NCHRP

SYNTHESIS 359

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

Bridge Rating Practices and Policies for Overweight Vehicles

A Synthesis of Highway Practice

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

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Bridge Rating Practices and Policies for Overweight Vehicles

A Synthesis of Highway Practice

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SUBJECT AREAS

Bridges, Other Structures, and Hydraulics and Hydrology and Highway Operations, Capacity, and Traffic Control

Research Sponsored by the American Association of State Highway and Transportation Officials in Cooperation with the Federal Highway Administration

TRANSPORTATION RESEARCH BOARD

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

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In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation 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 Federal Highway Administration, United States Department of Transportation.

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FOREWORD

By Staff
Transportation
Research Board

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice*.

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

This synthesis focuses on overweight vehicle bridge permit processes. Information on state and provincial bridge rating systems, bridge evaluation practices and permit policies as they relate to overweight and oversize vehicles is highlighted and discussed. This report is intended to assist in the understanding of the reasons for nonuniform permitting practices. The report reviews specifications, software types, treatment of nonstandard configurations, and allowance for in-place dead loads; processes of permit review; and personnel assigned to permit review.

A survey was distributed to transportation agencies at the state level in the United States and to Canadian provinces. A literature search was undertaken to identify relevant research reports, papers, and other publications for review and summation. Additional information was acquired from telephone interviews with targeted individuals and organizations to supplement the survey and literature search.

Gongkang Fu and Clementine Fu, Troy Michigan, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

CONTENTS

BRIDGE RATING PRACTICES AND POLICIES FOR OVERWEIGHT VEHICLES

SUMMARY

A commercial vehicle exceeding the legal limits on size and/or weight for a jurisdiction must have a permit to operate within that jurisdiction. During a permit review, bridge evaluation for the particular permit vehicle may be required, depending on the jurisdiction's laws, regulations, and/or practices. Different jurisdictions in the United States have various laws and regulations that can make the travel of the permit vehicle difficult and inefficient. The practice of bridge evaluation for permit review also varies, sometimes significantly, among the agencies issuing these permits. This synthesis report summarizes current bridge evaluation practices and permit policies for overweight vehicles in the United States, focusing on their nonuniformity.

In the United States, oversize and overweight vehicle permitting is determined by a highly complex system that involves many agencies at the state and local levels. The governing policies and regulations vary extensively and significantly in terms of permit type and processing operation. There is a definite need for enhanced uniformity in this area.

In addition, bridge evaluation for permit review also varies noticeably among the state-level agencies, primarily owing to the variation in interpretation of the AASHTO specifications, and possibly also the result of differences in the computer software programs used. Most state agencies believe that having electronic bridge models that can be used repeatedly for bridge evaluation is an effective approach to enhanced uniformity for permit review.

The multistate permit programs of the New England Transportation Consortium and the Southeastern Association of State Highway and Transportation Officials are successful models of improved uniformity in permitting. One permit issued in each program can be valid for traveling across all participating states, avoiding the need for multiple permits from different states for interstate trips. Such permits are issued for vehicles falling within certain parameters for dimensions, gross vehicle weight, and axle weights.

A survey questionnaire was distributed to U.S. state and Canadian transportation agencies. Forty-four transportation agencies from the United States and 10 from Canada responded.

CHAPTER ONE

INTRODUCTION

BACKGROUND

Trucking is an important transportation mode for the economy of this country. Trucking is regulated not only by federal rules but also by state and sometimes local legislation and policies. In particular, trucks that exceed the legal limits for dimension and weight are required to have a permit to operate, which is referred to as an oversize/overweight (OS/OW) permit. The criteria used in the permitting process are not uniform among different jurisdictions. Nonuniformity has been a concern for the trucking industry, with respect to different lengths of time needed to have a permit review completed, different results of permit application for the same load, the need to change the vehicle configuration to transport the same goods through different states, etc. Note that some of the factors contributing to nonuniformity are difficult to control. For example, many states have thresholds for the definition of "superload" that require evaluation of all the bridges on the planned route. These thresholds are often defined by state legislation or policies established at different times in the past. Making them uniform can be difficult if not impossible.

In permit review, particularly for overweight trucks, bridge capacity is important. As opposed to pavements for which truck wheel loads are critical factors, bridges are required to carry the entire truck load, depending on the relation between the vehicle and the bridge lengths. When a bridge on the route is determined to be unable to carry the load, the permit cannot be issued. Therefore, bridge capacity sometimes becomes the weakest link in issuing a permit.

Some state permitting offices have worked with industry toward a goal of increased uniformity in permitting overweight and oversize trucks within and between states. Historically, most of that effort has been focused on state laws and regulations governing motor carriers. Relatively little attention has been directed toward the contribution of state bridge evaluation practices and procedures toward achieving this goal. This issue is a focus of the present study.

Bridge evaluation for permit review is very much related to bridge load rating practice, and both may vary between and within states. Choice, interpretation, and limitation of the specifications, software tools, treatment of nonstandard configurations (such as axle gages and multiple-lane configurations), and allowances for in-place dead loads are examples of those areas where variation in practice often exists. The extent of these differences and their impact on the goal of more uniform permitting is not well understood. Identifying and documenting the different bridge evaluation practices used for OS/OW vehicle permits are considered to be an important step toward more uniform permitting.

This synthesis study focuses on overweight vehicle permit review that requires bridge evaluation. However, other potentially relevant subjects are also addressed to have a complete understanding of the subject.

OBJECTIVE

The objective of this synthesis study is to gather information on state bridge rating systems, bridge evaluation practices, and permit policies, as they relate to overweight and oversize vehicles. The information is intended to help in the understanding of the reasons for nonuniformity in permit practices, and thus to encourage the development of possible solutions.

APPROACH

This study was approached using the following steps.

- A survey was conducted of transportation agencies at the state level in the United States and their counterparts in Canada to understand the operations of permit review and issuance and related bridge evaluation and load rating. The questionnaire was initially sent to four states and then further revised to address the issues and concerns thereby generated. The final questionnaire was distributed to state-level transportation agencies in the United States and several agencies in Canada and is given in Appendix A. A total of 44 agencies from United States and 10 from Canada returned the questionnaire and their responses are summarized and discussed in this report.
- A literature search was performed that included the use of the World Wide Web to understand previous relevant work with regard to bridge evaluation for truck permit issuance. The identified research reports, papers, and other publications were reviewed and are summarized and discussed in this report.
- Telephone interviews were conducted with targeted organizations and individuals to supplement the information acquired through the survey and literature review.

Those organizations, individuals, and information sources contacted included:

– Hauling companies and construction and crane rental companies that routinely request permits to move overweight loads: the Specialized Carriers and Rigging Association (SC&RA), Midwest Specialized Carriers, Intermountain Rigging and Heavy Haul, Keen Transport, and Commercial Vehicle Safety Alliance.
– States that are perceived to have large load limits: Kentucky, Michigan, and North Dakota.
– Southeastern Association of State Highway and Transportation Officials (SASHTO) Multi-State Permit Group.
– AASHTO BRIDGEWare Task Force.
– Illinois Department of Transportation (DOT) survey on Load and Resistance Factor Rating (LRFR) usage.
– New England Transportation Consortium (NETC).
– State transportation agency engineers and consulting engineers.

• The information received was then analyzed and synthesized.

ORGANIZATION

This synthesis report has five additional chapters. Chapter two presents a brief review of the relevant studies identified in the literature search. Chapter three provides a summary of nonuniformity observed in permit types, processes of permit review, personnel assigned to permit review, etc. Chapter four discusses more details of bridge evaluation and rating as practiced in the United States and Canada that may be the causes of the nonuniformity observed. Chapter five presents previous and current efforts to reduce nonuniformity in permit issuance and other relevant practices. The final chapter (chapter six) summarizes the study, draws several conclusions, and suggests future research relevant to the focused subject.

CHAPTER TWO

LITERATURE REVIEW

Review of OS/OW permits may require evaluation of the bridges that the permit vehicle would cross before approval is granted. For those who are not familiar with bridge evaluation, its concept and process are briefly reviewed here to provide the background needed for the following literature review.

Bridge evaluation for permit review is very similar to bridge load rating. Both are used to understand the bridge's safe load carrying capacity, with the former targeting the permit vehicle as the reference and the latter referring to some standard vehicle loads meant to represent the general truck traffic. Because of their common objective to understand bridge capacity, these two phrases or processes are sometimes interchanged.

Bridge load rating in the United States is guided by the AASHTO specifications *Manual for Condition Evaluation of Bridges* (*MCEB*) (2000). The safe load carrying capacity here as the result of load rating refers to a load level that the bridge can safely carry, but not the ultimate capacity.

The bridge load rating process is usually analytical (i.e., it does not involve the physical testing of the material or the entire bridge system). When estimating the quantities needed, such as the material strength and load effect distributed to the structural component, the AASHTO *MCEB* refers to the design specifications (*Standard Specifications* . . . 2002). This also reflects the conceptual consistency between the design and rating processes for highway bridges. The following load rating factor (LRF) is the result of bridge load rating for a bridge component with respect to a specific failure mode (bending moment, shear, etc.), according to the *MCEB*:

$$\text{Load rating factor} = (R - A_1\, DL)/(A_2 LL) \qquad (1)$$

where

R is the bridge component's resistance for that particular failure mode, and

DL and LL, respectively, are the total dead and live (vehicular) load effects in that component.

A_1 and A_2 are the dead and live load factors that cover possible uncertainty involved in estimating DL and LL. The specifications (*MCEB* 2000) give specific values for each depending on which limit state (i.e., the load factor method or the service load/allowable stress method) and which rating level (i.e., the inventory or the operating rating) are used. This formula should also be applied to all of the critical cross sections of the bridge component, and the lowest resulting LRF is taken as the LRF for that bridge component. In addition, for a bridge structure with a number of structural components, the same formula needs to be applied repeatedly to all the components of concern. The lowest of the resulting LRFs for these components and failure modes is typically taken as this bridge's LRF. This is an important index in the jurisdiction's inventory for the particular bridge. It is also required by FHWA, as included in the National Bridge Inventory.

When the LRF of the bridge is found to be 1.0 or higher for a standard vehicular load LL, the bridge is said to be able to carry that standard load. Alternatively, the bridge is also said to have a (safe) load carrying capacity equal to the standard load's tonnage times the LRF. For example, if a bridge is found to have a LRF of 1.20 for the AASHTO standard HS20 live load (gross vehicle weight or GVW = 36 tons or 72,000 lb) as shown in Figure 1, it is said to have a capacity of 1.20×36 tons = 43.2 tons (86,400 lb). As seen in Figure 1, the HS20 load consists of the standard truck and the lane load. The lane load may induce a higher load effect than the truck depending on the span length. When this happens, the larger load effect is taken and used in Eq. 1 as LL for load rating.

The H20 load is another AASHTO standard load as shown in Figure 2, which is sometimes also used as a reference when stating the load carrying capacity. Note that the load carrying capacity in tonnage depends on the reference standard vehicle load used, because the (vehicular) live load effect used in Eq. 1 is not proportional between different standard loads. For example, Figure 3 shows the maximum load effects (bending moments and shear forces) of simply supported bridge spans for the AASHTO HS20 load, and Figure 4 for the H20 load for comparison. Both are taken from the AASHTO design specifications (*Standard Specifications. . .* 2002), which specify the HS20 truck GVW as 72,000 lb and the H20 truck GVW as 40,000 lb. However, the ratio of the two maximum load effects is not always 40/72 for every bridge span. This also illustrates that different permit vehicles may induce different load effects in a bridge's components. Therefore, for heavier truck loads, bridge evaluation is required to understand their individual effects to the bridge and associated risk of bridge failure.

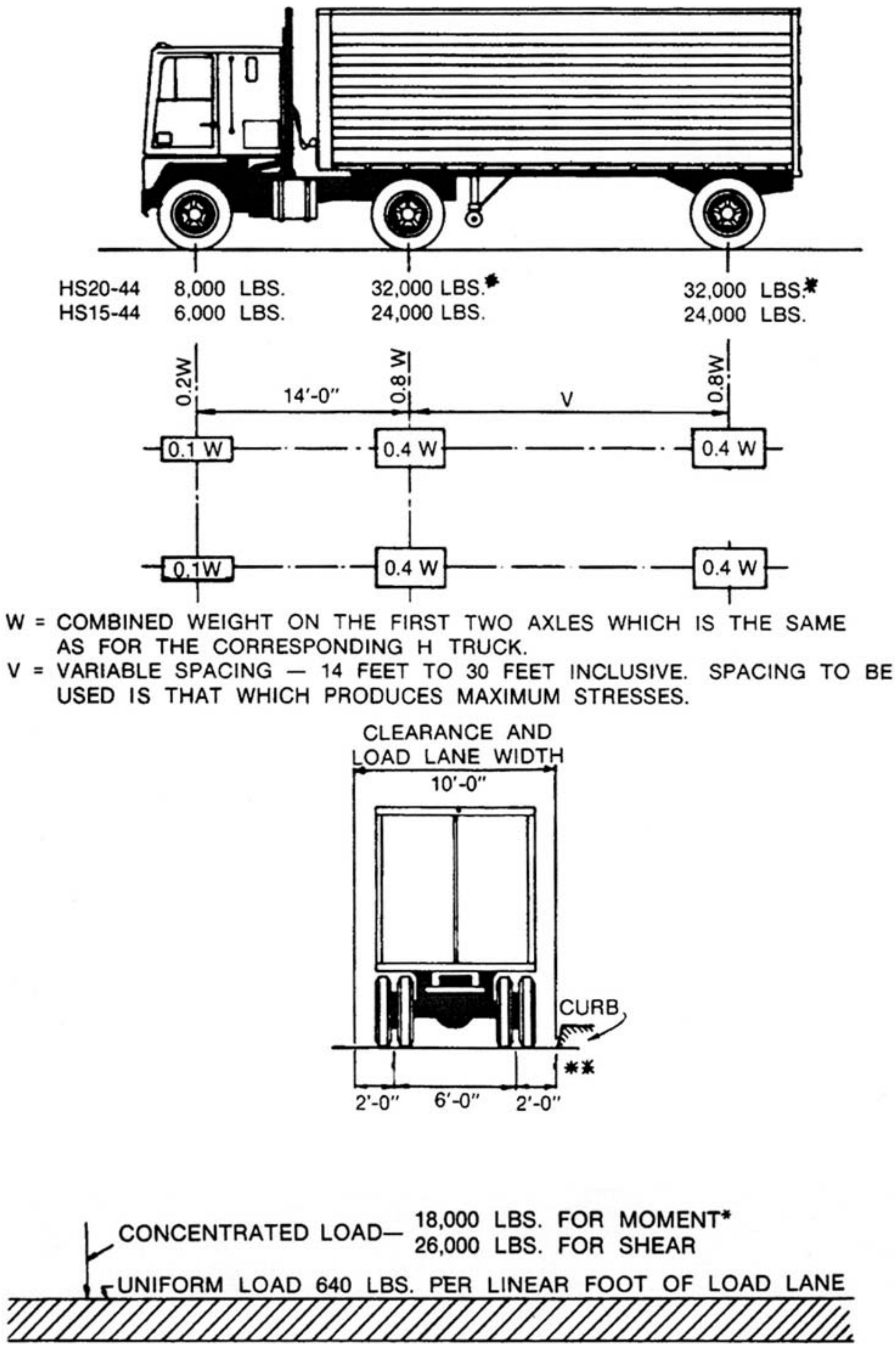

FIGURE 1 AASHTO standard HS20 vehicle live load: (*top*) truck load; (*bottom*) lane load.

As mentioned earlier, bridge evaluation for permit review also has the same purpose of understanding the bridge's load carrying capacity, but for a specific target of the permit vehicle. Namely, it is to answer the question whether the bridge is able to carry the particular permit vehicle. Thus, bridge evaluation for overweight permit review typically replaces the standard vehicle load's load effect *LL* with the permit vehicle's load effect in Eq. 1. Similarly, if the bridge's LRF is 1.0 or higher, after all the components and critical cross sections are taken into account, the permit vehicle is then considered to be permissible for that evaluated bridge.

In practice and literature, there have been many different phrases used to refer to bridge evaluation for permit review. For example, "bridge load rating" is one term for the obvious reason of using the same equations and identical quantities. Other terms that were found to refer to bridge

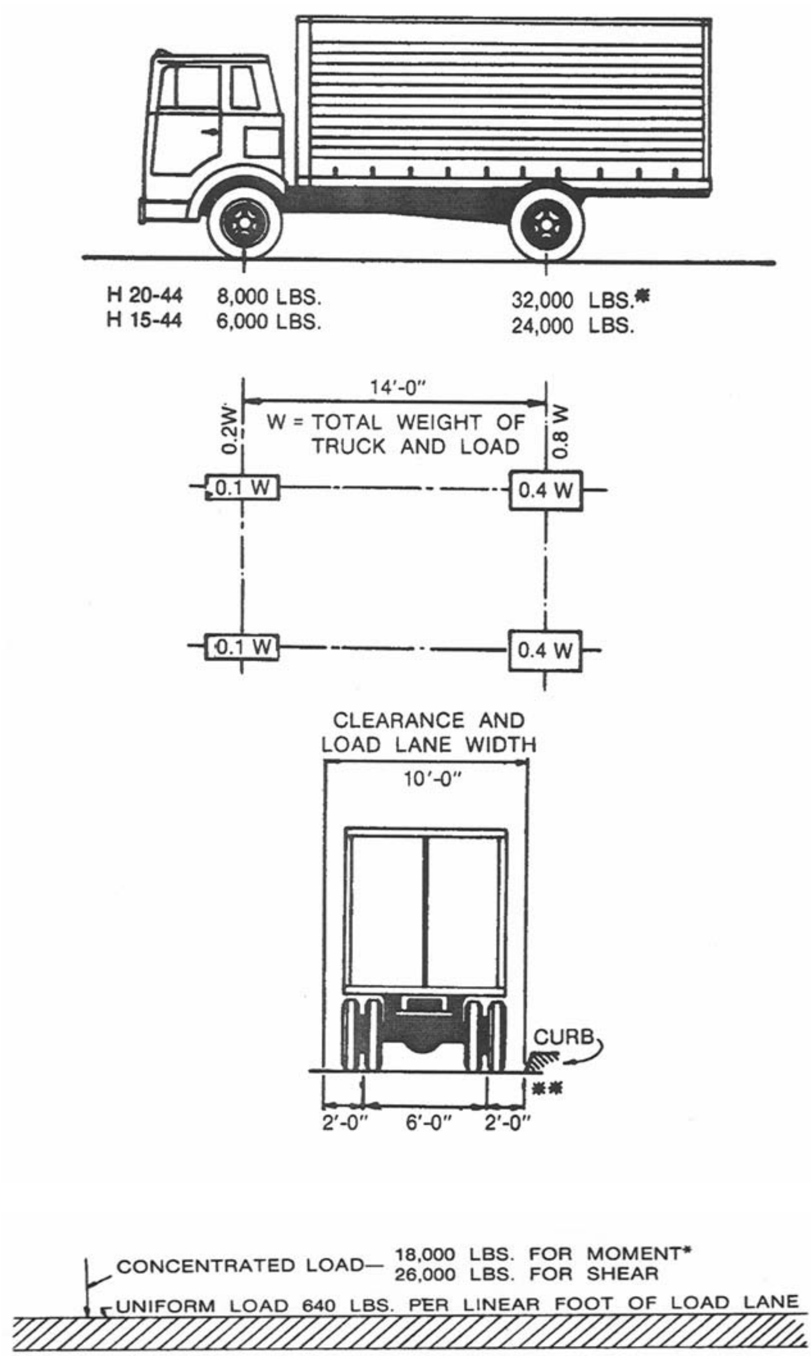

FIGURE 2 AASHTO standard H20 vehicle live load: (*top*) truck load; (*bottom*) lane load.

evaluation for permit review include "bridge review," "structure review," "bridge study," "engineering study," "engineering analysis," "engineering evaluation," and "engineering review." These phrases have all been used by different states in the responses to the questionnaire, which will be discussed later.

It is also important to point out the following issues that have been the focus of discussions regarding bridge evaluation for permit review. They are relevant and possibly attributable to the observed nonuniformity in permit review.

LIVE LOAD FACTOR

In Eq. 1, the live load factor is A_2. For example, the AASHTO specifications (*MCEB* 2000) prescribe this factor as 1.3 for the operating rating and 2.17 for the inventory rating when the LFR is used. The operating rating refers to the maximum load level the bridge is allowed to carry. The inventory rating is a load level the bridge is allowed to carry without a time limit (*MCEB* 2000). There have been discussions on whether using these live load factors for permit review is appropriate, because the bridge evaluation for permit focuses on the

LOADING—HS 20-44 (MS18)

TABLE OF MAXIMUM MOMENTS, SHEARS, AND REACTIONS— SIMPLE SPANS, ONE LANE

Spans in feet; moments in thousands of foot-pounds; shears and reactions in thousands of pounds.

These values are subject to specification reduction for loading of multiple lanes.

Impact not included.

Span	Moment	End shear and end reaction (a)	Span	Moment	End shear and end reaction (a)
1	8.0(b)	32.0(b)	42	485.3(b)	56.0(b)
2	16.0(b)	32.0(b)	44	520.9(b)	56.7(b)
3	24.0(b)	32.0(b)	46	556.5(b)	57.3(b)
4	32.0(b)	32.0(b)	48	592.1(b)	58.0(b)
5	40.0(b)	32.0(b)	50	627.9(b)	58.5(b)
6	48.0(b)	32.0(b)	52	663.6(b)	59.1(b)
7	56.0(b)	32.0(b)	54	699.3(b)	59.6(b)
8	64.0(b)	32.0(b)	56	735.1(b)	60.0(b)
9	72.0(b)	32.0(b)	58	770.8(b)	60.4(b)
10	80.0(b)	32.0(b)	60	806.5(b)	60.8(b)
11	88.0(b)	32.0(b)	62	842.4(b)	61.2(b)
12	96.0(b)	32.0(b)	64	878.1(b)	61.5(b)
13	104.0(b)	32.0(b)	66	914.0(b)	61.9(b)
14	112.0(b)	32.0(b)	68	949.7(b)	62.1(b)
15	120.0(b)	34.1(b)	70	985.6(b)	62.4(b)
16	128.0(b)	36.0(b)	75	1,075.1(b)	63.1(b)
17	136.0(b)	37.7(b)	80	1,164.9(b)	63.6(b)
18	144.0(b)	39.1(b)	85	1,254.7(b)	64.1(b)
19	152.0(b)	40.4(b)	90	1,344.4(b)	64.5(b)
20	160.0(b)	41.6(b)	95	1,434.1(b)	64.9(b)
21	168.0(b)	42.7(b)	100	1,524.0(b)	65.3(b)
22	176.0(b)	43.6(b)	110	1,703.6(b)	65.9(b)
23	184.0(b)	44.5(b)	120	1,883.3(b)	66.4(b)
24	192.7(b)	45.3(b)	130	2,063.1(b)	67.6
25	207.4(b)	46.1(b)	140	2,242.8(b)	70.8
26	222.2(b)	46.8(b)	150	2,475.1	74.0
27	237.0(b)	47.4(b)	160	2,768.0	77.2
28	252.0(b)	48.0(b)	170	3,077.1	80.4
29	267.0(b)	48.8(b)	180	3,402.1	83.6
30	282.1(b)	49.6(b)	190	3,743.1	86.8
31	297.3(b)	50.3(b)	200	4,100.0	90.0
32	312.5(b)	51.0(b)	220	4,862.0	96.4
33	327.8(b)	51.6(b)	240	5,688.0	102.8
34	343.5(b)	52.2(b)	260	6,578.0	109.2
35	361.2(b)	52.8(b)	280	7,532.0	115.6
36	378.9(b)	53.3(b)	300	8,550.0	122.0
37	396.6(b)	53.8(b)			
38	414.3(b)	54.3(b)			
39	432.1(b)	54.8(b)			
40	449.8(b)	55.2(b)			

(a) Concentrated load is considered placed at the support. Loads used are those stipulated for shear.
(b) Maximum value determined by Standard Truck Loading. Otherwise the Standard Lane Loading governs.

FIGURE 3 Maximum load effects of AASHTO HS20 live load for different bridge span lengths.

particular permit vehicle and the load rating process considers general truck traffic loads. These two groups of loads have very different probabilities of occurrence (Fu and Moses 1991; Fu and Hag-Elsafi 1996). The latest AASHTO bridge evaluation specification [*Guide Manual for Condition Evaluation and Load Resistance Factor Evaluation* (*LRFR*) *of Highway Bridges* 2003] has adopted a probabilistic concept of prescribing different load factors for the standard bridge load rating and the bridge evaluation for permit review.

LIVE LOAD DISTRIBUTION FACTOR

In Eq. 1, *LL* is defined as the live load effect distributed to the particular component being evaluated. The load distribution depends on how many vehicles are used to load the bridge, the material types of the structural components involved, and their structural arrangement. It also depends on how the wheel lines are arranged in the transverse direction, namely the vehicle's gage width. The AASHTO evaluation specifications (*MCEB* 2000) refer to the AASHTO design specifications (*Standard Specifications* . . . 2002) to guide how load distribution should be done in bridge evaluation for the standard gage width of 6 ft. Although these guidelines may be adequate for bridge load rating of general truck traffic, they are unable to cover all bridge evaluation scenarios for permit review. There are many situations where these guidelines are not applicable. For example, permit loads may not simultaneously appear in two or more lanes on the bridge, as likely as nonpermit vehicles. In addition, the gage widths of permit vehicles may not be the standard 6 ft. These factors leave ample of room for interpretation and alternatives, which could lead to different results of permit review.

IMPACT FACTOR

In Eq. 1, *LL* also includes the so-called impact factor meant to cover the dynamic amplification of the vehicle load. According

LOADING—H 20-44 (M 18)

TABLE OF MAXIMUM MOMENTS, SHEARS, AND REACTIONS— SIMPLE SPANS, ONE LANE

Spans in feet; moments in thousands of foot-pounds; shears and reactions in thousands of pounds.

These values are subject to specification reduction for loading of multiple lanes.

Impact not included.

Span	Moment	End shear and end reaction (a)	Span	Moment	End shear and end reaction (a)
1	8.0(b)	32.0(b)	42	365.9(b)	39.4
2	16.0(b)	32.0(b)	44	385.8(b)	40.1
3	24.0(b)	32.0(b)	46	405.7(b)	40.7
4	32.0(b)	32.0(b)	48	425.6(b)	41.4
5	40.0(b)	32.0(b)	50	445.6(b)	42.0
6	48.0(b)	32.0(b)	52	465.5(b)	42.6
7	56.0(b)	32.0(b)	54	485.5(b)	43.3
8	64.0(b)	32.0(b)	56	505.4(b)	43.9
9	72.0(b)	32.0(b)	58	530.1	44.6
10	80.0(b)	32.0(b)	60	558.0	45.2
11	88.0(b)	32.0(b)	62	586.5	45.8
12	96.0(b)	32.0(b)	64	615.7	46.5
13	104.0(b)	32.0(b)	66	645.5	47.1
14	112.0(b)	32.0(b)	68	675.9	47.8
15	120.0(b)	32.5(b)	70	707.0	48.4
16	128.0(b)	33.0(b)	75	787.5	50.0
17	136.0(b)	33.4(b)	80	872.0	51.6
18	144.0(b)	33.8(b)	85	960.5	53.2
19	152.0(b)	34.1(b)	90	1,053.0	54.8
20	160.0(b)	34.4(b)	95	1,149.5	56.4
21	168.0(b)	34.7(b)	100	1,250.0	58.0
22	176.0(b)	34.9(b)	110	1,463.0	61.2
23	184.0(b)	35.1(b)	120	1,692.0	64.4
24	192.0(b)	35.3(b)	130	1,937.0	67.6
25	200.0(b)	35.5(b)	140	2,198.0	70.8
26	208.0(b)	35.7(b)	150	2,475.0	74.0
27	216.9(b)	35.9(b)	160	2,768.0	77.2
28	226.8(b)	36.0(b)	170	3,077.0	80.4
29	236.7(b)	36.1(b)	180	3,402.0	83.6
30	246.6(b)	36.3(b)	190	3,743.0	86.8
31	256.5(b)	36.4(b)	200	4,100.0	90.0
32	266.5(b)	36.5(b)	220	4,862.0	96.4
33	276.4(b)	36.6(b)	240	5,688.0	102.8
34	286.3(b)	36.9	260	6,578.0	109.2
35	296.2(b)	37.2	280	7,532.0	115.6
36	306.2(b)	37.5	300	8,550.0	122.0
37	316.1(b)	37.8			
38	326.1(b)	38.2			
39	336.0(b)	38.5			
40	346.0(b)	38.8			

(a) Concentrated load is considered placed at the support. Loads used are those stipulated for shear.
(b) Maximum value determined by Standard Truck Loading. Otherwise the Standard Lane Loading governs.

FIGURE 4 Maximum load effects of AASHTO H20 live load for different bridge span lengths.

to the AASHTO bridge design specifications (*Standard Specifications* . . . 2002) this factor can be as high as 1.3 or 30% above the static load effect. Many transportation agencies adjust that factor in bridge evaluation for permit review, particularly when the bridge capacity is otherwise below the required level. When a lower impact factor is used in *LL*, the rating factor in Eq. 1 can become higher and therefore more likely to reach the 1.0 level to allow issuance of the permit. This also imposes a requirement for the permit vehicle's operation to control the driving speed, braking, and/or acceleration to limit impact when crossing the bridge. Apparently, different jurisdictions used different practices with respect to this factor.

In this study, a literature search was undertaken with regard to bridge evaluation for permit review and other possibly related subjects. The identified previous research efforts reported in the literature are reviewed next. Some of the issues possibly causing nonuniformity are addressed in these research reports and papers, with respect to bridge evaluation for permit review.

***NCHRP Synthesis of Highway Practice 143: Uniformity Efforts on Oversize/Overweight Permits* 1988.**

This synthesis study focused on the uniformity efforts in OS/OW permit issuance. The report summarized the reasons for nonuniformity in permit procedures as follows. From the states' perspectives, the difficulty in common permit procedures includes concerns about physical, safety, economic, legal, and political factors. More specifically, the following factors were identified as contributors to the observed nonuniformity: inadequate funding and staffing, continuing changes in state policies, inadequate data for analysis, pressure from the trucking industry, concern about federal preemption, a lack of constituency, concern about reducing standards, and national effort having little chance for success. From the federal perspective, only a limited degree of intervention was considered possible; therefore, the federal government preferred to have the states take the lead toward a higher level of uniformity.

It was also concluded in this study that among all the efforts aimed at achieving better uniformity only the NETC has been able to succeed in developing relatively uniform permitting procedures. (An update of the NETC activity is given in chapter five.) The reasons were summarized as follows:

- Recognition of the importance of the issue by the chief administrative officers of the involved state DOTs.
- A set of issues was selected for resolution that all participating DOTs believed were critical and for which the probability of achieving success was very high.
- Full cooperation and participation was achieved by the technical individuals of the DOTs who were responsible for issuing permits.
- Within that framework of mutual cooperation, each of the states was willing to drop its "jurisdictional barriers."
- The participating states presented a uniform position to the trucking industry.
- The NETC did not attempt to include all permit requirements within the regional agreement; therefore, each state can deal with the exceptions in the usual way and no situation is excluded.
- A concerted, centralized staff effort was funded to develop and implement this program.
- Every state gained and none lost anything from this agreement.
- The participating states believed that it was inevitable that uniform procedures will be required by the federal government, and that it is much more efficient for the states to take the lead before they are preempted.

It was also concluded that the NETC experience illustrates that it is possible to enhance better uniformity. However, it appears that it cannot be accomplished initially on a national scale. Rather, it should begin on a regional or even a subregional basis as the NETC was able to do. Then, it would require that the appropriate policy and political as well as technical interaction take place within and between regions.

Note that in view of contemporary concerns about a fast response to natural and terrorist driven disasters, harmonization must be accomplished readily to facilitate permit reciprocity across multistate areas in time of disaster and to eliminate the conflicts in OS/OW permitting.

NCHRP Synthesis of Highway Practice 108: Bridge Weight-Limit Posting Practice 1984

For overweight permit issuance, weight limit owing to bridge capacity (load rating) is often a critical factor. Understanding how the bridge weight limits are determined is therefore relevant to this study. *NCHRP Synthesis 108* summarizes the practice of bridge weight-limit posting in the United States as of 1984. Besides the administrative aspects of weight-limit posting, engineering practices, which are more relevant to the current study, were also addressed in that study.

In practice, bridge weight-limit posting is typically determined based on bridge inspection and bridge load rating. Bridge inspection, in the context of its relation to weight-limit determination, is necessary to obtain the information for properly evaluating the strength of the bridge and its behavior and performance under the load. On the other hand, this synthesis emphasized that bridge inspectors are often not involved in the following structural load rating, possibly using the inspection results. This "discontinuity" may contribute to nonuniformity or inconsistency in bridge weight-limit determination, which in turn affects the uniformity in permit issuance.

In the issue of bridge load rating, the synthesis noted that the relevant AASHTO specifications for the practice allow for considerable leeway for the use of engineering judgment in evaluating or posting bridges. This leeway has resulted in considerable variation in the ways different states evaluate and post bridges. This issue will be discussed further in chapters three and four.

"Overload Permit Checking Based on Structural Reliability" (Fu and Moses 1991) and "New Safety-Based Checking Procedure for Overloads on Highway Bridges" (Fu and Hag-Elsafi 1996)

Currently, a common practice in issuing overweight permits is to use the bridge load rating formula Eq. 1 provided earlier, prescribed in the AASHTO specifications (*MCEB* 2000 and its previous editions). Note that these bridge rating formulas are intended for use in evaluating bridges against typical truck traffic loads, and not necessarily for very heavy and occasional permit loads. These two papers represent the first research efforts focusing on the issue of different probabilities of occurrence of legal vehicle traffic and permit vehicles above the legal load level done for the Ohio and New York DOTs, respectively.

The research projects reported in these publications analyzed data of the respective states for normal truck traffic and permit truck traffic and developed different live load factors (A_2 in Eq. 1) specifically for bridge evaluation in permit review, to maintain the same bridge safety as for bridge load rating intended to cover general truck traffic. These live load factors are different for single trip permits and multitrip (e.g., annual) permits. In general, the live load factor can be smaller for less frequent permit loads. This concept has been adopted in the latest AASHTO bridge evaluation specifications (*Guide Manual* . . . 2003).

Overload Permit Procedures (Noel et al. 1992)

As reviewed earlier, overweight vehicle review uses the same load rating concept of the AASHTO specifications (*MCEB* 2000); namely, the vehicle requesting a permit is placed on a bridge structure in a mathematical model, replacing the standard vehicle, such as the HS20. If the induced load effects (moment, shear, etc.) do not exceed the capacity allowed, the vehicle will then be allowed to cross the bridge and, otherwise, not. Although there may be many bridges needing evaluation for a permit type (e.g., annual permits without specified routes), analyzing every bridge in the jurisdiction is costly and can become particularly difficult. Therefore, there have been some models suggested and developed to cover a group or population of bridges within a jurisdiction. Noel et al. (1992) represents a typical effort in this direction for bridges designed to the AASHTO H15 load. Hereafter, these bridges are referred to as H15 bridges. Figure 2 shows the H20 load whose 75% proportional reduction is the H15 load (15/20 = 75%).

The reason for focusing on H15 bridges in this study was that they were considered to be the bottleneck in approving overweight permits in Texas. These bridges typically have the lowest capacity, because the H15 design load has been obsolete for some years and it induces lower load effect than the HS20 design load.

As a result, the study developed a formula of maximum gross weight as a function of the permit vehicle's wheelbase (the distance between any two axles) and the bridge's span length. A similar formula was also proposed as a function of the wheelbase only. It is more restrictive than the first one (with span length as another variable), because it uses the most restrictive gross weight for all span lengths. Furthermore, an empirical modification factor was also suggested to cover the gage width of the permit vehicle other than the standard 6 ft. It should be noted that the analysis used in this study included only one permit vehicle in one lane (not multiple vehicles in all lanes available) on the bridge.

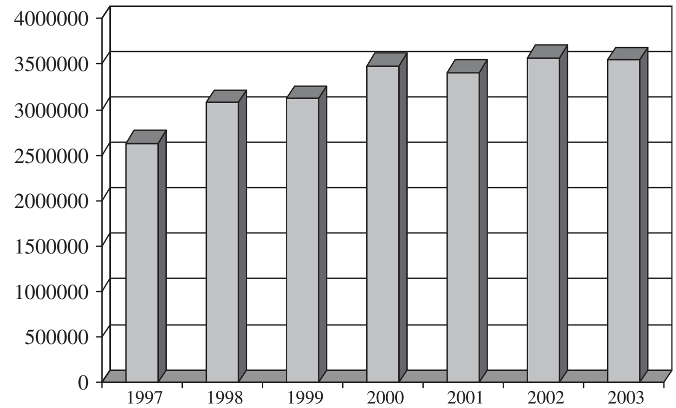

FIGURE 5 Number of overweight/overwidth permits issued by states.

The proposed formulas can be useful for a first screening of permit vehicles if the formulas' validity is confirmed. This type of screening can reduce the work load required, because otherwise every permit vehicle needs to be analyzed. It also should be noted that those permit vehicles that fail the screening may still be permissible; however, they will need to be analyzed on a case-by-case basis. Sometimes additional requirements (such as reduced speed for reduced dynamic impact) may be needed on the permit vehicle's operation.

Bridge Analysis Simplified (Bakht and Jaeger 1984)

In this paper, Bakht and Jaeger proposed an overweight permit review method. The method's concept is that the safe permit load can be the worst combination(s) of the maximum vehicle loads the bridge is likely to have sustained during its lifetime. The procedure was derived using theoretical assumptions regarding the probability distribution of the truck

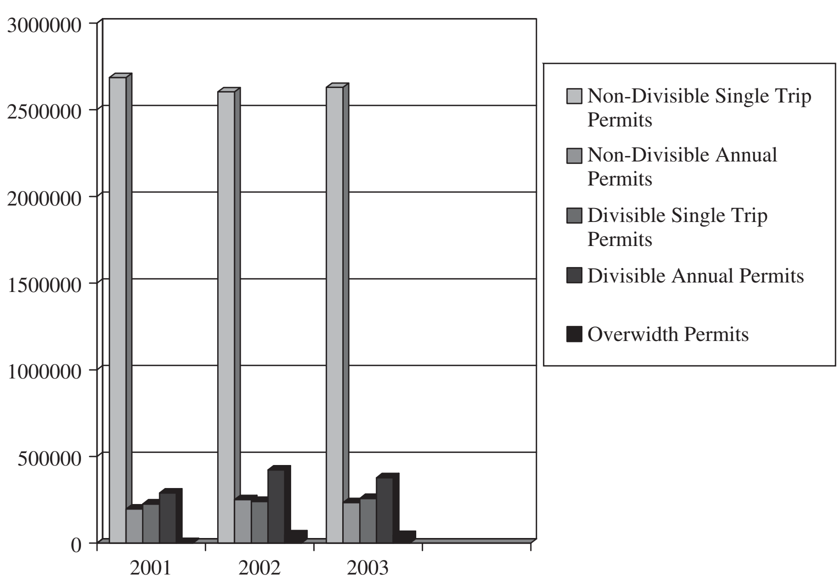

FIGURE 6 Overweight/overwidth permits issued by states by type.

loads that have been experienced. Although the probabilistic concept appears to be reasonable, it is not clear whether the theoretical model is applicable to all real bridges, because the truck load spectrum for each bridge can be very much different. It has not been reported since then that this procedure has been applied to real cases of permit review.

"National Commercial Motor Vehicle Size & Weight Enforcement Trends" (2004)

FHWA routinely monitors the practice of OS/OW vehicle operation. Apart from the earlier FHWA statistics published in 1991, these statistics derived in 2003 may currently be the latest presented. Figure 5 shows the number of overweight/overwidth permits issued in the states from 1997 through 2003. An annual increase in permit issuance can be seen.

Figure 6 shows these permits broken down by type for 3 years (2001–2003), indicating nondivisible trip permits dominating the population. Nondivisible loads here refer to those that cannot be cost-effectively divided, such as a large transformer, a house, a piece of construction equipment, etc. It should be pointed out that the figure shows "head counts" for the permits, not indications of how frequently each permit type of vehicles appears on the road. Statistically, the annual permits represent significantly more trips than the single trip permits. Therefore, the annual permit vehicles may appear much more often on the roads. FHWA (*LRFD Bridge Design Specifications* 2004) also indicated that "Overweight permit issuance continues to increase, with annual or multiple trip permits becoming more commonplace." In addition, "Freight tonnage moved by truck is forecast to continue to increase." This has been a concern of FHWA for some time.

CHAPTER THREE

NONUNIFORMITY IN PERMITTING SYSTEMS

In the United States, the current weight limit for the National System of Interstate and Defense Highways and reasonable access thereto includes: 80,000 lb for GVW and 20,000 lb for an axle, along with the federal bridge formula (Formula B) for axle spacings and axle weights. The federal bridge formula is established to provide a simple means of determining whether or not a vehicle will be allowed to travel without a permit.

$$W = 500(LN/N - 1 + 12N + 36) \quad (2)$$

where

- W is the allowable gross weight in pounds on any group of two or more consecutive axles,
- L is the distance in feet between the extreme of any group of two or more consecutive axles, and
- N is the number of axles included in the group under consideration.

Another alternative way of presenting this bridge formula is a table with L and N as two variables and W as the function value in the table. Figure 7 shows the bridge formula with L in the first column and N the first row. The federal truck weight and size limits have evolved over several decades. A brief history of this evolution can be found in *NCHRP Report 198* (1979).

It also should be noted that many states have GVW limits different than 80,000 lb. In addition, the states also have their own laws and regulations to allow those trucks exceeding the federal limits to travel within respective jurisdictions. These laws and regulations were often developed without considering other, especially neighboring, states. Also, they are often made without input from the technical community, such as bridge engineers. As a result, laws and regulations of different states are nonuniform for both permit vehicles and legal loads.

In this chapter, the nonuniformity in permit review and issuance is first analyzed regarding the permitting systems in the states. The system here refers to the definitions of permit types of the jurisdiction, the process of permit review and issuance, human resources allocated to the operation, etc. When an overweight vehicle falls into different permit types in different jurisdictions in which the carrier would like to travel, the permit review processes and procedures can vary, possibly causing different results. Furthermore, even for a same permit type, different jurisdictions may still have noticeably different processes and procedures. Owing to resource allocation, the processes and procedures used can also be different in efficiency, and the accuracy of permit review may be affected as well.

VARIATION IN PERMIT TYPES AND POLICIES

Table C3-1A in Appendix C presents an overview of the OS/OW permit types according to the state-level agencies in the United States, derived from the responses of state agencies to the questionnaire that can be found in Appendix A. Table C3-2A includes more information regarding whether bridge evaluation is needed in reviewing the permits. For several states, more information was added using the provided websites or attached documents given in the original responses. Table C3-1A shows a wide variety of permit types, in terms of their definitions (e.g., annual, nondivisible, and radius), GVW limit (e.g., 112,000, 120,000, or 200,000 lb), dimensional limit, frequency of use (e.g., annual vs. single trip permits), etc.

Many state-level agencies have two groups of permits with respect to whether bridge evaluation is required or not. Table C3-1A lists the permit types according to that requirement, if the response so indicated. It is seen that the dividing line between the two groups varies, sometimes, significantly. For example, Illinois uses 120,000 lb as the threshold for requiring new bridge evaluation, whereas Iowa has a 156,000 lb threshold. Note that the two states share borders. In addition, New Mexico allows GVW up to 140,000 lb not requiring bridge evaluation, but Texas allows cranes weighing up to 200,000 lb without requiring bridge evaluation. They too are neighboring states.

Furthermore, within the group of permits not requiring bridge evaluation/load rating, there are usually some routing requirements to meet. For example, Iowa uses an annually updated bridge restriction map to route vehicles below the 156,000 lb threshold, but Illinois' response did not indicate other specific requirements for vehicles below their 120,000 lb limit. Although the survey did not ask the basis for the dividing line between the two groups of permits, it is an important factor to understand to improve uniformity in permitting OS/OW vehicles.

Distance in feet (L) between the extremes of any group of 2 or more consecutive axles

Maximum load in pounds carried on any group of 2 or more consecutive axles[1]

	N =	2 AXLES	3 AXLES	4 AXLES	5 AXLES	6 AXLES	7 AXLES	8 AXLES	9 AXLES
Tandem Axle Weight (see pages 4 & 5)	4	34,000	----------	----------	----------	----------	----------	----------	----------
	5	34,000	----------	----------	----------	----------	----------	----------	----------
	6	34,000	----------	----------	----------	----------	----------	----------	----------
	7	34,000	----------	----------	----------	----------	----------	----------	----------
	8 & less	34,000	34,000	----------	----------	----------	----------	----------	----------
	more than 8	38,000	42,000	----------	----------	----------	----------	----------	----------
	9	39,000	42,500	----------	----------	----------	----------	----------	----------
	10	40,000	43,500	----------	----------	----------	----------	----------	----------
	11	----------	44,000	----------	----------	----------	----------	----------	----------
	12	----------	45,000	50,000	----------	----------	----------	----------	----------
	13	----------	45,500	50,500	----------	----------	----------	----------	----------
	14	----------	46,500	51,500	----------	----------	----------	----------	----------
	15	----------	47,000	52,000	----------	----------	----------	----------	----------
	16	----------	48,000	52,500	58,000	----------	----------	----------	----------
	17	----------	48,500	53,500	58,500	----------	----------	----------	----------
	18	----------	49,500	54,000	59,000	----------	----------	----------	----------
	19 ----Example-----	----------	50,000	54,500	60,000	----------	----------	----------	----------
	20 --(see page 8)--	----------	51,000	55,500	60,500	66,000	----------	----------	----------
	21	----------	51,500	56,000	61,000	66,500	----------	----------	----------
	22	----------	52,500	56,500	61,500	67,000	----------	----------	----------
	23	----------	53,000	57,500	62,500	68,000	----------	----------	----------
	24	----------	54,000	58,000	63,000	68,500	74,000	----------	----------
	25	----------	54,500	58,500	63,500	69,000	74,500	----------	----------
	26	----------	55,500	59,500	64,000	69,500	75,000	----------	----------
	27	----------	56,000	60,000	65,000	70,000	75,500	----------	----------
	28	----------	57,000	60,500	65,500	71,000	76,500	82,000	----------
	29	----------	57,500	61,500	66,000	71,500	77,000	82,500	----------
	30	----------	58,500	62,000	66,500	72,000	77,500	83,000	----------
	31	----------	59,000	62,500	67,500	72,500	78,000	83,500	----------
	32	----------	60,000	63,500	68,000	73,000	78,500	84,500	90,000
	33	----------	----------	64,000	68,500	74,000	79,000	85,000	90,500
	34	----------	----------	64,500	69,000	74,500	80,000	85,500	91,000
	35	----------	----------	65,500	70,000	75,000	80,500	86,000	91,500
	36	----------	Exception	66,000	70,500	75,500	81,000	86,500	92,000
	37	----------	(see page 10)	66,500	71,000	76,000	81,500	87,000	93,000
	38	----------	----------	67,500	71,500	77,000	82,000	87,500	93,500
	39	----------	----------	68,000	72,500	77,500	82,500	88,500	94,000
	40	----------	----------	68,500	73,000	78,000	83,500	89,000	94,500
	41	----------	----------	69,500	73,500	78,500	84,000	89,500	95,000
	42	----------	----------	70,000	74,000	79,000	84,500	90,000	95,500
	43	----------	----------	70,500	75,000	80,000	85,000	90,500	96,000
	44	----------	----------	71,500	75,500	80,500	85,500	91,000	96,500
	45	----------	----------	72,000	76,000	81,000	86,000	91,500	97,500
	46	----------	----------	72,500	76,500	81,500	87,000	92,500	98,000
	47	----------	----------	73,500	77,500	82,000	87,500	93,000	98,500
	48	----------	----------	74,000	78,000	83,000	88,000	93,500	99,000
	49	----------	----------	74,500	78,500	83,500	88,500	94,000	99,500
	50	----------	----------	75,500	79,000	84,000	89,000	94,500	100,000
	51	----------	----------	76,000	80,000	84,500	89,500	95,000	100,500
	52	----------	----------	76,500	80,500	85,000	90,500	95,500	101,000
	53	----------	----------	77,500	81,000	86,000	91,000	96,500	102,000
	54	----------	----------	78,000	81,500	86,500	91,500	97,000	102,500
	55	----------	----------	78,500	82,500	87,000	92,000	97,500	103,000
	56	----------	Interstate Gross	79,500	83,000	87,500	92,500	98,000	103,500
	57	----------	Weight Limit	80,000	83,500	88,000	93,000	98,500	104,000
	58	----------	(see page 4)	----------	84,000	89,000	94,000	99,000	104,500
	59	----------	----------	----------	85,000	89,500	94,500	99,500	105,000
	60	----------	----------	----------	85,500	90,000	95,000	100,500	105,500

[1]The permissible loads are computed to the nearest 500 pounds as required by statute.

[2]The following loaded vehicles must not operate over H15-44 bridges: 3-S2 (5-axle) with wheelbase less than 38 feet; 2-S1-2 (5-axle) wih wheelbase less than 45 feet; 3-3 (6-axle) with wheelbase less than 45 feet; and 7- 8- and 9-axle vehicles regardless of wheelbase.

FIGURE 7 Tabulated federal bridge formula.

In addition, the last column of Table C3-1A includes the responses of the state-level agencies to the question whether other agencies within the jurisdiction also issue OS/OW permits. Approximately half of the state-level jurisdictions also have other agencies (including local agencies) issuing OS/OW permits. The local agency permits are for the roads and bridges within their own jurisdictions. For example, Alabama, California, Illinois, Iowa, Kansas, Massachusetts, Minnesota, New York, North Carolina, and North Dakota all have local agencies issuing permits. This situation perhaps has made nonuniformity even more visible.

Table C3-1B is similarly obtained from Table C3-2B. It includes the types of OS/OW permits issued in Canadian provinces and other jurisdictions. For each province or jurisdiction the number of permit types appears to be similar to that of the United States state-level jurisdictions shown in Tables C3-1A and C3-2A. The overall situation is also similar to that in the United States. Conversely, under the North American Free Trade Agreement (NAFTA), some of these permit vehicles may be allowed to travel in the United States, which can worsen nonuniformity in permitting.

It should also be noted that OS/OW policies and regulations constantly change for a variety of reasons. Tables C3-3A and C3-3B indicate those states, provinces, or jurisdictions that could possibly have new OS/OW policies or regulations. Although it is understood that efforts to establish new laws, regulations, or policies may not always be successful, there is still a significant probability that some of these efforts will be implemented in the future. Also note that the two proposed changes to weight limit (California's tridem axle to 60,000 lb and Illinois' annual OW permit to 120,000 lb GVW) appear to represent increases. In general, truck weight limits have increased over the years, and these changes may continue (*Overweight Vehicles* . . . 1991; "National Commercial . . ." 2004).

In Table C3-3B, the response of Newfoundland indicates that four Atlantic Canadian provinces are in the process to establish a single overweight vehicle policy for the region. These provinces have implemented a uniform policy for legal vehicles for the region. This is a step further for regional uniformity in truck weight regulation. More information about this effort will be presented in chapter five.

In summary, the variation in permit types and policies shown in Tables C3-1 to C3-3 offer an overall perspective of the OS/OW permit policies and regulations in the United States and Canada. The various permit types and associated practices represent a major source of nonuniformity observed in OS/OW permit issuance.

VARIATION IN PERMITTING BUSINESS PROCESSES

The business process of reviewing permit applications is also thought to contribute to nonuniformity of permitting practice. Tables C3-4 and C3-5 provide snapshots of a few sections of the situation.

A permit may be issued by state or local agency offices. Table C3-4A shows more details about the situation in the United States. Note that a relatively higher uniformity is generally expected if all permits are issued by one single office, with adequate staffing, and receiving consistent support for bridge evaluation. Furthermore, personnel at the state level are better supported in terms of resources and technical expertise needed. Their proficiency in technical issues such as bridge load rating is expected to be higher. Therefore, a higher uniformity is more likely if a single state office performs permit review. Table C3-4A shows that more than half of the state-level agencies (24 of 44) issue OS/OW permits through one single office, approximately 40% of them issue through several offices, and 8 states also have local agencies issuing permits. Table C3-4B shows the same information for Canadian respondents. Tables C3-5A and C3-5B show how OS/OW enforcement is practiced within the states/provinces/jurisdictions in the United States and Canada.

NONUNIFORMITY FROM PERSPECTIVE OF INDUSTRY

The SC&RA conducted a number of surveys of its member carriers and state permitting officials, mainly regarding the turnaround time for routine OS/OW permit review and issuance. Table C3-6 summarizes its 2004 survey results. The routine permit vehicles addressed here usually are relatively lighter and do not require bridge evaluation. Typically, the permit review is done by comparing the permit vehicle's configuration and weight distribution with a set of simple requirements (e.g., the bridge formula and a GVW cap). These simple requirements may not have been rigorously studied using bridge structure analysis. Of the 48 states included, 30 are reportedly able to issue a routine permit within 2 h. Some states are able to complete the process by means of the Internet. It was also concluded that, in general, the states have been improving their services in this area ("Report on State Permitting . . ." 2004). Some of the states also offered comments on the turnaround time for other permits they issue, such as superload permits that typically require bridge evaluation. They are also included in Table C3-6. The survey itself and the results indicate that the turnaround time is important to the industry. In addition, the nonuniform distribution of this time among the states could be the focus of a concerted effort among the states.

SC&RA has also developed a manual that contains information on permits for various agencies in United States and Canada (*Oversize/Overweight Permit Manual* . . . 2005). It covers legal limits, permit limits, general permit restrictions, types of permits, permit fees, escort and sign requirements, fines, etc. A wide variety is observed with respect to these items as recorded in this manual.

In addition, carriers indicated different costs and efforts spent on obtaining permits for the same load from different agencies. For example, for two loads shipped in 2004 by one carrier for two agencies/corporations from Florida to California, 98 permits were acquired from 8 states ("Transcontinental . . ." 2004). The cost and time spent on these permits were significant and had a negative impact on the job.

CHAPTER FOUR

BRIDGE EVALUATION FOR OVERSIZE/OVERWEIGHT PERMITTING

As discussed earlier in chapter two, bridge load rating is a federal requirement. The bridge load rating factor, as defined in Eq. 1, is an important index for the bridge's condition in managing the entire United States bridge network. Bridge load rating is currently practiced according to the AASHTO *Manual for Condition Evaluation of Bridges* (2000), which also refers to the AASHTO *Standard Specifications for Highway Bridges* (2002). The result of load rating for a bridge is its capacity to safely carry vehicular load. Therefore, when a vehicle exceeds the legal weight limit of the jurisdiction and needs a permit to operate, load ratings of the bridges the permit vehicle planned to cross are often used for examination. Because load rating uses standard vehicle loads, such as the AASHTO HS and the H loads, the load rating results are directly useful only when the permit vehicle's configuration is close to the standard load used. Otherwise, the typical approach of reviewing the permit is to load the bridge with the permit vehicle and then determine whether the bridge can sustain the load. The latter is referred to as bridge evaluation for permit review, as discussed in chapter two.

It was also noted that a number of different terms have been used in the practice and literature to refer to the bridge evaluation process. These terms are identified in chapter two.

Although bridge load rating is guided by the AASHTO *MCEB* (2000), when applied to bridge evaluation for permit review there is ample room for interpretation and thus nonuniformity (this was discussed briefly in chapter two). With respect to this issue, this chapter presents relevant information collected from U.S. and Canadian transportation agencies. Bridge load rating and bridge evaluation for permit review are closely related actions as already discussed. For many steps of the two processes and procedures the same concepts and quantities are used. Therefore, the survey for this synthesis study attempted to gather information on the state practices in both, and the results are presented and discussed here.

VARIATION IN EVALUATION AND RATING PROCESS

It has been observed that there is a variation in the management of the bridge evaluation and load rating process among state-level highway agencies in the United States. This variation may result in different bridge evaluation and load rating procedures, in terms of various factors such as the level of detail considered and software tools. This issue is observed in the survey and discussed next.

Tables C4-1A and C4-1B in Appendix C offer an overview of the population of highway bridges with load ratings in the United States and Canada. Load rating is a requirement of FHWA for all highway bridges in the United States. The result of load rating a bridge is its safe live (vehicular) load carrying capacity with reference to standard vehicle configurations. They include the HS and H loads discussed earlier. In addition, the AASHTO specifications (*MCEB* 2000; *Guide Manual* . . . 2003) also include other standard loads, Types 3, 3S2, and 3-3, as shown in Figure 8. The load rating result, as defined in Eq. 1, is the load carrying capacity of the bridge component as the difference between the rated member's capacity and the total dead load effect, with all the safety factors included. There are two levels of load rating that are prescribed in the AASHTO *MCEB* (2000); the inventory and the operating ratings. The inventory rating refers to the "normal" load carrying capacity (or normally allowed load) and the operating rating to the maximum load carrying capacity (or maximum allowed load). The existence of load ratings for a bridge indicates that some information is available about the bridge's capacity, although sometimes the load rating is estimated based on engineering judgment. When a permit vehicle is reviewed for a particular bridge, the existence of the load rating itself can mean that a detailed and quantitative analysis is possible for a relatively small amount of additional work, because some information is already available about the bridge.

Table C4-1A shows that all the responding agencies have more than 60% of the bridges within their jurisdictions with a load rating, except for Massachusetts, North Dakota, Ohio, Puerto Rico, and Tennessee. As to what percentage of the bridges have an electronic model available, the difference between the state-level agencies is much more significant, varying from 0% to 95%, as shown in Table C4-1A. An electronic model here refers to a model that can be repeatedly used, but requires minimal updating for some of the input data, such as corrosion-induced section loss, reduced strength owing to aging, the loading vehicle, etc. When such a model is available for a bridge, the bridge evaluation for permit review can be readily done and the results will be more consistent, compared with manual calculations. These electronic models may use the concept of

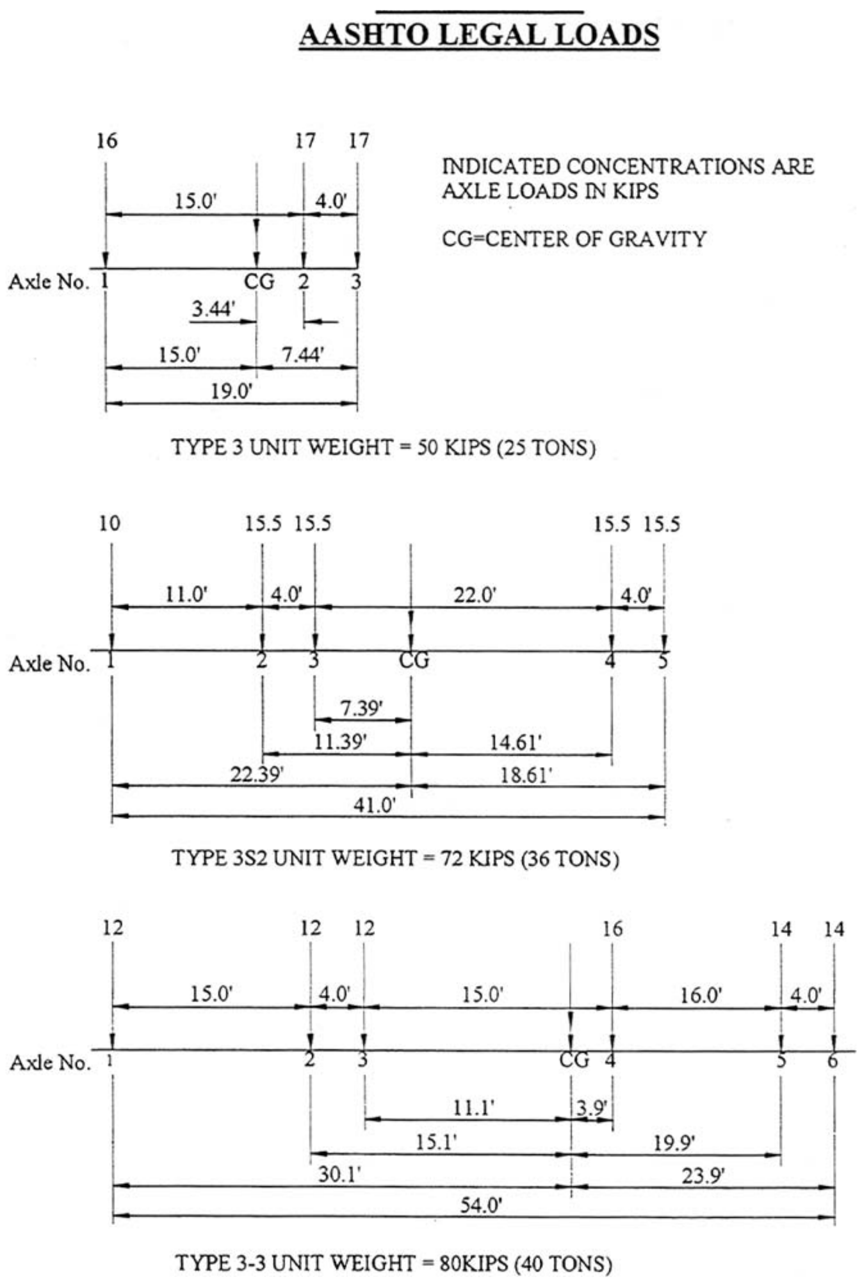

FIGURE 8 Three other standard vehicle loads of AASHTO (Types 3, 3S-2, and 3-3) (*MCEB* 2000).

girder line, 2-dimensional grillage analysis, 3-dimensional finite-element analysis, etc. When asked whether availability of such electronic models for the bridges has had an impact on the uniformity in permit review, 25 respondents said yes and 14 no. Of those agencies that answered yes, 23 explained why. It shows that more state-level agencies agree that electronic modeling is an effective approach in improving uniformity in permitting.

Table C4-1B shows the same data as C4-1A, but for Canada. It can be seen that considerably lower percentages of bridges in the Canadian jurisdictions have a load rating. Also, many fewer bridges have electronic models available for repeating and updating load rating.

Tables C4-2A and C4-2B show the responses of the agencies to the question of who provides the service of rating (i.e., bridge evaluation) when needed, for United States and Canada, respectively. The responses show mostly that state personnel undertake this function in permit review. This indicates that efforts to improve uniformity in this area can be effective when mostly only state personnel are involved, because more resources are available to state personnel compared with other levels.

VARIATION IN EVALUATION AND RATING PROCEDURE

The AASHTO *MCEB* (2000) has been used extensively in guiding bridge evaluation for permit review. This has also left ample room for the engineer to decide on many issues and aspects in the evaluation. In addition, the newly adopted AASHTO *LRFR Bridge Design Specifications* (2004) offers another alternative for bridge load rating and bridge evaluation for permit review. Table C4-3 displays the responses of U.S. transportation agencies to the survey regarding their practice on some of these aspects of permit review. It shows that only one of the states (Pennsylvania) is using the LRFR specifications, most states use LFR, and many use both the Allowable Stress Rating and LFR. As to which load rating level is used, it can be seen almost uniformly that the operating level is used for permit review. The reasons for using this level are mainly as follows: (1) the operating rating allows higher loads, so that the probability of having a permit application approved can be maximized and (2) the operating level is rational for infrequent loads with higher certainty. Note also that Canada uses different specifications for load rating. Therefore, the differences between the United States and Canadian practices are more noticeable.

Load Placement

How to place the load on the bridge in bridge evaluation for permit review and how to determine the associated load distribution factor is one of the most important elements affecting the result. Tables C4-4A and C4-4B contain the responses of the U.S. and Canadian agencies, respectively, regarding this issue. Seventeen U.S. agencies load only one lane with the permit vehicle, whereas another 15 load other lanes in addition to the lane loaded with the permit vehicle. One agency uses both methods. For comparison, the Canadian agencies mostly use multiple-lane loading (Table C4-4B). Note that quantifying the probability of multiple vehicle presence on a bridge is still a subject for further research, because it has not been scientifically proven which way(s) is more appropriate.

The right-hand portions of Tables C4-4A and C4-4B show the responses of the agencies regarding possible restrictions for the permit vehicle on the bridge. These restrictions are usually imposed on the vehicle to reduce stress and therefore the risk of failure, which in turn increase the probability for the permit application to be approved. These restrictions include the loading position of the permit vehicle on the bridge, vehicle speed, whether other vehicles are allowed simultaneously on the bridge, and whether acceleration or deceleration is allowed on the bridge. The first three options have been used by most of the agencies that responded (88%), whereas the fourth option is less frequently used (45%). In addition, other measures have been mentioned to permit heavy loads: restricting traffic under the bridge to be crossed by the permit vehicle, restricting time of day of travel, and altering the vehicle's configuration to distribute the load to more members. These restrictions all can change the bridge evaluation result for permit review.

Computer-Aided Modeling

Bridge evaluation for permit review and routine load rating now are largely done using computer software programs. Therefore, which program is used may have a strong impact on the result, although conceptually the differences should not be significant between the different programs. Table C4-5 shows the models and corresponding software programs used by the U.S. agencies. In addition to the finite-element analysis (FEA), grillage, and girder line methods given in the questionnaire, the following methods were also mentioned in the responses: load testing and in-house methods and programs. These results show that the girder line method is the most often used by the responding agencies. Therefore, if uniformity in analysis methods and software programs is a goal, more emphasis should be placed on this method and its associated software.

Permit Screening Approach

As discussed earlier, many U.S. state agencies take a two-step approach in permit review: (1) screening the permits into two groups, one requiring bridge evaluation and the other not, and (2) performing bridge evaluation if required. Various screening concepts and approaches were cited in the responses. Table C4-6 summarizes the findings in this area. A large majority of the responding agencies use comparison with the design vehicle and/or acceptable axle spacing and axle weight for this screening. Other approaches are also being used including (1) comparison with the standard rating vehicles, (2) agency-specific formula (e.g., as used by Indiana), (3) comparison with the Federal Bridge Formula, and (4) comparison with previously approved permits. The comparisons may be done using charts, maps, and/or computer programs.

It is interesting to note that Kansas, Nebraska, and North Dakota use a rather unique approach that examines every bridge on the selected route, so that no screening is needed. It appears that the systems include electronic models for all the bridges in the jurisdiction. This approach is believed to be able to maintain a high level of uniformity, at least within the respective states.

Bridge Condition and Material Properties

Bridge load rating requires quantified estimation for bridge components' material properties. When existing old bridges are involved, this estimation may not be uniformly done. Table C4-7 shows that approximately one-third of the U.S. agencies do not have specifications or guidelines as to how bridge condition is taken into account in load rating or bridge evaluation for permit review, and seven reported that no specifications or guidelines are used for material property estimation for bridge evaluation and load rating. This situation may have contributed to nonuniformity in bridge evaluation for permit review, because individual and possibly inconsistent decisions may have been made regarding these issues.

Vehicle Gage Width

The gage width here refers to the center to center distance between dual wheel tires in the direction of the axle (see Figures 1 and 2). Gage width is important in bridge evaluation because it directly affects the lateral distribution of the axle load over the bridge superstructure. In the case of beam-type bridges, the gage width directly affects the fraction of a wheel load to be transferred through the deck to the beams supporting the deck.

The AASHTO vehicles used in the design of bridges are based on trucks that have a gage of 6 ft. Consequently, a gage of 6 ft is considered to be the standard gage width by virtually all permitting agencies in the United States. Gage widths that vary significantly from the standard 6 ft gage are often referred to as nonstandard gage widths. Although many OS/OW vehicles have standard or near standard gage widths, many do not, and typically the very heavy OS/OW vehicles (i.e., superloads) have nonstandard gage axles.

In bridge evaluation for permit review, there is considerable disparity between the states regarding the lateral distribution of the nonstandard gage axle loads. This is because there is no nationally recognized specification for the distribution of nonstandard gage axles. As seen in Table C4-8, the most frequently used specifications for lateral distribution is by far the AASHTO *Standard Specifications for Highway Bridges* (2002), followed by the AASHTO *LRFD Bridge Design Specifications* (2004) and the AASHTO *Guide Specifications for Distribution of Loads for Highway Bridges* (1994). However, these specifications are all based on the standard gage axle and do not have specific provisions for the distribution of nonstandard gage axle loads.

Tables C4-8A and C4-8B show the responses of United States and Canadian agencies, respectively, as to how they deal with this issue in permit review. Sixteen of the responding agencies indicated that gage width is not taken into account in permit review at all, and those who do take into account gage width use the following methods or concepts:

- Empirical distribution factors as functions of gage width, such as the effective width concept of McLelland (2003);
- Lever rule;
- A method cited in "A Rational Procedure for Overweight Permits" (Bakht and Jaeger 1984); and
- A method described in *Bridge Analysis Simplified* (Bakht and Jaeger 1985).

It would clearly be valuable to compare these methods and to eventually develop a more widely acceptable method (that can be one or a combination of these methods) to have consistent practice.

For multilane loads, columns 3 and 4 of Tables C4-8A and C4-8B provide additional details on this subject. Cranes actually can be viewed as a special case of OW vehicles; however, many transportation agencies single out them for special treatment, as can be seen from these tables.

Other Details in Load Rating

Tables C4-9 and C4-10 exhibit the responses of the agencies to the questions regarding various details in bridge load rating. They include dead load distribution, span length definition, treatment of rebar cutoffs in concrete members, determination of dynamic impact factor, load effects considered as limit states, lateral load distribution factor, and inclusion of nontraditional additional loads and environmental factors.

According to Tables C4-9 and C4-10, the following factors appear to be relatively uniformly treated: span length definition, dynamic impact factor, and dead load distribution. The most nonuniformly treated factors are, in order of decreasing severity, environmental factors, bar cutoff, additional dead loads, limit state, and lateral distribution factor (with the gage length issue excluded).

Consideration of the listed environmental factors varies from "not considered at all" to "as detailed as in design." The same is observed for bar cutoffs. Bar cutoff here refers to steel reinforcement discontinued in concrete members. It causes a sudden reduction in load carrying capacity at the cutoff section. These types of sections may require checking in bridge evaluation as critical sections. As seen in Table C4-10, the most commonly concerned limit states are moment, and then shear. The most commonly used specifications for lateral load distribution factors by far is the AASHTO *Standard Specifications for Highway Bridges* (2002), followed by the AASHTO *LRFD Bridge Design Specifications* (2004) and the AASHTO *Guide Specifications for Distribution of Loads for Highway Bridges* (1994).

Local Bridge Evaluation

Of the total numbers of bridge structures in this country, there are more locally owned bridges than there are bridges owned by state-level agencies. Also, local bridges have a higher percentage of their inventory with a lower load carrying capacity. Therefore, the safety of most of the entire bridge population deserves adequate attention. However, it is known that not all local bridges are maintained to the same condition level as state-owned bridges, for a variety of reasons, including the demand on local bridges being relatively lower in terms of level of traffic, so that they do not have to be maintained to a higher standard and the resources available to local bridges are not as adequate. Table C4-11 shows the responses of the state-level agencies regarding load rating for local bridges. Fifteen of the agencies do not know whether their local bridges are evaluated using the same procedure used for the state-owned bridges, and four agencies of the 44 that responded believe that they are not.

SUMMARY

As discussed in this chapter, load rating involves many details on which there could be a large variety of available approaches. These approaches can lead to different results. Conversely, the quantification of these differences has not yet been done to understand the nonuniformity thereby caused. In addition, the number of cases of permit review requiring bridge evaluation may be relatively small, compared with the number of permits issued without bridge evaluation, although the weights of those loads requiring bridge evaluation are much higher. Calibrating these various approaches along with the computer software programs used can be an effective approach to improved uniformity.

CHAPTER FIVE

EFFORTS POSSIBLY CONTRIBUTING TO IMPROVED UNIFORMITY OF BRIDGE RATING FOR OVERSIZE/OVERWEIGHT VEHICLES

The truck transportation industry has been concerned with permitting uniformity, because it is viewed as a cause of lower productivity. For example, when the same load is required to have multiple permits, it can be considered a waste of time and effort in applying and reviewing the permits. This chapter discusses several concerted efforts that are expected to contribute to reducing nonuniformity.

NEW ENGLAND TRANSPORTATION CONSORTIUM

In 1986, five New England area states in the NETC (Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) started to work with FHWA and the Center for Transportation Studies at Massachusetts Institute of Technology in developing an agreement on a multistate permit program. In 1987, the five states signed an agreement on a set of permit procedures. This program is documented in the *New England Transportation Consortium Handbook* (1995), which describes the common procedures for issuing permits for a majority of the nondivisible oversize and overweight trucks for highways administered by the five states (not other agencies in these states). Although the procedures were developed by and for the five New England states, they were established in a way that also allows for other states and Canadian provinces to become participants (*New England* . . . 1995).

The multistage permit program covers a common core of nondivisible oversize and overweight combination vehicles for a single trip permit. These vehicles need to be within the following "envelope vehicles":

Length: 90 ft or less.
Height: 13 ft 6 in. or less.
Width: 14 ft or less, except for modular or mobile homes. In that case, an additional 6 in. overhang for eaves will be allowed. The greater overhang shall be on the right-hand shoulder side of the highway, making the case 14 ft 6 in.
Weight: 108,000 lb or less, traveling on five or more axles, or 120,000 lb or less, traveling on six or more axles, in addition to other axle spacing and axle weight requirements.

A New England multistate permit can be issued by only one of the five states, although it is valid for all of the states. The carrier needs to file only one application (as shown in Figure 9), no matter how many states the load will need to travel through. The carrier is also required to pay all the fees applicable in each of the states in which the load will travel, but only to the state issuing the permit. This procedure can reduce the work load for both the carrier and the states involved, without the loss of revenue. The permit-issuing state needs to be the destination state of the trip if it is one of the five New England states or the entry state or the origin state if the destination state is not one of them. In addition, the single trip permit can also cover the return trip if one is required according to the law(s) of the involved states.

This multistate permit program requires the timely coordination and cooperation of the involved states. For example, the program determines the specific route using a map of the routes that can accommodate the vehicles meeting the requirements. On the other hand, these routes may change their condition affecting their ability to do so, owing to construction or other reasons. When this occurs, the state with the jurisdiction of the route needs to notify the other states of the situation and provide information on the detour. The involved states also review the practice in a coordinated fashion and revise the program accordingly when needed.

ATLANTIC CANADA

Atlantic Canada includes four Canadian provinces: New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island (PEI). *A Guide to the Agreement on Uniform Vehicle Weights and Dimensions Limits* (2001) has been developed by Atlantic Canada and implemented in these provinces. The guide has two parts: Part 1 contains general limits on vehicle dimensions and axle and gross weights and Part 2 covers the more detailed limits with respect to 10 categories of vehicles. The following implementation milestones were agreed on by the four provinces.

- Once implemented, the weight and dimension limits will apply to all vehicles beginning with model year 2003.
- Once implemented, the weight limits in Parts 1 and 2 will apply to all existing vehicles that comply with the configuration requirements and dimension limits contained in Parts 1 and 2.

STANDARD APPLICATION AND PERMIT FORM FOR INTERSTATE TRAVEL
FOR NON-DIVISIBLE OVERSIZE AND/OR OVERWEIGHT LOADS

APPLICATION & PERMIT

Issue Date/Time: | Issue State & Permit No.:

Date(s) of Move: | Type Payment:

TOTAL FEE:

Issued To: | Fax Agency:

Object to be moved: ____________________
(if mobile home, your, make, color & serial number)

Vehicle and Load Maximum Dimensions

MAXIMUM WIDTH	MAXIMUM HEIGHT	MAXIMUM LENGTH	TOTAL COMB. GROSS WEIGHT	FRONT OVERHANG	REAR OVERHANG
ft in	ft in	ft in	lbs.	ft in	ft in

	Registration	Registration Weight	No. Axles
Truck/Truck-Tractor (indicate one)	______	______	______
Semi-Trailer/Trailer (indicate one)	______	______	______

Origin (Municipality/State) ______ | Destination (Municipality/State) ______ | For Permit Office Only

State Routing	State Fee
A. ____	$ ______
B. ____	$ ______
C. ____	$ ______
D. ____	$ ______
E. ____	$ ______

INSURANCE CERTIFICATE NO.
Vermont ______________
Rhode Island ______________

FUEL DECAL/PLATE NO.
Vermont ______________ (Non VT Reg. Only)

SPECIAL PROVISIONS: escorts required.

Authorized Permit Official: | Telephone:

Authorization and permission is hereby granted to move your vehicle as described in detail above. Movements shall be made in compliance with the Special Provisions and the General Provisions listed on the back side of the route map which shall apply as if fully written herein. Movements shall be made only within the limits of the routes stated above. Permit shall be void if limitations and/or restrictions are exceeded. IN CONSIDERATION OF THE FEE PAID THE REGISTERED WEIGHT OF THIS VEHICLE IS DEEMED TO BE INCREASED TO THE WEIGHT AND CONDITIONS SHOWN ON THIS PERMIT, EXCEPT FOR VEHICLES REGISTERED AND TRAVELING IN MASSACHUSETTS, WHICH MUST BE REGISTERED FOR THE VEHICLE GROSS WEIGHT. Note: Failure to comply with all individual Agreement State and municipal laws, rules, and regulations invalidates this permit. All bridge weight and height limits, as posted must be observed.

FIGURE 9 New England area Interstate permit application form.

- Once implemented, common administrative and enforcement policies and procedures respecting vehicle weight and dimension limits will be adopted by the parties.
- On December 31, 2004, liftable axles on equipment from model year 2003 or later will not be recognized in other than tandem-equivalent or tridem-equivalent axle groups.
- On December 31, 2005, the automatic application of tolerances on axle and GVW limits, published or not, will be eliminated.
- On December 31, 2009, weight and dimension limits that differ from those contained in Schedule A and that have been provided under grandfather or transition programs will expire.

Note also that this agreement does not apply when the following factors are concerned: seasonal weight restriction, weight-posted bridges, route restrictions, and OS/OW permits. In other words, this agreement defines common "legal" vehicles in the involved provinces. Nevertheless, this model of regional agreement may offer an inspiration as to which form of cooperation can be effective. It also appears that a national agreement on OS/OW policies for the United States is not foreseeable at this point; however, regional agreements as short-term goals can be a first step toward such an agreement.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS MULTISTATE PERMIT GROUP SURVEY

SASHTO has established a multistate permit group with a focus on vehicle permits. One of the group's activities was a survey on permit review through bridge evaluation. This is the first effort known to quantify the impact of differences in the load rating procedures between the states. Note also that some of these differences may occur even within a state, because different offices or individuals may perform the work differently based on their own understanding and interpretation of the governing specifications.

In this survey, a specific reinforced-concrete beam bridge and a specific permit vehicle were used as a specimen. These assumptions about the bridge were provided to the participating DOTs:

- Bridge was built according to their standard construction practices in 1964,
- Material strengths used in the bridge matched those in common use in their state in 1964,
- There were allowances for rail and curb dead loads, and
- There were allowances for overlays.

The bridge and the vehicle were sent to 21 SASHTO states to perform bridge evaluation as part of a permit issuance review. Based on the latest information available, 8 of the 21 responded. The returned calculated rating factors from the eight state DOTs varied from 1.00 to 1.28. Although all of the responding states would approve the permit application, several would impose some requirements, the most common being to limit the travel speed to between 5 and 10 mph to apparently reduce dynamic impact. It is noted that it could be interesting to review the calculations and the computer input and output to understand the exact sources of the different results. Nevertheless, this effort has pioneered quantification of nonuniformity in bridge evaluation for permit review.

WESTERN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS GUIDE

In 2004, the Western Association of State Highway and Transportation Officials (WASHTO), which includes 18 western states, issued the sixth edition of its *Guide for Uniform Laws and Regulations Governing Truck Size and Weight Among the WASHTO States* (2004). The first edition of the document was adopted in 1990. This guide is meant to provide directions toward uniform practice in truck size and weight among WASHTO states, although the document also states that each jurisdiction may require some exceptions based on road configurations and local issues. As a result, each jurisdiction maintains the right to develop special exceptions to these recommendations. The minimum standards, however, are expected to apply to the Interstate and primary routes, and any other road that a state may determine as appropriate.

WASHTO continues to encourage individual states to incorporate, to the extent possible, the recommendations of the *Guide* into the laws, regulations, and policies of all the WASHTO states, to accomplish increased efficiency of interstate truck transportation in the WASHTO region.

Note also that the WASHTO *Guide* (2004) covers not only vehicles in regular operation (i.e., legal vehicles), but also permit vehicles. This is one of the major differences between this document and the one for the four Atlantic Canadian provinces (*A Guide* . . . 2001). Nevertheless, the latter has specified milestones, and some of them have been completed. Furthermore, Atlantic Canada is now in the process of developing a similar agreement for permit loads.

ILLINOIS DEPARTMENT OF TRANSPORTATION LOAD AND RESISTANCE FACTOR RATING SURVEY

The AASHTO *Guide Manual for Condition Evaluation and Load Resistance Factor Rating* (*LRFR*) *of Highway Bridges* (2003) is a relatively new set of AASHTO specifications. Although relatively less experience has accumulated with this manual, it should have an impact on bridge load rating and bridge evaluation for permit review. Thus, the effort of the Illinois DOT (ILDOT) regarding the new specifications is discussed here.

In 2004, the ILDOT conducted a survey on DOTs' usage and perspective concerning the LRFR specifications. A questionnaire was issued to the states in the Virtis/Opis/BRASS User's Group. Of the 40 states surveyed, 32 (80%) responded, with 28 reporting that they have reviewed the specifications and 4 saying they have not. Fifteen states reported having used the specifications for load rating, whereas 17 have not. A total of 275 bridges in the country had been rated using this new set of specifications. However, 209 of the 275 bridges are in two states, with just 66 in the other 13 states. It appears that the new specifications have not been widely used, except in two states.

Of those states that had used the code, seven found that the ratings were lower than those using the current AASHTO *MCEB* (2000), two reported about the same, and three noted that they could be higher, the same, or lower. When asked whether the state would be more or less likely to use the new specifications, 12 said more likely and 17 said less likely. However, when asked the same question but with the additional condition that Virtis could be used to apply the new specifications, 22 states said more likely, whereas 4 still said less likely.

AASHTO BRIDGEWARE

Virtis is an AASHTO BRIDGEWare product that can be used for bridge load rating and bridge evaluation for permit review. It has the graphical tools to speed preparation of the data and application of the results. It uses the Wyoming DOT's program Bridge Rating and Analysis of Structural Systems (BRASS) as its analytical engine for load rating. Another important feature of Virtis is its integrated database where rating inputs and outputs can be readily stored, reviewed, and reused. This feature can make bridge load rating and bridge evaluation results more uniform, because of the repeated use of the same data with minimal updating. Through the comprehensive database and other interactive functions, the user may provide a 3-dimensional description of a bridge superstructure. These bridge data can then be used by a variety of girder-line, 2-dimensional, or 3-dimensional analysis packages for permit and routing review.

As discussed previously, a number of states have started their implementation of Virtis, which requires that a large amount of information be loaded in the database. The payoff for this loading is that detailed information on the bridges within the jurisdiction will be available electronically. As a result, a higher consistency of bridge evaluation for permit review can be expected.

UNIFORM OVERDIMENSIONAL AND OVERWEIGHT PERMIT POLICY PROPOSED BY SPECIALIZED CARRIERS & RIGGING ASSOCIATION

The SC&RA is an organization representing member companies involved in transportation of oversize and overweight items. From a viewpoint of carriers, and with consideration to state agency positions and practices, SC&RA developed a uniform overdimensional/overweight permit policy as a basis for a position on uniformity in permit policy. This policy is presented here.

1) Any state, which, based on safety considerations has established limits in excess of those found in this proposal, should continue such limitations and practices.
2) Routine Issue: This refers to any overdimensional/overweight permit that would not exceed provisions covered by the Uniform Permit Policy.
   a) Height—Limited by route only.
   b) Length—Routine issue up to 120 ft.
   c) Weight—Routine issue for combinations not to exceed 22,000 lb per axle and/or combination weights as follows:

Axle	Weight (in lb)
Single (Dual Tire)	22,000
Tandem	46,000
Tri	60,000
Trunnion	60,000

   d) Width—Routine issue up to 14 ft wide.
   e) Trunnion Axle—A short axle pivoted at or near its mid-point. Normally used in pairs in conjunction with a walking beam in order to achieve two axles of oscillation.
3) Uniform Permit Information
   A uniform application form for permits is to be used by every state which shall be valid on a single trip for a minimum of 5 days excluding holidays. There shall also be a system in every state in which revisions or extensions may be obtained.
4) Blanket Permits and Self-Issue
   Endorse the concept of Blanket Permits by states on an annual basis. Usage would be available to all domiciled and nondomiciled motor carriers.
   Self-issue permits would apply to single trips only. Self-issue permits would be completed by the holder of the self-issue forms after communicating with the appropriate governing agency. Usually, a permit number routing of some other specified piece of information is given to each person completing the form.
5) Sign and Flag Uniformity
   Loads exceeding 8 ft 6 in. will have appropriate signs. All overdimensional loads will require signs. Required load signs should be the following dimensions: 7 ft wide by 18 in. high with black letters 1-1/2 in. wide and 10 in. high on yellow background reading "OVERSIZE LOAD" in front and rear locations.
6) Escort Vehicle Requirements
   a) Length—One rear escort after 90 ft overall length on less than 4-lane highway and after 110 ft on 4 or more lane highways.
   b) Width—One escort required on all loads when in excess of 13 ft wide. Additional escort required on less than 4-lane highways when in excess of 14 ft wide.
   c) Height—One escort required in excess of 14 ft 6 in. loaded height.
   d) Weight—No routine escort service required.
   e) Escort vehicles shall be equipped with two roof-mounted 18 in. red flags. Whenever the vehicle is escorting a load requiring the overdimensional load sign, the escort shall display a bumper-mounted yellow 14 in. × 5 ft sign reading "OVERSIZE LOAD" with black letters 8 in. high and 1-1/2 in. wide. Wherever special lights are required, a revolving amber dome light, meeting the requirements of SAE J845, mounted in the center of the vehicle roof, shall meet the state's special lighting requirements.
7) Periods of Travel Under Permits
   a) Overweight loads only: overweight loads that are not overdimensional and can flow with the traffic shall be allowed continuous travel.
   b) Overdimensional loads 10 ft wide or less shall be allowed continuous travel.
   c) Overdimensional loads exceeding 10 ft wide shall operate in daylight hours only.
   d) Vehicles under permit shall be prohibited from travel on the following holidays: New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas.

SC&RA recognizes that there would be modifications by states to this uniform policy; however, this can be a foundation toward enhanced uniformity for the OS/OW permit practice. In item (3) of the uniform policy, a concept of uniform permit information is proposed toward the direction of a uniform permit application form. Figure 10 displays SC&RA's proposed information form. On the other hand, SC&RA does recognize that each state has its own forms for a variety of reasons.

UNIFORM PERMIT INFORMATION REQUIRED

Contact: ______________________ Date: ____________

Company Name: ______________________

Address: ______________________

City: ______________ State: ________ Zip: ____________

Telephone: ______________ Fax: ______________

LOAD DESCRIPTION MAKE & MODEL:

Tractor:
Year & Make: ______________ License # ________ State: ____

Trailer:
Year & Make: ______________ License # ________ State: ____

Trailer:
Year & Make: ______________ License # ________ State: ____

Overall Dimensions Length: ________ Width: ______ Height: ______

Gross Weight: ______________ # of Axles: ____________

Spacings: ______________ Total Bridge: ____________

Tire Sizes: ______________________

Origin: ______________ Destination: ______________

Routes: ______________________

Effective Dates: ______________ Special Account #'s: ____________

Special Provisions:

Specialized Carriers & Rigging Association
2750 Prosperity Avenue, Suite 620, Fairfax, VA 22031
Phone: 703-698-0291 Fax: 703-698-0297
http://www.scranet.org

FIGURE 10 SC&RA proposed uniform permit information required.

ELECTRONIC MODELS FOR BRIDGES AND ELECTRONIC SCREENING

In chapter four, it was noted that a majority of the states responding to the survey (25 of 44) indicated favorable positions for having electronic bridge models for evaluation. The advantages of this better practice can be summarized according to Table C4-1A as follows: ease, high speed, consistency, and permit-vehicle precision for bridge analysis. These advantages result in a number of positive outcomes.

- Uniform modeling leads to uniform review results,
- Reduction of modeling effort allows for the consideration of more options in permit review and thus a higher probability to approve permits, and
- Reduction of turnaround time for permit issuance.

These following states reported having electronic models for 90% or more of the state bridge population: Connecticut, Illinois, Iowa, Kansas, Minnesota, Oklahoma, Pennsylvania, South Dakota, Washington, Wisconsin, and Wyoming.

In addition, electronic screening can be used for reviewing permits not requiring bridge evaluation and has similar advantages. Note that some electronic screening software programs are also applicable for those permits requiring bridge evaluation. According to the survey results and other sources, these states have this capability: Alabama, Nebraska, Ohio, South Carolina, South Dakota, and West Virginia.

SOUTHEASTERN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS MULTISTATE PERMIT PROGRAM

In 1996, SASHTO established a multistate permit agreement among its member states ("Multi-State Permit . . ." 2000), to "ease the burden of obtaining state oversize/overweight documents for the trucking industry." This agreement covers single trip permits for nondivisible loads. The member states currently participating in the program are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, North Carolina, South Carolina, Virginia, Tennessee, Texas, and West Virginia. The permit vehicle is required to be within the so-called "envelope vehicle," which is defined as follows: length $<$ 100 ft ($>$51 ft for outer axle measurement), height $<$ 14 ft, width $<$ 14 ft, GVW $<$ 120,000 lb, steering axle weight $<$ 12,000 lb, single axle weight $<$ 20,000 lb, tandem axle weight $<$ 40,000 lb, and axle group weight (three or more axles) $<$ 60,000 lb. One permit is valid for traveling in all participating states. Thus, multiple permits from different states will not be needed for an interstate trip.

Representatives from these participating states meet twice each year to get feedback from the states and industry to further improve the program. This group is also considering adopting the WASHTO envelope vehicle so that the same vehicle can be permitted in both regions. Note also that the group is working on other issues that can benefit the trucking industry, such as a common envelope permit vehicle for both SASHTO and WASHTO states, uniform escort certification, uniform hours of movement for permit loads, and online permitting (R. Braden, personal communication, 2005).

OTHER

The questionnaire used in this study also solicited additional information and comments that the state-level agencies might have on the subject. Tables C5-1A and C5-1B cite the comments received for the United States and Canada, respectively. The required follow-ups for more detailed information have been done and the results have been included in this report.

CHAPTER SIX

CONCLUSIONS AND FUTURE RESEARCH NEEDS

Most states developed tools or methodologies years ago that determined the allowable weight limitations and vehicle dimensions for permit vehicles in their jurisdictions. Some of the approaches that states have used are:

- Determine allowable permit axle and/or axle group weights by increasing Federal Formula B weights by some amount.
- Develop a permit design and analysis vehicle and set the allowable axle group weights based on the load effects of this vehicle.
- Use locally developed methodologies to extrapolate allowable permit weights from the bridge design loading.
- Use weight limitations that are legislated rather than derived based on engineering concepts.
- Use basic weigh policies of adjacent state(s) with modifications.

Note that these approaches not only establish the maximum axle and/or axle group weights, but may also affect the axle spacing or number of axles required to carry the weight. For instance, Federal Formula B considers the number of axles in a group, whereas in some states the spread of the axles is used as an important factor in permit review.

These weight policies have evolved over the years to make accommodations for local industry needs and the needs of specialized vehicles and industries. The policies may be difficult to modify for the following reasons:

- The permit trucking industry has made an economic investment based on these policies. Changing the policies would change the interstate and intrastate competitive playing field.
- The personnel who developed these polices are no longer employed at the agencies. The present personnel are reluctant to make significant changes without additional studies or electronic computer modeling of the bridges that would support the considered changes. Resources are frequently not available for the studies or computer models.

Some states now have various electronic computer models, which allow them more flexibility to make changes. This also contributes to the nonuniformity in permit weight policies and practices. Apart from the policy differences, the specifications for bridge evaluation also allow ample room for variation because they do not have specific enough provisions.

Several conclusions can be drawn to summarize this synthesis study.

- In the United States, overweight vehicle permitting is operated through a highly complex system that involves many agencies at the state and local levels. The governing policies and regulations vary extensively and significantly in terms of permit type and processing operation. The industry has a strong interest in enhanced uniformity in this area.
- Bridge evaluation for permit review as a step in the permitting system also varies noticeably among the state-level agencies, primarily as a result of variation in interpretation of the AASHTO *Manual for Condition Evaluation of Bridges* (2000) and the referenced AASHTO *Standard Specifications for Highway Bridges* (2002), and possibly also as a result of the differences in the computer software programs used. The Southeastern Association of State Highway and Transportation Officials (SASHTO) study discussed in chapter four shows that the difference in the allowable vehicle weight for one single case can be as high as 40%. Note that the lack of specific provisions in these specifications for the involved quantities has allowed for the various observed interpretations.
- Having electronic models of the bridges that can repeatedly be used for bridge evaluation is an effective approach to enhanced uniformity for permit review. It can reduce turnaround time for permit review, allow for more effort on examining other options for approving the permit, and provide more consistent and accurate results.
- The multistate permit programs of the New England Transportation Consortium and SASHTO represent a successful model for improved uniformity in oversize/overweight permitting. In these programs, one permit can be applied in all participating states for interstate trips if the vehicle falls within the defined specifications for dimensions, GVW, axle weights, and/or other parameters.

As a result of this synthesis effort, the following needs were identified for further research in the area of improved uniformity.

- Further understanding of the technical basis for issuing those permits that do not require bridge evaluation currently practiced in many states is needed. This effort should cover, for example, the vehicle configuration models used in determining the thresholds for not requiring bridge evaluation, axle and axle group load limits, and experiences of the states with different thresholds. Next, it would be helpful to develop rational methods and the needed electronic tools to perform screening, which could easily be implemented in most states. This research effort should include review of the computerized systems used by transportation agencies in Alabama, Nebraska, Ohio, South Carolina, South Dakota, and West Virginia, which can analyze every bridge on any route given in the respective state.
- Acquire quantitative understanding of the differences in the approaches, procedures, and software tools used for bridge evaluation in permit review, followed by the development (or identification) of those that can achieve enhanced uniformity. For example, they could address the differences in estimating the load distribution factor, dynamic impact factor, and live (vehicular) load positioning. This effort could cover those bridges considered not ratable for a variety of reasons. It is also suggested that the details collected in the SASHTO survey be fully understood in the context of this research effort, to identify the causal factors for nonuniformity in bridge evaluation for permit review.
- Develop a national envelope vehicle based on the envelope vehicles of the New England Transportation Consortium and SASHTO, and the uniform vehicle of the Specialized Carriers & Rigging Association. This vehicle can be a candidate for a national permit program, which should cover a majority of permit vehicles in the country.

Resolution of these issues could improve the uniformity of permit review for oversight/oversize vehicles.

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APPENDIX A
Questionnaire

NCHRP Project 20-5
Synthesis Topic 36-01

BRIDGE RATING PRACTICES AND POLICIES FOR OVERWEIGHT VEHICLES

This synthesis' objective is to document state/province bridge rating systems, practices, and policies as these relate to overweight and oversize vehicles. This survey is to understand the causal factors for lack of uniformity in permit issuance among different agencies. We appreciate your responding to the following questionnaire. It may need to involve personnel of different units in your organization (e.g., your district or regional offices). For your convenience, you may return multiple copies answered by various units. Please return the questionnaire by e-mail, fax, or U.S. mail to:

Dr. Gongkang Fu, PE
1647 Greenwich Drive
Troy, MI 48098
(248) 641-3864 (voice and fax); (313) 577-3842 (voice)
gfu@eng.wayne.edu

Please return this questionnaire by January 28, 2005.

Name:
Title:
Organization:
Phone:
e-mail:

Name:
Title:
Organization:
Phone:
e-mail:

In case you are unable to answer some of these questions, you may leave them unanswered, but please return this questionnaire with the above section filled. Thank you!

I. Permitting Process and Procedure

I-1. Please identify and explain the classifications of overweight/oversize permits your state/province issues (e.g., annual permit for up to 115 kips, trip permit, etc.) or provide a copy of your permit practice manual that includes this information. For each classification of permit, indicate if a review of the structure's existing load rating is required or if a new load rating is required. Attach more sheets if needed.

Type 1
Type 2
Type 3
Type 4
Type 5
Type 6

Do agencies other than the state/province DOT (e.g., local agencies) issue these permits?
☐ Yes
☐ No.
If "Yes," specify these agencies and which permit classifications they issue: ________________________
____

I-2. Is your agency considering or adopting new changes in your overweight/oversize permit policies?
☐ Yes
☐ No.
If "Yes," please describe them:____

I-3. In your state/province, overweight/oversize permits are processed (check all that apply)

a.☐ by only one single state/province DOT office.
If you checked this box, how many full-time equivalent employees (2,080 h/year) are dedicated to this function? ________
Do you think this staffing is adequate?
☐ Yes
☐ No.
If bridge load rating is needed for permit checking, which offices perform that?
☐ The same state/province DOT office
☐ Other (specify): ____

b.☐ by several state/province DOT offices.
If you checked this box, how many such offices process permits in your jurisdiction? ________
How many full-time equivalent employees (2,080 h/year) are dedicated in these offices to this function? ________
Do you think this staffing is adequate?
☐ Yes
☐ No.
If bridge load rating is needed for permit checking, which offices perform that?
☐ The same state/province DOT offices
☐ A single state/province DOT office
☐ Other (specify): ____

c.☐ by several local agency offices.
If you checked this box, how many such offices process permits (involving either state or local roads and bridges)? ________
How many full-time-equivalent employees (2,080 h/year) are dedicated in these local agency offices to this function? ________
Do you think this staffing is adequate?
☐ Yes

☐ No.
If bridge load rating is needed for permit checking, which offices do that?
☐ The same local agency offices
☐ Several state/province DOT offices
☐ A single state/province DOT office
☐ Other (specify): ________

I-4. Which agencies enforce overweight/oversize permit restrictions in your state/province?
☐ DOT
☐ State/province police
☐ Local police
☐ Other (specify): ____

I-5. Please give the total number of bridges that are rated in your state/province. ________
They represent ________% (percent) of all the bridges in your state/province.

I-6. What approximate percentage of bridges in your jurisdiction has electronic analytical models that can regenerate load ratings with minimal additional data input? ________%.
Do you think whether an electronic analytical model is available may have an impact on achieving uniformity in permitting trucks within and between states/provinces?
☐ Yes
☐ No.
If "Yes," please specify the impact: ____
____

II. Load Rating Procedure for <u>State/Province Bridges</u>

II-1. Which methods do you use in rating state/province bridges for permit review?
☐ AASHTO LRFR
☐ AASHTO ASR
☐ AASHTO LFR. If checked, do you use the compact section provisions?
☐ Yes ☐ No.
Do you use the overload article 10.57 of the specification? ☐ Yes ☐ No
☐ Other (specify): ____

Please provide the reasons for using these methods/specs in your rating practice: ____________________
____

II-2. If a permit review requires a bridge load rating to be reviewed or regenerated, who fulfills the task? (Check all that apply.)
☐ State/province agency personnel
☐ State/province-contracted consultants
☐ Other (specify): ____

II-3. Which load rating levels are used in checking overweight/oversize permits in your jurisdiction?
☐ Inventory
☐ Operating
☐ Other (specify): ____
Please explain the rationale for using the level indicated: ___________________________________
____
If two or more boxes were checked, please describe when to use which one(s): ____________________
____

II-4. How do you apply vehicle load to consider possible multiple presences of vehicles in permit checking?
☐ Not considered (i.e., one lane of permit vehicle only)
☐ One lane of permit vehicle plus other adjacent lanes of lighter/legal vehicles
☐ Other (specify): ____

II-5. Do you restrict permit vehicles regarding their traveling behaviors?
☐ Position on bridge
☐ Speed
☐ Exclusion of other vehicles on bridge
☐ Acceleration/deceleration while on bridge
☐ Other aspects (specify): ____
To what classification(s) of permit are these restrictions applicable? (You may use the classification definitions in your answer to Question I-1.) ____

II-6. What computer-aided modeling methodologies and tools do you use in rating for permit checking?
☐ None
☐ Finite-element analysis. Specify software: ____
☐ Grillage method. Specify software: ____
☐ Girder line analysis. Specify software: ____
☐ Other (specify method and software): ____

II-7. What software do you use for bridge rating? (Check all that apply.)
☐ None
☐ BRASS - Girder
☐ BARS
☐ Virtis
☐ Other (specify): ____
If more than one is checked, please identify the most used software: ___________________________

If you are *not* using Virtis, do you have a plan to use it?
☐ Yes. If "Yes," by when? ____
☐ No.

II-8. What methods do you have for screening permit vehicles to minimize or eliminate bridge analysis?
☐ Comparing permit vehicle's and design vehicle's load effects
☐ Using charts and/or curves of acceptable axle spacings and weights
☐ Comparing with analysis results of standard bridges
☐ Other (specify): ____

II-9. Do you have specifications/guidelines/policies for considering bridge conditions in rating?
☐ Yes
☐ No.
If "Yes," please give the title of the document (e.g., AASHTO Specifications ….) or provide a copy of the document if it is state/province-specific: ____

II-10.
a. Do you consider axle widths/gages in bridge rating for checking permit trucks?
☐ Yes
☐ No.
If "Yes," please describe how it is handled or provide a document that explains how: _______________
____
b. Do you consider axle widths/gages in bridge rating for checking permit cranes?
☐ Yes

☐ No.

If "Yes," please describe how it is handled or provide a document that explains how:

c. Please describe how a superload occupying more than one lane can be checked in bridge rating?

d. Does your agency allow higher weight for trucks with wider axle widths/gages?

☐ Yes

☐ No.

If "Yes," please provide more details or a policy document for this permit type. ______________________
____

II-11. Do you have specifications/guidelines/policies for determining a bridge's material properties in bridge rating?

☐ Yes

☐ No.

If "Yes," please give the title of the document (e.g., AASHTO Specifications….) or provide a copy of the document if it is state/province-specific: ____
____

II-12. Please describe how curb post and rail dead loads are distributed to the members in bridge rating or provide the specifications/guidelines/policies regarding this: ______________________________________
____

II-13. For load rating, which definition(s) do you use for span length?

☐ Bearing center to center

☐ Structural length as defined in NBI

☐ Other (specify): ____

II-14. Please describe how you consider bar cutoffs in rating reinforced concrete members. ____________
____

II-15. How do you determine the dynamic load allowance/impact factor in load rating?

☐ According to the AASHTO Standard Specifications

☐ According to the AASHTO LRFD Specifications

☐ Other (specify): ____

II-16. Which limit states do you use in rating for permit vehicle checking?

☐ Moment

☐ Shear

☐ Serviceability

☐ Other (specify): ____

II-17. How is the distribution factor determined in rating for permit checking?

☐ Use AASHTO Standard Specifications

☐ Use AASHTO LRFD Specifications

☐ Other (specify): ____

II-18. Do you consider these additional loads in checking permits?

☐ Overlay dead loads

☐ Temporary barriers

☐ Other dead and live loads (specify): ____

II-19. Do you consider these effects of environmental factors in checking permits?

☐ Temperature

☐ Humidity (e.g., for P/S concrete members)

☐ Other (specify): ____

III. Load Rating Procedure for Local Bridges

III-1. Are the local bridges in your jurisdiction rated using the same procedures as for state/province bridges (with respect to all items in Section II above)?

☐ Do not know
☐ Yes
☐ No. If no, please indicate the differences: ____
____

III-2. Who performs rating for local bridges when it is needed in permit checking? (Check all that apply.)

☐ State/province agency personnel
☐ State/province-contracted consultants
☐ Local agency personnel
☐ Local agency-contracted consultants
☐ Other (specify): ____

III-3. At which level is the decision on who performs rating made?

☐ State/province
☐ Local government
☐ Other (specify): ____

IV. Additional Information

IV-1. If you are aware of any effort spent towards improving uniformity in rating for permitting overweight/oversize vehicles or any study relevant to this subject, please kindly provide contact information below. Add more sheets if needed.

Subject:
Name:
Organization:
Phone:
e-mail:

Subject:
Name:
Organization:
Phone:
e-mail:

V. Additional Comments

V-1. If you have any further comments/questions relevant to this questionnaire or this synthesis topic, please add them here. ____
____
____

You have completed this survey. Please return by January 28, 2005.
Thank you very much!

APPENDIX B

Abbreviations and Acronyms

ASR	Allowable Stress Rating
GVW	Gross vehicle weight
LFR	Load Factor Rating
LRFR	Load and Resistance Factor Rating
MCEB	*Manual for Condition Evaluation of Bridges*
MIT	Massachusetts Institute of Technology
NAFTA	North American Free Trade Agreement
NASA	National Aeronautics and Space Administration
NETC	New England Transportation Consortium
OS	Oversize
OW	Overweight
SASHTO	Southeastern Association of State Highway and Transportation Officials
SC&RA	Specialized Carriers & Rigging Association
WASHTO	Western Association of State Highway and Transportation Officials

APPENDIX C

Responses to Questionnaire

TABLE B3-1A
TYPES OF OS/OW PERMITS AND PERMIT ISSUING AGENCIES (United States)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
AL	Type 1—Overweight permit (passed screening). Vehicles are screened by analyzing them for a certain subset of bridges. If they pass this screening, then a permit is issued as appropriate. There is no specified weight limit used to define these types of vehicles. These vehicles typically have standard gage axles. Type 2—Overweight permit (failed screening). Vehicles that do not pass the screening described in Type 1 or that have non-standard gage axles (except for cranes) are passed to ALDOT's Bridge Rating office for detailed analysis.	
AK	Type 1—Single oversize trip permit—These permits are issued to vehicles that do not conform with the dimensions given in 17 AAC 25.012. The vehicle is not overweight. Single trip oversize permits are valid for three days to five days. No new load rating is required. Type 2—Single overweight trip permit—These permits are issued to vehicles that do not conform with the weights given in 17 AAC 25.013. The vehicle is not oversize. Single trip overweight permits are valid for three days to five days. A review of the load rating may be required. Type 3—Single trip oversize/overweight permits—These permits are issued to vehicles that do not conform with either 17 AAC 25.012 or 17 AAC 25.013. Single trip oversize permits are valid for three days to five days. A review of the load rating may be required. Type 4—Extended trip permits—These permits are issued for different periods of time. They are issued for a minimum of one month and a maximum of 12 months. The permitted vehicle may make unlimited moves while the permit is valid.	No
AZ	Type 1—Type A. See Arizona Administrative Code Title 17, Chapter 6 (http://www.sosaz.com/public_services/Title_17/17-06.pdf). Type 2—Type B. Type 3—Type C. Type 4—Type E. Type 5—Type F. Type 6—Type H.	No
AR	See attached manual.	
CA	No structure review required: Type 1—5-axle annual permit (125,000 lb gross weight). Type 2—7-axle (180,000 lb gross weight). Type 3—9-axle (240,000 lb gross weight). Type 4—11-axle (300,000 lb gross weight). Structure review required: Type 5—13-axle (360,000 lb gross weight). Type 6—Superloads 20 ft wide, 360,000 lb to over 1,000,000 lb.	Local permits are issued by cities and counties. Permit ratings for the 5-, 7-, 9-, 11-, and 13-axle vehicles noted above are furnished to local agencies by the state. Many locals have limited knowledge of state permit polices however.

TABLE B3-1A (*continued*)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
CO	Type 1—Single trip permits—up to 200,000 lb and/or 17 ft wide (subject to the maximum limit for width designated on the Pilot Car Escort and Oversize Restriction Map). Type 2—Special permits—over 200,000 lb, over 17 ft wide (subject to the maximum limit for width designated on the Pilot Car Escort and Oversize Restriction Map). Type 3—Annual OS, OW, and oversize/overweight permits—max. 200 kips; 17 ft wide (subject to the maximum limit for width designated on the Pilot Car Escort and OS Restriction Map); 130 ft in length for all four-lane highways; 120 ft in length for all non-mountainous two-lane highways; 110 ft in length for all mountainous, two-lane highways; and/or 35 ft rear overhang. Type 4—Annual OW divisible permits—issued to vehicles utilized as a Longer Vehicle Combination with a maximum weight of the lesser of 110 kips, Colorado Bridge formula ($W = \{L + 40\}$), or the Federal Bridge Formula ($W + 500\ \{LN/\{N - 1\} + 12N + 36\}$).	No
CT	See attached sheets.	No
DE	Type 1—A copy of Delaware's Hauling Permit Policy attached. Type 2—Only "Superloads" (GVW over 120 kips) require review of load ratings.	No
DC		
FL	Type 1—Blanket (multi-trips) for cranes/straight trucks issued up to 127,000 lb. Type 2—Blanket (multi-trips) for truck tractor semi-trailers issued up to 199,000 lb. Type 3—For trip permits, there are virtually no limits except the natural limits generated by bridge capacities. Type 4—For Types 1 and 3 above, some type of engineering evaluation may be required. Those are performed independently from the "existing" load ratings.	No
GA	Type 1—Annual permit (100,000 lb max.) Type 2—Single trip (less than 150,000 lb) Type 3—Single trip ("Superload" less than 180,000 lb) Type 4—Single trip ("Super +" greater than 180,000 lb)	
HI	No special classifications.	No
ID	Type 1—Annual permits—May be issued to vehicles carrying nondivisible loads weighing between 105 kips (80 kips on the Interstate) and 200 kips. Permittees are given a color-coded Route Capacity Map of Idaho state highways. Colors are determined based on the limiting bridge capacity for that segment. Also, allowable axle and axle configuration loads are given. Annual permitted trucks must obey the load restrictions of the Route Capacity Map for all state highways they travel. Type 2—Single trip permits—May be issued to vehicles carrying nondivisible loads that do not have annual permits or weigh in excess of 200 kips. A screening algorithm based on load carrying capacity information for each bridge on every state highway is provided by the bridge inspection unit to the permit writers. If the weight and axle configuration of the vehicle requesting a permit fits the algorithm, the permit writer is authorized to issue the permit. If not, the permit request is analyzed by the load rating engineer in the bridge inspection office. The engineer will approve/deny the request based on structural analyses of bridges involved in the move. The analysis is done using the software Virtis or BARS.	Yes. Local bridge owners are responsible for issuing their own permits. Generally it is done on a more informal basis than the state's procedures. I do not know the specifics of the local agencies' permitting processes.
IL	Type 1—Single trip permit 80,000 to 120,000 lb. If permit vehicle has a similar configuration to a vehicle previously OK'ed within the past 5 years by analysis over a particular bridge, that request will be OK'ed with no analysis. Type 2—Single trip permit over 120,000 lb (Superload), new load rating required. Type 3—Single trip vehicles <80,000 lb not meeting Federal Bridge Formula B, see note to Type 1.	Local agencies and Illinois State Toll Highway Authority issue single trip permits for roads under their respective jurisdictions.

TABLE B3-1A (*continued*)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
IN	Type 1—OW to 108,000 lb gross (120 Certain Axle Configuration). Type 2—OS/OW same as "1" up to 16 ft width, 110 ft length, 15 ft height. Type 3—Toll road gate various combinations up to 127,400 lb. Type 4—Mobile homes per width. Type 5—OS/OW from 120,000 to 200,000 lb and passing INDOT formula. Type 6—OS/OW exceeding 200,000 lb or INDOT formula.	Indiana Department of Revenue issuing all except Type 6.
IA	Type 1—Single trip permit. Bridge review is required for all vehicles over 156,000 lb or having axle weights in excess of 20 kips; vehicles under 156,000 lb are routed using bridge restriction map created annually. Type 2—Annual permit. No bridge review required for vehicles under 80 kips. Type 3—Annual oversize/overweight permit. Vehicles have specific axle configurations; bridges reviewed annually and a map of restricted bridges is created. Type 4—Multiple trip permit. Vehicles have specific axle configurations, bridges reviewed annually and map of restricted bridges is created.	County engineers and city engineers. Classifications are similar to state classes. Other classifications may be used.
KS	Annual Permits issued by Kansas Trucking Connection (KTC), up to 120,000 lb. Limits on axle group weights are: single, 22,000 lb; tandem, 45,000 lb; triple, 60,000 lb; quad+, 65,000 lb. Also table of allowable weights per given length based on modified TTI formulas. Other restriction are: 15 ft in height; 16 ft 6 in. in width; 126 ft in length. Load ratings using existing ratings are involved in creating maps for weight and clearance restrictions. Standard Trip Oversize/Overweight are same as Annual Permits except height is increased to 18 ft and weight is increased to 150,000 lb. Superload Permits issued by KTC after bridge analysis and approval by KDOT. Each bridge is analyzed and/or reviewed for each permit. Large Structure Permits are issued by KTC after review and approval of route by KDOT District Field Personnel.	KTC issues all permits following DOT guidelines or approvals. KTC is part of the Kansas Corporation Commission; 105 counties, 70 cities.
KY	Type 1—Single trip (superloads). Type 2—Industrial haul: allows trucks up to 80,000 lb on 44,000 lb roads. Type 3—Annual—attachment.	No
LA		
ME		
MD		
MA	Type 1—Reducible: 99 kips on five or more axles, annual basis, no load rating required. Type 2—Non-reducible: 130 kips on five or more axles, single trips and annual basis, no load rating required. Type 3—Superloads over 130 kips, individual basis, load rating required for each bridge.	Other Massachusetts transportation agencies and authorities (Turnpike Authority, MBTA, DCR, etc.) issue permits using their own criteria not set by the Massachusetts Highway Department.
MI		
MN	See attached.	All travel on local roads issued by county, city, or township.
MS	See attached pdf file.	No
MO	Type 1—Please visit MoDOT's Internet website for information regarding Missouri's Overdimension and Overweight Regulations at: http://www.carrier.state.mo.us/odow/.	No

TABLE B3-1A (*continued*)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
MT	Here is a link to our Motor Carrier Division Operations Manual: http://www.mdt.state.mt.us/mcs/manual.shtml. Refer to Section 4—Montana Codes Annotated, Title 61—Motor Vehicles, Chapter 10: Size–Weight–Load, Part 1—Standards Permits and Fees. See 61-10-125. Other fees for the permit fee schedule. 61-10-107 referred to is the legal loads for Montana, which is simply the Federal Bridge Formula. When overweight permits are referred to Bridge an analysis is done based on a review of the structure's existing load rating analyzed for the configuration in question.	No
NE	Type 1—Single trip: Overdimensional only, overweight only, overdimensional and overweight, self-propelled equipment, and two-axle floatation. Type 2—Manufactured home: new/dealer, pre-owned. Type 3—Continuous 3–6 month: Tractor/semi-trailer, self-propelled specialized mobile equipment, floatation construction equipment. Type 4—Other: Conditional Interstate use, building/slow moving large object, garbage/refuse, seasonally harvested products, annual implement of husbandry for I-80 only.	Yes
NV	Type 1—Trip permit. Type 2—Annual permit. Type 3—Semi-annual permit (6-month).	No
NH		
NJ	See attachment 1.	No
NM	Type 1—Permits up to 140 kips—no input from NMDOT required. Type 2—Permits from 140 to 240 kips—run truck loading through route and issue permit if New Mexico overload program ok. NMDOT Engineer not required to ok. Type 3—Permits over 240 kips—-run truck loading through route and issue permit if New Mexico overload program and NMDOT Engineer ok. NMDOT Engineer may do more analysis using BRASS or other program if desired on "bottleneck" or other bridges.	No
NY	Type 1—Annual/radius permit >80,000: review/new rating calculations may be needed. Type 2—Individual trip permit >80,000: review/new rating calculations may be needed.	All non-state bridge owners are responsible for their own review. They are not bound by NYSDOT policies.
NC	NC has a set route for routing certain overweight vehicles. It is called "Greenroute" and consists of pre-approved routes for the following vehicles: 5-axle vehicle—Maximum gross weight = 112,000 lb. 6-axle vehicle—Maximum gross vehicle weight = 120,000 lb. 7-axle vehicle—Maximum gross vehicle weight = 132,000 lb. Maximum single axle weight = 25,000 lb. Maximum tandem axle weight = 50,000 lb. Maximum tridem axle weight = 60,000 lb. Maximum quad axle weight = 68,000 lb. The minimum wheelbase from steer axle to rear trailer axle for the above vehicles is 51 ft 0 in. The permits for the above Greenroute can be issued by the Central Permit Unit or by NCDOT District Offices. Any vehicle shorter than the above requires an individual bridge study. Any overweight vehicle requests other than the above require "Single Trip Permits" and individual bridge studies. These permits can only be issued by the NCDOT Permit Unit. Bridge Load Rating: Bridge load ratings are not required for Greenline route overweight permits. For all other overweight permits, individual bridge studies are required. I have 10 engineers that perform Bridge Load Capacity Ratings full time. I have one engineer that works full time on overweight permits. We average reviewing 10–12 overweight permits per day. New load ratings are only calculated when absolutely necessary.	Yes—If the move requires the use of city streets, then the municipality that owns a bridge on that street would be required to issue any necessary permits. (There are only about 700 of these bridges in NC. The remainder of the bridges are state-owned.) There are also a few government-owned (Park Service, Corps of Engineers, etc.) bridges in NC. If a permit move needs to cross any of these bridges, then the mover must obtain a permit from the owner of the bridge.

TABLE B3-1A (*continued*)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
ND	Type 1—Single trip on truck-tractor semi-trailer combinations. A bridge analysis is done when the GVW exceeds 150,000 lb or when a combination of axles exceeds bridge weight limitations. Type 2—Single trip permits on self-propelled overweight vehicle. A bridge analysis is done when the GVW exceeds 114,800 lb. Type 3—Self-issue single trip. A bridge analysis is done when a combination of axles exceed bridge weight limitations. The GVW on this permit type cannot exceed 150,000 lb truck-tractor semi-trailer combinations or 114,800 lb for overweght self-propelled vehicles.	The ND Highway Patrol issues all permits for OS/OW vehicles and loads travelling on the state highway system to include the Interstate system. Some local government entities issue permits for movement on their local roads (county and townships roads, city streets). Of the 53 counties in North Dakota, 5 to 10 issue permits. In some cases, permits are issued only for specific OS/OW load movements. The number of personnel issuing permits in local government entities is unknown.
OH	Type 1—Trip permits (routine or superload). Type 2—Trip & return permits (routine). Type 3—Blanket permits (farms, manufacturing/building, or construction). Type 4—90-day or 365-day permits (origin–destination). Type 5—Multi-state permits. Type 6—Emergency permits.	Ohio Turnpike, counties, and cities/municipalities also issue permits to OS/OW loads for routes under their jurisdiction.
OK	Department of Public Safety: 1. All overdimensional loads. 2. All loads travelling over load posted bridges. 3. All loads where gross is no greater than legal (Federal Formula B). 4. All loads traveling “green” routes that do not exceed configurations listed on Std. OL1. 5. Issuing all permits. Engineering Consulting firm (currently Grossman & Keith): 1. All overloads that do not exceed 350,000 lb that do not match any of the configurations listed in Std. OL1. 2. All overloads that do not exceed 350,000 lb that are travelling on “red” routes. OKDOT: 1. All overloads that exceed 350,000 lb. 2. All overloads that have an approved trunnion type configuration (occupying more than one traffic lane). The above applies only to highways under state of Oklahoma jurisdiction. Any travel over roads or bridges owned by county, city, turnpike, Corps of Engineers, etc., must be approved by the owner.	Yes. See left.
OR		
PA	Special Hauling Permit Manual attached, see chapter 3. Type 1—Single trip >80,000—every permit, every bridge on route. Type 2—Annual (route-specific) >80,000—same as single + re-analyzed every month. Type 3—Annual (non-route-specific) > 80,000—All bridges on applicable network (PA, U.S., Interstate) are analyzed. Bridges that fail for load or clearance are placed on restricted list provided to applicant.	No. However, local owners must grant approval to utilize their roads.
PR	Type 1—A review of existing load ratings is required. Type 2—A review of existing load ratings is required. Type 3—Special permits—a review of existing load ratings is required, or new load rating if truck configuration is very different from standard truck configurations.	Yes

TABLE B3-1A (*continued*)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
RI	We have blanket permit for up to 104,800 lb on construction vehicles. No review of the rating or new rating is required.	The Rhode Island Division of Motor Vehicles issues the overweight/oversize permits.
SC	Type 1—Single trip up to 130,000 lb. Type 2—Multi-trip up to 90,000 lb and 1 year. Type 3—Superload (single) more than 130,000 lb.	No
SD	Type 1—OS/OW single trip—each vehicle analyzed for each bridge crossed. Type 2—Over 80 k on Interstate—single trip—over 80 k is legal load (per bridge weight formula B)—no analysis. Type 3—Multitrip for construction equipment—each vehicle analyzed for each bridge crossed.	SD Highway Patrol—Motor Carrier Division issues all permits.
TN	We have several types of permit (single trip, annual, mobile home, boat, etc.). The only one that requires a bridge analysis is single trip permits that fail our screening algorithm. Generally, these will exceed 150 kips in weight. I have attached a copy of our permit practice manual as an adobe PDF file, which provides further information as to the types of permits available.	Local city and county governments (under Tennessee law) have the option to issue permits if the vehicle needs to use local city streets or county highways. As a practical matter, these local governments seldom choose to invoke this option. Generally, a Tennessee DOT permit is the only one needed for Interstate and state routes except for the unusual case where a local government chooses to exercise the option to also issue a permit for local routes. In Tennessee, local bridges are also inspected and load rated by the Tennessee DOT. Therefore, if a permit vehicle needs to cross local bridges, we typically permit any required permit rating analysis for them as well.
TX	No bridge review required: Type 1—Annual envelope permits (vehicle and company specific). Type 2—Annual oil well servicing unit permit. Type 3—Annual overaxle/overgross weight tolerance permits. Type 4—Annual rig-up truck permit. Type 5—Annual water well drilling machinery and equipment permit. Type 6—Quarterly hubometer permits. Type 7—Annual implement of husbandry permit. Type 8—Annual crane permits—no bridge review required if less than 200,000 lb. Bridge review required: Type 9—General single trip mileage permits. Type 10—General OS/OW permit.	No
UT		

TABLE B3-1A (*continued*)

State Level Jurisdiction	Types of OS/OW Permits Issued by State Level Jurisdiction	Do Other Agencies Issue OS/OW Permits?
VT	Type 1—Gross vehicle load in excess of 150,000 lb requires an engineering study and are issued a single-trip overweight permit according to state statute. Type 2—Self-propelled cranes are issued single trip for each move. Type 3—The DMV issues all permits and would be the best source for this type of permit information.	The Vermont DMV Permit Office issues all permits. This office, Structures Section, only makes recommendations based on ratings when an engineering study is required.
VA	Type 1—See the Virginia Department of Motor Vehicles Policy and Manuals. Type 2—http://leg1.state.va.us/000/reg/TOC24030.HTM#C0111.	Virginia DMV.
WA	Type 1—Fixed load. Type 2—Log tolerance. Type 3—Refuse/collection. Type 4—Oversize/overweight. Type 5—Superloads >200,000 lb. Type 6—House moves.	Local agencies, outside agents issue permits except for superloads and house moves, self-issuers can get only monthly dimensional permits.
WI	Type 1—Annual permits to 170,000 lb. Type 2—Single trip permits to any weight—actual axle weights are evaluated for each structure on route.	Counties may also issue permits but usually check with the state if crossing state-owned bridges.
WY	Type 1—Class A permits authorize separate movements of indivisible loads that exceed Class B/C limits; they are approved only by the state DOT Office of Overweight Loads and are issued by permit issuing authorities. They are subject to any conditions and restrictions imposed. Type 2—Class B permits authorize separate movements of indivisible loads that do not exceed Class B/C limits; they are issued by permit issuing authorities; with prior approval of permit issuing authorities. Type 3—Class C permits are self-issuing permits that authorize separate movements of indivisible loads that do not exceed Class B/C limits; they are approved and issued to qualified residents of the state of Wyoming by the state DOT Office of Overweight Loads. The self-issuing permit holder is required to complete a separate Class C permit prior to each separate movement. Type 4—Class D permits are extended period permits that authorize multiple movement of vehicles without load that do not exceed the Class D limits. They are approved for specified vehicles, routes, and time periods. Type 5—Class W.	No

TABLE C3-1B
TYPES OF OS/OW PERMITS AND PERMIT ISSUING AGENCIES (CANADA)

Jurisdiction	Types of OS/OW Permits Issued	Do Other Agencies Issue OS/OW Permits?
Alberta	1. Multi-trip overweight permit—This type of permit can be issued to units with permanently mounted equipment and to vehicles carrying construction equipment. The permit is valid point to point within the province. There are axle and gross weight caps in the permits that have been pre-determined as acceptable for travel across non-restricted bridges structures. The permits are not valid for crossing restricted bridges. This permit is normally issued for a year and there are no limits to the number of trips. 2. Single trip overweight—This type of permit is issued for a single trip overweight. When this permit is issued, every bridge structure along the route is reviewed by comparing the default capacity of each bridge against the vehicle weight being permitted. If the bridge capacities are adequate, the permit is issued with no further review. If a bridge structure has inadequate capacity, then the bridge is re-rated with the actual weights and dimensions of the vehicle being permitted to see if it has adequate capacity.	No
Calgary	Type 1—Annual trip permit. This is used primarily for those smaller vehicles; i.e., mobile cranes or trucks hauling small construction equipment from site to site within the city limits. Type 2—Specific trip permit. This is used for the balance of the overload requests. Any request would require that the route be considered and those bridges that require additional evaluation identifed. These bridges would then be reviewed to see whether they are suitable for the proposed load.	No
New Brunswick	Type 1—Single trip permits—review existing load ratings. Sometimes require new load rating, especially for secondary routes. Type 2—Annual permits—require new load rating for secondary routes. Type 3—Permit controlled—for single trip heavy loads.	Permits issued by Department of Public Safety employees (Commercial Vehicle Enforcement Officers) as well as DOT staff, both provincial agencies.
Newfoundland	A single trip permit is issued to a specific tractor/trailer combination for either overweight and/or overdimension, subject to maximum dimensions of: width up to and including 4.88 m; length up to and including 35 m; height up to and including 4.88 m; rear overhang up to and including 6.2 m; and maximum mass of 70,000 kg for a regular single trip and 120,000 kg for a single trip two vehicle concept. An annual permit will be issued to a specific tractor for either overmass and/or overdimension. A single annual permit will be issued for various trailer configurations. Single trip permits are issued when the dimensions exceed the annual permit limitation. The maximum dimensions are: width 3.66 m; height 4.5 m; front or rear overhang 3.1 m; length—up to and including 25 m; and mass 64,000 kg. No review of structures is done by Motor Registration Division for either regular single trip or annual permits. Above these limits would be single trip excessive overweight/oversize permits based on a case-by-case basis.	Government of Newfoundland and Labrador, Department of Government Services and Lands, Motor Registration Division.
Northwest Territories		No

TABLE C3-1B (*continued*)

Jurisdiction	Types of OS/OW Permits Issued	Do Other Agencies Issue OS/OW Permits?
Ontario	Type 1—Single trip permit up to 120,000 kg * (264.6 kips) (*120,000 kg is only allowed for transportation of long prefabricated items using the two-vehicle concept (1). Otherwise, max GVW = 70,000 kg. (See note below for detailed route evaluation requirement—Type 6.) Type 2—Annual permit up to 63,500 kg (140 kips). Type 3—Project permit up to 70,000 kg (154.3 kips). Type 6—Permit vehicles can be divided into three main categories: 1. Permit vehicles with GVW falling within the "maximum observed load level (MOL)," which is assumed as the GVW per Ontario Bridge Formula + 10,000 kg. These vehicles are allowed to travel without any travel restrictions and no load rating is required for bridges. Typically, these vehicles are covered by all three types of permits mentioned above. 2. Heavy permit vehicles may be allowed to travel under certain travel restrictions; e.g., reduced speed, sole vehicle when travelling on bridges, etc. Load rating of bridges for these cases is still not needed. 3. Extra heavy vehicles that fail to meet the weight limits associated with category (2) will need a full evaluation of bridges along the travel route. A more comprehensive discussion about Ontario's OW/OS permit system is given in reference 1. 1. Agarwal, A., "Permit Vehicle Control in Ontario," *Proceedings of Canadian Society of Civil Engineering Conference,* Montreal, QC, Canada, May 1987.	Municipalities also issue permits for vehicles using roads under their jurisdiction. Permit classifications are determined by municipalities.
Ottawa	Type 1—Annual. Type 2—Project. Type 3—Single trip. Type 4—Single trip: Superload.	Municipality.
PEI	Not available	No
Quebec	1. For non-standard transport in terms of width, height, length, or front or rear overhang oversize other than Class 2 (no review needed). 2. For vehicles carrying prefabricated buildings (no oversize criteria—no review needed). 3. For other miscellaneous oversize elements (no review needed). 4. For towing trucks hauling damaged trucks (seldom used—no review needed). 5. For overweight vehicles carrying an indivisible load that roughly exceeds the legal loads for a specific axle configuration by less than 15%. These permits are usually annual permits but they can also be given for a specific route and for a limited duration (generally no review needed). We have a special posting for these vehicles that specifically prohibits access to a bridge by these vehicles. The bridge is posted that way for two reasons: (a) It is a bridge that has been designed with a loading that is prior to the H20-S16 loading and that has not been rated yet. (b) It is a bridge that has been rated for legal loads but that is not considered to have the sufficient reserve (resistance) to allow a Class 5 vehicle loading. 6. Special travel permits for overweight vehicles that do not meet the conditions for a Class 5 permit or the legal loads because of a weight problem or a configuration that is not included in the allowed configurations. These are controlled permits as defined by the CAN/CSA-S60-00 Canadian Highway Bridge Design Code. 7. Oversize vehicles require an expert's report from the MTQ (no review needed regarding bridge rating), but an important field mobilization to verify the vehicle access to all bridges on the route.	
Toronto	Type 1—Single trip permits: exceeding: 4.15 m height, 2.59 m width, 21.33 m length, 50,000 kg. Type 2—Single trip permits with police escort exceeding: 4.15 m height, 3.7 m width, 24.5 m length, 63,500 kg. Type 3—Annual permits: maximum 4.15 m height, maximum 3.7 m width, maximum 23.0 m length, maximum 63,500 kg weight.	Local government.

TABLE C3-2A
TYPES OF OS/OW PERMITS REQUIRING OR NOT REQUIRING BRIDGE EVALUATION AT STATE LEVEL (UNITED STATES)

State Level Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
AL	Permit vehicles screened by analyzing them for a certain subset of bridges. A permit is issued if they pass the screening.	Permit vehicles that do not pass the screening described left or have non-standard gage axles (except for cranes).	
AK	1. Single oversize trip permit valid for 3 to 5 days. 2. Extended trip permits valid for 1 to 12 months. Unlimited moves.	1. Single overweight trip permit valid for 3 to 5 days. Bridge evaluation may be required. 2. Single trip oversize/overweight permits valid for 3 to 5 days. Bridge evaluation may be required.	
AZ	1. Type A (OS-OW) permits. 2. Type B (OS) permits. 3. Type E (OS-OW) permits. 4. Type F (OS) permits. 5. Type H (OS) permits.	Type C Permit—no limit on GVW.	
AR			1. Oversize permits. 2. Overweight permits.
CA	1. 5-axle annual permit <125,000 lb. 2. 7-axle <180,000 lb. 3. 9-axle <240,000 lb. 4. 11-axle <300,000 lb.	1. 13-axle <360,000 lb. 2. Superloads <20 ft wide, 360,000 lb to over 1,000,000 lb.	
CO			1. Single trip permits <200,000 lb, and/or <17 ft wide. 2. Special permits >200,000 lb, >17 ft wide. 3. Annual OS, OW, and OS/OW permits <200,000 lb; <17 ft wide, 130 ft long for four-lane highways; 120 ft long for non-mountainous two-lane highways; 110 ft long for mountainous, two-lane highways; and/or 35 ft rear overhang. 4. Annual OW divisible permits for longer vehicle combinations, with a maximum weight of the lesser of 110,000 lb, Colorado Bridge formula $W = \{L + 40\}$, and the Federal Bridge Formula B.
CT			1. Oversize permits. 2. Overweight permits.
DE		Superload (GVW over 120,000 lb, >15 ft high, >15 ft wide, or >120 ft long) may need bridge evaluation.	1. Single trip permit. 2. Multi-trip permit.
DC			
FL	Blanket (multi-trips) for truck tractor semi-trailers up to 199,000 lb.	1. Blanket (multi-trips) for cranes/straight trucks up to 127,000 lb. 2. Trip permits.	

TABLE C3-2A (*continued*)

State Level Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
GA			1. Annual permit (<100,000 lb) 2. Single trip (<150,000 lb) 3. Single trip (superload <180,000 lb) 4. Single trip ("Super +" >180,000 lb)
HI			
ID	1. Annual permits for nondivisible loads weighing 105,000 (80,000 on Interstate) to 200,000 lb. Must conform with load restrictions of the Route Capacity Map. 2. Single trip permits for nondivisible loads weighing >200,000 lb. A screening algorithm based on load carrying capacity of bridges is used for permit review. If not passed, bridge evaluation is required.	Single trip permits if a screening algorithm is not passed (see left).	
IL	1. Single trip permit 80,000 to 120,000 lb. Also for vehicles similar to one previously OK'ed within 5 years. 2. Single trip permit for vehicles <80,000 lb similar to one previously OK'ed within 5 years.	Single trip permit over 120,000 lb (superload).	
IN			1. OW up to 108,000 lb gross (120,000 lb for certain axle configuration). 2. OS/OW up to 108,000 lb gross and 16 ft width, 110 ft length, 15 ft height. 3. Toll road gate various combinations up to 127,400 lb. 4. Mobile homes per width. 5. OS/OW from 120,000 to 200,000 lb and passing INDOT formula. 6. OS/OW exceeding 200,000 lb or INDOT formula.
IA	1. Single trip permit for trucks under 156,000 lb (routed using bridge restriction map). 2. Annual permit for vehicles under 80,000 lb. 3. Annual OS/OW permit for vehicles with specific axle configurations. 4. Multiple trip permit for vehicles with specific axle configurations.	Single trip permit for vehicles over 156,000 lb or with axle weights over 20,000 lb.	
KS	1. Annual permits up to 120,000 lb GVW and axles: single 22,000 lb; tandem 45,000 lb; triple 60,000 lb; quad+, 65,000 lb. Also table of allowable weights per given length based on modified TTI formulas. 15 ft high, 16.5 ft wide, 126 ft long. 2. Standard trip OS/OW permits: same as annual permits except 18 ft high and GVW to 150,000 lb.	1. Superload permits. Each bridge is evaluated for each permit. 2. Large structure permits for transporting large structures may need bridge evaluation when >150,000 lb.	

TABLE C3-2A (*continued*)

State Level Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
KY			1. Single trip (superloads). 2. Industrial haul allowing trucks up to 80,000 lb on 44,000 lb roads. 3. Annual.
LA			
ME			
MD			
MA	1. Reducible: 99,000 lb on 5+ axles, annual. 2. Non-reducible: 130,000 lb on 5+ axles, single trip/annual.	Superloads >130,000 lb, individual.	
MI			
MN	1. Annual divisible load. 2. Annual non-divisible load. 3. Single trip non-divisible load.	Loads over 145,000 lb may need bridge evaluation.	
MS			1. Annual blanket permit. 2. Single trip permit. 3. Self-issued permit.
MO			1. Routine OW permits. 2. Super heavy and large load permits. 3. Non-commercial building movement permits.
MT			1. Non-divisible load permit. 2. Reducible load permit. 3. Axle permit. 4. Term OW permit (for non-reducible load). 5. Designated facility (trip) permit.
NE			1. Single trip: OS, OW, OS-OW, self-propelled equipment, and two-axle floatation. 2. Manufactured home: new/dealer, pre-owned. 3. Continuous 3/6 month: tractor/semi-trailer, self-propelled specialized mobile equipment, floatation construction equipment. 4. Other: conditional Interstate use, building/slow moving large object, garbage/refuse, seasonally harvested products, annual implement of husbandry for I-80 only.
NV			1. Trip permit. 2. Annual permit. 3. Semi-annual permit (6-month).
NH			
NJ	Vehicles >80,000 lb and <150,000 lb.	Vehicles ≥150,000 lb.	
NM	Permits up to 140,000 lb.	1. Permits from 140,000 to 240,000 lb—run permit vehicle through route. 2. Permits over 240,000 lb—run permit vehicle through route and possibly perform other evaluations.	

TABLE C3-2A (*continued*)

State Level Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
NY		1. Annual/radius permit >80,000 lb, bridge evaluation may be needed. 2. Individual trip permit >80,000 lb, bridge evaluation may be needed.	
NC	1. Vehicles allowed to travel on "Greenroute" in NC: 5 axle, GVW <112,000 lb; 6 axle, GVW <120,000 lb; 7 axle, GVW <132,000 lb. 2. Axle weights: Single <25,000 lb, Tandem <50,000 lb, Tridem <60,000 lb, Quad <68,000 lb. 3. Wheelbase (from steering to rear axle) >51 ft.	Permit vehicle shorter that defined left. OW vehicle beyond that defined left.	
ND	1. Single trip on truck-tractor semi-trailer combinations <150,000 lb. 2. Single trip on self-propelled OW vehicles <114,800 lb. 3. Self-issue single trip, with no combination of axles exceeding bridge weight limitations.	1. Single trip on truck-tractor semi-trailer combinations >150,000 lb or axle combination exceeds bridge weight limitations. 2. Single trip on self-propelled OW vehicles >114,800 lb. 3. Self-issue single trip if any combination of axles exceeding bridge weight limitations.	
OH			1. Trip permits (routine or superload). 2. Trip & return permits (routine). 3. Blanket permits (farms, manufacturing/building, or construction). 4. 90- or 365-day permits (origin–destination). 5. Multi-state permits. 6. Emergency permits.
OK			1. OW loads <350,000 lb. 2. OW loads <350,000 lb and traveling on "red" routes. 3. OW loads >350,000 lb. 4. OW loads with trunnion configuration (occupying more than one lane).
OR			
PA		1. Single trip >80,000 lb. 2. Annual (route-specific) >80,000 lb. 3. Annual (non-route specific) >80,000 lb.	
PR		Special permits	
RI	Blanket permit for up to 104,800 lb on construction vehicles.		
SC			1. Single trip up to 130,000 lb. 2. Multi-trip up to 90,000 lb and 1 year. 3. Superload (single trip) over 130,000 lb.

TABLE C3-2A (*continued*)

State Level Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
SD	Over 80,000 lb on Interstate—single trip (per Bridge Formula B).	1. OS/OW single trip permits. 2. Multi-trip for construction equipment—each vehicle analyzed for each bridge crossed.	
TN	1. Single trip. 2. Annual. 3. Mobile home. 4. Boat.	Single trip permits—failing the screening algorithm, generally >150,000 lb.	
TX	1. Annual envelope permits (vehicle and company specific). 2. Annual oil well servicing unit permit. 3. Annual overaxle/overgross weight tolerance permits. 4. Annual rig-up truck permit. 5. Annual water well drilling machinery and equipment permit. 6. Quarterly hubometer permits. 7. Annual implement of husbandry permit. 8. Annual crane permits <200,000 lb.	1. General single trip mileage permits. 2. General OS/OW permit.	
UT			
VT	Single trip for self-propelled cranes.	Single trip for vehicles >150,000 lb.	
VA	Single trip permit for 13 days. <15 ft high, 14 ft wide, 150 ft long; 130,000 lb for secondary and primary, 150,000 lb for Interstate.	1. General blanket permit. 2. Restricted blanket permit. 3. Superload permit.	
WA			1. Fixed load. 2. Log tolerance. 3. Refuse/collection. 4. Oversize/overweight. 5. Superloads >200,000 lb. 6. House moves.
WV	Blanket, <110,000 lb on 3S2 or 3S3 type vehicle. Mobile home.	1. Single trip, <120,000 lb. 2. Superload, >120,000 lb.	
WI	Annual permits <170,000 lb.	Single trip permits.	
WY			1. Class A permits for indivisible loads exceeding Class B/C limits. 2. Class B permits for indivisible loads not exceeding Class B/C limits. 3. Class C self-issuing permits for indivisible loads not exceeding Class B/C limits. 4. Class D permits for multiple movements of vehicles not exceeding Class D limits. 5. Class W.

No response received if empty.

TABLE C3-2B
TYPES OF OS/OW PERMITS REQUIRING OR NOT REQUIRING BRIDGE EVALUATION (CANADA)

Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
Alberta	Multi-trip overweight permit—Typically for a year. There are axle and gross weight caps. Not valid for crossing restricted bridges.	Single trip overweight.	
Calgary	Annual trip permit. Typically for mobile cranes or trucks hauling small construction equipment within the city limits.	Specific trip permit.	
New Brunswick	Annual permits.	1. Single trip permits, especially for secondary routes. 2. Annual permits for secondary routes. 3. Permit controlled—for single trip heavy loads.	
Newfoundland	1. Single trip permit for OS/OW tractor/trailer combinations. ≤4.88 m width, ≤35 m length, ≤4.88 m height, ≤6.2 m overhang, ≤70,000 kg weight for a regular single trip and 120,000 kg a single trip two vehicle concept. 2. Annual permit for OS/OW trailer configurations. ≤3.66 m width, 4.5 m height, front or rear overhang 3.1 m; 25 m length, ≤64,000 kg weight.	Single trip excessive OS/OW permit.	
Northwest Territories			
Ontario	1. Single trip permit ≤120,000 kg (264,600 lb). 2. Annual permit ≤63,500 kg (140,000 lb). 3. Project permit ≤70,000 kg (154,300 lb). Note: (1) Permit vehicles with GVW falling within the range of Ontario Bridge Formula + 10,000 kg, no load rating is required for bridges. (2) Heavy permit vehicles may be allowed to travel under certain travel restrictions, and load rating of bridges is still not needed.	Extra heavy vehicles exceeding the criterion for note (2) (left).	
Ottawa			1. Annual. 2. Project. 3. Single trip. 4. Single trip—Superload.
PEI			
Quebec	1. Non-standard transport in terms of width, height, length, or front or rear overhang oversize. 2. Vehicles carrying prefabricated buildings. 3. Other miscellaneous oversize permits. 4. Towing trucks hauling damaged trucks. 5. OW indivisible load exceeding the limits by less than 15%. 6. OS vehicles requiring an expert's report from the MTQ.	1. Special travel permits as defined by the Canadian Highway Bridge Design Code.	

TABLE C3-2B (*continued*)

Jurisdiction	Permits Not Requiring Bridge Evaluation	Permits Requiring Bridge Evaluation	Permits Not Clearly Identified in Response to Whether Bridge Evaluation Is Required.
Toronto			1. Single trip permits: >4.15 m height, 2.59 m width, 21.33 m length, 50,000 kg. 2. Single trip permits with police escort: >4.15 m height, 3.7 m width, 24.5 m length, 63,500 kg. 3. Annual permits: <4.15 m height, 3.7 m width, 23 m length, 63,500 kg weight.

TABLE C3-3A
POSSIBLE NEW DEVELOPMENTS IN OS/OW POLICIES (UNITED STATES)

State/ Jurisdiction	New Changes to OS/OW Permit Policies Expected?
AL	1. Trying to get legislature to change state code so that overweight violations are administrative rather than civil/criminal. 2. Considering a redefinition of escort requirements.
AK	Alaska Department of Transportation and Public Facilities (AKDOT&PF) is reviewing a proposed increase of the tridem axle group from 42,000 lb to 45,000 lb.
AZ	
AR	No
CA	Continually considering changes requested by industry. Currently considering more weight on tridem axles. Maximum weight currently 52,500 lb. Considering up to 60,000 lb. Also, considering more flexible weight policies for superload vehicles between 15 and 20 ft wide.
CO	No
CT	No
DE	No
DC	
FL	We are in the process of evaluating the impact of the new LRFR code on our operations, design, and load rating policies.
GA	No
HI	No
ID	No
IL	Annual overweight permits for loads up to 120,000 lb.
IN	No
IA	No
KS	Increasing fees from our current $5 for oversize/overweight permits.
KY	No
LA	
ME	
MD	
MA	No
MI	
MN	Instead of the ABC weight classification we are looking at using a modified TTI (Texas Transportation Institute) formula. The problem is that current trucks are only notational and do not represent any real truck that asks for permit. It is a subjective art to take actual trucks and correctly classify for every bridge. The new system will use a formula to describe critical axle loading and compare to bridge database. There is no ratioing or subjectivity, just formula to check any truck to any bridge.
MS	No
MO	MoDOT has recently created a “working group” to improve our processes and update our regulations.
MT	No
NE	Please visit http://www.dor.state.ne.us/intermodal/motr-carriers.htm and click on the link titled “View the Proposed Motor Carrier Updates.” (A 50-page pdf file: “Motor Carrier Rules Updates” 3/15/2005).

TABLE C3-3A (*continued*)

State/ Jurisdiction	New Changes to OS/OW Permit Policies Expected?
NV	Clarifications to existing regulations.
NH	
NJ	No
NM	Always looking for better ways to handle the process. Looking to add more uniform policy to address loads 10 ft wide and wider.
NY	No
NC	No
ND	No
OH	No
OK	No
OR	
PA	No
PR	No
RI	No
SC	No
SD	No
TN	No
TX	No
UT	
VT	
VA	VDOT is collaborating with the DMV to develop and implement an electronic GIS-based automated routing and analysis system.
WA	No
WV	No
WI	No change in policies, but going to online permit processing.
WY	No
Summary	42 responses: 13 yes and 29 no.

TABLE C3-3B
POSSIBLE NEW DEVELOPMENTS IN OS/OW POLICIES (CANADA)

Jurisdiction	New Changes to OS/OW Permit Policies Expected?
Alberta	No
Calgary	We are implementing a more detailed overload evaluation program with the result that the limits on some bridges might require adjusting. Also, we are considering linking our approvals with the provincial authority at some time.
New Brunswick	Initiative under way to harmonize policies and practices for oversize/overweight loads in the four Atlantic provinces (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador), eventually leading to a regional permit recognized in these four jurisdictions.
Newfoundland	Discussions are under way with the other three Atlantic provinces, Nova Scotia, New Brunswick, and Prince Edward Island, to produce a single Overweight Vehicle Policy for the whole region.
Northwest Territories	
Ontario	
Ottawa	
PEI	
Quebec	Class 5 permits will be extended to include a bigger variety of truck configurations, and the total weights of these vehicles will be slightly increased. Classes 1 and 3 will be regrouped within a class and Class 4 will be cancelled.
Toronto	The entire process is currently under review. We are looking to allow wider vehicles under the Annual Permit, and allowing private escorts in some circumstances, centralizing the office from which the permits are issued.
Summary	6 responses: 5 yes and 1 no.

TABLE C3-4A
OPERATION OF PERMIT PROCESSING AND ASSOCIATED BRIDGE EVALUATION (UNITED STATES)

	Processed by One State DOT Office				Processed by Several State DOT Offices				Processed by Several Local Offices			
State Level Jurisdiction	Processed by one state DOT office?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by several state DOT offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by several local agency offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?
AL	Yes	12	Yes	A separate state office (Bridge Rating) performs the analysis.					Yes. They are involved but do not issue permits.	Unknown		A single state DOT office.
AK	Yes	6	No	A separate state office (Bridge Design).								
AZ					Yes		No	A state office				
AR					Yes	15	Yes	Same state offices				
CA					2 offices	30	Yes	A state office				
CO	Yes	8.5	Yes	Same state office								
CT	Yes	3		Same state office and Bridge Safety & Evaluation and Bridge Operations								
DE	Yes	1	Yes	Same state office								
DC												
FL	Yes	17		Same state office								
GA	Yes			Same state office								
HI					4 offices	4	Yes	A state office				
ID	Yes	5	Yes	A separate state office (Bridge Inspection)					Yes	0?		Probably not done at all.
IL	Yes	17	No	A separate state office: Bureau of Bridges and Structures.					102 counties and 450 municipalities.			State Bridge Office or a consultant.
IN												
IA	Yes	1	Yes	Same state office					99 offices			The same local agency offices or consultants.
KS					17	17	Yes	A state office				
KY	Yes. (Division of Motor Carriers)	6	No	Division of Maintenance								
LA												
ME												
MD												
MA	Yes	1	Yes	Same state office								
MI												

TABLE C3-4A (*continued*)

State Level Jurisdiction	Processed by One State DOT Office: Processed by one state DOT office?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by Several State DOT Offices: Processed by several state DOT offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by Several Local Offices: Processed by several local agency offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?
MN	Yes	11	No	A separate state office (Bridge Office)					87 counties and municipalities.	At most one in each office.	No	Same local agency offices.
MS	Yes		Yes	Same state office								
MO					1 central + 10 district offices	30		A state office				
MT	Yes	3	No	Same state office								
NE					1 central office and 7 satellites in district offices	6 in central office + 7 in satellites	Yes					
NV	Yes	4	Yes	A separate state office (Structural Design Division)					NA			
NH												
NJ	Yes	2.5	Yes	Same state office								
NM	Yes	3	No	Same state DOT office								
NY					12 offices	15	Yes	Same state offices				
NC	Yes	22	No	Separate state offices (Bridge Maintenance Unit and Structure Design Unit)								
ND					Several state ND Highway Patrol offices	3	Yes	Load rating by one single state office: NDDOT Bridge Division.				
OH	Yes	9	No	A separate state office (Office of Structural Engineering)					88 counties and many cities?			Same local agency offices or consultants.
OK									Department of Public Safety			DOT for loads >350,000 lb. Otherwise consultants.
OR												

TABLE C3-4A (*continued*)

State Level Jurisdiction	Processed by One State DOT Office				Processed by Several State DOT Offices				Processed by Several Local Offices			
	Processed by one state DOT office?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by several state DOT offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by several local agency offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?
PA					12 offices—80% auto issued	40	Yes	State district offices				
PR	Yes		Yes	Same state office								
RI					2	0	No	A DOT office				
SC	Yes	7	Yes	Same state office								
SD					SD Highway Patrol—Motor Carrier Division		Yes	Only in certain cases are overload requests evaluated by SDDOT—Bridge Division Office				
TN	Yes	11	Yes	A separate state office: Structure Inventory & Appraisal Office linked permit issuance office by a permit management software system.								
TX					Yes	80	Yes	Private consultants with final approval of Bridge Division				
UT												
VT					Yes			A separate state office				
VA					10 offices	2	Yes	State central office				
WA					27 offices	15	No	State Bridge Preservation Office	Yes			Some local agencies have the capability of load rating, others send them to consultants.
WV					40 offices	10 to 12	Yes	Same state DOT offices. Evaluation engineers in 10 districts review some permit analysis.				
WI	Yes	20	Yes	A separate state office (Bureau of Structures)								
WY	Yes			A separate state office (Bridge Design Program)	28 offices		No	A state office				

Summary:	Adequate staffing? 38 responses: 25 yes and 13 no.

TABLE C3-4B
OPERATION OF PERMIT PROCESSING AND ASSOCIATED BRIDGE EVALUATION (CANADA)

	Processed by One Provincial DOT Office				Processed by Several Provincial DOT Offices				Processed by Several Local Offices			
Jurisdiction	Processed by one provincial/city office?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by several provincial/city offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?	Processed by several local agency offices?	Equivalent full-time employees (2,080 hr/year)	Adequate staffing?	Who does bridge rating if needed?
Alberta	Yes	1	No	Same province office								
Calgary	Yes	<1	No	City of Calgary Structures and Bridges Group								
New Brunswick					14 offices	39	Yes	A single province office				
Newfoundland	Yes	<2		A province office (Bridge Office)								
Northwest Territories	Yes		Yes	Same province office								
Ontario	Yes		Yes	Same province office								
Ottawa									Yes	<3	Yes	Same local agency offices
PEI	Yes	0.2	Yes	Same province office								
Quebec	Yes	4+	Yes	Same province office								
Toronto									4 offices	3	No	Same offices and Bridges & Expressways Unit

Summary:	Adequate staffing? 9 responses: 6 yes and 3 No.

TABLE C3-5A
OS/OW ENFORCEMENT PROVIDER (UNITED STATES)

State/ Jurisdiction	Enforcement Provided by	State/ Jurisdiction	Enforcement Provided by
AL	State police, local police, state troopers. ALDOT permit office frequently requires escorts.	MT	DOT
AK	DOT	NE	State police
AZ	DOT, state police, local police	NV	Nevada Highway Patrol
AR	DOT	NH	
CA	DOT, state police, local police	NJ	State police, local police
CO	State/province police, local police, Ports of Entry officers	NM	Department of Motor Transportation
CT	DOT, state police, local police, Department of Motor Vehicles	NY	DOT, state police, local police
DE	State police	NC	State police, local police
DC		ND	State police, local police
FL	DOT, Motor Carrier Compliance Office	OH	State police, local police
GA	State police	OK	State police
HI	DOT	OR	
ID	DOT, state police, local police	PA	State police. Weigh teams are provided by the DOT.
IL	State police, local police	PR	DOT, state police
IN	State police	RI	DOT, RIDMV
IA	DOT	SC	State police.
KS	State police	SD	State police (Highway Patrol)
KY	The Justice Cabinet (part of state government)	TN	State police
LA		TX	State police, local police
ME		UT	
MD		VT	DOT, state police
MA	State police	VA	State police, local police
MI		WA	State police, local police
MN	State police, local police	WV	
MS	DOT	WI	State police
MO	Missouri law enforcement branches	WY	DOT

No response received if empty.

TABLE C3-5B
OS/OW ENFORCEMENT PROVIDER (CANADA)

Jurisdiction	Enforcement Provided by
Alberta	DOT, province police, local police
Calgary	Local police
New Brunswick	Province police, local police, Royal Canadian Mounted Police
Newfoundland	Department of Government Services with help from provincial and local police
Northwest Territories	DOT
Ontario	DOT
Ottawa	Province police, local police
PEI	DOT, province police
Quebec	DOT, province police, local police
Toronto	Province police, local police

TABLE C3-6
SC&RA SURVEY RESULTS FOR STATE ROUTINE PERMIT ISSUANCE PRACTICE

State Level Jurisdiction	0–2 hours	2–4 hours	4–6 hours	6+ hours	State Feedback
AL	Yes	Yes			3 to 5 min for standard permits. Auto approval available to registered clients.
AK					
AZ	Yes				Standard turnaround 30 min for permits ordered by fax.
AR	Yes				Usually within one day.
CA		Yes			21% under 1 h, 47% under 2 h, 69% under 3 h, 83% under 4 h.
CO		Yes			2 h or less. 4 days or less on superloads.
CT	Yes				Less than 5 h for non-divisible load permits and 1 day on divisible loads.
DE	Yes				15 min to 1 h.
DC					
FL		Yes			2–4 h.
GA	Yes				94% issued within 1 h. For GVW between 150,000 and 180,000 lb, permits issued on same day. Over 180,000 lb issued 5 to 10 days.
HI					
ID		Yes			
IL	Yes				Within 30 min.
IN	Yes				
IA		Yes			
KS	Yes				
KY	Yes				Can get 120,000 lb on six axles and 132,000 lb on seven axles for annuals.
LA	Yes				
ME	Yes				Majority issued within 4 h. Half issued over the phone.
MD	Yes				1/2 hour if all information is correct.
MA		Yes			
MI			Yes		Single trip: 30 min to 4 h. Extended permits: within 10 days.
MN	Yes				Normal permits issued as they are received by phone, fax, or web.
MS	Yes				
MO	Yes				Routine and blanket: 1 to 20 min. Superloads: 3 days to 2 weeks.
MT		Yes			
NE	Yes				30 min or less.
NV		Yes			
NH	Yes				
NJ	Yes				1 h on routine issues.
NM		Yes			
NY				Yes	
NC	Yes				Dealing directly with state rather than third party results in quicker turnaround.
ND	Yes				15 min for routine issues, 15 to 20 min for annual permits and 30-day permits.
OH	Yes				2 h or less on routine issues. Superload dimension permits in 1 day or less. Superload weight permits in 7 days or less, but asks for 2 weeks.
OK		Yes			Average of 10 to 15 min.
OR		Yes			Continuous trip permits in 10 min. Single trip permits in 10 min to 1 h.

TABLE C3-6 (*continued*)

State Level Jurisdiction	0–2 hours	2–4 hours	4–6 hours	6+ hours	State Feedback
PA	Yes				80% of permits are auto-issued in 1 min or less if e-mailed to carrier. The average “total” for all PA permits is approximately 55 min, including weekends, evenings, and holidays.
PR					
RI			Yes		
SC		Yes			2 h or less unless application is incomplete.
SD	Yes				
TN	Yes				Issue times generally 40 min. No known delays on superloads.
TX	Yes				Internet time permits: immediate. Remote permit system customers: immediate. Internet single trip: within 8 h and working on goal of 4 h. 3 weeks on superloads and 6–8 weeks on super heavy.
UT	Yes				Oversize only: 5 to 30 min. Semi-annual: 5 to 15 min. OS/OW: <125,000 lb, 5 to 30 min. >125,000 lb, 30 min to 2 h. Extreme OS/OW loads may take up to 1 week.
VT	Yes				
VA				Yes	Single trip issues: within 15 min of call. Blanket: 2 to 3 days. Superloads: 5 to 8 days.
WA		Yes			OS: 38 min. OW: 40 min. Regional: 47 min.
WV		Yes			
WI	Yes				Up to 150,000 lb gross with a width less than 16 ft: 6 h. Over 16 ft wide: 3 days. Over 270,000 lb gross: 3 days.
WY	Yes				

No response received if empty.

TABLE C4-1A
POPULATION OF LOAD RATED BRIDGES AND ELECTRONICALLY MODELED BRIDGES (UNITED STATES)

State/ Jurisdiction	No. of Bridges Load Rated	Percent of Bridges Load Rated	Percent of Bridges Having e-Model	E-Models Have Impact on Uniformity?	If Agreeing to Impact of e-Models, Explain
AL	6,098	61%	60%	Yes	Having a model already created lets the rater focus on performing more detailed analysis so as to get the most favorable result instead of spending his/her time initially generating the model.
AK	995		80%	No	
AZ		80%	50%	No	
AR	12,336	100%	70%	Yes	If a bridge can be analyzed with the actual load, there's more confidence in permitting the load to pass.
CA		99%	2%	Yes	Without models engineers cannot accurately assess the maximum axle and gross weight a bridge can carry. This contributes to non-uniformity. For instance, California bases allowable axle weight policies on the permit design vehicle that is used to design and analyze state and local bridges. A weight chart is used that limits axle group weights to those that are enveloped by the permit design vehicle. This chart is sometimes conservative. If many electronic models existed, allowable weights could be based on analysis of the bridge for the actual permit vehicle.
CO	3,531 On-System; 3,643 Off-System.	95% for On System.	On System: 59%	Yes	The rating factor for each structure may not be indicative of its overload capacity because the configuration of a long truck may mean that the structure will not be subjected to the entire truck load at one time.
CT	3,053	72% by analysis. 26% by judgment.	94%	Yes	Ease and speed of re-analysis
DE	1,457	100%	66%	Yes	It will enable us to analyze various specific load configurations in a uniform manner.
DC					
FL	11,500	100%	Not available (our office does not work directly with electronic load rating files).	No	
GA	9,000	100%	46%	Yes	Quicker turnaround on permits.
HI	746	65%	0%	No	
ID	3,532	88%	88%	Yes	It would speed up the structural analysis portion of the permitting process.
IL	26,679	100%	92%	No	
IN					
IA	3,000	94%	90%	Yes	The time needed to review a permit could be reduced and the result can be more similar from one state to another.
KS	State 4800, Local 20,000.	100%	90%+ of state. Very few of local.	Yes	With electronic models available permitting can be based on each truck not on more generalized maps and guidelines.

TABLE C4-1A (*continued*)

State/ Jurisdiction	No. of Bridges Load Rated	Percent of Bridges Load Rated	Percent of Bridges Having e-Model	E-Models Have Impact on Uniformity?	If Agreeing to Impact of e-Models, Explain.
KY	6,500	70%	60%	No	
LA					
ME					
MD					
MA	2,212	45%	9%	Yes	Would assist in providing uniform methods of analysis and criteria for approval.
MI					
MN	18,000	100%	95%	Yes	Some continuity between states.
MS		95%	0%	No	
MO	State system = 7,255; Non-state system = 12,976 Total = 20,231	State system = 71% Non-state system = 96%, Total = 85%.	71%	No	
MT	4,600	90%	25–30%	No	
NE	2,200	65%			
NV	1,544	89%			
NH					
NJ	6,383	100%. Some are rated by engineering judgment due to lack of plans.		Yes	It will expedite the issuance of permits and provide greater uniformity.
NM	3,600	100%		Yes	We already have an overload program in place that gives us uniformity.
NY	17,500	100%	75%	Yes	Ratings can be regenerated based on each individual permit vehicle.
NC	14,000	99.9%	0%	No	
ND		30%—estimated.	0%	No	
OH	About 20,000	46% (including all state and non-state bridges 10 ft and longer).		Yes	Permitting policies will be uniform across the state and based on the analysis rather than on engineering judgment.
OK		95% of on-system.	95% of on-system.	Yes	
OR					
PA	26,000	100%	100%	Yes	APRAS provides significant time savings.
PR	600	25%	25%	Yes	If a uniform database of bridges like Virtis is adopted by the state or the analytical model can read data files from older rating software (like BRASS) then it will be easier to adopt a uniform rating policy.
RI	750	75%	0%	Yes	Yes, but only if we can re-rate all of our bridges using the software products that are compatible with the electronic analytical model.
SC			0%		

TABLE C4-1A (*continued*)

State/ Jurisdiction	No. of Bridges Load Rated	Percent of Bridges Load Rated	Percent of Bridges Having e-Model	E-Models Have Impact on Uniformity?	If Agreeing to Impact of e-Models, Explain.
SD	1,800	99%	98%	Yes	One less hurdle to overcome.
TN	5,500	28.40%	10%	Yes	Electronic models provide the data to allow a more rapid analysis of permit vehicle requests. They also allow a more rapid updating of allowable capacity, for permits, when conditions change (e.g., additional asphalt is added to the structure).
TX			10%	No	
UT					
VT	897 (state owned)	83.7%	65%	Yes	Consistency would be the biggest benefit provided all states were to use the model.
VA	20,499	100%	45%	Yes	A uniformity permit applicability through a uniformity of analysis and results.
WA	3,018	99%	95%	No	
WV	6,000	90%	75%	Yes	
WI	4,900	100%	100%	No	
WY	1,900	100%	100%		

Summary				38 responses: 24 yes and 14 no.	

No response received if empty.

TABLE C4-1B
POPULATION OF LOAD RATED BRIDGES AND ELECTRONICALLY MODELED BRIDGES (CANADA)

Jurisdiction	No of Bridges Load Rated	Percent of Bridges Load Rated	Percent of Bridges Having e-Model	E-Models Have Impact on Uniformity?	If Agreeing to Impact of e-Models, Explain
Alberta	4,711	85%	25%	No	
Calgary	65	25%	20%	No	
New Brunswick	330	10%	1%	No	
Newfoundland	20—estimated	2%	0%	Yes	
Northwest Territories			0%	No	
Ontario	20 per year		0%	Yes	It would standardize and simplify the process. Faster and easier service can be provided.
Ottawa	12	1.80%	0%	Yes	Will introduce uniformity into the analysis and rating of bridges.
PEI			0%		
Quebec		35%	15%	No	No real impact since the permits are all issued by the same agency. But we do have an interest in having for every bridge an analytical model. It is a quick way to check the rating of a specific bridge, but for Class 6 permits with a long route it is at the moment impossible to analyze all the bridges that way.
Toronto	349	95%	0%		

Summary					
Total responses				8	
Yes				3	
No				5	

TABLE C4-2A
BRIDGE RATING SERVICE PROVIDERS FOR PERMIT CHECKING (UNITED STATES)

State/ Jurisdiction	Who Performs Load Rating if Needed in Permit Checking	State/ Jurisdiction	Who Performs Load Rating if Needed in Permit Checking
AL	State agency personnel	MT	State agency personnel
AK	State agency personnel	NE	State agency personnel
AZ	State agency personnel	NV	State agency personnel, state-contracted consultants
AR	State agency personnel	NH	
CA	State agency personnel	NJ	State agency personnel
CO	State agency personnel	NM	State agency personnel
CT	State agency personnel, state-contracted consultants. For loads over 500,000 lb, the carrier provides load analysis for all structures along the proposed route.	NY	State agency personnel, state-contracted consultants
DE	State agency personnel	NC	State agency personnel (Bridge Maintenance Unit)
DC		ND	State agency personnel
FL	Bridge load rating is not reviewed in the course of routine bridge evaluation performed to issue permits. Our load ratings are reviewed by our office at periodic interval through Quality Assurance Reviews.	OH	State agency personnel
GA	State agency personnel	OK	State agency personnel
HI	State agency personnel	OR	
ID	State agency personnel, state-contracted consultants	PA	State agency personnel—automatically done by APRAS
IL	State agency personnel, local agencies sometimes contract consultants to perform ratings, but the state still must concur with the consultant.	PR	State/province agency personnel
IN	State agency personnel	RI	State agency personnel, state-contracted consultants
IA	State agency personnel	SC	State agency personnel
KS	State agency personnel	SD	State agency personnel
KY	State agency personnel	TN	State agency personnel
LA		TX	The carrier is required to hire a consultant to perform the analysis—the Bridge Division must review this analysis and provide final approval.
ME		UT	
MD		VT	State agency personnel
MA	State agency personnel. Bridges located on heavily used routes are analyzed by Massachusetts Highway Department personnel, while bridges located off these routes are analyzed by private consultants hired by the permit applicant.	VA	State agency personnel, state-contracted consultants, local municipalities
MI		WA	State agency personnel
MN	State agency personnel	WV	State agency personnel
MS	State agency personnel	WI	Bureau of Structures
MO	State agency personnel	WY	State agency personnel

No response received if empty.

TABLE C4-2B
BRIDGE RATING SERVICE PROVIDERS FOR PERMIT CHECKING (CANADA)

Jurisdiction	Who Performs Load Rating if Needed in Permit Checking
Alberta	Province agency personnel, province-contracted consultants
Calgary	City of Calgary for their own bridges
New Brunswick	Province agency personnel
Newfoundland	All analysis regarding bridges is done by the Bridge Office, only.
Northwest Territories	Province agency personnel, province-contracted consultants
Ontario	If required, applicant is responsible for hiring a consultant to evaluate all bridges along travel route.
Ottawa	
PEI	Province agency personnel
Quebec	Province agency personnel, province-contracted consultants
Toronto	

No response received if empty.

TABLE C4-3
LOAD RATING METHOD AND LEVEL FOR PERMIT REVIEW (UNITED STATES)

State/ Jurisdiction	Load Rating Method for Permit Review						Load Rating Level for Permit Review		
	AASHTO LRFR?	AASHTO ASR?	AASHTO LFR?	Compact Section Provisions Used	Art. 10.57 Used?	Why the Method(s) Used?/Comments	Inventory	Operating	Rationale for the Level(s) Used?/Comments
AL		Y	Y	Y	Y	On composite steel structures, when LFR gives a rating factor "close to" 1.0, a serviceability check (ASR) is also performed. Our available software rating tools use these methods/specs. LFR is the specification of choice. ASR is used in those cases where it yields a better result.		Y	Inventory levels would result in too many denied permits.
AK			Y	Y	N				The Operating Rating less impact. If a permit vehicle is greater than Legal but less than the Operating Rating Level less impact, it can cross the bridge with no conditions. If a permit vehicle is greater than the Operating Rating Level less impact, but less than the Operating Rating, the permit vehicle can cross at a constant speed of 3 mph centered on the bridge with no shifting or braking. Since the permit vehicle is traveling slowly, without shifting or braking, the impact effect is removed justifying the Operating Rating.
AZ			Y	Y	N	According to AASHTO specs.		Y	For loading seldom seen by a bridge.
AR		Y	Y	Y	Y			Y	Not routine loads. If inventory used, many more loads would be rejected, which does not seem realistic.
CA			Y	Y	Y	Compact section allows more girder capacity. Article 10.57 limits stresses to prevent permanent deflections of steel girders.		Y	To obtain maximum safe capacity from bridges to facilitate movement of overweight permit vehicles. Bridges are inspected biennially to ensure that they are performing adequately.
CO			Y	Y	Y			Y	Single lane distribution factors assumed. Loads are assumed to be infrequent. Impact may be reduced to 10% and travel speed restricted to 10 mph if a structure fails the first analysis.
CT		Y	Y	Y	Y	LFR is generally used for all structures. ASR for some mildly reinforced concrete structures as well as timber and masonry structures.		Y	
DE			Y	Y	Y			Y	Magnitude of load is known with more certainty, and it is a one-time occurrence.

TABLE C4-3 (*continued*)

State/ Jurisdiction	Load Rating Method for Permit Review						Load Rating Level for Permit Review		
	AASHTO LRFR?	AASHTO ASR?	AASHTO LFR?	Compact Section Provisions Used?	Art. 10.57 Used?	Why the Method(s) Used?/Comments	Inventory	Operating	Rationale for the Level(s) Used?/Comments
DC									
FL		Y	Y					Y	We always strive to achieve a good balance between preservation of our inventory and commercial truck mobility. Our bridges are, by national standards, in good condition.
GA			Y	Y	Y			Y	Operating is for short-term, occasional loading.
HI			Y	N	N			Y	
ID			Y	N	N	LFR is FHWA standard for rating.		Y	We use operating rating based on the premise that the overload is only occasional and controlled.
IL			Y	Y	Y	Office practice.		Y	We feel we can use the maximum permissible load when we are more sure about the actual loading.
IN			Y	Y				Y	
IA		Y	Y	Y	Y	Due to past experience and load testing we have done, we do not feel that it is necessary to be more conservative than the specifications allow.		Y	If we did not use the operating level, it would be nearly impossible to route any heavy loads anywhere in the state. Our bridges have not deteriorated at a rate that makes us believe we are too unconservative in our bridge capacity calculations.
KS		Y	Y	N	N			Y	Operating is intended for occasional loads. We also may reduce the ratings for known conditions
KY		Y	Y	Y	N	Rating as designing.		Y	Operating rating is the highest allowable rating for occasional use on all bridges.
LA									
ME									
MD									
MA		Y						Y	Permit vehicles are typically thought of as infrequently applied loads that justify the use of the operating level capacity.
MI									
MN			Y	Y Virtis	Y Virtis	To permit heaviest vehicle AASHTO safely allows with sound engineering judgment.		Y	Per *Manual for Condition Evaluation of Bridges* .
MS			Y	Y	Y	FHWA minimum requirement prior to LRFR		Y	AASHTO specifications

TABLE C4-3 (*continued*)

State/ Jurisdiction	Load Rating Method for Permit Review						Load Rating Level for Permit Review		
	AASHTO LRFR?	AASHTO ASR?	AASHTO LFR?	Compact Section Provisions Used?	Art. 10.57 Used?	Why the Method(s) Used?/Comments	Inventory	Operating	Rationale for the Level(s) Used/Comments
MO		Y	Y	Y	Y			Y	Generally, for routine permitting, the two-lane operating ratings for certain configurations (MO5 and 4S3P) are used to envelope the configurations given in our regulations. For superloads, an individual analysis is performed and the resulting operating rating is also used. These are used since there are a relatively low number of permit vehicles crossing our bridges as compared with the fatigue loading cycles given in AASHTO. Therefore, we compare with the ultimate load capacity of the structure.
MT		Y	Y	Y	Y			Y	Overweight permitted loads are just that; “permitted” meaning we have a track on the number of these type loads we are analyzing. Therefore, we feel justified in using the operating rating because the number of these type loads is limited. Many of these loads require center-lining on the bridge, and slowing down, using the operating stress level, is the only thing that makes sense.
NE		Y	Y	Y	N			Y	Overweight vehicle defined in the permit is a loading that the bridge will not encounter frequently.
NV			Y	Y	Y			Y	
NH									
NJ		Y	Y	Y				Y	Operating rating is the maximum allowable load that can be placed on the bridge per the AASHTO specifications; therefore, that is the chosen method for checking permit loads.
NM			Y	N	N	Having used for about 20 years.		Y	We basically use operating ratings. We use inventory ratings on a very limited basis.
NY		Y	Y	Y	Y	Current AASHTO specifications.		Y	Maximum allowed by code.
NC		Y	Y	Y	N	Will never use LRFR unless forced—no advantage for the amount of work required. Will never be able to take advantage of site-specific factors. That is not realistic with a large number of structures. Generally, we use LFR for all load ratings except timber and steel trusses. LFR is not accurate for timber. For permitting purposes, we may revert to ASR for reinforced-concrete T-beams and slab bridges. LFR ratings are significantly lower than ASR ratings in many cases. ASR ratings are closer to reality for reinforced concrete. There is much more reserve capacity in reinforced concrete than there is in steel beams. However, the ratings come out opposite.		Y	NC posting policy is based on Operating. We want to limit stresses from overweight permit vehicles to the same stress level.

TABLE C4-3 (*continued*)

State/ Jurisdiction	Load Rating Method for Permit Review						Load Rating Level for Permit Review		
	AASHTO LRFR?	AASHTO ASR?	AASHTO LFR?	Compact Section Provisions Used?	Art. 10.57 Used?	Why the Method(s) Used?/Comments	Inventory	Operating	Rationale for the Level(s) Used/Comments
ND		Y	Y	Y	Y	Original ratings ASR—slowly converting to LFR.		Y	We have a relatively small number of trucks that exceed legal loads, so occasional operating loads are acceptable.
OH		Y	Y	Y	Y	FHWA mandate.		Y	AASHTO guidelines.
OK			Y	Y	Y			Y	
OR									
PA	Y		Y	Y	Y	We use our own software that has PennDOT-specific changes to many sections.		Y	
PR			Y					Y	Operating defined as the maximum load level that the bridge can sustain, and permit loads are not frequent.
RI			Y	Y	N			Y	These vehicles are over statutory loads.
SC		Y	Y	Y	Y			Y	
SD		Y	Y	Y	N	ASR—timber and trusses. LFR—all other.		Y	Post at operating. Must route in SD and have low average daily traffic and low truck traffic.
TN		Y	Y	Y	Y	LFR preferred to rate bridges. Do not have the means or software to rate certain types of bridges (i.e., truss bridges, timber bridges, etc.). For these structures, ASR is used. LRFR will likely be used only to rate LRFD designs once software becomes available. However, even for these bridges, we may use LFR for permitting purposes.		Y	Section 7.5.1 of the AASHTO *Manual for Condition Evaluation of Bridges,* 2nd ed.
TX		Y	Y	N	N	A long history of success using this system.			We use ASD in some cases to compare with allowable or maximum stresses and LFD in other cases to check against maximum allowable moments and shears. IR and OR levels are based on standard AASHTO gage widths (6 ft). Most of our super heavy vehicles (>254,000 lb) do not have this width and so the IR and OR values cannot be applied to review the bridges.
UT									
VT		Y	Y	Y	Y	Historical load rating files exist for a high percentage of our structures, which allows us to provide, with limited staffing, a quick turnaround time on the engineering studies needed. Our function is to make engineering review recommendations and DMV issues the permits.		Y	Operating and 5 mph speed. We feel comfortable allowing the operating level due to the infrequency of these moves having a gross weight equal to or greater than 150,000 lb. This is used only when a trip must occur and the route is the logical one. Restricting the vehicle to cross a structure at 5 mph allows for impact to be reduced by about 20%.

TABLE C4-3 (*continued*)

State/ Jurisdiction	Load Rating Method for Permit Review						Load Rating Level for Permit Review		
	AASHTO LRFR?	AASHTO ASR?	AASHTO LFR?	Compact Section Provisions Used?	Art. 10.57 Used?	Why the Method(s) Used?/Comments	Inventory	Operating	Rationale for the Level(s) Used/Comments
VA		Y	Y	Y	Y	To comply with the AASHTO *Manual for Condition Evaluation of Bridges*.		Y	The operating stress level is the absolute maximum allowed.
WA						We use 1989 AASHTO *Guide Specifications for Existing Steel and Concrete Bridges*. The method we use allows us to take into consideration the condition of each element of the structure as well as traffic volumes when we load rate our bridges.			The method we use has only one level of rating.
WV		Y	Y	Y	Y			Y	Decision from upper management.
WI			Y	N	N			Y	It is a safe load for limited applications.
WY			Y	Y	Y	Following AASHTO code.		Y	This represents loads the bridge would see on a less than routine basis.
Summary:									
Total responses:	44	44	44	44	44	Total responses:	44	44	
Yes:	1	23	42	34	25	Yes:	0	41	

No response received if empty.

TABLE C4-4A
LOADING THE BRIDGE IN PERMIT REVIEW (UNITED STATES)

State/ Jurisdiction	Multiple Presence of Vehicles: One Lane Loaded Only	Multiple Presence of Vehicles: One Lane Permit Vehicle + Other Lanes Loaded	Multiple Presence of Vehicles: Other Remarks	Permit Vehicle Restricted with respect to: Position on Bridge	Permit Vehicle Restricted with respect to: Speed	Permit Vehicle Restricted with respect to: Without Other Vehicles	Permit Vehicle Restricted with respect to: No Acceleration/ Deceleration on Bridge	Permit Vehicle Restricted with respect to: Other/Remarks
AL			For Type 1 permits, analyses are performed for both single-lane and dual-lane distribution factors (DF) during screening. If the vehicle fails with the dual-lane DF, then the single-lane DF is used. If the single-lane DF also fails, then the permit request is forwarded to the Bridge Rating office. Type 2 permit vehicles are routinely analyzed with no adjacent traffic and the permit is issued with that restriction included.	Yes	Yes	Yes	Yes	
AK			Permit vehicle is in one lane centered on the bridge.	Yes	Yes	Yes	Yes	For single trip permits.
AZ	Yes			Yes	Yes	Yes	Yes	
AR	Yes			Yes	Yes	Yes		
CA			Allow about 10% more axle weight for permit vehicle due to the improbable occurrence of side-by-side permit vehicles. More likely occurrence considered is permit vehicle and heavily loaded legal vehicle.	Yes	Yes	Yes		
CO	Yes			Yes	Yes			
CT		Yes	For loads over 500,000 lb (superloads), any other vehicles may not pass under any structure that the permit vehicle is crossing.	Yes	Yes	Yes	Yes	For loads over 500,000 lb (superloads), any other vehicles may not pass under the structure the permit vehicle is crossing.
DE	Yes				Yes	Yes		
DC								
FL			Our load ratings policies require applying legal loads on all design lanes. When no control of traffic is planned for, other lanes are assumed to be loaded with HS20 loading when a permit load is evaluated.	Yes	Yes	Yes		Considered deforming some truck rig geometry to spread load more widely. Weighed axles of the truck. Applied to trip permits.
GA			Standard AASHTO distribution	Yes	Yes	Yes	Yes	
HI		Yes		Yes	Yes	Yes		
ID			Case specific. If the permit load can be the only one on the bridge, we specify just that. Otherwise, it travels with other vehicles on the bridge.	Yes	Yes	Yes		
IL	Yes	Yes	If analysis fails for multiple presence, we will analyze for one lane and specify no other traffic to be on the bridge.	Yes	Yes	Yes		
IN	Yes			Yes	Yes	Yes	Yes	
IA	Yes			Yes	Yes			
KS	Yes	Yes	In some cases we specify only permit vehicle on bridge.	Yes	Yes	Yes	Yes	Normally only for superloads.
KY		Yes		Yes	Yes	Yes	Yes	
LA								
ME								
MD								
MA		Yes		Yes	Yes	Yes		
MI								

TABLE C4-4A (*continued*)

	Multiple Presence of Vehicles			Permit Vehicle Restricted with respect to				
State/ Jurisdiction	One Lane Loaded Only	One Lane Permit Vehicle + Other Lanes Loaded	Other Remarks	Position on Bridge	Speed	Without Other Vehicles	No Acceleration/ Deceleration on Bridge	Other/Remarks
MN		Yes	For BARS calculations assume multiple lanes filled with same permit vehicle.	Yes	Yes	Yes		For all single trip and annual nondivisible permits.
MS	Yes			Yes	Yes	Yes		
MO			Two-lane operating ratings are used for routine permitting.	Yes	Yes	Yes	Yes	
MT			If the load is heavy enough we will require that they be the only vehicle on the bridge (flaggers are required and center-lining is done). If the load is not heavy enough to require these special procedures we use the operating level and the presence of another vehicle (design multi-presence distribution factors) in the analysis. In general, loads that come to the bridge fall in the first (non-multiple presence of vehicles) category.	Yes	Yes	Yes	Yes	
NE		Yes		Yes	Yes	Yes	Yes	
NV	Yes			Yes	Yes	Yes	Yes	
NH								
NJ		Yes			Yes			To reduce impact.
NM	Yes			Yes	Yes	Yes		For loads over 140,000 lb.
NY		Yes		Yes	Yes	Yes		
NC		Yes		Yes	Yes	Yes	Yes	
ND	Yes				Yes			
OH			Two permit vehicles side by side.	Yes	Yes	Yes	Yes	
OK	Yes			Yes	Yes	Yes		
OR								
PA			We always use multilane distribution factor unless a special road permit condition states only one truck at a time.	Yes	Yes	Yes	Yes	
PR	Yes							Time of day when the bridge can be used for wide loads.
RI	Yes			Yes	Yes	Yes		Applicable to all permits.
SC		Yes		Yes	Yes	Yes	Yes	
SD	Yes			Yes	Yes	Yes		
TN			Our procedure is checking the permit vehicle for three states: (1) with a two-lane distribution factor plus full impact—no restriction needed; (2) with a two-lane distribution factor and reduced impact—speed reduction required; (3) with a one-lane distribution factor and reduced impact—both speed reduction and centerline restriction (with no other traffic on the bridge). If it fails, all three—rejected.	Yes	Yes	Yes		Other restrictions (axle weights, etc.) may apply.
TX	Yes			Yes	Yes	Yes		
UT								
VT				Yes	Yes	Yes	Yes	For single trip self-propelled craned and overweight studies.

TABLE C4-4A (*continued*)

	Multiple Presence of Vehicles			Permit Vehicle Restricted with respect to				
State/ Jurisdiction	One Lane Loaded Only	One Lane Permit Vehicle + Other Lanes Loaded	Other Remarks	Position on Bridge	Speed	Without Other Vehicles	No Acceleration/ Deceleration on Bridge	Other/Remarks
VA		Yes		Yes	Yes	Yes	Yes	We allowed bridging over shorter spans to avoid rerouting.
WA		Yes		Yes	Yes	Yes		For loads over 105,500 lb.
WV			One permit vehicle in each lane. Multiple presence factors are used for more than two lanes.	Yes	Yes	Yes	Yes	Sometimes require truck to crab. Mostly superloads, a few single trip.
WI		Yes		Yes	Yes	Yes		Depending on vehicle weight and bridge capacity.
WY			Overweight load software checks each bridge at four different levels: (1) permit vehicle on bridge, both directions simultaneously; (2) same as first without impact; (3) permit vehicle with no other loads; (4) same as three with no impact.	Yes	Yes	Yes	Yes	

Summary								
Total responses	44	44		44	44	44	44	
Yes	17	15		40	43	39	20	

No response received if empty.

TABLE C4-4B
LOADING THE BRIDGE IN PERMIT REVIEW (CANADA)

	Multiple Presence of Vehicles			Permit Vehicle Restricted with respect to				
Jurisdiction	One Lane Loaded Only	One Lane Permit Vehicle + Other Lanes Loaded	Other Remarks	Position on Bridge	Speed	Without Other Vehicles	No Acceleration/Deceleration on Bridge	Other Remarks
Alberta	Yes			Yes	Yes	Yes		For single trip overweight permits.
Calgary		Yes		Yes	Yes	Yes	Yes	
New Brunswick	Yes	Yes	Use both methods, depending on class of permit.	Yes	Yes	Yes		They are used in some instances. Permit controlled for single trip permit.
Newfoundland		Yes		Yes	Yes	Yes		
Northwest Territories		Yes		Yes	Yes	Yes	Yes	
Ontario			Ontario Bridge Formula (OBF) for permit checking allows for all lanes to be simultaneously loaded. However, ministry guidelines allows a heavier permit load than provided by OBF if travel restrictions are imposed; i.e., permit vehicles would be controlled when crossing bridges and police escort would be required.	Yes	Yes	Yes		Imposed in specific cases to obtain a higher allowable load than allowed by Ontario Bridge Formula, for permit vehicles exceeding 70,000 kg.
Ottawa								
PEI		Yes		Yes	Yes	Yes	Yes	
Quebec		Yes	May be used for Class 6 permits.	Yes	Yes	Yes		
Toronto								

Summary								
Total responses	8	8		8	8	8	8	
Yes	2	6		8	8	8	3	

TABLE C4-5
COMPUTER-AIDED MODELING FOR PERMIT REVIEW AND LOAD RATING

	Computer-Aided Modeling Methods/Software for Permit Review								Software for Bridge Load Rating						
State/ Jurisdiction	None	FEA	FEA Software	Grillage	Grillage Software	Girder Line	Girder Software	Other	None	BRASS-Girder	BARS	Virtis	Other	Most Used	When Do You Plan to Use Virtis?
AL		Y	BRUFEM					Very rarely use GT STRUDL girder line analysis. Virtis (BRASS-Grider and Madero) and BARS		Y	Y	Y		Virtis	
AK						Y	Access	Excel, Risa 3D, DR Beam Pro, and Mathcad to load rate bridges					Excel, Risa 3D, DR Beam Pro, and Mathcad to load rate bridges.		
AZ		Y	GT STRUDL, Win STRUDL	Y			Virtis, BDS, BRASS-Girder	Spreadsheets		Y		Y	BDS, GT STRUDL, Win STRUDL, Spreadsheets	Virtis	
AR						Y	LARS, BAR7						LARS, BAR7		
CA					BRUFEM, Midas			Use spreadsheets to assist in substructure analysis.				Y	BRUFEM		
CO						Y	BARS, BRASS, Virtis	In-house Mathcad routines		Y	Y	Y			2008 to replace BRASS girder, Bars
CT		Y	STAAD, MDX, DESCUS, C-BRIDGE, GT STRUDL, SIMON, BDS			Y	PennDOT software	BAR7, PS3, BOX5, Leap, Merlin-Dash					BAR7, PS3, BOX5, Leap, Merlin-Dash		We may
DE						Y	BRASS-Girder			Y					
DC															
FL		Y	SALOD, BRUFEM, MDX, Merlin-Dash			Y	BARS	Load test results are also used as a basis for bridge capacity when performing permit evaluations. In-house software (ASABE) to do evaluations based on results obtained with listed software.			Y				This year
GA						Y	BAR7 PS3						BAR7, PS3, LoadRate, (GDOT)		Being considered
HI								LEAP					LEAP		
ID		Y	LARSA			Y	Virtis, BARS				Y	Y	BARS, moving to Virtis		

TABLE C4-5 (*continued*)

State/ Jurisdiction	Computer-Aided Modeling Methods/Software for Permit Review								Software for Bridge Load Rating						
	None	FEA	FEA Software	Grillage	Grillage Software	Girder Line	Girder Software	Other	None	BRASS-Girder	BARS	Virtis	Other	Most Used	When Do You Plan to Use Virtis?
IL						Y	BARS, STAAD, Virtis/ BRASS			Y	Y	Y	STAAD, BARS		
IN						Y	BARS				Y	Y			
IA						Y	BARS, Virtis				Y	Y		BARS	
KS						Y	BRASS			Y		Y		BRASS-Girder	
KY						Y							LARS		
LA															
ME															
MD															
MA		Y	GT STRUDL STAAD			Y	Virtis					Y			
MI															
MN		Y	MDX for curved steel			Y	Virtis	STAAD for rigid frames			Y	Y		Virtis	
MS	Y										Y				On completion of final version, debugging, etc.
MO						Y	modified BARS	Plan to adopt Virtis			Y	Y			Currently transitioning to Virtis.
MT		Y	BRASS–DIST			Y	Virtis				Y	Y	Visual analysis	Virtis	
NE	Y							None			Y	Y			
NV						Y	IAI-BDS; BRASS-Girder			Y					
NH															
NJ								In-house program comparing the weights of permit vehicle and legal trucks, then finding the allowable weight of permit vehicle.			Y		Hand calculations, DESCUS, STAAD		After LRFR software has been developed and available.
NM	Y									Y			ConSpan		Jan. 2006
NY		Y		Y				Virtis				Y			

TABLE C4-5 (*continued*)

State/ Jurisdiction	Computer-Aided Modeling Methods/Software for Permit Review								Software for Bridge Load Rating						
	None	FEA	FEA Software	Grillage	Grillage Software	Girder Line	Girder Software	Other	None	BRASS-Girder	BARS	Virtis	Other	Most Used	When do you plan to use Virtis?
NC								In-house software					In-house software. Wisconsin continuous		
ND						Y	Pontis, Excel					Y			
OH						Y	BARS, BRASS				Y		Descus, BARS		2006
OK															
OR															
PA						Y		Own software in-house			Y		In-house		When software is linked to main engine.
PR						Y	BRASS-Girder			Y					Within 5 years.
RI									Y						
SC						Y	BARS				Y	Y			
SD						Y	BARS	Migrating to Virtis			Y	Y		BARS	
TN						Y	Virtis, BARS	In-house software		Y	Y	Y	In-house programs		
TX		Y	Risa3D STAAD-pro			Y	In-house software	In-house software					In-house software, BAR 7		
UT															
VT								In-house spreadsheets/programs					In-house programs		Not for a few years.
VA		Y	STAAD			Y	pcBARS				Y		STAAD, Descus		Mid-2005
WA								BRIDG					BRIDG		
WV						Y	Super load/ LARS						LARS		
WI						Y	SIMON, in-house programs	Girder line analysis					SIMON in-house programs		
WY										Y		Y			
Summary															
Total responses	44	44		44		44			44	44	44	44			
Yes	3	11		2		29			1	11	19	20			

TABLE C4-6
METHODS OF SCREENING PERMIT VEHICLES

State/ Jurisdiction	Compare with Design Vehicle	Compare with Acceptable Axle Spacing and Weight	Compare with Standard Bridges	Other
AL			Yes	
AK				An agency produced girder-line analysis.
AZ	Yes	Yes	Yes	
AR	Yes			
CA				Compare permit vehicle to Caltrans design permit vehicle load effects used for design and rating of all bridges.
CO	Yes			Color-coded map based on allowable axle group weights.
CT	Yes			
DE		Yes		
DC				
FL	Yes	Yes		Extrapolation and interpolation thereby.
GA	Yes			
HI	Yes			
ID		Yes		
IL		Yes		
IN				INDOT formula.
IA				Vehicles under 156,000 lb are routed using four typical axle configurations. An annually updated map showing locations of bridges that cannot carry certain loads is used.
KS				Generally analyze each bridge for each truck. It only takes a couple of minutes anyway. Load rating and permit routing experience minimizes analysis.
KY				Bridge analysis is done on gross loads weighing above 250 kips, and may be on those with an axle above 20 kips.
LA				
ME				
MD				
MA	Yes			
MI				
MN	Yes			
MS		Yes		
MO		Yes		
MT	Yes	Yes		

TABLE C4-6 (*continued*)

State/ Jurisdiction	Compare with Design Vehicle	Compare with Acceptable Axle Spacing and Weight	Compare with Standard Bridges	Other
NE				No need to screen permit vehicles to minimize or eliminate bridge analysis because of an automated permit system. Upon the request of route, each bridge on the route is analyzed for the permit vehicle.
NV		Yes		
NH				
NJ	Yes			
NM				A program comparing moments of the rating truck to the permit truck.
NY	Yes	Yes		
NC	Yes			
ND	Yes			
OH				No analysis required for GVW < 60 tons and below Federal Formula B. Comparing similar permit vehicles.
OK	Yes			
OR				
PA	Yes			
PR	Yes			
RI	Yes			
SC				Previous permits.
SD				We analyze every vehicle over every bridge crossed.
TN				Find the ratios of axle group weights with those allowed in Federal Formula B. Compare the maximum with allowable value curve based on GVW.
TX	Yes	Yes	Yes	Customized chart based on standard bridge designs.
UT				
VT	Yes			
VA	Yes	Yes		
WA				Compare permit vehicle to an overload truck used in load rating.
WV				80% to 90% of OW permits are issued through our Superload computer system by bridge analysis. Remaining single trip permits are issued in our District and County offices, relying on charts and guidance from District Bridge Engineers.
WI	Yes			
WY		Yes		
Summary				
Total responses	44	44	44	
Yes	22	13	3	

No response received if empty.

TABLE C4-7
TECHNICAL SPECIFICATIONS FOR CONSIDERING CONDITION AND MATERIAL PROPERTIES IN LOAD RATING

State/ Jurisdiction	Spec.-Guided in Considering Bridge Condition in Rating?	If Yes, Which Spec(s)?	Spec.-Guided in Considering Material Properties in Rating?	If Yes, Which Spec(s)?
AL	Yes		Yes	AASHTO MCEB
AK	Yes	AASHTO MCEB, two department memos	Yes	AASHTO MCEB, two department memos
AZ	Yes	AASHTO MCEB	Yes	AASHTO MCEB
AR	Yes	AASHTO specs.	Yes	AASHTO specs.
CA	No		Yes	AASHTO MCEB
CO	Yes	CDOT Bridge Rating Manual, AASHTO MCEB, AASHTO Standards & LRFD specs.	Yes	CDOT Rating Manual
CT	Yes	CDOT Bridge Inspection Manual	Yes	AASHTO specs.
DE	Yes	AASHTO MCEB	Yes	AASHTO MCEB
DC				
FL	No	Bridge condition could be considered as a factor.		
GA	No		Yes	AASHTO MCEB
HI	No		No	
ID	Yes	AASHTO MCEB	Yes	AASHTO specs.
IL	Yes	Deterioration is taken into account in section property estimation.	Yes	Attached rating stress levels
IN	No		Yes	AASHTO specs.
IA	No		No	
KS	No		Yes	AASHTO specs.
KY	Yes	NBIS bridge inspection report	Yes	AASHTO MCEB
LA				
ME				
MD				
MA	Yes	MassHighway Permit Vehicle Analysis Guidelines	Yes	MassHighway Bridge Load Rating Guidelines
MI				
MN	Yes	AASHTO MCEB	Yes	AASHTO MCEB
MS	Yes	AASHTO specs.	Yes	AASHTO specs.
MO	Yes	Internal guidelines	Yes	MoDOT Bridge Inspection and Rating Manual
MT	No		Yes	Engineering knowledge of the time frame under which the bridge was constructed. We use AASHTO MCEB, but more often than not we will refer to the Department's Standard Specs used during the time of construction.
NE	Yes	NE Bridge Inspection Manual and Coding Guide	No	

TABLE C4-7 (*continued*)

State/ Jurisdiction	Spec-Guided in Considering Bridge Condition in Rating?	If Yes, Which Spec(s)?	Spec-Guided in Considering Material Properties in Rating?	If Yes, Which Spec(s)?
NV	No		No	
NH				
NJ	Yes	AASHTO specs.	Yes	AASHTO specs., NJDOT Bridge Design Manual
NM	Yes	AASHTO specs.	Yes	AASHTO specs.
NY	No		Yes	
NC	Yes	AASHTO specs.	Yes	AASHTO specs.
ND	Yes	AASHTO MCEB	Yes	Internal guidelines
OH	Yes	AASHTO MCEB	Yes	ODOT Bridge Design Manual
OK	No. Just engineering judgment.		Yes	AASHTO MCEB
OR				
PA	Yes		Yes	AASHTO specs.
PR	Yes	AASHTO MCEB	Yes	AASHTO MCEB
RI	No		No	
SC	No		Yes	AASHTO specs.
SD	Yes	AASHTO specs.	Yes	AASHTO specs.
TN	Yes	AASHTO MCEB, AASHTO stand. specs.	Yes	AASHTO MCEB, AASHTO stand. specs.
TX	Yes		Yes	AASHTO specs./actual material properties from archives
UT				
VT	No		Yes	AASHTO MCEB
VA	No		Yes	AASHTO MCEB, AASHTO stand. specs.
WA	Yes	1989 AASHTO Guide Specs. for Existing Steel and Concrete Bridges.	Yes	AASHTO MCEB, AASHTO Guide specs.
WV	Yes	AASHTO MCEB	No	
WI	No		No	
WY	No		No	

Summary				
Total responses	44		43	
Yes	27		35	
No	17		8	

Note: AASHTO MCEB = AASHTO *Manual for Condition Evaluation of Bridges.*

TABLE C4-8A
CONSIDERATION TO VEHICLE GAGE WIDTH IN PERMIT REVIEW (UNITED STATES)

State/ Jurisdiction	Gage Considered in Permitting? If Yes, How?	Gage Considered in Permitting Cranes? If Yes, How?	How Is Lane-Crossing Load Checked?	Higher Load Allowed if Wider Gage Length? If Yes, How?
AL	Yes. See paper by Gerald McLelland.	No	Equivalent standard-gage axle is computed and applied to a single lane with no vehicles in adjacent lanes.	Yes. Higher limits, if indicated by appropriate analysis.
AK	No	No	Bridge Section performed live load distribution tests on a Cozad Heavy Hauling Unit to determine a distribution factor.	No
AZ	Yes. Lever rule method.	No	Prorating based on capacity.	Yes. See Arizona Rules
AR	Yes. If trunnion axle configurations can distribute LLs to two lanes, then axle load is reduced.	No		Yes. Same procedure.
CA	Yes. Allow about 10% to 15% more weight for axle widths of 10 ft when eight tires per axle. Allow 150% more for axle widths over 15 ft and 200% for widths of 20 ft.	Yes. Cranes with 10-ft axle width or greater are allowed to transfer up to 7,000 lb from front to rear axle groups. GVW increase not allowed.	Superloads 20 ft wide are analyzed as a standard single wide vehicle even though it is allowed double weight, because multi-lane S/over distribution factors consider two lanes of loading. When widely spaced girders are encountered, special analysis (3-D analysis) is sometimes required.	Yes. Axles 10 ft wide and with eight tires are allowed 10% to 15% more weight.
CO	Yes. When axle widths exceed 12 ft the load is prorated to one lane.	Yes. See left.	See left.	Yes. Prorated.
CT	No	No		No
DE	No	No	Use wheel load reactions, using lever rule.	No
DC				
FL	Yes. For very heavy trip permits (sometimes above 1000 kips) consider lateral truck gages.	No		Yes. See left.
GA	No	No		No
HI	No	No		No
ID	Yes. For an extra wide vehicle, we may split it into two vehicles for analysis. We also will use simple beam analysis to determine a distribution factor for non-standard gages.	Yes. Same way as left.	Usually checked as if only occupying one lane. Sometimes the distribution factor modified to a one-lane bridge.	No

TABLE C4-8A (*continued*)

State/ Jurisdiction	Gage Considered in Permitting? If Yes, How?	Gage Considered in Permitting Cranes? If Yes, How?	How Is Lane-Crossing Load Checked?	Higher Load Allowed if Wider Gage Length? If Yes, How?
IL	Yes. See right.	Yes. See right.	See right.	Yes. If the load is wide enough for two lanes (18 to 20 ft), use two-lane distribution. If 10 to 18 ft, interpolate between one- and two-lane distributions.
IN	No	Yes		
IA	Yes. Use lever rule or the method in "A Rational Procedure for Overweight Permits," *Transportation Research Record 930*.	Yes. Use lever rule.	It depends. If it uses a dollie system using side-by-side groups of axles, use multiple-lane loading considering one-half of the vehicle, which is conservative.	No
KS	Yes. Using factors similar to those of Gerald McLelland.	Yes. Using factors similar to those of Gerald McLelland.	Increase distribution as left.	Yes. Only used on overweight permits with the increased distributions noted left.
KY	Yes. Determine the live load distribution factor.	Yes. Same as left.	Use single lane distribution factor. If bridge fails, hand analysis to determine the distribution factor.	Yes. Distribute the load over more beams.
LA				
ME				
MD				
MA	No	No		No
MI				
MN	Yes. We use interpretation of code to lower axle weight based on percent beyond standard gage for non-slabs. For multilane distribution, 11/13 axle weight for 8 ft gage and 11/14 axle weight for 9 ft gage; for single-lane distribution 14/16 and 14/17 axle weight, respectively.	Yes. Same as left.	Same as left.	Yes. Trunnions (eight-tire axles) are allowed up to 40 k, otherwise standard trucks limited to 23 k.
MS	No	No	Total load is applied to the entire structure (total section properties).	No
MO	Yes. For superloads having trunnion and dolly, gage length is considered.	No. Gage may be considered for superload.	We use girder line analysis, which takes into account where the wheel lines are.	Yes. Internal guidelines for trunnions and dolly systems. Normal axles with two wheel lines are not allowed heavier weights.
MT	Yes. Use BRASS–DIST to handle non-standard widths and gages.	Yes. Same as left.	Same as left.	Yes. Same as left. Policy is under development based on analyses performed to date.
NE	No	No	Modify the live load distribution factor.	No

TABLE C4-8A (*continued*)

State/ Jurisdiction	Gage Considered in Permitting? If Yes, How?	Gage Considered in Permitting Cranes? If Yes, How?	How Is Lane-Crossing Load Checked?	Higher Load Allowed if Wider Gage Length? If Yes, How?
NV	Yes. By charts.	Yes. Same as truck.	Allowable single-lane loads are multiplied by appropriate factors for widths >14 ft.	Yes. At 10, 14, and 20 ft.
NH				
NJ	No	No	Checked in the same manner as if it occupied a single lane.	No
NM	Yes. Give a percentage of lane width for loads wider than 10 ft.	No	Use a ratio to a 10-ft-wide truck. For 16 ft wide, reduce axle loading by 1.6.	Yes. Same as left.
NY	No	No		No
NC	Yes for very heavy OW permits.	No	Adjust axle loads to account for extra width. If out-to-out of trailer is greater than 16 ft, halve the load and treat as two lanes loaded.	Yes. Only in special cases.
ND	Yes	Yes. Use ratios of actual vs. 6.0 ft standard gage and distribution factors.	Reduce to wheel loads by using ratios of truck widths and distribution factors.	Yes
OH	Yes. Only for superloads on dolly or crab configuration.	No	Dolly or crab configuration.	No
OK	No	No	Use multiple-lane distribution.	No
OR				
PA	No. Unless hauler performs own FEA.	No		No
PR	No	No		No
RI	Yes. Only if the vehicle has a problem achieving permit status using load factor criteria, might the state consider passing the permit vehicle rating along to a consultant for a more in-depth review using wider axle widths.	Yes. See left.	See left.	Yes. See left.
SC	Yes. For very wide vehicles use rules by Gerald McLelland.	Yes. Same as left.	Same as left.	
SD	Yes. Empirical formula to reduce effective axle weight.	Yes. See left.	Do not allow single lane loading.	Yes. See far left.
TN	Yes. Only significantly deviating from standard—develop custom distribution factors using BRASS DIST.	No		Yes. See far left.
TX	Yes. See attached.	Yes. See attached.	See attached.	Yes. See attached.
UT				

TABLE C4-8A (*continued*)

State/ Jurisdiction	Gage Considered in Permitting? If Yes, How?	Gage Considered in Permitting Cranes? If Yes, How?	How Is Lane-Crossing Load Checked?	Higher Load Allowed if Wider Gage Length? If Yes, How?
VT	No	No	Restrict load to one lane, straddling centerline and wheels distributed to girder line.	No
VA	No	Yes. Lateral load distribution is modified using a moment calculation program for cranes with 8 ft 6 in. or greater gage.	Use single-lane distribution factors if considered most realistic.	No
WA	Yes. For eight-tire >16-ft-wide truck, treat as two trucks.	No	See far left.	For eight-tire axles: width in (8 ft,10 ft), (10 ft,12 ft), (12 ft,16 ft), (>16 ft): allowable axle weight increases by 15, 25, 35, 100%.
WV	Yes. Recalculate distribution factors.	No.	Yes. Only if a load rating is completed, and in rare situations.	Yes. See left.
WI	Yes. Distribution factors are adjusted.	Yes. Same as left.	Same as left.	Yes
WY	Yes. If trunnion axle width >20 ft, treat as two trucks.	Yes. See left.		Yes. See left.

No response received if empty.

TABLE 4-8B
CONSIDERATION TO VEHICLE GAGE WIDTH IN PERMIT REVIEW (CANADA)

Province/ Jurisdiction	Gage Considered in Permitting? If Yes, How?	Gage Considered in Permitting Cranes? If Yes, How?	How is Lane-Crossing Load Checked?	Higher Load Allowed if Wider Gage Length? If Yes, How?
Alberta	Yes	Yes	When performing a bridge rating for a permit vehicle, each axle is modeled for its width, gage, and number of tires. This is then, through a grillage analysis, used to determine the distribution of the various axles to the supporting bridge elements.	Yes
Calgary	Yes	Yes	Modifying load distribution.	Yes
New Brunswick	No	No	Use method in *Bridge Analysis Simplified* by Bakht and Jaeger	No
Newfoundland	No	No	Such loads are rare and would require highway be closed in at least one direction, so would not be approved.	Yes. A factor from *Bridge Analysis Simplified,* by Bacht and Jaeger greater than one to be applied to ‘S/over’ distribution factor.
Northwest Territories	No	No	Load will be carried out with more girders	Yes
Ontario	Yes	Yes	Bridge-specific analysis	Yes
Ottawa				
PEI	No	No		No
Quebec	No	No	Using a ratio of different load factors based on multiple lanes loaded, single lane loaded, or one vehicle centered on the bridge.	No
Toronto		No	Not available	No

No response received if empty.

TABLE C4-9A
BRIDGE LOAD RATING DETAILS (UNITED STATES)

State/ Jurisdiction	How to Distribute Curb/Post/Rail Dead Load?	Span Length Definition	How to Treat Bar Cutoffs?	How to Determine Dynamic Impact Factor?
AL	Uniformly distributed to all girders.	Bearing center to center.	Analyzed if cutoffs may control rating. Bar lengths included up to where fully developed.	Per AASHTO Standard Specifications.
AK		Bearing center to center.		Per AASHTO Standard Specifications.
AZ	Distributed evenly.	Bearing center to center.	Capacity based on cross sections at controlling locations.	Per AASHTO Standard Specifications.
AR	Distributed equally for concrete and composite sections. For non-composite steel sections, one-half to the exterior girder and one-half to the remaining girders.	Bearing center to center.	Not considered.	Per AASHTO Standard Specifications.
CA	Distributed equally unless 3-D analysis.	Bearing center to center or as required by AASHTO specifications.	Reduce endpoints of cutoff bars by half of development length.	Per AASHTO Standard Specifications.
CO	Distributed uniformly, unless separated by a joint or attached directly to exterior girder.	Bearing center to center.	At rating points bars are considered only if fully developed.	Per AASHTO Standard Specifications.
CT		Bearing center to center.	AASHTO Standard Specifications.	Per AASHTO Standard Specifications.
DE	Distributed equally to all girders.	Bearing center to center.		Per AASHTO Standard Specifications.
DC				
FL	For girder line analysis, various methods have been used. FEM programs determine this automatically.	Bearing center to center.	Varies.	Per AASHTO Standard Specifications. Research underway to determine more accurate impact factors for cranes and bulky truck on selected and typical Florida bridges.
GA	Distribute rail load over four to five beams.	Bearing center to center.	Not considered.	Per AASHTO Standard Specifications.
HI		Bearing center to center.		Per AASHTO Standard Specifications.
ID	Exterior girders carry them because most state bridges were designed this way. When looking for capacity for a permit load, distribute the rail to all the girders.	Bearing center to center.	We do not consider them in rating.	Per AASHTO Standard Specifications.

TABLE C4-9A (*continued*)

State/ Jurisdiction	How to Distribute Curb/Post/Rail Dead Load?	Span Length Definition	How to Treat Bar Cutoffs?	How to Determine Dynamic Impact Factor?
IL	Distributed to the nearest four beams if more than seven, otherwise evenly. Evenly for slab bridges.	Bearing center to center.	15 bar diameters or 1/20th span length, whichever greater, past point where steel is required, usually inflection point.	Per AASHTO Standard Specifications.
IN	Based on Virtis.	Bearing center to center.	Enter length shown on plans.	Per AASHTO Standard Specifications.
IA	Distributed evenly.	Bearing center to center.	Do not consider development length as contributing to capacity.	Per AASHTO Standard Specifications.
KS	Generally distributed over the whole bridge width as in AASHTO specifications.	Bearing center to center.	Subtract the development length from the actual end of the bar to locate effective ending point.	AASHTO Standard Specifications.
KY	Typically spread evenly.	Bearing center to center.	Typically use an average length.	AASHTO Standard Specifications.
LA				
ME				
MD				
MA	Even distribution or 60% to exterior 40% to interior beams, whichever maximizing rating factor.	Bearing center to center.	Per AASHTO.	Per AASHTO Standard Specifications.
MI				
MN	Distributed evenly to all beams.	Bearing center to center. For slabs use clear distance + d.	Do not consider development length unless at critical location.	Per AASHTO Standard Specifications.
MS	Equal percent distribution.	Bearing center to center.	Not considered.	Per AASHTO Standard Specifications.
MO	Generally, equal to all girders.	Bearing center to center.	Cutoff or development length are typically ignored. Will likely start considering this using Virtis.	Per AASHTO Standard Specifications.
MT	Done the same as in the AASHTO Standard Specifications.	Bearing center to center.	We do not. They were designed, they should be adequate. We are talking about rating here not design.	
NE	Equally to all girders.	Bearing center to center.	Assume bars are sufficiently developed.	Per AASHTO Standard Specifications.
NV	Uniformly distributed.	Bearing center to center, structural length as defined in NBI.		Per AASHTO Standard Specifications.

TABLE C4-9A (*continued*)

State/ Jurisdiction	How to Distribute Curb/Post/Rail Dead Load?	Span Length Definition	How to Treat Bar Cutoffs?	How to Determine Dynamic Impact Factor?
NH				
NJ	Distributed evenly in most cases.	Bearing center to center.	Only fully developed length of rebar is considered in load rating.	Per AASHTO Standard Specifications.
NM	We presently divide it among all girders.	Bearing center to center.	Do not know.	Per AASHTO Standard Specifications.
NY	Generally equally to all members.	Bearing center to center.		Per AASHTO Standard Specifications.
NC	For more than six beam lines, distribute to three per side, otherwise evenly.	Bearing center to center.	Most spans are simple spans where bar cutoffs not an issue.	Per AASHTO Standard Specifications.
ND	Uniformly to all supporting members.	Bearing center to center.	Check ends of cutoffs for problems.	Per AASHTO Standard Specifications.
OH	Distributed equally to all members.	Bearing center to center.	Cutoff point considered as point of change in sections.	Per AASHTO Standard Specifications.
OK	Interior girders—averaged dead load Exterior girders—factored dead load.	Bearing center to center.		Per AASHTO Standard Specifications.
OR				
PA	Distribute per AASHTO and critical girder/member used for analysis.	Bearing center to center.	We only consider if bars are properly developed.	Per AASHTO Standard Specifications, LORD specifications.
PR	Distributed equally to each girder.	Bearing center to center.	In R/C bridges sections properties are changed at cutoff points.	Per AASHTO Standard Specifications.
RI	Typically the superimposed dead loads are distributed equally across all beams.	Bearing center to center.	In older concrete slabs, the main reinforcement is turned upward at the ends of the beams and hooked. Hence these beams are considered to have adequate development length for moment.	Per AASHTO Standard Specifications.
SC	Distributed equally.	Bearing center to center.		Per AASHTO Standard Specifications.
SD	AASHTO	Bearing center to center.	Typically do not review bar cutoffs and only rate at 1.4, 2.0, 2.5, etc.	Per AASHTO Standard Specifications.
TN	With two or three girders in cross section, distribute to exterior girders. For more girders, distribute evenly.	Bearing center to center.	No special policy regarding cutoffs.	AASHTO Standard Specifications. May be reduced compared to AASHTO allowance, but not below 10% unless the permit move can be so strictly controlled.
TX	Uniformly distributed.	Bearing center to center.	Not considered.	Control the vehicle speed over a bridge, <5 mph.
UT				

TABLE C4-9A (*continued*)

State/ Jurisdiction	How to Distribute Curb/Post/Rail Dead Load?	Span Length Definition	How to Treat Bar Cutoffs?	How to Determine Dynamic Impact Factor?
VT	Entire curb/rail load from one side is placed on the exterior beam. For an interior beam, the entire curb/rail load is distributed evenly among the interior beams.	Bearing center to center.	Not considered at this time.	Per AASHTO Standard Specifications.
VA	Per AASHTO specifications.	Bearing center to center.	Per AASHTO specifications.	Per AASHTO Standard Specifications.
WA	Distributed to a maximum of three girders on each side of the bridge. If five or fewer girders, distribute evenly.	Bearing center to center.	Either calculate it and enter it in software or have the software deduct it automatically.	1989 AASHTO Guide Specifications for Existing Steel and Concrete Bridges.
WV	AASHTO Design spec.	Bearing center to center.	Not sure what the question is asking.	Per AASHTO Standard Specifications.
WI	Varies	Bearing center to center.	Adequate as designed.	Per AASHTO Standard Specifications.
WY	Distribute uniformly.	Bearing center to center.		Per AASHTO Standard Specifications.

TABLE C4-9B
BRIDGE LOAD RATING DETAILS (CANADA)

Jurisdiction	How to Distribute Curb/Post/Rail Dead Load?	Span Length Definition	How to Treat Bar Cutoffs?	How to Determine Dynamic Impact Factor?
Alberta	Equally to the girders.	Bearing center to center.	We assume that design drawings are correct and use provisions of CHBDC.	CHBDC
Calgary		Bearing center to center.		CSA-S6-00
New Brunswick	Distribute equally for balanced loads. Torsional loading is distributed according to torsional properties of bridge cross sections.	Bearing center to center.	Canadian Highway Bridge Design Code (CHBDC)	CHBDC clause 3.8.4.5, 14.8.3, which relates DLA to number of axles on structure.
Newfoundland	Distributed equally.	Bearing center to center.	Do not consider bar cutoff.	CAN/CSA-S6-00
Northwest Territories		Bearing center to center.		CAN/CSA-S6-00 Cl. 14.8.1.6
Ontario	Distributed uniformly among all girders.	Bearing center to center.	Sections will be analysed using reinforcements considered effective at sections; i.e., allowing for bar development lengths.	CHBDC or site-specific data if load testing has previously been done for structure.
Ottawa				
PEI	Distributed to edge beam.	Bearing center to center.		Per CHBDC.
Quebec	If overhangs are less than 0.6 S or 1.8 m, these loads and the wear surface are distributed evenly on all beams [the spacing of main beams must be constant ($\pm$10%)]. Otherwise, these loads are statically attributed to the different supporting elements. If overhangs >0.6 S, these loads are imposed on the exterior beams.	Bearing center to center.	We consider and analyze a critical section at every cutoff, in addition to the critical sections at the maximum and minimum moment points. For shear analysis, we consider a critical section at the beginning of every group of stirrups.	Per CHBDC.
Toronto				

CHBDC = Canadian Highway Bridge Design Code; CSA = Canadian Standards Association.

TABLE 4-10A
RATING DETAILS (UNITED STATES)

State/ Jurisdiction	Which Limit States Used in Permit Review?	Load Distribution Factor Determination	Additional Loads Considered?	Environmental Factors Included?
AL	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, temporary barriers.	
AK	Moment, shear.	AASHTO standard specs.	Overlay dead loads, temporary barriers.	Humidity for timber.
AZ	Moment, shear.	AASHTO standard specs. AASHTO Guide Specs. for Distribution of Loads for Highway Bridges (1994), lever rule modifications for nonstandard gage axles.	Overlay dead loads, temporary barriers.	
AR	Moment, shear, serviceability.	Use AASHTO standard specs. Always one lane DF.	Overlay dead loads.	
CA	Moment, shear. For steel girders overload provisions.	AASHTO standard specs. When evaluating super loads may use those from 3-D grillage models using specified placement of permit vehicle.	Overlay dead loads, temporary barriers, large utilities, soundwalls, sidewalks.	
CO	Moment, shear, serviceability, other. Shear ignored except for timber.	AASHTO standard specs. LRFD specs. for critical structures.	Overlay dead loads. Temporary loads are not considered, but permanent loads are considered.	Humidity and temperature used in original design are considered in rating.
CT	Moment, shear.	AASHTO standard specs. AASHTO Guide Specifications	Overlay dead loads, temporary barriers. All appropriate dead loads are applied.	
DE	Moment, shear, serviceability.	AASHTO standard specs.		
DC				

TABLE 4-10A (*continued*)

State/ Jurisdiction	Which Limit States Used in Permit Review?	Load Distribution Factor Determination	Additional Loads Considered?	Environmental Factors Included?
FL	Moment, shear, for segmental bridges, elastic range (opening of segments). Some box girders are governed by web buckling that affects our permit vehicle capacities.	AASHTO standard specs. SALOD is also used.		We use initial load ratings; other factors such as creep could be used.
GA	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads.	
HI	Moment, shear.	AASHTO standard specs.	Overlay dead loads, temporary barriers.	
ID	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads.	
IL	Moment, shear.	AASHTO standard specs.	Overlay dead loads, temporary barriers, whatever is on the bridge at the time of the move.	
IN	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads.	
IA	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, temporary barriers. Any dead load acting as the permit load is crossing will be considered in rating.	
KS	Moment, shear, serviceability.	AASHTO standard specs. with modifications for extra width.	Overlay dead loads, temporary barriers.	
KY	Moment, shear.	AASHTO standard specs.	Overlay dead loads.	
LA				
ME				
MD				
MA	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, temporary barriers.	
MI				

TABLE 4-10A (*continued*)

State/ Jurisdiction	Which Limit States Used in Permit Review?	Load Distribution Factor Determination	Additional Loads Considered?	Environmental Factors Included?
MN	Moment, shear, serviceability.	AASHTO standard specs.	Utility allowance of 2 to 3 lb/sq. ft of deck.	
MS	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, temporary barriers, all known dead loads.	
MO	Moment, shear, serviceability. Also, consider material properties of bridge such as timber piling and condition of structure. Shear is currently only considered for steel girders. Plan to implement shear checks for concrete structures with Virtis.	AASHTO standard specs.	Overlay dead loads, temporary barriers, other dead and live loads. All additional dead loads are considered such as sidewalks, light standards, conduit, etc.	No
MT	Moment, shear.	AASHTO standard specs. BRASS–DIST	Overlay dead loads.	
NE	Moment	AASHTO standard specs.	Overlay dead loads.	
NV	Moment, shear.	AASHTO standard specs.		
NH				
NJ	Moment, shear.	AASHTO standard specs.	Overlay dead loads, temporary barriers.	No
NM	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads.	No
NY	Moment, shear.	AASHTO standard specs. AASHTO LRFD specs.	Overlay dead loads, temporary barriers, all loads considered.	No
NC		AASHTO standard specs. Judgment as necessary.	Overlay dead loads, temporary barriers, all known dead loads are used.	
ND	Moment	AASHTO standard specs.	Overlay dead loads, temporary barriers, any overburden.	No
OH	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, vandal protection fence, utilities.	

TABLE 4-10A (*continued*)

State/ Jurisdiction	Which Limit States Used in Permit Review?	Load Distribution Factor Determination	Additional Loads Considered?	Environmental Factors Included?
OK	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads. All dead loads.	Humidity
OR				
PA	Moment, shear, serviceability—all AASHTO code checks are done.	AASHTO standard specs. AASHTO LRFD specs.	Overlay dead loads, temporary barriers.	
PR	Moment, shear.	AASHTO standard specs.	Overlay dead loads, temporary barriers, utilities.	
RI	Serviceability	AASHTO standard specs.		
SC	Moment	AASHTO standard specs.	Overlay dead loads.	
SD	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, temporary barriers, utilities.	
TN	Moment, shear, serviceability.	AASHTO standard specs. BRASS–DIST may be used.	Overlay dead loads, temporary barriers, bridge rail and curb, bracing, utilities.	
TX	Moment, shear, serviceability.	Use single lane distribution and modify for gage width.	Overlay dead loads.	
UT				
VT	Moment, shear.	AASHTO standard specs.	Overlay dead loads, temporary barriers.	
VA	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads, earth/gravel fill.	
WA	Moment, shear.	AASHTO standard specs.	Overlay dead loads, utilities if significant.	
WV	Moment, shear, serviceability.	AASHTO standard specs.	Overlay dead loads. Including permanent dead loads and section loss.	No
WI	Moment	AASHTO standard specs.	Overlay dead loads.	
WY	Moment, shear.	AASHTO standard specs.	Overlay dead loads.	

No response received if empty.

TABLE C4-10B
RATING DETAILS (CANADA)

State/ Jurisdiction	Which Limit States Used in Permit Review?	Load Distribution Factor Determination	Additional Loads Considered?	Environmental Factors Included?
Alberta	Moment, shear.	Grillage analysis.	Overlay dead loads.	
Calgary	Moment, shear.	CSA-S6-00	Overlay dead loads, temporary barriers.	
New Brunswick	Moment, shear.	CHBDC section 5.7.1	Overlay dead loads.	
Newfoundland	Moment and shear.	CAN/CSA-S6-00	No	Humidity—Only when determining shrinkage losses in prestressed structures.
Northwest Territories	Moment, shear.		Overlay dead loads.	
Ontario	Ultimate	CHBDC and Ministry guidelines.	Overlay dead loads, temporary barriers.	
Ottawa				
PEI	Moment, shear.	Simplified Method of Analyses in CHBDC.	Overlay dead loads.	
Quebec	Moment, shear, serviceability. Sometimes for fatigue-prone girder bridges and for AASHTO prestressed beams for durability.	CAN/CSA-S6-00 Canadian Highway Bridge Design Code (simplified method). Grillage analysis when the simple method not authorized by the code.	Overlay dead loads, temporary barriers.	
Toronto				

No response received if empty; CHBDC = Canadian Highway Bridge Design Code; CSA = Canadian Standards Association.

TABLE C4-11A
LOCAL BRIDGE LOAD RATING (UNITED STATES)

State/ Jurisdiction	Are Local Bridges Rated Using Same Procedure?	Who Performs Rating for Local Bridges for Permit Review?	Who Decides Who Performs Rating for Local Bridges?
AL	Yes	State agency personnel, local agency personnel (only one county does their own ratings, other 66 counties depend on ALDOT).	Local government.
AK	Yes	State agency personnel, state-contracted consultants.	State
AZ	Do not know.	Do not know.	Do not know.
AR	Yes	Local agency-contracted consultants.	Local government.
CA	No. The state has load rated local bridges for the design (13-axle) permit vehicle and furnishes the permit load carrying capability of these bridges in terms of 5 permit vehicles to the locals. Most local agencies do not have the staff to perform special permit analysis.	State agency personnel. As noted, state performs analysis for standard permit vehicles (13 axle or less). State only rarely performs analysis. Do not know who performs analysis for locals when required. It is likely that locals do not recognize when special analysis is required.	State and local government.
CO	Yes	State-contracted consultants.	State
CT	Yes	State agency personnel, state-contracted consultants. For loads over 500 kips, carrier provides load analysis for all structures along proposed route.	State
DE	Do not know.		
DC			
FL	Yes	State agency personnel, state/province-contracted consultants, local agency personnel, local agency-contracted consultants. Some agencies may be given the ownership/maintenance of bridges. They are then responsible for updating load ratings. State contracts with consultants for load rating selected bridges.	State, other.
GA	Yes	State agency personnel.	State
HI	Do not know.	Local agency personnel.	Local government.
ID	Yes	State agency personnel, state-contracted consultants.	State
IL	Yes	State agency personnel, local agency-contracted consultants.	Local government.
IN	No. Not in INDOT jurisdiction.	Unknown	Other—Unknown.
IA			
KS	Yes	Local agency personnel, local agency-contracted consultants.	Local government.
KY	No. We only rate state-maintained bridges for permit loads.	Local agency personnel.	State/province.

TABLE C4-11A (*continued*)

State/ Jurisdiction	Are Local Bridges Rated Using Same Procedure?	Who Performs Rating for Local Bridges for Permit Review?	Who Decides Who Performs Rating for Local Bridges?
LA			
ME			
MD			
MA	Yes	Private consulting engineers.	State/province.
MI			
MN	Do not know.	Local agency personnel.	Local government.
MS	Do not know.	Local agency personnel.	Local government.
MO	Yes	Local agency personnel, local agency-contracted consultants.	Local government.
MT	Yes	State agency personnel.	State
NE	Do not know.	Local agency personnel.	Local government.
NV	Do not know.	Local agency personnel, local agency-contracted consultants.	Local government.
NH			
NJ	Yes	Local agency personnel.	Local government.
NM	Yes	State agency personnel, local agency personnel, local agency-contracted consultants.	State, local government.
NY	Do not know.	Local agency personnel.	Local government.
NC	Do not know.		Local government.
ND	Yes	State agency personnel, local agency personnel, local agency-contracted consultants.	State
OH	Do not know.	Local agency personnel, local agency-contracted consultants.	Local government.
OK	Do not know.	Local agency-contracted consultants.	Local government.
OR			
PA	Yes. Local bridges and roads are done manually without using APRAS.	Local agency personnel, local agency-contracted consultants.	Local government.
PR	Yes	State agency personnel.	State
RI	Yes	State agency personnel, state agency-contracted consultants.	State
SC	Yes	State agency personnel.	State
SD	Do not know.	Local agency-contracted consultants.	Local government.
TN	Yes	State agency personnel.	State
TX	Do not know.	Local agency personnel, local agency-contracted consultants.	Local government.
UT			
VT	No. When plans are available, this office provides initial rating.	Generally, no rating is performed by locals, who may request assistance from state.	State

TABLE C4-11A (*continued*)

State/ Jurisdiction	Are Local Bridges Rated Using Same Procedure?	Who Performs Rating for Local Bridges for Permit Review?	Who Decides Who Performs Rating for Local Bridges?
VA	Yes	Local agency personnel, local agency-contracted consultants.	State, local government.
WA	Do not know.	Local agency personnel, local agency-contracted consultants.	Local government.
WV			
WI	Do not know.	Local agency personnel.	Local government.
WY	Yes	Local agency personnel, local agency-contracted consultants.	State/province.

Summary			
Total Responses	42		
Yes	23		
No	4		
Do not know	15		

No response received if empty.

TABLE C4-11B
LOCAL BRIDGE LOAD RATING (CANADA)

Province/ Jurisdiction	Are Local Bridges Rated Using Same Procedure?	Who Performs Rating for Local Bridges for Permit Review?	Who Decides Who Performs Rating for Local Bridges?
Alberta	Yes	Province agency personnel, local agency personnel, local agency-contracted consultants.	Province
Calgary	Yes	Local agency personnel.	Local government.
New Brunswick	Yes	Province personnel.	Province
Newfoundland	Yes	Province personnel.	Province
Northwest Territories	Do not know.	Province personnel.	Province
Ontario	Yes	Local agency personnel, local agency-contracted consultants.	Local government.
Ottawa	Yes	Local agency personnel, local agency-contracted consultants.	Local government.
PEI	Yes	Province personnel.	Province
Quebec	Yes	Province personnel, province-contracted consultants.	Province
Toronto	Yes	Local agency personnel.	Local government.

Summary			
Total Responses	10		
Yes	9		
No	0		
Don’t know	1		

TABLE C5-1A
OTHER RELEVANT STUDIES/INVESTIGATIONS AND COMMENTS (UNITED STATES)

State/ Jurisdiction	Aware of Any Relevant Studies/Investigations?	Additional Comments
AL	ALDOT. 334-242-6474. Bradenr@dot.state.al.us. Permit rating exercise, SASHTO Multi-State Permit Working Group George Conner, ALDOT 334-242-6281. Connerg@dot.state.al.us.	
AK		Do you know of a Seminar for Load Rating Bridges according to AASHTO?
AZ		
AR		
CA		
CO		Additional contact: Mark Leonard, Staff Bridge Engineer CDOT, 303-757-309, mark.leonard@dot.state.co.us.
CT		
DE		
DC		
FL		It is extremely difficult, for various reasons (tracking of multi-trips, loads applied for are often higher than the real ones, etc.), to relate bridge deterioration to bridge loading and frequency of loading. Until we introduce some consistency among the state to perform evaluations with the explicit goals of maximizing mobility while agreeing on preservation strategies, we are bound to have inconsistencies in permitting decisions.
GA		
HI		
ID		
IL		If there is to be uniformity in allowing permit loads between the states, then each state's laws regulating permits must be uniform with the other states. It is NOT an engineering issue, it is a legislative issue.
IN		
IA		We use the superload routing system, and thus our electronic data in the most efficient manner. The system analyzes every bridge along a given route for a given permit truck configuration. The process eliminates the need for special knowledge about bridges on a route and saves time previously spent reviewing a route by hand and trying to determine which bridges are the critical structures to analyze. A permit can be reviewed and approved/rejected in minutes instead of hours or days. Having all states provide this type of fast turnaround on permit requests would be the best improvement to OS/OW carrier industry. Uniformity in the rating procedures between states will not have a significant affect on the trucking industry.
KS		
KY		
LA		
ME		
MD		
MA		
MI		

TABLE C5-1A (*continued*)

State/ Jurisdiction	Aware of Any Relevant Studies/Investigations?	Additional Comments
MN		How does your state rate curved steel or post-tensioned concrete box structures? We are just starting to use MDX for rating curved steel. For longer span bridges do you consider any lane loading or is permit-only vehicle in lane? We are contemplating this. Does your state have any rating trucks that are used in design check? We do not have any. How many permits are processed by bridge rating staff? We do about eight/day. When you give speed restriction do you eliminate impact in check? We lower impact to 5% rather than what is calculated. What load maximum triggers a bridge check in permit office? In Minnesota, if load is above 145 k then bridge office sees permit. Do you use the new LRFD steel distribution factors for LFD rating check? They are less conservative and allow heavier permit loads. Are any states finding any problems with newly designed LRFD bridges with LFD ratings? For LRFD the –M in steel is lower than LFD, thus causing lower ratings. For states using Virtis are they checking shear on older prestressed concrete bridges? This seems to drastically lower rating yet no evidence of problems in field. For finite-element software (such as MDX), what do you put in adjacent lanes when checking permit truck? We put HS20 truck in adjacent lane(s) in combination with permit truck.
MS		
MO		
MT		
NE		
NV		Contact for clarifications.
NH		
NJ		
NM		Uniformity of overloads in Southwest—one meeting held March 2005, Las Vegas, NV.
NY		
NC		It is going to be very difficult to get consistency from state to state permit reviews for a variety of reasons, including posting policy, state laws for legal loads, rating methods that are used, no confidence in AASHTO Rating Specifications where the real world does not fit the specification results (e.g., Rating of Reinforced Concrete Members), shear control ratings in specifications (there has never been a known shear failure in NC). Results from most research or synthesis is for the highest quality structure where cost is not an issue (these study results should be based on the smallest structure where cost is a major factor in making decisions as to what will be done). An agency cannot afford to spend precious dollars on elaborate studies or work for permit studies for small bridges.
ND		
OH		1. Ohio bridge definition is any structure with total 10 ft or larger. 2. ODOT has the inventory data of all the bridges in the state but does not possess or own the structural data files of all the bridges analyzed.
OK		
OR		
PA		
PR		
RI		

TABLE C5-1A (*continued*)

State/ Jurisdiction	Aware of Any Relevant Studies/Investigations?	Additional Comments
SC		
SD	Automated Commercial Vehicle Permitting [Project 2001-09] Hal Rumpca, SDDOPT-Research 605-773-4713, hal.rumpca@state.sd.us.	All permits are reviewed using SD Automated Permitting System.
TN		My impression is that permit procedures and policies vary widely from state to state. There is little uniformity in the way permit vehicles are handled.
TX		
UT		
VT		
VA		
WA		
WV		WV Division of Highways has responsibility for all bridges except for 100 bridges on WV Turnpike, load rated by a consultant using the same procedures as all other bridges. The data for those bridges are included in our superload program, which is used for issuing permits.
WI		
WY		

No response received if empty.

TABLE C5-1B
OTHER RELEVANT STUDIES/INVESTIGATIONS AND COMMENTS (US)

State/ Jurisdiction	Aware of Any Relevant Studies/Investigations?	Additional Comments
Alberta		
Calgary		
New Brunswick	Province of Ontario Regulations for Overweight Permits, Robert Barsalou, Ministry of Transportation Ontario. 905-704-2518. robert.barsalou@mto.gov.nb.ca	
Newfoundland	The four Canadian Atlantic provinces are in continued discussion regarding a proposal of harmonization of regional special permits. Contact would be with Council of Atlantic Premiers.	
Northwest Territories		
Ontario		This is a very interesting topic that would be of great benefit to all transportation agencies.
Ottawa	CHBDC, Section 14—Evaluation provides a standard used throughout Canada to rate existing bridges for overweight loads.	
PEI		
Quebec		
Toronto		

CHBDC = Canadian Highway Bridge Design Code. No response received if empty.

Abbreviations used without definitions in TRB publications:

AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NCHRP	National Cooperative Highway Research Program
NCTRP	National Cooperative Transit Research and Development Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation