38,783	1,107	581	4,254	43,140	17,460

TABLE 11—Continued

STATE	MARINE, GENERAL	MARINE MACH.	BOATS	PUBLIC, GENERAL	TRANSFORMERS	GENERATORS	NUCLEAR REACTORS	PIPES	POLES	PIPES AND/OR POLES	MILITARY, GENERAL	MILITARY EQUIP.	MISSILES	MISSILE OR ROCKET PARTS	AIRCRAFT PARTS	MISC.	HOUSES	OTHER BUILDINGS	TANKS, BINS, ETC.	MISC. MACHINERY	AUTOS OR OTHER VEHICLES	AIRCRAFT	ELECTRONIC EQUIP.	MEDICAL EQUIP.	UNKNOWN	TOTAL	
Alabama	33	—	233	—	—	33	1	33	—	—	—	33	—	67	200	200	—	267	900	2,833	167	33	133	—	33	10,299	
Arizona	0	37	389	93	98	0	0	204	407	37	19	315	19	37	41	477	234	399	855	2	74	208	74	0	783	36,694	
Arkansas	34	0	708	0	67	0	0	134	0	0	0	403	31	0	67	881	1,443	545	1,649	34	442	0	34	0	64	45,978	
California	588	0	2,463	526	581	629	0	273	607	0	0	547	118	120	449	3,148	959	2,479	3,660	1,679	1,210	176	483	0	306	90,523	
Colorado	0	0	35	0	210	0	0	384	35	0	0	419	140	105	35	1,956	245	1,153	2,305	0	140	0	0	0	106	49,535	
Connecticut	136	32	836	189	129	0	0	111	0	0	39	72	0	39	39	182	32	208	444	275	104	162	32	32	285	29,172	
Delaware	—	70	1,296	35	—	70	—	35	—	—	—	35	—	—	245	140	105	175	736	—	—	—	70	—	90	17,374	
Florida	0	0	834	32	266	53	0	149	536	0	0	53	27	80	186	239	0	1,762	654	302	414	133	239	0	120	43,140	
Georgia	170	0	1,101	0	137	0	0	1,390	29	0	172	34	0	144	26	432	2,869	410	972	144	28	0	0	0	0	42,937	
Idaho	0	0	185	21	41	0	0	41	62	0	0	21	0	0	21	304	287	426	794	19	0	0	21	0	459	24,531	
Illinois	0	29	1,321	86	230	115	0	144	0	0	0	172	0	0	0	86	763	172	3,631	345	986	29	29	0	10,866	73,476	
Indiana	35	0	612	0	133	34	0	330	91	0	0	333	0	0	58	8,181	593	252	1,183	591	173	0	30	0	36	58,763	
Iowa	0	0	0	0	0	0	0	100	33	0	0	100	0	0	0	200	200	696	1,662	0	0	0	0	0	3,992	19,499	
Kansas	0	0	364	36	218	0	0	364	0	0	36	182	0	36	0	437	36	255	5,349	109	73	36	36	0	0	51,490	
Kentucky	—	—	1,068	17	33	33	—	387	600	—	—	79	—	79	79	1,160	166	199	1,164	258	96	0	0	0	332	28,788	
Louisiana	684	73	684	0	42	23	1	4,838	368	315	0	0	1	53	263	357	2,261	1,493	6,362	784	1,630	0	0	0	50	85,356	
Maine	—	60	168	—	65	—	—	97	—	—	—	27	—	15	—	179	32	384	168	—	—	—	82	—	—	15,539	
Maryland	71	142	3,163	3	113	36	0	533	36	0	1	178	0	182	36	108	320	355	996	569	36	0	142	0	210	43,167	
Massachusetts	33	33	367	133	68	103	1	167	167	—	—	33	—	33	67	167	—	467	301	100	—	1	67	33	—	13,374	
Michigan	0	96	697	43	0	0	0	0	42	2,464	0	1,229	0	0	0	52	597	6	2,586	0	826	0	89	0	24,942	94,099	
Minnesota	34	0	1,079	36	69	0	0	174	107	0	0	140	0	0	34	562	0	1,446	1,142	105	143	0	36	0	2	34,398	
Mississippi	0	325	841	63	167	33	0	64	0	0	64	0	56	141	90	307	942	595	1,797	573	0	0	0	0	526	37,754	
Missouri	40	0	723	171	301	0	0	792	2,293	98	0	147	53	71	201	0	220	357	2,002	411	302	0	142	0	470	57,926	
Montana	0	2	172	55	2	0	0	112	59	0	0	21	31	3	55	2,314	444	860	288	79	165	2	5	0	7,116	23,122	
Nebraska	0	0	21	0	21	0	0	42	0	0	0	84	0	0	0	126	21	610	1,156	0	0	0	63	0	0	31,000	
Nevada	0	0	93	0	1	5	0	0	1	0	62	0	0	0	1	1	117	117	117	1	0	0	0	0	476	6,294	
New Hampshire	0	6	290	12	19	0	0	37	0	0	0	27	0	0	25	99	25	255	107	37	6	0	93	0	0	9,148	
New Jersey	48	354	3,067	0	258	75	1	75	259	0	0	0	0	38	237	651	97	137	3,408	640	430	145	296	0	294	48,950	
New Mexico	23	26	743	46	0	0	0	439	323	0	0	222	0	106	72	870	814	326	1,268	182	281	30	165	0	1,791	31,000	
New York	0	0	1,146	209	69	136	0	219	34	0	0	68	0	34	68	1,585	263	645	1,320	1,010	306	68	102	0	607	45,838	
North Carolina	126	0	1,340	51	25	51	0	126	0	0	0	202	25	25	76	152	708	278	936	253	51	0	25	25	77	31,052	
North Dakota	0	0	0	0	78	0	0	0	0	0	62	78	325	124	0	83	264	180	1,026	620	0	0	0	0	3,133	18,585	
Ohio	—	—	25	65	25	126	—	—	—	—	—	30	—	—	—	—	—	—	1,900	30	921	—	—	—	—	5,776	67,473
Oklahoma	132	67	829	1,560	101	32	1	4,755	563	101	202	366	0	101	371	526	1,692	3,012	10,074	0	34	199	100	0	1,139	88,830	
Oregon	34	0	471	0	34	0	0	205	171	0	0	34	0	0	68	444	136	1,564	410	137	129	34	34	0	0	31,198	
Pennsylvania	—	—	2,318	—	122	244	4	244	244	—	—	488	244	—	122	—	122	1,098	4,026	—	3,538	—	—	—	258	151,298	
Rhode Island	19	17	128	—	4	5	—	11	4	—	5	0	—	—	5	29	31	52	55	15	4	—	5	—	15	1,478	
South Carolina	0	100	770	326	41	0	0	42	20	20	41	40	0	21	141	63	122	1,059	591	102	0	20	0	0	366	25,199	
South Dakota	24	0	108	25	1	0	0	12	0	0	12	14	0	0	0	264	240	529	854	24	48	0	12	0	171	17,883	
Tennessee	22	23	964	0	39	0	0	208	329	0	14	79	0	0	50	288	637	58	1,175	23	89	0	0	0	58	27,739	
Texas	0	140	2,239	195	0	0	0	12,926	8,078	0	0	1,259	140	140	140	0	4,758	5,598	24,125	280	1,259	280	700	0	1,502	234,514	
Utah	0	0	19	0	0	0	0	163	41	0	0	41	41	0	0	122	320	120	466	282	101	20	0	0	17,557	26,964	
Vermont	0	0	37	0	9	0	0	0	156	0	0	9	0	0	0	19	0	94	28	0	0	0	0	0	497	5,388	
Virginia	102	327	1,777	82	286	41	0	653	388	0	0	123	82	41	163	41	0	1,080	1,144	82	2,165	102	245	0	201	50,424	
Washington	0	50	1,154	503	57	30	0	856	1,167	0	54	452	0	0	151	407	262	754	1,212	50	1,451	50	0	0	21,156	86,461	
West Virginia	0	15	189	75	152	0	0	466	57	29	15	101	0	0	14	530	59	215	1,117	242	212	0	42	0	265	27,854	
Wisconsin	0	32	602	32	34	0	0	488	163	1,929	0	200	0	0	34	0	230	375	723	32	64	0	0	0	0	24,026	
Wyoming	0	0	133	0	67	33	0	233	100	0	0	0	33	33	0	800	267	133	2,733	600	867	0	0	0	2,535	33,164	
D. Columbia	10	0	39	49	44	0	0	29	10	0	0	41	0	10	10	69	0	39	101	11	20	0	39	10	63	2,588	
All	2,228	2,056	37,841	4,769	4,457	1,940	9	33,085	17,580	4,993	798	8,531	1,366	1,878	3,940	29,238	23,933	33,689	101,672	13,868	18,985	1,728	3,665	100	108,725	2,151,282	

Intrastate and Interstate Characteristics

Table 13 gives numbers of permits issued by state for intrastate movements, interstate movements that passed through the state, and other interstate movements that either started or ended in the state. It also gives numbers of permits for in-state- and out-of-state-registered hauling vehicles. In only one state (Delaware) did the percentage of the permits issued for through-state interstate moves exceed 50 percent.

In 10 states and the District of Columbia, more than 50 percent of the permits were issued to out-of-state hauling vehicles. The top 5 states of out-of-state registrations were Rhode Island, Delaware, South Carolina, Kentucky, and Nevada. States having a low percentage of permits issued to out-of-state vehicles are Arizona, California, Colorado, Connecticut, Idaho, Maine, Minnesota, Oklahoma, Oregon, Pennsylvania, Tennessee, and Texas.⁵

Both of these types of data may indicate the extent to which (1) a state is a corridor state, (2) a state is either a producer or a consumer of commodities reliant upon permits for movement, and (3) local industry is the beneficiary of permitted moves. For example, in Pennsylvania, California, and Texas, local industry needs for permit moves entirely within the state far exceed the needs of industries wishing to move commodities into, out of, or through the state. In Pennsylvania, however, there are a significant number of interstate moves that either start or end (probably start) in Pennsylvania. This probably is due to the large amount of heavy industry situated in Pennsylvania. At the other end of the scale, Nevada is a state which produces few of the types of commodities that require permits to be moved. Therefore, most of this state's permit moves involve transit of commodities through the state on their way from or to California.

⁵ The Ohio sample indicated no out-of-state vehicles. However, this is believed to be due to bias in the sample data and not representative of permit issuance in that state.

TABLE 12
NUMBER OF PERMITS ISSUED FOR LEADING
COMMODITIES

COMMODITY	NO. OF PERMITS	PERMIT ISSUANCE ^a (%)
Construction equipment	686,444	33.61
Mobile homes	635,288	31.10
Tanks and bins	101,672	5.02
Oil-well equipment	94,702	4.64
Structural members	91,239	4.47
Buildings and houses	57,622	2.82
Industrial equipment	43,140	2.11
Agricultural equipment	38,783	1.90
Boats	37,841	1.85
Construction materials	25,276	1.24
Autos and other vehicles	18,985	0.93
Poles	17,580	0.86
Industrial products	17,460	0.85

^a Excluding unknowns.

Figure 6 shows a flow diagram of interstate permit trips. If all states had uniform permit laws, regulations, operations, and weight law enforcement, the trip connections at the state borders should be equal. Figure 6 shows, within the accuracy of the permit sample, that these connections are significantly variant in many cases. The mismatches on the Ohio border have been attributed to a bias believed to exist in the Ohio sample. Most other significant mismatches, however, are believed to be attributable to variations in regulations and enforcement, although part of the discrepancy may be due to normal sampling error. Another reason for some variances may be the termination of a move in a city on the border. Other changes from state to non-state highways at borders also may be reflected in some cases, but probably not to any large extent. Differences in quantity of multiple-trip permits also contribute to mismatches, particularly between a state issuing multiple-trip permits and one that does not.

Permit Fees

Table 14 gives a summary of total permit fees collected and the fees for selected commodities by state. The grand national total of permit fees collected is estimated for 1966

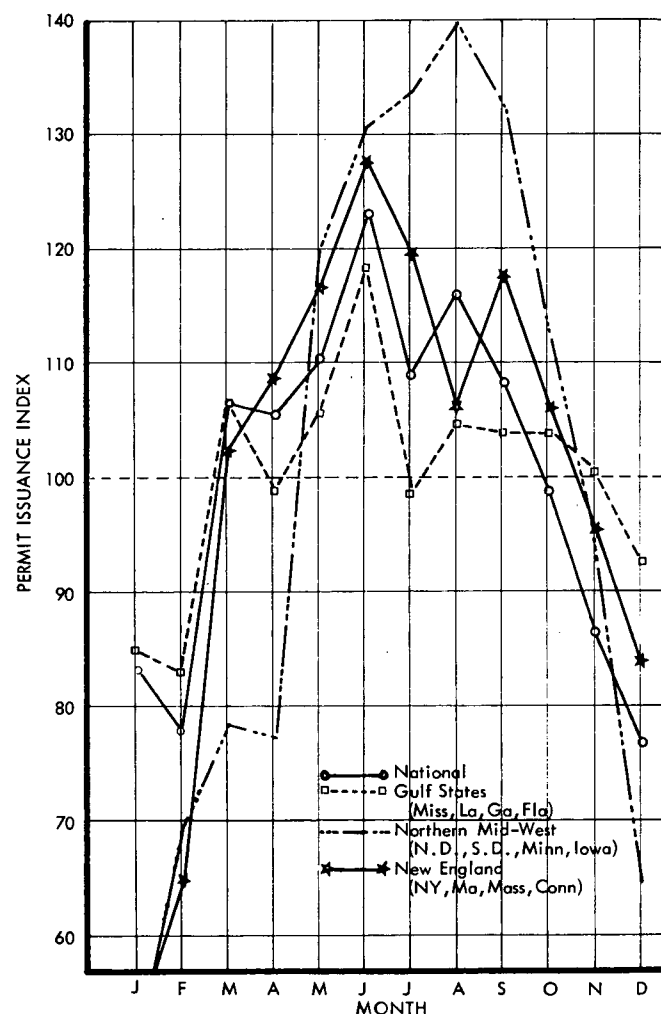


Figure 5. Annual distribution of permits issued.

TABLE 13
NUMBER OF PERMITS, BY INTRASTATE-INTERSTATE CHARACTERISTICS

STATE	TYPE OF PERMIT ^a			REGIS. OF HAULING VEHICLE ^b	
	INTRASTATE	INTERSTATE	THROUGH-STATE	IN-STATE	OUT-OF-STATE
Alabama	4,200	3,500	2,600	6,133	4,166
Arizona	19,788	9,790	6,849	26,576	9,761
Arkansas	20,874	16,432	8,640	27,026	18,316
California	80,975	8,643	118	83,984	6,336
Colorado	33,393	12,575	3,423	38,144	11,212
Connecticut	18,943	6,348	3,805	21,754	7,098
Delaware	3,888	4,554	8,092	5,885	11,490
Florida	15,712	11,113	376	22,010	10,532
Georgia	37,441	3,684	1,813	27,712	15,167
Idaho	12,039	8,574	3,524	18,928	5,322
Illinois	21,885	20,557	10,211	39,317	23,093
Indiana	29,895	20,727	4,881	35,809	18,611
Iowa	11,405	3,068	1,166	8,454	6,452
Kansas	36,043	13,554	1,788	39,312	12,045
Kentucky	8,279	8,644	10,716	2,058	10,216
Louisiana	44,638	31,151	7,727	58,485	26,609
Maine	11,698	3,842	0	12,963	2,577
Maryland	15,112	15,751	12,233	16,952	20,636
Massachusetts	6,673	5,134	1,567	7,539	5,268
Michigan	49,274	13,919	106	0	78
Minnesota	22,639	9,920	1,839	25,506	8,860
Mississippi	17,002	12,655	7,779	18,884	18,121
Missouri	31,268	18,456	7,503	33,654	20,846
Montana	8,150	1,071	629	8,022	2,023
Nebraska	14,553	11,160	5,113	16,297	14,621
Nevada	2,986	2,078	636	1,895	3,579
New Hampshire	3,087	2,906	3,155	3,516	5,291
New Jersey	21,736	16,605	10,148	27,589	17,943
New Mexico	11,166	8,466	9,579	14,155	15,056
New York	28,392	13,376	4,041	14,606	17,102
North Carolina	11,834	14,535	4,683	16,052	14,999
North Dakota	11,986	3,067	888	12,392	3,782
Ohio	46,102	12,237	1,674	59,153	0
Oklahoma	50,221	26,056	12,320	69,601	19,094
Oregon	29,618	1,168	414	23,526	7,641
Pennsylvania	72,300	36,200	12,200	116,000	35,550
Rhode Island	169	881	421	282	1,188
South Carolina	5,760	9,412	9,951	8,735	16,368
South Dakota	10,055	4,364	3,364	11,994	5,764
Tennessee	15,764	7,157	4,727	20,990	6,671
Texas	193,363	34,955	5,373	217,983	15,698
Utah	20,400	2,699	1,391	14,029	10,693
Vermont	1,681	2,458	314	2,472	2,847
Virginia	12,755	16,026	5,618	25,586	24,716
Washington	51,465	12,734	1,311	46,055	13,263
West Virginia	15,407	8,805	3,584	18,448	9,336
Wisconsin	8,662	5,329	7,169	15,242	8,160
Wyoming	18,098	7,699	5,733	19,231	12,199
D. Columbia	786	1,375	130	1,186	1,329
All	1,219,560	525,410	221,322	1,362,122	557,725

^a 184,990 unknowns not included. ^b 231,436 unknowns not included.

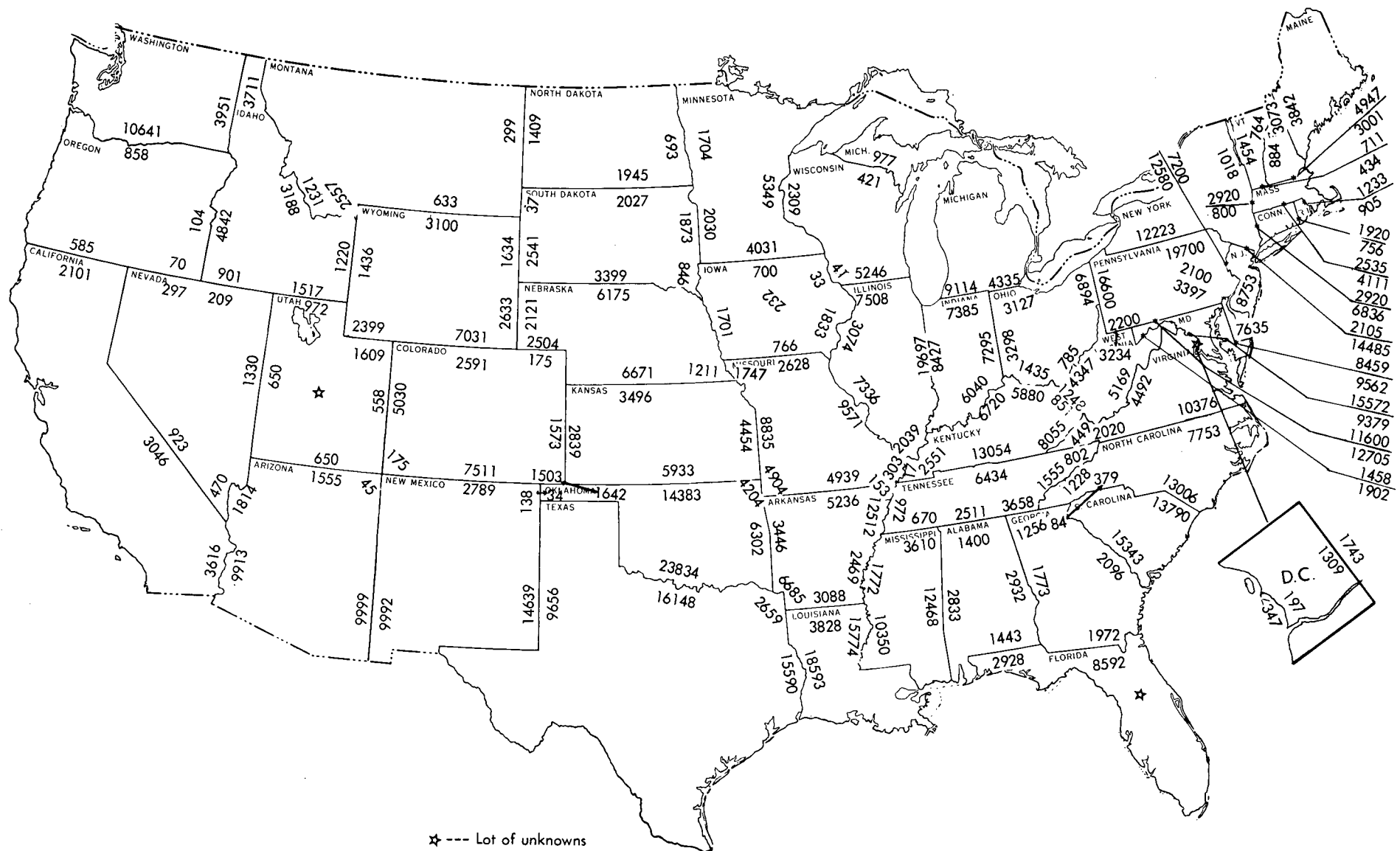


Figure 6. Border matches of interstate permits, by state.

TABLE 14

TOTAL FEES COLLECTED, BY STATE, FOR SELECTED COMMODITIES

STATE	FEES COLLECTED (\$)										TOTAL
	MOBILE HOMES	CONSTR. EQUIP.	STRUCT. EQUIP.	OIL-WELL EQUIP.	AGRIC. EQUIP.	INDUST. EQUIP.	BOATS	PIPES	HOUSES- BUILDINGS	TANKS AND BINS	
Alabama	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arizona	79,072.00	58,678.80	5,100.05	280.10	3,702.00	3,242.25	1,943.55	1,018.05	3,165.70	4,276.65	181,789.95
Arkansas	85,862.00	60,204.15	14,388.20	1,674.35	6,252.80	1,662.90	3,540.30	501.05	9,942.25	7,568.10	207,655.95
California	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Colorado	13,381.68	21,834.74	2,619.75	2,480.03	1,222.55	0.00	34.93	384.23	1,397.20	2,270.45	48,804.19
Connecticut	0.00	0.00	0.00	0.00	0.00	0.00	3.92	0.00	0.00	0.00	0.00
Delaware	32,227.60	20,443.31	7,370.31	0.00	175.15	1,779.50	6,585.64	175.15	1,401.20	3,373.38	96,885.60
Florida	145,411.13	122,556.40	11,636.80	212.80	5,967.50	26,864.80	6,163.00	665.00	25,980.00	3,590.00	383,312.63
Georgia	542,977.84	461,788.44	10,158.24	125.38	1,559.28	0.00	3,052.91	63,256.56	9,675.32	3,863.91	1,178,018.20
Idaho	66,865.50	56,671.39	1,203.45	0.00	2,171.82	240.69	553.77	123.06	2,025.06	3,340.92	137,844.52
Illinois	50,156.84	77,892.32	1,667.76	402.08	646.20	8,404.60	2,297.60	287.20	2,035.76	7,036.40	168,906.64
Indiana	275,109.00	200,921.08	32,269.22	7,429.40	24,324.77	17,919.77	9,986.39	5,345.73	10,464.15	23,443.67	743,043.55
Iowa	21,470.64	17,007.84	2,000.75	0.00	2,801.34	1,000.71	0.00	300.24	2,686.23	4,984.56	95,284.27
Kansas	44,355.89	21,688.44	873.36	17,917.20	1,965.06	509.46	727.80	727.80	582.24	10,698.66	103,601.69
Kentucky	70,633.20	137,959.65	6,609.60	0.00	2,051.10	4,803.75	16,181.55	5,800.95	5,484.60	17,616.60	334,596.90
Louisiana	24,482.32	275,343.24	6,909.14	46,454.24	1,926.86	4,355.34	683.54	5,297.68	4,249.68	28,351.54	434,409.82
Maine	13,108.66	53,855.36	7,111.28	0.00	1,231.96	54.40	1,054.48	4,149.76	2,372.98	744.84	93,598.50
Maryland	154,594.50	200,858.22	18,549.80	0.00	710.80	5,011.60	32,341.40	15,282.20	8,529.60	13,585.50	492,453.92
Massachusetts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Michigan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minnesota	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mississippi	126.00	204,561.57	0.00	43,064.60	0.00	2,124.07	100.62	0.00	6,721.07	1,155.17	312,892.10
Missouri	43,067.86	39,785.20	3,575.78	297.78	2,881.48	1,519.34	1,445.84	1,583.82	1,153.88	4,004.48	117,392.58
Montana	7,373.82	65,812.04	394.80	59.07	1,824.93	37.59	517.02	335.73	4,994.17	2,916.63	145,894.27
Nebraska	78,378.95	47,372.59	1,326.67	622.00	23,000.00	494.00	30.85	925.58	3,023.70	12,865.59	185,992.00
Nevada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Hampshire	64,262.45	20,017.63	1,604.50	0.00	185.40	382.54	1,325.55	61.70	913.46	753.94	92,958.40
New Jersey	43,224.35	61,175.15	36,891.55	0.00	1,719.00	20,416.35	17,886.45	376.60	1,154.10	17,607.05	318,948.23
New Mexico	35,900.68	14,342.05	1,347.51	3,562.52	1,523.83	721.60	1,856.55	1,098.50	2,850.08	3,169.62	73,440.65
New York	144,422.78	370,440.03	15,613.40	0.00	950.60	4,515.35	10,895.90	1,782.40	21,658.65	9,327.10	663,066.62
North Carolina	112,644.00	26,048.70	2,655.45	0.00	885.15	632.25	6,701.85	632.25	4,931.55	4,678.65	168,029.10
North Dakota	26,021.87	21,734.58	850.02	1,964.46	2,167.14	531.75	0.00	0.00	2,974.50	5,814.33	90,430.43
Ohio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oklahoma	12,228.33	29,875.53	1,048.97	14,021.21	66.66	3,723.51	1,358.19	2,626.78	2,722.36	6,501.26	87,692.26
Oregon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pennsylvania	251,760.00	665,580.00	64,630.00	1,000.00	2,530.00	49,910.00	9,170.00	1,480.00	6,090.00	19,370.00	1,487,062.66
Rhode Island	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South Carolina	108,272.25	1,015.15	3,348.20	0.00	0.00	3,268.50	5,834.95	207.85	6,002.15	2,952.90	202,338.50
South Dakota	36,269.10	37,590.75	2,523.70	119.70	7,361.55	184.55	658.35	59.85	3,665.85	4,394.05	99,052.00
Tennessee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Texas	148,336.40	374,463.33	61,177.80	596,990.49	19,636.95	6,297.30	11,195.20	95,040.20	51,777.80	121,598.20	1,618,835.46
Utah	10,261.94	19,806.64	721.74	967.62	2,233.05	0.00	58.29	365.64	1,434.33	1,339.62	234,190.50
Vermont	11,508.55	7,129.07	1,386.91	0.00	120.00	282.07	168.28	0.00	420.70	126.21	32,254.91
Virginia	57,984.70	30,597.90	5,636.16	0.00	367.18	2,449.60	3,553.74	1,306.54	2,160.26	2,287.42	123,542.62
Washington	55,188.43	415,773.40	27,873.09	0.00	6,012.57	450.60	4,167.23	6,017.05	19,427.05	4,527.71	681,072.00
West Virginia	36,994.27	139,169.58	8,785.28	941.93	746.12	7,313.31	468.31	929.82	685.02	33,155.59	262,336.07
Wisconsin	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wyoming	78,422.06	152,457.81	7,579.17	104,399.39	6,166.05	166.65	1,199.88	1,333.20	3,259.65	19,011.33	407,911.77
D. Columbia	58.68	9,668.18	1,326.24	0.00	0.00	58.68	176.04	117.36	176.04	604.80	30,264.37
All	2,982,416.27	4,542,120.26	378,764.65	844,986.35	137,086.85	181,329.38	163,919.87	219,595.53	238,188.34	412,906.83	12,135,803.83

at \$12,135,800. Twelve states (Alabama, California, Connecticut, Massachusetts, Michigan, Minnesota, Nevada, Ohio, Oregon, Rhode Island, Tennessee, Wisconsin) did not charge any fees. (See Appendix E for information on fee schedules.)

Table 15 gives a national summary of average fees per permit for selected commodities. Between states, average permit fees vary from nothing to \$27.44 per permit. Within individual states, some examples of ranges in average permit fees by commodity are:

1. Delaware—\$5.00 for most commodities to \$11.92 for piling.
2. Florida—\$5.00 to \$24.74.
3. Indiana—\$7.22 for haystacks to \$34.25 for unspecified construction items.
4. Louisiana—\$1.00 for some commodities to \$250 for nuclear reactors and missiles.
5. Mississippi—nothing for mobile homes and other legal-weight commodities to \$99.59 for transformers.
6. Pennsylvania—\$5.00 for some commodities to \$22.03 for autos and other vehicles.
7. Texas—\$5.00 for some commodities to \$11.04 for oil-well equipment.
8. Washington—\$3.00 for some commodities to \$257.00 for unspecified agricultural commodities.
9. Wyoming—\$5.00 for some commodities to \$18.21 for oil-well equipment.

There is considerable spread in the distributions around the mean averages. Some individual commodity movements have cost much more and some much less.

Dimensions and Weights

Tables 16, 17, 18, and 19 give for each state the distribution of lengths, widths, heights, and gross weights, respectively, for which permits were obtained. Tables 20, 21, 22 and 23 give the same types of distributions for the national sample by commodities. Table 24 gives a national summary

of permits for over-axle limits broken down by weight groups and number of axles per axle group. Comments concerning dimension and weights characteristics are contained in the discussions of various industries in Chapter Four.

The data on the permits often indicated an overage on both the single axle and the tandem. These data were coded to the highest overage.

TRIPS AND MILEAGE

Trips

The national permit sample indicates that 2,151,282 permits were issued during the sample year (1966). The number of trips represented by these permits is estimated to be 6,551,134, determined as follows:

1. In-state single-trip permits, including both one-way and round-trip single trips, were assumed to equal one trip per permit. These permits account for 1,127,821 trips.
2. Using the special sample obtained from the Heavy-Specialized Carriers Conference of the American Trucking Associations, it was determined that interstate oversize-overweight movements required an average of 3.689 permits per trip. By dividing this average into the number of interstate and through-state single-trip permits, it was estimated that these permits represent 201,847 trips.
3. The number of trips made on multiple-trip permits (MTP) was known only for a small number of MTP. The number of trips made under the majority of MTP were estimated using the MTP survey and certain trip data from the national permit survey.

The multiple-trip permit survey was directed in part at determining average number of trips per permit for multiple-trip permits of 30-day, 90-day, 6-month, 9-month, and 12-month durations, and for mobile homes, construction equipment and other commodities. The survey took the form of a letter to 1,346 multiple-trip permit holders in 37 states. In each case, the letter referred to a specific permit and requested the number, commodity, origins, destinations, and trip lengths of movements made under the permit. Replies were received from 224 permittees. Also, similar data were available from the record in two other states (West Virginia, Wisconsin). In total, trip data were obtained concerning 388 permits. The values for 6-month and 9-month multiple-trip permits were interpolated. Table 25 gives these estimates.

The MTP with unknown trips were broken down by state, time period, and commodity, and the number of trips was determined. Using both the national permit sample and the MTP survey, the percentage of MTP that were for intrastate movements was determined for each state. This value was multiplied by the total of the estimated and known MTP trips. An estimated 5,944,736 intrastate trips were made on MTP, and an estimated 276,690 inter- and through-state trips.

TABLE 15
AVERAGE PERMIT FEES, BY SELECTED COMMODITIES

COMMODITY	AVERAGE PERMIT FEE (\$)
Mobile homes	\$ 5.20
Construction equipment	6.78
Structural members	4.24
Oil-well equipment	8.92
Logging spars	20.17
Agricultural equipment	4.41
Industrial equipment	4.36
Boats	4.32
Poles	6.75
Military equipment	3.38
Missiles	3.04
Buildings	4.13
Tanks and bins	4.13
All	5.79

TABLE 16

NUMBER OF OVERLENGTH PERMITS,* BY STATE AND OVER-ALL LENGTH GROUP

STATE	41- 50 FT	51- 55 FT	56- 60 FT	61- 65 FT	66- 70 FT	71- 75 FT	76- 85 FT	86- 100 FT	101- 120 FT	121 FT AND OVER	TOTAL
Alabama	0	0	633	2,166	267	167	33	0	0	0	3,266
Arizona	973	641	1,706	4,468	5,960	5,211	1,100	449	259	93	20,860
Arkansas	203	134	2,833	3,884	9,356	6,662	302	306	0	0	23,680
California	999	299	1,251	2,506	3,159	7,149	9,979	4,394	1,311	637	31,684
Colorado	768	559	978	3,423	6,881	7,196	2,236	1,223	70	140	23,474
Connecticut	32	143	2,796	2,021	3,095	1,898	2,193	1,726	362	64	14,330
Delaware	315	210	666	2,102	3,818	2,067	455	1,156	245	105	11,139
Florida	565	121	1,633	1,803	4,839	16,347	1,330	431	16	53	27,138
Georgia	0	28	1,171	2,434	3,606	20,277	579	633	99	124	28,951
Idaho	401	309	1,172	1,164	2,814	8,870	363	181	21	21	15,316
Illinois	58	144	3,020	2,418	15,136	864	556	517	86	0	22,799
Indiana	194	239	2,064	1,296	31,495	550	505	8,032	68	0	44,443
Iowa	300	334	801	634	4,079	67	33	267	0	0	6,515
Kansas	558	640	4,364	5,903	9,463	7,297	722	392	853	284	30,476
Kentucky	100	2,902	2,317	3,664	4,421	5,536	112	244	63	0	19,359
Louisiana	500	740	6,442	13,576	22,420	9,049	714	557	211	3	54,212
Maine	0	27	962	1,923	3,243	1,616	286	60	54	60	8,231
Maryland	107	17,131	3,629	4,765	6,930	6,575	1,919	398	112	568	42,134
Massachusetts	167	1,766	969	1,368	2,533	1,867	734	167	100	69	9,740
Michigan	267	260	2,859	5,286	6,729	26,044	1,036	527	35	39	43,082
Minnesota	458	1,845	2,915	5,943	3,354	4,497	1,227	822	105	71	21,237
Mississippi	205	172	2,077	2,256	5,098	5,529	468	76	0	0	15,881
Missouri	621	682	3,028	6,199	9,034	10,587	1,082	418	319	0	31,970
Montana	8	57	0	3,205	2,867	1,299	879	124	217	2	8,658
Nebraska	430	188	904	1,588	4,112	5,621	250	147	0	20	13,260
Nevada	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	6	49	1,012	1,538	1,128	1,648	583	132	25	6	6,127
New Jersey	124	2,183	4,640	3,117	4,444	3,109	2,888	3,687	1,406	354	25,952
New Mexico	185	181	232	1,171	3,881	6,201	2,733	621	84	12	15,301
New York	476	4,667	3,776	7,367	3,375	8,432	3,179	746	306	132	32,456
North Carolina	556	430	1,391	2,858	19,039	278	51	0	0	0	24,603
North Dakota	256	45	41	765	1,303	612	3,541	1,376	0	41	7,980
Ohio	12	112	4,360	5,905	6,861	15,556	0	21	151	25	33,003
Oklahoma	97	882	6,812	10,476	14,646	16,157	1,647	461	34	458	51,670
Oregon	137	2,549	3,151	3,687	1,932	1,387	6,813	232	273	512	20,673
Pennsylvania	3,416	28,792	8,496	17,180	13,420	23,404	2,562	2,318	366	244	100,198
Rhode Island	14	4	138	135	167	221	58	28	8	8	781
South Carolina	20	22	505	512	17,771	442	0	60	21	20	19,373
South Dakota	74	133	182	1,569	3,258	1,979	1,152	122	38	0	8,507
Tennessee	28	1,767	1,765	1,268	1,798	11,509	220	282	64	22	18,723
Texas	6,878	2,756	13,721	27,258	13,014	72,442	8,256	7,237	615	0	152,177
Utah	101	45	102	2,742	613	4,846	523	2,118	372	70	11,532
Vermont	0	0	246	747	485	1,051	446	61	21	19	3,076
Virginia	1,365	4,924	3,654	4,511	6,491	10,070	511	1,347	286	0	33,159
Washington	1,774	819	2,399	3,853	6,379	8,842	2,613	2,065	621	1,014	30,379
West Virginia	1,095	1,949	2,318	1,951	2,984	3,439	270	255	29	87	14,377
Wisconsin	570	136	2,002	1,632	1,548	6,179	1,684	2,491	236	64	16,542
Wyoming	1,833	1,033	1,000	867	5,866	1,200	400	267	33	0	12,499
D. Columbia	20	506	215	133	40	186	231	179	0	10	1,520
All	27,266	83,555	113,348	187,237	305,152	362,032	69,454	49,353	9,595	5,451	1,212,443

* 39,262 not included due to missing dimensions.

TABLE 17

NUMBER OF OVERWIDTH PERMITS,^a BY STATE
AND OVER-ALL WIDTH GROUP

STATE	8'-1" to 10'-0"	10'-1" to 12'-0"	12'-1" to 14'-0"	14'-1" to 20'-0"	20'-1" to 30'-0"	30'-1" AND OVER	TOTAL
Alabama	4,266	5,133	33	33	67	0	9,532
Arizona	16,858	9,854	3,617	569	284	107	31,289
Arkansas	19,489	18,878	1,141	702	1,007	0	41,217
California	30,140	39,632	8,421	771	955	717	80,636
Colorado	17,151	18,548	7,580	384	279	140	44,082
Connecticut	9,277	12,558	1,949	466	0	39	24,289
Delaware	6,901	6,375	806	210	210	0	14,502
Florida	6,341	30,185	1,104	103	53	27	37,813
Georgia	9,074	28,020	851	490	2,038	487	40,960
Idaho	14,774	5,676	1,229	617	463	41	22,800
Illinois	21,478	33,294	230	373	172	86	55,633
Indiana	8,058	45,093	845	216	390	86	54,688
Iowa	3,801	7,611	298	896	67	33	12,706
Kansas	13,317	24,285	6,798	2,905	255	0	47,560
Kentucky	11,540	12,762	901	65	249	17	25,534
Louisiana	34,219	34,127	2,075	1,449	1,316	0	73,186
Maine	6,934	5,230	901	285	0	0	13,350
Maryland	17,522	21,794	575	466	71	71	40,499
Massachusetts	5,400	5,236	800	169	168	67	11,840
Michigan	13,747	38,765	1,245	340	227	32	54,356
Minnesota	13,780	12,089	896	765	371	56	27,957
Mississippi	20,045	14,462	0	131	847	0	35,485
Missouri	17,406	28,838	1,674	294	129	22	48,363
Montana	4,198	4,506	1,048	1,812	176	280	12,020
Nebraska	11,453	7,463	629	9,447	182	39	29,213
Nevada	1,673	935	650	467	117	117	3,959
New Hampshire	3,816	3,809	333	111	31	19	8,119
New Jersey	14,862	19,561	5,790	982	145	0	41,340
New Mexico	12,346	9,757	2,047	1,136	835	152	26,273
New York	11,582	26,295	3,069	463	340	68	41,817
North Carolina	7,056	21,214	733	582	582	50	30,217
North Dakota	5,355	4,031	2,499	659	383	82	13,009
Ohio	9,784	45,527	2,928	160	23	1	58,423
Oklahoma	38,666	32,495	1,440	1,080	2,375	258	76,314
Oregon	7,164	13,953	3,204	403	165	110	24,999
Pennsylvania	52,116	80,002	1,952	2,196	0	0	136,266
Rhode Island	481	636	65	26	58	4	1,270
South Carolina	12,152	9,327	121	590	428	102	22,720
South Dakota	7,849	5,791	1,282	743	181	30	15,876
Tennessee	8,231	14,458	736	309	377	42	24,153
Texas	54,337	93,780	22,211	17,213	2,799	560	190,900
Utah	4,013	2,818	2,125	483	122	120	9,681
Vermont	1,261	2,562	180	47	9	0	4,059
Virginia	10,830	24,993	2,103	346	41	61	38,374
Washington	28,241	16,608	7,605	476	150	0	53,080
West Virginia	11,609	10,755	702	159	44	41	23,310
Wisconsin	5,162	9,753	1,034	300	231	32	16,512
Wyoming	12,665	7,533	4,433	767	33	34	25,465
D. Columbia	577	830	123	25	0	0	1,555
All	658,997	927,837	113,011	53,681	19,445	4,230	1,777,201

^a 52,537 not included due to missing dimensions.

TABLE 18

NUMBER OF OVERHEIGHT PERMITS,^a BY STATE AND HEIGHT GROUP

STATE	12'-7" to 13'-0"	13'-1" to 13'-6"	13'-7" to 14'-0"	14'-1" to 15'-0"	15'-1" to 16'-0"	16'-1" to 17'-0"	17'-1" to 20'-0"	20'-1" to 30'-0"	30'-1" AND OVER	TOTAL
Alabama	0	0	2,433	433	100	67	0	0	0	3,033
Arizona	0	0	1,400	2,301	1,186	217	177	21	0	5,302
Arkansas	0	35	1,975	837	337	498	438	0	34	4,154
California	61	0	9,453	19,457	2,522	1,253	1,495	177	4	34,422
Colorado	210	70	2,969	5,554	1,292	699	489	70	140	11,493
Connecticut	176	79	3,117	39	32	0	79	0	72	3,594
Delaware	0	0	315	70	35	37	70	70	35	632
Florida	0	0	4,569	1,629	904	213	142	0	27	7,484
Georgia	0	28	3,045	414	440	904	1,523	33	0	6,387
Idaho	21	66	795	729	280	167	144	493	0	2,695
Illinois	0	201	3,764	1,637	86	115	86	57	29	5,975
Indiana	189	134	2,168	12,308	123	70	68	44	0	15,104
Iowa	166	267	4,679	566	166	33	166	167	0	6,210
Kansas	73	179	2,547	3,167	3,390	2,387	934	0	0	12,677
Kentucky	17	0	702	652	166	0	166	17	17	1,737
Louisiana	199	261	8,433	8,689	890	809	704	106	53	20,144
Maine	0	32	404	152	119	0	0	0	0	707
Maryland	0	0	215	37	1	2	7	36	0	298
Massachusetts	0	0	2	2	0	0	0	0	0	4
Michigan	0	0	1,486	3,110	408	64	124	91	195	5,478
Minnesota	0	0	1,921	803	407	92	305	203	112	3,843
Mississippi	68	256	2,026	400	265	202	226	67	0	3,510
Missouri	0	0	2,393	888	263	56	373	159	96	4,228
Montana	5	55	234	220	177	0	390	119	2	1,202
Nebraska	123	147	796	1,469	9,600	104	140	98	20	12,497
Nevada	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	19	185	78	31	6	12	6	6	343
New Jersey	0	0	3,909	1,460	290	274	0	0	97	6,030
New Mexico	46	32	611	2,795	688	372	1,177	92	0	5,813
New York	0	0	764	230	34	0	6	0	30	1,064
North Carolina	25	76	1,012	379	303	228	379	101	0	2,503
North Dakota	78	89	688	946	1,087	721	344	81	20	4,054
Ohio	0	61	8,954	2,671	0	8	23	0	0	11,717
Oklahoma	97	995	5,675	12,469	4,976	1,270	1,914	195	0	27,591
Oregon	34	34	5,280	2,248	123	68	171	27	28	8,013
Pennsylvania	244	15,006	2,196	610	0	0	0	0	122	18,178
Rhode Island	0	0	64	43	4	14	23	2	0	150
South Carolina	21	21	124	184	246	224	184	62	41	1,107
South Dakota	12	12	419	589	235	61	85	84	0	1,497
Tennessee	0	0	1,138	0	0	0	0	0	0	1,138
Texas	0	420	15,520	36,095	18,582	5,458	14,694	280	280	91,329
Utah	0	0	80	1,776	59	164	2,754	100	40	4,973
Vermont	0	0	56	37	0	0	0	0	0	93
Virginia	0	470	2,573	694	448	82	41	61	0	4,369
Washington	50	254	4,474	2,324	565	152	107	49	0	7,975
West Virginia	488	1,385	1,203	562	43	15	14	16	0	3,726
Wisconsin	0	0	1,545	868	2,805	65	67	66	0	5,416
Wyoming	133	0	1,400	3,866	633	567	167	67	33	6,866
D. Columbia	317	461	191	85	57	16	0	10	0	1,137
All	2,853	21,145	119,902	136,572	54,398	17,754	30,408	3,327	1,533	387,892

^a 13,358 not included due to missing dimensions.

TABLE 19
NUMBER OF PERMITS,^a BY STATE AND GROSS WEIGHT GROUP

STATE	30,100- 50,000 LB	50,100- 60,000 LB	60,100- 70,000 LB	70,100- 80,000 LB	80,100- 100,000 LB	100,100- 120,000 LB	120,100- 150,000 LB	151,100- 200,000 LB	200,100- 500,000 LB	500,100 LB AND OVER	TOTAL
Alabama	0	200	1,766	1,567	0	0	0	0	0	0	3,533
Arizona	113	188	113	1,163	2,472	597	378	10	0	0	5,034
Arkansas	362	265	236	1,264	4,959	168	264	0	0	0	7,518
California	379	1,183	1,735	1,703	14,431	15,769	4,459	3,046	395	117	43,217
Colorado	908	454	699	2,236	5,798	2,480	943	245	0	0	13,763
Connecticut	32	692	402	2,084	3,902	3,924	72	32	0	32	11,068
Delaware	35	175	420	315	701	140	35	0	0	0	1,821
Florida	69	43	833	1,401	1,886	293	2,421	399	0	0	7,345
Georgia	52	177	138	1,068	5,419	80	0	29	0	0	6,963
Idaho	175	287	184	480	2,714	359	82	20	0	0	4,301
Illinois	1,647	1,068	838	3,531	7,984	3,906	57	230	0	0	19,261
Indiana	0	62	35	891	2,726	2,037	337	3	2	0	6,093
Iowa	400	133	300	1,067	1,867	0	0	0	0	0	3,767
Kansas	686	2,351	1,910	2,052	4,871	971	0	73	0	0	12,914
Kentucky	393	623	1,353	1,238	3,284	1,006	295	0	0	0	8,192
Louisiana	1,086	269	218	4,999	1,738	32	22	5	0	0	8,369
Maine	552	227	476	688	1,316	206	65	217	0	0	3,747
Maryland	284	675	2,594	2,559	5,226	892	145	37	5	3	12,420
Massachusetts	100	100	100	1,567	1,633	633	3	3	1	0	4,140
Michigan	491	753	1,315	1,226	3,035	1,075	1,606	1,110	43	0	10,654
Minnesota	458	1,845	2,915	5,943	3,354	4,497	1,227	822	105	37	21,203
Mississippi	68	169	717	1,683	2,326	561	11	0	3	0	5,538
Missouri	532	105	141	636	2,616	101	201	289	151	1	4,773
Montana	11	48	1,250	291	1,184	1,066	0	0	0	1	3,851
Nebraska	326	351	435	958	1,512	63	0	0	0	0	3,645
Nevada	75	75	0	283	430	190	34	21	8	0	1,116
New Hampshire	58	874	1,011	810	838	589	19	6	0	0	4,205
New Jersey	0	0	0	1,723	4,157	846	451	145	48	97	7,467
New Mexico	179	281	314	419	1,699	255	206	31	8	0	3,392
New York	3,309	3,153	2,730	3,162	4,733	3,482	471	0	34	0	21,074
North Carolina	278	405	101	506	2,453	329	430	0	0	0	4,502
North Dakota	103	178	21	301	1,654	984	57	0	0	0	3,298
Ohio	474	415	3,015	3,350	11,550	11,867	0	23	21	0	30,715
Oklahoma	0	0	0	0	0	0	0	0	0	0	0
Oregon	34	273	68	956	6,654	2,118	410	68	34	0	10,615
Pennsylvania	1,341	2,320	610	12,450	13,070	4,390	1,341	0	23	0	35,545
Rhode Island	4	0	4	66	121	95	4	4	0	0	298
South Carolina	0	0	20	20	0	0	0	0	0	0	40
South Dakota	145	108	275	624	832	241	48	1	2	0	2,276
Tennessee	0	0	0	1,348	2,305	251	44	181	0	0	4,129
Texas	874	6,577	6,437	13,044	47,418	8,536	980	2,519	0	0	86,385
Utah	627	553	258	453	8,839	146	732	140	0	0	11,748
Vermont	21	52	77	155	170	143	9	0	0	0	627
Virginia	2,101	1,652	1,633	2,103	4,308	41	41	0	41	0	11,920
Washington	1,660	1,831	813	3,067	9,483	3,672	1,412	173	15	0	22,126
West Virginia	682	990	1,243	1,507	3,962	469	29	14	0	0	8,896
Wisconsin	64	34	0	468	2,038	534	563	336	0	0	4,037
Wyoming	200	500	1,633	3,333	3,266	600	100	0	0	1	9,633
D. Columbia	542	98	127	156	484	139	26	4	0	0	1,576
All	21,930	32,812	41,513	92,914	217,346	80,773	20,030	10,236	939	257	518,750

^a 100,202 not included due to missing weight data.

TABLE 20

NUMBER OF OVERLENGTH PERMITS,^a BY COMMODITY AND OVER-ALL LENGTH GROUP

COMMODITY	41- 50 FT	51- 55 FT	56- 60 FT	61- 65 FT	66- 70 FT	71- 75 FT	76- 85 FT	86- 100 FT	101- 120 FT	121 FT AND OVER	TOTAL
Trailers, type unknown	—	104	88	825	1,693	208	65	20	130	—	3,133
Mobile homes	1,341	3,377	18,600	73,271	230,662	234,887	23,712	1,516	236	—	587,602
Mobile offices	34	111	150	781	786	888	66	—	—	17	2,833
Empty semi-trailer	64	225	143	498	680	1,092	1,977	—	87	—	4,766
Construction, gen.	—	59	358	105	133	92	284	487	59	—	1,577
Construction equip.	2,594	36,463	45,748	50,700	28,652	45,275	22,138	10,736	1,433	1,293	255,032
Bulk materials	288	903	1,305	1,504	1,471	2,906	1,109	2,393	758	179	12,816
Structural members	1,007	3,714	4,596	7,931	7,746	11,880	7,433	9,285	2,908	1,841	58,341
Booms	69	156	266	105	394	370	154	155	—	50	1,719
Piling	54	68	40	275	444	1,003	334	2,157	105	66	4,546
Mining, general	—	34	34	—	14	21	—	—	—	35	138
Mining equipment	102	286	304	357	382	362	18	52	—	—	1,863
Mining products	4	—	—	—	—	—	—	—	—	—	4
Oil-well equipment	7,675	3,487	10,913	11,872	4,569	19,505	2,765	2,868	1,026	848	65,528
Forest, general	—	—	—	—	34	34	—	—	—	—	68
Logging equipment	51	—	123	67	104	68	59	235	27	34	768
Logging spars	—	—	—	—	101	50	34	—	—	—	185
Forest products	41	91	41	67	672	687	166	211	51	50	2,077
Agricultural, gen.	—	724	33	2	—	—	59	59	—	33	910
Agricultural produce	—	41	—	41	—	—	—	—	—	—	82
Livestock	—	—	—	20	—	—	—	—	—	—	20
Agricultural equip.	217	409	612	399	582	221	181	200	—	—	2,821
Haystacks	—	—	12	—	—	82	—	—	—	—	94
Nursery products	1	6	6	23	—	33	19	—	58	—	146
Industrial, general	—	107	345	205	92	139	38	59	—	—	985
Industrial machinery	62	6,143	2,652	1,869	978	1,499	236	206	331	—	13,976
Industrial products	90	1,948	1,011	545	361	281	201	403	19	36	4,895
Marine, general	—	57	83	248	—	105	59	—	59	—	611
Marine machinery	—	374	115	155	—	—	—	—	—	—	644
Boats	181	6,681	4,704	2,309	981	410	57	207	—	42	15,572
Public, general	95	75	291	189	87	85	76	228	—	1	1,127
Transformers	—	302	413	215	155	28	197	6	128	32	1,476
Generators	—	329	154	34	—	23	122	—	8	—	670
Nuclear reactors	—	200	49	35	—	—	—	200	—	—	484
Pipes	124	831	1,917	4,343	4,339	14,252	693	731	53	—	27,283
Poles	113	—	618	611	769	7,343	1,839	2,974	1,296	680	16,243
Pipes and/or poles	—	—	—	53	67	413	31	1,972	—	—	2,536
Military, general	—	—	34	58	—	34	5	—	—	29	160
Military equipment	95	367	180	221	195	214	—	37	50	36	1,395
Missiles	—	141	57	295	159	25	107	86	—	—	870
Missile or rocket parts	—	187	152	240	91	—	—	70	1	—	741
Aircraft parts	53	376	126	75	20	69	100	—	—	—	819
Miscellaneous	378	594	1,083	2,251	1,537	463	556	8,164	50	33	15,109
Houses	350	225	2,213	4,793	2,698	3,011	1,130	1,123	270	35	15,848
Other buildings	515	1,347	2,741	2,421	1,834	1,778	755	193	68	43	11,695
Tanks, bins, containers	357	3,903	6,920	8,712	5,330	4,692	1,239	519	23	38	31,733
Misc. machinery	162	1,047	586	1,377	534	317	450	163	2	—	4,638
Autos or other veh.	188	2,120	1,193	1,101	2,271	1,130	58	97	—	—	8,158
Aircraft	37	—	123	275	—	—	4	—	—	—	439
Electronic equipment	59	282	178	62	218	188	—	140	—	—	1,127
Medical equipment	—	—	35	33	—	—	—	—	—	—	68
Unknown	865	5,661	2,003	5,669	3,317	5,869	928	1,401	359	0	26,072
All	27,266	83,555	113,348	187,237	305,152	362,032	69,454	49,353	9,595	5,451	1,212,443

^a 39,262 not included due to missing dimensions.

TABLE 21

NUMBER OF OVERWIDTH PERMITS,^a BY COMMODITY AND OVER-ALL WIDTH GROUP

COMMODITY	8'-1" TO 10'-0"	10'-1" TO 12'-0"	12'-1" TO 14'-0"	14'-1" TO 20'-0"	20'-1" TO 30'-0"	30'-1" AND OVER	TOTAL
Trailers, type unknown	1,730	2,071	41	—	—	—	3,842
Mobile homes	238,020	352,451	6,065	1,084	38	0	597,658
Mobile offices	1,849	1,265	—	—	—	—	3,114
Empty semi-trailer	3,385	1,977	180	95	—	0	5,637
Construction, gen.	828	1,479	70	137	—	—	2,514
Construction equip.	203,699	342,808	64,172	7,097	882	212	618,870
Bulk materials	4,887	7,575	2,081	394	—	0	14,937
Structural members	17,323	19,981	2,850	1,907	248	61	42,370
Booms	1,278	1,365	71	—	—	13	2,727
Piling	48	66	4	—	—	—	118
Mining, general	113	—	33	2	—	55	203
Mining equipment	1,921	2,125	158	14	—	22	4,240
Mining products	44	241	33	—	—	—	318
Oil-well equipment	29,269	34,856	11,088	6,787	554	89	82,643
Forest, general	20	97	—	—	—	—	117
Logging equipment	1,399	1,275	720	55	—	—	3,449
Logging spars	51	169	—	—	—	6	226
Forest products	1,225	368	—	—	—	0	1,593
Agricultural, gen.	854	576	82	44	—	—	1,556
Agricultural produce	1,599	855	35	—	—	—	2,489
Livestock	71	—	19	—	—	—	90
Agricultural equip.	13,783	8,246	3,760	11,286	54	0	37,129
Haystacks	553	154	84	156	24	—	971
Nursery products	136	274	2	—	—	0	412
Industrial, general	1,939	1,364	147	—	—	—	3,450
Industrial machinery	18,168	13,689	901	410	—	0	33,168
Industrial products	7,473	4,805	785	401	48	0	13,512
Marine, general	808	929	144	68	59	—	2,008
Marine machinery	685	671	82	168	—	—	1,606
Boats	12,453	19,543	2,477	757	198	28	35,456
Public, general	1,853	1,700	93	1	—	—	3,647
Transformers	1,720	930	177	5	—	—	2,832
Generators	708	162	179	170	—	—	1,219
Nuclear reactors	101	182	—	—	—	—	283
Pipes	4,284	1,673	594	24	1	0	6,576
Poles	417	349	66	—	—	—	832
Pipes and/or poles	—	—	—	—	—	—	—
Military, general	328	203	22	17	—	—	570
Military equipment	4,612	2,906	444	100	—	—	8,062
Missiles	508	346	162	—	—	0	1,016
Missile or rocket parts	887	381	335	130	—	0	1,733
Aircraft parts	1,501	1,086	155	271	34	27	3,074
Miscellaneous	7,713	13,282	1,225	925	94	—	23,239
Houses	1,776	1,922	888	3,720	12,010	2,442	22,758
Other buildings	7,744	9,833	3,123	4,556	4,774	1,140	31,170
Tanks, bins, containers	32,733	43,297	6,010	11,223	326	65	93,654
Misc. machinery	6,504	4,774	378	316	—	0	11,972
Autos or other veh.	4,457	5,211	1,198	467	—	—	11,333
Aircraft	388	167	175	260	66	56	1,112
Electronic equipment	2,255	628	—	34	—	—	2,917
Medical equipment	25	—	—	—	—	—	25
Unknown	12,872	17,530	1,703	600	35	14	32,754
All	658,997	927,837	113,011	53,681	19,445	4,230	1,777,201

^a 52,537 not included due to missing dimensions.

TABLE 22

NUMBER OF OVERHEIGHT PERMITS,^a BY COMMODITY AND OVER-ALL HEIGHT GROUP

COMMODITY	12'-7" TO 13'-0"	13'-1" TO 13'-6"	13'-7" TO 14'-0"	14'-1" TO 15'-0"	15'-1" TO 16'-0"	16'-1" TO 17'-0"	17'-1" TO 20'-0"	20'-1" TO 30'-0"	30'-1" AND OVER	TOTAL
Trailers, type unknown	—	33	148	243	23	—	20	—	—	467
Mobile homes	41	425	3,997	3,257	130	85	0	0	—	7,935
Mobile offices	—	—	—	23	—	—	—	—	—	23
Empty semi-trailer	—	—	320	93	78	2	—	—	0	493
Construction, gen.	—	44	729	163	67	—	—	—	0	1,003
Construction equip.	1,310	8,006	59,474	54,748	11,475	2,027	1,203	431	378	139,052
Bulk materials	—	100	1,251	583	873	97	98	—	—	3,002
Structural members	120	588	2,199	1,989	331	126	162	—	0	5,515
Booms	—	65	112	223	59	—	—	—	—	459
Piling	—	—	—	—	4	—	—	—	—	4
Mining, general	—	—	—	—	—	—	—	—	—	—
Mining equipment	29	70	455	109	20	—	33	—	22	738
Mining products	—	—	—	53	—	—	—	—	—	53
Oil-well equipment	217	840	13,859	25,006	12,417	2,752	5,287	58	208	60,644
Forest, general	—	—	—	19	—	—	—	—	—	19
Logging equipment	—	—	499	91	51	67	—	—	—	708
Logging spars	—	51	—	50	—	—	—	—	—	101
Forest products	—	—	—	271	52	—	—	—	—	323
Agricultural, gen.	—	—	102	—	—	—	95	—	—	197
Agricultural produce	—	—	67	122	—	—	—	—	—	189
Livestock	—	—	19	19	—	—	—	—	—	38
Agricultural equip.	69	67	2,048	2,413	9,777	—	275	—	—	14,649
Haystacks	—	55	—	12	—	—	60	12	—	139
Nursery products	—	—	—	176	19	20	2	—	—	217
Industrial, general	—	—	350	665	129	64	32	—	—	1,240
Industrial machinery	144	2,635	5,216	2,664	370	38	56	—	—	11,123
Industrial products	29	616	824	300	79	82	60	—	0	1,990
Marine, general	—	—	167	257	25	—	—	—	—	449
Marine machinery	—	41	113	178	—	—	—	—	—	332
Boats	79	1,321	1,620	612	255	132	61	140	30	4,250
Public, general	—	100	471	592	202	75	4	—	—	1,444
Transformers	—	43	548	833	687	462	592	1	32	3,198
Generators	100	2	113	238	165	—	—	—	—	618
Nuclear reactors	—	100	33	1	—	—	—	—	—	134
Pipes	—	110	198	704	50	30	36	—	—	1,128
Poles	34	—	1	203	—	—	—	—	—	238
Pipes and/or poles	—	—	—	—	—	—	—	—	—	—
Military, general	—	—	19	87	—	—	—	—	—	106
Military equipment	—	136	462	185	35	—	—	—	0	818
Missiles	—	47	94	27	35	—	—	—	—	203
Missile or rocket parts	—	—	41	52	—	96	1	—	—	190
Aircraft parts	—	110	302	566	43	159	—	49	—	1,229
Miscellaneous	—	45	1,569	9,936	464	77	179	22	0	12,292
Houses	21	—	1,143	2,358	2,666	3,952	7,614	1,260	183	19,197
Other buildings	87	182	3,734	2,977	2,443	1,062	3,321	968	401	15,175
Tanks, bins, containers	428	1,818	12,870	18,262	10,688	5,996	9,803	353	150	60,368
Misc. machinery	24	151	2,365	1,219	34	170	164	33	—	4,160
Autos or other veh.	—	576	1,683	1,415	138	—	60	—	—	3,872
Aircraft	—	—	100	412	153	—	25	—	—	690
Electronic equipment	10	—	254	608	41	48	27	—	—	988
Medical equipment	—	—	—	—	—	—	—	—	—	—
Unknown	111	2,768	333	1,558	320	135	1,138	—	129	6,492
All	2,853	21,145	119,902	136,572	54,398	17,754	30,408	3,327	1,533	387,892

^a 13,358 not included due to missing dimensions.

TABLE 23

NUMBER OF OVER-GROSS WEIGHT PERMITS,* BY COMMODITY AND GROSS WEIGHT GROUP

COMMODITY	30,100- 50,000 LB	50,100- 60,000 LB	60,100- 70,000 LB	70,100- 80,000 LB	80,100- 100,000 LB	100,100- 120,000 LB	120,100- 150,000 LB	150,100- 200,000 LB	200,100- 500,000 LB	500,100 LB AND OVER	TOTAL
Trailers, type unknown	52	—	34	39	37	0	—	—	—	—	162
Mobile homes	49	—	36	0	0	0	—	0	—	—	85
Mobile offices	—	17	34	—	—	—	—	—	—	—	51
Empty semi-trailer	100	147	59	65	221	61	—	0	—	—	653
Construction, general	—	—	10	197	281	549	—	—	—	—	1,037
Construction equip.	14,817	20,336	27,534	59,869	147,304	63,801	14,950	7,991	485	121	357,208
Bulk materials	600	231	40	881	1,673	52	—	—	—	0	3,477
Structural members	333	450	357	2,010	4,035	1,004	251	185	1	—	8,626
Booms	34	103	164	47	378	159	51	59	—	—	995
Piling	100	34	43	136	41	34	2	—	0	—	390
Mining, general	—	—	—	12	117	—	—	—	—	—	129
Mining equipment	301	124	352	361	628	22	1	1	1	1	1,792
Mining products	—	—	32	48	59	35	—	0	—	—	174
Oil-well equipment	941	5,181	5,484	10,717	26,160	3,626	635	—	—	0	52,744
Forest, general	—	—	—	2	—	—	—	—	—	—	2
Logging equipment	79	136	138	181	783	207	87	34	—	—	1,645
Logging spars	—	—	57	34	51	—	50	—	—	—	192
Forest products	—	—	—	85	100	270	—	—	—	—	455
Agricultural, gen.	—	—	—	112	—	270	—	—	—	0	382
Agricultural produce	—	—	—	—	23	—	—	—	—	—	23
Livestock	—	—	—	33	—	—	—	—	—	—	33
Agricultural equip.	268	29	132	195	758	353	42	—	—	—	1,777
Haystacks	—	—	—	—	93	—	—	—	—	—	93
Nursery products	—	—	—	44	—	—	—	—	—	—	44
Industrial, general	34	40	46	339	149	55	—	59	—	—	722
Industrial machinery	188	538	573	2,945	7,035	1,117	172	74	106	—	12,748
Industrial products	100	51	422	677	1,078	395	80	1	2	0	2,806
Marine, general	—	—	—	—	—	—	—	—	—	—	—
Marine machinery	—	123	41	88	139	—	—	—	—	—	391
Boats	254	12	—	33	123	84	—	—	0	—	506
Public, general	111	6	44	118	225	1	—	1	—	—	506
Transformers	—	—	114	262	1,056	470	165	144	127	3	2,341
Generators	34	—	71	228	476	242	78	66	8	—	1,203
Nuclear reactors	—	—	—	—	—	100	2	—	—	2	104
Pipes	164	91	30	73	1,138	—	35	—	—	—	1,531
Poles	114	—	100	—	34	35	—	—	—	—	283
Pipes and/or poles	—	—	—	—	—	—	—	—	—	—	—
Military, general	—	—	—	—	—	1	—	1	2	—	4
Military equipment	33	67	120	356	1,230	107	158	315	—	—	2,386
Missiles	—	—	41	—	32	265	30	—	—	—	368
Missile or rocket parts	—	—	59	—	35	141	36	—	1	—	272
Aircraft parts	—	—	52	—	80	—	—	—	—	—	132
Miscellaneous	52	262	222	541	2,160	290	374	60	—	—	3,961
Houses	324	101	75	87	217	131	—	—	—	—	935
Other buildings	94	68	6	301	1,018	50	108	—	34	—	1,679
Tanks, bins, containers	491	824	801	2,094	2,986	648	158	246	3	0	8,251
Misc. machinery	254	211	859	1,129	1,459	369	301	4	6	—	4,592
Autos or other veh.	895	689	47	266	1,089	255	—	—	—	—	3,241
Aircraft	—	—	—	—	—	34	—	—	—	—	34
Electronic equipment	19	99	—	57	222	—	—	—	—	—	397
Medical equipment	—	—	—	—	—	—	—	—	—	—	—
Unknown	1,095	2,842	3,284	8,252	12,623	5,540	2,264	995	163	130	37,188
All	21,930	32,812	41,513	92,914	217,346	80,773	20,030	10,236	939	257	518,750

* 100,202 not included due to missing weight data.

Mileage

Table 26 represents estimates of vehicle mileage for permit moves in each state. This estimate was developed using both the national permit sample and the multiple-trip permit survey. The latter was used to develop average trip lengths under multiple-trip permits when trip length and number of trips were unknown.

TRENDS IN PERMIT ISSUANCE

In keeping with the study objective to make estimates of future permit needs, historical data on permit issuance were collected where these were reasonably available. Such data were collected from ten states. All data except these collected in Oklahoma were in the form of numbers of permits issued. The Oklahoma data indicated revenues collected only.

The trend in each of these states is shown in Figure 7. Each state trend has individual characteristics, the variance being caused by the following factors:

1. Legislative changes in legal limits and legal-limit tolerances. The trend in Maine probably has been relatively steady because of a series of additional legal-limit tolerances granted by legislation.

2. Changes in enforcement practice and tolerances. A change in the state administration can result in either tighter or more lenient weight enforcement, and consequently a variance in the number of permits.

3. A significant temporary or permanent change in the state's industrial nature. For example, the peak exhibited by the curve for permit issuance in Missouri is almost entirely attributable to the construction of ICBM installations in that state.

4. Changes in exceptions to legal limits. The addition of an exception to a commodity class may relieve a significant number of movements from acquiring a permit.

TABLE 24

NUMBER OF OVER-AXLE WEIGHT PERMITS, BY NUMBER OF AXLES AND WEIGHT GROUP

WEIGHT GROUP (LB)	PERMITS (NO.)			
	SINGLE-AXLE	TANDEM		
		TWO-AXLE	THREE-AXLE	FOUR-AXLE
16,000-20,000	3,322	2,776	0	0
20,100-24,000	7,858	2,186	0	0
24,100-28,000	8,867	5,716	33	0
28,100-32,000	13,699	10,686	53	0
32,100-36,000	940	13,070	261	0
36,100-40,000	980	52,983	392	0
40,100-48,000	3,759	86,815	2,683	44
48,100-56,000	707	14,971	11,193	0
56,100-64,000	226	5,441	8,151	140
64,100 and over	382	486	212	1,120

TABLE 25

AVERAGE NUMBER OF TRIPS FOR MULTIPLE-TRIP PERMITS (MTP) OF VARIOUS DURATIONS

PERMIT DURATION	TRIPS PER MTP		
	MOBILE HOMES	CONSTR. EQUIP.	OTHER COMMODITIES
30 days	3.9	11.5	11.7
90 days	9.2 ^a	19.2	25.9 ^a
6 months	18.0 ^a	30.0 ^a	46.2 ^a
9 months	26.7 ^a	41.5 ^a	65.8 ^a
12 months	35.3	52.8	87.2

^a Interpolated.

TABLE 26

VEHICLE MILEAGES FOR PERMIT MOVES, BY STATE

STATE	MILES	STATE	MILES	STATE	MILES
Alabama	5,101,745	Maryland	10,980,127	Oregon	4,091,377
Arizona	8,604,512	Massachusetts	1,809,711	Pennsylvania	11,525,950
Arkansas	5,194,689	Michigan	12,373,384	Rhode Island	79,688
California	73,190,278	Minnesota	5,711,113	South Carolina	5,170,874
Colorado	14,260,502	Mississippi	2,950,335	South Dakota	3,863,526
Connecticut	17,688,010	Missouri	9,699,745	Tennessee	3,785,746
Delaware	691,336	Montana	26,737,382	Texas	29,801,309
Florida	31,123,724	Nebraska	9,781,444	Utah	6,815,130
Georgia	2,180,657	Nevada	687,203	Vermont	5,496,469
Idaho	3,354,028	New Hampshire	469,486	Virginia	35,798,669
Illinois	22,018,279	New Jersey	2,904,897	Washington	58,732,756
Indiana	78,795,692	New Mexico	9,773,849	West Virginia	1,971,824
Iowa	10,073,287	New York	4,922,860	Wisconsin	21,417,044
Kansas	6,461,232	North Carolina	4,701,787	Wyoming	4,172,349
Kentucky	12,466,547	North Dakota	1,728,700	Dist. of Col.	304,774
Louisiana	7,209,882	Ohio	29,883,760		
Maine	1,497,572	Oklahoma	19,742,520	All	657,797,760

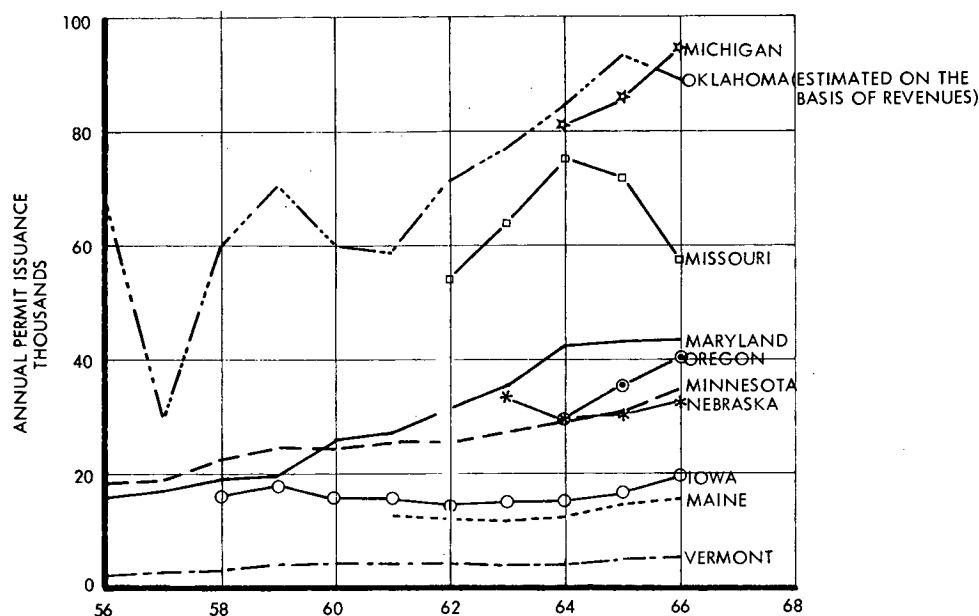


Figure 7. Trends in permit issuance.

5. Changes in permit practice. When a commodity class normally requiring single-trip permits is granted the privilege of operating under a multiple-trip permit, there is a significant reduction in the number of single-trip permits.

Only the data obtained from Minnesota break down trends by commodity. The change in the number of permits issued for 10- and 12-ft mobile homes is a reflection of the sales pattern in that industry. Whereas permits for 8- to 10-ft mobile homes decreased to 6,551 in 1966 from a high of 8,427 in 1963, the issuance for 12-ft units increased from 0 in 1963 to 4,175 in 1966. The increase of 2,681 permits for 12-ft mobile homes between 1965 and 1966

accounts for 70 percent of the total increase (3,801) in permit issuance. This is an excellent example of the effect that industry trends can have on the volume of permit issuance.

Table 27 gives the data from which Figure 7 was developed, together with the totals and annual percent increase. This percentage figure takes into consideration the effect of varying historical depth in the data from different states and does not add in a new state until a previous year's data are available for comparison. Although the small sample does not provide a strong trend basis for making a national projection, it does appear that there will be between 3,900,000 and 4,700,000 permits issued in 1975.

TABLE 27
TRENDS IN PERMIT ISSUANCE

YEAR	IOWA	MAINE	MARY- LAND	MICH- IGAN	MINNE- SOTA	MISS- OURI	NE- BRASKA	OKLA- HOMA ^a	ORE- GON	VER- MONT	TOTALS	% INCREASE
1956	—	—	16,032	—	18,209	—	—	66,711	—	2,214	103,166	—
1957	—	—	17,250	—	18,767	—	—	29,847	—	2,610	68,474	—33.6
1958	16,122	—	18,958	—	22,230	—	—	59,871	—	3,098	104,157	120,279 ^b +52.1
1959	18,100	—	19,792	—	24,489	—	—	70,265	—	4,070	—	136,716 +13.7
1960	15,940	—	25,325	—	24,254	—	—	60,404	—	4,234	—	130,157 —4.8
1961	15,945	12,728	26,817	—	25,690	—	—	58,717	—	4,065	143,962 ^c	131,234 +00.8
1962	14,380	12,159	31,124	—	25,408	54,210	—	70,975	—	4,262	158,308	212,518 ^d +10.0
1963	15,181	11,914	35,446	—	27,187	63,942	33,493	76,394	—	3,856	267,413 ^e	233,920 +9.9
1964	15,249	12,360	42,028	80,879	28,909	74,995	29,962	84,122	29,489	3,919	291,544	401,912 ^f +9.0
1965	16,540	14,634	42,766	85,062	30,703	71,503	30,046	92,916	35,489	4,766	—	424,425 +5.7
1966	19,499	15,528	43,167	94,099	34,504	57,340	32,300	88,830	40,267	5,388	—	430,922 +1.5

^a Estimate based on fees collected. ^b Iowa included. ^c Maine included. ^d Missouri included. ^e Nebraska included. ^f Michigan and Oregon included.

CHAPTER THREE

PERMIT ADMINISTRATION

The quantitative results of the national permit inventory are presented in Chapter Two. This chapter discusses the results of a thorough review of the laws, regulations, administrative practices, fee schedules, and weight law enforcement of the states.

RELATION TO LEGAL LIMITS

At present there is variance between states regarding legal size and weight limits on state highways. The Interstate System exhibits the least variance as a result of the Federal-Aid Highway Act of 1956, which provides that any state which accepts Federal-aid highway money for the construction of the Interstate System agrees not to permit the System to be used by vehicles having a width in excess of 96 in., a single-axle weight greater than 18,000 lb, a tandem-axle weight greater than 32,000 lb, and a gross vehicle weight greater than 73,280 lb, except where the existing state law as of July 1, 1956, permitted dimensions or weights greater than these limits.

Table 28 gives the legal size and weight limits for each state. A review of state regulations indicates that in only two states is the legal width greater than 8 ft on all roads, including the Interstate. These two states have legal widths of 8½ ft on all highways with the exception of the Interstate System, which is limited to 8 ft.

Thirty-three states have statutory limits of 18,000 lb on a single axle. Of the 16 states and the District of Columbia that have a greater limit, 9 have single-axle weight limits of 22,400 lb.

Thirty-two states have a tandem-axle weight limit of 32,000 lb. At least two of these have two tandem weight limits—the lower applied to the Interstate System and the higher to the other state highways.

Over the past few years many states have raised their gross vehicle weight so that now there are only four states and the District of Columbia that have a basic limit of less than 73,000 lb. Twelve states allow gross weight exceeding 73,280 lb.

Currently, 47 of the contiguous states have established legal height limits of 13½ ft or more. The District of Columbia and West Virginia limit height to 12½ ft. Utah and Idaho have limits of 14 ft; Maine has two height limits—13½ for the vehicle alone and 14 ft for the load. Massachusetts has no statutory height limits, and Nevada has restrictions on the height of a vehicle or load.

Legal limits for length vary in type as well as dimension. The length of a single vehicle can range from the usual 35 ft to 42½ ft. A combination of vehicles may range in length from 50 ft to as much as 98 ft in Idaho for certain designated highways. Only one state and the District of Columbia limit the length of a combination of vehicles to 50 ft.

When a load and vehicle exceed the legal limits, it

becomes necessary to move under special permit if the load is not divisible. Because none of the Federal-Aid Highway Acts has covered this area except with respect to the Interstate System, there are no uniform restrictions placed on the states with respect to the other Federal-aid systems. Consequently, the states have considerable leeway as to any limitations they may or may not impose over movements on their highways, with the result that the rules, regulations, and procedures governing those movements vary greatly between the states, even between states of the same region.

In the visits with state permit officials, it appeared that most states made every effort to grant requests for permits for oversize-overweight moves. It would be difficult to determine the limits beyond which a permit would not be granted in most states. Under close supervision, ideal traffic and weather conditions, and advance preparations, loads of more than 500,000 lb have been moved. For 1966 alone, there were approximately 112,000 permits issued for moves weighing more than 100,000 lb. Table 29 gives the general limits for permit issuance.

When it is necessary to obtain a permit to move an over-dimensional load, the physical characteristics of the routes to be used become extremely important. The vertical clearances of structures and the width of the highways limit the height and width of the load. Most highway departments allow moves to be made up to the maximum restrictions of the highways. Lengths of loads are not controlled as much by the road limitations as by elements of safety. As the length of a truck and load increases, tracking characteristics around curves may be such as to cause infringements on adjacent lanes, increasing the danger of accidents. There have been occasions where overlength vehicles have been "hung up" in off-ramps and caused considerable problems. As a general policy, the states seemed to allow any reasonable overlength move.

In every state there are exceptions to the regulations requiring permits. These are varied and numerous, but certain exceptions appear in many states. For example, 32 states do not require implements of husbandry to obtain a permit, and the remaining states have lifted some of the restrictions for farm machinery or products. Another exception that appears in 34 states is the raising of the overlength limits for pipe and pole movements. Many states permit road machinery to move without permit. Table 30 gives the many permit exceptions to legal limits that are found throughout the states.

Exceptions to legal limits are extended to military equipment in three states. The special military sample indicated that a significant number of permits is being obtained in at least one of these states. This suggested misinterpretation of or lack of knowledge concerning the military exception on the part of the military or the permit agency.

TABLE 28
LEGAL DIMENSIONS AND WEIGHTS

STATE	LENGTH (FT)		WIDTH (FT)	HEIGHT (FT)	STATUTORY AXLE LIMITS (LB)		PRACTICAL GROSS VEHICLE WEIGHT ^a (LB)		BASIS ^b FOR GROSS WEIGHT LIMIT
	SINGLE- UNIT TRUCK	TRUCK COMBI- NATION			SINGLE	TANDEM	FIVE AXLES	OTHER COMB.	
Alabama	40	55	8.0	13.5	18,000	36,000	73,280	NP	Table
Arizona	40	65	8.0	13.5	18,000	32,000	72,000	76,800	Table
Arkansas	40	65	8.0	13.5	18,000	32,000	73,280 ^c	76,800	Specified maximums
California	35	65	8.0	13.5	18,000	32,000	72,000	76,800	Table
Colorado	35	65	8.0	13.5	18,000	36,000	76,000	76,000	Formula, specified limit
Connecticut	40	55	8.5	13.5	22,400	36,000	73,000	NP	Specified limit, tire capacity
Delaware	40	60	8.0	13.5	20,000	36,000	73,280	73,280	Table, specified limit
Florida	35	55	8.0	13.5	20,000	40,000	73,271	73,271	Table
Georgia	55	55	8.0	13.5	18,000 ^d	36,000	73,280 ^e	73,280	Specified maximums
Idaho	35	65 ^f	8.0	14.0	18,000	32,000	73,280	76,800	Table
Illinois	42	60 ^f	8.0	13.5	18,000	32,000	72,000	73,280	Specified limit, tire capacity
Indiana	35	65	8.0	13.5	18,000	32,000	72,000 ^g	72,000 ^g	Specified limit, tire capacity
Iowa	35	60	8.0	13.5	18,000	32,000	73,280	73,280	Table
Kansas	42½	55	8.0	13.5	18,000 ^d	32,000	72,000	73,280	Table
Kentucky	35	65	8.0	13.5	18,000	32,000	73,280	73,280	Specified limit, tire capacity
Louisiana	35	65	8.0	13.5	18,000 ^d	36,000	72,000	73,280	Axle limit, tire capacity
Maine	55	55	8.5 ^h	13.5 ⁱ	22,000	36,000 ^j	72,000	73,280	Table, tire capacity
Maryland	65	65	8.0	13.5	22,400	40,000	73,280	73,280	Table
Massachusetts	35	55	8.0	NL	22,400 ^k	36,000	73,000	NP	Table, specified limit
Michigan	35	55	8.0	13.5	18,000	32,000	68,000	102,000	Axle limit, tire capacity
Minnesota	40	55	8.0	13.5	18,000	32,000	72,000	73,280	Table
Mississippi	35	55	8.0	13.5	18,000	32,000 ^l	72,000	73,280	Table, tire capacity
Missouri	40	55 ^f	8.0	13.5	18,000 ^d	32,000	72,000	73,280	Table
Montana	35	60	8.0	13.5	18,000	32,000	72,000	76,800	Table
Nebraska	40	65	8.0	13.5	18,000	32,000	73,280	73,280	Table
Nevada	40	70	8.0	NL	18,000	32,000	75,200	76,800	Table
New Hampshire	35	55	8.0	13.5	22,400	36,000	73,280	73,280	Table, specified limit
New Jersey	35	55	8.0	13.5	22,400	32,000	73,280	73,280	Axle limit, tire capacity
New Mexico	40	65	8.0 ^m	13.5	21,600	34,320	76,640	86,400	Table
New York	35	55	8.0	13.5	22,400	36,000	71,000	71,000	Formula
North Carolina	35	55	8.0	13.5	18,000	36,000	73,280	73,280	Specified limit
North Dakota	35	65	8.0	13.5	18,000	32,000	72,000	73,280	Formula
Ohio	40	65	8.0	13.5	19,000	32,000	71,000	78,000	Formula
Oklahoma	40	65	8.0	13.5	18,000	32,000	72,000	73,280	Table
Oregon	35	60	8.0	13.5	18,000	32,000	72,000	76,000	Table
Pennsylvania	35	55	8.0	13.5	22,400	36,000	73,280	73,280	Specified limit
Rhode Island	40	55	8.5	13.5	22,400	32,000	73,280	88,000	Specified limit
South Carolina	35	55	8.0	13.5	20,000	36,000 ^l	72,000	73,280	Specified limit
South Dakota	35	60 ^c	8.0	13.5	18,000	32,000	72,000	73,280	Table
Tennessee	40	55	8.0	13.5	18,000	32,000	73,280	73,280	Table
Texas	40	65	8.0	13.5	18,000	32,000	72,000	72,000	Table
Utah	45	60	8.0	14.0	18,000	33,000	74,000	79,900	Table
Vermont	55	55	8.0	13.5	22,400	36,000	73,280	73,280	Table, tire capacity
Virginia	35	55	8.0	13.5	18,000	32,000	70,000	70,000	Table
Washington	35	65	8.0	13.5	18,000	32,000	68,000	72,000	Table
West Virginia	35	50	8.0	12.5	18,000	32,000	73,280	73,280	Table
Wisconsin	35	55	8.0	13.5	19,500	32,000	73,000	73,000	Table
Wyoming	50	65	8.0	13.5	18,000	32,000	73,950	73,950	Table
D. Columbia	40	50	8.0	12.5	22,000	38,000	70,000	70,000	Table, tire capacity

^a Practical gross weight as defined by U.S. Bureau of Public Roads in *Public Roads*, Vol. 33, No. 9 (Aug. 1965) pp. 192-193, is based on the following:

A. Front axle load of 8,000 lb.

B. Maximum practical wheelbase.

C. Includes statutory enforcement tolerances.

^b U.S. Bureau of Public Roads, *Public Roads*, Vol. 33, No. 9 (Aug. 1965) pp. 192-193.

^c 64,000 lb on some routes.

^d For low-pressure tires; limit for high-pressure tires is 16,000 lb.

^e 56,000 lb on some routes.

^f On specified routes only the following lengths are allowed: 98 ft in Idaho; 65 ft in Illinois, Missouri and South Dakota.

^g 73,000 lb on specified routes.

^h Interstate restriction, 8 ft.

ⁱ Height with load, 14 ft.

^j 32,000 pounds on Interstate System.

^k 18,000 pounds where axle spacing is less than six feet.

^l 28,650 lb on low-limit highway system.

^m 8.5 ft allowed on specified routes.

SIZE AND WEIGHT LIMITS FOR PERMITS

STATE	ROUTINE LIMITS ^a					ABSOLUTE LIMITS ^b					
	LENGTH (FT)	WIDTH (FT-IN.)	HEIGHT (FT-IN.)	GROSS WEIGHT (LB)	SINGLE- AXLE WEIGHT (LB)	LENGTH (FT)	WIDTH (FT)	HEIGHT (FT)	GROSS WEIGHT (LB)	SINGLE- AXLE WEIGHT (LB)	TANDEM WEIGHT (LB)
Alabama	—	—	—	—	—	120	—	—	95,000	—	—
Arizona	—	—	—	96,000	—	—	—	—	—	28,000	63,000 ^c
Arkansas	—	—	—	—	18,000	—	—	—	128,000	—	45,000
California	—	—	—	—	—	No specific limits					
Colorado	70	14-0	—	100,000	—	No specific limits					
Connecticut	80	14-0	14-0	120,000	—	No specific limits					
Delaware	—	16-0	—	120,000	—	Physical limitation only					
Florida	75	12-0	14-0	100,000	—	No specific limits					
Georgia	—	12-0	13-6	—	25,000	No specific limits					
Idaho	—	—	—	—	—	Physical limitation	—	—	156,500	25,000	60,000 ^c
Illinois	—	—	—	88,000	—	—	—	—	106,000	—	54,000
Indiana	70	12-0	15-0	110,000	18,000	—	—	—	110,000	—	—
Iowa	80	12-5	—	90,000	18,000	—	—	—	—	18,000	34,000
Kansas	126	16-6	18-0	110,000	22,000	Above routine limits commission action required					
Kentucky	No specific limits										
Louisiana	90	14-0	—	96,000	22,000	—	16 ^d	—	—	—	—
Maine	75	12-0	15-0	90,000 ^e	—	No specific limits					
Maryland	—	—	—	110,000	—	No specific limits					
Massachusetts	—	—	—	120,000	—	No specific limits					
Michigan	75	12-0	14-0	110,000	25,000	No specific limits					
Minnesota	75	12-0	—	—	20,000 ^f	Route limitations only					
Mississippi	78 ^g	12-0 ^g	—	106,000	18,000	No specific limits	—	—	106,000	18,000	32,000
Missouri	85	12-4	—	—	18,000	No specific limits					
Montana	70	15-0	—	—	—	No specific limits					
Nebraska	—	—	—	—	—	Physical limitation					
Nevada	—	—	—	—	—	—	—	—	—	20,000	—
New Hampshire	90	12-0 ^k	—	140,000	—	No specific limits					
New Jersey	None specified					Physical limitation					
New Mexico	80	14-0	15-0	130,000	—	No specific limits					
New York	Varies by district					No specific limits					
North Carolina	—	12-0	—	—	—	—	—	—	130,000 ^j	24,000	—
North Dakota	—	—	—	—	—	No specific limits					
Ohio	75 ^k	13-0	—	—	—	No specific limits					
Oklahoma	80	12-0	—	—	—	No specific limits					
Oregon	—	—	—	—	—	No specific limits					
Pennsylvania	75	12-0	14-0	150,000	—	No specific limits					
Rhode Island	—	—	—	75,000	—	No specific limits					
South Carolina	—	—	—	—	—	100	12	Phys. lim.	90,000 ^l	—	40,000
South Dakota	—	—	—	—	—	Bridge capacity only					
Tennessee	—	12-6	13-10	—	—	—	—	13-10	—	18,000	36,000
Texas	75	20-0	—	100,000	25,000	No specific limits					
Utah	95	14-0	15-0	—	22,400	125,000					
Vermont	84	14-0	—	120,000	—	— ^m					
Virginia	—	—	—	—	—	No specified limits					
Washington	—	— ⁿ	—	130,000	22,000 ^o	No specific limits					
West Virginia	—	—	—	90,000	22,000	110,000					
Wisconsin	—	—	—	—	—	No specified limits					
Wyoming	75	18-0	15-0	100,000	20,000	No specified limits					
D. Columbia	80	10-0	14-0	—	31,000	Physical limitations only					

^a Routine limit is defined as a size or weight limit beyond which any or all of the following are needed:

- (a) Bridge Division check.
- (b) Escort.
- (c) Headquarters approval.
- (d) Headquarters must issue.
- (e) Extensive analysis of the routing.

^b In rare cases these absolute limits are extended.

^c Applies to triple tandems.

^d Does not apply to wide houses.

^e Limit for which divisions may issue interdivisional trip; 167,000-lb

limit applies to divisions issuing intra-divisional trips.

^f 34,000 lb for dual tandem, 48,000 lb for triple tandem.

^g Mobile homes only.

^h Police escort necessary if width exceeds 18 ft.

ⁱ 800 lb per inch of tire width.

^j Applies to 7-axle vehicle combination.

^k 100 ft if load is not overweight.

^l Applies to 5-axle vehicle combination.

^m 600 lb per inch of tire width.

ⁿ Width restrictions on some routes.

^o 43,000 lb for dual tandem.

MULTIPLE-TRIP PERMITS

Multiple-trip permits (MTP) for oversize-overweight movements allow multiple trips of a specified commodity or vehicle for a specified time period. Depending on how these permits are administered, control over routing and number of movements varies from no control to tight control.

Table 31 gives the variation in blanket permit characteristics between states. The general types of control of routing are as follows:

1. Telephone approval. Two states issue annual MTP with the requirement that before each trip the permittee must call in his planned route for approval. Approval is quick.

2. Supplemental single-trip coupons. Two states issue annual MTP with the requirement that a supplemental trip coupon be submitted for each trip. Payment is made on a per-trip basis.

3. Quarterly reports. Two states require MTP holders to submit quarterly summary reports of trips made under the permit.

4. Radius or county control. Seventeen states issue some or all MTP for certain geographic areas, designated either by a radius about a certain city or by county limits. The biggest radius allowed is 75 miles. The maximum number of adjacent counties allowed by any county-limits permit is four.

5. Route, system, and origin-destination control. The remaining states use varying degrees of control by route, system, or origin-destination. Some states designate only that movements be made on state highways. Several states provide the permittee with color coded maps and instructions regarding the restrictions for each classification. The permittee under the terms of his permit must select his routes according to these restrictions.

Regarding fees for MTP, the following general characteristics were found:

1. In 15 states MTP are issued at no cost to the permittee.

2. Fees vary with time, commodity, number of axles, number of trips, trip length, and/or type of overlimit.

3. The most expensive lump-sum MTP was an annual mobile home manufacturer's permit in one state costing \$500. However, this permit allowed movement of all units produced by the manufacturer.

4. One state charges on a per-axle, per-annum basis, with a prorated amount for periods less than a year.

Almost one-half the states issue MTP for most commodities except houses and extraordinary-sized pieces. Practices in connection with major commodity classes are as follows:

1. Mobile homes. Most states issue MTP for 10-ft mobile home combinations. The national total for all mobile homes was 33,827 blanket permits issued in 1966.

A few states did not issue any blanket permits for this commodity. Several states limit the issuance to a maximum width of 10ft. Controls on the movement of 12-ft mobile homes include radius restrictions in one state, which also

requires movement to be made on a semitrailer lowboy rather than on the mobile homes' own wheels.

Alabama does not require any permit for mobile home moves that do not exceed 12 ft in width. In essence, permission for multiple trips has been granted with no paper work or control.

Issuance of MTP for mobile homes may produce substantially less revenue than that collected if all permits were for single trips. For example, in one state that does not issue MTP for mobile home movements, it was proposed that dealers or owners of mobile homes be enabled to acquire a \$25 annual permit in lieu of the \$10 single-trip permits. A study indicated a potential decrease in revenue from owners and dealers of \$137,410 for the sample year.

2. Construction equipment. Most states grant MTP for construction equipment. Most radius- and county-limit permits pertain to construction equipment. In some cases, a blanket permit is granted only when the contractor is engaged in state work. On the other hand, one state will not grant MTP to contractors bidding on state work because of an indicated desire to avoid favoritism. MTP for truck cranes, dump trucks, and ready-mix concrete trucks have a unique status in several states, these often being the only type of construction equipment which is allowed to move on the highways under MTP.

3. Pipes, poles, logs, and piling. Poles necessary for maintenance of public power and telephone systems do not require a permit in several states. In several other states, MTP for these poles are the only MTP issued.

Specific MTP categories for overlength or overweight forest products (logs) are found, as expected, in some but not all of the northwestern states, as well as a few states in other regions of the country.

One state issues 30-day MTP for hauling piling. Curiously enough, this is the only type of MTP issued in that state and the trips primarily are through-state trips. The returns from the MTP survey did not indicate the numbers of these movements.

The MTP for pipes cover either overwidth or overlength. In states where pipeline construction is significant, such permits are largely issued for the latter category. The permits for overwidth pipes are issued to enable safe and economical loading of concrete pipe sections; that is, the pipe can be loaded parallel to the axles.

With the exception of one state, all MTP for these commodities are overdimension permits.

4. Other specific commodity-oriented multiple-trip permits. Other commodities for which special MTP categories exist in some states are fire trucks on trailers, oil-well equipment, agricultural equipment, and steel tanks.

LOADS PERMITTED ON BRIDGES

In all states, the degree of total gross overload permitted on state highways is most commonly influenced by the stresses liable to occur in bridges or other structures. Limits of permissible loads usually are determined through application of a bridge formula involving axle loads and spacing.

Unfortunately, there is no universally accepted formula to determine load-spacing combinations likely to damage

TABLE 31
MULTIPLE-TRIP PERMIT CHARACTERISTICS

STATE	COMMODITY	TYPES OF OVER-LIMIT ALLOWED	METHOD OF CONTROL
Alabama	Most commodities. ^a	All	50-mile radius; origin and destination; specified routing.
Arizona	Most commodities.	All types, with limits.	60-mile radius, same load and equipment.
Arkansas	Specially designed oil-field equipment. ^b	Steering axle overload only.	Must be used exclusively in oil-field operation.
California	Truck cranes; tow trucks; construction equipment; oil-well servicing equipment; fire fighting equipment. Also concrete pipe; seasonal permits for can movements; towing vehicle of trailer coaches; saw logs.	All types, depending on commodity.	75-mile radius, except for fire fighting equipment.
Colorado	Land leveling equipment; overweight cranes; small drill rigs; farm implement dealers; combine permits; applicant must list number of trips needed on application.	All types, depending on commodity.	30-mile and 50-mile radius.
Connecticut	Three-axle dump trucks; Connecticut mobile home dealers; 3-axle concrete trucks.	All types, depending on commodity.	25-mile radius; does not apply to mobile homes.
Delaware	Poles and pilings only.	Length only.	Specified routing.
Florida	Most commodities except buildings or items with weight exceeding 100,000 lb.	All types, depending on commodity.	None.
Georgia	Mobile homes; pipes.	All types, depending on commodity.	None.
Idaho	Mobile home; logging and construction equipment; pea viners. ^c	Up to 25% over legal weight and all other types.	Specified routes.
Illinois	All vehicles overdimension up to 12 ft in width; except for mobile homes, which are limited to 10 ft.	Overdimensional only.	Limited to four counties, except no distance limits for mobile homes.
Indiana	Mobile home; slag and coal; steel. ^d	All types, mobile home up to 10 ft wide.	None.
Iowa	Agricultural machinery and equipment; construction machinery, equipment, and materials; poles and gas pipes; mobile homes; portable buildings.	All types, depending on commodity.	Trip length and specified routes.
Kansas	Oil-well servicing equipment only.	All types, depending on equipment.	Radius.
Kentucky	Most commodities.	Overdimensions only	Specified routes.
Louisiana	Mobile homes; poles and others.	Overdimension, with limits.	Insufficient data.
Maine	Self-propelled equipment.	Overweight; overwidth when length is 65 ft or less.	Radius, and origin and destination.
Maryland	Small truck cranes; pipe suppliers; contractor's equipment.	All types, depending on commodity.	15-mile radius (cranes); county restriction.
Massachusetts	Construction equipment.	Overwidth and over GVW.	25-mile radius; specified routes.
Michigan	Most commodities.	All types, depending on commodity.	Pre-registration and telephone permission before move.
Minnesota	Contractor's own equipment.	All types, depending on commodity.	Route approval.
Mississippi	Most commodities.	Overdimension.	None.
Missouri	Soil conservation equipment; house trailers; public utilities.	All types, depending on commodity.	Limited to two counties.
Montana	Most commodities.	Overdimension.	None.
Nebraska	Soil conservation equipment; public utilities; oil-well servicing equipment; a limited number of others.	All types, depending on commodity.	Two-county limit.
Nevada	Most commodities.	Overweight on single axle.	None.
New Hampshire	Most New Hampshire-registered vehicles.	All types, depending on commodity.	25-mile radius; telephone approval for routings.
New Jersey	New Jersey-registered road building equipment and structural members, with limits. ^e	All types, depending on commodity.	None.
New Mexico	Most commodities. ^f	All types, depending on commodity. ^f	Specified routes. ^f
New York	Most commodities.	All types, depending on commodity.	25-mile radius.
North Carolina	Most commodities.	All types, depending on commodity.	Specified routes.
North Dakota	Most commodities.	All types.	None.

TABLE 31 (Continued)
MULTIPLE-TRIP PERMIT CHARACTERISTICS

STATE	COMMODITY	TYPES OF OVER-LIMIT ALLOWED	METHOD OF CONTROL
Ohio	Mobile homes; contractor's equipment for state projects.	Overdimensional.	Specified routes for mobile homes. Project engineer approves each move of construction equipment.
Oklahoma	Soil conservation or log hauling vehicles; mobilized machinery.	All types, depending on commodity.	50-mile radius; specified routes.
Oregon	Most commodities.	Overdimensional.	Specified routes.
Pennsylvania	Agricultural commodities; quarry trucks.	All types, depending on commodity.	20-mile limit, agricultural permits; 1/2-mile, quarry and construction.
Rhode Island	Mobile homes; construction equipment.	All types, depending on commodity.	None.
South Carolina	Mobile homes only.	Overdimensional.	20 trips per permit.
South Dakota	Soil conservation equipment; mobile homes; farm implements; haystacks.	All types, depending on commodity.	Four-county area for haystack moves.
Tennessee	Practically anything overdimensional; contractors on state projects may be overweight.	All types, depending on commodity.	Overweight moves are routed.
Texas	Pipes; poles; construction equipment; oil-well equipment; combines; cotton pickers, and limited number of others.	All types, depending on commodity.	None.
Utah	Most commodities.	Overdimensional only.	Specified routes.
Vermont	Most commodities.	All types, depending on commodity.	None.
Virginia	Most commodities.	All types, depending on commodity.	None.
Washington	Most commodities.	All types, depending on commodity.	Insufficient data.
West Virginia	Most commodities.	Overdimensional only.	Coupons sent in for each move.
Wisconsin	Most commodities.	All types, depending on commodity.	None.
Wyoming	Most commodities. ^a	All types.	Specified routes.
D. Columbia	Concrete trucks; dump trucks; cranes.	All types.	Specified routes.

^a No permit required for 12-ft or narrower home. ^b Allows up to 18,000 lb (rather than 12,000) on front axle. ^c 30-day only type of blanket. ^d Mobile home can get annual; all others get 30 days. ^e Issued as special trailer registration. ^f Overweight movements limited to immediate area. ^g Annual permits issued for forest products and baled hay only.

a structure. This occurs because of the safety factors employed in bridge design to take care of unknown quantities such as impact loadings, fatigue, and variances in the strength of materials.

Bridges usually are designed for a number of repetitions of loadings of known value related to the legal limits. Because of the safety factors, a few loads of larger value can be tolerated without damage. It becomes a matter of judgment by bridge designers as to what reasonable upper limits of loadings under permit will be. Absolute values of the safety factors are unknown, although engineers agree on a range. The difference in permit formulas reflects this range.

Comparisons between available formulas and tables based on formulas for all states would fill a small volume. Most, but not all, formulas and tables relate loadings on groups of axles to distances between the first and last axle. Although comparisons are fraught with problems because of relationships to types of vehicles and other limitations, Table 32 is an attempt to illustrate typical state variances by applying published formulas or tables uniformly.

Another problem with comparisons of this type, based on published formulas and tables, is that such comparisons do not take into consideration the disposition of some of

the states with lower values to make provision for unusual loads exceeding the values given. Lateral placement of movement on a bridge may be taken into consideration. Movers may be asked to provide shoring or false-work according to the bridge designer's specifications. As with most other aspects of oversize-overweight permit administration, there is considerable variance in the degree of flexibility in requiring strict adherence to the bridge formula.

Some research of note has been performed on stresses in bridges due to overloads. Experimentation occurred at the AASHO Road Test, Ottawa, Ill. (1956-1961), particularly in connection with the movement of some types of army vehicles.

Seasonal Restrictions

The time of the year that an overweight permit is requested in many instances determines whether it will be approved. During the spring breakup period, the states that are seriously affected by seasonal changes in road surface conditions generally will not issue overweight permits for designated highways. Annual permit holders are not

allowed to exceed restricted loadings during this time. The severity of the restrictions depends on the type of road construction, the amount of moisture, temperature extremes, and the extent of frost heaves and breakup. The highway department looks at these factors and determines what restrictions are necessary to protect the roadway and insure public safety. The department may decide to allow the maximum legal weight or to restrict axles' weights.

On the other hand, movement of extremely heavy loads often is scheduled for that time of the winter when the frost penetration is deepest (frozen ground will support greater loads than unfrozen ground).

Maine allows issuance of permits for vehicles traveling during the winter months with loads considerably exceeding their registered gross weight. This practice does not affect oversize-overweight permit practice, however, because loads exceeding the maximum legal gross load or axle weights still must have oversize-overweight permits.

RESPONSIBLE AGENCIES

Table 33 gives the placement of administrative responsibility for the issuance of oversize-overweight permits in

TABLE 32
MAXIMUM PERMITTED GROSS LOADS

AXLE SPACING (FT)	GROSS LOADS (KIPS)			
	STATE 1	STATE 2	STATE 3	STATE 4
4	34.3	46.0	50.0	34.0
20	54.0	75.0	78.5	54.0
40	72.0	95.0	106.0	87.0
60	86.4 ^a	115.0	140.5	90.0 ^a

^a Maximum.

TABLE 33
RESPONSIBLE AGENCIES

AGENCY	NO. OF STATES ^a
Highway department:	
Maintenance division	20
Weight law enforcement div.	4
Traffic eng. and operations div.	12
Planning division	1
Chief eng. office or admin. div.	6
Permits division	2
Motor vehicle division	1
State police	4
Department of motor vehicles	2
Bureau of motor carriers	1
Bureau of permits	1

^a In 5 states permits may be obtained at two different departments or divisions.

the various states. The maintenance division of the highway department is the agency most commonly charged with this responsibility, subject to final authority of the chief administrative officer of the department. This is considered a logical responsibility assignment because of road damage considerations involved. There is usually close liaison with the bridge department.

As noted previously, the bridge department usually is called upon to check overloads that do not meet certain formula criteria relating to safe stresses in structural members. There is considerable variance, however, not only in the formulas used for the same basic bridge designs (see "Loads Permitted on Bridges") but also in the types and degree of individual analyses performed by bridge department personnel.

In some cases, formulas given to the permit officer are absolute in that no deviation is permitted; the permit office makes the calculations, referring any unusual configurations to the bridge department for individual analyses. In other cases, the formulas provide bases for general referrals—limits where the permit office may give approval without referring to the bridge department. Load and space combinations not conforming to the formulas still may receive approval, but must be referred. In a few cases, all or a specified level of overload permits are invariably checked by the bridge departments either at headquarters or in the districts.

In permit administration agencies other than maintenance divisions of state highway departments—other highway department divisions or divisions of other state agencies—there is always some administrative liaison with the bridge department, with about the same variances in types and extent of bridge department approval as are found when the maintenance division is the responsible agency. In New Jersey, however, where administration is by the Bureau of Motor Carriers, the bridge department acts only in an advisory capacity.

Inflexibility in administration does not appear to be related to the kind of administrative agency. Some of the most inflexible agencies are maintenance or other divisions within highway departments. Inflexibility usually amounts to a prescribed set of weights and dimensions which will not be exceeded under any circumstance whether or not it can be demonstrated that the load or dimensions are reasonable "safe," or that special provisions will be made by the mover to protect the roadway or the public, as necessary. There are several degrees of inflexibility. However, by far the larger number of permit authorities appear willing to work with permit applicants to try to allow any movement that is crucial to an industry or of general benefit to the public. Interpretations of crucial interest or benefit usually are made in favor of the mover.

In a few states the authority of the state over movements on state highway systems does not extend into the cities. For example, in Maryland the state issues no permits for any intracity moves in Baltimore.

In other states, where the state highway department retains the right to require permits on state extensions, there are problems with the cities. In some cases, two permits are required. In some of these cases, the state permit may

be obtained because there can be little or no enforcement of the state requirement within the cities.

Place of Issuance

Only eleven states found it to their advantage to issue permits from one central location. Other states have decentralized their permit operations in a variety of ways. In these states the central office holds final authority but shares the task of permit issuance with district offices, state patrol stations, and/or weigh stations. The authority vested in the districts and stations varies from equal status with the central office to the extreme where approval for every permit must be obtained from the central office before issuance. Generally, however, a middle-ground approach has been used quite effectively; the subordinate offices are granted authority up to certain limits without headquarters' approval. In Michigan, for example, district offices could issue single-trip permits only up to 12 ft in width, 75 ft in length and 14 ft in height. The district offices in Kansas can issue oversize permits, but the central office must issue the overweight permits.

Conditions of Issuance

Permits may be requested in four ways: (1) by a personal appearance at either the central, district, or highway patrol office; (2) by completion of a state permit application or other form of written request prior to the move; (3) by telegram request, which is usually answered by a collect telegram either approving or denying the request; and (4) by telephone. Installation of wire facilities sometimes is paid for by the permittee; for example, telegraphic equipment in several states has been installed by a major user of permits at no cost to the state. The cost of telegrams, telephone calls, etc., is always borne by the permittee.

Figure 8 shows two typical state permit applications. Although the sequence of the information needed varies, the over-all information that must be supplied is the same. The standard items found on all applications are date of application, name and address of mover, description of item to be moved, routes to be used, origin and destination, dates of move, dimensions and weight of load, description of vehicle used to carry load, and state of vehicle license. Because some states require specified amounts of insurance before a permit will be issued, there often is an insurance testification on the application. Where the permit fee is determined by the ton-mile, there also is a statement of the trip length in miles.

Application approval depends on several factors. One of these, the reputation of the company involved, does not appear on any application. If prior association with a particular firm has shown it to be reputable, close scrutiny of the form can be held to a minimum. On the other hand, if it is a "gypsy" hauler, or one with a disreputable past, the application usually is checked more closely. Some items must be examined in any event. The dimensions and weights of the movement must be checked against the route the mover desires to follow for vertical clearances, bridge capacities, and the condition of the road. Road

width is an important factor when overwidth loads are involved. Often, if a load is extremely overweight, the final determination on permit issuance is referred to the bridge department, as noted previously.

Permit approval often is contingent on the imposition of certain conditions. Routes, time of day, and day of week limitations are specified. Pilot car, flagmen requirements, or (depending on the type of movement) speed limits may be imposed. These limitations vary between states. For example, in the eleven member states of the Southeastern Association of State Highway Officials, the following variations exist:⁶

1. Speed restrictions on bridges. Five states have no restrictions. The others vary from 10 to 50 mph.
2. Red flags required on overweight movements. Seven states do not require red flags. The size of flags, where required, varies from 12 to 18 in. square.
3. Size of tow truck for mobile homes. No requirement in six states, others vary from $\frac{3}{4}$ ton to 1 ton.
4. Saturday and Sunday moves. No Sunday moves allowed except mobile homes in Alabama. Five states do not permit Saturday moves, except South Carolina allows mobile homes to be moved less than 12 miles on Saturday mornings. The remaining seven states allow Saturday moves, but some limit these moves to the morning.

The complexity and variation defies orderly tabulation.

PERMIT FEES

Permit fees range from nothing in twelve states to charges by ton-miles and/or foot-miles in others. To a large extent, the cost of a permit is dependent on the philosophies of permit administration in the different states. If oversize-overweight permits are considered to be a normal part of size and weight control, permits may be free. Or, if it is the philosophy in a state that the permit fee should at least cover the cost of issuance and administration, a nominal charge of from \$1 to \$5 is made. If it is felt that revenue should be produced from oversize-overweight permit operations, as in the case of some states, the cost of a permit may be considerably higher.

In the majority of states, federal, state, or local governments are not charged a fee for permits.

Fee schedules for the 48 contiguous states and the District of Columbia are given in Appendix E.

INSURANCE REQUIREMENTS

Insurance requirements vary less from state to state than most requirements for obtaining oversize-overweight permits. The majority of states do not have specific requirements for insurance as a condition for obtaining oversize-overweight permits. The main reason is the requirement, in many states, for liability insurance before license plates are issued. In the few states where there are insurance stipulations, there normally are different insurance limits for the various types of permits issued. Consequently, insurance needed to move a house trailer is different from

⁶ Summarized from data collected by a special committee of SASHO (1967).

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
 DEPARTMENT OF PUBLIC WORKS, DIVISION OF ROADS AND BRIDGES
 224 State Office Building, Providence, R. I.

APPLICATION FOR SPECIAL HAULING PERMIT
 (Under provisions of Motor Vehicle Code Act, Chapter 2595, P.L.1950)

Date _____

Permission is requested to move _____
 (Type of load)

ON _____
 (Type of vehicle) (Width of vehicle)

_____ (Weight of load) _____ (Gross weight, vehicle and load)

Overall Dimensions: _____
 (Length) (Height) (Width)

over the State road from _____ to _____

via Routes _____

to be effective from _____ to _____

The undersigned agrees to assume all responsibility for any damage to the road surface, bridges, traffic lights or other structures, and all liability in case of injury to person or property that may result from such transportation and to carry public liability and property damage insurance in sufficient amounts to cover any and all claims which may arise.

It is understood and agreed that suitable precautions will be taken to warn traffic while moving operations are in progress and that no unnecessary inconvenience will be occasioned other traffic on the road.

(SIGNED) _____

(ADDRESS) _____

Figure 8. Typical state permit applications.

STATE OF ILLINOIS
DEPARTMENT OF PUBLIC WORKS AND BUILDINGS
DIVISION OF HIGHWAYS
SPRINGFIELD, ILLINOIS

DO NOT WRITE HERE

TYPE ALL ANSWERS AND
ANSWER ALL QUESTIONS FULLY

Permit No. _____
Date of Permit _____

NAME OF OWNER
OF VEHICLE _____

ADDRESS OF OWNER
OF VEHICLE _____

APPLICATION FOR PERMIT FOR LIMITED CONTINUOUS OPERATION OF OVERSIZE VEHICLES
AND OBJECTS OVER STATE HIGHWAYS.

OBJECT OR LOAD
TO BE MOVED _____

MAKE, CAPACITY, ATTACHMENTS, SIZE

METHOD OF
MOVEMENT _____

(MOUNTED ON, TOWED BY, UNDER OWN POWER, ETC.)

Is this move
for hire? _____
Ill. CC
No. _____

Check Which and
Supply Information } →

TRUCK - TRACTOR ☐
TRUCK ☐

SEMI-TRAILER ☐
FULL TRAILER ☐

OBJECT OR LOAD
TO BE MOVED

MAKE _____

MODEL NUMBER _____

NUMBER AXLES _____

GROSS WEIGHT (Pounds) _____

SERIAL NUMBER _____

ILLINOIS LICENSE NUMBER _____

OVERALL DIMEN-
SIONS OF VEHICLE
AND LOAD:

Width _____ Ft. _____ In.

Length _____ Ft. _____ In.

Height _____ Ft. _____ In.

In Contact with Pavement →	AXLE 1*	AXLE 2	AXLE 3	AXLE 4	AXLE 5	AXLE 6
AXLE WEIGHT (Pounds)	←	→	→	→	→	→
AXLE SPACING (Feet-Inches)						
Distance Between Extreme Axles	Ft. _____ In. _____					Combination Gross Weight _____ Lbs.

* AXLE 1 IS THE FRONT AXLE. FOR ALLOWABLE WEIGHTS SEE INSTRUCTIONS ITEM 2E.

MOVEMENTS ARE TO BE MADE ONLY
WITHIN THE FOLLOWING COUNTIES: _____

(NOT TO EXCEED FOUR COUNTIES)

Please date permit:

19 _____

I _____ do solemnly swear that

NAME OF APPLICANT

OFFICIAL TITLE

I have read the foregoing application and that all statements and data contained herein are true and correct,
and that I have read and agree to abide by the GENERAL PROVISIONS set forth on the reverse side of this
sheet.

→ SIGNATURE _____

Subscribed and sworn to before me this _____ day of _____, 19 _____

(SEAL)

Notary
Public

Notary's
Address _____

PERMIT - ORIGINAL COPY

Persuant to Section 133 of the Uniform Act Regulating Traffic on Highways, THIS IS YOUR AUTHORITY AND

PERMISSION TO MOVE _____

described in detail above in the Application. Movements shall be made in compliance with the GENERAL
PROVISIONS listed on the reverse side of this sheet, which shall apply as if fully written herein. Movements
shall be made only within the limits of the Counties stated in the Application. Permit void if limitations are
exceeded. Except on highways posted with minimum speed limits, speed shall not exceed _____ mph.

This permit expires at sunset _____, 19 _____.

W. A. FRICK
ENGINEER OF TRAFFIC

By _____

PERMIT ENGINEER

Mail Application to: ILLINOIS DIVISION OF HIGHWAYS
BUREAU OF TRAFFIC - PERMIT OFFICE
STATE OFFICE BUILDING
SPRINGFIELD, ILLINOIS

DO NOT WRITE HERE

DO NOT WRITE HERE

that required to move a tractor-trailer. New York requires each permittee to pay an additional \$2 for insurance to cover any damage incurred during an extra-legal move. Insurance requirements do not appear to present any problems generally, either to permit agencies or to haulers.

Many states do require bonds to be posted for some, most, or all extra-legal moves. Conditions and amounts of bonds vary widely. Because of general insurance coverage as previously noted, bonding requirements have been dropped by some states and are expected to be dropped by others in the future. Some states restrict requirements for bonds to extraordinary moves which, by judgment, possibly could cause damage to the highways.

ENFORCEMENT

Responsibility for enforcing weight laws and permit regulations is assigned to several different agencies among the states. In at least 19 states, weight enforcement is just one of the many functions of the state police. Other states rely on the special weight-enforcement division of the state police, the highway department, the department of motor vehicles, or the comptroller's office.

The number of enforcing officials within special divisions ranges from four to as many as 200 or more. The number of permanent scalehouses varies from none to more than 120 in one state.

It can be seen from these data that attitudes and qualities of enforcement vary greatly from state to state. Where weight law enforcement is only one minor activity of a traffic-enforcement-oriented state police agency, it sometimes is neglected because the understaffed police have more urgent duties. In some states, trucks are never checked unless they are causing a traffic hazard, and then only for overdimensions and not overweight, because no scales are carried. In some states, the police officer has the authority to take the truck to the nearest weighing station, although this authority often is limited to a specific distance.

Some states use only so-called "permanent" scales (that is, scales at prescribed fixed locations) for weight enforcement. These scales are generally located on principal arterial highways. Because permanent scales are easy to bypass, the use of portable scales along with permanent scales provides better control. Portable scales sometimes are operated at random locations or as an officer stops a suspected offender. In other cases, locations adjacent to but safely off the roadway may be established as "loadometer sites" for operation at random times—a so-called "hit-and-miss" schedule.

Where weighing scale sites are established, either as permanent scales or temporary sites, normal operations call for weighing all passing vehicles during the time of operation. Because of lack of manpower, not many scales are operated on a 24-hr basis by any state. A few continuous-operation stations in some states are located at critical points on the highway, such as bridges, tunnels, and low clearances. Permanent stations, as well as temporary loadometer sites, also are sometimes operated on a hit-or-miss schedule. This kind of operation offers advantages in providing for efficient enforcement with minimum personnel.

As already noted, another avenue of enforcement is involved when an officer spots a suspected offending vehicle. In several states, regular (not special weight enforcement) officers can call for a portable scale. Special officers may carry portable scales at all times.

The legal weight limits established by the states are not necessarily absolute. Many states allow different weight tolerances varying from several hundred pounds to a percentage (generally 10 percent) of the axle weight or gross weight. Some of the expressed reasons for granting tolerances in weight were inaccuracy of scales and the change of moisture content in some products (such as rice or salt). Although more than one-half of the states allow a tolerance for legal weight limits, less than one-quarter allow any tolerance in dimensions or in weights for permit loads. The tolerances in dimensions vary from 1 to 6 in. in width, with a slightly greater range in height and length. Tolerances for permit loads or axle weights often are the same percentages as tolerances for legal loads and axle weights.

Table 34 summarizes the tolerances extended by the states. These tolerances are of two types—those established by law and those set by practice. Tolerances established by law may apply to a certain industry or universally to all trucking. Transportation of logs in lumbering areas frequently is the subject of special legal tolerances. Police often have a formal (published) or informal general policy on tolerances. Sometimes, however, tolerances are left to the discretion of individual officers.

Table 35 summarizes weight law violation fine schedules. At least twelve states have no fine schedule set by law; the fines in these states are set individually by the courts. Even when schedules are established by statute, local judges in some states according to the enforcement authorities apparently pay no attention and set their own fines. Established fine schedules vary between states, a typical fine schedule calling for \$0.02 per pound overweight up to 5,000 lb, then \$0.06 per additional pound. Some fines are a flat rate for the first violation, with an increasing rate for each additional violation. In several states, the law sets a minimum and maximum fine only, which gives the courts flexibility to decide each case according to particular circumstances. Enforcement officers sometimes complained about lack of support from the courts in some states. The opinion was expressed that some trucking companies were able to exert influence on judges to obtain fines smaller than those which would help deter violations.

In five states, state officials administering oversize-overweight permits consider weight-law enforcement inadequate. None of these states has a special division for truck weight enforcement and only one state has a fixed fine schedule. The efficiency of any system, however, cannot be related to only a few parameters. Some states which appear to have an efficient enforcement agency have no fine schedule and complain about lack of support from courts. Some states allow comparatively high tolerances, but indicate a high degree of enforcement efficiency. In one state, the semiannual revenues from permit fees and weight-distance taxes were \$2 million; with a change in administration and attitude toward enforcement, revenues were increased to \$5.5 million for an equivalent time period.

TABLE 34
LEGAL LIMIT TOLERANCES

STATE	STATUTORY TOLERANCE?	TOLERANCE
Alabama	Yes	10% on axle weights.
Arizona	No	None indicated.
Arkansas	No	2,000 lb for scale inaccuracy.
California	No	5% on single axle; 3% on axle group or GVW; 4 in. on width; 3 in. on height; 12 in. on length.
Colorado	No	None indicated.
Connecticut	Yes	2% on weights.
Delaware	No	Confidential scale tolerance.
Florida	Yes	10% on weights.
Georgia	Yes	3% on weights.
Idaho	No	None indicated.
Illinois	No	None indicated.
Indiana	Yes	1,000 lb on weights.
Iowa	Yes	3% on single and tandem axles; 8% on axle groups; 5% on registered weight.
Kansas	No	None indicated.
Kentucky	Yes	5% on axle weights.
Louisiana	No	None indicated.
Maine	No	2,000 lb on weights; varies with type of load.
Maryland	No	None indicated.
Massachusetts	No	None indicated.
Michigan	No	Variable.
Minnesota	No	None indicated.
Mississippi	Yes	Confidential scale tolerance not statutory; 3,350 lb on tandem axles on designated routes.
Missouri	No	None indicated.
Montana	No	Varies from 1 to 3% on weight.
Nebraska	Yes	5% on axle weight.
Nevada	Yes	5% on axle weight.
New Hampshire	No	None indicated.
New Jersey	Yes	5% on axle weight if GVW is not exceeded.
New Mexico	No	None indicated.
New York	No	5% on weights; 3 in. on width for door knobs, lights, etc.
North Carolina	Yes	5% on weights.
North Dakota	No	None indicated.
Ohio	Yes	3% on weights.
Oklahoma	No	1,000 lb on weights.
Oregon	No	1,000 lb on axle; 2,000 lb on axle group; 2,000 lb on GVW.
Pennsylvania	Yes	3% on weights.
Rhode Island	No	None indicated.
South Carolina	No	10% on weights.
South Dakota	No	None indicated.
Tennessee	No	Varies.
Texas	No	5% on axle weight; 5% on axle weight on permitted loads.
Utah	No	None indicated.
Vermont	Yes	2,000 lb on GVW; 1 to 2 ft on length.
Virginia	No	5% on weights; 2 in. on width.
Washington	No	500 lb on single axle; 1,000 lb on two axles; 1,500 lb on 3-axle vehicles; 2,000 lb on combinations.
West Virginia	Yes	5% on weights.
Wisconsin	Yes	1,500 lb on single axle; 1,600 lb on tandem axles.
Wyoming	Yes	4,000 lb on tandem axles.
D. Columbia	No	None indicated.

TABLE 35

WEIGHT LAW VIOLATION FINE SCHEDULES FOR OVERLOADS

STATE	FINE SCHEDULE
Alabama	No fines; bond might be required for possible damage.
Arizona	Fines—\$30 minimum to \$280 maximum by increments of 500 lb.
Arkansas	\$10 minimum; 2¢/lb to 5¢/lb by increments in kips.
California	First offense—judge's discretion, limits from \$10 to \$1,000.
Colorado	Insufficient data.
Connecticut	\$1 to \$10/100 lb overweight.
Delaware	2¢/ton-mile for wt. over licensed gross load; first offense—\$10 to \$100 and/or 10 to 30 days; all others—\$50 to \$200 and/or 15 to 30 days.
Florida	5¢/lb after first 100 lb overweight.
Georgia	\$40 minimum; 1¢/lb to 5¢/lb by increments in kips.
Idaho	Insufficient data.
Illinois	\$1 minimum; 2¢/lb to 10¢/lb by increments in kips.
Indiana	\$5 minimum; 2¢/lb to 10¢/lb by increments in kips.
Iowa	\$1 to \$8/100 lb by increments of % overload.
Kansas	First offense—\$500 and/or 30 days; second offense—\$1,000 and/or 16 months.
Kentucky	2¢/lb to 9¢/lb; \$500 maximum.
Louisiana	First offense—\$50; second—\$100; third—\$250.
Maine	\$200 maximum; \$20 plus court cost to \$100 plus court cost.
Maryland	2¢/lb up to 5 kips; 6¢/lb over 5 kips.
Massachusetts	\$500 maximum; \$10/1,000 lb.
Michigan	2¢/lb to 10¢/lb.
Minnesota	No established fine schedule.
Mississippi	5¢/1,000 lb times mileage (50-mile minimum) plus 500%; \$300 fine for knowingly committing violations.
Missouri	2¢/lb first 500 lb; 5¢/lb second 500 lb; 10¢/lb thereafter.
Montana	\$15 minimum; \$1,000 maximum; increased by wt. steps.
Nebraska	Insufficient data.
Nevada	\$20 minimum; \$500 maximum; increased by wt. steps.
New Hampshire	First offense—\$25 to \$200; second—\$50 to \$500.
New Jersey	\$50 minimum; 2¢/lb up to 10 kips; 3¢/lb over 10 kips.
New Mexico	Insufficient data.
New York	First offense—\$100 to \$250; second—\$250 to \$500.
North Carolina	1¢/lb to 5¢/lb.
North Dakota	1¢/lb to 8¢/lb.
Ohio	\$25/2,000 lb plus \$1/lb over 2,000 lb plus \$2/lb over 5,000 lb.
Oklahoma	First violation within a year—\$50 to \$200; second—\$100 to \$200; third—\$250 to \$500.
Oregon	1¢ to 7¢/lb; \$100 plus 5¢/lb for permit violations.
Pennsylvania	(\$600 for 6,000 lb over plus \$50/500 lb additional) \$50 plus court expenses.
Rhode Island	\$500 maximum.
South Carolina	No fines listed on law books; \$25 to \$100 bond.
South Dakota	\$100 and/or 30 days plus 3¢ to 10¢/lb by increments in kips.
Tennessee	\$25 to \$500 plus court costs.
Texas	First offense—\$25 to \$200; second—\$50 to \$200; third—\$100 to \$500.
Utah	Insufficient data.
Vermont	Court's discretion—on the average, \$50.
Virginia	2¢/lb up to 5 kips; 5¢/lb over 5 kips.
Washington	First offense—\$25 to \$50; second—\$50 to \$100; third—\$100 plus 2¢ to 5¢/lb.
West Virginia	\$20 to \$1,600 by 1-kip increments.
Wisconsin	First offense—\$50 to \$100; second—\$100 to \$200; 1¢ to 10¢/lb.
Wyoming	\$50 to \$100.
D. Columbia	Fines not mentioned in regulations.

To measure the effectiveness of the various systems of weight-law enforcement, four parameters were used: (1) the number of oversize-overweight permits issued; (2) the number of weight-law violations; (3) the percentage of trucks weighed during loadometer studies that were in excess of state weight limits;⁷ and (4) the annual truck vehicle mileage for each study state.⁸ Two relationships were developed.

Figure 9 is the scatter diagram showing the percent of trucks weighed during loadometer studies that were over state weight limits in each state plotted against the weight-law violations per truck vehicle-mile for the same state. It is assumed that, if a state rates low in violations per truck-mile and high in percent in excess of state law, either enforcement is weak or the permit issuance is high.

Figure 10 plots the violations per truck-mile in excess of state law against permits per truck-mile in excess of state law for the same state. It was assumed that if both the rate of permit issuance and the rate of violations—measured against the estimated vehicle mileage over legal limits—were low, enforcement probably is poor.

Comparing Figures 9 and 10, the same states fall mostly in the same regions in both plots, tending to substantiate the assumptions. These plots demonstrate the variety in quality of weight-law enforcement. The states involved are purposely not identified.

This analysis of the quality of truck weight enforcement is indicative at best. It does point out that there is a need for further analysis in which all parameters can be measured carefully. The Iowa State Highway Commission presently is conducting a study to determine the optimum level of enforcement of regulations governing the size and weight of motor vehicles operated on Iowa highways. This subject would be worth studying on a national basis.

⁷ Truck weight studies from each state.

⁸ Unpublished data from the Bureau of Public Roads.

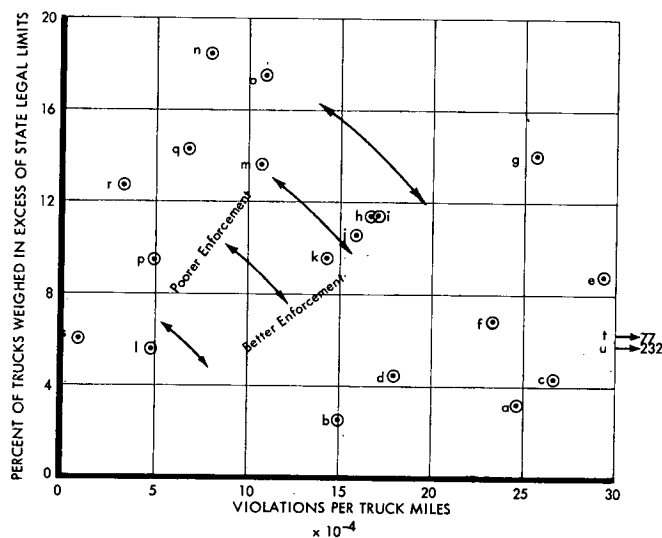


Figure 9. Relationship between overweight loads and overweight violations.

PERMIT OPERATIONS ON TOLL FACILITIES

Although toll roads and toll facilities may be integral parts of state highway systems, the size and weight regulations relating to these facilities and the responsibility for administration generally are different from those of the free state systems. Because of the differences in regulations and administration, over-limit haulers generally are required to obtain special permission to move on the toll facility in addition to the permit obtained for movement on free state highways.

Twelve toll facility authorities required haulers to obtain specific permission to make oversize-overweight movements on their facilities. Like most other aspects of permit operations, requirements for operating on toll roads vary widely. A summary of the characteristics is given in Table 36.

Eleven⁹ of the twelve authorities issued approximately 150,400 permits or verbal permissions to move oversize or overweight vehicles. These are summarized in Table 37.

The New Jersey Turnpike Authority does not permit over-limit movements on its facility, except for movements of the Armed Forces made in the interest of national defense. In 1966 only one over-limit movement involving a spacecraft was permitted.

⁹ The Massachusetts Turnpike Authority did not respond to the questionnaire.

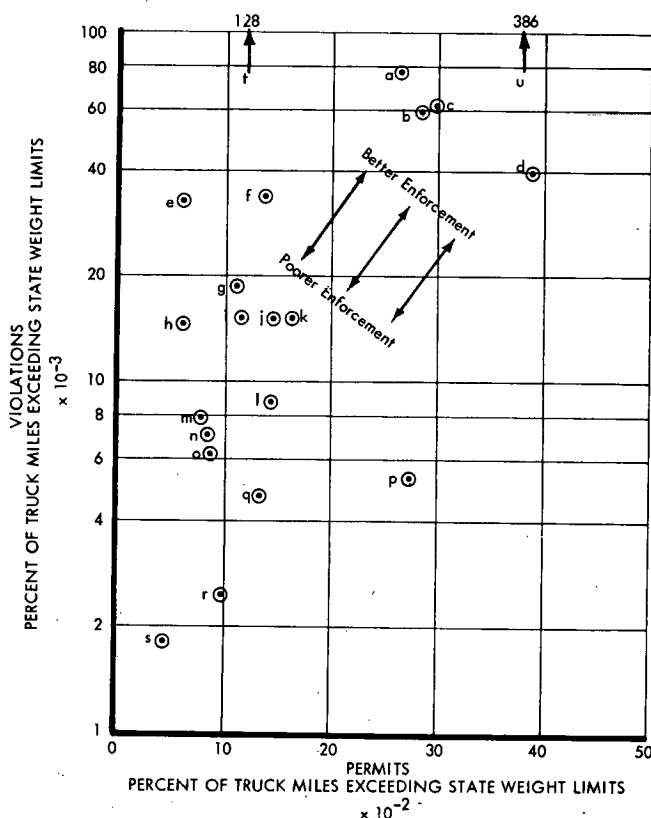


Figure 10. Relationship between violations and permits.

TABLE 36

CHARACTERISTICS OF PERMIT OPERATIONS ON HIGHWAY TOLL FACILITIES ^a

TOLL FACILITY	FORM OF PERMISSION	PERMIT ^b FEE (\$)	STATE HIGH- WAY PERMIT NEEDED?	DOUBLE BOTTOMS ALLOWED?	LEGAL LIMITS ^c						
					LENGTH, SINGLE (FT)	LENGTH, COMB. (FT)	WIDTH (FT-IN.)	HEIGHT (FT-IN.)	SINGLE AXLE (LB)	DOUBLE AXLE (LB)	GROSS WEIGHT (LB)
Delaware River and Bay Authority:											
(a) New Jersey approach	By permit	3.50	Yes	No	35	50	8-0	13-6	22,400	—	—
(b) Delaware approach	—	—	—	—	40	55	—	—	22,000	—	—
Illinois State Toll Highway Commission	By special use toll form	10.00	Yes	Yes up to 65 ft	42	55 ^d 60 ^e 60 ^f	8-0 (10-0)	13-6 (14-9)	18,000 —	32,000 —	73,280 —
Indiana Toll Road Commission	By permit	Toll schedule special class	Yes ^g	Yes	36 40 ^h	60 65 ⁱ	8-0	13-6	22,400	36,000	90,000
Kansas Turnpike Authority	Verbal	No special fee indicated	Yes	Yes	—	65 ⁱ	8-0	14-0	18,000	32,000	73,280
Maine Turnpike Authority	By permit	5.00	No	No	—	55	8-6 (10-0)	13-6 —	22,000 —	36,000 —	73,280 —
New York State Thruway Authority	By permit	10.00	No	Yes, by permit	35 (50)	55 (80)	8-0 (12-0)	13-0 (13-6)	22,400 —	36,000 —	71,000 —
Port of New York Authority:											
(a) George Washington Bridge	Visual check Permit	Double toll Double toll	No No	No No	45 45	85 85	8-6 8-6	14-0 ^j 13-0 ^k	32,000 32,000	40,000 40,000	70,000 70,000
(b) Other facilities											
Ohio Turnpike Commission	Permit ticket	2.00 ^l	—	Yes (Annual permit)	35 45 ^b	55 ^d 60 ^f	8-0	13-6	21,000	32,000	90,000 (127,400) ^t
Pennsylvania Turnpike Commission	Verbal	Special toll class	No	—	—	70	10-0	13-6	—	—	100,000

^a Florida State Turnpike Authority, Turnpike Authority of Kentucky, Oklahoma Turnpike Authority, and the Texas Turnpike honor state highway department permits and do not issue their own permits. The New Jersey Turnpike does not allow overlimit moves except for national defense. Data concerning the Richmond-Petersburg Turnpike Authority (Virginia) and the West Virginia Turnpike were insufficient.

^b In addition to regular tolls.

^c Size and weight limits below which no permit or permission is necessary. Limits in parentheses are those limits beyond which permission will not be granted.

^d 2-units.

^e Auto transporters.

^f Double bottoms.

^g If exit or entrance in Indiana.

^h Bus.

ⁱ Except double bottoms.

^j Bridge.

^k Tunnels.

^l Plus 2¢/ft-mile overwidth, 1¢/ft-mile overlength, 2¢ per ft-mile overheight.

TABLE 37

NUMBER OF PERMITS ISSUED FOR OVERSIZE-OVERWEIGHT MOVES ON TOLL FACILITIES

PERMIT TYPE	PERMITS ISSUED (NO.)									
	TOTAL	OVER LIMIT, NO BREAK-DOWN	OVER-LENGTH	OVER-WIDTH	OVER-HEIGHT	OVER-DIMENSION, NO BREAK-DOWN	OVER-WEIGHT	DAN-GEROUS LOAD	DOUBLE BOTTOMS ^a	OTHER
Written single-trip	143,901	84,740	118	9,365	48	37,730	259	250	11,391	—
Written annual	974	—	—	—	—	—	—	—	574	400
Verbal permission	5,250	5,250	—	—	—	—	—	—	—	—
All	150,125									

^a Some authorities included double bottoms in overlength; others do not require permits to operate them.

The Illinois State Toll Road Commission, the Maine Turnpike Authority, and the Ohio Turnpike Commission all issue overdimension permits and overweight permits for movements on their facilities. The Illinois Commission honors the state highway overweight permit and charges a special use toll based on the weight stated on the permit.

The Maine Turnpike Authority issues only overlength and overwidth permits. Weights and heights must conform to allowable weights and heights provided by the Maine motor vehicle laws.

The Ohio Turnpike Commission has established maximums of 21,000 lb for single-axle load and 90,000 lb gross weight. The legal weight limits on Ohio state highways are 19,000 lb on a single axle and 78,000 lb maximum gross weight. Therefore, in effect, the Ohio Turnpike Commission is permitting movement without permit of some loads that are overweight by state highway limits.

The Delaware River and Bay Authority, the Indiana Toll Road Commission, the New York Turnpike Authority, the Port of New York Authority, the Richmond-Petersburg Turnpike Authority, and the West Virginia Turnpike issue permits for both overdimension and overweight movements.

The Delaware River and Bay Authority requires that either a Delaware or a New Jersey over-limit permit be presented. The rules and regulations of the states regarding over-limit are used by the Authority despite variations in the legal limits for length and weight.

The Indiana Toll Road requires oversize and overweight vehicles entering or exiting from or to Indiana highways to have a highway department special permit. Toll road

permits actually are a Class 9 toll ticket and are required for vehicles exceeding the toll road limits, which are similar to state limits with the exception of a 90,000-lb limit for gross weight.

New York Thruway size and weight limits are the same as those on state highways. Although the Indiana Toll Road includes double bottoms in its Class 9, the New York Thruway Authority does not require special hauling permits to move these vehicles on its facilities.

Port of New York Authority limits vary according to physical limitations of its various facilities.

The Kansas Turnpike Authority grants verbal permission to oversized vehicles only. These oversized vehicles must have a state highway permit.

The Pennsylvania Turnpike Commission also grants verbal permission. However, this permission is not needed unless the vehicle exceeds the following limits: 13 ft 6 in. in height, 70 ft in length, 10 ft in width, and 100,000 lb gross weight. It is interesting to note that the oldest of the toll roads has a "legal" limit in excess of those established for the newer and presumably better-designed toll roads and Interstate roads.

Only one state was found to have provided a compromise between state limits and toll road limits for limited movements using both classes of highways. Indiana issues to users of the Indiana Toll Road an annual permit that allows them to move vehicles meeting toll road limits within 7½ miles of toll road exits. Most of these loads are reducible and ordinarily would not be allowed on state highways under any circumstances.

CHAPTER FOUR

INDUSTRIES AND PERMIT OPERATIONS

The need for and characteristics of permit operations vary between industries. This chapter presents the characteristics of permit operations by major industries, including agriculture, aerospace, construction, forest, marine, military, mining, mobile home, oil and gas, public power, and heavy-specialized trucking. Trends have been determined for all but the last of these industries, and projected to 1975 as a basis for estimating the future need for permits. Because of the nature of the heavy-specialized trucking industry, its trends are reflected in the other industry trends and data are not sufficiently refined to separately develop trends by size and weight class.

The size and weight characteristics of industry-related commodities are presented graphically. The results of special trip samples from the Heavy-Specialized Carriers Conference, the Oil Field Haulers Conference, and the Military Management and Terminal Service are discussed and provide additional data concerning permit-trip characteristics.

AGRICULTURE INDUSTRY

The national permit sample shows that an estimated 45,925 permits were issued nationally for agriculture-related commodities in 1966. Of these, 38,781 permits were issued for farm machinery, 3,152 for produce, 1,107 for haystacks, 142 for livestock, 82 for nursery items, and 2,160 for unspecified categories. Farm machinery accounted for 84 percent of the total. Nebraska issued the most permits in the project year, both for agriculture and agricultural equipment—9,854 for the equipment, approximately one-third of the state's total permit issuance. Connecticut, South Carolina, and Wisconsin did not issue any agricultural permits. Three states (Nebraska, Minnesota, Texas) issued 35 percent of the total number of agricultural industry permits.

Non-uniformity between states in exceptions to legal limits contributes to the variance between states in issuance of agriculture permits. Twenty-seven states have no size or weight restrictions for implements of husbandry. Ten other states allow greater width for farm vehicles or implements. Fifteen states have a width exception for farm tractors. There are numerous other exceptions for farm products. These exceptions are given in Table 30.

In some states, implement dealers are not allowed the same exceptions as farmer-operators. In a few of these states, a special annual permit is issued to the dealer.

Most permits for agricultural commodities are needed for overwidths only. Figure 11 shows the distribution of widths.

Of the permits issued to the agricultural industry in 1966, 4,247 (9.24 percent) were blanket permits issued largely for seasonal or dealer moves of equipment.

Special permits are frequently issued for overwidth combines. Although the movements of agricultural machinery

generally are local in nature, many combines traverse the Plains States region at harvest time. Because of the critical time factor involved, it is considered essential that the combines be moved from field to field without unnecessary delay.

One problem raised by some of the equipment owners was the difficulty in obtaining a permit when crossing state lines. Whereas in most states permits can be obtained from a port of entry or highway patrol station, as well as central and district offices, at least 14 states make no provision for permits to be obtained except at central or district offices. This often means a delay while a special trip is made to obtain a permit. Although this particular situation might cause an occasional hardship, it has been pointed out by the permit authorities that it is the permittee that causes the delay, because permits can be obtained in advance by mail.

The latest truck census¹⁰ indicates that there are 3,528,000 trucks engaged in agriculture. This is the largest number of trucks in any major use category. Other categories given are: personal, for hire, contract construction, manufacturing, wholesale and retail, services, and other. Of the farm trucks, 73.6 percent are classified as light, 10.4 percent as medium and 1.3 percent as heavy-heavy. In the for-hire category, 14.7 percent of 679,000 trucks were classified as light, 9.8 percent as medium, 22 percent as light-heavy, 44 percent as heavy-heavy, and 9.5 percent as miscellaneous. The census further categorizes moves by distance. In agriculture, local moves

¹⁰ U. S. Department of Commerce, Bureau of Census, *Census of Transportation. Truck Inventory and Use Survey*, Vol. 2, pp. 2-5, (1963).

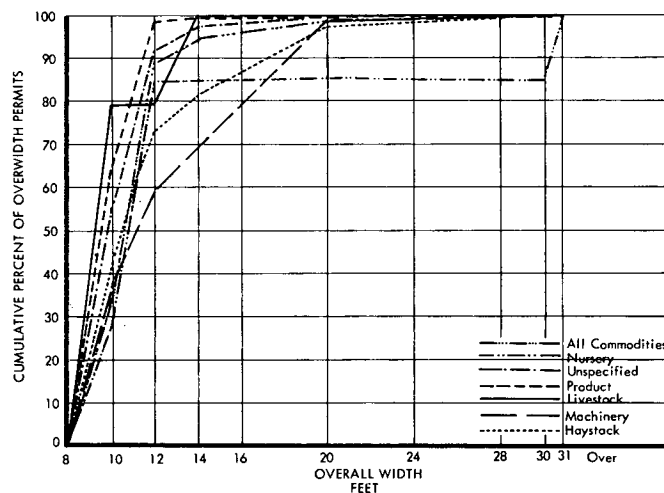


Figure 11. Cumulative distribution of overwidth permits for agricultural products and equipment.

account for 74.9 percent; moves under 200 miles one way, 2.9 percent; and moves over 200 miles, 0.2 percent. For-hire trucks were used 54.8 percent for local travel, 21.9 percent for intermediate trips, and 13.9 percent for long distance travel. These figures show the relatively local nature of most movements in the agricultural industry.

Despite a decrease in the number of farms from 6.5 million in 1929 to 3.7 million in 1959, farm output as measured by gross national product has shown a gradual moderate increase. For the ten-year period 1920-1929, the gross farm product amounted to \$14,800 million. The 1950-1959 period showed an increase to \$19,200 million, and by 1962 the figure increased to \$21,600 million. Projection of this trend indicates a total of \$23,500 million by 1970.¹¹ As the number of farms decreases, the number of persons employed on farms also decreases. However, trends show that amounts of farm machinery are increasing and the size undoubtedly also is increasing to operate the larger farms. Table 38¹² shows the trends in numbers from 1946-1966 for tractors, grain combines, corn pickers, pickup balers, and field forage harvesters. Based on a projection of these trends, the number of oversize-overweight agricultural permits that probably will be issued in 1975 is estimated at 47,624.

AEROSPACE INDUSTRY

The Aerospace Industry Association indicated that its members moved a total of 619 oversize-overweight shipments requiring special permits during the period from January 1965 through March 31, 1966. The majority of these shipments involved aircraft, missile, or space program items. Of the 619 shipments reported, 74 percent had heights in excess of 17 ft when loaded, 17 percent loaded out at heights between 15 ft and 16 ft, and 7 percent loaded out at heights between 14 ft and 15 ft. The majority of movements were California intrastate. The second largest category of movements originated in California and were destined for points east of the Mississippi River.

From the data gathered in the state inventories of oversize-overweight permits, there were, nationally, 7,181 permits issued for commodities related to the aerospace industry. The commodities were: missiles, accounting for 1,366 permits; missile or rocket components, accounting for 1,878 permits; and aircraft parts, accounting for 3,937 permits. Of the total number of permits, 11 percent were blanket permits.

Table 39 gives the proportions of total permits in the various oversize-overweight categories. There is some overlap of categories, as some of these items fall into more than one category.

Figures 12 through 15 show the distributions of the over-dimensions and overweights for each of the commodity codes. The height distribution does not display as high a percent of overheights over 17 feet as the reported industry data. Military missiles of smaller dimension in the national sample probably account for the difference.

¹¹ U. S. Department of Commerce, Bureau of Census, *Statistical Abstract of the United States*, 1967, p. 628, Table 925.

¹² U. S. Department of Commerce, Bureau of Census, *Statistical Abstract of the United States*, 1967, p. 621, Table 918.

It is very difficult to make a long-range forecast of future oversize-overweight aerospace industry traffic. However, there is expected to be a 15 to 20 percent increase in this traffic for 1968. Government agencies indicate that although they generate program concepts, they can not forecast the ultimate results of contractors' design and manufacture on specific size or weight. On the other hand, the contractors indicate that until they have a contract and concept on hand they can not be sure of the item design, weight, or size. There is no doubt, however, that the trend is to larger and heavier missile systems or space age articles.

The industry feels that an increase in size and weight tolerances for items moved under permit (where applicable) will benefit both the industry and the government in several ways, as follows:¹³

- (a) Increase in the heavy and specialized carrier industry capability to service the shipping public.
- (b) Easing of present shipment transportability problems.

¹³ From a letter dated June 6, 1967, from Louis A. Molinari, Manager, United Technology Center, to Roy Jorgensen and Associates.

TABLE 38

TRENDS IN NUMBERS OF FARM MACHINERY AND EQUIPMENT, 1940 TO 1966

YEAR	NUMBER ON FARMS ^a (1,000's)				
	TRAC-TORS ^b	GRAIN COMBINES	CORN PICKERS	PICKUP BALERS	FIELD FORAGE HAR-VEST-ERS
1940	1567	190	110	—	—
1950	3394	714	456	196	81
1955	4345	980	688	488	202
1960	4685	1042	792	680	291
1963	4730	940	720	718	307
1964	4755	920	705	734	312
1965	4783	910	690	751	316
1966 ^c	4800	895	675	765	320

^a January 1. ^b Excludes garden tractors. ^c Preliminary.

TABLE 39

AEROSPACE-RELATED PERMITS, BY TYPE OF OVER-LIMIT

COMMODITY	PERCENTAGE OF TOTAL PERMITS			
	OVER-HEIGHT	OVER-WIDTH	OVER-LENGTH	OVER-WEIGHT
Missiles	15	76	64	27
Missile, rocket parts	10	94	39	14
Aircraft parts	31	79	21	3
Combined	23	82	34	11

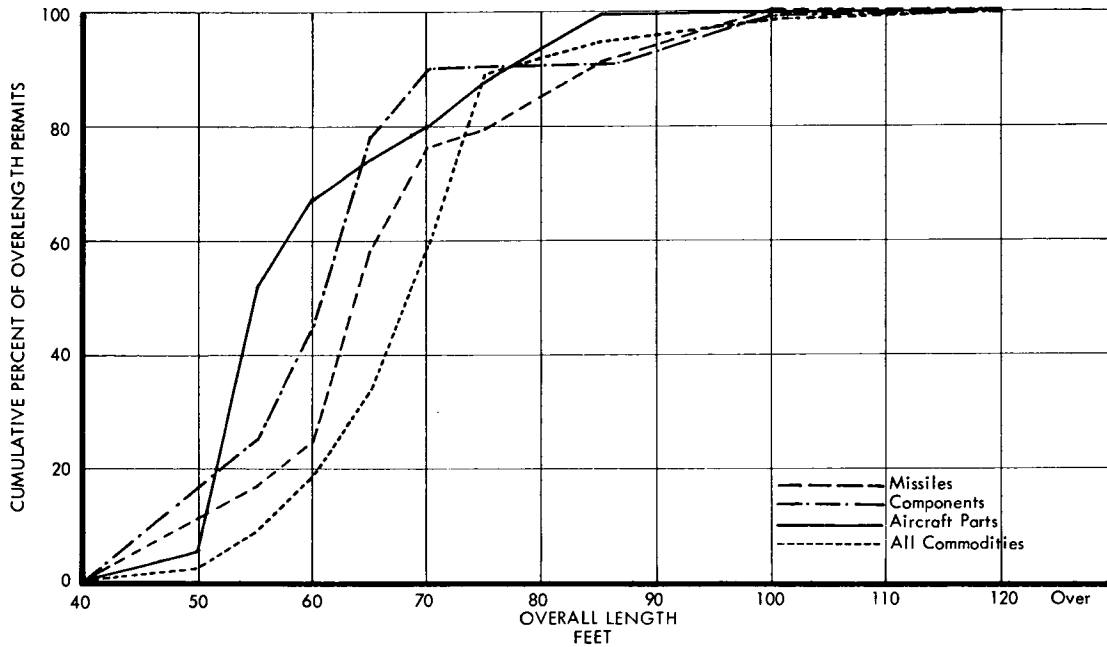


Figure 12. Cumulative distribution of overlength permits for missiles, components, and aircraft parts.

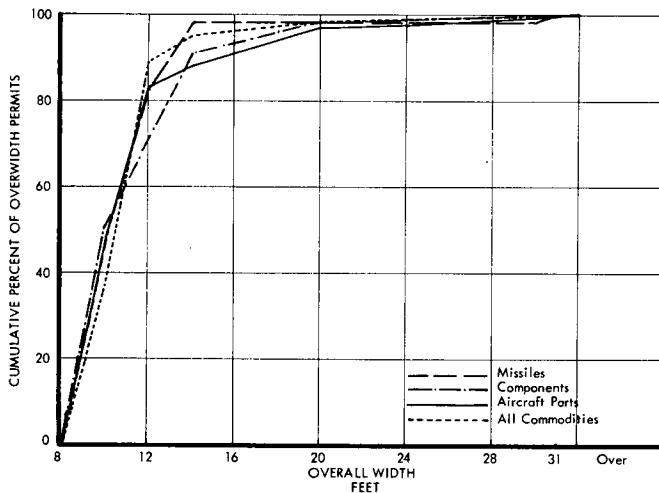


Figure 13. Cumulative distribution of overwidth permits for missiles, components, and aircraft parts.

- (c) Reduction of shipping costs, by elimination of some permit costs and carrier service charges.
- (d) Reduction of shipping costs now incurred when highway-eligible excess size or weight shipments are routed via more expensive transport modes due to state refusal to issue special permits.
- (e) Reduction of in-transit shipping times.

Because the major portion of movements involves government-owned items moving under government bills of lading, the Military Traffic Management and Terminal Service of the Department of Defense intercedes with the states on

behalf of the shippers for the required permits. Usually MTMTS is successful, provided the item can not be shipped by other than highway means or feasibly disassembled for shipment. Permits for items owned by industry moving on commercial bills of lading generally are more difficult to obtain.

This industry's transportation problems stem mainly from the physical limitations of the highways and appurtenances rather than from a permit department's refusal to issue permits. When it is physically possible, all of the state authorities indicated they would make every concession to allow these shipments to move and every effort to route them over any available route with the necessary physical characteristics. Generally, a permit will be refused only in the case of geometric limitations, especially vertical clearance restrictions that can not be bypassed.

The Aerospace Industry Association in 1965 began a project which they hope will enable them to keep these shipments moving. This project has as its objective "to promote the establishment of a national highway network, linking Government and industrial activities, appropriate for the efficient and safe movement of excess dimension and weight aerospace articles." Its goals are:¹⁴

1. To establish criteria for a national highway network appropriate for transport of known or predictable excess size/weight articles which will provide the maximum attainable mobility of this traffic for times of both peace and mobilization.
2. To identify a minimum highway national network which should meet Goal 1 criteria, and promote implementation for changes where these criteria are not met.
3. To create an industry-wide awareness of the problems of moving excess size and weight traffic by release of pub-

¹⁴ Aerospace Industries Association of America, Mar. 26, 1965.

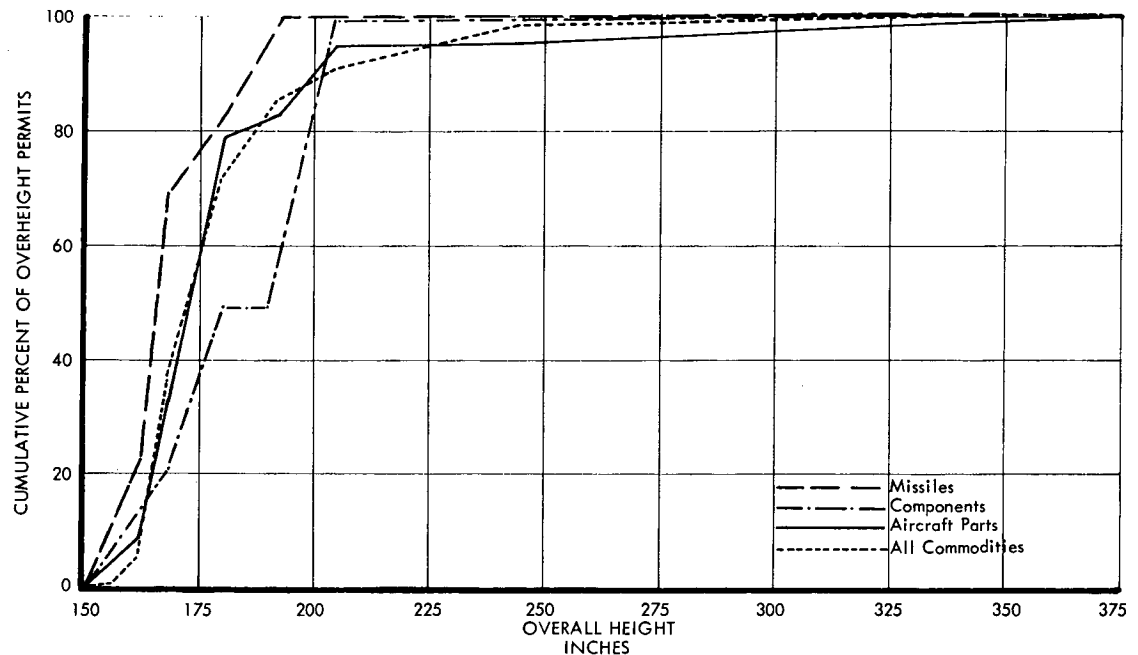


Figure 14. Cumulative distribution of overheight permits for missiles, components, and aircraft parts.

licity through trade media and participation at appropriate conferences.

4. To promote the urgency, need and importance of this project with the Bureau of Public Roads, state, and other public road administrations to secure their cooperation in achieving the desired compatibility of highway network characteristics with the traffic's needs.

5. To publicize project results for industry and government-wide use.

The problem of serving the needs of the growing space-age technology on the highways is a difficult one. The requirements of both the aerospace industry and the military need to be taken into consideration. It is obvious that limitations being designed and built into the most modern highways do not provide satisfactorily for oversize (largely overheight) movements which now appear to be required. Nor is the problem susceptible entirely to an economic solution. The future of an important developing technology can not now be measured in absolute economic terms. The needs of the military for adequate national defense are above economic value.

The future course of the aerospace industry, affecting movements of both the industry and the military, is difficult to foresee. For example, as the industry grows larger, what are the possibilities of plants and terminal facilities being so located as to minimize or eliminate the long-range need to provide for this industry's extra-dimensional movements? Already, space exploration vehicles have become so large as to have much of the fabrication performed on-site.

What are the likely long-range trends in space vehicle size? Currently, trends are toward increased size, equated with more power. However, new power modes and fuels could revise this trend. Should highway authorities look forward to the necessity of providing substantially higher clearances, perhaps lift or swing-away spans?

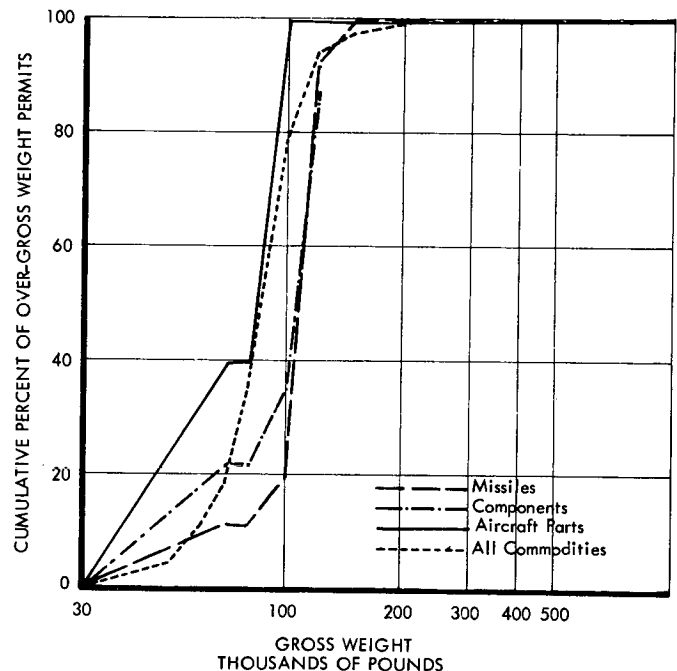


Figure 15. Cumulative distribution of over-gross weight permits for missiles, components, and aircraft parts.

What are the possibilities of special provisions on a network of highways to provide for the current relatively small number of specially justified overheight movements exceeding normal bridge clearances? For example, off- and on-ramps can be and sometimes are used to bypass interchange structures that present a vertical clearance problem. (However, some ramp designs are too restrictive to permit this.)

Would it be possible to develop special limited-use ramps at the sites of structures where other bypass possibilities are not provided?

If all possibilities were explored of making the most economic provision for extra-height movements, considering the added advantages of other industry moves that could be made, what would be the best mix of structural height and other measures?

Other modes of transport providing alternatives for over-dimensional movements by aerospace and other industries are faced with many similar limitations. What are the possibilities of supplementing special highway networks with special railroad networks?

It is believed that most previous studies by highway officials have involved the collection of representations by industry and the military on vertical clearance needs, and have not included in-depth evaluations of all possibilities of providing for extra-high movements which are in the public interest, or the economics of making the best possible provisions.

It is recommended, therefore, that objective research be conducted to identify and evaluate all possible measures and economics, and other values related thereto, with the purpose of providing guidelines for use in developing future highway standards, industry fabrication standards, transport arrangements, legislation, and permits policy.

Although it is extremely difficult to make a projection of the future number of permits required by this industry, numbers of permits issued in 1975 probably will range between 13,213, based on trends in defense expenditures,¹⁵ and 25,301, based on a constant annual increase as predicted for 1969 by the aerospace industry.¹⁶ Because a large number of the movements probably will relate to defense, a figure closer to the lower end of the range (13,213) is the prediction for 1975.

CONSTRUCTION INDUSTRY

The construction industry uses more oversize-overweight permits than any other industry. Table 40 gives the esti-

mates of numbers of permits issued nationally in 1966 by permit type and commodity breakdown.

Figures 16, 17, 18, and 19 compare the size and weight distributions of various construction commodities with the distributions of all commodities. Construction commodities present a wide distribution of dimensions and weights, with good representation in the heaviest weight classes and largest dimension categories. Table 41 gives a breakdown of construction commodity permits by type of over-limit.

Construction equipment permits characteristically tend to be issued for overwidth and overweight movements. Structural members generally are issued permits as an overlength commodity. As expected, piling almost always needs only an overlength permit. Bulk materials and unspecified classes are well distributed between the various oversize and overweight classes.

Use of permits by the construction industry is generally similar in most states. Construction industry permits range from a low of 3.9 percent to a high of 75.1 percent of all permits issued in each state. However, in the majority of states the ratio ranges from 35 to 50 percent.

Multiple-trip permits, as well as single-trip permits, are issued in most states for movements of equipment, structural members, booms, and piling. Some states also issue multiple-trip permits for movements of some bulk commodities such as aggregates and ready-mix concrete. Only eleven states do not issue multiple-trip permits for any kind of construction industry move. Other variances between states include limitations in the distances construction equipment can move from construction sites or from a city under multiple-trip permit.

As a result of the use of multiple-trip permits as well as single-trip permits, it is estimated that there are 2,529,300 moves of oversize-overweight construction equipment.

Permits for bulk construction materials of the types classified vary most significantly in numbers between the states, ranging from 0 percent of all construction industry permits in ten states to 29.97 percent in the District of Columbia. There are two major reasons for these variances. First, there is the inclusive nature of this category—bulk construction materials, as designated, include such widely different types of materials as ready-mix concrete, concrete

¹⁵ *Statistical Abstract of the United States*, 1967, pp. 254-255.

¹⁶ Aerospace Industries Association of America.

TABLE 40
PERMITS FOR CONSTRUCTION COMMODITIES

COMMODITY	NO. OF PERMITS			
	SINGLE-TRIP	MULTIPLE-TRIP	TYPE UNKNOWN	TOTAL ISSUED
Construction, general	2,149	986	0	3,135
Construction equipment	604,364	78,390	3,690	686,444
Bulk constr. materials	20,819	4,385	72	25,276
Structural members	78,486	12,426	327	91,239
Booms	3,675	541	15	4,231
Piling	3,162	1,491	93	4,746
All	712,655	98,219	4,197	815,071

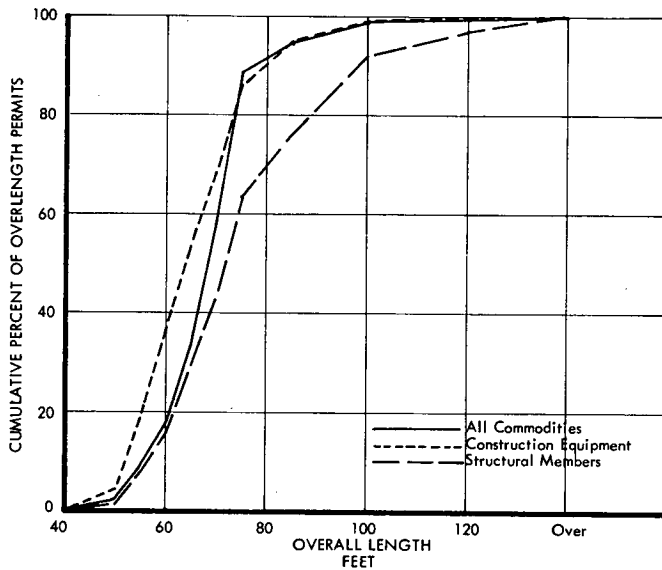


Figure 16. Cumulative distribution of overlength permits for construction equipment.

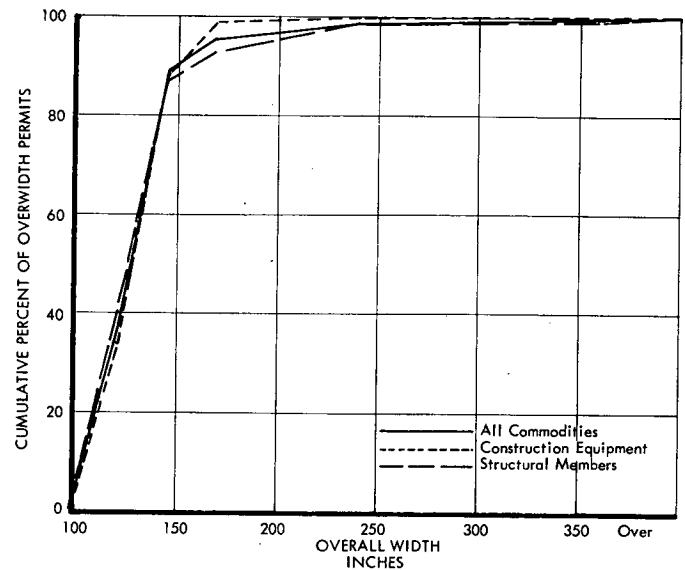


Figure 17. Cumulative distribution of overwidth permits for construction equipment.

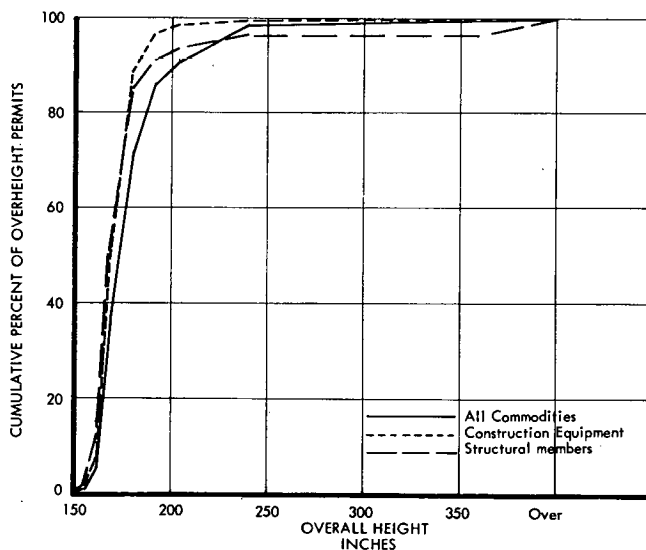


Figure 18. Cumulative distribution of overheight permits for construction equipment.

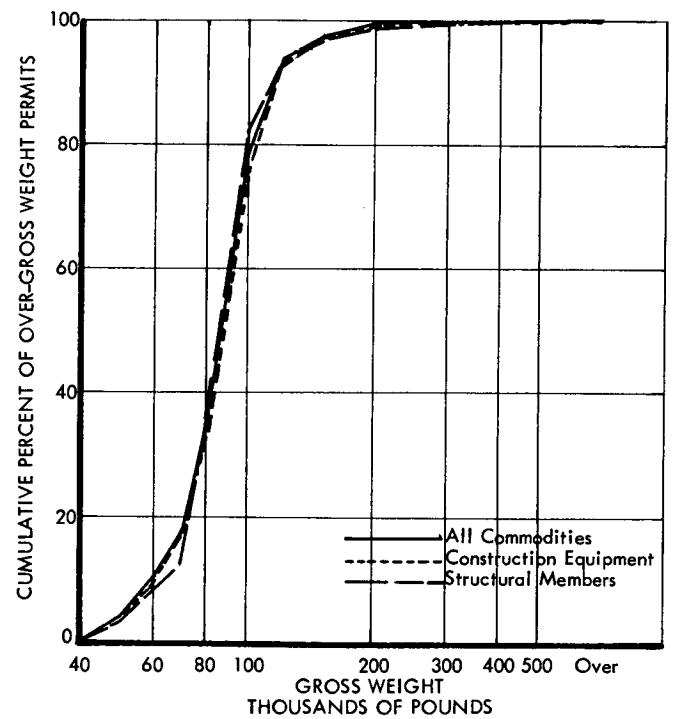


Figure 19. Cumulative distribution of over-gross weight permits for construction equipment.

slabs, granite blocks, and aggregates. Second, there are the exceptions made by some states for movement of some classes of construction materials; one state and the District of Columbia, for example, allow extra-legal movements of ready-mix concrete under multiple-trip permit. Most other states make no exceptions in the case of reducible loads. (This probably results in the use of smaller and lighter conveyor vehicles in these states.)

Construction activity in general has maintained a steady increase over the years. Figure 20 shows this trend as measured by the GNP for contract construction.¹⁷ If it could be assumed that the construction industry's need for oversize-overweight permits would keep pace with the industry's growth, it could be anticipated that a total of

¹⁷ U. S. Department of Commerce, Bureau of Census, *Long-Term Economic Growth—1860-1965*, October 1966.

900,629 permits (an increase of 10.50 percent over 1966) would be issued by 1975. The chances are, however, that a larger number of permits than this will be required by this industry.

Sizes and weights of construction equipment and some commodities indicate continuing increase. The trend originated in the conservation and power field with equipment for large dam projects, but has progressed into the highway construction field as well. This has been important because construction equipment in highway work moves much more frequently than it does in dam work.

The January 1968 issue of *Roads and Streets*, subtitled "1892-1967, The Incredible Years," gives several indications of increasing sizes and weights in construction equipment in particular. The following references are paraphrased or quoted from this magazine.

TABLE 41
CONSTRUCTION COMMODITY PERMITS, BY OVER-LIMIT GROUP

COMMODITY	PERCENTAGE OF TOTAL PERMITS FOR COMMODITY			
	OVER-LENGTH	OVER-WIDTH	OVER-HEIGHT	OVER GROSS WEIGHT
Construction, general	50.27	80.19	32.95	33.08
Construction equipment	37.15	90.24	20.30	52.11
Bulk constr. materials	50.70	59.30	11.88	13.79
Structural members	63.94	46.85	6.28	9.56
Booms	40.63	64.45	10.85	23.52
Piling	95.79	2.49	0.08	8.91

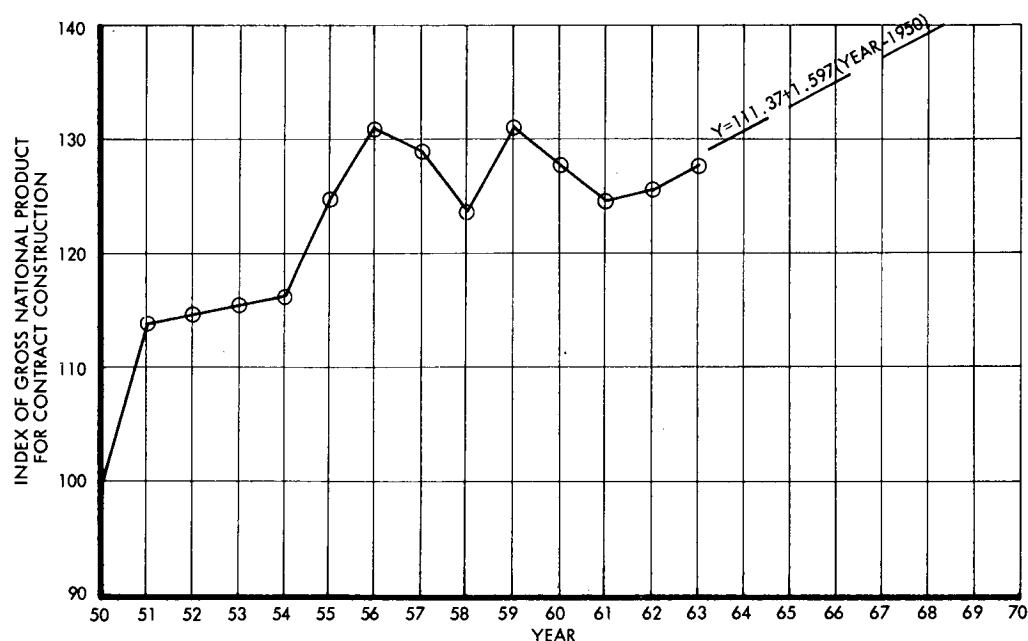


Figure 20. Trend in contract construction.

Small 14- to 15-yard self-propelled scrapers of today are larger than the big DW21 of the early 1950 era. Today's large scrapers, in demand by major earthmoving contractors, are rated at 40 yards struck capacity, and larger scrapers are expected. In general, the 40-yard scraper must be partly dismantled for between-the-job moves.

The largest crawler tractors in use today were introduced around 1954-55, but are becoming more numerous. Some weigh 71,250 lb.

With new blasting technologies and agents, drills and air packages of portable equipment, as well as equipment to load and transport materials, have become larger in the highway construction, mining, and pit and quarry fields.

"In Pennsylvania recently, for example, on an I-80 project, a stripping contractor employed 12-yd shovels with 65-ton rear dumps, backed up by 9-in. rotary drills.

"A leading Connecticut rock firm drills 60-ft lifts for his 4½-yd shovels in highway cuts, compared with traditional 20-ft lifts, reducing drilling, hole loading, and shovel costs."

"Concrete transport bodies for centrally-mixed paving concrete have prevailed at 8-yd size for several years . . .

"One manufacturer now offers a 12-yd 90-degree, swiveling agitating body . . .

"In parts of Southern California, great haul distances over flat terrain and wide arterials, plus favorable state laws, have fostered rapid and highly efficient transport of excavation material (and aggregates) by long-wheel-based units, usually with full rear-dumping trailer in tow. These 25-ton legal units travel at 45 mph

"Familiar particularly in Southern California today is the slide transfer trailer with retractable drawbar for dumping the hauling unit's body while nestled into the front body.

"Around Detroit, in contrast, while double-bottom hauling is a prevailing pattern, the units are short and have extra axles to meet over-the-road requirements. In the East, the ordinary rear-dump truck still prevails."

In addition to the increasing equipment size described in *Roads and Streets*, safety trends in highway design and construction calling for longer-span structures will influence the length of prefabricated structural members, for which a transport demand will be felt.

As in the case of other oversize-overweight permit users, the construction industry gains substantial economic advantage—which undoubtedly is passed along in lower construction costs—through being able to move extra-legal loads and sizes over the highways. In developing a reasonable and generally beneficial permit policy, the question which needs answering, of course, is the relative economic cost on the other side—the influence of these moves on the roadway structure and the costs of safety and convenience aspects of these moves to the traveling public.

When the construction industry is able to operate at a lower unit cost the public is a beneficiary of these savings. Likewise, cost effects of extra-heavy loads on the roadway structures and inconveniences to the traveling public are passed on to the public. Research needs to be performed to quantify these savings and costs and to determine the optimum allowable sizes and weights for construction equipment.

FOREST INDUSTRY

Another industry relying heavily on the use of oversize-overweight permits in several states, as well as special legal provisions in a few states, is the forest industry. Segments of this industry rely on permits for the transport of both the products themselves and the equipment used in obtaining and processing these products. The national sample estimates a total of 9,251 permits for moves classified under the forestry heading during the 1966 permit year. For forestry equipment, a total of 3,775 permits were issued; for spars, 260 permits; for logs, 4,944 permits; and 272 permits were in a general, unspecified category.

Thirty-two states issued permits for movements under the commodity categories indicated. Washington, Oregon, and Montana issued by far the largest number, accounting for 62.26 percent of the total number under the forestry category. The forestry permits represented 0.43 percent of total permits in 1966.

The permits categorized in this way, however, do not reflect all of the forestry-related moves, because moves of wooden piles, telephone poles, and possibly wooden structural shapes, are in other industrial categories.

Forestry-related permits tend to be issued for overwidth, overlength, and overweight, in that order. Equipment accounts substantially for the overwidth permits. Overweight permits possibly would account for a much larger proportion if Georgia, Idaho, Louisiana, Oregon, and Washington did not provide special weight exceptions for forestry commodities such as logs. Washington has a unique provision for log (weight) tolerances by permit. In this state, permits can be obtained for 10 percent gross weight tolerance over legal limits, 5 percent axle weight tolerance.

Logging operations seem to evoke, at least in some of the states where logging is a large industry, some of the strongest feeling on sizes and weight administration, both from industry and government authorities.

The industry has made several recommendations reflecting considered needs in different parts of the country. It was recommended by some industry representatives that the Great Lakes states should adopt a uniform policy on the overload factor(s) for frozen roads during the winter months. Others thought that states with logging substantially directed toward pulpwood and railroad ties should adopt laws permitting use of double-trailer rigs with 20-cord capacity. There has been general agreement that increased legal gross weights and axle loads would be beneficial to the industry. This would allow lower cost per unit hauled and open up areas not now economically feasible for forestry operations. Some industry representatives expressed the belief that acquiring special (permit) privileges for oversize and overweight loads not accorded to other industries could result in detrimental or punitive legislation.

Highway officials in some of the states considered logging trucks the most damaging vehicles on the road—probably because of their numbers as related to other vehicles possibly imposing over-maximum axle loads.

In all of the states visited, the law enforcement agencies were asked what vehicles were most prone to oversize or overweight violations. Often, logging vehicles were con-

sidered the greatest offenders. Officers felt that, because loggers hauled under contract, the more they could carry per load the more money they could make, as a general rule, and the risk of being caught was worth the gain. It was learned that some judges were sympathetic to the loggers' problems and, as a result, fines were kept to a mini-

mum. Situations like this created problems and frustrations for the law enforcement agencies.

Because logging is one of the basic industries where production costs have a significant influence on the entire cost of living, it seems essential that special privileges be extended to the industry to the extent that significant net

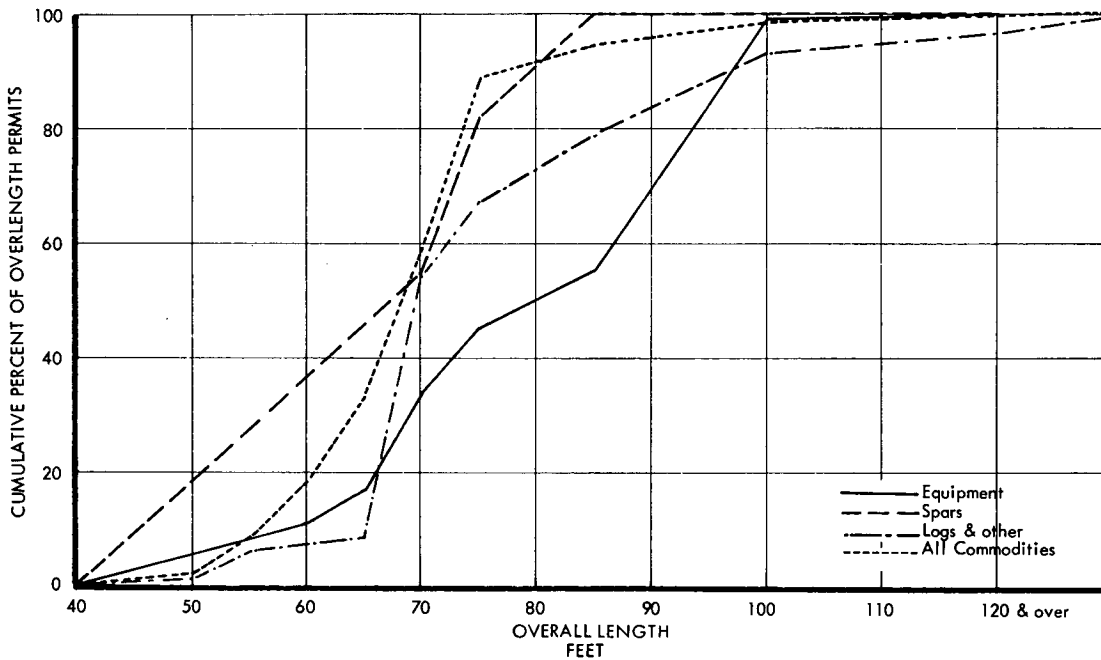


Figure 21. Cumulative distribution of overlength permits for forest products and equipment, Western and Coastal States.

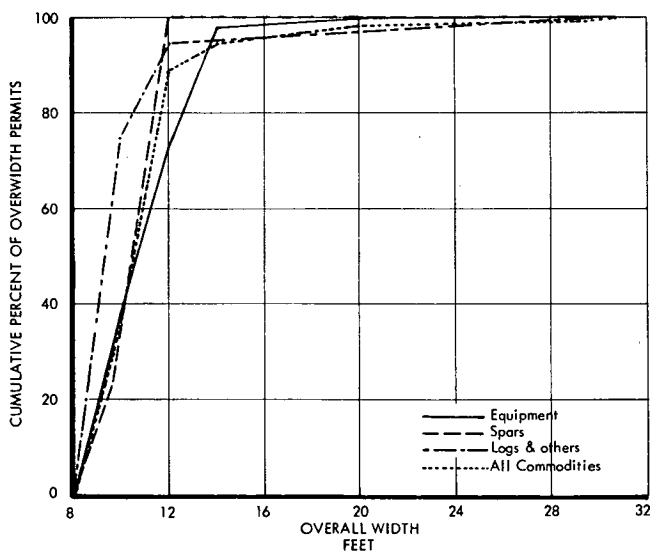


Figure 22. Cumulative distribution of overwidth permits for forest products and equipment, Western and Coastal States.

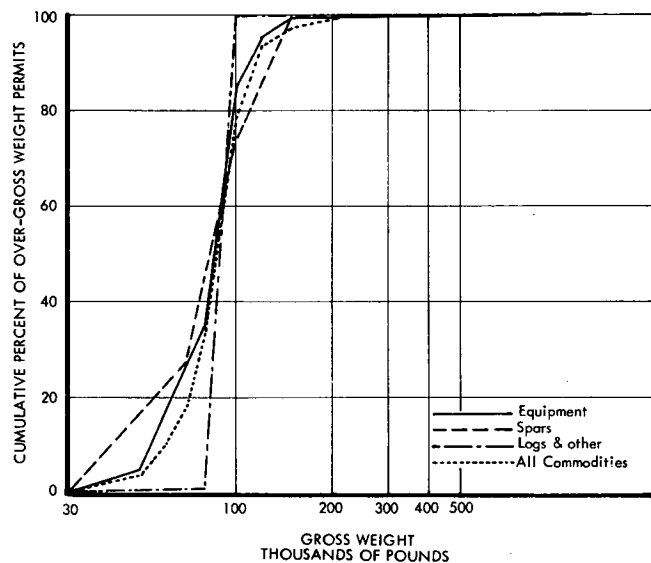


Figure 23. Cumulative distribution of over-gross weight permits for forest products and equipment, Western and Coastal States.

economic benefit can be realized. That is, the good to the general public in increased industry productivity and reduced costs should outweigh additional costs of providing and maintaining highways and other costs or disadvantages to the traveling or general public. Undoubtedly, where logging is a significantly large state industry, some balance has been achieved through give and take over the years. States, therefore, will not be easily dissuaded from their

current laws and regulations, even in the interests of uniformity. This suggests the need for studies of the economic impact, on both sides, of any possible changes in the current provisions, including oversize-overweight permits.

Distributions of width, length, and weight for permit movements are given in two sets of figures because of basic differences in types of logging. Figures 21, 22, and 23 apply to the western, mountain, and coastal states; Figures 24, 25, and 26 apply to the remaining states.

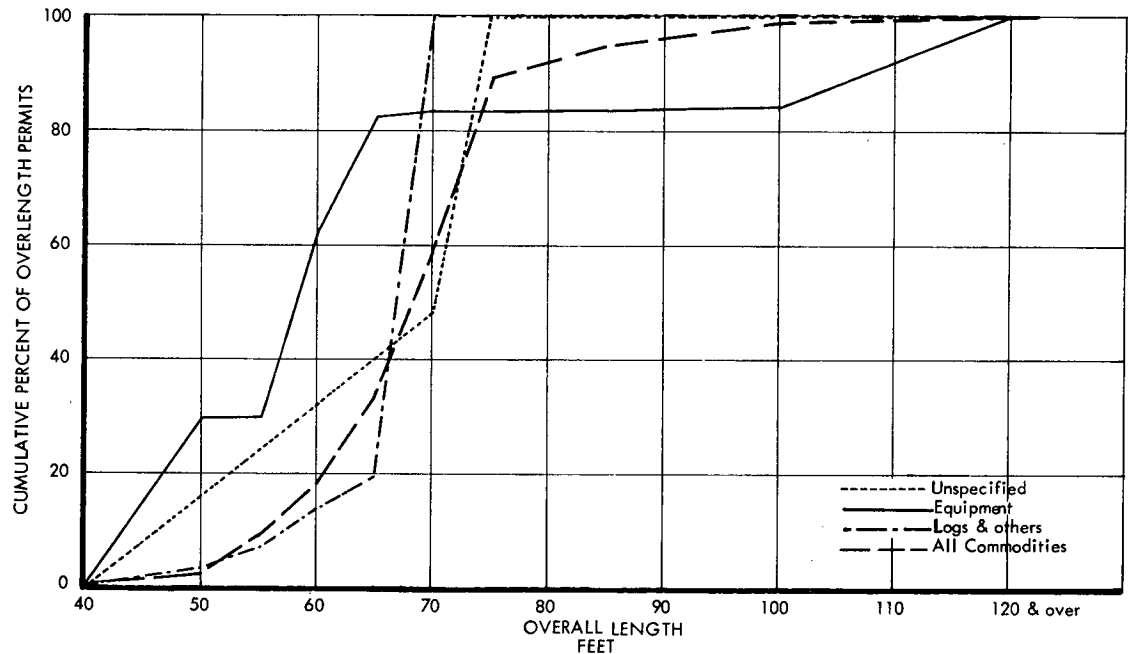


Figure 24. Cumulative distribution of overlength permits for forest products and equipment, remaining states.

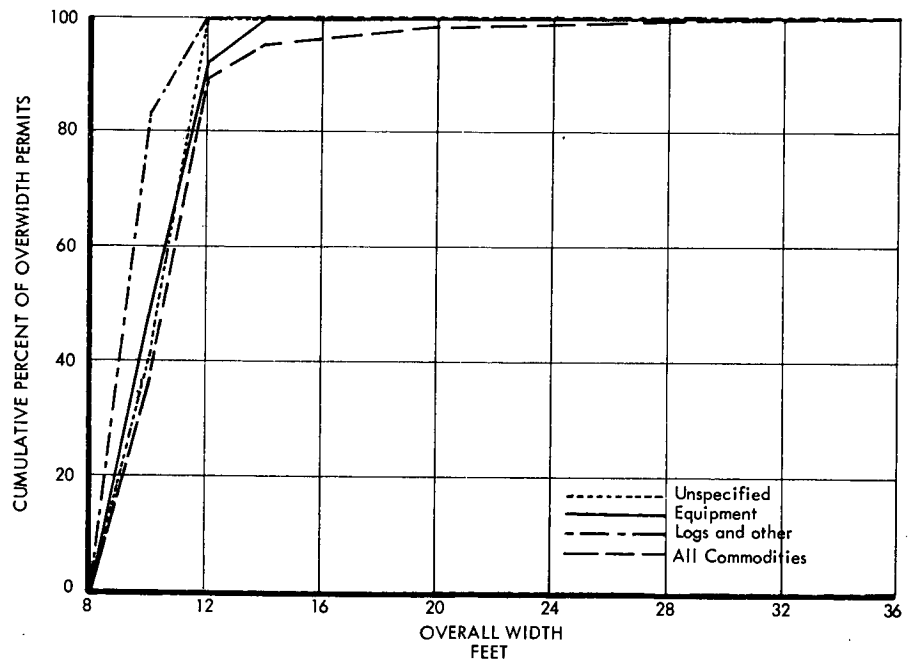


Figure 25. Cumulative distribution of overwidth permits for forest products and equipment, remaining states.

As to future trends, from all indications the consumption of lumber will continue gradually to increase from 37,000 million board-feet in 1962 to 42,400 million board-feet by 1980. The consumption of plywood and veneers will increase more rapidly from 6,776 million board-feet in 1962

to 12,500 million in 1980. Figure 27 indicates the expected trend of lumber, plywood, and veneer.¹⁸ As the consumption increases, the number of permit moves will also increase. On the basis of these trends, an annual increase in production averaging about 1.5 percent, the number of permits for oversize-overweight forestry movements in 1975 is estimated at 10,432 permits.

MARINE INDUSTRY

Three marine industry commodities were identified in the national permit sample. Of a total of 42,025 marine commodity permit moves, 2,056 were for machinery, 37,741 were for boats, and 2,228 were unspecified. Marine moves accounted for 1.95 percent of the total number of oversize-overweight permit moves and tended largely to be in the oversize category. New Jersey issued the largest number of marine permits, with Maryland being second.

The National Association of Engine and Boat Manufacturers feels that the market will be requesting larger boats in the future. At present the tight money situation has affected the sale of larger boats. A projection for larger boats (Fig. 28) has been developed through use of Coast Guard figures for registered boats.¹⁹ Class two and three of the Coast Guard summaries (for boats 26 ft to less than 40 ft, and boats 40 ft to less than 65 ft) were used in making this projection. Although there appears to be an increasing number of boats in these categories, it will be

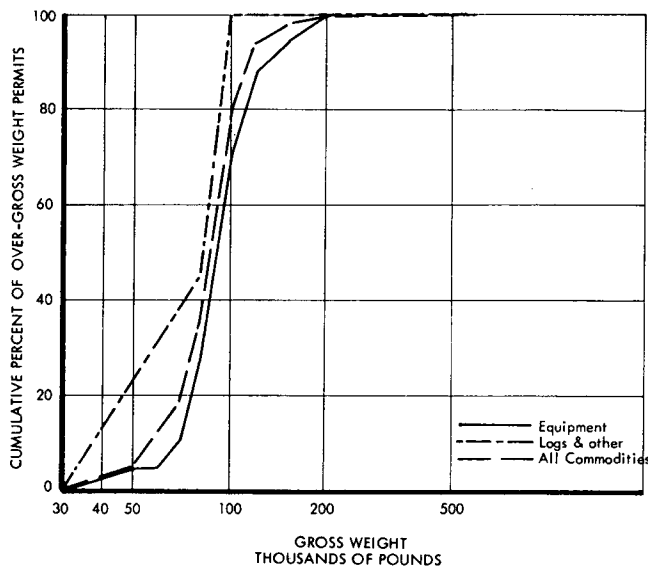


Figure 26. Cumulative distribution of over-gross weight permits for forest products and equipment, remaining states.

¹⁸ U. S. Department of Agriculture, *Timber Trends in the U. S.*, Forest Resource Report No. 17.

¹⁹ *Recreational Boating in the U. S.*, U. S. Coast Guard Annual Reports, 1961, '62, '63, '65.

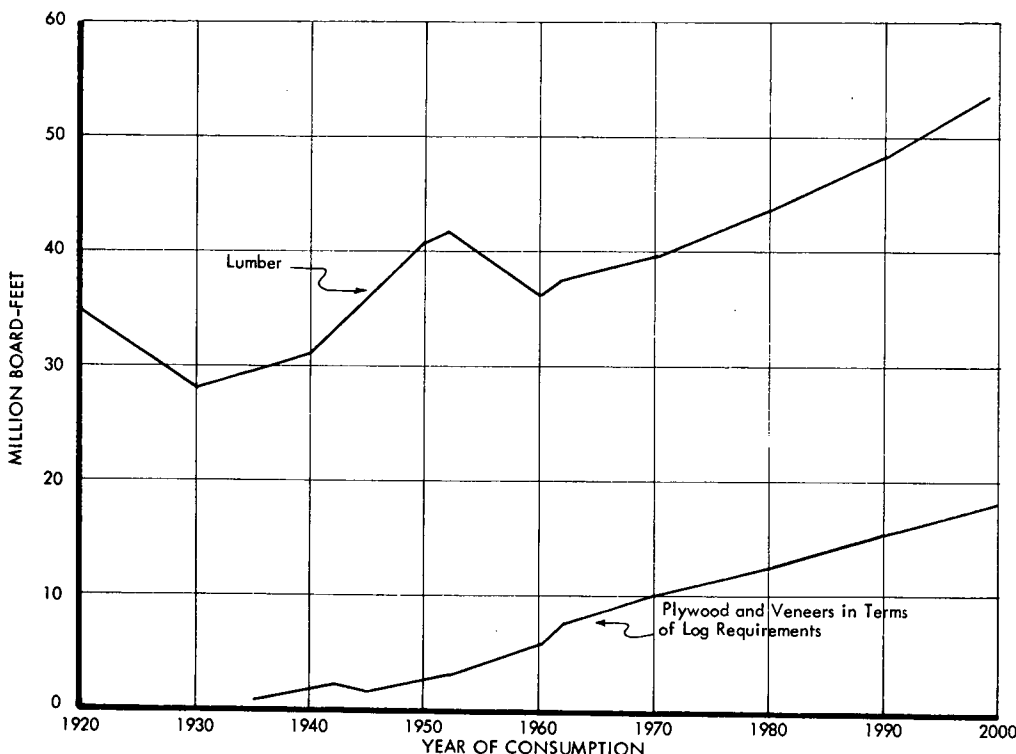


Figure 27. Trends in forest products.

gradual over the years. It can be assumed that the number of permits needed to move these boats will also increase gradually. On this basis, it is estimated that there will be 43,874 permits for marine industry moves in 1975. The cumulative distributions of current overdimension moves for the marine industry are shown in Figures 29, 30, and 31.

No examples of problems with regard to marine moves were encountered. Michigan allows an exception to legal limits for transporting motor boats—an additional 1 ft of height before a permit is necessary. None of the states indicated that overdimension moves involving boats or marine equipment offered any difficulties in issuing the

permit or in routing the load. Interested people were contacted in the boating industry itself regarding marine permit moves; their response did not indicate that any difficulties have been encountered.

MILITARY

Based on the national permit sample, it is estimated that 16,513 permits were issued for the movement of military commodities during 1966. This total is broken down in Table 42.

In general, these commodities tended to need permits

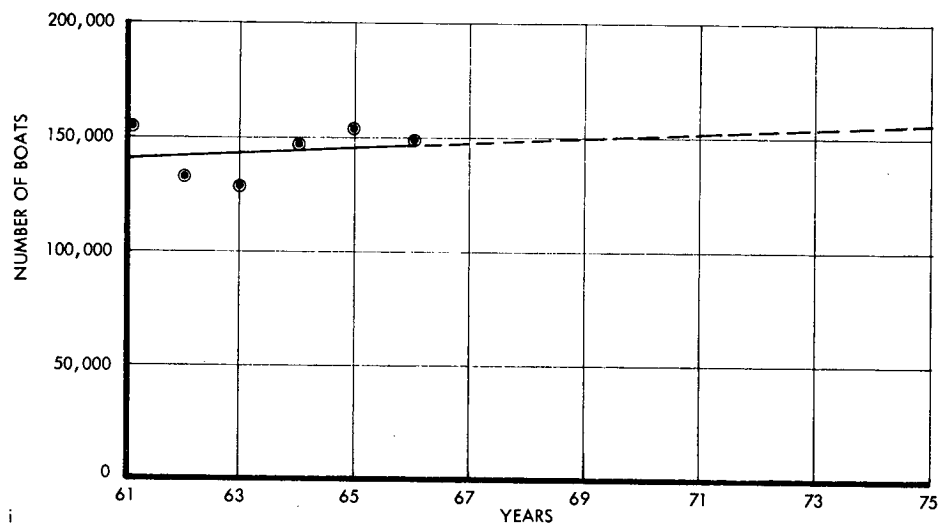


Figure 28. Projection of registered boats, 26 to 65 feet.

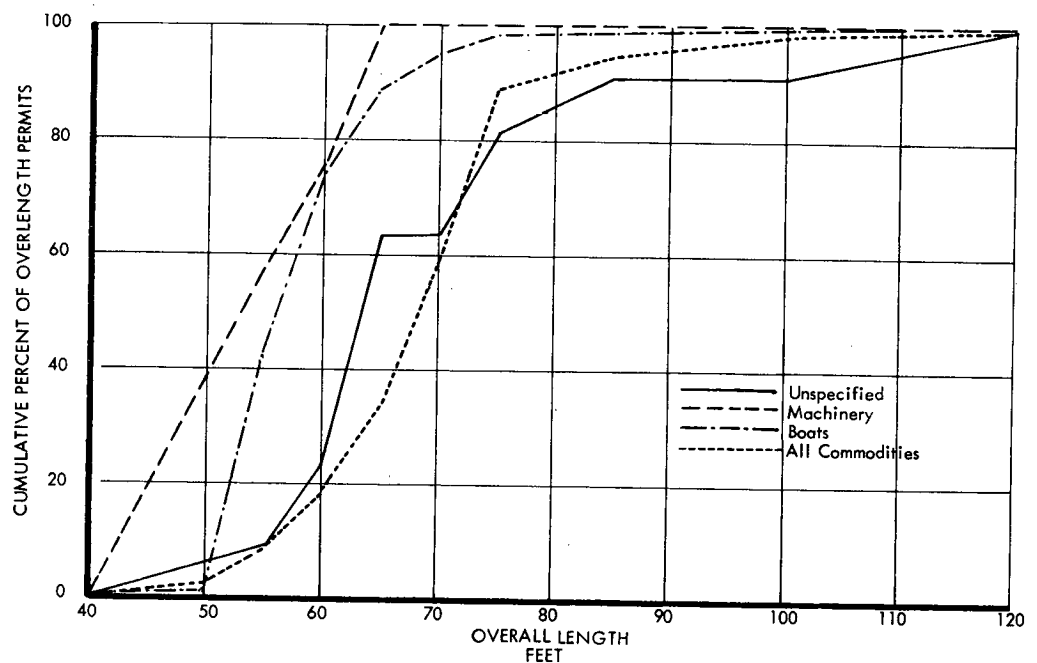


Figure 29. Cumulative distribution of overlength permits for marine industry.

because of overwidth. Missiles were indicated as being overlength on 64 percent of the permits. Aircraft parts tended to be overheight more than other commodities. In no case did gross overweight permits account for more than 28 percent of the total permit issuance for a military commodity.

The Military Traffic Management and Terminal Service (MTMTS) of the Department of the Army provided a 6-month (May 1 through October 31, 1967) sample of permit movements made by or for the Army, Navy, and Air Force. Each Continental Army Group, through its traffic management office, logged all movements. The data

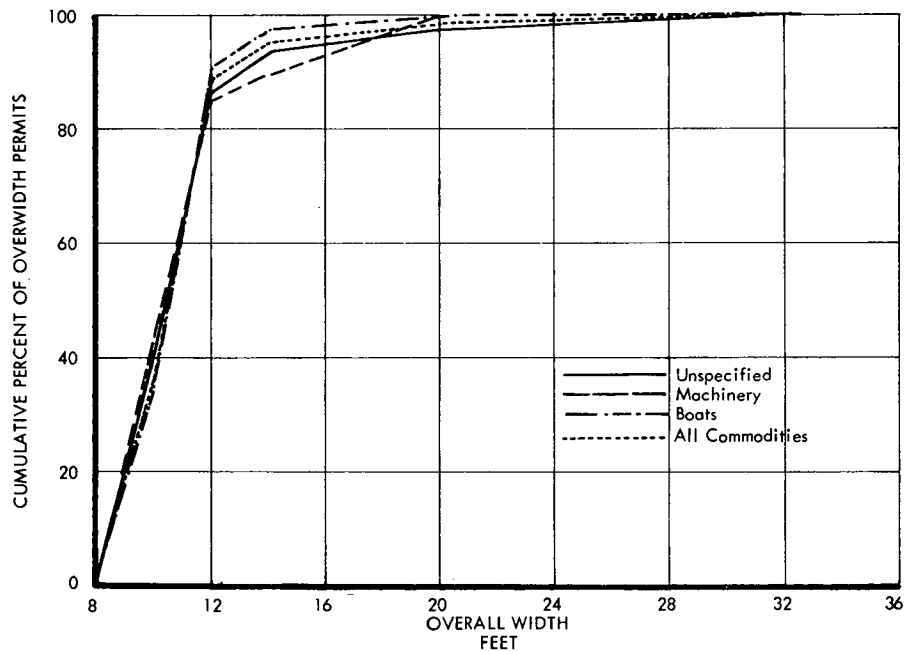


Figure 30. Cumulative distribution of overwidth permits for marine industry.

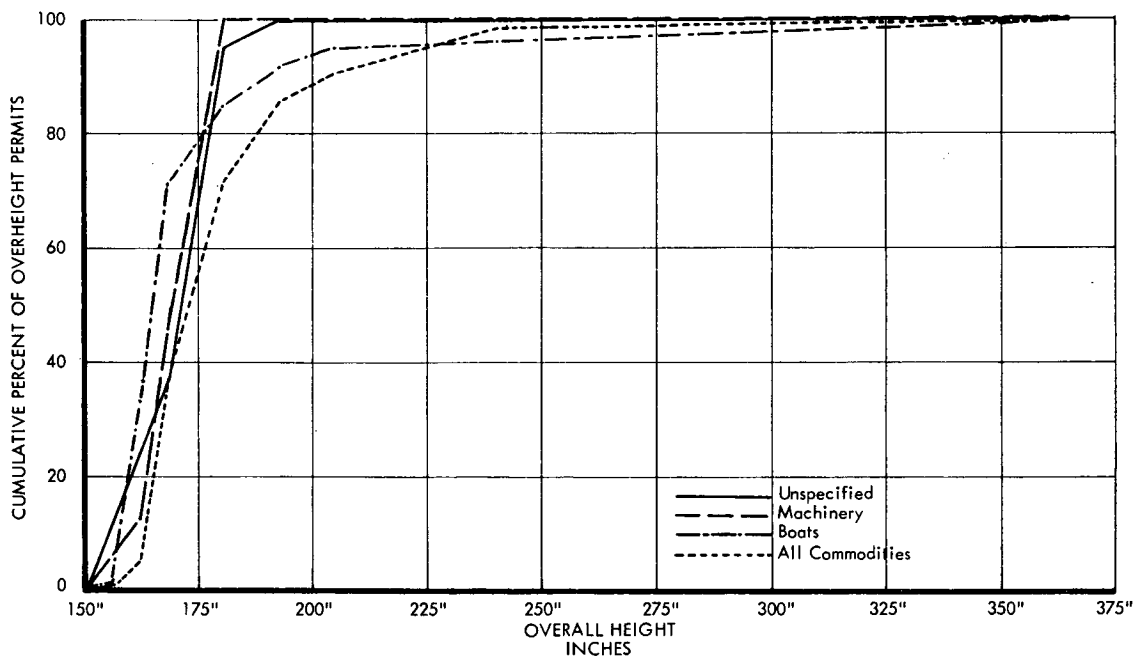


Figure 31. Cumulative distribution of overheight permits for marine industry.

were broken down by Army, Navy, Air Force, commercial-certified, and commercial-noncertified. The certification referred to is that given by the military to the state that the movement in question is for defense purposes. The total sample consisted of 3,327 trips—not permits. The breakdown by hauler is given in Table 44.

The sample of noncertified commercial trips is incomplete. Trips logged represent only those movements that originated in the Central and Eastern States. On the basis of the ratio of trips-to-permits, the total noncertified commercial moves during the 6-month period is estimated to be 1,251. Therefore, the total estimated number of trips of military commodities for the six-month period is 3,723. These trips probably account for 9,136 permits for the same time period, or 16,486 permits during a one-year period, based on the annual distribution given in Chapter Two. This estimated number of military commodity permits is within 27 permits of the national permit sample estimate.

Of the military commodity trips, 63.12 percent were performed by the Armed Forces. Noncertified commercial moves accounted for 33.60 percent of all military commodity moves. Thirteen commodity classes were identified in the sample. Table 45 gives the number of trips logged by commodity. Table 46 gives the number and percent of these moves that were in excess of dimension and weight limits. This table demonstrates that overwidth is by far the major over-limit requirement of the military with regard to numbers of moves. However, 2,292 (74.0 percent) of the overwidths were 10 ft or less.

Although the military sample does not indicate large numbers of overheight movements, these have created some vertical clearance problems in the past. Of the total permit movements, 817 (25.56 percent) exceeded 12 ft 6 in. in height; of these, only 22 (2.69 percent) were in excess of 16 ft. The national summary, with 2.01 percent, is in agreement with this value. Table 47 presents the vehicle mileage and average trip length by hauler.

The average trip lengths for the individual haulers indicate significant characteristics. Over-limit movements by the Navy and Air Force are local and short. Long interstate moves are made by commercial haulers. One-half of the Army vehicle moves are interstate.

The military equipment movements recorded by the H-SCC tended to be long hauls, with 90 percent being in excess of 250 miles in length and 37.8 percent being in excess of 2,000 miles in length. This further indicates that most of the long-distance hauls of military commodities are performed by commercial haulers. The commercial haulers' portion of the military sample bears this out. Figure 32 shows the trip-length distributions for the individual haulers.

The seven states with the most military intrastate trips were California, Virginia, Georgia, Nevada, Missouri, Pennsylvania, and Alabama.

The origin-destination characteristics of interstate trips are shown in Figures 33 and 34. Figure 33 shows the relative number of trip ends—trip commencements and completions—for each state. In order of decreasing magnitude, the five leading states are Virginia, Pennsylvania, New York, Georgia, and California. Incomplete reporting of the non-certified trips probably results in lower numbers in

states to the west of the Rocky Mountains. The interchange between regions is shown in Figure 34.

Table 11 summarizes the number of permits issued in each state by commodity from the national survey and affirms the finding from the military sample that the issuance of permits for military equipment and missiles varies widely between states.

TABLE 42
PERMITS ISSUED FOR MILITARY COMMODITIES

COMMODITY ^a	PERMITS ISSUED (NO.)			TOTAL
	SINGLE-TRIP	MULTIPLE-TRIP	UNKNOWN	
Military, general	562	177	59	798
Military equipment	7,195	1,244	92	8,531
Missiles	1,134	188	44	1,366
Missile or rocket components	1,597	281	0	1,878
Aircraft parts	3,584	331	25	3,940
All	14,072	2,221	220	16,513

^a Table 43 gives the distribution of the over-limit characteristics.

TABLE 43
MILITARY COMMODITY PERMITS,
BY OVER-LIMIT GROUP

COMMODITY	PERCENTAGE OF PERMITS ISSUED			
	OVER-LENGTH	OVER-WIDTH	OVER-HEIGHT	OVER-GROSS WEIGHT
Military, general	19.92	71.30	13.28	0.50
Military equipment	16.35	94.49	9.91	27.96
Missiles	63.69	75.84	14.86	26.94
Missile or rocket components	39.46	93.82	10.17	14.43
Aircraft parts	21.33	78.96	31.19	3.38

TABLE 44
NUMBER OF MILITARY SAMPLE TRIPS, BY HAULER

HAULER	NO. OF TRIPS	NO. OF PERMITS
Army	1,135	1,899
Navy	478	279
Air Force	737	774
Commercial:		
Certified	122	434
Noncertified ^a	855	3,929
All	3,327	7,315

^a Data from Central and Eastern states only.

TABLE 45

NUMBER OF MILITARY SAMPLE TRIPS,
BY COMMODITY

COMMODITY	NO. OF TRIPS	PERCENT OF SAMPLE
Military equipment	1,526	45.88
Military, general	690	20.75
Boats	126	3.79
Empty trailers ^a	414	12.44
Missiles	386	11.58
Other 8 commodities	185	5.56
All	3,327	100.00

^a The majority are overdimension missile transporters.

TABLE 46

NUMBER OF OVER-LIMIT TRIPS
IN THE MILITARY SAMPLE

OVER-LIMIT	NO. OF TRIPS	% OF TRIPS
Gross weight, over 70,000 lb	522	15.69
Overlength, exceeding 55 ft	899	27.02
Overwidth, exceeding 8 ft	3,098	93.06
Overheight, exceeding 12½ ft	817	24.56

TABLE 47

AVERAGE TRIP LENGTHS FOR MILITARY TRIP SAMPLE

MOVED BY	NO. OF TRIPS	TOTAL VEHICLE TRAVEL (MI)	AVG. TRIP LENGTH (MI)	DISTRIBUTION (%)	
				INTRA-STATE	INTER-STATE
Army vehicle	1,135	289,500	255.07	48.46	51.54
Navy vehicle	478	22,955	48.02	94.98	5.02
Air Force vehicle	737	47,433	64.36	95.12	4.88
Commercial vehicle:					
Certified	122	100,983	827.73	50.82	49.18
Noncertified ^a	1,251	1,036,942	828.89	8.07	91.93
All	3,723	1,497,812	402.31	50.17	49.83

^a Projected estimate for all noncertified commercial trips.

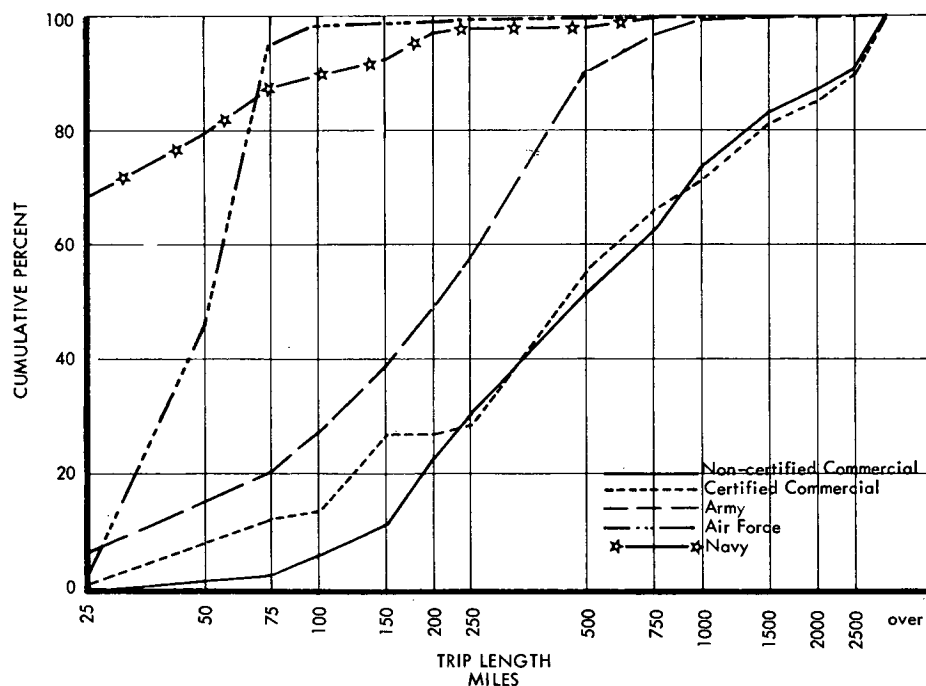


Figure 32. Trip length distributions for MTMTS sample.

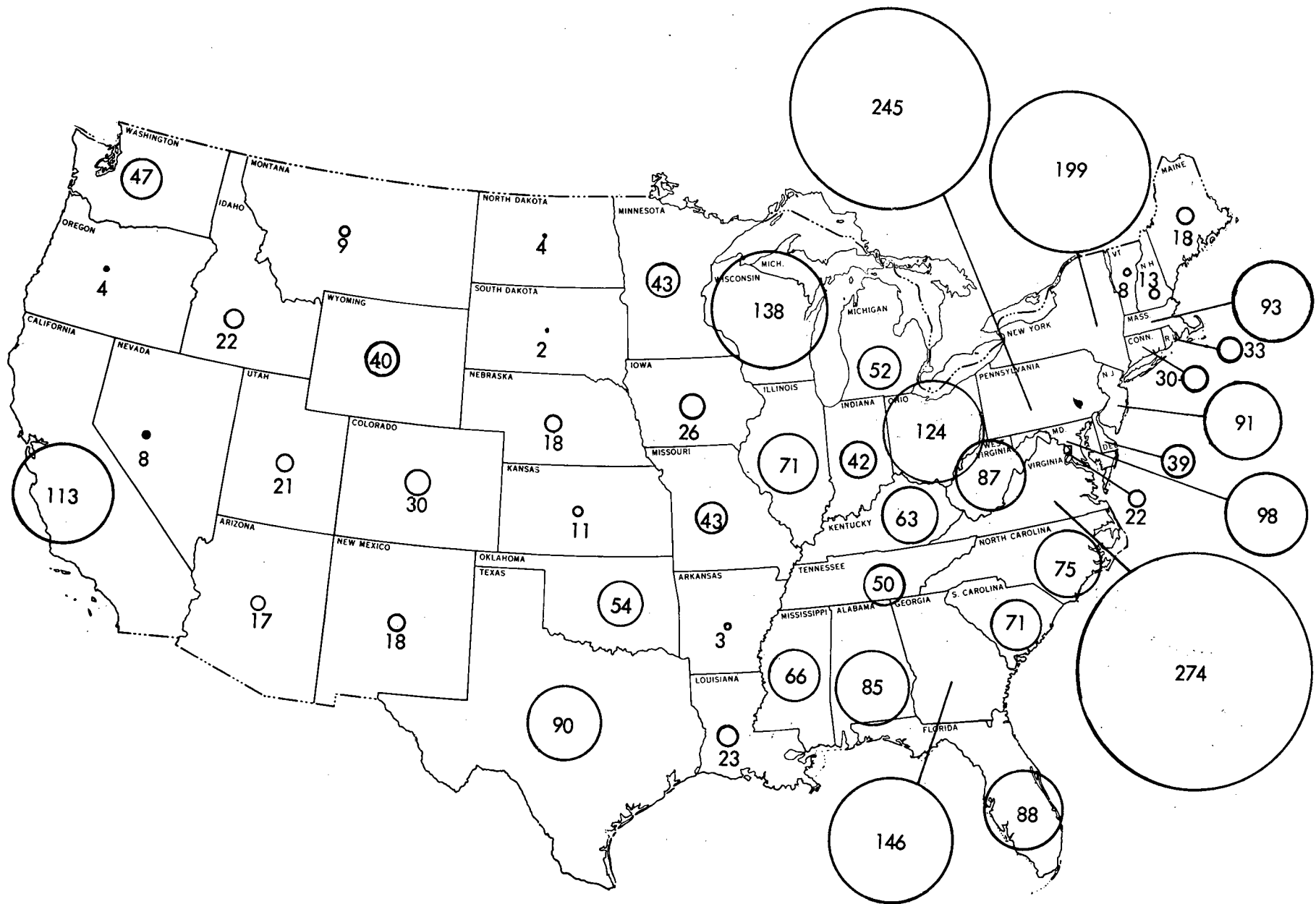


Figure 33. Interstate trip ends of military movements under permit, by state.

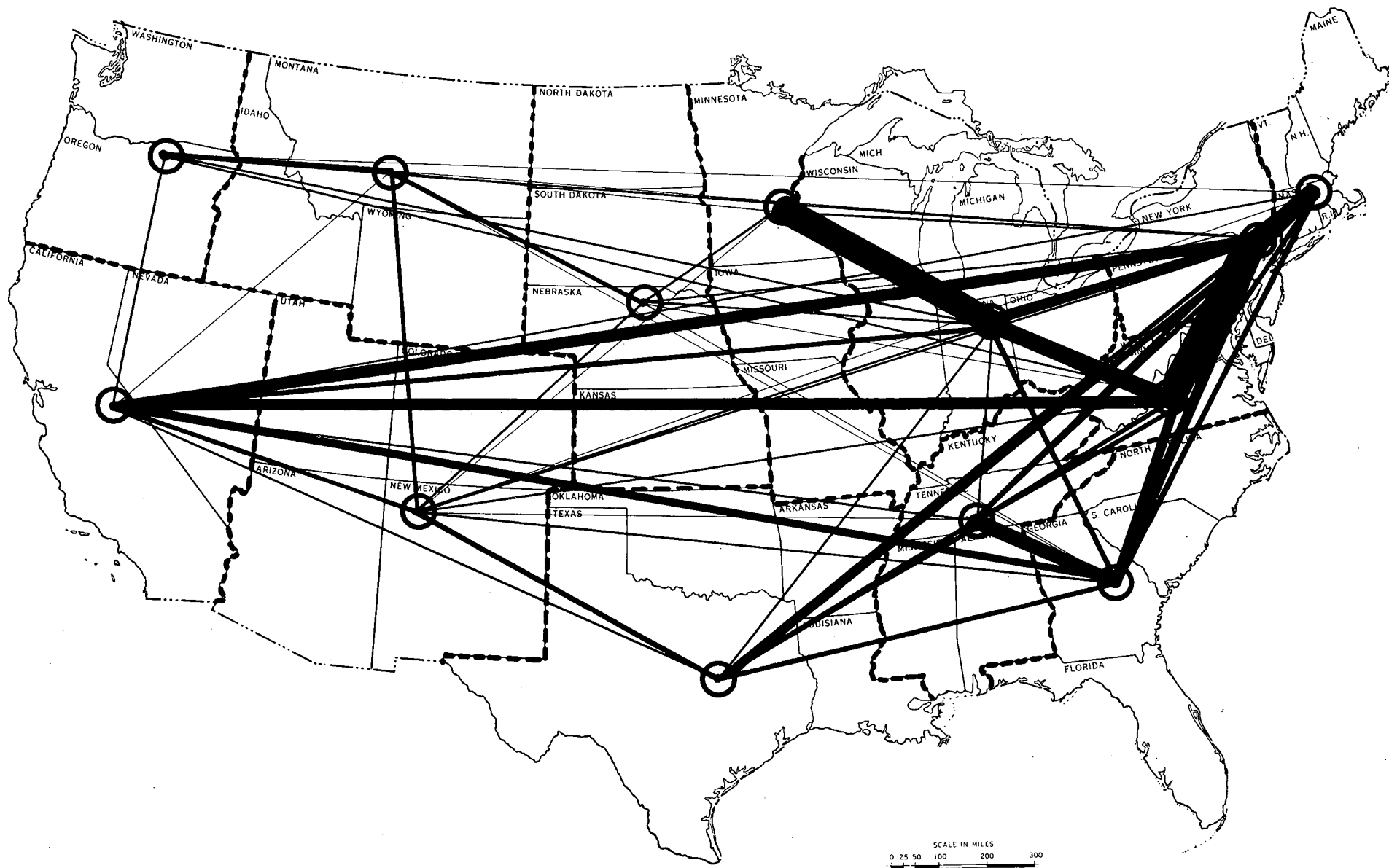


Figure 34. Desire lines for military movements under permit.

The national permit sample indicates that as a percentage of state issuances, permits for military equipment varied from none in six states to 1.62 percent in the District of Columbia. No permits were issued for missiles in 31 states and the District of Columbia. Except for Florida, North Carolina, Virginia, and Pennsylvania, states issuing permits for missiles were located west of the Mississippi River. The numbers of missile movements in individual states undoubtedly are influenced by the location of established missile hauling routes.

Three states (Alabama, Indiana, Kentucky) grant military vehicles unlimited exceptions to all legal limits. Two other states (Illinois, North Dakota) grant unlimited exceptions in the case of some legal limits. Despite exceptions, a significant number of military movements in Alabama were made under permit. In addition to legislated exceptions, at least one state (New York) has a working agreement with the military whereby verbal approval is given in lieu of a written permit. Many states do not require a permit fee for the movement of government-owned vehicles. None of these exceptions is applicable to private commercial haulers, even though their cargo may be a military consignment.

The future need to move oversize-overweight military commodities over the highways surely will not diminish. To estimate the degree of increase poses a problem in selecting a base for projection. Any method must be considered arbitrary in light of the unpredictable nature of events affecting the level of military activity. As an example, permit issuance for missiles was particularly high during the period 1962 to 1965 because of the construction of missile bases and installation of missiles.

However, the issuance of permits for military commodities has been projected to 1975 on the basis of straightline projection of expenditures for national defense during 1955-1965.

The issuance of permits for the movement of two commodities—general military and military equipment—is projected to be 17,134; that is, an increase of 83.66 percent over the issuance of 9,329 for 1966 given in Table 42. The projection of permits for missiles, missile or rocket parts, and aircraft parts is made under "Aerospace Industry."

Regarding the potential value to national defense of having 16-ft vertical clearances on the Federal-Aid Primary System and modifying bridges on certain routes to provide a 27,000-mile network of connected 16-ft vertical clearance interstate routes, the Department of Defense has expressed its views as summarized in the following:

1. The highway system is a subsystem in the total national transportation system and as such should provide a maximum of interchange capability with other transportation modes. The effective vertical clearances of the other modes, air and rail, are or will soon be 16 ft and 23 ft, respectively.

2. Although present traffic in overheight military commodities is light in numbers, the national emergency needs for movement of such commodities could be particularly important. It has been pointed out that a total emergency would require the ability to move essential industrial equipment as well as military equipment in order to effect "mili-

tary and industrial dispersal, logistical support of the Armed Forces, and to serve the potentialities of mobile defense."²⁰

In consideration of this representation by the military authorities, it perhaps is pertinent to note that the needs of the national defense played a significant part in providing justification for the National System of Interstate and Defense Highways. The Department of Defense figured prominently in the selection of locations. In 1959, the American Association of State Highway Officials joined the Defense Department in calling for increased vertical clearances from 14 ft to 16 ft, but before this change was effected some 2,600 structures were built with less than 16-ft vertical clearance.

It is possible that, in the future, concepts of mobility will be extended to intercontinental ballistic missiles, thus increasing the number of oversize military movements. In that event, the question is raised whether or not it is in the public interest to have such movements made part of public permit records. Accordingly, it is possible that special multiple-trip permit arrangements would need to be made with all states.

MINING INDUSTRY

With the exception of the oil-field sector, the mining industry is not a major user of oversize-overweight permits. Because of general differences in the type of mining, concentrations of the industry, and special sampling for this study, the oil and gas industry is treated under a separate heading.

Otherwise, the state inventories indicate that an estimated 5,298 permits for mining equipment were issued by 28 states; 1,989 permits for mining products, by 11 states; and 584 unspecified mining permits, basically by the same states. In Virginia, the state issuing the largest number of mining permits in 1966, these accounted for only 4.4 percent of its total state permit issuance. Factors accounting for the small percentage of permits identified with the mining industry were (a) nature of equipment and (b) single-location nature of operations.

Because much of the equipment is similar to that used in other industries (such as construction), it was not always possible to identify equipment as related to mining. Because of the single-location-type of operation, the majority of this equipment moves once over state highways and seldom again until the mine closes down.

Mine products generally do not move under a permit, because their loads are reducible to the legal limits. A few states have exceptions and allow special legal limits for coal-hauling vehicles. For example, in Virginia a gross weight of 50,000 lb may be carried on three axles, or 36,000 lb on two axles; single-axle weights are not permitted to exceed 40,000 lb. Moves are allowed between mines or other places of production, preparation plants, loading docks, or railroads, for a distance not exceeding 25 miles. The majority of states do not permit exceptions and require loads to be reduced.

²⁰ From a letter dated July 18, 1967 from Major General John J. Lane, to F. C. Turner, Director, Bureau of Public Roads.

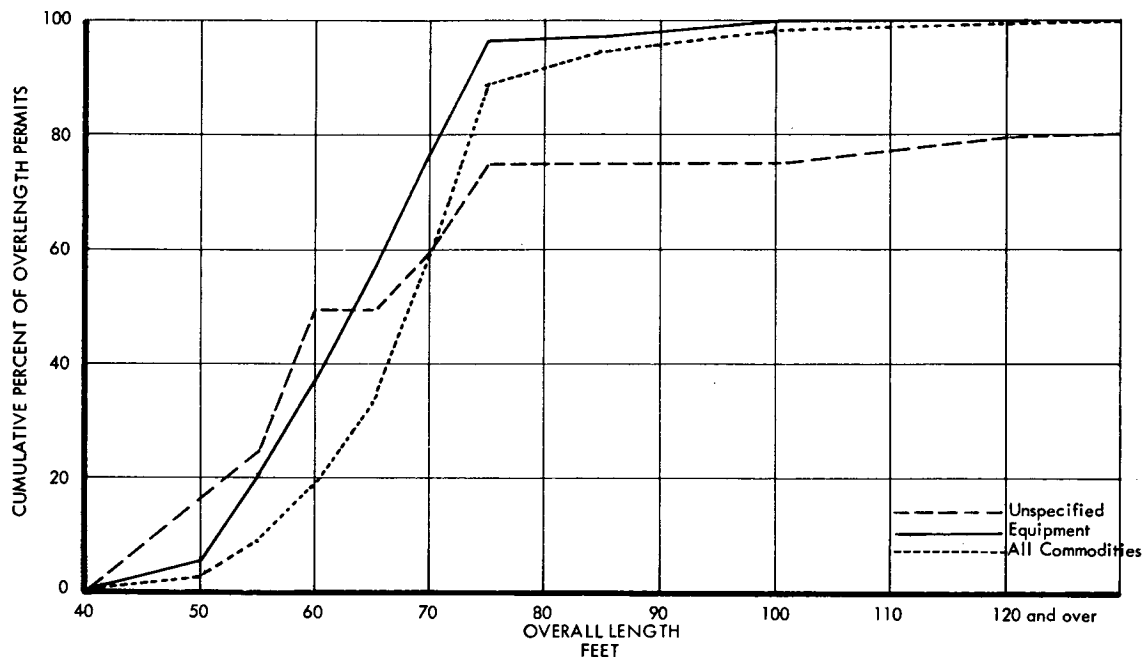


Figure 35. Cumulative distribution of overlength permits for mining industry.

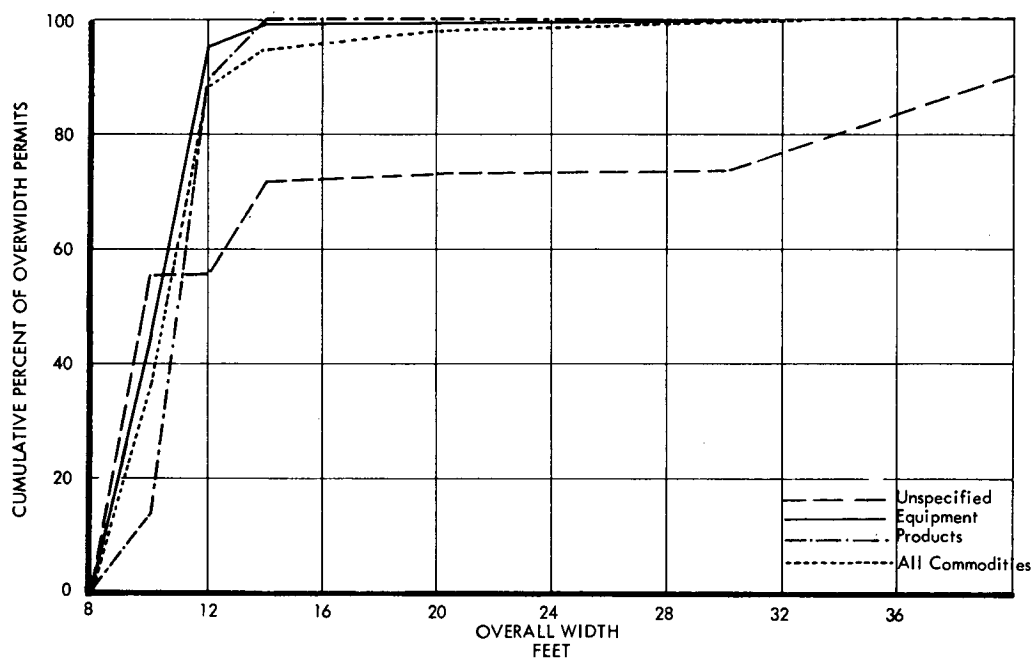


Figure 36. Cumulative distribution of overwidth permits for mining industry.

Figures 35, 36, 37, and 38 show the cumulative distributions of overdimensions and overweight for mining industry (other than oil-field) permits.

Although there is little over-the-road travel of mining equipment, the moves that are made are very important to

the industry. The heaviest move of the sample occurred in Missouri and involved a strip-mining shovel weighing more than 500 tons. This equipment was moved across the highway by building up the roadbed and side slopes with more than 5 ft of fill.

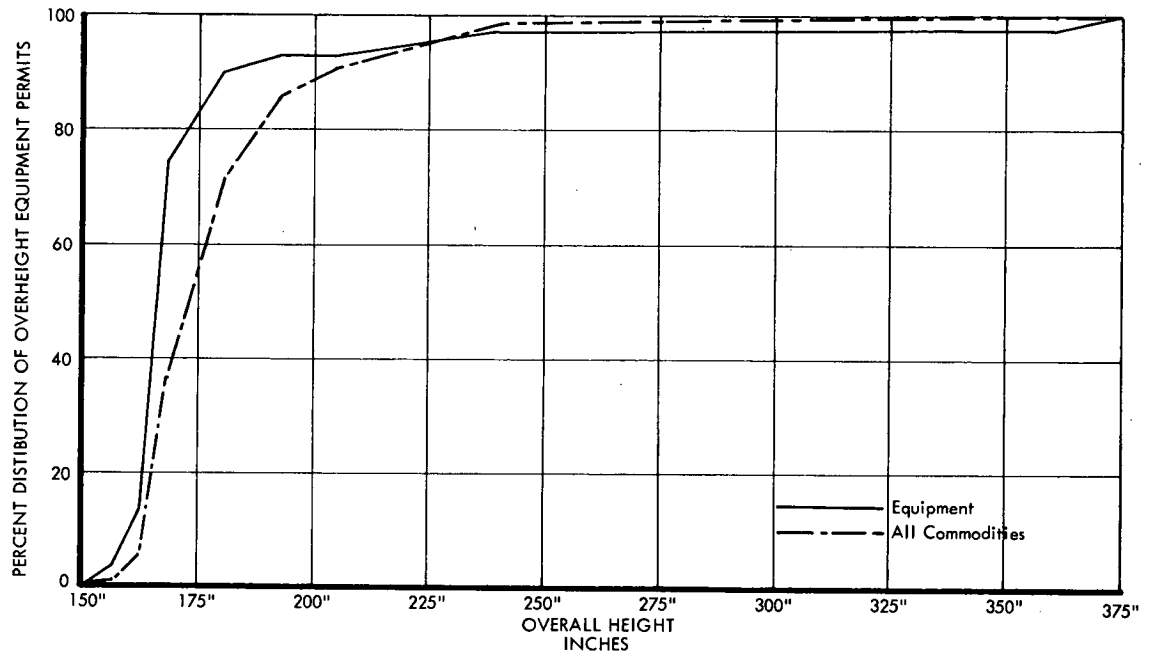


Figure 37. Cumulative distribution of overheight permits for mining industry.

To estimate the number of permit moves in 1975, two different trends were applied. When the number of mines is projected to estimate future permit moves, this figure drops to 3,520 in 1975. Nevertheless, even though the number of mines and the people employed in mining is decreasing, production is increasing. Consequently, when mine production²¹ figures are used as a projection basis, it is estimated that there will be 5,661 permit moves for mining in 1975. With the increased productivity it is difficult to conceive of a decline in permit moves, regardless of the decreasing number of mines. As a result, it is estimated that permit moves for mining will continue at the present level.

MOBILE HOME INDUSTRY

In 1966, 625,700 permits, including 586,900 single-trip and 33,827 multiple-trip permits, were issued for mobile homes and offices. Approximately 96 percent of these moves were for overwidth, including 38.04 percent for 10-ft units and 56.3 percent for 12-ft units.

The mobile home industry has enjoyed continued advancement in sales for the past ten years. This success has had its impact on oversize-overweight permit issuance throughout the states. Permit agencies have adopted new regulations to meet the growing number of permit applications and the increased size of the mobile home.

In 1956, 91 percent of all mobile homes shipped were 8 ft wide. By 1958, 10-ft units accounted for 69 percent of the shipments. Shipments of 8-ft units have steadily declined, and now only amount to 0.5 percent of total ship-

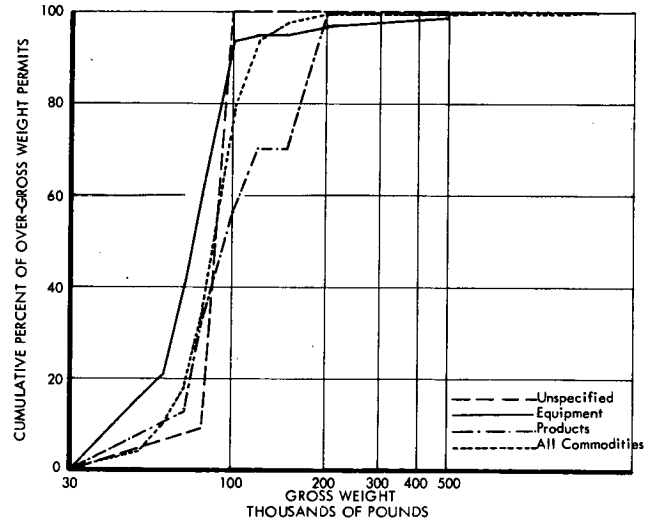


Figure 38. Cumulative distribution of over-gross weight permits for mining industry.

ments. 1962 saw the advent of both 12-ft-wide mobile homes and expandables and double-wide homes. Twelve-foot units have increased to the point where their shipments now exceed those of 10-ft units. With the rapid rise of the 12-ft units, the expandables and double-wides have decreased.²²

²¹ Statistical Abstract of the United States, Sec. 27, 1967 Federal Reserve Board Production Indexes.

²² 16th Annual Industry Review, Mobile Home Manufacturers Association.

The industry optimistically has estimated that 400,000 units a year will be sold by the early 1970's. Figure 39 shows trends in this industry. Much of the basis for the prediction is the increasing number of retirees; as the years go by, this group probably will be improving its economic status. The industry is also intensifying its efforts to attract a broader segment of the housing market from other age groups.

Two factors contributed to the apparent leveling off of sales in 1966. The young household market is affected by the Vietnam war and the tight money situation which developed during the fourth quarter. The industry is confident that 1967 sales will be no less than 1966 and expects a 5 percent increase. Rising apartment rents are expected to put the mobile homes in a more attractive position.

Mobile home moves are of three basic types: (1) manufacturer-to-dealer, (2) dealer-to-buyer, and (3) home relocation. Figure 40 shows the marketing area of one Indiana mobile home manufacturer. The 968 trips represented ac-

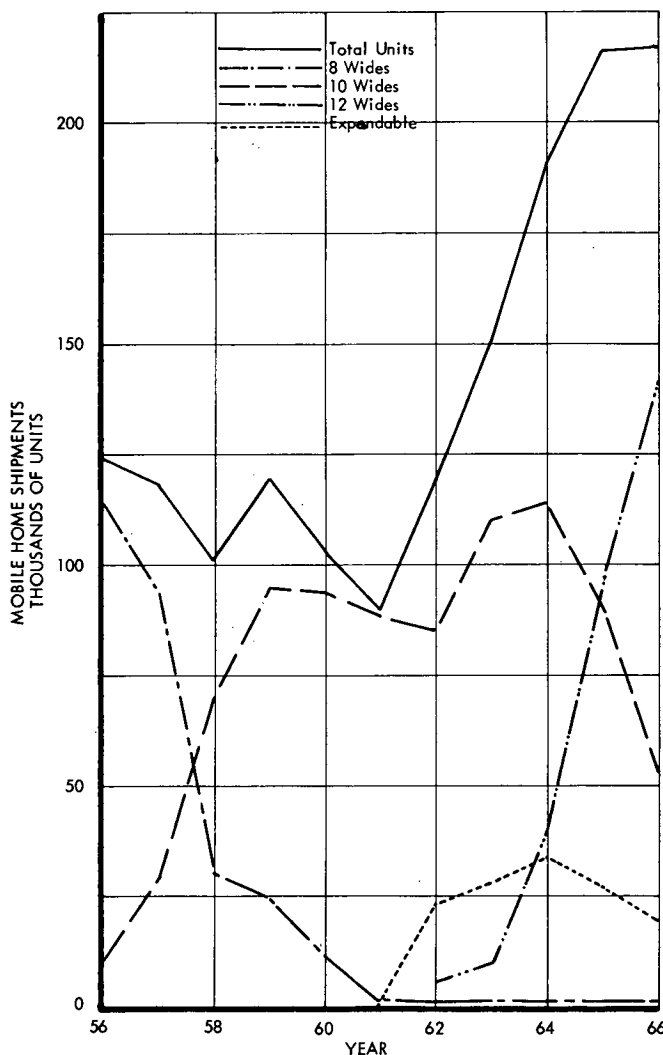


Figure 39. Trends in the mobile home industry.

counted for 280,708 vehicle-miles, averaging 290 miles per trip.

Figure 41 shows the number of units manufactured in and shipped to each state. This figure demonstrates the need of the industry for interstate permit moves.

Manufacturers' shipments in 1966 numbered 217,300, of which 24.6 percent and 65.3 percent were for 10-ft and 12-ft units, respectively. More than 212,800 of these shipments had to be moved under permits. These consisted of 53,500 10-ft units, 141,900 12-ft units, and 17,400 expandables over 8 ft in width.

Dealer-to-owner moves under permit probably numbered 212,800 plus the number of used mobile homes sold. Although the total number of trips is not known, it can be estimated that the manufacturer-to-dealer and dealer-to-buyer moves accounted for at least 425,600 trips in 1966.

Dealer-to-owner moves generally are local moves. Interstate relocations ordinarily occur within the same region of the country. One possible exception is the relocation of military personnel. Moving a 10-ft-wide mobile home from coast to coast costs a minimum of \$1,500, or 30 percent of the cost of a lower-priced mobile home.

Predicting permit issuance for mobile homes in 1975 is difficult because of the fluctuations in the mobile home industry's growth and the changes in its product line. For this reason, industry estimates are reported herein.

Based on the industry's prediction of 400,000 units by 1970,²³ it may be estimated that, with similar growth between 1970 and 1975, the number will grow to 736,000 units. This suggests a 339 percent increase in mobile home and office permits between now and 1975, amounting to 2,121,000 permits in 1975. Assuming a more conservative growth rate of 5 percent per year, the permit issuance for 1975 is estimated at 970,664.

At present only one state allows 12-ft-wide mobile homes to move without a permit. Six other states let 8 ft 4 in. and 8 ft 6 in. units travel without permit. The remaining states require permits for any move over 8 ft wide. Generally, multiple-trip permits can be obtained to move 10-ft or narrower mobile homes.

If the mobile home industry expands at its anticipated rate, it is assumed that either permit regulations will have to be revised to allow multiple-trip permits for 12-ft mobile homes or permit office staffs will need to be significantly increased to handle the projected permit load.

OIL AND GAS INDUSTRY

Several sectors of the oil and gas industry are heavily reliant on oversize-overweight permits for the necessary movement of related commodities. In the permit sample, the commodities associated with each sector are as follows:

1. Exploration—construction equipment, oil-well equipment, pipes.
2. Storage—pipes, tanks.
3. Transmission—construction equipment, pipes, tanks.
4. Processing—industry, general; pipes; other, general; tanks, including vessels, etc.; machinery, general.

²³ 15th Annual Industry Review, Mobile Home Manufacturers Association.

All of these commodities except oil-well equipment can be associated with other industries. Therefore, except for oil-well equipment, pipes, and tanks and bins, the other commodities are not included in the analysis of the oil and gas industry.

Table 48 gives the estimated number and type of permits issued in each state for oil-well equipment. Twenty-two states and the District of Columbia issued no permits for oil-well equipment. The drilling activity for 1966 also is summarized in Table 48, including exploratory test drilling, development well drilling, core drills, service wells, and miscellaneous wells. Off-shore drillings are not included. As might be expected, the variation in number of permits per state corresponds roughly with the number of holes drilled per state.

In addition to the national permit sample, data were obtained on 4,327 trips made by members of the Oil Field Haulers Conference.

Figures 42, 43, 44, and 45 show the distributions of extra-legal sizes and gross weight for the commodities related to the oil and gas industry. Table 49 gives the percentage of permits for these commodities by type of over-limit.

Movements of oil-well equipment required permits because of all types of excesses. Pipes tended to be primarily overlength, whereas oversize tanks and bins tended toward overwidth and overheight.

During the first quarter of 1967 the oil and gas industry drilled 7,512 wells. This represents a drop in activity of 829 over the same quarter in 1966. This is indicative of the decline in new well completions from 37,881 in 1966 to 33,558 in 1967. A further decline to 31,571 is expected in 1968. Exploratory wells are expected to number 9,170

TABLE 48
ISSUANCE OF PERMITS
FOR OIL-WELL EQUIPMENT, BY STATE

STATE	PERMITS ISSUED			HOLES ^a DRILLED
	SINGLE- TRIP	MULTI- PLE- TRIP	TOTAL	
Arizona	56	—	56	17
Arkansas	368	—	368	520
California	577	253	830	2,286
Colorado	1,502	978	2,480	551
Florida	27	—	27	17
Georgia	125	—	125	1
Illinois	201	—	201	1,631
Indiana	102	349	451	695
Kansas	8,959	—	8,959	2,781
Louisiana	5,296	105	5,401	2,986
Michigan	8	—	8	419
Mississippi	2,237	—	2,237	836
Missouri	149	—	149	5
Montana	5	15	20	573
Nebraska	126	—	126	292
Nevada	2	—	2	0
New Mexico	518	699	1,217	1,262
North Dakota	655	—	655	185
Oklahoma	10,404	469	10,873	4,161
Oregon	68	—	68	0
Pennsylvania	244	—	244	741
South Dakota	24	—	24	14
Texas	50,454	3,630	54,084	11,203
Utah	123	40	163	144
West Virginia	201	—	201	1,119
Wyoming	5,733	—	5,733	971
Total	88,164	6,538	94,703	33,412

^a Source: American Petroleum Institute, *Quarterly Review of Drilling Statistics for the United States*, First Quarter, 1967, Second Quarter, 1967. Vol. 1, No. 1 (Aug. 1967).

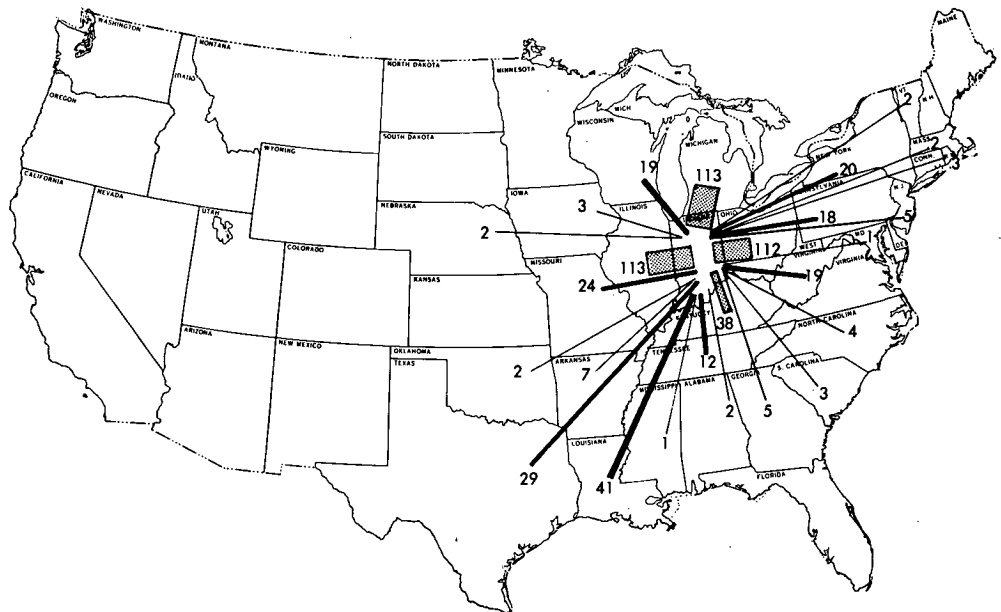


Figure 40. Typical market area of a mobile home manufacturer.

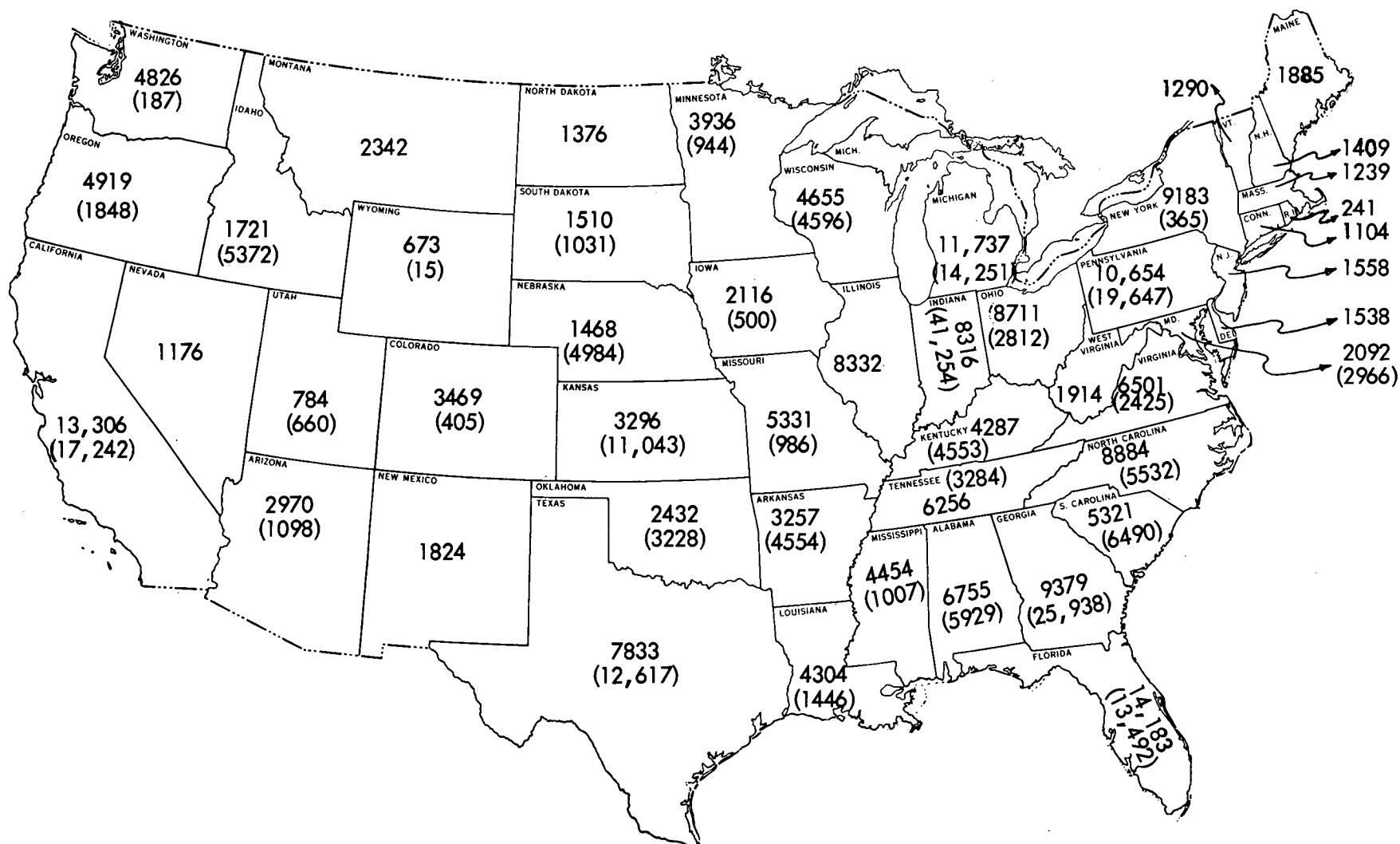


Figure 41. Mobile home production and shipments to dealers, 1966; total production, 222,771; total shipments to dealers, 217,300; difference between production and shipments due to direct sales and exports; production figures in parentheses.

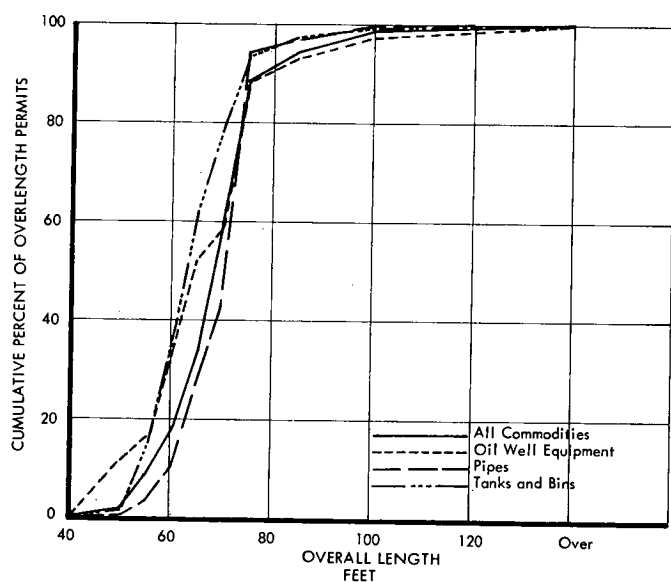


Figure 42. Cumulative distribution of overlength permits for commodities related to oil and gas industry.

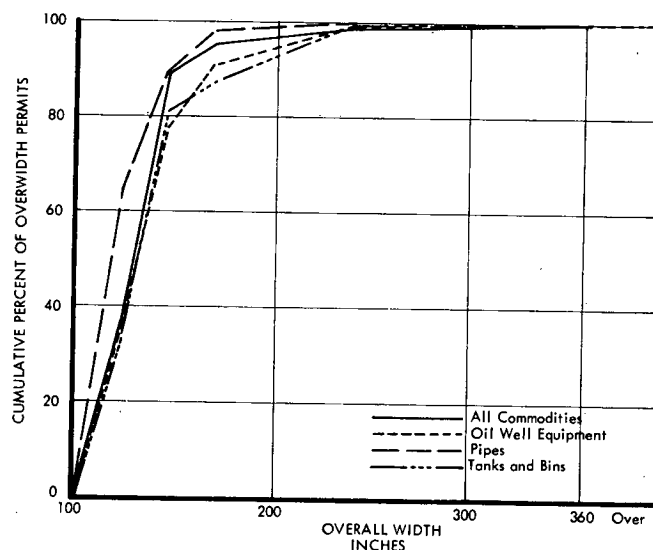


Figure 43. Cumulative distribution of overwidth permits for commodities related to oil and gas industry.

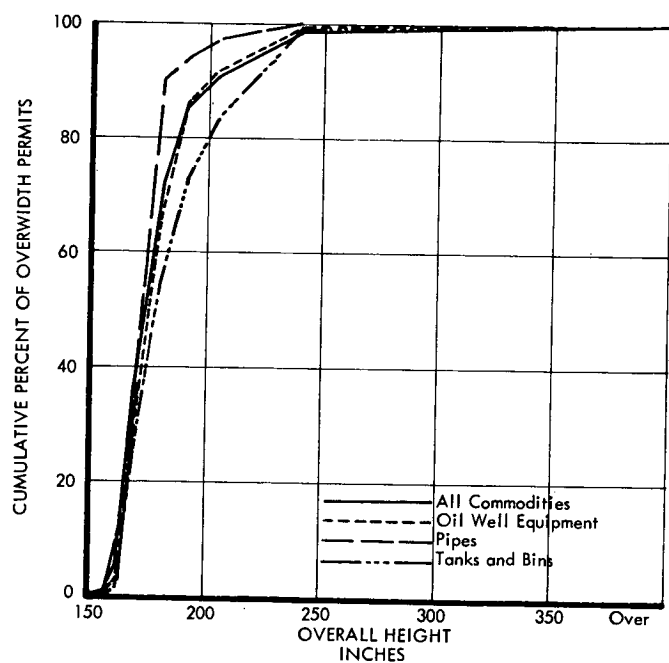


Figure 44. Cumulative distribution of overheight permits for commodities related to oil and gas industry.

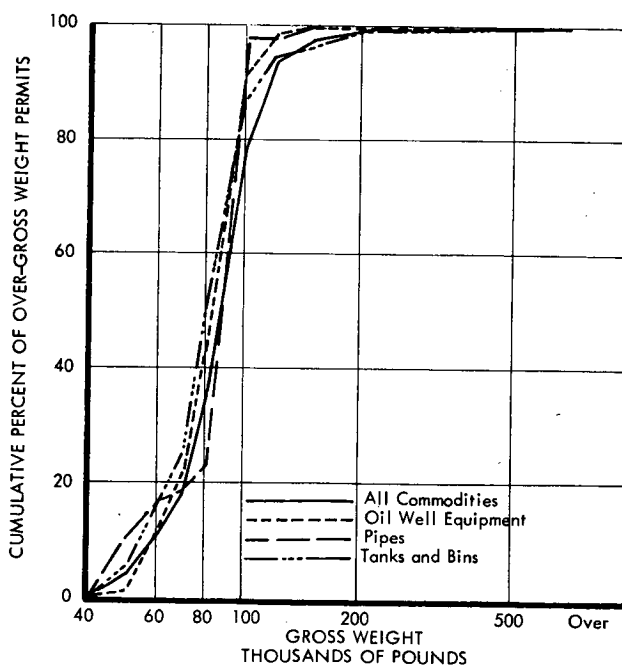


Figure 45. Cumulative distribution of over-gross weight permits for commodities related to oil and gas industry.

TABLE 49

OIL AND GAS INDUSTRY COMMODITY PERMITS, BY TYPE OF OVER-LIMIT

COMMODITY	PERCENTAGE OF TOTAL PERMITS			
	OVER-LENGTH	OVER-WIDTH	OVER-HEIGHT	OVER GROSS WEIGHT
Oil-well equip.	69.19	87.34	64.04	55.91
Pipes	82.46	20.16	3.41	4.62
Tanks and bins	31.43	92.27	59.38	8.16

in 1968. This is a rise of 284 over 1967, but does not recover the 14 percent loss over 1966.²⁴

Most significant to permit activity is the continuing decline in the average number of operating rotary rigs. Except in a few states where the general rate of activity is low, this trend is evident in all regions. The industry has made no forecasts beyond 1968. Extending the trend of the last ten years to the future, the average number of operating rotary rigs would number 44 by the year 1975. Assuming the activity in oil-field-related permit operations to be analogous to this trend, a 65.5 percent decrease in permits for these commodities over the 1966 level can be anticipated.

Using trends in other indicators such as exploratory well completions, total well completions, and total footage, or assuming the same analogy as previously, the decrease by 1975 over the 1966 number of permits would be 51.0, 48.5, and 31.9 percent, respectively.

Using this last and most conservative percentage decrease, the total number of permits issued in 1975 for oil-well equipment would be 64,492. In states like Texas and Oklahoma, a projected decline from 54,084 and 10,873 to 36,831 and 7,405, respectively, would have a substantial impact on permit operations, assuming that permit issuance for all other commodities remained stable.

Although activity in the exploratory and drilling sector of the gas and oil industry has been in decline, the opposite trend has been present in the rest of the industry. Refinery runs of crude oil have increased from 7,642,000 bbl per day in 1958 to 9,805,000 bbl per day in 1967. Inventories of refined products, natural-gas liquid, and crude stocks have increased from 788,796,000 bbl in 1958 to 926,300,000 bbl in 1967.²⁵

Production of natural-gas liquids and liquified refinery gases has increased from 40,546,000 bbl per day in 1958 to 71,631,000 bbl per day in 1967. The marketed production of natural gas increased over the same period from 30,222 million to 50,043 million cubic feet per day.²⁶

These trends indicate a steady increase in the need for commodities related to the storage, transmission, and processing of crude and refined gas and oil products.

The actual mileage of petroleum pipelines has not increased as rapidly as some of the foregoing trends. Between 1959 and 1966, total pipeline mileage, including crude and products trucklines and gathering lines, increased from 189,982 to 214,913.²⁷ This increase primarily has been in the mileage of products trunklines. The estimated mileage for 1968 is 221,382. The estimated mileage of natural-gas pipelines for 1968 is 856,700, and has been projected to be 1,077,300 by 1975.²⁸

By projecting the petroleum pipeline mileage to 1975 on the basis of the past trend and determining a combined trend for both pipeline systems, it is estimated that permits for overlength pipe will increase by 31.01 percent between 1966 and 1975; that is, from 33,085 to 43,344 permits.

Regarding the storage of gas and oil, it is assumed that the need for these facilities will vary with inventories. An extension to 1975 of the past trend in inventories indicates a potential increase in storage facilities to 15.09 percent. Assuming a similar relationship for the shipment of tanks, the level of permit issuance for tanks will rise from 101,672 in 1966 to 117,018 by 1975.

The Oil Field Haulers Conference (OFHC) special sample provided data concerning trip characteristics and size and weight characteristics of over-limit movements. Table 50 gives the distribution of these trips by commodity.

The general commodity category, machinery, accounted for the largest percentage of trips. It is suspected that this machinery is either oil-well equipment or construction equipment; the firm that logged these trips was not specific. However, Table 50 does demonstrate that the members of the OFHC do not wholly specialize in oil-well equipment.

The vehicle mileage for the sample trips was 869,891, or an average of 201 miles per trip. This was distributed as shown in Figure 46, which indicates that trip lengths for oil-well equipment hauled by the OFHC tend to be shorter than the average for all commodities and much shorter than those for construction equipment.

Intrastate trips accounted for 77.91 percent of the trips. Of all such trips logged, 3,241 (74.90 percent) were in Texas. The next highest category was the Texas-Louisiana group, which accounted for 196 (4.5 percent) of the logged trips. According to the national permit sample, Oklahoma should have been better represented in the trip sample. The origin-destination patterns of the OFHC samples are given in Table 51.

Figures 47, 48, 49, and 50 compare the cumulative distributions of length, width, height, and gross weight over-limits for oil-well equipment permit trips. The differences between the distributions for trips and permits are not consistent—possible causes being the relationships between number of trips under multiple-trip permit and number of multiple-trip permits for the different kinds of moves.

PUBLIC POWER INDUSTRY

Public power must be ranked as one of the most important industries in mechanized society. Therefore, in spite of its relatively low use of permits (11,166 out of 2,151,282), it

²⁴ "Forecast Review," *Oil and Gas Jour.*, Feb. 5, 1968, p. 144, 151.

²⁵ *Ibid.*, p. 156.

²⁶ *Ibid.*, p. 158, 159.

²⁷ Bureau of Mines and "Pipe Line Industry Surveys."

²⁸ American Gas Association.

can be considered a permit user of major importance.

Public-power-related commodities were identified in the national permit sample as general public utility, transformers, generators, nuclear reactors, and poles. This last commodity (poles) is associated more with power-line maintenance, whereas the others are massive components of a power plant. However, because poles can be associated with industries other than public power, this commodity is not dealt with in this discussion. The numbers of permits issued for the other commodities are: general public utility, 4,769; transformers, 4,457; generators, 1,940; and nuclear reactors, 9.

These remaining commodities tend to be overweight, overwidth, and overheight. Although many public power moves weigh less than 150,000 lb gross, a significant number fall in the 200,000- to 500,000-lb categories. Vehicles required to accommodate such loads often include back-to-back truck tractors with two sets of tandem dollies and a special low-boy trailer with goosenecks on each end. Such a train of vehicle units often exceeds 100 ft in length.

As indicated in Chapter Two, these commodities are hauled almost exclusively on single-trip permits. Exceptions to the general rule occur in the case of movement of small transformers by public utility companies. Missouri, for example, permits this type of movement.

Although a proportion of power commodities is and will be shipped by rail, it is assumed that growth trends in the industry can be used as an indicator of the need for permits in the future. Because nuclear power sources are relatively new and growing at a faster rate than fossil-fueled or hydraulic power sources, trends in nuclear power have been prepared separately.

TABLE 50

SAMPLE OF TRIPS BY OIL FIELD HAULERS
CONFERENCE, JULY-SEPTEMBER 1967

COMMODITY HAULED	NO. OF TRIPS	% OF TRIPS
Machinery	1,334	30.83
Tanks, bins, etc.	723	16.71
Oil-well equip.	659	15.23
Construction equip.	644	14.88
Pipes	169	3.91
Structural members	154	3.56
All others	644	14.88
All	4,327	100.00

The electric energy output of the United States has been approximately doubling every ten years (Fig. 51). Projections indicate a continuation of this trend. The industry has kept pace with the growing demand by increasing its total capacity. As evidence of this growth, the load factor—actual output/output capability—since 1958 has varied between 59.4 and 66.1 percent.

Between 1967 and 1972 and later, a total of 630 units producing 117,531,860 kilowatts have been or are scheduled to be added to the 1966 level of commercial operation. Figure 52²⁹ shows the new capacity placed in commercial operation, 1957-1966, and that scheduled for service in coming years. These units all are 4,000-kw or larger in capacity.

²⁹ Edison Electric Institute, 41st Semi-Annual Electric Power Survey, April 1967.

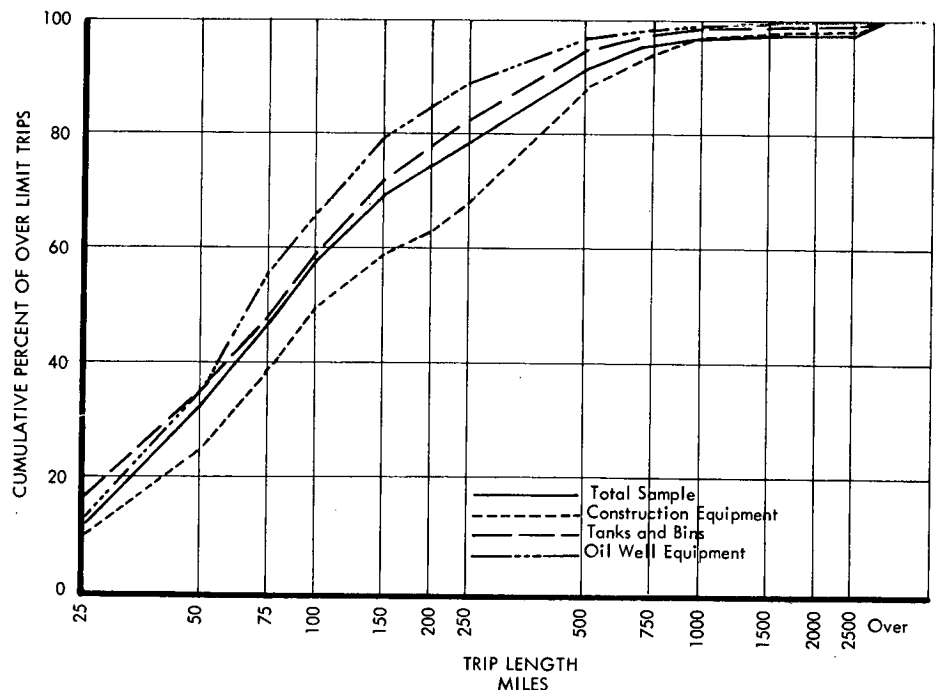


Figure 46. Cumulative distribution of trip length for over-limit moves by the Oil Field Haulers Conference.

TABLE 51
ORIGINS AND DESTINATIONS OF OFHC SAMPLE

REGION	NUMBER OF TRIPS						
	REGION 1	REGION 2	REGION 3	REGION 4	REGION 5	REGION 6	REGION 7
	Tex. Ark. Okla. N. Mex. La.	Fla., Ga. Ala., N.C. S.C. Tenn. Miss., Ky. Va.	Ohio Ill., Ind. Mich. Wisc. Minn.	Iowa N.D., S.D. Mo. Kans. Nebr.	Mont. Idaho Utah Colo. Ariz.	Wash. Ore. Nev. Calif.	N. Eng. N.Y., Pa. N.J., Md. W. Va. Del.
1	3,752	37	24	43	2	—	2
2		10	75	15	—	—	26
3			182	41	2	—	78
4				3	—	—	8
5					—	—	—
6						—	—
7							2

Starting in 1969, a marked increase in the capacity per unit is scheduled. In 1966 the average new unit in operation had a manufacturer's rating of approximately 95,000 kw. In 1969 the average will be 255,000 kw, and by 1970 the average will be up to 400,000 kw (Fig. 53). This trend toward larger units could result in fewer but larger installations.

This trend is carried over to the shipping requirements of various power components. For example, the maximum shipping requirements of generators produced by a leading manufacturer are given in Table 52. Most of these are shipped by rail or water. However, this trend is occurring among other components, such as transformers, which require some movement over highways.

The annual increase in the manufacture of transformers, although more sporadic from year to year than the trend in electric energy output, generally has maintained the same trend (Fig. 54). Therefore, it may be assumed that the need to move transformers over the highway will conform with the trend in electric energy output.

Production of steam turbine-generators in the 10,000-kw or larger class shows a similar trend. Production of steam turbine-generators in the 4,000- to 9,999-kw class is decreasing, both in real numbers and relative to electric energy output. This is a further indication of the continual move toward use of larger components.

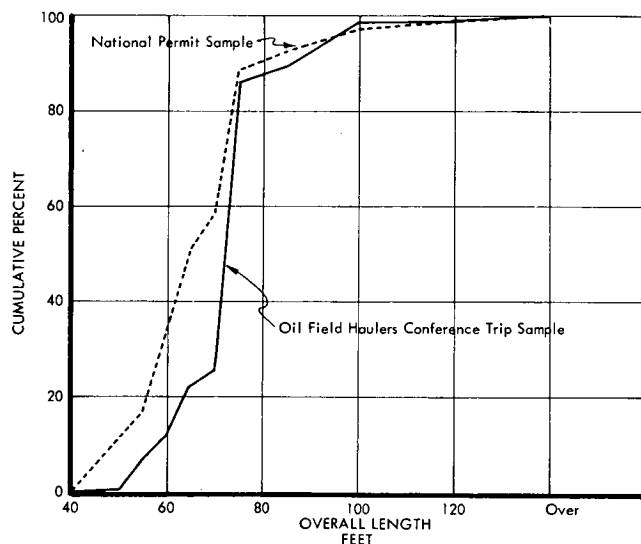


Figure 47. Comparison between length distributions for trips and permits relative to oil-well equipment.

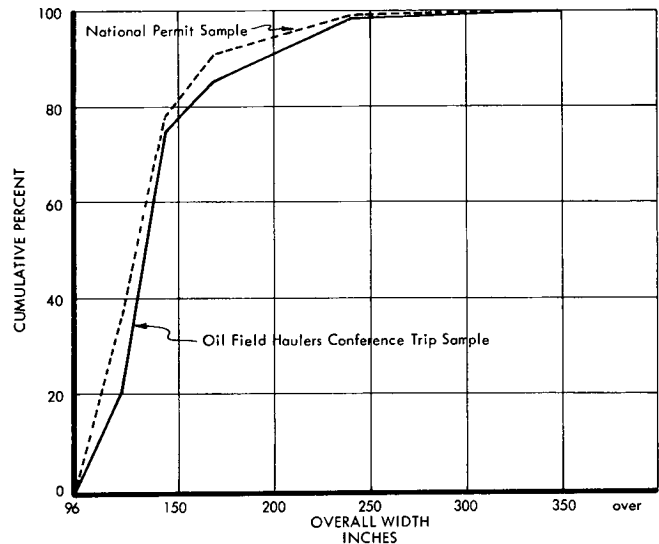


Figure 48. Comparison between width distributions for trips and permits relative to oil-well equipment.

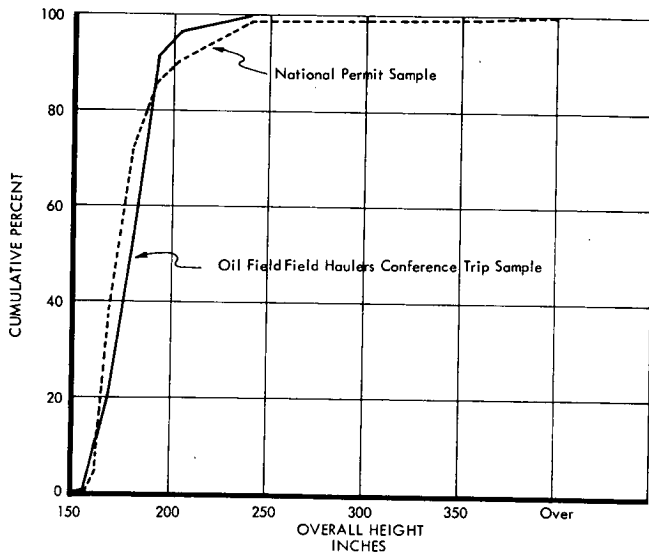


Figure 49. Comparison between height distributions for trips and permits relative to oil-well equipment.

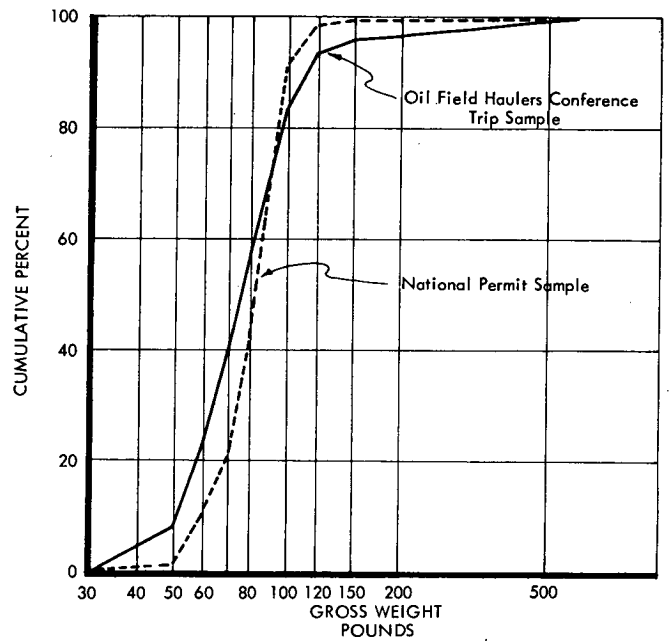


Figure 50. Comparison between gross-weight distributions of trips and permits relative to oil-well equipment.

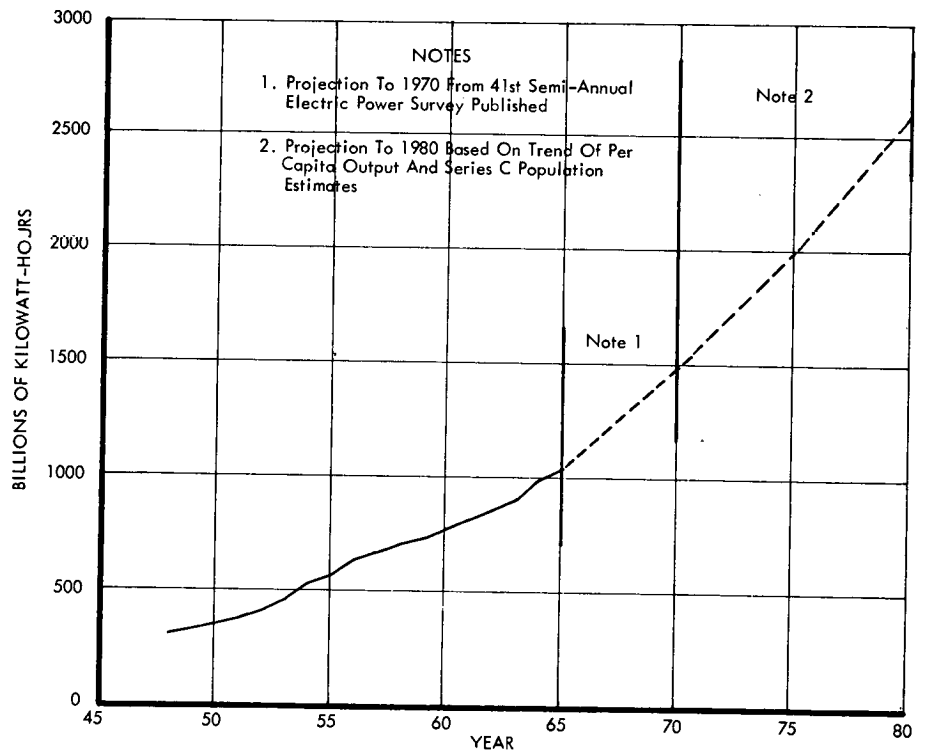


Figure 51. Trend in electric energy output.

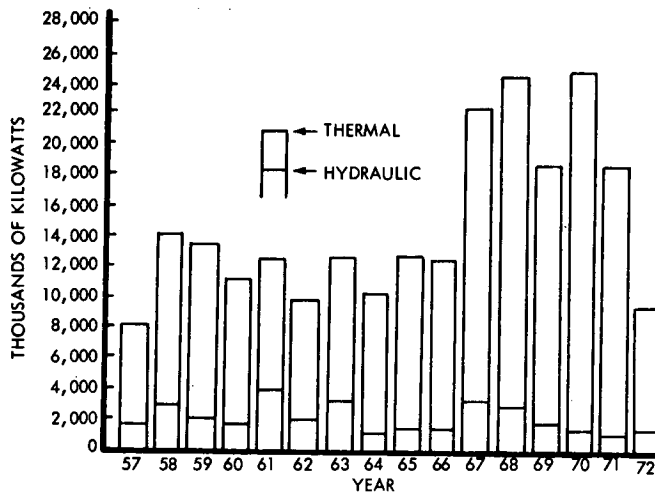


Figure 52. New capacity placed in commercial operation in the contiguous United States, 1957-66, and that on order and scheduled for service in the coming years as of April 1, 1967; units of 4,000 kw and larger.

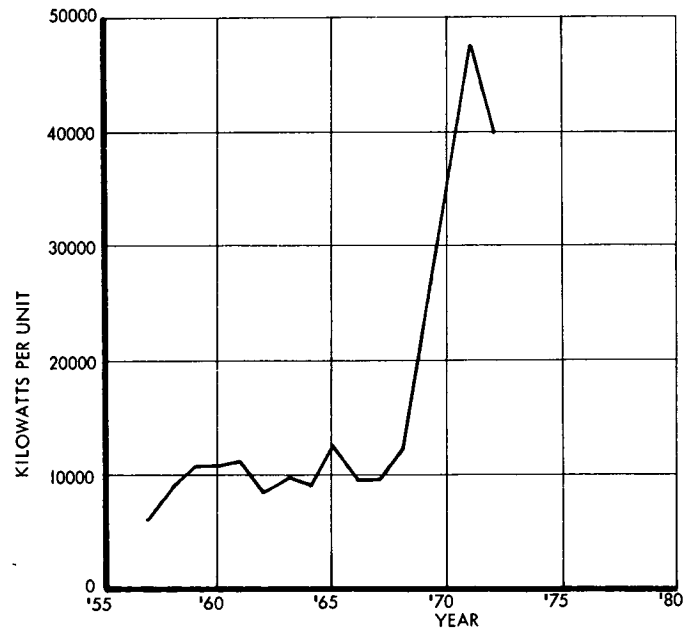


Figure 53. Average kilowatt rating of new public power units.

TABLE 52

SHIPPING REQUIREMENTS FOR GENERATORS^a

YEAR INSTALLED	WEIGHT (LB)	DIMENSIONS (FT-IN.)		
		WIDTH	HEIGHT ^b	LENGTH
1960	605,000	12-8	17-4	27-2
1965	660,000	13-0	17-8	33-0
1968	775,000	13-0	17-8	34-6
On order	800,000	13-0	18-0	36-3
Needed by 1972	900,000	13-4	18-6	40-0
Desired by 1974	1,200,000	13-4 ^c	18-9	48-0

^a Data provided by General Electric Co. ^b ATR. ^c Or more.

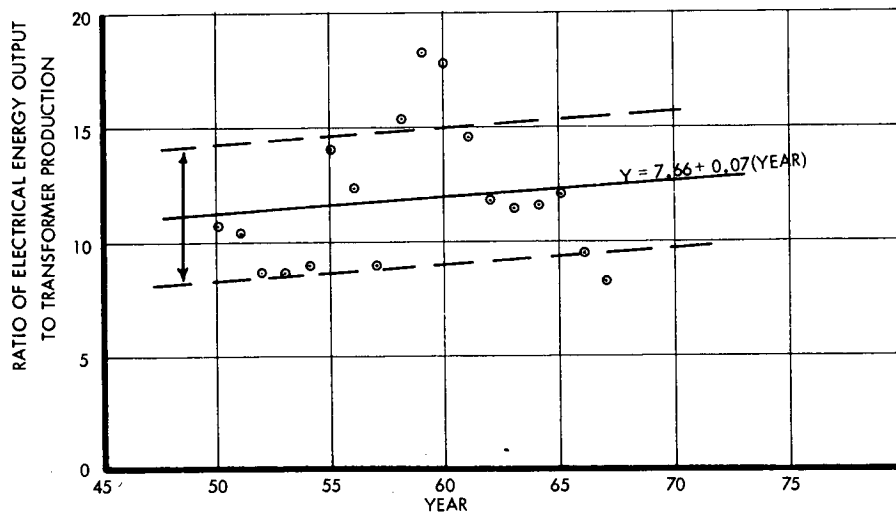


Figure 54. Trend in the ratio of electrical energy output to transformer production.

Use of nuclear reactors is starting to increase rapidly; Figures 55 and 56³⁰ illustrate this trend in operational units and power generated, respectively. Unit sizes also are increasing significantly. Table 53 summarizes these data.

The figures decrease after 1971. This probably can be attributed to the current limits of lead time for planning. As time passes, projects will be added to the present list. Table 53 gives an estimate of the capacity and number of units based on the assumption that after 1971 megawatts of nuclear power added annually will increase as electrical output increases. This assumption probably is extremely conservative.

The nuclear reactor vessel is the component of nuclear power stations which provides the greatest problems in shipment. Its dimensions preclude rail shipment, thereby requiring shipment by water as far as navigation is possible and then overland by highway or specially constructed haul road.

In 1964, a nuclear reactor vessel destined for the Peach Bottom Power Plant was moved over Maryland highways from the port of Havre De Grace, Md., to the Pennsylvania line. The gross weight of the load and vehicles was 422,000 lb. The over-all length, width, and height were 105 ft, 21 ft, and 25 ft, respectively. This plant is rated at 40 megawatts. Photographs of this move are contained in Appendix G. Newer, more powerful units will weigh more and exceed these over-all limits, thus compounding the shipment problem.

The move described was a well-executed one involving close cooperation between the Hauling Permit Section of the Maryland State Roads Commission, the Maryland State

Police, and the hauling and rigging contractor, Frank W. Hake of Philadelphia.

The Roads Commission surveyed all possible routes and issued instructions and precautions regarding the selected route. The move was made on a cold day in January to obtain the advantage of frozen ground. The police provided escort service. The contractor bridged all roadway structures on the route.

It is anticipated that Peach Bottom will require several new reactors in the future. Projected gross weights will be approximately double that of the first move. If it is determined that Maryland roads can not sustain this load, moves may have to be made over land. This is cited as a problem which will not become common but certainly may face many permit offices during the next ten years.

The geographic distribution of the nuclear power units to be completed in 1968 or after is given in Table 54. Based on the trend in electrical energy output, the projected number of permits for public-power-related commodities is estimated to be 25,752 by 1975.

HEAVY-SPECIALIZED CARRIERS

The Heavy-Specialized Carriers Conference of the American Trucking Associations has a membership of 199 firms that specialize to varying degrees in the movement of extra-heavy and/or extra-size commodities over the highways. Being well-equipped professional movers of extraordinary loads, these firms are able to conduct such movements with a minimum of inconvenience and a maximum of safety. Several permit officials have praised the methods and preparedness of these firms. One characteristic cited is their ability to repair almost any breakdown en route with a minimum of delay.

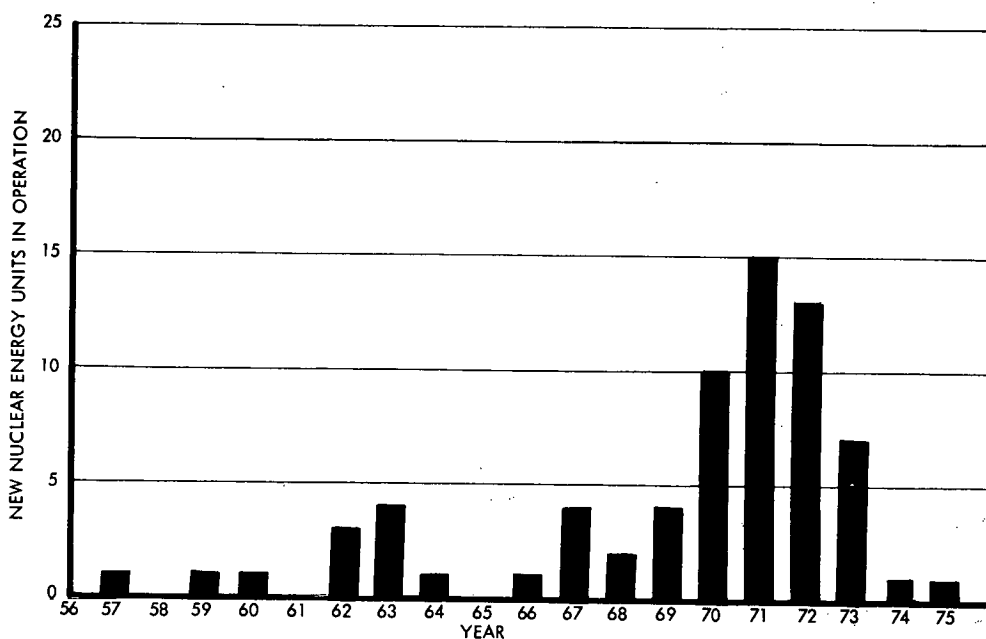


Figure 55. Number of new nuclear energy units in operation annually.

³⁰ United States Atomic Energy Commission, *Nuclear Reactors Built, Being Built, or Planned*, June 30, 1967.

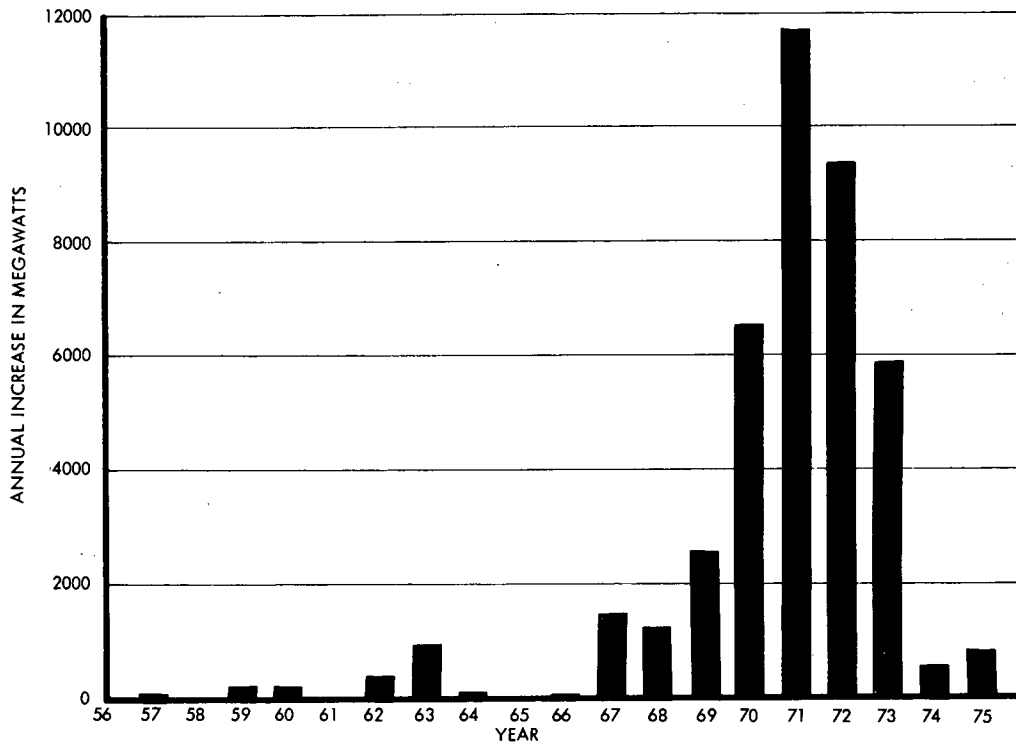


Figure 56. Annual increase of nuclear-generated public power.

TABLE 53
PROJECTION OF NUMBER OF NUCLEAR REACTOR UNITS

YEAR	(1) ELECTRIC ENERGY OUTPUT (10 ⁹ KW)	(2) NU- CLEAR ^a UNITS PLACED IN OPERA- TION	(3) MEGAWATTS ADDED TO TOTAL CAPACITY	(4) COL. 3 COL. 1	(5) PROJECTED MEGAWATTS ADDED TO TOTAL CAPACITY	(6) MEGA- WATTS PER UNIT	(7) PRO- JECTED UNITS, COL. 5 COL. 6
1957	670	1	90	0.134	—	90	—
1959	735	1	200	0.272	—	200	—
1960	780	1	175	0.224	—	175	—
1962	860	3	357	0.415	—	119	—
1963	904	4	931	1.030	—	223	—
1964	990	1	59	0.060	—	59	—
1966	1,130	1	40	0.035	—	40	—
1967	1,220	4	1,442	1.182	—	361	—
1968	1,300	2	1,230	0.946	—	615	—
1969	1,395	4	2,557	1.833	—	639	—
1970	1,490	10	6,537	4.387	—	654	—
1971	1,575	15	11,704	7.431	—	780	—
1972	1,680	13	9,371 ^b	7.431	12,484	721	17
1973	1,790	7	5,872 ^b	7.431	13,301	839	15
1974	1,890	1	550 ^b	7.431	14,045	800	18
1975	1,997	1	800 ^b	7.431	14,840	800	19

^a According to U.S. Atomic Energy Commission. ^b Figures incomplete.

The commodities moved by these firms include construction equipment, structural members, industrial equipment, transformers, and tanks. Because these commodities tend to be important to the general welfare and/or belong to the higher size and weight categories, and because the Heavy-Specialized Carriers Conference members depend on the issuance of special permits for a substantial share of their business, it was considered important to obtain as much special information as possible concerning the movements made by this group of haulers. In addition, it was desirable to obtain from industry, if possible, those data concerning trip lengths, origins and destinations which are lacking in the state permit data.

The H-SCC requested its membership to log permit movements for the months of June, July, and August 1967. Data collected included carrier's name, carrier's address, date, all states in which permits were acquired for each trip, commodity hauled, states of origin and destination, trip length, gross vehicle weight, dimensions, and "yes-or-no" answers to the questions: "Was any part of this trip made on the Interstate Highway System?" and "Was it necessary due to restrictive state regulations to travel in part on county roads?" The response to this request was as follows:

MONTH	TRIPS	MEMBERS
May	4	1
June	2,983	83
July	2,213	68
August	1,705	44
September	17	2
Total	6,922	

The incomplete response introduces a regional bias, which must be considered when examining the origin-destination information. By regions, it appears the responses from the Southeastern states (Florida, Georgia, South Carolina, North Carolina) and the Great Lakes states (Illinois, Indiana, Michigan, Ohio, Wisconsin) were low. Conversely, the response from the Upper Mississippi Valley states (Iowa, Minnesota, Missouri) was better than expected.

By states, New York and Illinois had responses that were well below the average, whereas the responses from Pennsylvania and Missouri were well above the average.

The responses decreased each month starting in July; these dropouts contributed to the sample bias. The sample has not been adjusted because the bias can not be quantified.

The characteristics of the H-SCC sample are as follows:

1. Commodities hauled are given in Table 55 as percentages of the trips.
2. The origin-and-destination data are shown in Figures 57 and 58; Interstate trips totaled 4,524, or 65.36 percent of all trips. Figure 57 shows the trip starts and ends for each state graphically.

Pennsylvania, Ohio, New York, Texas, Illinois, New Jersey, Indiana, Michigan, Kentucky, and California, in that order, had the greatest number of trip starts and ends.

TABLE 54

NUCLEAR POWER UNITS TO BE COMPLETED IN 1968 OR THEREAFTER ^a

STATE	NUCLEAR UNITS	STATE	NUCLEAR UNITS
Alabama	3	Minnesota	4
California	4	Nebraska	2
Colorado	1	New Jersey	5
Connecticut	1	New York	6
Florida	3	Pennsylvania	3
Illinois	5	South Carolina	4
Indiana	1	Tennessee	1
Maryland	2	Vermont	1
Massachusetts	1	Virginia	2
Michigan	1	Wisconsin	3

^a Nuclear Reactors Built, Being Built, or Planned. U. S. Atomic Energy Commission (June 30, 1967).

TABLE 55

DISTRIBUTION OF H-SCC SAMPLE TRIPS, BY COMMODITY

COMMODITY	% OF TRIPS
Construction equipment	23.29
Miscellaneous	12.08
Industrial and other machines	16.92
Structural member	9.48
Indus. products and miscellany	6.80
Tanks and bins	6.52
Empty hauling rigs	3.12
Military equipment	2.60
Pipes	1.83
Transformers	1.70
Oil-well equipment	1.57
All other commodities	14.09

Figure 58 shows the interstate trip desire lines for a 13-region nation.

The states having the greatest number of intrastate trips were Pennsylvania, California, Michigan, Maine, Minnesota, Missouri, New York, Texas, West Virginia, and Massachusetts. Figure 59 shows the relative distribution of intrastate trips between states.

The average trip length for all movements under permit by the H-SCC was 442.17 miles. The cumulative trip distributions for the total sample and for five major commodities are shown in Figure 60.

Figures 61, 62, 63, and 64 show the cumulative distributions of extra-legal length, width, height, and gross weight for all H-SCC permit trips and for the three major commodities. The distribution from the national permit sample is plotted on each graph for comparative purposes.

The H-SCC distributions tend toward lower dimensions and weights than the national permit sample. This tendency is quite pronounced in the length distribution, probably

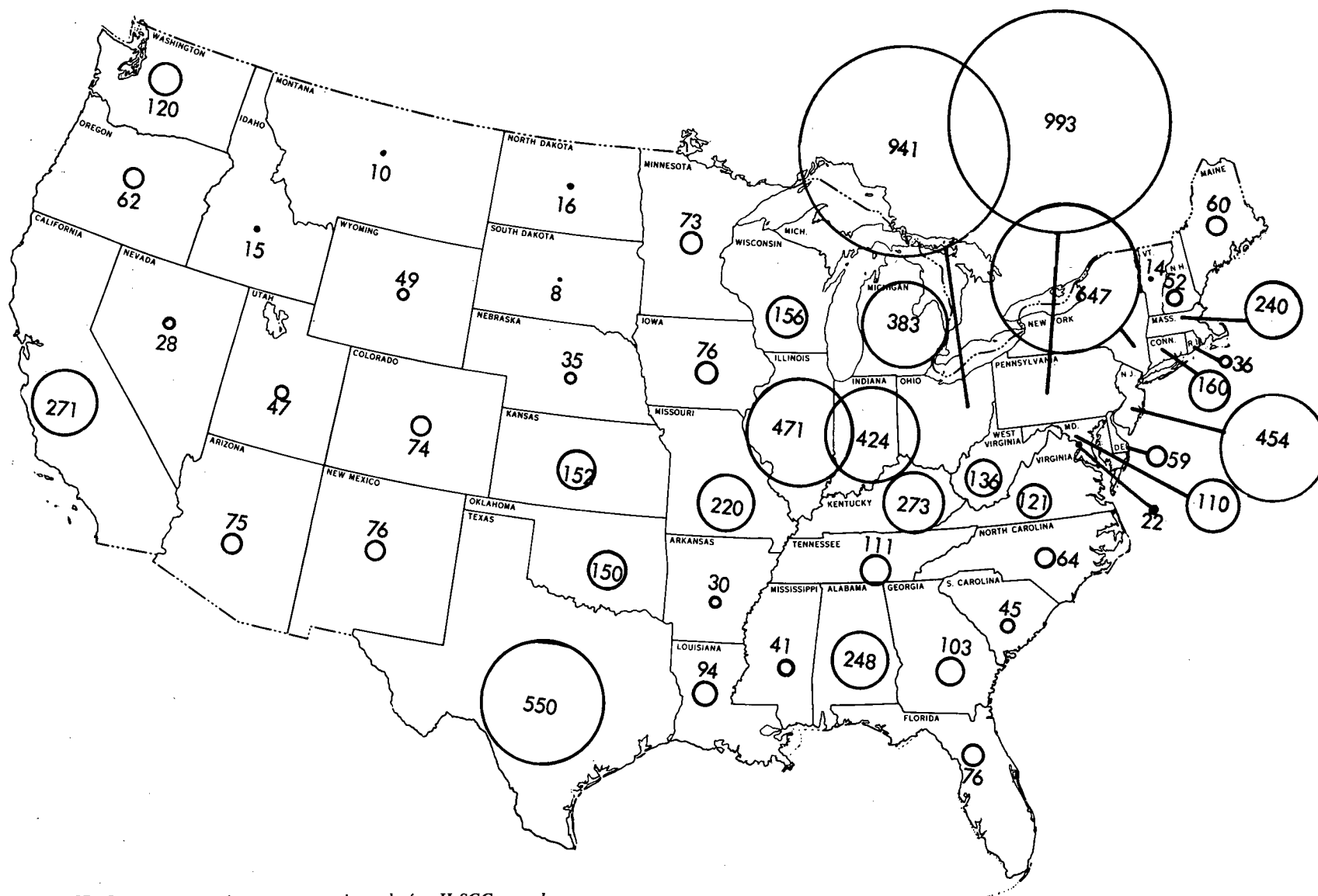


Figure 57. Interstate permit movement trip ends for H-SCC sample.

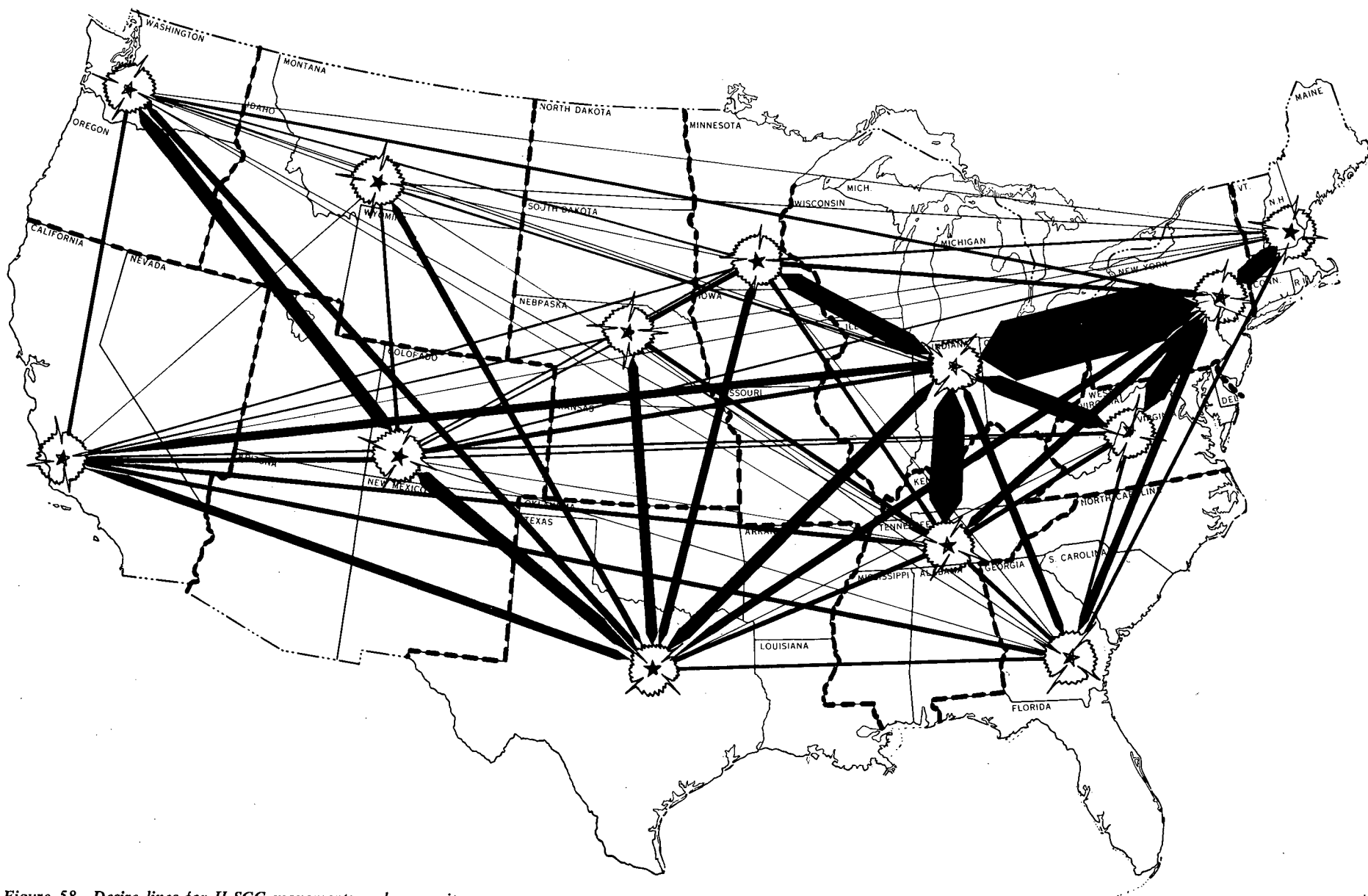


Figure 58. Desire lines for H-SCC movements under permit.

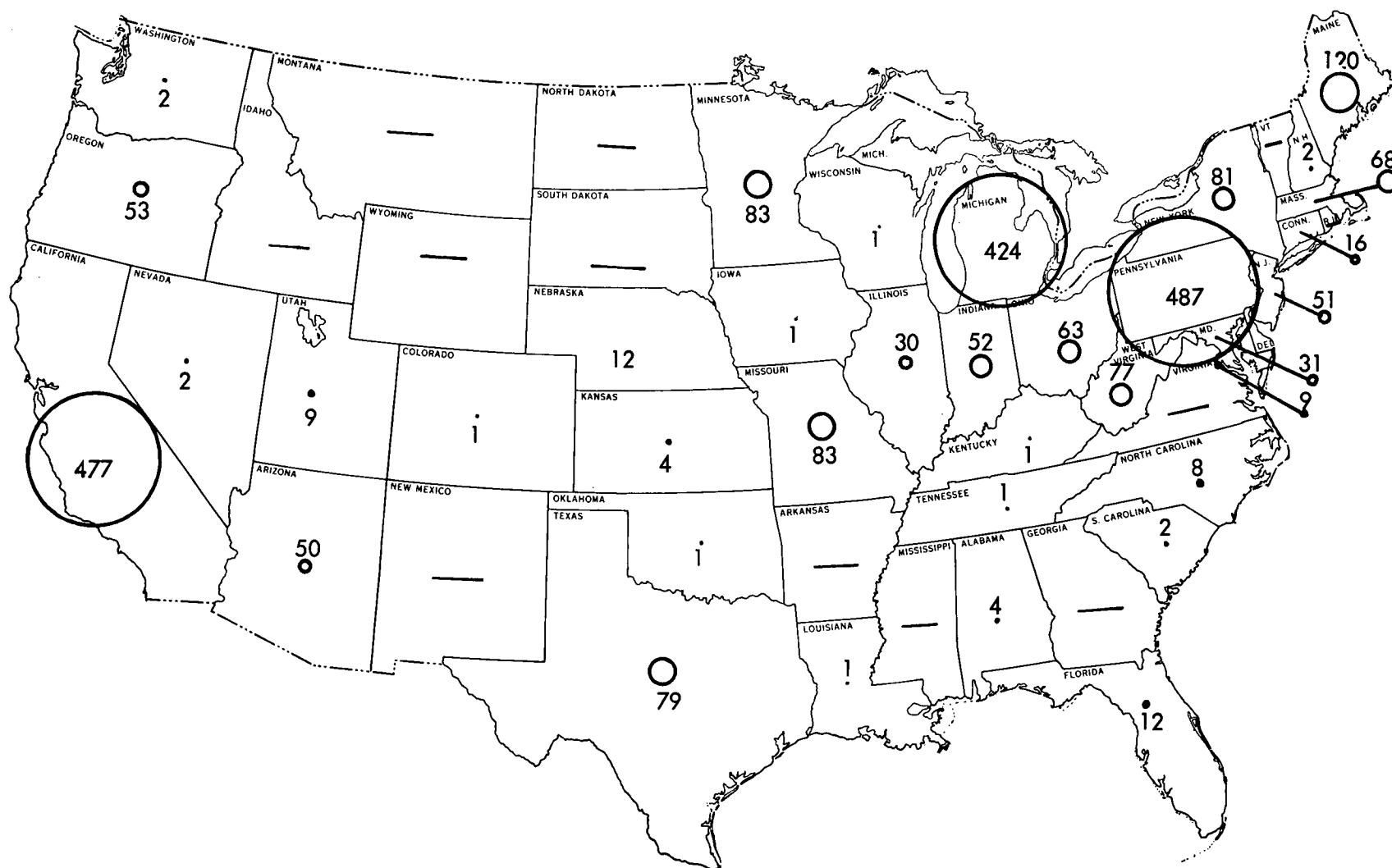


Figure 59. Intrastate permit movements, by state, for the H-SCC sample.

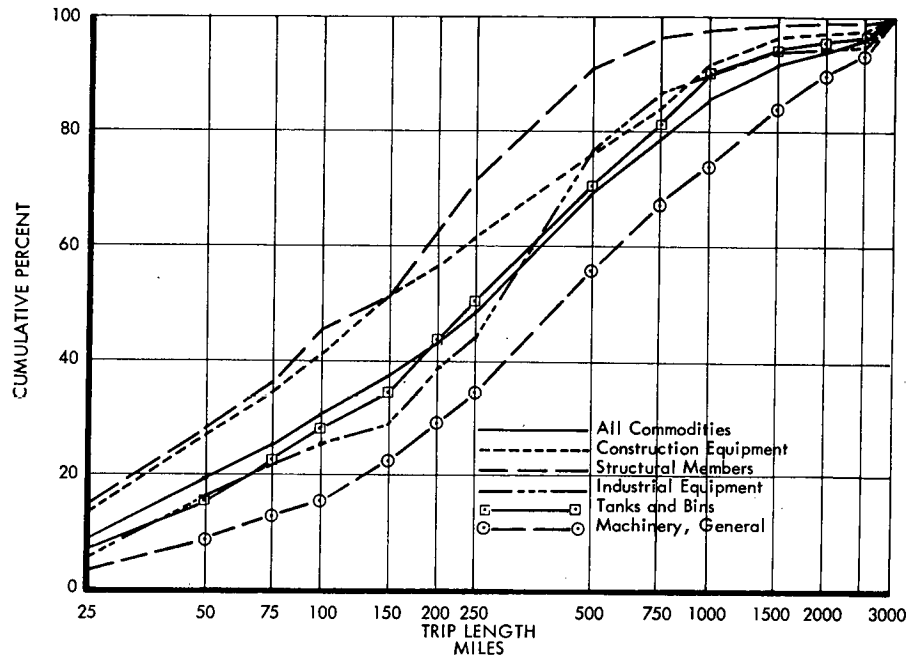


Figure 60. Trip length distributions for H-SCC sample.

because the H-SCC do not haul mobile homes and the national permit sample, as indicated previously, contains a large percentage of permits issued for mobile homes.

Nevertheless, it appears that members of the H-SCC do not haul any more extraordinary-sized commodities than the average permittee, except that these hauls probably account for a larger proportion of the hauls of H-SCC members.

SUMMARY AND PROJECTION

Assuming no change in legal limits and permit regulations, it is estimated that 3,807,818 oversize-overweight permits will be issued in 1975. This estimate is based on the high estimates made for each industry group where different trend bases have suggested a high and low figure. The high figures—influenced largely by the mobile home industry—were selected as more probable because other estimates based on limited historic trends, as reported in Chapter Two, show even higher values.

For comparison, using low figures including conservative estimates for the aerospace and mobile home industries would have produced a total issuance in 1975 of 2,645,394 permits. The lowest value from the historic trends as developed in Chapter Two gives a value close to the 3,807,818 selected. All projections are extremely rough due to the very limited base of the data.

Table 56 compares the estimate of oversize-overweight permits issued in 1966 and the selected projections of permit issuance in 1975, by industry group. The projection of the number of permits for the all-others category is based on a projection of the GNP as related to population.

The third objective of this research was to determine the

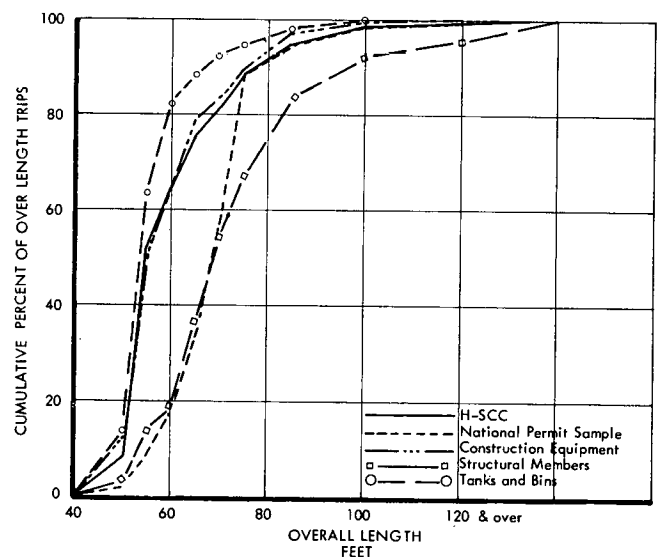


Figure 61. Cumulative distribution for overlength trips for H-SCC trip sample.

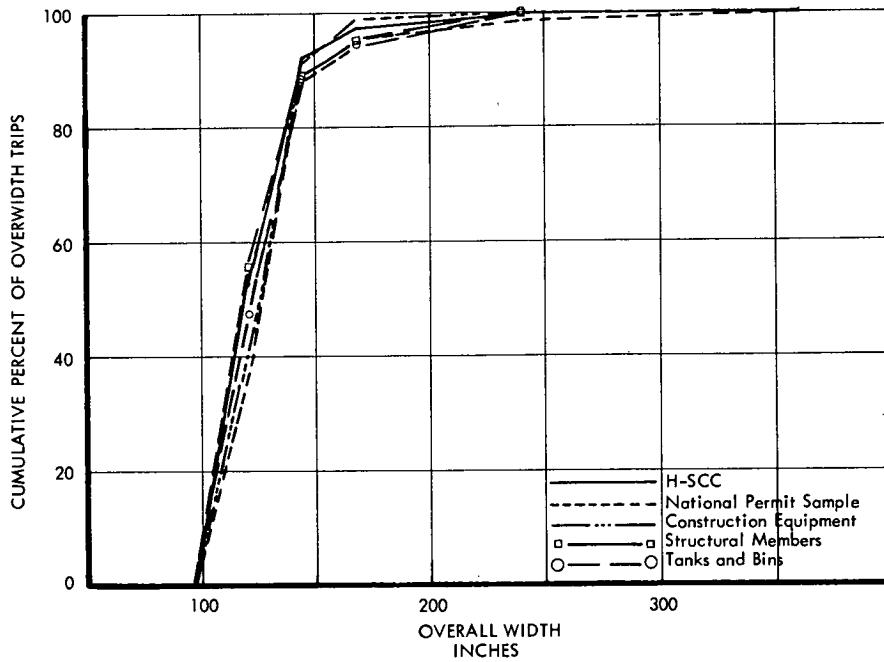


Figure 62. Cumulative distribution for overwidth trips for H-SCC trip sample.

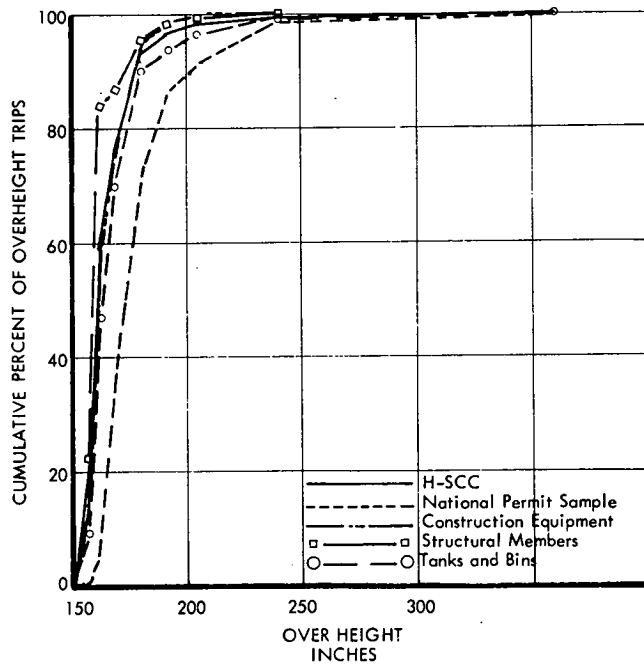


Figure 63. Cumulative distribution for overheight trips for H-SCC trip sample.

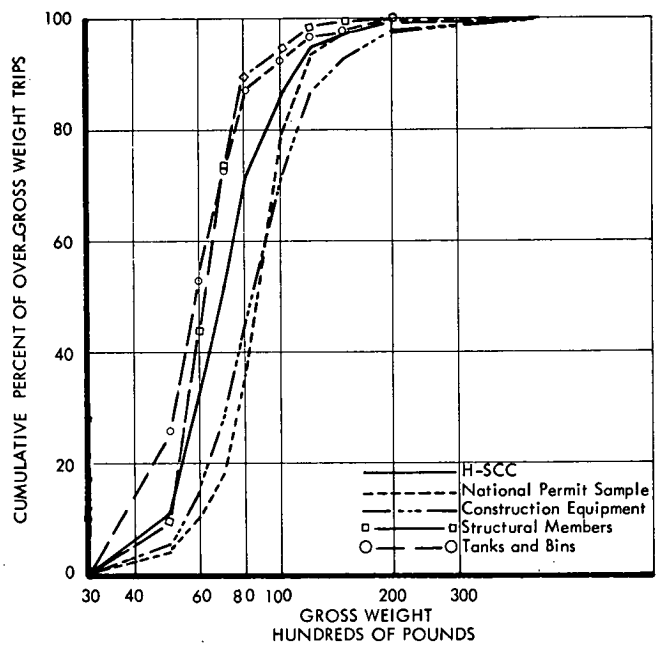


Figure 64. Cumulative distribution for over-gross weight trips for H-SCC trip sample.

foreseeable needs of transportation groups in regard to the extension or alteration of permit operations. The foregoing projections provide a rough quantitative measure of these needs.

With respect to extensions or alterations, this research indicates that almost any commodity can be moved on state highways somewhere in the nation with due consideration for preservation of the highways and safety and convenience of the public. Further, extension of permit operations is needed only by certain industries in limited areas of the country. Although there is no national need for extension, there is a need for more uniformity in the rules and procedures under which movements are permitted and in the conditions imposed by the states. Specific problems in uniformity of rules and procedures are discussed in Chapter Five.

TABLE 56
PROJECTED PERMIT ISSUANCE

INDUSTRY	ESTIMATED PERMIT ISSUANCE	
	1966	HIGH 1975
Agriculture	45,925	47,624
Aerospace	7,181	25,301
Construction	815,071	900,629
Forest	9,251	10,432
Marine	42,025	43,874
Military	9,329	17,134
Mining	7,871	7,871
Mobile home	625,700	2,121,000
Oil and gas	229,460	224,854
Public power	11,175	25,732
All others	348,294	383,367
Total	2,151,282	3,807,818

CHAPTER FIVE

NATIONAL POLICIES AND UNIFORMITY

The second objective of this research was to determine the extent and nature of reciprocity and compact agreements in relation to permit operations. Findings are that there is neither reciprocity between states in oversize-overweight permit operations nor any compact agreements.

In fact, as related to the third objective—to determine the needs of transportation by industry groups in regard to the extension or alteration of permit operations—lack of uniformity between states was found generally to be the industries' greatest problem. This chapter discusses the problems of uniformity and reciprocity.

Attempts by the American Association of State Highway Officials to bring about uniformity through recommended policies also are discussed.

UNIFORM PRACTICE AND RECIPROCITY

The interstate movement of oversize and/or overweight commodities presents the hauler with a wide variety of procedures for obtaining permits and restrictions relating to the permitted move. Uniform permit practices and reciprocal agreements have been suggested as means for streamlining interstate permit operations. The American Association of State Highway Officials has attempted to develop uniform procedures.

The problem of non-uniformity can be broken down into several major areas of variance. These include application format, method of issuance, fee schedules, type of vehicle configuration, legal size and weight limits, permit size and weight limits, exceptions to legal limits and permit regula-

tions, and the granting of blanket or multiple-trip privileges. Most important, however, are the conditions under which a permit will be issued.

Complete uniformity in all of these problem areas probably would be impossible to obtain. Uniform philosophies of permit operations, including purpose of fees, would be necessary in all states, as well as uniformity of judgment on road and traffic effects. However, somewhere between complete uniformity and the status quo there probably are degrees of uniformity and reciprocity practices that can provide convenience and economy to the haulers without creating undue administrative problems for the states.

Taking each problem area, the following discussion postulates possible methods of uniform practice and explores both negative and positive benefits to be derived therefrom.

Legal Limits

Lack of uniformity between states in legal limits does not have a great effect on the movement of irreducible oversize-overweight commodities. Basically, these limits affect only the movement of reducible commodities. Nevertheless, as a point of beginning for oversize-overweight permit operations, legal sizes and weights are important. Unless there can be basic uniformity in this area, there is little likelihood of much uniformity in the over-legal permit area.

There is lack of uniformity on legal size and weight limits not only as these apply to different states but also,

in some cases, as these apply to highway systems within the same state. The latter occurs largely because of Federal laws controlling sizes and weights on the Interstate System while the states enact more liberal provisions to control movements on other systems.

The Interstate System sizes and weights were established by the 1956 Federal Highway Act to provide uniform control. However, a "grandfather" clause permitted states having legislation exceeding the Federal limits to continue to be governed at the level of their existing state laws. Some states have since changed their size and weight laws with respect to all other systems, but are "frozen" on the Interstate System.

Despite general recognition of the desirability of uniform size and weight legislation—legal limits—it will be difficult to achieve. One of the major problems is lack of research in sufficient depth to show conclusive (or convincing) relationships between costs of highway facilities as related to incremental size and weight increases and economic benefits to be realized from these increases. This is discussed at further length in the later section on "AASHTO Policies."

Method of Application

Most states require the hauler of over-limit loads to have a permit in hand during the entire move. This limits the means for acquiring a permit to wire, mail, and in person. A few exceptions allow the movement to proceed into the state and to acquire the permit at the first weigh station or port of entry. In at least one case, telephone permission can be obtained to enter the state and proceed to the nearest port of entry.

No matter how it is done, the permittee now is required to obtain an additional permit for each state in which a movement takes place. Such permits can be obtained in advance by mail. If they are obtained en route, either by wire or in person, there is an expenditure of time and money over and above the permit fee.

Possible solutions to the problem of several permits for one trip are (1) an interstate permit issued by the state in which the move starts which covers the entire move or (2) issuance of the various state permits by the same agent in the first state traversed. These solutions of the permittee's problem present several problems for the permit officers.

To issue interstate permits, the permit officer must broaden his knowledge of regulations, legal limits, fee schedules, and highway systems to states other than his own. Assuming existing fee structures, an interstate apparatus or compact would be necessary to provide for auditing and equitable distribution of fees collected. At a minimum, each state would have to establish additional auditing procedures. The different bases for fee determinations in the various states would make the problem very complex. Also, in some states, permit applications or permits often contain standard hauling restrictions. Unless these restrictions were uniform between states, it would be necessary to provide separate addenda to an interstate permit to cover individual states' restrictions. Assuming that regulations remain generally the same, it is not believed that "first state"

issuance of interstate permits would be feasible because of the variance between states in regulations.

The other alternative, an arrangement whereby each state would act as an agency of all other states in issuing permits according to each state's rules and forms, is fraught with many of the same problems.

A communications net between permit control offices might be helpful, however. In this case, forms for "compact" states might be available in each office. When these are filled out by the applicant, they could be put on wire. Fee requirements and restrictions could be wired back—one office could collect the fee. A communications net serving a compact of states also would be helpful in coordinating enforcement at border crossings and for other coordination.

Under present conditions, all states with a well-developed port-of-entry system could extend to haulers the privilege of proceeding to the first port of entry to obtain a permit. Guidelines need to be given to haulers to prevent the situation where a hauler proceeds to a port of entry only to be denied a permit because of dimensions, weights, loading, etc., which do not conform to the state's regulations.

Fee Schedules

Any movement to bring about uniformity in fee schedules probably would be met by the states and the haulers with mixed reactions. Some states have no charge for permits, whereas others charge fees ranging from a flat \$3 permit fee to a relatively expensive weight-distance fee schedule. Uniformity would probably result in increased revenues for some and decreased revenues for others. The philosophies behind these various fee schedules need to be brought into uniformity before fee schedules can be made uniform.

Adoption by the states of a simple uniform fee priced to cover the expenses of permit operations would be an equitable step toward uniformity and reciprocity. It would reduce the complexity of the auditing necessary to administer interstate permits under present fee schedules. However, as long as some states use permit fees as a source of revenues, these complexities cannot be reduced.

Permit Limits and Vehicle Configurations

Possibly the biggest problem faced by haulers is the variance in permit size and weight limits and allowable vehicle configurations.

A number of states do not issue permits for overweight on either single or tandem axles. This means that extra axles must be added to the normal 4- or 5-axle truck-tractor, semitrailer combination to enable the movement of loads with a gross vehicle weight in excess of 80,000 lb. In some states, the axle-load requirements effectively have restricted GVW to approximately 110,000 lb.

Most states have established dimension and weight limits below which a permit is considered to be routine, not warranting extensive investigation. For movements with dimensions and weights beyond these limits, permits are not issued without an analysis of the route to be traveled. The limits used for gross weight vary up to 75 tons. Several states have a 55-ton routine permit limit, but will allow

almost anything above that limit if the move is carefully planned. However, there is at least one state which issues so few permits for moves with a GVW in excess of 55 tons that it may be said that virtually none is issued beyond this limit, no matter how important the move is economically or how well planned.

What is acceptable in one state is not acceptable in another. These differences cause inefficient vehicle configurations and sometimes create difficulty in locating a hauler who can do the job. A hauler in Pennsylvania may have equipment well-suited for Pennsylvania hauls but be restricted from doing business in Ohio because his equipment is difficult to load in accordance with Ohio permit regulations.

A uniform definition of a routine over-limit move would be a big step toward enabling development of a uniform interstate permit. Such a permit might allow moves up to the agreed limits.

Movements that exceed these limits still would probably need to obtain permission on a state-by-state basis. It is in the area of dimensions and weights exceeding routine limits that danger to motorists, bridges, and highways, and inconvenience to the motorist, become critical. It would be desirable to establish a uniform procedure for evaluating applications for permission to conduct these extraordinary moves and uniform procedures for conducting the move. For example, Maryland requires the hauler to design a plan for making an extraordinary move. The State Roads Commission reviews the plan, surveys the route, and establishes certain requirements as necessary. The end result is a safe and convenient move. The record move in Maryland was the 422,000-lb nuclear reactor vessel discussed earlier. Other states have similar requirements and make similar provisions. However, this move could never have been made on the highways of a few states because their thinking and procedures are not oriented toward an "anything goes, but goes safely" type of operation.

With uniform procedures, the hauler could better plan his extraordinary interstate move and avoid the possibility of permit denial.

Exceptions to Legal Limits

Exceptions to legal limits are granted to favor local industries. Although it would be a convenience to some haulers to have uniform exceptions between states, it probably would have little effect on most interstate moves.

Multiple-Trip Permits

Again, multiple-trip permits accommodate largely local moves and uniform practice would have little effect on interstate moves.

AASHO POLICIES

The first attempt at national recommendations respecting motor vehicle sizes and weights was made in 1926. During that year, the Transport Committee of the American Association of State Highway Officials made recommendations to the Association on vehicle sizes and weights and

authority of state highway departments. By 1930, the Committee recommended endorsing legislation in several states which allowed the then maximum single-axle load to be imposed on six-wheel vehicles provided the minimum axle spacing was 40 in. By 1931, the Committee recommended general use of pneumatic tires and special permits for solid rubber tires, together with legal axle load maximums of 16,000 lb.

In 1932, AASHO adopted the first "Policy on Gross Weights, Dimensions, and Speed for Vehicles Operating on the Highways," which made provision for permit operation of oversize and overweight vehicles. With minor revisions, this policy remained in effect until 1946. Although need to further revise the 1946 policy was recognized as early as 1955, revision was postponed until after the AASHO Road Test research project and was not finally completed until 1963.³¹

In 1963, AASHO adopted a "Policy on Maximum Dimensions and Weights of Vehicles to Be Operated over the Highways of the United States." Significant characteristics of this policy as related to permit operations were Chapters 3.00 and 4.00, entitled "Vehicles Operating by Special Permit" and Issuance of Special I & D Permits (Interstate and Other Designated Highways)," respectively.

Chapter 3.00 of the Policy recommended that statutory provision be made on the basis of engineering determination of economy for authorizing oversize-overweight movements over the highways. The dimensions and weights permitted to be moved under permit during a single trip over the Interstate System or other designated highways were recommended as: width, 12 ft, or lane width if less; height, physical limitation of the route; length, 110 ft; single axle (4 tires), 125% of legal axle load; single axle (8 tires), 150% of legal axle load; tandem-axle group (4 tires per axle), 125% of legal tandem-axle load; tandem-axle group (8 tires per axle), 150% of legal tandem-axle load and no single axle in a tandem group will exceed single-axle limit as stated.

Chapter 3.00 recommended the following restrictions for mobile homes: maximum width, 120 in.; total height, 13 ft 6 in.; over-all length, 60 ft for the trailer unit, 75 ft for the trailer plus towing vehicle; towing vehicle, 12,000-lb minimum manufacturer's GVW, dual wheels, and minimum wheel base of 10 ft. Dimensions in excess of these shall be treated as buildings.

Chapter 4.00 was concerned with permit issuance for moves on the Interstate System or other designated highways. It was recommended that authority be placed by statute with the state highway department and that "upon agreement two or more states may extend authority to each state's highway department to cover permit issuance for over-limit moves on completed sections of the Interstate System or other designated highways in all states party to the agreement."

Permits would be issued only to the owner or lessee of the vehicle and would have to be in written form.

The issuing authorities were assigned primary concern for "safety and convenience of the general public and the

³¹ American Association of State Highway Officials, *AASHO, The First Fifty Years, 1914-1964* (1965).

preservation of the highway system" and were to make reasonable determination of the necessity and feasibility of each move. With regard to interstate moves, the applicant must furnish adequate assurance from the terminal state that transfer can be made from the Interstate or other designated highway to the point of destination.

The policy provided only for single-trip permits, and supplements and time extensions thereto. For interstate moves, a copy of each permit would be mailed by the issuing state to all other states included in the move.

The recommended cost of a permit was \$10 plus the following:

1. For overweight, gross—\$0.003 per ton-mile of excess gross weight.
2. For overweight, axle—\$0.004 per axle-ton-mile of excess axle weight.
3. For overwidth—\$0.001 per inch-mile for each inch of width in excess of legal limit.
4. For each foot of height in excess of that allowed regularly—\$0.002 per foot-mile.
5. For each foot of length in excess of that allowed regularly—\$0.002 per foot-mile.
6. For time extensions—\$5.00.
7. For supplemental permits—\$5.00, plus charges if size or weight are increased.
8. For telephone, telegraph, or teletype communications—all charges.

This policy was not well received by industry. In fact, industry representatives³² pressed for and obtained a revised policy which deleted most of these features. Particularly objectionable to industry were the weight limits and the fee schedule. Specific comments concerning these are as follows:

Each vehicle will require detailed individual analyses to determine its potential. . . . No provision is made nor any weight credit provided for permits for special 7 or more axle equipment common in many states, nor for tri-axle equipment.

It is apparent that the fees set forth coupled with the other limitations imposed represent a deliberate attempt to slow or make impossible essential oversize or overweight movements of lesser magnitude than are now permitted in most states. All of the fees are to be added together to determine total fee. A tractor-semitrailer with two tandem axles, each loaded to maximum would be charged a fee, 84¢ per mile, just for the overweight portion; a house trailer or mobile home, 10 ft wide, would be assessed a fee of 18¢ per mile for the overwidth; the tractor-semitrailer noted above would be charged 1.02¢ per mile if overloaded and if it were 10 ft wide. Overwidth and overheight loads cause no extra stress to the pavement, hence no cost should be assessed for this feature. Any potential danger to the public is covered by protective features, such as flagmen, escort vehicles, etc., paid for by the hauler. A maximum 110 foot long vehicle and load transporting poles, girders, beams or other integral structural members, with no other excess dimension or weight, would be charged 90 cents per mile for a load which will not subject a high-

way to unusual stress. Overweight and overdimension fees do not take into account the charges for regular vehicle licensing and bear no relationship to roadway damage.

Comments by Heavy Specialized Carriers Conference dated February 1, 1964

If either the Michigan Legislature or the Highway Department . . . accept the AASHO recommendations the cab card permit system would be a thing of the past. . . . It has been estimated that waiting time alone for single special permits could accrue on a normal construction project to almost 1% of the contract price.

The existing special permit charges to move a 52,000-lb vehicle, 140 in. wide, from Benton Harbor, Mich., to Kansas City, Mo., are approximately \$165. The special permit charges under the proposed policy would be approximately \$450 for the same machine. This is approximately a 250% increase on what must be considered a medium-sized construction machine.

Letter dated June 1, 1964 from Paul McAdams, Chief Engineer of Clark Equipment Co., to George E. White, Chairman, AASHO Committee on Highway Transportation

The new special permit fee proposal is extremely excessive and could be very detrimental to Iowa Manufacturing Company. For instance, a Bituminous Paver, ten feet, eight inches wide, shipped from Cedar Rapids, Iowa, to Philadelphia, Pa., would add permit charges of \$420.00 to the cost of the Paver.

Letter dated August 13, 1964 from A. C. Gossard, Vice President-Sales Manager, Iowa Manufacturing Co., to Robert P. McKendrick, Executive Director, Construction Industry Manufacturers Association

The AASHO policy³³ of 1964 reduced Chapter 3.00 to three unrestrictive paragraphs and eliminated all of the 1963 Chapter 4.00 and replaced it with a chapter entitled "National Defense."

At the 1967 national meeting of AASHO, a new policy was adopted.³⁴ The significant change from the 1964 policy, as affecting permit operations, was the following addition:

In the interest of safety, no permits shall be issued for other than short local movements where vehicles, or vehicles with load, are of a width requiring more than one lane of the selected route of travel. Exceptions may be made if movement is essential to national defense (as outlined in Chapter Four) or under unusual or unavoidable circumstances.

The impact of this recommended policy, if adopted by individual states, will be affected by the interpretation of the phrase "requiring more than one lane." It would appear possible to make the following interpretations:

1. No permit shall be issued . . . where vehicles, or vehicles with load, are of a width in excess of one lane width of the selected route.
2. No permit shall be issued . . . where vehicles, or vehicles with load, are of a width which would either (a) create hazard to motorists in lanes adjacent to the lane

³² Including American Trucking Associations, Heavy-Specialized Carriers Conference, American Petroleum Institute, American Association of Oilwell Drilling Contractors, Shippers Oil Field Traffic Association, Oil Field Haulers Conference, American Boiler Manufacturers Association, Oilwell Servicing Contractors, Prestressed Concrete Institute, Mobile Home Manufacturers Association, American Road Builders Association, Associated Equipment Distributors, Associated General Contractors, etc.

³³ AASHO, *Policy on Maximum Dimensions and Weights of Motor Vehicles to Be Operated over the Highways of the United States*, December 7, 1964.

³⁴ Revised January 15, 1968.

occupied by the overwidth vehicle or (b) essentially deny the use of the adjacent lane to other road users.

If the first interpretation is accepted, the impact on industry would be considerable. Approximately 63 percent of the rural primary state highway mileage has lanes with widths under 12 ft. Movement of all vehicles, or vehicles and load, which exceed 14 ft in width would be eliminated in states using this interpretation. Nationally, 9.07 percent and 3.69 percent of all permits are issued for such movements in excess of 12 ft and 14 ft, respectively.

If the second interpretation is generally accepted, adoption of the recommended policy would produce little difference from the existing situation.

The effect of the AASHO policies on size and weight legislation is difficult to assess. There still is significant variance in size and weight limits between geographic regions, both for regular legal and permitted movements. There has been a steady increase in the average of maximum gross weights permitted by state laws, including statutory tolerances.³⁵

The federally legislated Interstate System size and weight limits, which currently are being reviewed by Congress, are influenced by AASHO policies. Although the Interstate System limits undoubtedly influence state laws, some states have chosen to extend their legal limits for other state highways beyond the limits to which they are bound on the Interstate System. Permit laws and regulations also have been modified by some states for highways other than Interstate. In one or two cases, permit authorities indicate such a confusing situation that they are not sure what they can allow on the Interstate.

Although the Federal Government has studied the problem of maximum sizes and weights and has developed considerable data related to the highway and trucking economies, the lack of completeness and refinement of objective research to show conclusive relationships has been recognized.

³⁵ Floh, Allen C., "The Implications of Truck Size and Weight Regulations," *American Cartagemen and Heavy Haulers*, Vol. 15, No. 6, Feb. 1968, p. 16.

In the Federal document, "Maximum Desirable Dimensions and Weights of Vehicles Operated on the Federal-Aid Systems" (Aug. 1964), the following are typical of qualifying statements:

It was not possible to provide definitive data on the needs of the several branches of commerce with respect to size and weight requirements. Therefore, any standards proposed for adoption at this time must be based on averages and other general measures valid insofar as existing practices and research can indicate, but not entirely suitable as a basis for size, weight and performance policy for the continued evolution of highway transportation. (Page 17, *House Document 354*)

Significant new data on weight-pavement relationships were discovered in these [AASHO Road Test] results. However, the empirical nature of the results of the research require that they be interpreted carefully in transferring conclusions to actual road conditions. (Page 28, *House Document 354*)

Basically, the situation with respect to the completeness of needed research for objective sizes and weights recommendation has not changed since 1964. Some additional information has been developed on the economics of trucking operations through (1) additional research studies of the economies of over-all and specific industry motor freight operations, and (2) reports to Congress by private industries, trade organizations, and others during recent hearings on the currently proposed Senate Bill 2658 to change size and weight limits on the Interstate System. These studies are referenced in Appendix F.

This is the scope of the problem which AASHO faces in formulating policy on legal size and weight limits. Research is not sufficiently complete and the nature of the problem is highly controversial. Policy with respect to permit operations presents all of the difficulties presented by policy on legal limits—and more, because of many more intangibles.

Table 57 gives general size and weight provisions of AASHO policies 1946 to 1968 and compares 1964 and 1968 policy provisions with other proposals to Congress for limits on the Interstate System.

TABLE 57
RECOMMENDED MAXIMUM VEHICLE SIZE AND WEIGHT LIMITS

SOURCE	RECOMMENDED MAXIMUM								WEIGHT (1,000 LB)	
	WIDTH (IN.)	HEIGHT (FT)	LENGTH (FT)							
			SINGLE- UNIT TRUCK	SINGLE- UNIT BUS	SEMI-TR. OR TRAILER	TRUCK- TRACTOR SEMI-TR.	OTHER TRUCK COMB.	SINGLE AXLE	TANDEM AXLE	
AASHO, 1946 ^a	96	12½	35	35	—	50	60	18	32	
AASHO, 1963, 1964, 1968 ^b	102	13½	40	40	40	55	65	20	32	
Dept. of Commerce, Interstate recommendations, 1964 ^c	102	13½	40	40	40	55	65	20	34	
Senate Bill 2658, 1968 ^d (Interstate only)	102	— ^d	— ^d	— ^d	— ^d	— ^d	— ^d	20	36	

^a AASHO, "Policy Concerning Maximum Dimensions, Weights and Speeds of Motor Vehicles to Be Operated over the Highways of the United States." (Apr. 1946).

^b AASHO, "Policy on Maximum Dimensions and Weights of Motor Vehicles to Be Operated over the Highways of the United States." (Oct. 1963).

^c "Maximum Desirable Dimensions and Weights of Vehicles Operated on the Federal-Aid Systems." 88th Cong., 2d. Sess., House Doc. No. 354, Washington, D.C. (1964) pp. 2-6.

^d No limit specified.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDED RESEARCH

A large proportion of the financial resource available to conduct this research was required to meet the objective of developing a complete inventory of oversize-overweight permits issued by different states, including breakdowns to show detailed characteristics of the movements under permit.

The method proposed by the research agency was a sampling survey in each state made with such cooperation as could be obtained from state permit personnel. Unfortunately, limited personnel, work load, and other factors prevented several permit offices from providing much more than access to the permit files and discussion of permit problems. The predominant number of offices, however, drew samples on the basis of procedures established by the research agency and made reproductions of permits for coding and processing. A few states actually coded the permit sample, providing the largest contribution to this research.

The net result was a considerable requirement on the research agency manpower that could not entirely be foreseen. Accordingly, assimilation and interpretation of data to meet stated research objectives 1, 2 and 3 (see Chapter One) used the majority of available funds. This was in accord with the requirements of the study contained in the NCHRP project statement: "The first three objectives are to be completed and as much progress made on objective four as possible within the funds available."

ECONOMIC RESEARCH NEEDS

It is difficult to assess how much progress has been made toward the accomplishment of objective 4. Certainly, interpretations and evaluations of the data collected have gone considerably beyond the bare requirements of objectives 1, 2, and 3. Nevertheless, a sizeable amount of research still will need to be done before objective 4—determination of economic benefits from social and private viewpoints—can be accomplished.

Probably, more can be done with the data already collected. But, mainly, it now will be necessary to collect substantial data from industries and other sources on the economic values to be associated with the commodity movements reported herein. Information needs to be gathered on such things as (a) values (prices) of commodities moved under oversize-overweight permits, (b) cost and time factors of typical movements over the highway or by alternative forms of transportation, (c) problems associated with alternative transportation methods, and (d) changes in values and other effects, both direct and indirect, of inability or difficulty in making movements.

Information also needs to be developed on possible highway costs as related to oversize-overweight permit opera-

tions. Such costs would include (a) estimates of additional construction and maintenance costs as related to permitted oversize-overweight movements, and (b) costs of additional physical provisions to provide more extensively for certain types of movement (for example, costs of additional vertical clearances).

Information also needs to be gathered on the costs of administration and enforcement in the different states, and many other factors that relate to benefits and costs from social and private viewpoints.

Some cost-benefits research on extra-heavy movements currently is being performed in South Africa.³⁶ Research of this nature needs to be reviewed and evaluated.

As a judgment reflecting experience on this project with the viewpoints of many different permit authorities, it is believed that there is little possibility of any substantial gain in the development of uniform practices until such additional research is carried out. Net benefits to the public of having such movements on the highways need to be demonstrated. Costs on the highway and other costs of oversize-overweight administration and enforcement, as well as benefits, need to be known as the bases for developing rational recommendations for fee schedules.

For these reasons, it is recommended that further research be conducted to analyze the economic values of oversize-overweight permit operations to the different users of these permits, to relate these economic values to the public interest, and to make pertinent comparisons of these values with any adverse values relating to the cost of permit administration, enforcement, possible highway damages or maintenance, and values that can be associated with public safety or convenience.

There is considerable reason for further recommending that research in this area encompass economic evaluations as related to legal limits. The two problems are not entirely separate. However, the obvious relationships probably are not the most important.

Although, in a sense, uniformity of oversize-overweight permit operations is impossible without uniformity of basic legal limits, such limits, in fact, have small influence on permits because of reducible load requirements.

Nevertheless, lack of general acceptance of the official national (AASHO) policy on legal sizes and weights has a substantial influence on the probability of acceptance of uniformity in connection with oversize-overweight permits.

Also, sizes and weights administration basically constitutes one general problem area with similar economic impacts on the same kinds of people and similar types of consideration with respect to the highway. Much of the research data gathered in connection with legal sizes and

³⁶ A report by D. J. van Vuuren, of the South African National Institute for Road Research, is expected to be completed soon.

weights limits would be applicable to permit operations. A combined research project would tend to avoid duplication of effort in canvassing industries and agencies for pertinent data.

It is recommended that further research in the area be open-ended—as much to be accomplished as possible in both spheres, with a possible initial project expenditure of between \$150,000 and \$200,000 over approximately two years. Open-endedness is recommended principally because it would be difficult to evaluate in advance the adequacy of the large amounts of related economic data already available through library sources.

It is envisioned that research would involve analyses of incremental costs and benefits related to incremental increases in legal sizes and weights limits, beginning with the lowest limits now used in some states,³⁷ and those related incrementally to different levels of permit control.

Expected accomplishment under a further two-year research project at the level of expenditures noted would include:

1. Complete analysis and meaningful summarization of all data available from library sources on user costs and benefits related to increments of sizes and weights, as well as different permit provisions.
2. Complete analyses and meaningful summarization of all data available from library sources on highway costs related to sizes and weights, including estimated costs in the public safety and convenience sector.
3. Canvass of all appropriate state authorities for costs related to the regulation and enforcement of sizes and weight laws, including permit administration.
4. Development of initial economic relationships from data obtained under the foregoing three items.
5. Design of a data collection scheme to obtain additionally needed data from all sources, with estimates of final cost.
6. Initial collection and analysis of additional data (open-ended).

RECOMMENDATIONS ON SOME CURRENT PROBLEMS

Although additional research into the economics of permit operations needs to be performed before objective recommendations can be made for uniformity in most permit provisions, including fees, some recommendations on current problems can be fully justified from the data assembled in this report. Some of the problems referred to are permit user problems. Others are administrative problems.

The following recommendation reflects the single most important need of industry groups dependent on oversize-overweight permits for “extension and alteration” of current permit operations:

As a priority for policy consideration on oversize-overweight permit operations, it is recommended that AASHTO give early consideration to developing a national policy for uniformity between states on the conditions under which an oversize-overweight permit will be issued.

³⁷ As an example, the largest number of states have axle load limits of 18,000 and 32,000 lb, respectively, for single and tandem axles; eleven states now have single-axle load limits at or exceeding 22,000; seven have tandem limits at or exceeding 36,000 lb.

It is believed that this policy should reflect the philosophy of the large majority of states that any oversize-overweight move should be permitted if there is reasonable indication of substantial economic advantage that will, in some manner, be passed along to a large segment of the public, and if the highways and structures can be reasonably protected.

There appears to be little reason for the variety of upper limits on permitted gross loads in different states. Loads exceeding 100,000 lb gross often appear to be moves of economic importance (transformers, power plant parts, basic industry equipment, etc.) and there appears to be little reason why moves of these types should not be allowed provided:

1. There is not likely to be more damage to the highway over the approved routing than from other normally permitted moves.
2. There is no reasonable alternative to making the movement on highways without excessively large expense, including costly time factors.
3. The load is not reasonably reducible.
4. The movement is of value to a reasonably large sector of the economy.

It is further recommended that:

Permit administrative authorities should take the lead in forming, by regions, permanent committees composed of representatives of the regional states and representatives of the regional permit user interests, to develop joint recommendations for improving uniformity of oversize-overweight permit administration.

Many of the differences in permit administration between states probably do not involve irreconcilable philosophies or technical decisions. Instead, uniformity, although thought of as desirable, is not considered to be a high-priority objective by many of the permit authorities. There generally seems to be a high degree of satisfaction with the way states individually are conducting their own affairs, and not much disposition to change.

These attitudes appear to stem, in large part, from a lack of effective communication between collective industry and permit authorities. Industry often has played a legislative game, opposing virtually all controls on oversize-overweight movements whether such controls are in the general public interest or not. On the other hand, permit authorities in many states appear to view oversize-overweight permit users as antagonists whose sole purposes are to damage the highways or make them unsafe for other travelers. Indeed, in some states, the inflexibility of regulations on such things as axle loadings regardless of numbers of wheels or tires would be difficult to support from possible road damage considerations.

It is also recommended that:

All permit administration authorities should refer requests for movements involving extraordinary loadings of the highways and bridges, not covered by established formula, to the design engineering personnel skilled in determining stresses in roads and bridges.

Highway engineers familiar with state design practices

are the only persons competent to set parameters or make individual decisions on possible road damage from different configurations of load, axles, and wheels.

Where bridge loadings are a consideration, industries often are willing to follow the specifications of the bridge department in providing, at their own expense, protection to the structure. Obviously, this should be a condition for moves where there would be real risk of structural damage. Because of the technical complexities, only engineers experienced in bridge design are competent to set parameters or make individual decisions on possible structural damage.

From the foregoing considerations, and more or less in summary of the previous recommendations, it is the recommended that:

The small number of states with arbitrary upper limits on gross loads or with limits on axle weights regardless of tires, who cannot support such upper limits fully from engineering determinations of load or structural damage inherent in exceeding such limits, should join the large majority of states in removing such arbitrary limits and in considering each extraordinary permit load application on its own merit considering economic justification and possible highway damages.

As another important recommendation:

There should be, as a matter of approved national policy, recommended standards for posting bridges in accordance with such things as design criteria, condition of members, age of structure, and other parameters. Nationally recommended maximum bridge load tables, formulas, or charts also should be developed for occasional loads under permit. These should be related to the standard postings.

Although development of the foregoing recommended standards undoubtedly is a formidable task, it would appear to present the only possibility of achieving uniformity of sizes and weights administration (voluntarily) in a category where variances are large and numerous. Uniformity of application of bridge formulas is particularly important because it is in the major problem area of concern to industry—the area of rules governing whether or not a movement will be allowed under permit.

As a result of history, as well as many discussions with industry and permit officials, it is recommended that:

Development of national policy recommendations for general uniformity of oversize-overweight permit operations should be postponed until such time as recommended research on economic impacts is completed.

Almost any policy recommendation that cannot be objectively supported from the standpoint of the economics involved is almost certain to meet with strong opposition either from industry or from highway agencies. Until policy recommendations can be thoroughly supported by economic analyses, joint industry-state committees probably present the best possibility of making headway toward uniformity.

INTERSTATE AND DEFENSE NEEDS

At least one major problem of moving oversize-overweight commodities is shared by both industry and the Department of Defense. This is the problem of limited vertical clearances. It is not an easy problem to solve because of the high cost of providing vertical clearances, particularly on existing highways where they are not already available.

To provide reasonably for defense needs, as well as to assist industry, the proposal of the Department of Defense to establish a mileage of interconnected routes on the Interstate System where clearances will be at least 16 ft appears to be reasonable. There may be some possibility of minimizing structural changes through development of emergency-use detours around overpasses or interchanges.

Laws and regulations controlling sizes and weights on the Interstate System should be made uniform throughout the country.

If uniformity cannot be developed for sizes and weight administration on the Interstate System, it probably never can be developed. Objectively, there is little to support the variety of regulations governing the use of essentially the same kind of highways. Differences in design axle loads do constitute a problem. The following need to be evaluated in connection with these differences:

1. Differences in design procedures between states using basically the same design axle load: different final serviceability index, materials constants, etc.
2. Numerous repetitions of loads are required to develop road damages. A heavier axle load—within limits—only shortens service life.
3. Design axle loads do not figure in the design of bridges—with the possible exception of pavement surfaces.
4. Road surface thickness design is a rough science at best, because of variations in materials and environment.

Adoption of legislation to establish a basis of uniformity for maximum sizes and weights anywhere on the Interstate System, including sizes and weights under permit, would have a significant influence as a step toward more over-all uniformity of sizes and weights, including operations under permit.

COSTS, FEE SCHEDULES, AND ADMINISTRATIVE PROCEDURES

In most conversations with industry representatives, fee schedules were not presented as a problem except in a few states. This probably does not mean that fees are considered unimportant; but, instead, that reasonable provisions for needed movements are more important. Some states, according to their authorities, are not following their own philosophies of permit issuance in recovering enough through fees to pay the cost of permit issuance. All in all, however, the fee question does not seem to pose any particular problems for industries or permit agencies. Nevertheless, it could be a problem in reciprocal agreements between states, if these ever come to pass.

Difference in controls over permit issuance between states

is significant. However, it does not necessarily follow that states which reserve all overweight and certain oversize issuances to headquarters have the best control. Other states have established specific parameters—including route maps—for “routine” issuance in the case of repetitive movements. District or resident offices, port-of-entry stations, or clerk-agents can follow the rules quite easily, providing more convenience to industry. Some permit offices maintain a continuous communication network with subordinate offices or agents. Details of applications are copied rapidly and approval given or withheld for further checking over the telephone or radio. All of these have potential to be good control systems.

EXTENSION OF LEGAL LIMITS

Extension of legal limits is a device that should be given more consideration by states in lieu of multiple-trip permits. If a justified exception to legal limits, ordinarily provided for by multiple-trip permit anyway, can be built into law, a lot of time and paper work is saved.

ENFORCEMENT RESEARCH NEEDS

The variances in the type and quality of enforcement of sizes and weights legislation indicate a need for research to be conducted on a national basis to determine optimum levels of enforcement and to evaluate the effectiveness of different methods of organization and enforcement procedures.

As well as studying the cost-effectiveness of different stationing and uses of officers and equipment as related to the proportion of probable violators accosted under different conditions of environment and traffic, the research also should be directed toward a determination of the effect on numbers of violations of different levels of enforcement tolerances, different citation procedures, and different dispositions of cases or amounts of fines.

Pending the outcome of this kind of study, some interim comments, based on discussions and field observations made during the course of this research, may be helpful.

First, it was observed that hit-and-run enforcement schedules at different scales and sites is considered to be an effective way of obtaining maximum enforcement with minimum manpower.

Coupled with this, the establishment of portable scale sites off the traveled way is preferable to the more usual method of pulling vehicles to the side of the road, anywhere, because of safety considerations and the ability to plan enforcement patterns.

To obtain a high quality of sizes and weight enforcement requires separate field units of weight enforcement officers, whether part of the state police or another state agency. If part of the state police, officers in these units may be required to respond to other emergency matters in the immediate vicinity of their duties. Such requirements on their time should be carefully controlled, however, if effective enforcement is to result.

APPENDIX A

INITIAL QUESTIONNAIRE ON ISSUANCE AND RECORDING OF OVERSIZE-OVERWEIGHT PERMITS

Preliminary to the collection of data concerning oversize-overweight permit operations in the states, it was necessary to become familiar with their issuance practices and the form and locations of their permit records. Answers to the following questions served this function:

1. What office(s) in your organization perform the duty of issuing permits? Please list name(s) and location(s).
2. Descriptively name the various major classifications of permit issued, by vehicle type, load type, route type, etc., assuming these are available. Major classifications should be more specific than overwidth, overlength, etc.
3. How many permits are issued annually in your state? Break down by the major classification, if possible.
4. What is the most recent year for which your permit

records would be complete and accessible for sampling?

5. Please provide copies of regulations and manuals regarding issuance of permits.

6. What office(s) in your organization perform the duty of keeping permit records? Please list name and location. It is assumed that the permits are maintained at these locations.

7. In what form are the permit records kept? (For example, carbon copy file, computer tape, punch cards, etc.) Please submit example.

8. If your permit records are dispersed is it possible to bring together in one place a representative statewide sample for purposes of this study?

9. For how many years are permit records maintained?

APPENDIX B

INTERVIEW QUESTIONS

A. ORGANIZATION AND PROCEDURES

1. Where do permit operations fit into the Department's organization chart?
2. Obtain names and titles of all superiors to the permit section.
3. Do other agencies either authorize or issue oversize-overweight permits?
4. Are there limited or unlimited exceptions for military movements?
5. Are there limited or unlimited exceptions for any class of movement or commodity? Explain. For example, exceptions may be made by either legislation or administrative directive.
6. Are there special requirements or exceptions for government vehicles?
7. Describe the order of events involved in obtaining a permit. What data must the prospective permittee submit? What does the permit office do to determine the desirability of issuing the permit?
8. Does the depth of permit application analysis vary with weight, size, or type of movement and commodity? How so?
9. What advantages or disadvantages are found in the state's permit operation regarding control over oversize and overweight movements?
10. What organizational changes would bring about improvement in operations?

B. LAWS AND ENFORCEMENT

1. When is a permit required by law?
2. How much enforcement tolerance is allowed on the legal limits? (This is known to vary widely from state to state.)
3. Are there exceptions to the law requiring permits?
4. Are there size and weight limitations beyond which a permit will not be issued? What are these?

Note: Regarding enforcement, visit the enforcement agency.

5. How strict is the enforcement of legal limits? What is proportion of warning citations to arrests?
6. What is the schedule of fines or penalties for hauling over legal limits without permit?
7. How strict is the enforcement of permit restrictions? Is any tolerance permitted?
8. What is the schedule of fines or penalties for non-compliance with permit restrictions?
9. How effective is enforcement?
10. If possible, obtain a summary of violations, both of legal limits and permit restrictions.

11. Are some vehicles more prone to violation than others? For example, do vehicle movements originating in one state tend to be in violation of restrictions and legal limits?

12. Are there any impending changes in size and weight legislation or policy? Discuss.

13. Determine the nature and extent of interstate reciprocity and compact agreements regarding oversize-overweight permit operations.

C. PERMIT CHARACTERISTICS

1. What is the cost of a permit? Obtain a fee schedule.
2. What exceptions are there to this schedule?
3. What types of permits are issued? (Blanket, single-trip, annual, etc.) In detail describe the characteristics and restrictions of each type.
4. If available, obtain annual and monthly summaries of permits issued and fee collected for each type of permit.
5. Where and how are permits issued? Obtain summaries.
6. Regarding multiple-trip, blanket, and annual permits, discuss methods of maintaining control of movements made under these permits.
7. Discuss the audit and disposition of permit fees.
8. Are there different classes of permits for the various state highway systems?
9. Do some permits restrict movements to certain seasons? For example, in areas where spring breakup is common, are certain movements restricted to frozen roadways only?

D. PERMIT RECORDS

1. How are permits filed?
2. To what purpose are the permit records put?
3. Has any previous research, formal or informal, been performed utilizing data from the state's permit records? If so, obtain name of researcher and title of report.

E. ECONOMIC EFFECT

1. Are certain industries more dependent on the ability to acquire permits than others? Explain.
2. Which state industries are most dependent on this ability?
3. Are permit practices designed to favor state industries?
4. Are certain industries discriminated against?
5. What are the foreseeable transportation needs of state industry with regard to extension or alteration of permit operations?

F. STATE TOLL FACILITIES

1. What are the legal limits and permit restrictions on toll facilities?
2. Does the state permit agency issue permits for toll facilities?
3. If not, who should be contacted at the toll authority? (Researcher should contact authority if it is situated in the same city.)
4. Are there permits specifically issued to permit entrance and exit movements between toll facilities and truck terminals?

G. INSURANCE

1. What is the minimum legally required insurance coverage for oversize-overweight vehicles? Does this vary with either weights, dimensions, or commodities?
2. What procedure is followed to insure compliance with these regulations?
3. Is the state in any way liable for damages to persons or private or public property arising from a permitted movement of oversize or overweight vehicles?
4. Are there devious ways of avoiding the insurance requirements? For example, cancellation of insurance after permit has been issued.
5. What penalties are applied for non-compliance with insurance regulations?

H. DATA COLLECTION

1. Calendar 1966 is the sample year.
 - (a) If the permits file is kept by calendar year and 1966 is available, no problem exists.
 - (b) If the permit file is kept on a fiscal year basis, determine whether the first half of fiscal '67 is available and whether it can be combined with the second half of fiscal '66 to form a calendar '66 sample.
 - (c) If (b) is not possible, accept fiscal '66 as the best possible sample source.
 - (d) If neither fiscal '66 nor calendar '66 is available, use the most recent year, fiscal or calendar, for sampling purposes. In addition, acquire the annual total number of permits issued, if readily available, for four or more years past. These additional data will indicate whether or not and to what extent a projection needs to be made.
2. Concerning the files, determine the following:
 - (a) Are applications filed with permits? If not, use applications file.
 - (b) Determine whether all permits are filed together or by permit type.
 - (c) Order of filing—date of issuance, serially, alphabetically, or otherwise.
 - (d) A predetermined sample size will be designated prior to each visit.
 - (e) Can individual permits or portions of the file be removed for any period of time?
 - (f) If not, why not? Who should be contacted to

obtain permission to remove permits? Emphasize that this study is a special case and probably beyond the intent of regulations restricting removal.

- (g) Designate the order of sampling.

* * *

5. Alternate methods of collecting the sample, in order of preference.

- (a) Will the state collect, code, and punch the permits sample? If so, provide coding instructions and coding materials to the state coders and the coders' supervisor. Do some coding yourself to determine possible pitfalls. This is desirable whether or not the state is coding the data.
- (b) If the state will not punch the data, determine if they will collect and code the sample. Provide coding materials and instructions and have the coded data sent to the research agency.
- (c) If the state will neither code nor punch the sample, ask them to draw the sample, reproduce it, and send it to the research agency. Explore all levels of management to obtain permission to remove from the department the sample or a reproduced copy of the sample.
- (d) If it is absolutely impossible to take a sample from the department and the department offers no assistance, a research agency coder will be placed in the state office to perform the coding. Therefore, obtain permission to do so. Also, be sure of understanding how the files are arranged. Obtain the coder from a local temporary personnel service.

6. Other alternatives—Some items of data may not be available from the sample. In these cases ask the state's assistance in the following ways:

- (a) Ask the state to keep a current tally of missing items as they issue permits. For example, method of issuance could be sampled for several weeks to determine the breakdown between the various methods.
- (b) Rare events, such as extraordinarily heavy loads or rarely issued permit types, may best be collected by asking the permit personnel to recall and pinpoint individual permits.
It is desirable to collect a 100 percent sample of extra-heavy movements, defined either as 100,000 lb plus or by the state's definition, whichever is acquired most easily.
- (c) Determine whether rare movements may be identified by specific characteristics or combinations of characteristics.

Finally, the researcher should obtain copies of all forms, state maps, regulations, bridge formulas, vehicle code, loadometer studies, and any other pertinent data.

APPENDIX C

METHOD OF CODING STATE PERMITS SAMPLES

The code sheet used to record for processing the data contained on the state oversize-overweight permits contained 29 items coded in 66 columns. The coding was all numerical. Each item and its related coding are discussed in the following.

Columns 1, 2—State That Issued the Permit

Code	State	Code	State
01	Alabama	26	Nevada
02	Arizona	27	New Hampshire
03	Arkansas	28	New Jersey
04	California	29	New Mexico
05	Colorado	30	New York
06	Connecticut	31	North Carolina
07	Delaware	32	North Dakota
08	Florida	33	Ohio
09	Georgia	34	Oklahoma
10	Idaho	35	Oregon
11	Illinois	36	Pennsylvania
12	Indiana	37	Rhode Island
13	Iowa	38	South Carolina
14	Kansas	39	South Dakota
15	Kentucky	40	Tennessee
16	Louisiana	41	Texas
17	Maine	42	Utah
18	Maryland	43	Vermont
19	Massachusetts	44	Virginia
20	Michigan	45	Washington
21	Minnesota	46	West Virginia
22	Mississippi	47	Wisconsin
23	Missouri	48	Wyoming
24	Montana	51	Dist. of Columbia
25	Nebraska		

Columns 3, 4, 5, 6—Identification Code

Because of the large number of permits being coded, it was necessary to assign each permit and respective line of coded data a unique identity. The identification (ID) code serves this purpose. When permits contained permit numbers, the last four digits were used as the ID code. When the permits lacked numbers, consecutive numbers were assigned.

Column 7—Place of Issuance

0	Port of entry
1	Weigh station
2	Highway patrolman
3	Headquarters (state capitol)
4	District offices or barracks
5	Maintenance residencies

6	Permit office (sole purpose)
7	Toll booth
8	Private agency
9	Unknown

In most states the distinction was clear as to where the permit was issued. However, in several states the permit was obtained in district offices, but only after receiving permission from the headquarters or central office. Permits issued this way were interpreted as being issued by the headquarters office because the other offices have no actual authority to issue permits.

Some states did not identify the type of office from which a permit was issued. This problem was solved in some states by obtaining lists of personnel and the location and type of office to which they were attached. By checking these lists, it was possible to determine the correct place of issuance.

"Headquarters" was defined as the central office of the responsible department.

"Permit office (sole purpose)" was defined as an office, separate and distinct from the district organization structure, having permit operations as its sole function.

"Private agency" was defined as a private person or agency issuing permits under state franchise.

Column 8—How Issued

0	Mail
1	In person before trip
2	Telegram
3	TWX
4	Telefax
5	Telephone
6	In person en route
9	Unknown

The ability to code this item accurately varied widely. In many states it was not possible to differentiate between permits issued by mail and permits issued in person or between permits issued by telegram, TWX, or Telefax. Where this problem existed the coders were instructed to code mail and in-person as "mail," and telegram, TWX, and Telefax as "telegram." Where it was not at all possible to code this item to these broad categories, the "unknown" code was used.

Determination of the correct code required interpretation in some cases. For example, some permits indicated that the fee was paid with cash. Such a permit reasonably was assumed to have been issued in person. Had it been a telegram, the permit would have indicated payment by money order or wire.

Columns 9, 10, 11, 12—Cost

Permit fees were coded to the nearest \$0.10. If the fee exceeded \$999.70 the coder was instructed to code it "9998," which indicates that the space allowed for coding has been exceeded.

Column 13—Oversize

- 0 Overlength
- 1 Overwidth
- 2 Overheight
- 3 Overlength and overwidth
- 4 Overlength and overheight
- 5 Overwidth and overheight
- 6 Overlength, overwidth and overheight
- 7 Oversize, dimensions not specified
- 8 Not oversize
- 9 Unknown

This item was easily determined by comparing the stated dimensions against the legal limits. Some permits actually indicated legal dimensions as "legal," thereby precluding the necessity of the comparative check.

Column 14—Overweight

- 0 Gross load exceeded
- 1 Axle limit exceeded
- 2 No overweight
- 3 Gross load and axle limits exceeded
- 4 Overweight, type not stated
- 5 Special case (Michigan)
- 9 Unknown

Similar to the oversize item, the coding categories were determined either by comparison with legal limits or directly from statements on the permit. Comparisons were more complex, however, because legal gross weights vary with axle spacing and number of axles. In some instances it was difficult or impossible to determine whether axle overloads were covered. By reference to state policies, it sometimes was determined that no axle overloads were ever allowed or that a standard overload was allowed.

Column 15—Permit Type (Number of Trips)

- 0 Single trip, one way
- 1 Single trip, round trip
- 2 Multiple trip
- 9 Unknown

In almost all cases this item was determined readily. The few exceptions involved permits entitled, "single trip" that allowed a 30-day time limit and specified both origin and destination. These were coded as single-trip permits.

Columns 16, 17, 18—Actual Number of Trips

The number of trips was obvious for the single-trip permits. This item was necessary to determine the number of trips made under multiple-trip permits. Unfortunately, with the exception of a few states, multiple-trip permits do not

indicate the number of trips made under the permit. This lack of information is one reason why a special survey of some holders of multiple-trip permits was made.

Column 19—Time Limit

- 0 3 days or less
- 1 7 days or less
- 2 10 days or less
- 3 15 days or less
- 4 1 month or less
- 5 3 months or less
- 6 6 months or less
- 7 9 months or less
- 8 Annual
- 9 Unknown

This item was determined by counting the number of days between and including the date of issuance and the date of expiration. Weekends or other days when movement is not permitted were not subtracted from the total.

Column 20—Specified Highway Routes

- 0 Identified routes
- 1 State primary system including Interstate
- 2 State primary system excluding Interstate
- 3 Limited to state secondary routes
- 4 Toll road only
- 5 Routes peripheral to a toll road
- 6 Physical limitations
- 7 State systems generally
- 8 Not specified
- 9 Unknown

The purpose of this item was to identify the types of routes over which over-limit movements are made. This objective was accomplished in part only. Code "0," identified routes, almost always was used for single-trip permits. The multiple-trip permits usually were limited by physical limitations or to state systems generally. The coding did not contain a specific category for radius or geographical limitations. These were coded "7," state systems generally, because the limitation was to state highways, but in a certain area only.

Column 21—Type of Carriage

- 0 Single-unit vehicle
- 1 House-trailer combination
- 2 Truck and trailer (2 unit)
- 3 Truck and train (3 unit)
- 4 Special truck or specially designed vehicle
- 5 Self-propelled machinery
- 6 Dollies, skids, rollers
- 7 House-moving truck unit
- 8 Towed unit
- 9 Unknown

Most categories in this item are self-explanatory. Regarding the exceptions the coders were instructed as follows:

Code 4, special truck or specially designed vehicle, was defined as any hauling vehicle which varied from the nor-

mal unit configuration for truck and trailer combinations, but did not include special house-moving truck units. For example, a three-axle tractor with two-axle semitrailer was coded "2." The same units, when beefed up with additional dollies or special equalizers were coded as special trucks. Units with more than six axles were classified as special. In several instances, excessive gross weight indicated that a special vehicle was used.

Code 5, self-propelled machinery, included truck-cranes, scrapers, self-propelled combines, lumber (not log) haulers, etc.

Code 8, towed unit, referred to movements where the commodity (for example, a combine or a scraper) was pulled along the highway on its own wheels rather than on a trailer.

Column 22—Commercial Class

- 0 Private
- 1 For hire
- 2 Dealer or manufacturer
- 3 Rental
- 4 Military
- 5 Government, not military
- 9 Unknown

This item required the greatest use of judgment on the part of the coders. The correct code was determined from the name of the permittee. The commercial class was defined as the relationship of the permittee to the commodity being hauled. It was the determination of this relationship that required judgment. The ground rules given the coders are as follows:

Code 0, private. If the permittee owned the commodity, the commercial class was considered to be private. For example, if the permittee was a construction company, it was assumed that they were moving their own equipment. The type of commodity also affected the decision. For example, if the permittee was "John Smith" and the commodity was a mobile home, the assumption was made that John Smith was moving his own home and therefore was coded private. Returns from the multiple-trip permit survey support this assumption.

Code 1, for hire. Any permittee with a name like "Morgan Driveaway," "Pacific Intermountain Express," or "Ajax Trucking" was assumed to be for hire. In a few states, the name of the hauler and the owner of the commodity were given. When these differed, it was assumed that the hauler was for hire.

Code 2, dealer or manufacturer. Most dealers could be identified by their names. For example, "trailer sales," "equipment company" and other similar titles indicated dealer. Manufacturers could be identified by name and commodity. For example, if Inland Steel was hauling steel beams, it was assumed that they were delivering one of their own products.

Code 3, rental. This category was difficult to determine because the permittee would not be listed as a rental company, except in a few rare cases. There may have been some permittees hauling rented equipment, but under the other ground rules they would not have been coded rental.

Codes 4 and 5, military and government. Both of these are obvious from the name of the permittee.

Columns 23, 24—Commodity

- 0 Trailers
 - 00 Trailer, type unknown
 - 01 Mobile homes
 - 02 Mobile offices
 - 09 Empty trailer
- 1 Construction
 - 10 General
 - 11 Equipment
 - 12 Materials, bulk
 - 13 Structural members
 - 14 Booms
 - 15 Piling
 - 16 Motor crane (special sample only)
- 2 Mining
 - 20 General
 - 21 Equipment
 - 22 Products
 - 23 Oil-well equipment
- 3 Forest
 - 30 General
 - 31 Equipment
 - 32 Spars
 - 33 Logs and other
- 4 Agriculture
 - 40 General
 - 41 Product
 - 42 Livestock
 - 43 Machinery
 - 44 Haystacks
 - 45 Nursery (trees)
- 5 Industry
 - 50 General
 - 51 Machinery
 - 52 Products
- 6 Marine
 - 60 General
 - 61 Machinery
 - 62 Boats
- 7 Public utility
 - 70 General
 - 71 Transformers
 - 72 Generators
 - 73 Nuclear reactors
 - 74 Pipes
 - 75 Poles
 - 76 Pipes or poles
- 8 Military
 - 80 General
 - 81 Equipment
 - 82 Missiles
 - 83 Missile or rocket components
 - 84 Aircraft parts (not necessarily military)
- 9 Other
 - 90 Miscellaneous
 - 91 Houses
 - 92 Other buildings

- 93 Tanks, bins, extra-large pipe, ovens
- 94 Miscellaneous machinery
- 95 Automobiles and other vehicles
- 96 Airplanes (complete)
- 97 Electronics
- 98 Medical equipment
- 99 Unknown

These commodity codes generally were satisfactory. It sometimes was necessary to stretch a definition or draw lines regarding certain commodities. The following are examples of such definitions:

Scales—If hauled by a construction company, these were coded as construction, equipment. If hauled by a trucking firm, these were coded as industrial, general.

Construction forms—These were coded as either structural members or construction, general, depending on whether they were made of steel or wood, respectively.

Heaters—These were coded as miscellaneous. The general categories were necessary to accommodate the coding of commodities that did not clearly fit into more specific categories but were related to a specific industry.

Columns 25, 26—Origin of Trip, by State

Columns 27, 28—Destination of Trip, by State

These two items were coded according to the state codes given for Columns 1 and 2. In addition, codes for Canada (80), Mexico (90), out-of-state, state unknown (98), and unknown (99) were used.

Origin and destination are misnomers for some interstate movements because no state identified origins or destinations beyond the state lines. Therefore, it was possible to determine only that an interstate movement entered from or exited to an adjacent state. In one state it was possible to identify from the destination of the telegraphic permit a further point on the route of movement. This still did not identify the true origin; that is, there was no way of telling whether this was the actual origin.

Columns 29, 30—State in Which Hauling Vehicle Is Licensed

Again, the same state codes were used. The state of the truck or hauling vehicle was used when the state of license of the truck and the trailer were different.

Columns 31, 32—Month Permit Issued

01	January	08	August
02	February	09	September
03	March	10	October
04	April	11	November
05	May	12	December
06	June	99	Unknown
07	July		

Columns 33, 34, 35, 36—Trip Length Within State

This item was recorded to the nearest mile. The trip length

recorded for multiple-trip permits—if known—was the trip length of one trip or the average trip length.

Column 37—Dimensions and Weights

- 0 All dimensions and weights are actual
- 1 All dimensions and weights are maximum allowable
- 2 Dimensions are actual, weight is maximum allowable
- 3 Dimensions are maximum allowable, weight is actual
- 9 Unknown

This item referred to the way dimensions and weights were labeled on the permit. That is, were the weights actual or were they a maximum allowable? For example, the overweight permits in one state allowed a maximum axle weight of 30,000 lb. No other weight was given. The axle weights were coded at that weight.

Columns 38, 39, 40—Overall Length

This item was expressed in feet. If the length was legal, the coder has the option to code either the actual length, if given, or "000."

Columns 41, 42, 43, 44—Overall Width

Overall width was coded in either feet and inches or in inches. Columns 41 and 42 were for feet and Columns 43, 44, and 45 were for inches. A width of 10 ft 5 in. could have been coded either "10005" or "00125." The coder had the option to code this item "00000" if the width was legal.

Columns 46, 47, 48, 49, 50—Overall Height

Overall height was coded in either feet and inches or in inches. Columns 46 and 47 were for feet and columns 48, 49, and 50 were for inches. A height of 15 ft 3 in. could have been coded either, "15003" or "00183." The coder had the option to code this item "0000" if the height was legal.

Columns 51, 52, 53, 54—Gross Weight

Gross weight was coded to the nearest 100 lb. For example, a gross vehicle weight of 98,650 lb would have been coded as "0987." The coder had the option to code this item "0000" if the gross weight was legal.

Columns 55, 56, 57—Axle Weight

Axle weight was coded to the nearest 100 lb. The coder had the option to code this item "000" if the axle weight was legal.

Columns 58, 59—State Categories

- 00 Other coding adequate
- 01 Radius permits, Colorado
- 02 Local moves, Florida
- 03 Long-distance moves, Florida
- 04 Heavy loads limited, Maine
- 05 Season permits, Minnesota
- 06 Period or area permits, Minnesota

- 07 25-mile radius, New York
- 08 Soil conservation, Oklahoma
- 09 Mobile-home open-end, South Carolina
- 10 Special log tolerance, Washington
- 11 Additional tonnage, Washington
- 12 Restricted route, Washington
- 13 Overhang, Utah
- 14 Logging, Wyoming
- 15 Overhang, Washington
- 16 Overhang, Arizona
- 17 Overhang, Idaho
- 18 Overhang, New Mexico
- 19 Overhang, Colorado

This item was included to allow for the identification of unique state classifications of over-limit. Except for the overhang categories, it was not necessary to use these codes.

Column 60—Axle Group

- 0 Single
- 1 Tandem (double)
- 2 Tridem (triple)
- 3 Four-axle group
- 9 Unknown

This item indicates the number of axles in the axle group carrying the weight recorded in Columns 55, 56, and 57. In many cases the coders had to select between an overweight single-axle and an overweight double-axle group. They were instructed to record the actual weight of the group that was the most overweight; that is, the legal weight subtracted from the actual weight.

Column 61—Sample Group

This column became redundant with the addition of the sample adjustment factor. Its original purpose was to differentiate between sample types.

Columns 62, 63, 64, 65, 66—Sample Adjustment Factor

Because the states maintain summaries of permit issuance, it is possible to obtain exact numbers of permits issued for various classifications. These summaries were used to adjust the permit samples. The procedure used was as follows:

1. The sample was broken down by the same categories as the state's summary.

2. The adjustment factor was calculated by dividing the actual number of permits issued of a specific category by the sample size for that category. The adjustment factor was carried to two significant decimal places. For example, if the state summary indicated that 5,273 permits were issued for 10-ft-wide mobile homes and the sample of permits for 10-ft-wide mobile homes was 153, the adjustment factor for these samples would be $5,273/153 = 34.46$; that is, one sample permit is equivalent to 34.46 actual permits. The adjustment factor was coded "03446."

Remarks

A remarks column was provided so the coders could note any questions arising during the coding for later explanation or interpretation.

APPENDIX D

SPECIAL SAMPLES LOG SHEET

CARRIER'S NAME _____ CITY _____ STATE _____ MONTH _____

DATE	ALL STATES IN WHICH PERMITS WERE ACQUIRED	COMMODITY HAULED	FROM (STATE)	TO (STATE)	LENGTH OF TRIP (MILES)	GROSS VEHICLE WEIGHT (LBS)	DIMENSIONS			QUESTIONS*	
							L (FT)	W (FT-IN)	H (FT-IN)	A	B

*Answer "YES" or "NO"

QUESTION A: Was any part of this trip made on the Interstate Highway System?

QUESTION B: Was it necessary due to restrictive state regulations to travel in part on county roads?

APPENDIX E

STATE OVERSIZE-OVERWEIGHT PERMIT FEE SCHEDULES

STATE	FEE (\$)	CONDITIONS																														
Alabama	Free	All types of permits.																														
Arizona	5.00	All types of permits.																														
Arkansas	5.00	Per permit; plus, for <i>each ton or major fraction thereof in excess of 56,000 lb</i> , excluding the front axles, as follows: <table><tr><td></td><td>On first 5 tons</td><td>On next 5 tons</td><td>On any additional tonnage</td><td></td></tr><tr><td></td><td>1.00</td><td>2.00</td><td>3.00</td><td>not more than 100 miles</td></tr><tr><td></td><td>1.50</td><td>2.75</td><td>4.00</td><td>101 to 150 miles</td></tr><tr><td></td><td>2.00</td><td>3.50</td><td>5.00</td><td>151 to 200 miles</td></tr><tr><td></td><td>2.50</td><td>4.25</td><td>6.00</td><td>201 to 250 miles</td></tr><tr><td></td><td>3.00</td><td>5.00</td><td>7.00</td><td>over 251 miles</td></tr></table>		On first 5 tons	On next 5 tons	On any additional tonnage			1.00	2.00	3.00	not more than 100 miles		1.50	2.75	4.00	101 to 150 miles		2.00	3.50	5.00	151 to 200 miles		2.50	4.25	6.00	201 to 250 miles		3.00	5.00	7.00	over 251 miles
	On first 5 tons	On next 5 tons	On any additional tonnage																													
	1.00	2.00	3.00	not more than 100 miles																												
	1.50	2.75	4.00	101 to 150 miles																												
	2.00	3.50	5.00	151 to 200 miles																												
	2.50	4.25	6.00	201 to 250 miles																												
	3.00	5.00	7.00	over 251 miles																												
	Free	Multiple-trip permit for special oil-field rigs.																														
California	Free	All types of permits.																														
Colorado	1.00	All types of permits.																														
Connecticut	Free	All types of permits.																														
Delaware	5.00	Plus \$0.02 per ton-mile for all weight above the licensed gross load of the vehicle or vehicle combination, or for weight above the maximum shown on the loading chart, whichever is least.																														
	12.50	30-day permit for tractor with pole trailer.																														
Florida	5.00	Single trip, overdimension only.																														
	20.00	12 month, overdimension only.																														
	7.00	Single trip, overweight only (not to exceed 100,000 lb).																														
	25.00	12 month, overweight only (not to exceed 100,000 lb).																														
	8.00	Single trip, overweight and overdimension (not to exceed 100,000 lb).																														
	30.00	12 month, overweight and overdimension (not to exceed 100,000 lb).																														
	15.00	Single trip only, overweight and/or overdimension (100,000 to 150,000 lb)																														
	25.00	Single trip only, over 150,000 lb.																														
	5.00	Single trip, house trailer.																														
	20.00	12 month, house trailer.																														
	15.00	Single trip only, buildings.																														
Georgia	1.00	Single trip.																														
	10.00	Multiple trip.																														
Idaho	3.00	Single trip, overweight to 25% over legal weight and/or oversize.																														
	25.00	30 calendar days, overweight to 25% over legal weight and/or oversize.																														
	25.00	Single trip, overweight in excess of 25% over legal weight.																														
		Oversize mobile homes:																														
	3.00	Single trip, overlength and legal width.																														
	5.00	Single trip, overwidth and overlength.																														
	25.00	30 calendar days, overwidth and/or overlength.																														

STATE	FEE (\$)	CONDITIONS
Illinois	2.00	Single trip.
	5.00	Limited continuous operation permit.
Indiana	10.00	Overdimension; if more than 100 miles, add \$0.10 per mile up to \$50 maximum for oversize.
	10.00	Overweight; if more than 40 miles, and \$0.25 per mile up to \$50 maximum for overweight.
	Free	Annual permits for mobile homes 10 ft or less.
	25.00	Per trip for mobile homes over 10 ft wide.
Iowa	3.00	Single trip other than mobile homes or house trailers.
	10.00	Unrestricted special other than for mobile homes or house trailers.
	10.00	Annual to an individual vehicle.
Kansas	2.00	State issues only single-trip permits.
Kentucky	15.00	Single-trip trucking, oversize or overweight.
	15.00	Extended permit, unlimited trip not for overweight.
	5.00	Single trip, mobile home.
	20.00	Annual, mobile home.
Louisiana	1.00	Each overlength, overheight, and overwidth permit, which may be given on a month-to-month basis. Overweight permit fees charged in accordance with weight/axle schedule as follows (weight of front axle excluded):
		Three load-carrying axles:
	25.00	50,001 to 60,000 lb.
	50.00	60,001 to 66,000 lb.
		Four or more load-carrying axles:
	25.00	64,001 to 80,000 lb.
	50.00	80,001 to 84,000 lb.
	75.00	84,001 to 88,000 lb.
	100.00	88,001 to 92,000 lb.
	150.00	92,001 to 96,000 lb.
	250.00	96,001 and over (movement must be approved by Dept. of Highways).
	25.00	Vehicles classified as mobile units used exclusively as off-the-road equipment, when in excess of the maximum weight permitted for that type of vehicle, regardless of amount of overweight, traveling under own power.
Maine		If more than one limit is exceeded, the permit fee is required on only one limit—that requiring the higher fee. An overweight permit is needed for weights in excess of 32,000 lb on a two-axle vehicle, or 51,800 lb on a three-axle vehicle, or 66,300 lb on a four-axle vehicle, or 73,280 lb on a five- or more axle vehicle.
	2.00	For up to 5,000 lb excess weight.
	1.00	For each additional 5,000 lb up to a maximum of \$10.
	2.00	For up to 2 ft in excess of 8½-ft width.
	1.00	For each additional foot up to a maximum of \$10.
	2.00	For up to 5 ft in excess of 14-ft height.
	1.00	For each additional foot up to a maximum of \$10.
	2.00	For up to 15 ft in excess of 55-ft length.
	1.00	For each additional 5 ft up to a maximum of \$10.
Maryland	10.00	Single trip, oversize.
	10.00	Single trip, overweight not exceeding 45 tons GVW, plus \$1.00 for each ton in excess of 55.
Massachusetts	Free	All types of permits.
Michigan	Free	All types of permits.
Minnesota	5.00	Single-trip permits.
	25.00	Contractors seasonal permits.

STATE	FEE (\$)	CONDITIONS
Mississippi	Free	Oversize.
	25.00	Per 1,000 lb per mile in excess of legal GVW.
Missouri	2.00	All types of permits.
Montana	3.00	Single or multiple trip, overdimension only.
	8.00	Single or multiple trip, overweight, 100 miles or less.
	18.00	Single or multiple trip, overweight, 101 to 200 miles.
	28.00	Single or multiple trip, overweight, over 200 miles.
		Loads in excess of 15 ft overwidth, 70 ft overlength, and overheight in excess of a limit determined by the SHC will be limited to single-trip permits.
Nebraska	2.00	Single trip, Nebraska-licensed vehicle(s) not over 10 ft wide, 14 ft 6 in. high, 40 ft long (single unit) or 65 ft long (combination of units).
	2.00	Farm machinery.
	25.00	Single trip, Nebraska-licensed vehicle(s) over 10 ft wide, 14 ft 6 in. high, 65 ft long, 80,000 lb GVW on 5 axles, 20,000 lb on a single axle, 40,000 lb on a tandem axle, legal axle weight for axle spacing or licensed gross load.
	25.00	Single trip, out-of-state vehicle(s) not over 10 ft wide, 14 ft 6 in. high, 40 ft long (single unit) or 65 ft long (combination of units).
	10.00	Single trip, overdimension vehicle not requiring registration.
	10.00	Single trip, buildings over 16 ft wide.
	10.00	Single trip, out-of-state vehicle(s) over 10 ft wide, 14 ft 6 in. high, 65 ft long, gross weight, axle weight or axle weight for axle spacing.
	10.00	Single trip, cabin trailer over 10 ft wide under tow.
	5.00	Continuous operation.
	25.00	Per quarter for manufacturers, continuous operation.
Nevada	Free	All permits issued.
New Hampshire	5.00	Single trip, oversize, does not apply to mobile homes or buildings.
		Single trip overweight:
	5.00	50,000 lb or less.
	6.00	50,001 to 60,000 lb.
	7.00	60,001 to 70,000 lb.
	8.00	70,001 to 80,000 lb.
	9.00	80,001 to 90,000 lb.
	10.00	90,001 to 100,000 lb.
	10.00	Over 100,000 lb, plus \$2.00 for each additional 10,000 lb or major fraction thereof.
	100.00	Special annual permit limited to dimensions not in excess of 13 ft 6 in. height, 75 ft length, 10 ft width; 80,000 lb weight.
	25.00	Limited distance; special annual permit to cover all types of moves for a specified unit within a radius of 25 miles from applicant's home location. Limited to dimensions not in excess of 13 ft 6 in. height, 75 ft length, 10 ft width, 80,000 lb weight, and units registered in New Hampshire.
	5.00	Single trip, mobile homes not over 10 ft wide.
	5.00	Special permit for single-trip movements of mobile homes not over 10 ft wide.
	100.00	Special annual permit for movements of mobile homes up to 10 ft wide and 75 ft long.
	25.00	Special annual permit for movements of mobile homes

STATE	FEE (\$)	CONDITIONS
		up to 10 ft wide and 75 ft long within a radius of 25 miles from applicant's home location. Issued only to cover units registered in New Hampshire.
	5.00	Building moving permit. For movements of buildings in excess of 12 ft in width, an additional \$20 charge is made for engineering inspection.
New Jersey	5.00	All permits issued.
New Mexico	2.50	Single trip.
	10.00	Annual permit for overdimension; may include a provision for excessive weight if the operation is in an area not more than 10 miles beyond any municipality limits.
	25.00	Per day for police escort for home or building move in excess of 20 ft wide or a distance greater than 5 miles.
	2.50	Special permit for implements of husbandry when required by law.
New York	7.00	Single-trip permit.
	10.00	Monthly 25-mile radius permit for each towing and each self-propelled vehicle.
	75.00	Annual 25-mile radius permit for vehicles of contract and trucking concerns.
	75.00	Multiple-trip annual permit for movement of mobile homes, truckers, and others.
	100.00	Each building move.
North Carolina	Free	All permits issued.
North Dakota	3.00	Single trip.
	3.00	Identification supplements.
	5.00	Single trip, mobile homes.
	5.00	Annual trip for 10 ft wide mobile homes.
	15.00	Annual haystack moving permits.
Ohio	Free	All permits issued.
Oklahoma	5.00	Single-trip overdimensions, plus \$5.00 each 1,000 lb over legal.
	25.00	Annual soil conservation permit for 50-mile radius not to exceed 11½ ft wide or 14 ft high; no over legal length or weight allowed under permit.
	5.00	Single trip, soil conservation.
	25.00	Annual permit for transporting autos, trucks, buses, and oil-field equipment not exceeding 60 ft long; no over legal height, width, or weight allowed under this permit.
	5.00	Mobilized machinery.
Oregon	Free	All permits issued.
Pennsylvania	5.00	Single trip, oversize; plus \$0.02 per ton-mile for excessive weight moved on registered equipment, and full gross weight on unregistrable equipment.
	10.00	Permit for construction trailers used for the storage and transportation of tools and construction equipment.
		Fees for self-propelled farm equipment, when required to obtain a permit, are as follows:
		Size Distance Time
	10.00	Not over 150 in. wide 20 miles 15 June to 15 Dec.
	25.00	151 to 166 in. 20 miles 15 June to 15 Dec.
	20.00	Not over 150 in. wide 20 miles 1 year
	50.00	151 to 166 in. 20 miles 1 year
Rhode Island	Free	All permits issued.
South Carolina	5.00	Single-trip permit.
	5.00	Open-end mobile home permit with additional charge of \$1.00 per trip made under each permit.

STATE	FEE (\$)	CONDITIONS
South Dakota	5.00	Single trip, covers any oversize or overweight movement and is required for interstate travel.
	5.00	30-day soil conservation.
	5.00	6-mo implement dealer's permit.
	5.00	6-mo mobile home permit.
	5.00	Convoy permit for road contractors moving to or from a South Dakota job.
	500.00	6-mo mobile home manufacturers' permits cover all units.
Tennessee	Free	All permits issued.
Texas	5.00	Single-trip permit.
	10.00	Time permit not exceeding 30 days.
	15.00	Time permit not exceeding 60 days.
	20.00	Time permit not exceeding 90 days.
Utah	3.00	Single-trip permit.
	15.00	Quarterly permit, not exceeding 90 continuous days.
	25.00	Annual, not exceeding one year from date of issue.
Vermont	4.50	Single-trip permit, unlimited mileage to complete trip and 2 weeks.
	10.00	Annual, unlimited number of moves.
Virginia	2.00	Single-trip permit.
	4.00	Single-trip permit for mobile homes and boats over 10 ft wide.
	2.00	Multiple-trip permit for mobile homes and boats up to 10 ft wide.
	2.00	Multiple-trip permit issued for other commodity if a need can be established.
Washington	3.00	Single-trip permit, overdimension only.
	20.00	30-day continuous operation permit for overwidth or overheight only.
	10.00	30-day continuous operation of overlength only.
	5.00	Minimum overweight permit fee; plus schedule of fees as follows:
		\$0.075 per mile 1-5,999 lb excess weight.
West Virginia		\$0.150 per mile 6,000-11,999 lb excess weight.
		\$0.225 per mile 12,000-17,999 lb excess weight.
		\$0.375 per mile 18,000-23,999 lb excess weight.
		\$0.525 per mile 24,000-29,999 lb excess weight.
		\$0.675 per mile 30,000-35,999 lb excess weight.
		\$0.825 per mile 36,000 lb or more excess weight.
	1.00	Basic issuance fee for single-trip permit, plus \$1.00 for each dimension over legal plus \$0.03 per ton-mile if overweight.
Wisconsin	5.00	Single-trip mobile home permit issuance fee, plus \$0.05 per mile for proposed trip.
	Free	All permits issued.
Wyoming	5.00	Single-trip overdimension permit; if, however, more than 60 ft long, 15 ft wide, or 15 ft high, or any combination of vehicles over 70 ft long, an additional charge of \$0.02 per ton-mile or fraction but not less than \$10.
	5.00	Single-trip permit for forest products.
	25.00	90-day continuous operation for forest products.
Dist. of Columbia	6.00	Single-trip permit.
	28.00	Annual permit for single-unit dump trucks, 3- and 4-axle self-propelled cranes, and concrete mixers.
	27.00	Annual permit for tractor-trailer combinations.

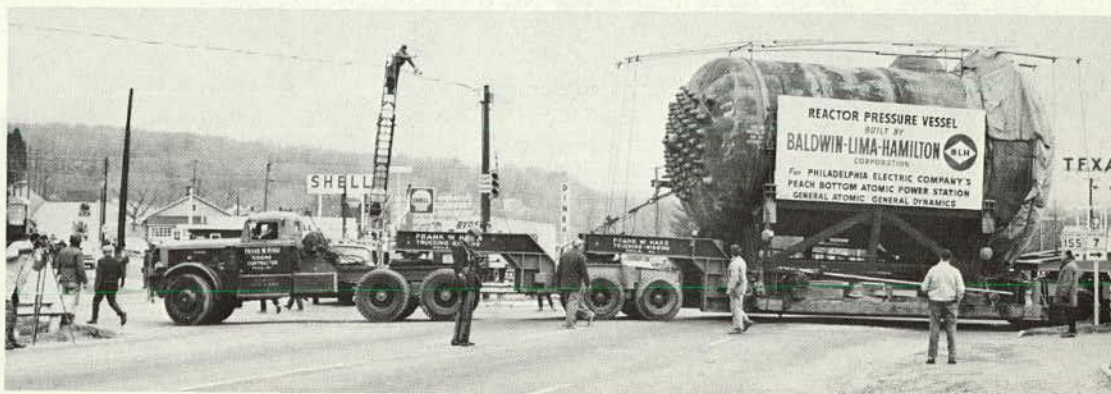
APPENDIX F

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APPENDIX G

EXTRAORDINARY PERMIT MOVE, PEACH BOTTOM REACTOR PRESSURE VESSEL, JANUARY 1964





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