SCAN TEAM REPORT

NCHRP Project 20-68A, Scan 12-01

Advances in State DOT Superload Permit Processes and Practices

Supported by the

National Cooperative Highway Research Program

April 2014


OVERSIZE LOAD


BARNHART
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Acknowledgments

The work described in this document was conducted as part of NCHRP Project 20-68A, the U.S. Domestic Scan program. This program was requested by the American Association of State Highway and Transportation Officials (AASHTO), with funding provided through the National Cooperative Highway Research Program (NCHRP). The NCHRP is supported by annual voluntary contributions from the state departments of transportation. Additional support for selected scans is provided by the U.S. Federal Highway Administration and other agencies.

The purpose of each scan, and of Project 20-68A as a whole, is to accelerate beneficial innovation by facilitating information sharing and technology exchange among the states and other transportation agencies, and identifying actionable items of common interest. Experience has shown that personal contact with new ideas and their application is a particularly valuable means for such sharing and exchange. A scan entails peer-to-peer discussions between practitioners who have implemented new practices and others who are able to disseminate knowledge of these new practices and their possible benefits to a broad audience of other users. Each scan addresses a single technical topic selected by AASHTO and the NCHRP 20-68A Project Panel. Further information on the NCHRP 20-68A U.S. Domestic Scan program is available at http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570.

This report was prepared by the scan team for Domestic Scan 12-01, Advances in State DOT Superload Permit Processes and Practices, whose members are listed below. Scan planning and logistics are managed by Arora and Associates, P.C.; Harry Capers is the Principal Investigator. NCHRP Project 20-68A is guided by a technical project panel and managed by Andrew C. Lemer, PhD, NCHRP Senior Program Officer.

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Disclaimer

Scan 12-01
Advances in State DOT Superload Permit Processes and Practices

REQUESTED BY THE

American Association of State Highway and Transportation Officials

PREPARED BY

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The information contained in this report was prepared as part of NCHRP Project 20-68A U.S. Domestic Scan, National Cooperative Highway Research Program.

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Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ALDOT	Alabama Department of Transportation
APRAS	Automated Permit Routing/Analysis System (Pennsylvania)
ASD	Allowable Stress Design
ASR	Allowable Stress Rating
BARS	Bridge Analysis Rating System
BMV	Bureau of Motor Vehicles (Maine)
BrR	Bridge Rating analytical software (AASHTOWare)
CDOT	Colorado Department of Transportation
DAF	Dynamic Amplification factor
DLF	Dynamic Load Factor
DMV	Department of Motor Vehicles
DOTD	Department of Transportation and Development (Louisiana)
FDOT	Florida Department of Transportation
HL-93	A hypothetical live load model proposed by AASHTO for analysis of bridges (H = highway, L = loading, 93 = developed in 1993)
IDOT	Illinois Department of Transportation
INDOT	Indiana Department of Transportation
ITD	Idaho Transportation Department
ITAP	Illinois Transportation Automated Permit
LFR	Load Factor Rating
LRFD	Load and Resistance Factor Design
LRFR	Load and Resistance Factor Rating
MAASTO	Mid America Association of State Transportation Officials
MBE	Manual for Bridge Evaluation
MDOT	Michigan Department of Transportation
MnDOT	Minnesota Department of Transportation
NASTO	Northeast Association of State Transportation Officials
NCHRP	National Cooperative Highway Research Program
NETC	New England Transportation Consortium
NYSDOT	New York State Department of Transportation
ODOT	Ohio Department of Transportation
OSOW	Oversized Overweight (Vehicles)
PennDOT	Pennsylvania Department of Transportation
PERBA	Permits Electronic Routing Bridge Analysis (Louisiana)
RFP	Request for Proposal
SASHTO	Southeastern Association of State Highway and Transportation Officials
SDDOT	South Dakota Department of Transportation
Superloads	Heavy and irregular vehicles
TRB	Transportation Research Board
TxDOT	Texas Department of Transportation
U.S.	United States
VDOT	Virginia Department of Transportation
WASHTO	Western Association of State Highway and Transportation Officials
WIM	Weigh-in-Motion
WisDOT	Wisconsin Department of Transportation
WSDOT	Washington State Department of Transportation

Executive Summary

The development of trucking technology and the increase in demands on freight transportation have led to longer and heavier vehicles traveling on the highway over the past two decades. Furthermore, to incorporate the special needs from industry, vehicles that are more irregular are used to transport heavy loads (e.g., prestressed concrete girder, automotive presses, transformers, and wind turbine components). Since these heavy and irregular vehicles (also known as superloads) have a significant effect on the infrastructure system when compared to regular-permit vehicles, they should be subject to special consideration in the permitting and operation process.

Standard permitting criteria for superloads differ from state to state. Although several regional associations were organized and successful pioneering practices were implemented to improve the efficiency and uniformity among different states (e.g., the New England Transportation Consortium[1], the Western Association of State Highway and Transportation Officials[2], and the Southeastern Association of State Highway and Transportation Officials[3]), significant differences in superload permitting processes still exist. Thus, there is a need to better understand the current state-of-practice in different states and to find a more practical way to improve the uniformity in permitting practices in the U.S.

This scan's aim was to gather current practices from different states, identify best practices, and propose an implementation plan to improve the uniformity in superload permitting processes in the near future.

To achieve this goal, this scan consisted of three stages:

- A desk scan
- A comprehensive questionnaire with amplifying questions for various topics
- A workshop with representatives from various states

In the desk scan, a detailed literature review was conducted regarding the superload permitting practices and new developments in these practices. The scan team also reached out to various DOTs to collect information regarding legal limits and superload limits. The desk scan proved that many DOTs can provide meaningful information on superload permit processes and practices. However, due to time constraints, a limited number of DOTs were selected for follow-up and further investigation.

During the organizational meeting, and based on input from the preliminary literature review and discussions with panel members, 18 states were selected for visits:

Alabama	Louisiana	Pennsylvania
California	Maine	South Dakota
Florida	Michigan	Texas
Idaho	Minnesota	Virginia
Illinois	New York	Washington
Indiana	Ohio	Wisconsin

1 New England Transportation Consortium, http://www.netc.umassd.edu/accomplishments.html

2 Western Association of State Highway and Transportation Officials, http://www.washto.org/

3 Southeastern Association of State Highway and Transportation Officials, http://www.sashto.org/

The scan team asked the selected states to complete a comprehensive questionnaire of amplifying questions covering various topics, including their current practices. The team later held a workshop to identify the best practices and propose a future implementation plan.

This scan's findings provided the scan team with a better understanding of the current state-of-practice for superload permitting, allowed it to identify best practices, and enabled it to make recommendations and propose an implementation plan to improve uniformity and automation in superload permitting in the near future.

Chapter 1 Introduction

Overview

The recently adopted American Association of State Highway and Transportation Officials (AASHTO) Manual for Bridge Evaluation[4] (MBE) provisions for load rating and permits provide a major advance in applying uniform guidelines for overload permits. As the sizes and weights of these superloads are ever increasing, there is a definite need to better understand the current state-of-practice within the contiguous U.S. and achieve enhanced uniformity and safety in this area.

National Cooperative Highway Research Program (NCHRP) Report 359 "Bridge Rating Practices and Policies for Overweight Vehicles"[5] provides a synthesis of permit rating policies. The scan team built this scan on the report's findings, focusing specifically on the topic of superload permitting. In addition, this scan compiles further detail on the current policies and procedures that govern the authorization of superload moves within the U.S. Of particular interest to state departments of transportation (DOTs) and the Technical Committees of the AASHTO Subcommittee on Bridges and Structures[6] are current practices with regard to bridge ratings for superload moves.

The scan team engaged the permit and bridge offices of various state agencies (see Table 1.1), as well as others deemed appropriate, to study in detail and document specific permitting processes and procedures for superloads and other over-legal-weight loads. The team specifically focused on how these DOTs ensure bridge safety and greater uniformity in superload permitting.

Because many of the superload moves are associated with specific industries and ports, the scan encouraged the invited state DOTs to address the needs and concerns of industry within their jurisdiction (e.g., petrochemical, aviation, energy, and construction), which often has the need to transport non-divisible loads and use major ports.

Superload movers, such as the Specialized Carriers & Rigging Association[7], are significant sources of information regarding current and future needs of superload movements, and this information would be beneficial to DOTs.

The findings of this scan provide a better understanding of the current state-of-practice for superload permitting. Additionally, this scan identified the need for further research to enhance bridge safety and provide improved guidance on the load rating methodology for superloads that could be included in the AASHTO Manual for Bridge Evaluation. The scan findings can also provide valuable information to DOTs regarding future trends pertaining to superloads.

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4 Manual for Bridge Evaluation, 2nd Edition, with 2011, 2013, 2014, and 2015 Interim Revisions, AASHTO Bookstore, https://bookstore.transportation.org/item_details.aspx?id=1750

5 Bridge Rating Practices and Policies for Overweight Vehicles: A Synthesis of Highway Practice, NCHRP Synthesis 359, National Cooperative Highway Research Program, Transportation Research Board of the National Academies, 2006, http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_359.pdf

6 AASHTO Subcommittee on Bridges and Structures, http://bridges.transportation.org/Pages/default.aspx

7 Specialized Carriers & Rigging Association, http://www.scranet.org/

Table 1.1 Agencies in the scan[a]

State DOT	Office/branch	Website
Alabama	Alabama DOT (ALDOT)	https://www.dot.state.al.us/
California	Caltrans Transportation Permits Office Caltrans Structure Maintenance and Investigations	http://www.dot.ca.gov/hq/traffops/permits/ http://www.dot.ca.gov/hq/structur/strmaint/
Florida	Florida DOT (FDOT)	http://www.dot.state.fl.us/
Idaho	Idaho Transportation Department (ITD)	http://itd.idaho.gov/
Illinois	Illinois DOT (IDOT), Bureau of Bridges and Structures IDOT Bureau of Operations, Permit Office	http://apps.dot.illinois.gov/bridgesinfosystem/main.aspx https://truckpermits.dot.illinois.gov/
Indiana	Indiana Department of Revenue, Motor Carrier Services Division Indiana DOT (INDOT)	http://www.in.gov/dor/4106.htm http://www.in.gov/indot/
Louisiana	Louisiana Department of Transportation and Development (DOTD)	http://wwwsp.dotd.la.gov/Pages/default.aspx
Maine	Maine DOT (MaineDOT) Maine Bureau of Motor Vehicles	http://www.maine.gov/mdot http://www.maine.gov/sos/bmv/
Michigan	Michigan DOT (MDOT)	http://www.michigan.gov/mdot/
Minnesota	Minnesota DOT (MnDOT)	http://www.dot.state.mn.us/
New York	New York State DOT (NYSDOT)	https://www.dot.ny.gov/index
Ohio	Ohio DOT (ODOT)	http://www.dot.state.oh.us/pages/home.aspx
Pennsylvania	Pennsylvania DOT (PennDOT) Bridge Design & Technology Division	http://www.dot.state.pa.us/Internet/BQADStandards.nsf/home?OpenFrameset
South Dakota	South Dakota DOT (SDDOT)	http://www.sddot.com/
Texas	Texas DOT (TxDOT) Texas Department of Motor Vehicles	http://www.txdot.gov/ http://www.txdmv.gov/
Virginia	Virginia Department of Motor Vehicles Virginia DOT (VDOT)	http://www.dmv.state.va.us/ http://www.virginiadot.org/
Washington	Washington State DOT (WSDOT)	http://www.wsdot.wa.gov/
Wisconsin	Wisconsin DOT (WisDOT)	http://www.dot.state.wi.us/

[a]Agencies that answered the amplifying questions and attended the workshop. NYSDOT attended the workshop via teleconference.

Methodology

The team conducted a desk scan to collect information regarding the permit practices and permit limits from various state DOTs and then used this information to finalize the list of candidate states for further contact and visits. The desk scan included a literature search to identify the best practices and the state-of-art research in superload movements (see Appendix A).

This scan was conducted as a Type 3 (peer exchange) scan. To get a collective response prior to the workshop, the scan team developed and sent a list of amplifying questions (see Appendix B) to the host agencies for their input and suggestions. This scan was conducted as a Type 3 (peer exchange) scan.

Invited Agencies

The team collected information regarding legal and permit weight limits from the invited agencies. (Host agency contact information is provided in Appendix C.) Table 1.1 summarizes the information regarding the legal weight limits that the team collected from the 18 invited states. Additional information on legal weight limits is provided in Appendix D. Information on permit limits is provided in Appendix E.

Table 1.3 shows a summary of the information regarding the permit weight limits and superload criteria that was collected from the 18 invited states.

Scan Team

Contact information for the scan team members is provided in Appendix F. Brief biographical sketches of the team members are provided in Appendix G.

Table 1.2 Summary of legal weight limits

State	Legal weight limits (kips)				
	GVW	Steering Axle	Axle	Tandem	Tridem
Alabama	80	12	20	34	42
California	80	20	20	34 min and up; depends on axle spacings	34 min and up; depends on axle spacings
Florida	80	22	22	44	66
Idaho	80	0.6 kips.in. width of tire	20	44	66
Illinois	80	20	20	34	42.5
Indiana	80	12	20	34	-
Louisiana	83.4	20	20	34	42
Maine	100	13.4	22	34	Federal bridge formula
Michigan	164[a]	12	20	34	39
Minnesota	80	20	20	34	42
New York	80	22.4	22.4	36	42
Ohio	80	20	20	34	42.5
Pennsylvania	80	20	20/22.4[b]	34.36[c]	42.5
South Dakota	80	20	20	34	42
Texas	80	[d]	20	34	42
Virginia	80	20	20	34	Federal Bridge Formula
Washington	105.5	20	20	34	Federal Bridge Formula
Wisconsin	80	20	20	34	42

[a] An indirect limit is caused by a combination of the maximum legal length of vehicles, maximum legal axle loads, axle spacing, and total number of axles allowed.
[b] 20 kips for GVW > 73.28 kips and 22.4 kips for GVW of 73.28 kips or under
[c] 34 kips for GVW > 73.28 kips and 36 kips for GVW of 73.28 kips or under
[d] Number of tires × Tire tread width (inches) × 0.65 ksi

Table 1.3 Summary of legal weight limits

State	Permit Weight Limits					
	GVW (kips)	Steering axle(kips)	Axle (kips)	Tandem (kips)	Tridem (kips)	Superload (kips)
Alabama	-	-	22	44	66	Over 250 kips
California	Depends on axle spacings					-
Florida	No tire may exceed 550 lb per inch of tire section width					Over 199 kips
Idaho	Depends on routes, axle spacings and vehicle configuration					-
Illinois	Depends on axles	20	25	44-48	60	o 29 kips oo 54 kips ooo 75 kips oooo 100 kips
Indiana	120	28	28	48	60	Over 120 kips
Louisiana	-	-	24/20[a]	48/40[b]	60	All loads over 254 kips require analysis. Loads over 232,000 off of designated highway system require analysis
Maine	-	-	-	39.1	62.1	Over 177 kips
Michigan	Depends on routes, vehicle gauge and tire sizes					-
Minnesota	Depends on axles	-	20	40/46[c]	60	-
New York	Depends on routes, axle spacings and vehicle configuration					Over 140 kips require bridge review
Ohio	120	-	29	36/50[d]	47/60[e]	Over 120 kips
Pennsylvania	-	-	27	52	63	-
South Dakota	Permits may be issued up to 1.533 times the legal bridge limit. Maximum weight on an axle is limited to 600lbs/inch tire width.					-
Texas	254.3	[f]	25	46	60	-
Virginia	-	24	24	44	-	-
Washington	-	600 lb/in. width	22	43	65	Over 200 kips
Wisconsin	-	-	20	30	81	-

[a] 24 kips for GVW of 120 kips and below and 20 kips for GVW > 120 kips
[b] 48 kips for GVW of 120 kips and below and 40 kips for GVW > 120 kips
[c] 46 kips w/bridge check
[d] 36 kips for 4' spacing and greater, 50 kips for 4' spacing
[e] 47 kips for 4' spacing and greater, 60 kips for 4' spacing
[f] Number of Tires × Tire Tread Width (inches) × 0.65 ksi

Chapter 2 Findings and Observations

Permitting Offices and Staff

As shown in Figure 2.1 and Table 2.1. 44% of all participating states have only one office handling permitting needs[8]. The remaining 56% of the states have more than one office handling permitting needs[9].

Figure 2.1 Number of offices involved in OW/OS permitting

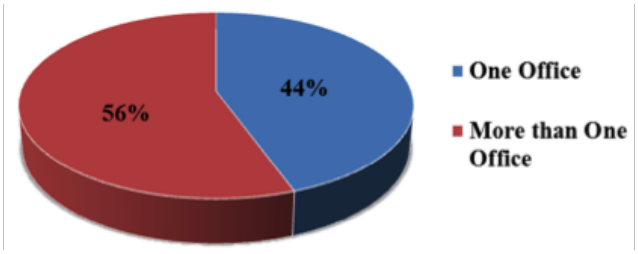

Table 2.1 Which offices and/or staffs are involved to issue the OW/OS permit?

Alabama	One permit office issues all over-dimensional permits.
California	Caltrans Permit Office issues all permits. Structure Maintenance and Investigations handles all bridge analysis when required.
Florida	Over Weight / Over Dimensional Permit Office, Office of Maintenance
Idaho	Motor Carrier Services Office, District Office, Bridge Asset Management Office
Illinois	DOT Permit Office issues the permits; Bridge Office does the bridge analysis. District Offices and the Illinois State Police Central Office may be asked to assist with the moves.
Indiana	Department of Revenue and Department of Transportation
Louisiana	Office of Transportation Permit Office, Bridge Design & Load Rating, Pavement & Geotechnical Services
Maine	Bureau of Motor Vehicle-Carrier Motor Service and DOT Bridge Maintenance Engineering Support Group
Michigan	The Permits Unit in the central office issues all permits; local offices are involved in review or approval.
Minnesota	MnDOT Permit Office for permitting and Bridge Office for bridge analysis
New York	NYSDOT Central Permit Office in Albany issues Special Hauling Permits. Nine NYSDOT regional offices issue permits as well.
Ohio	All permit issuance goes through the Special Hauling Permit Section.
Pennsylvania	Zero staff involved if auto-issued, two to three if basic routing, and 10 to if there are multiple bridge reviews in multiple districts.
South Dakota	Four ports of entry with 26 personnel at those four locations. Seven mobile crews (two-man teams); six Highway Patrol troopers are dedicated to motor carrier.
Texas	All OS/OW permits are issued by the Motor Carrier Division (MCD) of Texas Department of Motor Vehicles (TxDMV) that comprises 62 full-time employees.
Virginia	Virginia Department of Motor Vehicles (DMV) issues over-weight/over-sized permits. VDOT does all of the bridge analysis.
Washington	All region offices, Pavement Preservation, and the Northwest Region Traffic Office
Wisconsin	Both local and state officials are authorized to issue oversize/overweight truck permits.

[8] Alabama, California, Illinois, Michigan, Minnesota, Ohio, Texas, and Virginia

[9] New York, South Dakota, Florida, Idaho, Indiana, Louisiana, Maine, Pennsylvania, Washington, and Wisconsin

Annual Number of Permits Issued

As shown in Figure 2.2, the number of permits issued every year varies significantly from state to state. Table 2.2 summarizes the responses from each invited state with regard to the number of permits issued every year. In 2012, Texas issued the most permits (268,491), while Wisconsin issued the least (66,000). All of the states issued permits using different methods or types; some of the permits are routine, while some of them need special analysis. The total number for each type also varies significantly from state to state.

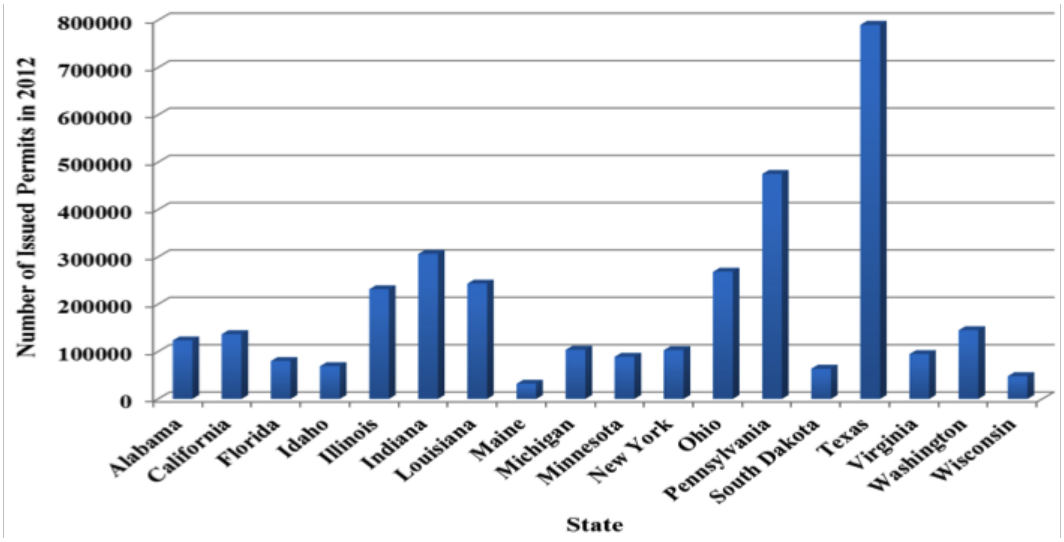

Figure 2.2 Number of permits issued in 2012

Table 2.2 How many permits do you issue every year?

Alabama	~123,500 permits per year, ALPASS Analysis – 25,000, VIRTIS Analysis – 50
California	136,679 annually; 120,664 are single trip, 15,664 are annual, 3341 are variance.
Florida	80,000 annually;, 45,000 trip permits and 55,000 annual blanket permits, 1% to 3% superloads (>300 kips)
Idaho	2012: 69,172 total permits issued
Illinois	Calendar Year (CY) 2012: 231,482; CY 2013: 212,962. 78.35% are auto-issued, while 21.65% are issued in-house.
Indiana	2012: 306,256 permits issued. 1790 superloads. 2013 so far 310,186 permits issued; 811 superloads.
Louisiana	Total = 243,553 annually. Automated = 63,680 annually. Superloads = 100 annually.
Maine	25,000 oversize and overweight permits; routine permits are about 5,000 to 7,000 per year
Michigan	2013 fiscal: 103,765, 13% of them are automated, 80% are routine, and 7% need special analysis
Minnesota	89,000 total. 15,000 permits and 62,000 moves are routine. 26,500 need special analysis
New York	The Central Permit Office (CPO) issued approximately 89,000 permits in 2012; the regional offices issued 14,000.
Ohio	268,491 in 2012. Of those, 24,525 were system-issued, 220,447 were routine issued, and 1,026 required review by the Office of Structural Engineering.
Pennsylvania	More than 475,000. 1200+ are superloads. 72% are auto-issued in seconds.
South Dakota	2010 = 54,000, 2011 = 54,400, 2012 = 63,700
Texas	790,123 in Fiscal Year (FY) 2013 and 741,079 in FY 2012. All routed permits are issued through automated system
Virginia	In 2012, 94,654 permits: 24,650 were auto-issued and 8,714 required an engineer to review them.
Washington	Approximately 145,000 permits; of these, 143,000 are routine permits. All routine permits are automated.
Wisconsin	66,000 single-trip permits; 98% of all single-trip permits are ordered online

New Changes in the OW/OS Permit Process

Figure 2.3 and Table 2.3 show that most states are in the process of adopting new changes in their permit processing, especially toward automated permitting and paperless processing. However, Indiana, South Dakota, Virginia, and Washington are not currently considering adopting new changes.

Figure 2.3 States considering or adopting new changes in their OW/OS permit process

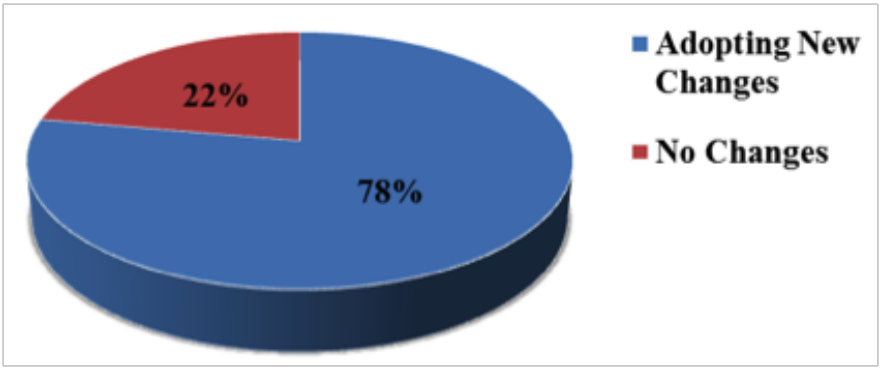

Table 2.3 Are you considering or adopting new changes in your OW/OS permit process?

Alabama	We continue to implement updates to the Bentley[10] system to include auto-issuance of permits.
California	We are considering an automated permitting system.
Florida	We are currently implementing a new automated permitting system.
Idaho	ITD is in the very beginning stages of updating its permit process.
Illinois	Yes. The Bentley bridge analysis software will be integrated into the ITAP.
Indiana	No, not at this time.
Louisiana	Yes. An RFP was issued to replace the Permits Electronic Routing Bridge Analysis (PERBA) system.
Maine	Yes. The BMV wants to implement automatic routing tools in the near future.
Michigan	Yes: automated, paperless, and review of provisions and requirements that may be outdated.
Minnesota	MnDOT has just switched to a web-based application process.
New York	We are in the process of obtaining a commercial off-the-shelf system to replace our current system.
Ohio	There are plans to convert the Ohio Permit Administration Software System OH ePASS[11] from a server-based system to a browser-based system. Additionally, we are finalizing rollout of an automated route-selection feature.
Pennsylvania	Centralizing, improving efficiency, rewriting. Automated Permit Routing/Analysis System[12] (APRAS)
South Dakota	Not aware of any changes at this time.
Texas	Texas continues to improve processes based on evolving business and industry needs.
Virginia	No, not at this time.
Washington	No changes are being considered at this time.
Wisconsin	WisDOT has already beefed up its commitment to movement of OSOW vehicles.

[10] Bridge Design and Engineering Products, Bentley Systems, Inc., http://www.bentley.com/en-US/Products/Bridge+Design+and+Engineering/

[11] OH-ePASS, Ohio Department of Transportation, https://ohpass.dot.state.oh.us/ohpass/login.asp

[12] Automated Permit Routing/Analysis System, Pennsylvania Department of Transportation, http://www.dot1.state.pa.us/apras/login.jsp

Process Tools for Screening Bridges and Issuing Permits

Table 2.4 shows that different processing tools have been used in different states. Most of the states have developed their own tools.

Table 2.4 What process tools have been developed to screen the bridges and issue permits?

Alabama	Bridge Analysis Rating System (BARS) was used prior to this year. Currently, AASHTOWare Bridge Rating (BrR) is used.
California	Permits website: www.dot.ca.gov/hq/traffops/permits/
Florida	Automated System for Approximate Bridge Evaluation (ASABE), FDOT Truck (Envelope Analysis), Inner Bridge / 88 k Permit Calculator. APASS, Maps/GIS Routing, Blanket Map Calculation via Excel Spreadsheet, Permit Application System
Idaho	Bridge screening tools.
Illinois	Routine weight permits can be verified by using Getting Around Illinois website . Bridge office has analyzed every structure using a 120,000-lb "envelope" vehicle.
Indiana	InspectTech (Bridge Data Base), DOR Permitting Program
Louisiana	All single trip permits over 254,000 lb need analysis and any over 232,000 lb if off the designated highway system. The bridges are categorized by type and condition. Analysis begins at the "worst" bridge and works up for acceptance in each category.
Maine	Google maps. Bridge handbook. Use custom in-house software (SAS) for screening superloads.
Michigan	MiTRIP is loaded with current bridge information.
Minnesota	Route Builder for issuing permits. AASHTOWare BrR/SuperLoad software is used for bridge load capacity check.
New York	NYSDOT has developed and maintains the OS/OW Prescreening Tool
Ohio	Module called "Superload" which employs the Load Analysis Rating System (LARS) database.
Pennsylvania	Evaluated by Bridge/Road Management System, Manually entered restrictions, registration, and tags
South Dakota	No longer use any tools to screen permits.
Texas	N/A
Virginia	A program that encompasses every overhead structure and every culvert/bridge within the state.
Washington	A program that calculates maximums for that configuration with weight restrictions on proposed route
Wisconsin	Single trip is based on software and database. Multi-trip is based on geometrics in the Highway Structures Information (HSI) System database.

[13] LARS Bridge, Integrated Bridge Load Rating Analysis, Modeling, and Editing, Bentley Systems Inc., http://www.bentley.com/en-US/Products/LARS+Bridge/

[14] AASHTOWare™ Bridge Rating, American Association of State Highway and Transportation Officials http://www.aashtoware.org/Bridge/Pages/Rating.aspx?PID=3

[15] Overweight and Over-Dimensional Vehicle Permit Program, Florida Department of Transportation, http://www.fdotmaint.com/

[16] Getting Around Illinois, Illinois Department of Transportation, http://www.gettingaroundillinois.com/

[17] InspectTech, http://www.inspecttech.com/casestudies.asp

[18] MiTRIP (Michigan Transportation Routing and Internet Permitting), Michigan Department of Transportation, http://www.michigan.gov/mdot/0,4616,7-151-9625_56949-253714--,00.html

[19] LARS Bridge, Integrated Bridge Load Rating Analysis, Modeling, and Editing, Bentley Systems Inc., http://www.bentley.com/en-US/Products/LARS+Bridge/

Definition of Superload

Figure 2.4 and Table 2.5 show a summary of the definition of superload, which is not the same for different states; some of the states (i.e., Idaho, South Dakota, and Wisconsin) do not use this term. For the states that use the term superload, the definition can be based on the dimensions only (e.g., Michigan) or the weight only (e.g., Florida), or a combination of both the dimensions and the gross vehicle weight (e.g., New York).

Figure 2.4 How do you define superload in comparison with other permit loads?

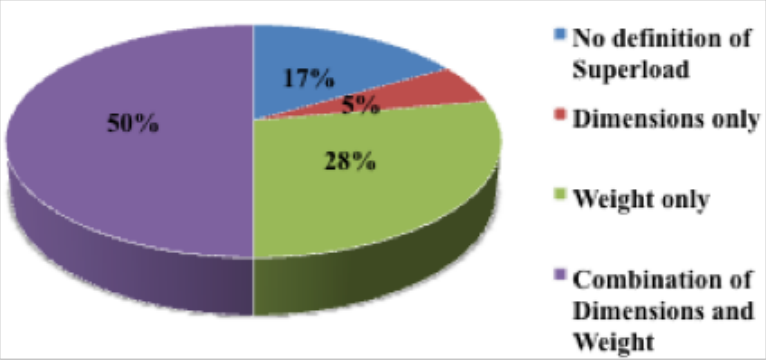

Table 2.5 Definition of superload in comparison with other permit loads

Alabama	Weight over 250,000 lb, height over 16 ft, length over 150 ft, width over 16 ft
California	> 135 ft in length, >=13 axles, >9 axles and a "bridge" > 40', double wide, exceed permit rating/weight chart
Florida	>300 k in GVW
Idaho	ITD does not use the term superload.
Illinois	Typically, loads over 120 kips are evaluated by the Bridge Office.
Indiana	For INDOT and the Indiana Department of Revenue, a superload is any permitted load weighing 200,000 lb or more.
Louisiana	Loads that exceed 232,000 off designated highways and all loads over 254,000 lb.
Maine	Loads that exceed the weight chart and all loads over 177,000 lb
Michigan	A vehicle exceeds 16 ft in width, 15 ft in loaded height, and/or 150 ft in overall length
Minnesota	Heavier or spacing tighter than standard permit trucks; non-standard gauge axle width; dual-lane truck.
New York	At or exceeding 200,000 lb gross vehicle weight; 16'1 wide. 16' high, and 160' long
Ohio	GVW that exceeds 120,000 lb, an overall width > 14 ft, and an overall height above 14'6"
Pennsylvania	Over 201 kips, 16' wide or 160' long. All are manual reviewed and must be escorted by the State Police.
South Dakota	We have no need for a superload definition.
Texas	254.3 kips GVW, or 200 kips but < 95' in length, or maximum allowable weight per axle
Virginia	Superloads exceed the weight chart and 15'0" high, 15'0" wide, and 150'0" long
Washington	Loads exceeding 200,000 lb and/or a vehicle with any 8-tire axles
Wisconsin	We don't have a specific "superload" definition.

Number of Revisions Allowed for Permit Application

Figure 2.5 and Table 2.6 show a summary of the number of revisions allowed for permit applications. Obviously, this varies from state to state. A number of states allow unlimited revisions until the permit is issued (e.g., Alabama) while other states only allow a limited number of revisions (e.g., Illinois). Moreover, 33% of the participating states do not allow revisions on the permit once it is issued (e.g., Wisconsin). The AASHTO Subcommittee on Highway Transport[20] is looking into harmonizing permit revisions.

Figure 2.5 How many revisions are allowed for permit application?

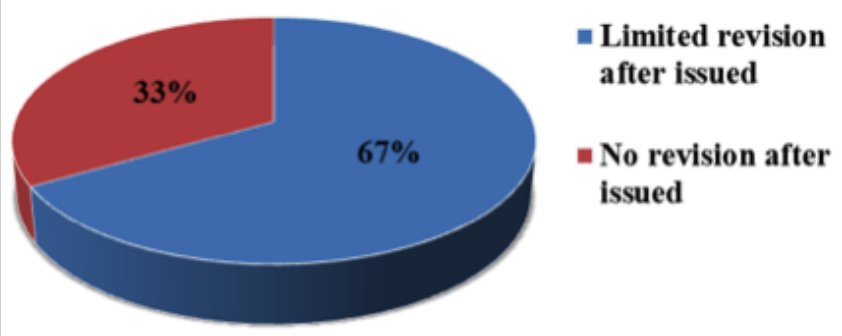

Table 2.6 How many revisions are allowed for permit application?

Alabama	Unlimited revisions until permit is issued.
California	Unlimited revisions before a permit is issued.
Florida	—
Idaho	Essentially unlimited revisions are allowed. Consultant analysis (paid by hauler) might be needed
Illinois	One revision is allowed per permit. One extension is allowed per permit.
Indiana	Up to two revisions for trip permits. A customer can apply for a permit as many times until it is correct.
Louisiana	Unlimited revisions during process to find a configuration and route that will work. Case-by-case basis after permit is issued. No changes allowed for automated permits.
Maine	No limit on the number of revisions and no extra fees for analysis.
Michigan	Unlimited prior to submittal. Permits have to be paid for before they are submitted to the permit unit.
Minnesota	Usually only one is allowed
New York	Revision is permitted if the application was rejected for various reasons
Ohio	The route, vehicle, and load description can each be revised one time, with a fee for each revision.
Pennsylvania	No “revisions” on non-superload permits. Superload allows edits as part of the original application.
South Dakota	Before the permit is issued we can run an unlimited number of trials. After the permit is issued we can amend the permit once at no cost. If any changes are needed after that, they must purchase a new permit.
Texas	MCD will allow an unlimited amount of revisions to the route before the permit is issued.
Virginia	No restriction on the number of revisions, but the carrier must repay for the permit.
Washington	Once a permit is issued, there are no revisions. No limit on permit requests.
Wisconsin	Once the permit has been issued, no revision of the route is allowed.

[20] AASHTO Subcommittee on Highway Transport, http://highwaytransport.transportation.org/Pages/default.aspx

Permit Fee Structure

Table 2.7 shows a summary of the permit fee structure, which also varies significantly from state to state. Most of the states established the fee structure based on permit type, trip type, and/or weight limit. Some states charge a fee for bridge analysis (e.g., Texas and Louisiana) while others states do not (e.g., Michigan, Minnesota, South Dakota, Virginia, and Washington).

Table 2.7 What is your permit fee structure? What is your fee for bridge analysis?

Alabama	Depends on weight: 80,000 – 100,000 lb = $10; 100,001–125,000 lb = $30; 125,001–150,000 lb = $60; 150,001 and over = $100; 250,001 lb and over will also be charged an hourly engineering rate for superload analysis
California	Permit fee is charged based on trip types and load limits. $90 for an annual permit and $16 for single trip permit.
Florida	Permit fee is charged based on permit types, over-dimension or overweight.
Idaho	Administrative fee plus road use fee is total permit fee.
Illinois	Routine weight and over-dimension are based on chart from the Illinois Vehicle Code. Superload is based on the formula.
Indiana	Fees charged based on permit type and trip type (p. 27 of the Indiana Over Size Over Weight Handbook[21])
Louisiana	Permit fee charged based on ton-mile, weight, and structure type, plus a fee for structural evaluation.
Maine	Fees charged based on weight of the vehicle
Michigan	Permit fee can be charged on single trip or monthly basis. No fees charged for detailed analysis.
Minnesota	Fee is based on weight only. No extra fee for detailed analysis.
New York	A flat $40 fee is charged for all trip permits.
Ohio	Case by case
Pennsylvania	$26 for loads 14’ wide or less, $51 for loads over 14’ +$0.03 per ton/mile. Annual permits based on legislation.
South Dakota	Single-trip O/S O/W permits cost $25. O/W permits are charged an additional fee when they exceed the statutory limit. That fee is calculated at $0.02 × miles traveled × tons over the statutory limit. There are no fees for a detailed analysis.
Texas	Cost for permit depends on weight; additional fees may be charged for bridge and pavement analysis.
Virginia	The cost of the permit depends on number of trips (multiple or single), exemption status, (nonexempt or exempt), and weight. No additional fees for analysis.
Washington	No additional fee for detailed analysis. Permit fee is calculated as per mile for different weight groups.
Wisconsin	Our permit fee structure is set in Wisconsin statute 348.25[22] and specified subsections in 348.27(8)[23].

Weigh-in-Motion (WIM) for Quality Control

Table 2.8 shows that all of the participating states use WIM systems. Some states use WIM for screening and verification purposes only, not for quality control (e.g., Alabama, Michigan, Minnesota, Ohio) while others do not use WIM for screening or for quality control (e.g., California, Idaho, Maine, South Dakota). New York’s WIM system can verify weights for Special Hauling Permits.

21 Oversize Overweight Vehicle Permitting Handbook, Indiana Department of Revenue, http://www.in.gov/dor/files/osowhandbook.pdf

22 Permits, 348.25 General provisions relating to permits for vehicles and loads of excessive size and weight, https://docs.legis.wisconsin.gov/1997/statutes/statutes/348/25/8

23 Permits, 348.27 Annual, consecutive month or multiple trip permits, http://docs.legis.wisconsin.gov/statutes/statutes/348/IV/27

Table 2.8 Do you use WIM or other methods to ensure quality control?

Alabama	Use WIM as an enforcement tool, not as QC.
California	Have several WIM systems in operation. Not used for enforcement or QC at this time.
Florida	Have several WIM systems in operation.
Idaho	WIM data is not used for enforcement or QC of permit vehicles in Idaho.
Illinois	It is up to the customer to enter the correct information and law enforcement to verify it when the customer is stopped.
Indiana	No, this is not done on a regular basis. Indiana does have some WIM in the state, but it is the customer's responsibility to enter the correct information on the permit request and enforcement to verify it when the customer is stopped.
Louisiana	There are several WIM sites to monitor loads, verify loads, and monitor a structure's health. Several sites were installed as a direct result of requested superload permits.
Maine	We have several WIM systems in operation. They are not used for enforcement or QC at this time.
Michigan	Policing agencies do the enforcement. The State Police use WIM.
Minnesota	WIM is only used for monitoring enforcement.
New York	WIM sites can verify weights for Special Hauling Permits.
Ohio	No WIM is used for verification. ODOT relies on law enforcement to check permitted vehicles.
Pennsylvania	Improving current network and reviewing current practices. WIMs are used primarily for data gathering.
South Dakota	At our ports of entry we use platform scales to check weights; our mobile crews and troopers use Haenni wheel load scales. Axle spacing and tire size are checked individually. There are WIM systems at three of our ports, but they are not used for any enforcement action.
Texas	WIM technology has not been used much for OS/OW loads.
Virginia	We are using WIM technology, but not as a quality control resource.
Washington	CVISN[24] WIM technology is used for weigh station bypass in Washington, but not for quality control.
Wisconsin	Weight stations, WIM, Virtual Scales[25], PrePass[26]

Allowing Permitted Vehicles to Leave the Designated Route

Figure 2.6 and Table 2.9 show that for half of the participating states, permitted vehicles are not allowed to leave the designated route. For those that do allow a vehicle to leave the permitted route, the distance the vehicle may travel is less than 1 mile, and then it is limited to fuel/food only.

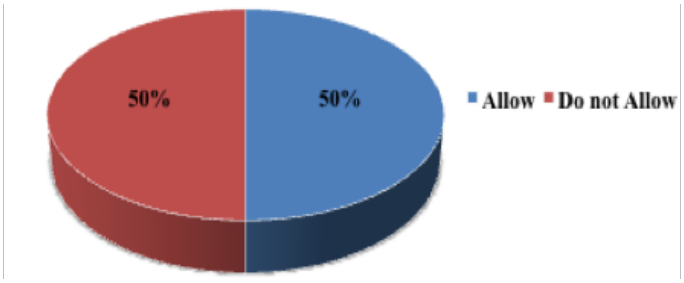

Figure 2.6 Do you allow permitted vehicles to leave the designated route?

[24] Commercial Vehicle Information Systems and Networks (CVISN), Federal Motor Carrier Safety Administration, http://www.fmcsa.dot.gov/commercial-vehicle-information-systems-and-networks-cvisn

[25] A virtual scale is a type of WIM system. An example can be found at this website: http://www.intercompcompany.com/virtual-scales-p-51-l-en.html

[26] PrePass, http://www.prepass.com/aboutus/Pages/AboutUs.aspx

Table 2.9 Do you allow permitted vehicles to leave the designated route?

Alabama	Only with permission. We will amend the permit if the load passes bridge analysis.
California	No.
Florida	—
Idaho	All permitted vehicles have 1 mile access for food, lodging, fuel, pick up, and drop off.
Illinois	Allowed 1 mile off a state route; however, they are not allowed to cross any structures so no bridge analysis is needed.
Indiana	No, not without permission. Normally it is only during an emergency shutdown of the highway; they must contact our office first before taking a detour.
Louisiana	Can leave designated route for food, fuel, and lodging. Otherwise a permit is needed if a load leaves the designated route, and a request is sent to Bridge Design for analysis.
Maine	No. Very rarely BMV gets a call during actual moves if problems arise.
Michigan	Only for fuel and lodging adjacent to the route.
Minnesota	No, even annual permit holders have to do a trip log for every move.
New York	A new permit must be obtained if leaving original route of travel.
Ohio	No, vehicles cannot leave the permitted route. Requests for stops may be included on the permit.
Pennsylvania	Permitted vehicles must have all routes approved.
South Dakota	Permit vehicles do leave the designated route for logistical reasons (e.g., fueling or stopping for the night), but we do not analyze those particular bridges at this time.
Texas	Permitted vehicles must follow the designated route. Loads off route can be cited by law enforcement.
Virginia	No.
Washington	Loads can leave designated route only for fuel/food stops adjacent to route.
Wisconsin	N/A

Bridge Analysis Methods

Figure 2.7 and Table 2.10 show a summary of the method that different states use for bridge analysis or load rating. Of the participating states, 44%[27] predominantly or exclusively use load factor rating (LFR), while 56%[28] also use other methods, such as LRFR and allowable stress rating (ASR).

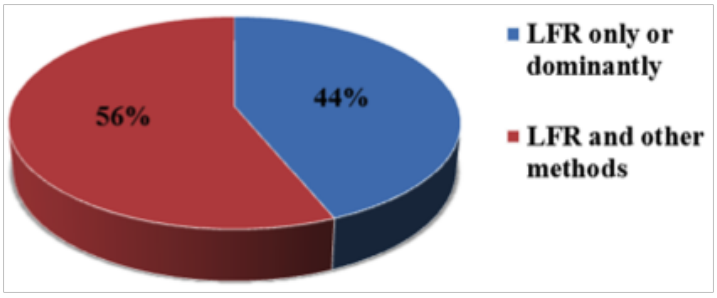

Figure 2.7 Which method do you use for the bridge analysis for OW/OS vehicles?

[27] Alabama, Idaho, Illinois, Maine, Ohio, South Dakota, and Wisconsin

[28] Indiana, Louisiana, Michigan, Minnesota, New York, Pennsylvania, Texas, Virginia, and Washington

Table 2.10 Which method do you use for the bridge analysis for OW/OS vehicles?

Alabama	AASHTO LFR method
California	LFR or LRFR used to analyze bridges when bridge analysis is required. In addition, both LFR and LRFR are used for initial bridge rating screening tool.
Florida	—
Idaho	AASHTO LFR for everything that is not timber (no timber on state system)
Illinois	Typically AASHTO LFR, although ASR has been used for allowable stress design (ASD)-designed structures
Indiana	LRFR for current bridges, LFR for bridges designed using LFD and older bridges designed with ASR
Louisiana	AASHTO LRFR, ASR, and LFR
Maine	AASHTO LFR
Michigan	Based on the design/existing rating method of the bridge. In general, LRFR and LFR are used.
Minnesota	AASHTO LRFR, AAHSTO ASR, AASHTO LFR
New York	Load effect method
Ohio	AASHTO LFR by default; on some of the newer bridges we also use AASHTO LRFR.
Pennsylvania	Automated Bridge Analysis System (ABAS) uses allowable stress and load factor; willing to accept other methods
South Dakota	AASHTO LFR
Texas	Texas allows the use of all of these methods, but is moving toward AASHTO LRFR.
Virginia	Ratings are performed under AASHTO ASR, LFR, or LRFR and are included in the bridge inventory record.
Washington	All methods are used. Method is selected based on structure types.
Wisconsin	AASHTO LFR typically; occasionally LRFR

Speed and Traffic Restriction on Permits

Table 2.11 shows that most states use speed and traffic restriction on permits. Some of the states occupy two lanes and/or speed limits for superloads (e.g. Minnesota) while some of the states even have more severe restrictions. For instance, Maine restricted the speed to 5 mph and only allows one vehicle along centerline of the bridge for severe conditions

Table 2.11 Speed and traffic restrictions on permits

Alabama	Travel is allowed daylight hours only on routine issued permits. All superloads require nighttime movement
California	Speed restriction (5 mph), specified location of truck on bridge (typically centerline), no other vehicles allowed on bridge; these restrictions used as required
Florida	—
Idaho	Speed reduction is required if a reduction in impact is required to make the analysis acceptable.
Illinois	Reduced speed, crawl speed, and/or single lane
Indiana	This is based on results of rating and permit analysis on a case-by-case basis for critical bridges.
Louisiana	Lane restrictions, speed restrictions, stopping and starting on the bridge restrictions, and traffic restrictions
Maine	Severe: 5 mph, one vehicle along centerline of bridge; less restrictive: 5 mph and no vehicles within 100 yd
Michigan	These provisions are based on width, height, and overall length
Minnesota	Yes, two restrictions: occupy two lanes or speed of 10 mph or less
New York	For trip permits, speed restriction on some bridges may be required to reduce the load effect to acceptable levels.
Ohio	Yes, we apply speed and traffic restrictions on superloads .
Pennsylvania	N/A
South Dakota	When necessary, 5 mph and centerline of bridge travel way
Texas	Reduced dynamic load allowance with reduced speed; traffic restrictions are used for superload permits
Virginia	N/A
Washington	Placed lane and speed restrictions or no other trucks on bridges in some instances
Wisconsin	Speed restrictions not to exceed 5 mph are used when the bridge can carry load without live load impact.

Modifications to the AASHTO Method

As shown in Figure 2.8 and Table 2.12, 43%[29] of participating states have no modification to the AASHTO load rating method, while 57%[30] of participating states have modification to the method.

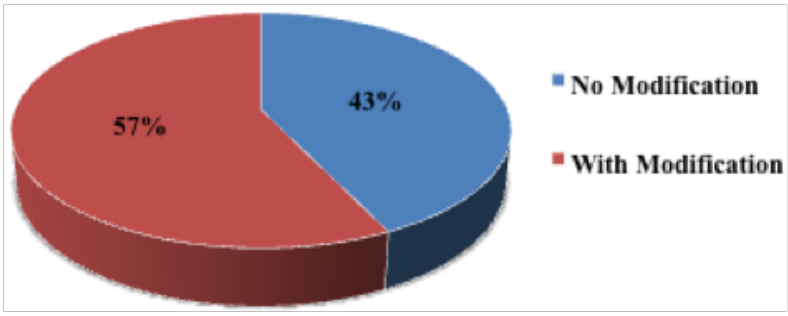

Figure 2.8 Do you have any modification to the AASHTO method?

[29] Alabama, Illinois, Indiana, Maine, South Dakota, and Wisconsin

[30] California Idaho, Louisiana, Michigan, New York, Virginia, and Washington

Table 2.12 Do you have any modification to the AASHTO method or to the method you use[31]?

Alabama	No.
California	AASHTO methods are used with California Amendments.
Florida	—
Idaho	For overweight vehicles, the impact factor is reduced and the distribution factors are adjusted if speed is reduced.
Illinois	No.
Indiana	No modifications. AASHTO methods are used.
Louisiana	Modifications can be made due to complexity of structure.
Maine	No.
Michigan	Based on WIM data in Michigan, the live load factors used for permit vehicles have been modified.
Minnesota	All overweight load analysis is at the operating level.
New York	Yes. We apply a multiple presence reduction factor (F = 8.0/width) not to exceed 85%.
Ohio	None.
Pennsylvania	No comment.
South Dakota	No modifications.
Texas	No comment.
Virginia	If in-depth analyses are required, we use smaller distribution factors and lower dynamic amplification factors.
Washington	We use 10% impact for all span lengths unless there are issues with the approaches or deck surface.
Wisconsin	No.

Dynamic Impact Factor

Table 2.13 shows that all of the states, with the exception of Indiana, would reduce the impact factor if speed restrictions were also applied. However, the degree of reduction on impact factor varies from state to state. Idaho allows the impact to be reduced to 10% if a speed reduction is specified, while some states (e.g., Maine) reduce the impact factor to 0% when the speed is lowered.

[31] See Table 2.10.

Table 2.13 Do you have any modifications to dynamic amplification factor for the load rating?

Alabama	Yes, the impact factor may be dropped to 0.0.
California	Impact included in all load ratings. Impact may be reduced for permitting reasons on a case-by-case basis with the previously mentioned travel restrictions.
Florida	—
Idaho	ITD allows impact to be reduced to 10% if a speed reduction is specified.
Illinois	Yes: reduced speed (10%) and crawl speed (0%)
Indiana	No modifications to Dynamic Load Factor (DLF) usually.
Louisiana	N/A
Maine	No impact, when down to 5 mph
Michigan	Escorted vehicles that travel at < 5 mph may be analyzed neglecting impact.
Minnesota	Reduced impact is used if a restriction of driving 10 mph or less is added to the permit.
New York	Yes. For trip permits where speed restriction has been prescribed, the analysis assumes the dynamic amplification factor (DAF) = 0.
Ohio	For the routine load rating, modify DLF. For superloads, adjust speed of the isolated vehicle and DLF.
Pennsylvania	N/A
South Dakota	No modifications. We will reduce speed to 5 mph and use less impact, but never < 10%
Texas	See Table 2.11.
Virginia	For permit vehicles that require an in-depth analysis, DLF is set to 0.0.
Washington	See Table 2.12.
Wisconsin	If a load exceeds capacity, we check it with DLF removed. If it then passes, we restrict speed to 5 mph.

One-Lane or Multiple-Lane Loading for Load Rating

Table 2.14 shows that most of the states use both one-lane or multiple-lane loading, depending on the permit type (e.g., Washington) or rating methods (e.g., Michigan). Wisconsin only uses one-lane loading for load rating for superloads.

Table 2.14 When performing load rating, do you use one-lane or multiple-lane loading?

Alabama	Rating is done as multilane based on live load distribution factors specified in the AASHTO Manual
California	Multiple lanes unless the bridge is < 18 feet wide
Florida	—
Idaho	All load ratings use multilane loading unless the roadway width is < 20 feet from curb to curb.
Illinois	Both.
Indiana	Both. Multiple lane loadings are used while using LRFR.
Louisiana	We step through the process with tightest parameters set and become less conservative as we analyze.
Maine	The superload plus a lane load is applied.
Michigan	Single lane for LFR. Multiple lanes for LRFR.
Minnesota	Multiple-lane loading is used first. When it doesn't work, one-lane loading will be used with restriction.
New York	Based on AASHTO LRFR
Ohio	We use multiple-lane loading for routine and permit load rating. Superloads may use one-lane loading.
Pennsylvania	One lane or multiple lane; multiple lane loading as first check, if necessary, one truck at a time is used
South Dakota	Yes, first pass will be normal live load distribution. Second pass will include single lane live load distribution.
Texas	For normal bridge load, we use multiple lanes. For super heavy permits, we use just one lane loaded.
Virginia	Generally one lane unless the vehicle is wide enough to consider multiple lanes.
Washington	One lane for typical permits; multiple lanes for dual lane configurations
Wisconsin	One lane.

Load Rating Level for Acceptance Criteria

Figure 2.9 and Table 2.15 show that 83% of the participating states use the operating level as acceptance criteria, except Maine (usually the inventory level) and Texas (does not use a load rating level when considering a superload).

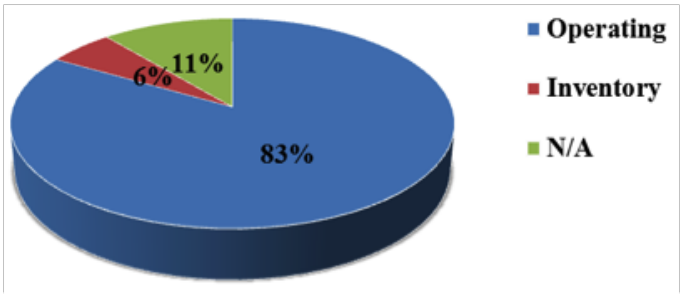

Figure 2.9 Which load rating levels are used as acceptance criteria for issuing OW/OS permit?

Table 2.15 Which load rating levels are used as acceptance criteria for issuing OW/OS permit?

Alabama	Operating
California	Operating
Florida	Operating
Idaho	Operating
Illinois	Operating
Indiana	Operating
Louisiana	Operating
Maine	Inventory, except when operator has very high confidence with the vehicle weights; then we use up to the operating load limit.
Michigan	Operating
Minnesota	Operating
New York	Operating
Ohio	Operating
Pennsylvania	N/A
South Dakota	Operating
Texas	We do not use a load rating level when considering a superload permit.
Virginia	Operating
Washington	Operating for LFR and ASR
Wisconsin	Operating

Refined analysis for OS/OW Rating

Table 2.16 shows that most of the states use refined analysis for certain conditions. For example, Maine uses refined analysis when a bridge is in a poor condition and no other routes are available. It also shows that AASHTOWare BrR is the most popular software for refined analysis.

Table 2.16 Do you use refined analysis when you conduct load rating for OW/OS?

Alabama	Yes. AASHTOWare BrR
California	Yes. AASHTOWare BrR
Florida	
Idaho	Yes. AASHTOWare BrR
Illinois	Yes. AASHTOWare BrR
Indiana	AASHTO standard analysis is usually used. Refined analysis is only done when the condition of the bridge is poor and no other routes are available.
Louisiana	Yes, as a fourth-level line of analysis. STAAD[32] or hand calculations.
Maine	Refined analysis is only done when the condition of the bridge is poor and no other routes are available.
Michigan	AASHTOWare BrR. We also use consultants, who may use STAAD or LUSAS[33].
Minnesota	For all bridge types that AASHTOWare BrR can handle, no refined analysis. For curved steel bridge, MDX[34] is used.
New York	Yes. For some special cases where the load effect is extremely high, or the hauler is higher, a New York State professional engineer will do refined analysis.
Ohio	We do not do 3-D finite element analysis except in very special cases. We use MDX and LARSA[35] 4 D programs for special structures.
Pennsylvania	N/A
South Dakota	Yes, AASHTOWare BrR.
Texas	Analysis method and software choice is left to the engineer's discretion.
Virginia	See Table 2.17.
Washington	No refined analysis.
Wisconsin	Typically, refined analysis is not performed; however, we have used AASHTOWare BrR on some occasions.

Computer Software for OS/OW Rating

Table 2.17 shows that while most of the states use AASHTOWare BrR for OS/OW rating, some (e.g., Maine and Virginia) use in-house software.

[32] STAAD.Pro V8i, Bentley Systems Inc., http://www.bentley.com/en-US/Products/STAAD.Pro/

[33] LUSAS engineering analysis software, http://www.lusas.com/

[34] MDX Software, Inc., http://www.mdxsoftware.com/

[35] LARSA, Inc., http://www.larsa4d.com/

Table 2.17 Do you use computer software for OW/OS rating?

Alabama	AASHTOWare BrR
California	AASHTOWare BrR is the most commonly used tool. We also use MIDAS[36], CTBridge[37], and LEAP[38] products.
Florida	—
Idaho	BARS, AASHTOWare BrR, MDX, and LEAP CONBOX[39]
Illinois	Bentley LARS and AASHTOWare BrR
Indiana	Yes, we use AASHTOWARE BrR.
Louisiana	AASHTOWare BrR, STADD[40], in-house software
Maine	Customized in-house software (SAS). Refined analysis: STAAD, MERLIN-DASH[41], LEAP software
Michigan	In general, AASHTOWare BrR.
Minnesota	AASHOTOWare BrR and MDX
New York	No, currently we don't rate for overweight vehicles.
Ohio	Bentley SUPERLOAD[42] system; AASHTOWare BrR.
Pennsylvania	N/A
South Dakota	Yes. Bentley Superload and LARS as part of the South Dakota Automated Permitting System[43].
Texas	See Table 2.16.
Virginia	In-house developed Excel spreadsheets, AASHTOWare Bridge Rating, and DESCUS[44]
Washington	Yes, bridge (in-house software) for steel and concrete structures using the LFR; spreadsheet for timber stringers
Wisconsin	SIMON[45] for steel girders, WisDOT-developed software for reinforced-concrete slab, prestressed deck girders, and steel trusses.

Joint Committee for Better Uniformity

Table 2.18 shows that nearly all of the states already are or are willing to be members of a committee for improving permitting uniformity, except Maine.

36 MIDAS Engineering Software, MIDAS Information Technology Co., Ltd., http://en.midasuser.com/

37 CTBridge™ software, Office of Special Funded Projects, California Department of Transportation, http://www.dot.ca.gov/hq/esc/osfp/ctbridge/ctbridge.html

38 LEAP Bridge Enterprise V8i, Bentley Systems Inc., http://www.bentley.com/en-US/Products/Bentley+LEAP+Bridge/

39 LEAP CONBOX, LEAP Enterprise V8i, Bentley Systems Inc., http://www.bentley.com/en-US/Products/Bentley+LEAP+Bridge/Bentley-CONBOX.htm

40 STAAD.beava, STAAD.Pro V8i, Bentley Systems Inc., http://www.bentley.com/en-US/Products/STAAD.Pro/STAAD-beava.htm

41 MERLIN-DASH (New Interface), Bridge Engineering Software Technology Center, University of Maryland, http://best.umd.edu/software/merlin-dash/

42 SUPERLOAD, Bentley Systems Inc., http://www.bentley.com/en-US/Products/SUPERLOAD/

43 South Dakota Online Automated Permits, South Dakota Department of Transportation, https://apps.sd.gov/applications/hy30commpermit/

44 DESCUS I and DESCUS II, Engineering Software Technology Center, University of Maryland, http://best.umd.edu/software/descus-i/ and http://best.umd.edu/software/descus-ii/index.html

45 LRFD SIMON, National Steel Bridge Alliance, American Institute of Steel Construction, https://aisc.org/contentnsba.aspx?id=33130

Table 2.18 Are you a member of or would you be willing to be a member of a committee for improving regional or national uniformity in OW/OS permitting?

Alabama	Happy to be a member of any committee that promotes harmonization between states and regions
California	Yes.
Florida	—
Idaho	Member of AASHTO, WASHTO, and Northwest Passage Permitting Project Phase I, II and III
Illinois	Yes.
Indiana	Not a member, but willing
Louisiana	Not a member, but willing
Maine	No.
Michigan	Member of the Mid America Association of State Transportation Officials[46] (MAASTO)
Minnesota	Yes.
New York	Yes. NYSDOT is represented on the Northeast Association of State Transportation Officials[47] (NASTO) OS/OW subcommittee.
Ohio	Member of MAASTO and the Multi-State Permit Group of the Southeastern Association of State Highway Transportation Officials[48] (SASHTO).
Pennsylvania	AASHTO, NASTO, I-95 Corridor Coalition[49], Specialized Carriers & Rigging Association
South Dakota	South Dakota did participate in a Northwest Passage effort to try to harmonize. I would anticipate that it would participate in additional efforts.
Texas	WASHTO Committee, AASHTO Standing Committee, and the Western Regional Permitting Agreement[50]
Virginia	Yes. Member of SASHTO
Washington	WASHTO Committee, WASHTO Western Regional Permit Agreement
Wisconsin	I would be willing to be a member of a committee.

46 Mid America Association of State Transportation Officials, http://www.maasto.net/

47 Northeast Association of State Transportation Officials, http://nasto.org/

48 Southeastern Association of State Transportation Officials, http://www.sashto.org/

49 I-95 Corridor Coalition, http://www.i95coalition.org/i95/Default.aspx

50 Obtainment of Western Regional Overweight/Oversize Single Trip Permits, http://www.itd.idaho.gov/dmv/poe/WesternRegionalPermitInfo.htm

Hands-On Analysis/Review for Permits

As shown in Figure 2.10 and Table 2.19, 53%[51] of the participating states have less than 5% of single-trip permits that requires a hands-on analysis/review of a structural engineer. Of the remaining 47%[52], more than 5% of their single-trip permits require a hands-on analysis/review.

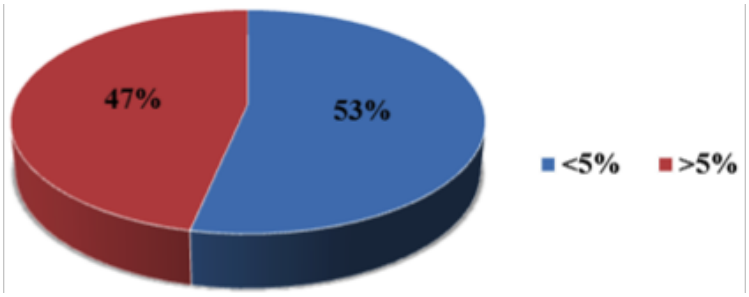

Figure 2.10 What percentage of single-trip permits requires hands-on analysis/ review by a structural engineer?

Table 2.19 What percentage of single-trip permits requires hands-on analysis/ review by a structural engineer?

Alabama	< 1%
California	Approximately 1%
Florida	—
Idaho	15%
Illinois	2.43% of superload permits need hands-on analysis/review by a structural engineer.
Indiana	Approximately 1%
Louisiana	All loads over 232,000 pounds up to 254,000 pounds off of designated highways and all loads over 254,000 pounds
Maine	An engineer reviews all superloads unless it is an identical load that has already been reviewed.
Michigan	10%
Minnesota	About 20% to 30% roughly
New York	16% for 2012
Ohio	Approximately 1%
Pennsylvania	15% to 20% require manual review by engineer
South Dakota	0.03%
Texas	Approximately 1% of overall permits require a hand on analysis/review by a structural engineer.
Virginia	9%
Washington	1.4%
Wisconsin	0.6% (290)

[51] Alabama, California, Illinois, Indiana, Ohio, South Dakota, Washington, and Wisconsin

[52] Idaho, Michigan, Minnesota, New York, Pennsylvania, Texas, and Virginia

Chapter 3 Practices from DOTs

The following practices from various DOTs are outlined and summarized below for future consideration:

- Many states consider superload weight threshold, but there is no one single definition for superload.
- Many states weigh loads over a certain threshold, and some inspect those loads, which reduces the uncertainty in the loads and live load factor. Many states have an automated system for issuing permits.
- Automation requires reliable and verified bridge information.
- Some states have automation, and many have an auto-issue percentage greater than 50%. Need to find out what is needed for each state to design or subcontract a system that will auto-issue a minimum of 50% of the permits.

Other selected DOT practices include the following:

- Texas – For very high load effects, require heavy haulers to hire consultants for superload analysis.
- Florida – The customer is responsible for horizontal and vertical clearance checks.
- Indiana – Loads of 200,000 lb or more and/or over 17 feet wide require police escort.
- Maine – Use a modified HL-93 load where the truck portion is increased by 25%.
- Michigan – Use HL-93[53] modified for design by applying a multiplier of 1.25.
- Pennsylvania – The PennDOT Public Private Partnership[54] (P3) Office will fund the automated permitting system.
- Virginia – If consultants are hired for complex bridges because of specific knowledge, have them run several large weight permit trucks nationally for future comparisons.
- Washington – Develop state-of-the-art GIS mapping for route finding, and offer training on permit policies and statutes to State Police and others

[53] AASHTO HL-93 Loading Highway Design, http://www.aboutcivil.org/aashto-hl-93-loading-design.html

[54] PennDOT Public Private Partnerships Office, http://www.dot.state.pa.us/Internet/P3info.nsf/P3Home?OpenFrameset

Chapter 4 Recommended Next Steps

Based on the investigations during the scan and discussions during the workshop, the following recommendations are summarized for future consideration.

Harmonization

- Collect data nationally to support enforcement efforts and ensure violators and haulers submit accurate permits.
- Develop a national permit map or corridors through different states with industry participation.
- Develop a national or regional standard permit vehicle.
- Have more cross-cultural meetings and regional collaboration for routine and annual permits to ensure harmonization (e.g., need hauler input regarding current fleet, challenges, future fleet, and regionalization or corridors).
- Connect with and help local jurisdictions when they write permits and make sure that they understand the rating levels and permitting process.

Future Research

- Confirm the assumptions made regarding self-propelled cranes, self-propelled well servicing units, platform trailers, and loading mechanisms and their effects on bridge elements (e.g., self-leveling suspension) and ensure equal axle distribution and axle suspension capacity.
- Use advanced technology to verify bridge information and data collected. Funding is needed to ensure the use of this advanced technology.
- Ensure that the AASHTO MBE incorporates bridge analysis (which is required for superload permitting) into the standard practice and provides guidance for different levels of analysis and different screening techniques.
- Establish a list of the top five steps or items for determining the best approach in handling one-million-pound loads or superloads.

Automation and Routing Process

- Establish minimum system/process requirements to assist the entire nation; however, it might be easier to come up with a system for different classes of loads.
- Work collectively with AASHTO to use automation for permitting.
- Since the frequency and weight of loads exceeding 300,000 pounds and mega-loads continue to increase, it is suggested that a definition for superloads be created to facilitate permitting.
- Investigate funding options to facilitate automation.
- Ensure that these key elements, which are based on Florida's and South Dakota's successes, are part of automated permitting:

  - Central database
  - Data entry and verification interface (graphical user interface)
  - Routing system module with geographical database that contains the network and detailed link information (e.g., roadway and bridge widths, clearances, and other information that would affect the routing decisions)
  - Bridge structural analysis module with an application program interface
  - Payment and billing system with user interface
- A more detailed recommendation on how individual states can develop their own automation process is provided in Appendix H.

Safety

- Establish route survey.
- Perform vehicle inspection.
- Verify vehicle weight.
- Confirm authenticity of submitted information.
- Require submittal of detailed shop drawings of the hauled weight.
- Perform pre- and post-move survey to establish what kind of damage the move could have or did cause.
- Educate and train local jurisdictions and bridge owners about the level of analysis required to ensure bridge safety.
- Develop and mandate operator training and certification for handling the trailer's loading and leveling system.
- Require and certify escort services, including training them on specialized equipment.

AASHTO

- Submit a proposal that the AASHTOWare contractor create capacity tables using influence lines.
- Create a permit module that incorporates a bridge analysis module as well as a geographic information system-based routing module to help with the automation of permit processes.

Future Trends

- Geofencing
- Applying advanced technology for route tracking (e.g., radio-frequency identification and tolling transponders)
- Virtual routes
- Crowdsourcing
- WIM for enforcement of permit weights and routes

- Working with the trucking industry and fabricators/designers of exceptional superloads to standardize permit trucks and consider how loads will be hauled.
- Check using closely-spaced wheels to emulate lane loading.
- Establish criteria for enhancing the experience of hauling companies.

Chapter 5 Implementation Plan

During the scan, a detailed implementation plan was developed to help encourage the implementation and dissemination of the scan's findings and recommendations in the industry.

Software Development and Research Proposal

The scan team's top-priority implementation activity is to provide AASHTOWare update suggestions to AASHTO and develop and submit research proposals to AASHTO committees. The team plans to present the scan findings to the AASHTOWare Bridge Management Task Force and help update the superload module for the AASHTOWare BrR analytical software.

The team will develop research proposals for permit truck for design and permit truck for evaluation and submit them to AASHTO SCOBS T5[55] and AASHTO SCOBS T18[56], respectively, for further research.

Presentations

The scan team will take opportunities to present the scan findings and promote the recommendations during meetings and conferences. Sharing the scan results within the team members' home agencies and the host agencies is a practical way to spread the word. Committee meetings, subcommittee meetings, and sessions sponsored by the Transportation Research Board[57] (TRB) and AASHTO provide numerous opportunities to present the scan findings to a broad audience.

Other industry conferences and entities can be platforms to share the information as well. Examples of the committees, subcommittees, and venues include the following:

- TRB Committee on General Structures (AFF10) and Committee on Bridge Management (AHD35)
- TRB Committee on Truck Size and Weight (AT-55)
- AASHTO Subcommittee on Bridges and Structures
- AASHTO Subcommittee on Highway Transport
- AASHTO Standing Committee on Highways
- Specialized Carriers & Rigging Association Symposium
- AASHTOWare Users Group Meeting—RADBUG
- AASHTO Standing Committee on Rail
- Northeast Regional Peer Exchange: Load Rating, Posting and Permitting

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55 T-5 Loads and Load Distribution, Subcommittee on Bridges and Structures, American Association of State Highway and Transportation Officials, http://bridges.transportation.org/Pages/T-5LoadsandLoadDistribution.aspx

56 T-18 Bridge Management, Evaluation, and Rehabilitation, Subcommittee on Bridges and Structures, American Association of State Highway and Transportation Officials, http://bridges.transportation.org/Pages/T-18BridgeManagement,Evaluation,andRehabilitation.aspx

57 Transportation Research Board, http://www.trb.org/Main/Home.aspx

Webinars

Webinars have become a popular medium to communicate critical information to a large audience at one time. The scan team believes that using webinars will assist in getting this information out to a large audience who may not be able to attend the other meetings and venues listed in this chapter.

Articles

A traditional means for sharing information in the transportation industry is through the monthly periodicals that are widely read by professionals. Examples of these publications include TRB's *TR News, Governing*, and the FHWA Center for Accelerating Innovation's Innovator newsletter.

Video

AASHTO TV web channel, Transportation TV, showcases the best projects, ideas, information, and videos in the transportation world today. A video presenting the scan finding will be a good fit for broadcast through Transportation TV to a broad audience.

Website

The scan team plans to create a Wiki-based guide or manual addressing permitting issues that will serve as a primer on permitting. This document will reside on the domestic scan website.

Appendix A:
Recent and Ongoing Research

The scan team conducted a detailed literature review regarding the superload permitting practices and new developments and collected various reports and articles from various databases (e.g., Compendex[58], National Technical Information Service[59], TRB, NCHRP, Research and Innovative Technology Administration[60], Transportation Research Information Services[61], and International Transport Research Documentation[62]).

This appendix summarizes each article or report starting from the year 2000.

Load Rating and Permit Vehicle Routing

Nord and Hovey[63] developed an automated Windows-based permitting system (FASTRACS) for Colorado DOT[64] (CDOT). In Colorado, if the permit request is heavier than 200 kips, the engineers in the Bridge Branch Rating Unit will review the request. The system the authors developed expedites the analysis process and provides fast processing time to the trucking industry. Figure A.1 shows the CDOT-specified configuration of a superload truck. Figure A.2 shows the numbers of annual special permits CDOT issued between 1989 and 1998.

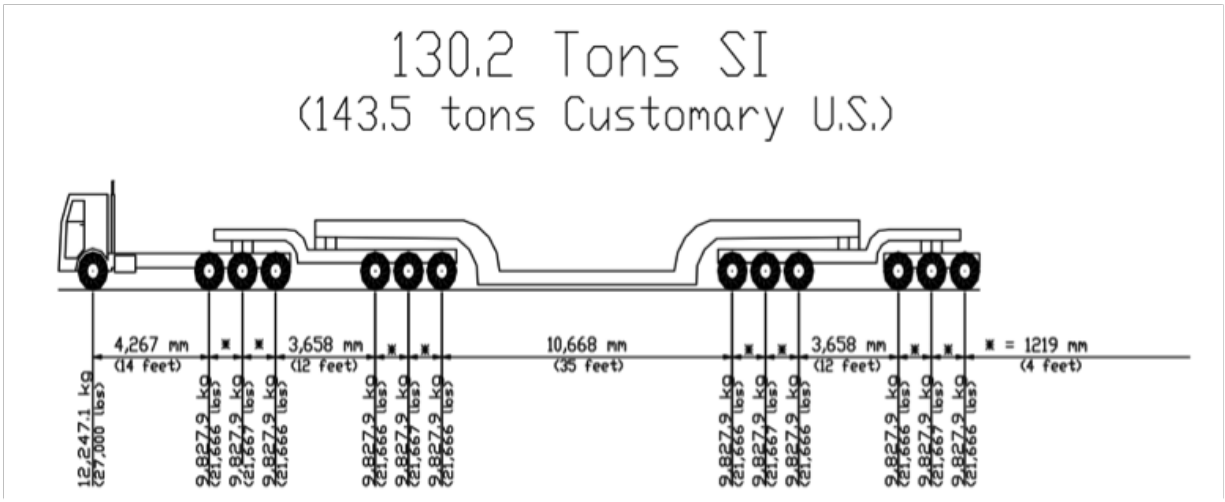

Figure A.1 Colorado DOT superload truck[65]

58 Engineering Village, Elsevier, http://www.engineeringvillage.com/home.url?acw=

59 National Technical Information Service, http://www.ntis.gov/

60 Research and Innovative Technology Administration, http://www.rita.dot.gov/

61 Transportation Research Information Services, Transportation Research Board, http://www.trb.org/informationservices/informationservices.aspx

62 International Transport Research Documentation, International Transport Forum, http://internationaltransportforum.org/jtrc/itrd/

63 Nord M and G, Load Rating and Permit Vehicle Routing, 8th International Bridge Management Conference, Transportation Research Circular 498, Vol. 2, 2000

64 Colorado Department of Transportation, http://www.coloradodot.info/

65 Nord M and G Hovey, Load Rating and Permit Vehicle Routing, 8th International Bridge Management Conference, Transportation Research Circular 498, Vol. 2, 2000

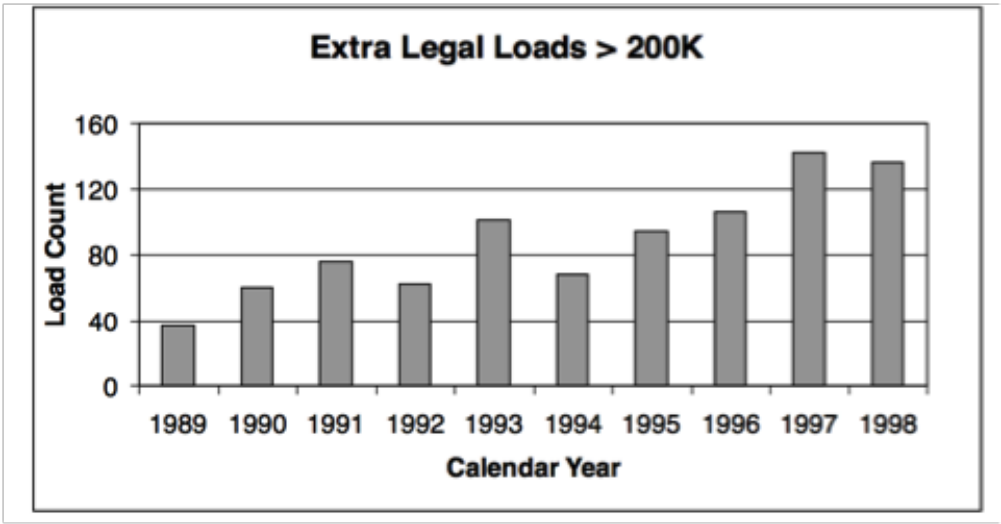

Figure A.2 Numbers of Annual Special Permits issued by Colorado DOT[66]

Behavior of Steel Bridges Under Superload Permit Vehicles

Culmo et al.[67] conducted a study regarding the behavior of steel bridges under superload permit vehicles. During the major power plant building process, large pieces of plant equipment needed to be transported to the construction site. The highway system is the major network to transport this equipment, especially in more remote areas. Figure A.3 shows the effect of long trailers on different types of structures.

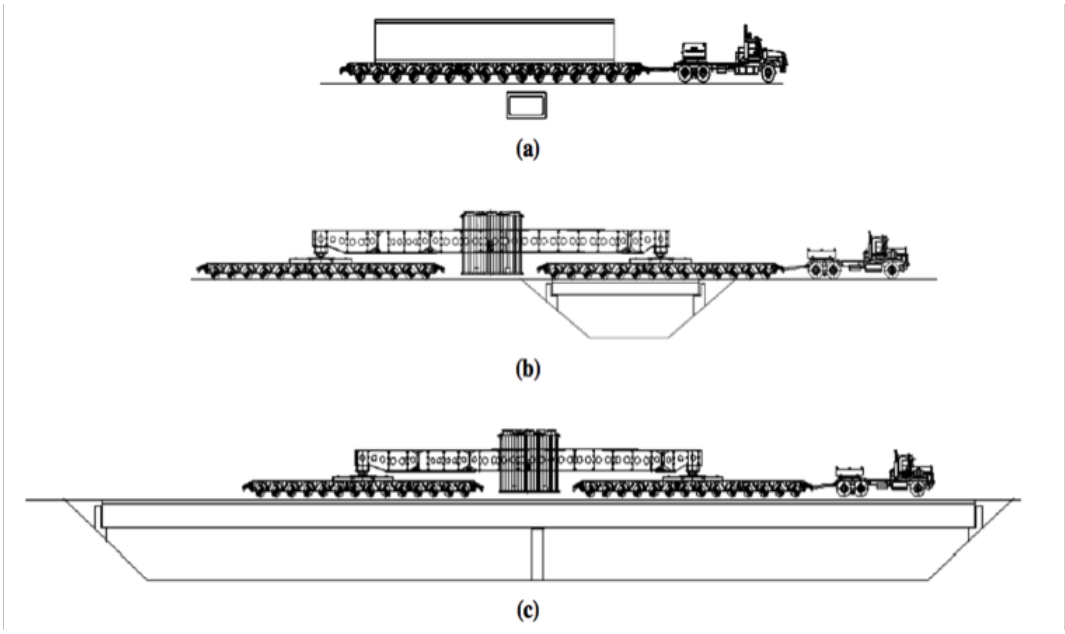

Figure A.3 Effect of trailer configuration on structures: (a) culvert crossing, (b) medium-span bridge crossing, and (c) long-span bridge crossing[68]

66 Nord M and G Hovey, Load Rating and Permit Vehicle Routing, 8th International Bridge Management Conference, Transportation Research Circular 498, Vol. 2, 2000

67 Culmo MP, JT De Wolf, and MR Del Grego, Behavior of steel bridges under Superload permit vehicles. Transportation Research Record: Journal of the Transportation Research Board, 1892(1), 2004, 107-114

68 Culmo MP, JT De Wolf, and MR Del Grego, Behavior of steel bridges under Superload permit vehicles, Transportation Research Record: Journal of the Transportation Research Board, 1892(1), 2004, 107-114

This study analyzed different types of vehicles, including traditional permit vehicles with gross vehicle weights ranging from 100,000 to 250,000 lb. Special heavy-load vehicles that allow engineers to move loads in excess of 1,000,000 lb were considered. The live load distribution, dynamic load amplification factor, and trailer layout were analyzed. In addition, a field experimental study was performed and strain data were collected when an actual 1,000,000 lb permit vehicle was passing a three-span composite steel bridge in Connecticut; the results from testing and analysis were compared.

Bridge Rating Practices and Policies for Overweight Vehicles

Fu and Fu[69] conducted a detailed synthesis study to gather information on state bridge rating systems, bridge evaluation practices, and permit policies for overweight vehicles. A literature search was performed to help understand the history and background of bridge rating practices and permitting policies. The authors also investigated the causes of non-uniformity in permitting systems.

It was determined that the variation in permit types and policies, as well as variations in permitting business processes, are major reasons for the non-uniformity in permitting systems. Furthermore, a questionnaire was distributed to transportation agencies at the state level in the U.S. and Canada to collect information related to bridge load rating and bridge evaluation for permit review. The variations in evaluation and rating process and the variations in evaluation and rating procedures collected from the completed questionnaires were summarized and compared.

The authors also indicated that 13 out of 42 responding states might revise their overweight/oversize vehicle polices in the near future. These states include Alabama, Alaska, California, Florida, Minnesota, Missouri, Nebraska, New Mexico, Wisconsin, and Virginia. In addition, the authors also summarized previous efforts to improve the uniformity of bridge rating for oversize/overweight vehicles. Conclusions and future research needs were also provided.

Recommendations for Michigan Specific Load and Resistance Factor Design Loads and Load and Resistance Factor Rating Procedures

Curtis and Till[70] developed a Michigan-specific load and load and resistance factor rating procedures for Michigan DOT[71] (MDOT). Based on the analysis results, the authors proposed a revised load and resistance factor design (LRFD) live load factors based on Michigan weigh-in-motion (WIM) data. In addition, the revised LRFD live load factors and other load and resistance factor rating (LRFR) recommendations are compared to HL-93 loading as specified in AASHTO LRFD Design Specification[72].

Guide for Uniform Laws and Regulations Governing Truck Size and Weight Among the WASHTO States

The Western Association of State Highway and Transportation Officials (WASHTO) is a regional transportation association that has 18 state members[73]. Figure A.4 shows how different states define a superload. WASHTO is promoting uniform laws, regulations, and practices among member jurisdictions

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69 Fu G, C Fu, MP Culmo, JT De Wolf, MR Del Grego, O Hag-Elsafi, and JR Casas, NCHRP Synthesis 359, Bridge Rating Practices and Policies for Overweight Vehicles. Transportation Research Board, Washington, DC, 2006

70 Curtis R and R Till, Recommendations for Michigan Specific Load and Resistance Factor Design Loads and Load and Resistance Factor Rating Procedures, (Vol. 1511), 2008

71 Michigan Department of Transportation, http://www.michigan.gov/mdot/

72 AASHTO LRFD Bridge Design Specifications, Customary U.S. Units, 7th Edition, AASHTO Bookstore, https://bookstore.transportation.org/item_details.aspx?id=2211

73 Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming

and other jurisdictions so that goods and services can move efficiently while maintaining the safety of all highway users and the highway infrastructure. In addition, WASHTO also serves as a forum to review and evaluate the effects of new AASHTO policies on highway transportation from a WASHTO perspective and to share best industrial practices among WASHTO member states.

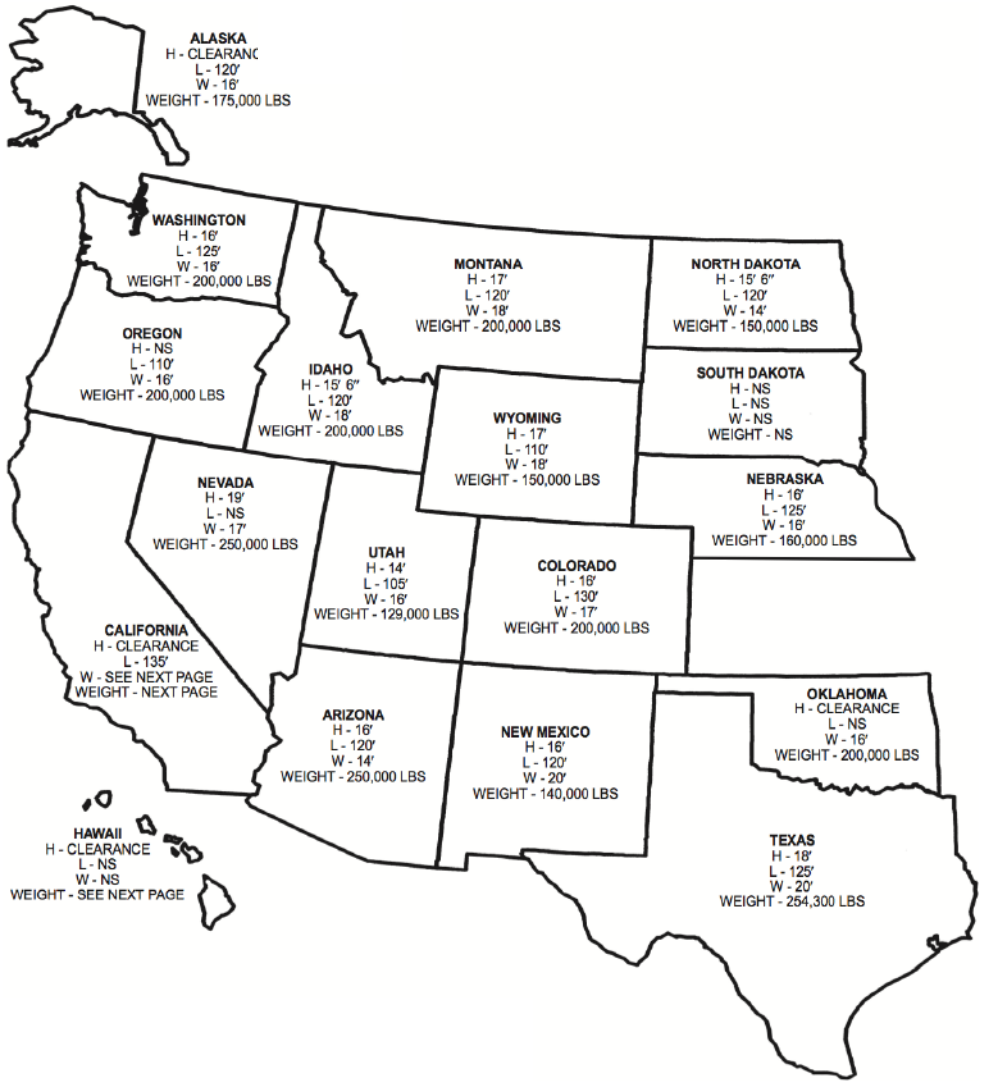


Figure A.4 Definition of superload[74]

This guide, published in 2009, provided a multi-state permit agreement that would serve as a routine uniform mechanism for processing multistate permits for oversize and/or overweight vehicles traveling between WASHTO member states. The agreement specifies that the maximum weights for an envelope vehicle is 160 kips having a minimum of five axles. Particularly, maximum weight per inch of tire width is 600 lb. The maximum weight per axle, per tandem axle, and per tridem is 21,500 lb, 43,000 lb, and 53,000 lb, respectively.

[74] Western Association of State Highway and Transportation Officials (WASHTO), Guide for Uniform Laws and Regulations Governing Truck Size and Weight Among the WASHTO States, WASHTO Policy Committee, 2009

Analysis of Permit Vehicle Loads in Wisconsin

Zhao and Tabatabai[75] analyzed three sets of overloaded vehicle data:

- Overweight vehicle records extracted from WIM data collected in 2007
- Records of single-trip permits issued from 2004 to 2007
- Overweight vehicles in neighboring states (e.g., Minnesota, Iowa, Michigan, and Illinois)

The movement and shear effects from actual data were compared to those from the 250-kip Wisconsin Standard Permit Vehicle (Figure A.5) for simple supported bridge, two-span, and three-span continuous bridges.

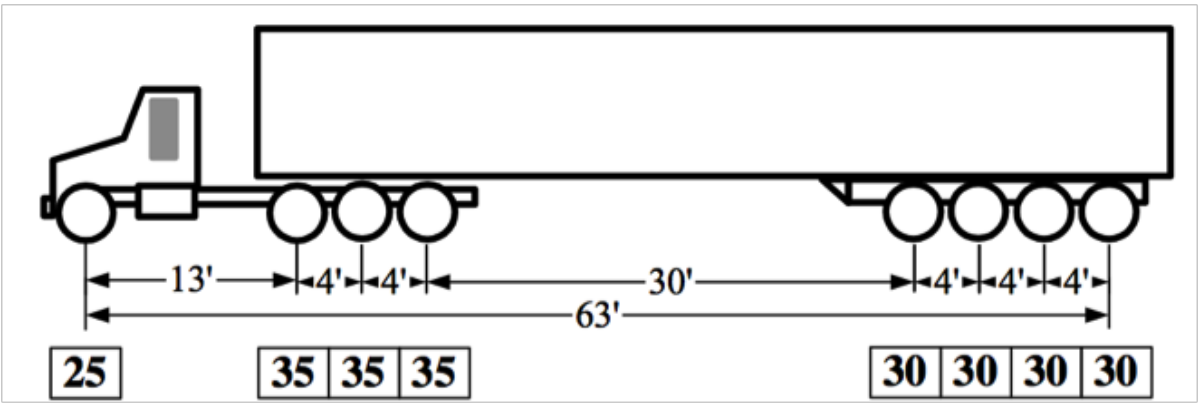


Figure A.5 Wisconsin standard permit vehicle[76]

The analysis results show that the Wisconsin standard permit vehicle provides an envelope for almost all single-unit trucks with fewer than nine axles. However, the result also shows that 0.035% of total overweight vehicles have larger load effects than those of the Wisconsin standard permit vehicle. Therefore, the authors proposed a 5-axle short truck as a supplemental permit vehicle to be used in the WisDOT Bridge Manual.

Superload Evaluation of the Bonnet Carré Spillway Bridge

Grimson et al.[77] performed both field and analytical evaluation of Bonnet Carré Spillway Bridge in Louisiana that was subjected to three superloads. A simplified computer analysis was performed to predict the behavior of the bridge prior to the crossing of each superload. Figure A.6 is the photo of superload 1.

[75] Zhao J and H Tabatabai, Analysis of permit vehicle loads in Wisconsin, (No. WHRP 09-03), 2009

[76] Zhao J and H Tabatabai, Analysis of permit vehicle loads in Wisconsin, (No. WHRP 09-03), 2009

[77] Grimson JL, BC Commander, PH Ziehl, Superload Evaluation of the Bonnet Carré Spillway Bridge. Journal of Performance of Constructed Facilities, 22(4), 2008, 253-263

Figure A.6 Photo of superload 1[78]

After the field monitoring and evaluation, the expected and actual behavior were obtained and compared. Various factors (e.g., rotational restraint, live load distribution, and the stiffening effect of bridge rails) were investigated. Based on the field evaluation and finite element analysis, it was concluded that the actual longitudinal configuration of axle loads applied on the bridge was different from the information that had been used to apply for the permit. The difference between proposed and actual axle loads might cause potential damage to the bridge. Therefore, it is recommended that axle loads and configuration be tested prior to approaching the bridge.

Evaluation of Effects of Super-Heavy Loading on the US-41 Bridge Over the White River

Sherman et al.[79] evaluated the effects of super-heavy loading on the US-41 White River Bridge that was built in 1958, which comprises two, 16-span superstructures sharing a common substructure. As a major entrance bridge to the construction site of a new power plant facility located in Edwardsport, Indiana, a series of nearly 100 super-heavy loads having gross vehicle weights ranging from 200 kips to 1000 kips crossed the bridge's northbound lanes from August 2009 to August 2010. Long-term remote monitoring was performed to evaluate the effects of these super-heavy-load events on the bridge's performance. Fracture and fatigue life evaluations were also performed.

Based on the long-term monitoring results, it was concluded that the superloads did not have significant long-term effects on the bridges. The US-41 White River Bridge is still in excellent condition. In addition, the fatigue analysis proved that the remaining fatigue life of the bridge is sufficient. Furthermore, the author suggested performing an in-depth inspection of the pin and hanger assemblies and lubricating all pin and hanger expansion joints as protective measures to mitigate the negative effects, if any, of superloads.

78 Grimson JL, BC Commander, PH Ziehl, Superload Evaluation of the Bonnet Carré Spillway Bridge. Journal of Performance of Constructed Facilities, 22(4), 2008, 253-263

79 Sherman RJ, JM Mueller, RJ Connor, and MD Bowman, Evaluation of Effects of Super-Heavy Loading on the US-41 Bridge Over the White River, 2011

Review and Revision of Overload Permit Classification

Mlynarski et al.[80] performed a study to review and revise the overload permit classification system for MDOT. Currently, by evaluating strength and service limit states in accordance with the 2005 MDOT Bridge Analysis Guide and with 2009 Interim Updates[81] and the 2010 AASHTO Manual for Bridge Evaluation[82], some structures will be classified as Overload Class. These structures will be evaluated by comparing the maximum moments due to vehicles that applied for permits with the moments produced by 20 standard overload configurations provided by the Bridge Analysis Guide for span lengths between 15 and 160 feet. MDOT uses a simplified solution that was developed over 20 years ago to perform the bridge analysis.

The authors developed a BridgeOV-Virtis application programming interface as an updated solution for bridge analysis. Furthermore, the authors reviewed a yearly list of 16,000+ permit vehicles and compared the permit vehicles with 20 standard overload vehicles.

Bibliography

1. Altay AK, DS Arabbo, EB Corwin, RJ Dexter, and CE French, Effects of increasing truck weight on steel and prestressed bridges (No. MN/RC-2003-16,), 2003
2. Hag-Elsafi O, and J Kunin, Monitoring prestressed concrete box-beam bridge for Superloads. Transportation Research Record: Journal of the Transportation Research Board, 1892(1), 2004, 126-136
3. Phares BM, TJ Wipf, FW Klaiber, A Abu-Hawash, and S Neubauer, Implementation of physical testing for typical bridge load and Superload rating. Transportation Research Record: Journal of the Transportation Research Board, 11(1), 2005, 159-167
4. Reisert JA and MD Bowman, Fatigue of Older Bridges in Northern Indiana Due to Overweight and Oversized Loads-Volume 1: Bridge and Weigh-In-Motion Measurements. Joint Transportation Research Program, 2006, 334
5. Wood SM, NO Akinci, J Liu, and MD Bowman, Long-Term Effects of Super Heavy-Weight Vehicles on Bridges, 2007
6. Saber A, FL Roberts, and X Zhou, Monitoring System to Determine the Impact of Sugarcane Truckloads on Non-Interstate Bridges (No. FHWA/LA. 06/418), 2008
7. Russell Sr ER and ED Landman, Optimizing the Analysis of Routing Oversize/Overweight Loads to Provide Efficient Freight Corridors (No. K-TRAN: KSU-11-4), 2012
8. Hammada AA, DK Nims, VJ Hunt, B Commander, and AJ Helmicki, Superload Evaluation of the Millard Avenue Bridge over the CSX Railroad. In Transportation Research Board 92nd Annual Meeting (No. 13-0240), 2013

[80] Mlynarski M, B Spangler, and H Rogers, Review and Revision of Overload Permit Classification (No. RC-1589), 2013

[81] Bridge Analysis Guide 2005 Edition with 2009 Interim Updates, Michigan Department of Transportation, http://www.michigan.gov/mdot/0,1607,7-151-9625_24768_24773-132786--,00.html

[82] Manual for Bridge Evaluation, 2nd Edition, 2013 Interim Revisions, AASHTO Bookstore, https://bookstore.transportation.org/item_details.aspx?ID=2038

Appendix B: Amplifying Questions

Topic 1: Current state-of-practice of overweight oversize permit process

1. Which offices are involved to issue the overweight oversize permit? How many staff are involved? How many staff are involved in the automated process and how many are involved in bridge analysis? (Please include flowchart.)
2. How many permits do you issue per year? How many are automated, how many are routine, and how many need special analysis? What are your performance measures?
3. Are you considering or adopting new changes in your overweight oversize permit process? If yes, please describe the changes. (Please provide your current overweight oversize permit process.)
4. What process tools have been developed to screen the bridges and issue permits? Who is responsible for maintaining the tools? In general, what is your process for analyzing/approving: single-trip permits, multi-trip (annual) permits, and geometrics?
5. When do you perform the bridge analysis/evaluation for the bridges that are on the route of overweight oversize loads before issuing the overweight oversize permit?
6. How do you define superload (a load you need to do detailed analysis for) in comparison with other permit loads? What are the triggers for detailed analysis? What are the criteria?
7. How many revisions are allowed for permit application? How many trials are allowed for permit request? How much effort is involved in unwritten permits?
8. What is your permit fee structure? Do you get additional an fee for detailed analysis?

Topic 2: Current state-of-practice of overweight oversize permit monitoring, data analyzing, and compliances

1. Do you use weigh-in-motion (WIM) technology or other methods to ensure quality control on the actual configuration of overweight oversize permit vehicles (e.g., axle spacing, axle weight, or gross vehicle weight)?
2. What are the statistics for the permit vehicles (e.g., percentage of those exceeding the weight limit that they applied for and statistics of each type of permits)?
3. Do you allow vehicle to leave the designated route? If so, how do you account for bridge analysis?
4. What measure in term of quality assurance/quality control to ensure:
   - Clearance
   - Rating data/analysis model
   - Permit process and designate route
   - Vehicle inspection

Topic 3: Current practices with regard to bridge analysis and rating for overweight oversize vehicles

1. Which method do you use for bridge analysis for overweight oversize vehicles (e.g., AASHTO LRFR, AAHSTO ASR, or AASHTO LFR)?
2. What method do you use to create your permit?
3. Speed and traffic restrictions on permits?
4. Do you have any modification to the AASHTO standard rating method you used in Topic 2, question 1? If yes, please list the modification and the reason for the modification.
5. Do you have any modification to dynamic amplification factor for the load rating?
6. When performing load rating, which is used: one lane or multiple loading?
7. How do you deal with nonstandard-gauge or dual-lane loading vehicles?
8. Which load rating levels are used as acceptance criteria for issuing overweight oversize permits (i.e., inventory, operating, or owner-specified)?
9. Do you use refined analysis when you conduct load rating for overweight oversize vehicles? If yes, which software do you use?
10. Do you use computer software for overweight oversize load rating? If yes, which software do you use?
11. Do you have any special requirements for complex bridges?

Topic 4: Current practices with regard to better uniformity in over-weight over-size permitting

1. Are you a member of or would you be willing to be a member of a committee for improving regional or national uniformity in superload permitting?
2. If an envelope vehicle is recommended for use as a basis for issuing superload permits nationwide, what is your suggestion (i.e., length, height, width, and weight)?
3. How do you handle local bridges? Who issues permits for your local bridges?
4. When is a surety bond required? How is value determined?

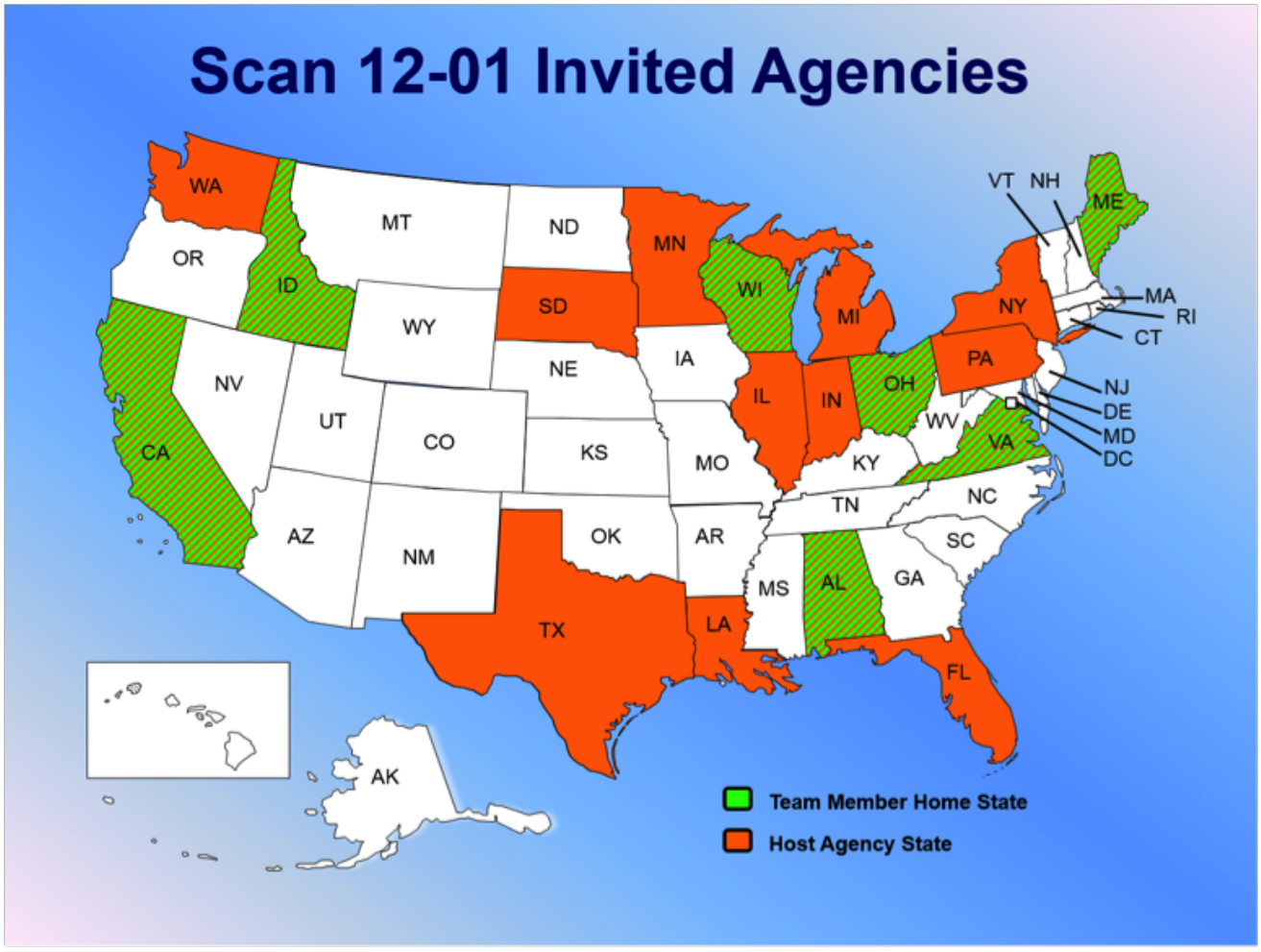
Topic 5: Permit questions

1. What percentage of single-trip permits requires hands-on analysis/review by a structural engineer?
2. What is the threshold level that requires review by an engineer?
3. Who is authorized to issue permits below this level?

4. For permits issued below this level, what quality control/quality assurance process is in place?
5. For permits issued above this level, what quality control/quality assurance process is in place?
6. Approximately how many loads over 300,000 pounds do you process annually?
7. What is the heaviest single-trip permit that has traveled through your state? Were different methods of analysis used for bridges along the route compared to standard single-trip permits?
8. How do you handle permitting for complex structures (i.e., structures other than the typical girder or slab structure, such as arches, bascules, and frames)?
    - Fully model structure and analyze on a case-by-case basis?
    - Approximate, simplified models?
    - Other approximate methods?
9. Do you permit using load factor rating or load and resistance factor rating methodologies? Both?
10. Do you have engineers on staff specifically for permit analysis? If so, how many?
11. How do you take into account wheel gauges different than the typical 6-foot gauge?
12. Do you permit box culverts? If so, how? Specific analysis? Approximate methods?
13. Do you analyze every bridge a given route for single trip permits? If not, how are the bridges to be analyzed chosen?
14. How do you handle permitting responsibility for border bridges? Does one state take authority for each bridge? If so, how is the authority determined? Shared authority?
15. What structural analysis software do you use for permitting analysis?

Appendix C:
Host Agency Contacts

During the organizational meeting, 18 states were selected for site visits. The contact information for these states is summarized in this appendix.



Alabama

Alabama Highway Department
PO Box 303050
1409 Coliseum Boulevard
Montgomery, AL 36130-3050
Hours: 7:00 a.m.–4:45 p.m., Monday–Friday
Phone: (334) 242-6474
Toll-free: (800) 499-2782
Fax: (334) 832-9084
E-mail: alabamapermits@dot.state.al.us
Web: http://www.dot.state.al.us/maweb/Oversize&OverweightPermitInformation.htm

California

CALTRANS Oversize/Overweight Permits Office
Mailing address
PO Box 942874, MS #41
Sacramento, CA 94274-0001
Walk-in location
1823 14th Street
Sacramento, CA 95811
Hours: 8:00 a.m. – 5:00 p.m.
Phone: (916) 322-1297 (North Region)
Fax: (916) 322-4966
STARS: (916) 322-6664
Annuals: (916) 445-0469
Variance: (916) 322-1505
E-mail: oversize-overweight-permits@dot.ca.gov
Permit forms, attachments, and instructions may be obtained online (http://www.dot.ca.gov/hq/traffops/permits) or by calling (916) 651-6129, 24 hours/day.
Walk-in customers are not taken after 3:00 p.m.

Florida

Office of Maintenance
Florida Department of Transportation
605 Suwannee
Permits Sections MS62
Tallahassee, FL 32399-0450
ACS/DOT Permit Office
2740 Centerview Drive, Suite I-C
Tallahassee, FL 32301
Hours: 7:30 a.m. – 5:30 p.m., Monday – Friday
8:00 a.m. – 12:00 noon, Saturday
Phone: (850) 488-4961
(850) 410-5777 (statewide)
Fax: (850) 410-5779
For information on obtaining oversized/overweight permits:
Florida Administrative Code 14-26
Florida Statutes Title XXIII, Chapter 316
Florida Trucking Manual (http://www.fdotmaint.com/permit/)

Idaho

Transportation Department
Over Legal Permit Office
PO Box 7129
3311 W. State Street
Boise, ID 83707
Hours: 7:30 a.m.–5:00 p.m.
Phone: (208) 334-8420 (in-state)
(800) 662-7133
Fax: (208) 334-8419
Website: dmv.idaho.gov

Illinois

Department of Transportation
Bureau of Operations Permit Office
2300 South Dirksen Parkway
Springfield, IL 62764
Hours: 7:00 a.m.–4:30 p.m., Monday–Friday
Phone: (217) 785-1477
(217) 782-6271
(800) 252-8636 (Illinois only)
E-mail: permitoffice@dot.il.gov
dot.permitoffice@illinois.gov
Online permitting: www.illinoistruckpermits.com
Website: http://www.dot.il.gov/

Indiana

Indiana Department of Revenue
7811 Milhouse Road, Suite M
Indianapolis, IN 46241
Hours: 8:00 a.m.–4:30 p.m., Monday–Friday
Phone: (317) 615-7320
(317) 615-7200
Fax: (317) 615-7241
E-mail: indianaosw@dor.in.gov www.in.gov/dor

Louisiana

Department of Transportation and Development
Truck Permit Office
1201 Capitol Access Road, Room 103A
Baton Rouge, LA 70802
DOTD Truck Permits are located on the first floor of the DOTD HQ BUILDING
Hours: 6:00 a.m.–5:00 p.m., Monday–Friday
Phone: (225) 343-2345
(800) 654-1433 (nationwide)
E-mail: permits@dotd.la.gov (permit information)
Website: http://www.dotd.state.la.us/
http://www.dotd.louisiana.gov (online permitting)

Maine

Mailing address
Bureau of Motor Vehicles
Motor Carrier Services, Overlimit Permit Unit
29 State House Station
Augusta, ME 04333-0029
Walk-in location
Bureau of Motor Vehicles Motor Carrier Services
101 Hospital Street
Augusta, ME
Hours: 7:30 a.m.–5:00 p.m.
Phone: (207) 624-9000, Ext. 52134
Fax: (207) 622-5332
E-mail: overpermits@maine.gov (commercial)

Website: http://www.maine.gov/sos/bmv/
Online information: www.maine.gov/sos/bmv/commercial/olperms.htm
Over Limit Permits online service is available 24 hours a day with either a credit card or subscription to InforME. Permits are approved between 7:30 a.m. and 5:00 p.m. weekdays at http://www.informe.org/overlimit/

Michigan

Transport Permits Unit Real Estate Support Area
Michigan Department of Transportation
7575 Crowner Drive
Dimondale, MI 48821
Hours: 7:30 a.m.–12:00 noon, 1:00 p.m.–4:30 p.m., Monday–Friday
Phone: (517) 636- 6915
Website: http://www.michigan.gov/mdot

Minnesota

Department of Transportation (Mn/DOT) OFCVO
Oversize/weight Permit Section Transportation Building
Mail Stop 420, Room 153
395 John Ireland Boulevard
St Paul, MN 55155
Hours: 8:00 a.m.–12 noon, 1:00 p.m.–4:00 p.m.
Phone: (651) 296-6000 (same hours as above)
Fax: (651) 215-9677
OSOW permits: ofcvopermits.dot@state.mn.us
Commercial Vehicle Operations: www.dot.state.mn.us/cvo/

New York

Central Permit Office
50 Wolf Road, First Floor
Albany, NY 12232
Hours: 8:00 a.m.–5:00 p.m.
Phone: (518) 485-2999
(888) 783-1685
E-mail: permits@dot.state.ny.us
Website: https: //www.dot.ny.gov/nypermits

Ohio

Department of Transportation
Special Hauling Permit Section
1980 Broad Street
Columbus, OH 43223
Hours: 8:00 a.m.–5:00 p.m.
Phone: (614) 351-2300
Fax: (614) 728-4099
Website: www.dot.state.oh.us/permits

Pennsylvania

Central Permit Office Keystone Building
PO Box 2671
Harrisburg, PA 17105-2671
Overnight deliveries:
400 North Street, 6th Floor
Keystone Building
Harrisburg, PA 17120
Hours: 8:00 a.m.–4:00 p.m.
Phone: (717) 787-4680 (general information)
Fax: (717) 787-9890
Online permitting: www.dot1.state.pa.us
(Must register with the Central Permit Office)
Website: www.dot.state.pa.us

South Dakota

South Dakota Highway Patrol
Motor Carrier Services
118 West Capitol Avenue
Pierre, SD 57501-2000
Hours: 8:00 a.m.–5:00 p.m.
Phone: (605) 773-4578
Please refer to our Motor Carrier Handbook (www.sdtruckinfo.com) for oversize/overweight restrictions.

Texas

Mailing address:
Department of Motor Vehicles Motor Carrier Division
4000 Jackson Avenue
Austin, TX 78731
Physical address:
4203 Bull Creek
Austin, TX 78731
Permit Section
Hours: 6:00 a.m.–6:00 p.m., Monday–Friday
6:00 a.m.–2:00 p.m., Saturday
Website: http://www.txdmv.gov
Motor Carrier Division
Hours: 8:00 a.m.–5:00 p.m., Monday–Friday, Front Desk
Phone: (800) 299-1700 (Permits Section, option 1)
E-mail: sizeweight@txdot.gov
Website: http://www.txdmv.gov

Virginia

Walk-in location
Virginia Department of Motor Vehicles
Hauling Permits Section
2300 West Broad Street, 6th Floor
Richmond, VA 23260
Mailing address
Virginia Department of Motor Vehicles
Hauling Permits Section
PO Box 23260, 6th Floor
Richmond, VA 23260
Phone: (804) 497-7135 (general inquiries and information)
(804) 786-2787 (single-trip permit via phone)
Fax: (804) 367-0063 (fax permit application, letter of variance, and any other attachments to your application)
E-mail: haulingpermit@dmv.virginia.gov
(ask a question, report a bug, or send comments about VAHPS)

Washington

Department of Transportation
Motor Carrier Services Office
PO Box 47367
Olympia, WA 98504-7367
Commercial Vehicle Services:
7345 Linderson Way SW
PO Box 47367
Tumwater, WA 98504-7367
Hours: 8:00 a.m.–4:30 p.m., Monday–Friday
Extended hours for outside agents (see website)
Phone: (360) 704-6340 (permits)
Fax: (360) 704-6350
E-mail: cvspermits@wsdot.wa.gov
Website: www.wsdot.wa.gov/commercialvehicle

Wisconsin

Department of Transportation
Motor Carrier Services, Permit Unit
4802 Sheboygan Avenue
PO Box 7980
Madison, Wl 53707-7980
Hours: 7:45 a.m.–4:30 p.m., Monday–Friday
Phone: (608) 267-4541
(608) 266-7320
Fax: (608) 264-7751
E-mail: oversize-permits.dmv@dot.state.wi.us
Website: www.dot.wisconsin.gov
www.dot.wisconsin.gov/business/carriers/osowgeneral.htm

California Department of Transportation

Kien Le
Office of Permits
Division of Traffic Operations
California Department of Transportation
Phone: 916-654-3093
Email: kien.le@dot.ca.gov

Florida Department of Transportation

Bryan Hubbard P.E.
Structures Maintenance Engineer
Office of Maintenance
Florida Department of Transportation
605 Suwannee Street, MS 52
Tallahassee, FL 32399-0450
Phone: 850-410-5516
FAX: 850-410-5511
Email: Bryan.Hubbard@dot.state.fl.us

Jonathan Fischer
Permit Operations Coordinator
Office of Maintenance
Florida Department of Transportation
Phone: (850) 410-5629
Email: Jonathan.Fischer@dot.state.fl.us

Idaho Transportation Department

Shanon Murgoitio
Bridge Load Rating Engineer
Idaho Transportation Department (ITD)
3131 W. State St.
Boise, ID 83707-1129
Phone: 208-224-8547
Email: Shanon.Murgoitio@itd.idaho.gov

Illinois Department of Transportation

Timothy A. Armbrecht, P.E., S.E.
Acting Engineer of Structural Services
Illinois Department of Transportation
Bureau of Bridges and Structures
Phone: (217) 782-2125
Email: Tim.Armbrecht@illinois.gov

Geno Koehler
Permit Unit Chief
Illinois Department of Transportation
2300 South Dirksen Parkway, Room 009
Springfield, Illinois 62764
Phone: (217) 782-2984
Email: Geno.koehler@illinois.gov

Indiana Department of Transportation	Badar A. Khan Permit Services Engineer Indiana DOT 100 North Senate Avenue IGCN Room N642 Indianapolis, IN 46204 Phone: 317-232-5436 Email: BKHAN@indot.IN.gov
Indiana Motor Carrier Services	Angela Woodard, Supervisor Indiana Motor Carrier Services OSW Permit Section 7811 Milhouse Rd, Suite M Indianapolis, IN 46241-9612 Phone: (317) 615-7234 Email: awoodard@dor.in.gov
Louisiana Department of Transportation & Development	Holly Thomas bridge load rating group Louisiana Department of Transportation & Development P.O. Box 94245 Baton Rouge, LA 70804-9245 Phone: 225-379- 1412 Email: Holly.Thomas@la.gov
Michigan Department of Transportation	Rebecca Curtis, PE Bridge Management Engineer Michigan Department of Transportation 425 West Ottawa Street PO Box 30050 Lansing, MI, 48909 Phone: 517-449-5243 Email: CurtisR4@michigan.gov Robert Whaley Manager, Utility Coordination & Permits Section Michigan Department of Transportation Van Wagoner Building 425 West Ottawa Street PO Box 30050 Lansing, MI, 48909 Phone: (517) 373-7682 Email: whaleyr@michigan.gov

Minnesota Department of Transportation

Yihong Gao, P.E.
Bridge Rating Engineer
Bridge Office
Minnesota Department of Transportation
3485 Hadley Avenue North, MS 610
St. Paul, MN 55128-3307
Phone: (651) 366-4492
Email: yihong.gao@state.mn.us

New York State Department of Transportation

Tom Golden
MO Permit Unit
Central Permit Office
New York State DOT
1st Floor Ave. 1 – 1st street
Phone: 518-457-0359
Thomas.Golden@dot.ny.gov

Mengisteab Debessay
Structure office
New York State Department of Transportation
50 Wolf Road
Albany, NY 12232
Phone: 518-485-9117
Email: Mengisteab.Debessay@dot.ny.gov

Pennsylvania Department of Transportation

Charles E. Carey, P.E.
Assistant Chief Bridge Engineer
Pennsylvania Department of Transportation
Bureau of Project Delivery
Bridge Design and Technology Division
400 North Street, 7th Floor Harrisburg, PA 17101
Phone: 717.787.7284
Fax: 717.787.2882
Email: chcarey@pa.gov

Matthew Hedge
Pennsylvania Department of Transportation
Bureau of Maintenance and Operations
400 North Street-6th Floor
Harrisburg PA 17120-0064
Phone: 717.772.5462
Fax: 717.705.0686
Email: mhedge@pa.gov

South Dakota Department of Transportation

Todd S. Thompson, PE
Bridge Management Engineer

	SD DOT - Office of Bridge Design 700 E Broadway Ave Pierre, SD 57501 Phone: 605-773-3285 Fax: 605-773-2614 Email: todd.thompson@state.sd.us
South Dakota Motor Carrier Services	Nick Veflin Sisseton Port of Entry South Dakota Motor Carrier Services PO Box 242 Sisseton, SD 57262 Main phone (605) 698-3925 Direct line (605) 698-3924 Fax (605) 698-7665 Email: hp.sisseton@state.sd.us
Texas Department of Transportation	Thomas C. Stout, Texas Department of Transportation Bridge Division Design Branch Leader Phone: 512-416-2228 Email: thomas.stout@txdot.gov
Virginia Department of Motor Vehicles	Wayne T. Davis Virginia Department of Motor Vehicles Deputy Director of Motor Carrier Size & Weight Services 2300 West Broad Street Richmond Virginia, 23220 Office: (804) 497-7121 Fax: (804) 367-0063 Email: wayne.davis@dmv.virginia.gov
Washington State Department of Transportation	Mohamad Al-Salman, PE Washington State Department of Transportation Bridge Preservation Office Risk Reduction Engineer Phone: (360) 570-2567 Email: AlSalM@wsdot.wa.gov Jim Wright Permit Program Officer Commercial Vehicle Services Washington State Department of Transportation Phone: (360)704-6345 Email: wrightji@wsdot.wa.gov

Appendix D:
State DOT Superload Permit Processes and Practices – Legal Limits

Alabama

GVW	80,000 lb	
Single axle (steer)	12,000 lb	
Single axle	20,000 lb (interstate), 20,000 lb (non-interstate)	
Tandem	34,000 lb (interstate), 36,000 lb (noninterstate)	
Tridem	42,000 lb (interstate), 42,000 lb (noninterstate)	
Tolerance	10% on state, county roads; no tolerance on interstates	
Width	8'	< 12' lanes
	8'6"	12' lanes
Height	13'6"	
Length	40'	Single unit
	57'	Semitrailer-designated highways
	28'6"	Twin trailers (each)

California

GVW	80,000 lb	
Single axle (steer)	20,000 lb	
Single axle	34,000 lb	
Axle group	8'6" or more between outer axles (8'6" is rounded up to 9'; see the California Vehicle Code (CVC) weight chart[83]	
Width	8'6"	
Height	14’	
Length	40'	Basic length limit for all single-unit vehicles
	45'	Buses and motor homes on certain routes
	65' or 75'	Combination vehicles coupled together (e.g., a truck and semi-trailer, or a truck tractor, semi-trailer and trailer) May be unlimited depending on the route. Legal trucks in California must not exceed a kingpin-to-rear axle length of 40'
Overhang:	3' front	
	4' front	When the load is composed solely of vehicles. The load shall not extend to the rear beyond the last point of support for a greater distance than that equal to two-thirds of the length of the wheelbase of the vehicle carrying such load. For the wheelbase measurement it is the distance from the last axle of the power unit to the last axle of the semi-trailer.

Florida

GVW	80,000 lb
Single Axle (steer)	22,000 lb
Single Axle	22,000 lb (depends on tire size)
Tandem	44,000 lb
Tridem	66,000 lb

—Federal Bridge Formula applies

[83] Legal Truck Access, California Department of Transportation, http://www.dot.ca.gov/hq/traffops/engineering/trucks/

Tolerance	10% for legal weight vehicles	
Width	8'6"	
	8'	< 12' lanes
Height	13'6"	
	14'	Autotransporters
Length	28'	Trailer for straight truck or 65' overall length
	48'	Semitrailer
	53'	Semitrailer, 41' kingpin
	41'	Kingpin restriction
	28'	Doubles
	50'	Autotransporter – 50' semitrailer (6' rear overhang)
	75'	Stinger steered (overall length)
	65'	Non-stinger steered
Overhang	3' front, 4' rear, must be within length limits	
	57'6"	Semitrailer allowed with permit, may not exceed manufacturer rating
	48'-53'	Semitrailer w/ >41' KP allowed with permit

Idaho

GVW	80,000 lb Vehicles hauling reducible loads must register for weight being hauled and purchase annual excess weight permit to exceed 80,000 lb on the interstate. They are only required to register for weight being hauled when operating on non-interstate highways.	
Single (steer)	600 lb per inch of tire width	
Single	20,000 lb	
Tandem	34,000 lb	37,800[a] lb
Tridem	42,000 lb	

—Federal Bridge Formula applies

[a] For exempt commodities (logs, pulpwood, stull, poles or piling; ores, concentrates, sand and gravel, and aggregates thereof, in bulk; unprocessed agricultural products, including livestock. On interstate up to 79,000 lb non-interstate 37,800 lb for any commodity up to 80,000 lb.

Tolerance	None	
Width	8'6"	
Height	14'	
Length	45'	Single motor vehicle
	48'	Trailer or semi-trailer other than national network
	53'	Trailer or semi-trailer on national network
	75'	Motor vehicle and one or more trailers except as noted
	61'	Double trailers other (or 75' overall) other than national network
	68'	Double trailers national network
	75'	Dromedary tractor stinger steered
	65'	Dromedary tractor non-stinger steered
	75'	Auto or boat transporter stinger steered
	65'	Auto or boat transporter non-stinger steered
	75'	Saddlemount combinations (non-national network)

	97' Saddlemount combinations (national network)
Overhang	4' front of vehicle
	10' from end of vehicle
	0' left fender of passenger vehicle
	6" right fender of passenger vehicle
	7' front and rear overhang combined of auto or boat transporter

Maximum allowable weight distribution for annual overweight permits on black coded routes of the route capacity map.

Single axle	33,000 lb
Tandem axle	56,000 lb
Tridem axle	70,500 lb

Tire width	**Single axle, single tires**	**Tandem axles, single tires**
8.25	13,200 lb	26,400 lb
9.00	14,400 lb	28,800 lb
10.00	16,000 lb	32,000 lb
11.00	17,600 lb	35,200 lb
12.00	19,200 lb	38,400 lb
13.00	20,800 lb	41,600 lb
14.00	22,400 lb	44,800 lb
15.00	24,000 lb	48,000 lb
16.00	25,600 lb	51,200 lb
17.00	27,200 lb	54,400 lb
18.00	28,800 lb	56,000 lb
19.00+	30,400 lb	56,000 lb

Maximum allowable weight is based on the distance in feet between the first and last axle of any group or groups of consecutive axles.

To find the weight allowed for the vehicle combination, use the number of axles and axle spacings from the number 2 axle to the last axle of the combination and add the weight for the steering axle (approximately 12,000 lb) to this weight to acquire the total gross weight allowed.

To find the weight allowed for self-propelled vehicles, use the number of axles and axle spacings from the number 1 axle to the last axle of the combination. If axles have fewer than 4 tires per axle see chart above for weights allowed.

Check the weight allowed for every internal group or groups of axles as well as total gross weight. At times the sum of the axle weights may be less than the total gross weight allowed. Must use most restrictive weights.

If the vehicle combination exceeds the weight allowed on any group or groups of axles, or total gross weight allowed by this chart and the route capacity map, the vehicle must operate on a single trip permit if approved.

The colored charts are also provided to decide the maximum allowable weight limit on different routes (e.g., including black chart, purple overweight chart, purple chart, green overweight chart, green chart, yellow overweight chart, yellow chart, blue overweight chart, blue chart, orange overweight chart, and orange chart).

Illinois

GVW	80,000 lb
Single axle	20,000 lb
Tandem axles	34,000 lb

Permit trucks are defined as:

1. A permit is a superload if ONE of the following is true:
   a. Width is > 14'06"
   b. Length is > 145'00"
   c. Height is > 15'00"
2. A permit is a superload if any axle exceeds 25,000 lb.
3. For methods of movement loaded on and towed, a permit is a superload if:
   a. The gross weight is > 120,000 lb
   b. Any tractor tandem weight is > 48,000 lb
   c. Any trailer tandem weight is > 60,000 lb
   d. The sum of the axle weights on the trailer is > 60,000 lb
   e. Any trailer has 2 or more tandems
4. For method of movement own power, a permit is a superload if:
   a. The configuration is NOT one of the following:
      i. 2 or more single axles
      ii. 1 single axle and 1 tandem
      iii. 2 tandems
   b. Total axles is 2 and gross weight is > 48,000 lb
   c. Total axles is 2 and any single axle is > 25,000 lb
   d. Total axles is 3 or more with 1 single axle and 1 tandem AND:
      i. Overall axle spacings are < 18'
      ii. OR gross weight is > 68,000 lb
      iii. OR gross weight is ≤ 68,000 lb and the single axle is > 21,000 lb
      iv. OR gross weight is ≤ 68,000 lb and the tandem weight is > 48,000 lb
      v. OR gross weight is ≤ 68,000 lb and any axle in the tandem is > 25,000 lb
   e. Total axles is 4 or more and the configuration is 2 tandems AND:
      i. Overall axle spacings are < 23'
      ii. OR gross weight is > 76000 lb
      iii. OR gross weight is ≤ 76,000 lb and any axle is > 23,000
      iv. OR Gross Weight is ≤ 76,000 lb and either tandem is > 44,000 lb
   f. Configuration is 3 single axles and gross weight is > 68,000 lb
   g. Configuration is 4 or more single axles and gross weight is > 76,000 lb

Indiana

GVW	80,000 lb	
Single axle (steer)	12,000 lb	
Single axle	20,000 lb	
Tandem	34,000 lb	
Width	8'6"	
Height	13'6"	
Length	40' max	Single vehicle
	60' max	Two-vehicle

	53'	Tractor-trailer (trailer and load – anything over that have to permit)

Louisiana

	Interstate	Non-Interstate
GVW	83,400[a] lb	88,000[a] lb
Single (steer)	20,000[b] lb	20,000[b] lb
Single	20,000 lb	22,000[b] lb
Tandem	34,000 lb	37,000[b] lb
Tridem	42,000 lb	45,000[b] lb
4-Axle	50,000 lb	53,000[b] lb
6-Axle	80,000 lb	80,000 lb

[a] Six-axle limits

[b] Federal Bridge Formula applies; depends on tire size; must be dual-tired (except steer)

Tolerance	Included in above weights, non-designated routes only	
Width	8'6"	
Height	13'6"	14' on Interstate
Length	45'	Single unit; no overall length semitrailer (nondesignated)
	59'6"	Semitrailer (designated highways)
	30'	Doubles (10-mile access)
	65'	Overall length (non-designated highways)
	75'	Autotransporter
Overhang	4' front, 8' rear	

Maine

	Interstate	Non-Interstate	Tolerance
GVW	80,000 lb	100,000[a] lb	100,000[a] lb
Single (steer)[b]			
Single	22,000[c] lb	22,400 lb	24,200 lb
Tandem	34,000 lb	38,000 lb	46,000[d] lb
Tridem	Federal	48,000 lb	54,000[e] lb
	Bridge	50,000 lb	
	Formula	(6-axle only)	

—Federal Bridge Formula applies

NOTE: In Maine a tri-axle is > 8 ft and < 12 ft between extreme axle centers.

[a] Three axle tractor hauling tri-axle semitrailer
4 axle-2 axle trailer 94,000 lb
5 axle special commodity tractor-semitrailer 88,000 lb
All others 80,000 lb or less
6-axles 100,000 lb (Applies only to a combination vehicle consisting of a 3-axle truck tractor towing a triaxle semitrailer unit.)

[b] Limited by 600 lb/inch of tire width.

[c] 20,000 lb for GVW over 73,280 lb

[d] 44,000 lb tandem unit for 5 or more axle combinations.

[e] 64,000 lb on 4-axle single unit hauling forest products.

Tolerance	Special commodity only; 10% (dirt, gravel, wood chips)	
Length	45'	Single unit truck
	53'	Single semitrailer (max 43' from Kingpin to rearmost axle center)
	65'	With trailer 45' or less

	65'	Overall double 28 ½' trailer vehicle length
	69'	With trailer > 45-48' (max 38' from center rear power unit axle to center rear trailer axle)
	74'	With trailer > 48'-53'
	75'	Stinger-steered autotransporter (3' front, 4' rear overhang)
Overhang	If > 4' from rear, must be flagged at all times and lighted at night.	

Michigan

GVW	80,000 lb
Single Axle (steer)	12,000 lb
Single Axle	20,000[a] lb
Tandem	34,000 lb
Tridem	39,000 lb

—Federal Bridge Formula applies

[a] Over 80,000 lb GVW, 13,000 lb/axle; with 9' or more of spacing between axles, 18,000 lb single axle, tandems limited to one set tandem at 32,000 lb, the rest at 26,000 lb, 13,000 lb per axle on axle groups of three or more, limit of 11 axles. Max. 164,000

Width:	8'	Nondesignated highways
	8'6"	Designated highways
Height:	13'6"	
Length:	40'	Single unit
	53'	Semitrailer (designated highways, 5-mile access for fuel, food, rest)
	37' to 41'	Kingpin limit; measured to center of tandem
	28'6"	Doubles
	58'	Overall length for doubles (nondesignated highways)
	65'	Autotransporter
	75'	Stinger steered
Overhang:	3'	Front, any amount is permissible if the legal length is not exceeded. However, if this overhang is 4' or more, there shall be displayed on the extreme rear of such a load a 12" red square flag in the daytime and a red light or lantern at night.
	4'	Rear, boat/auto carrier

Minnesota

	Interstate	**Non-Interstate**
GVW		
5 axles	80,000 lb	80,000 lb
6 axles	80,000 lb	
Single (steer)	20,000 lb	20,000 lb on10-ton roads 18,000 lb on 9-ton roads The Minnesota Tire Law is the limiting factor
Single	20,000 lb	18,000 lb
Tandem	34,000 lb	
Tridem	42,000 lb (8' to 9' between first and last axles)	
Width	8'6"	

Height	13'6"	
Length	45'	Motor vehicle (48' mobile crane)
	45'	Trailer and full trailer
	*53'	Semitrailer (75' overall on nondesignated highways)
	28'6"	Doubles
	75'	Stinger steered
Overhang	3' front, rear unlimited but over	

New York

GVW	80,000 lb	
Single axle (steer)	22,400 lb	Manufacturer's tire rating
Single axle	22,400 lb	
Tandem	36,000 lb	
Tridem	42,000a lb	(> 8' in spacings
Tolerance	N/A	
Width	8[b]	Pavement lane width of < 10'
	8'	Holland Tunnel, NY/NJ Port Authority
	8'6"	Designated highways and lane width of 10' or greater
Height	13'6"	
	12'6"	Holland Tunnel
	13'0"	Lincoln Tunnel; both NY/NJ Port Authority
Length	40'	Single unit
	48'	Semitrailer
	53'[c]	Semitrailer[d]
	28'6"	Doubles
	65'	Stinger-steered autotransporter + 3' front and 4' overhang
	75'	Autotransportersd + 3' front and 4' rear overhang
	65'	Overall length
		No overall length[d]
Overhang:	No limit rear, within overall length[e]	
	15'	Front max

[a] Axles < 46" apart, measured from axle centers, are considered one axle. Allowed eight based on Federal Bridge Formula.

[b] Except in New York City. 8'6" on highways with minimum pavement width of 10'

[c] Except in New York City. Distance from Kingpin to center of rear axle group limited to 41'

[d] On designated and access highways

[e] Flag or light over 4'

Ohio

GVW	80,000 lb
Weight	
Single	20,000 lb
Tandem	Two successive axles spaced 4' or less, center to center, not to exceed 24,000 lb 34,000 lb + 1,000 lb for each foot or fraction thereof over 4', not to exceed 40,000 lb
Tridem	Spaced more than 4' between each axle and not more than 9' between first and third axle; cannot exceed 48,000 lb
Width	Designated highway 8'6"
Height	13'6"

Length	53' Semi-trailers	

Pennsylvania

GVW	80,000 lb	
Single (steer)	20,000 lb	
Single	20,000 lb (GVW > 73,280 lb)	
	22,400 lb (GVW ≤ 73,280 lb)	
Tandem	34,000 lb (GVW > 73,280 lb)	
	36,000 lb (GVW ≤ 73,280 lb)	
Tridem	42,500 lb (GVW > 73,280 lb)	
—— Federal Bridge Formula applies to combination vehicles registered and weighing > 73,280		
Width	8'	Nondesignated highways
	8'6"	Designated highways
Height	13'6"	
Length	40'	Single unit
	53'	Semitrailers (53', kingpin setting to center of axle group not to exceed 41')
	28'6"	Doubles
	65'	Autotransporter
	75'	Stinger steered
Overhang	3' front	
	6' rear divisible loads; no rear restriction for nondivisible loads not exceeding 70'	
Tolerance	3% scale tolerance on GVW when axle weighed (not allowed on Interstate if weighed on stationary scales)	

South Dakota

GVW	80,000 lb	Interstate
Single (steer)	20,000 lb	
Single	20,000 lb	
Tandem	34,000 lb	
Tridem	42,000 lb (8' spacing)	
—Federal Bridge Formula applies		
Tolerance	Allowed, but not specified	
Width	8'6"	
Height	14'	
Length	45'	Single unit
	53'	Semitrailer
	28'6"	Doubles[a]
	53'	Autotransporter no overhang allowed
	No restriction on overall length[a]	
Tire width	600 lb per inch width	
Overhang	3' front, 4' rear	

[a] Truck tractor-semitrailer or truck tractor-semitrailer: trailer may not exceed 81'6" overall length. No unit may exceed 45'. Weight of second unit may not exceed weight of first by more than 3,000 lb.
Road tractor-trailer-trailer may not exceed 80' overall length. Each trailer limited to 28'6".
Straight Truck-Trailer may not exceed 80' overall length.
Saddlemount combinations may not exceed 75' overall length.

Texas

GVW	80,000 lb
Single	20,000[a] lb
Tandem	34,000[a] lb
Tridem	42,000[a] lb

—Federal Bridge Formula applies

Maximum legal weight is based on the number of axles

[a] Cannot exceed manufacturer's tire weight rating

Tolerance	None
Tolerance	3% scale tolerance on GVW when axle weighed (not allowed on Interstate if weighed on stationary scales)
Width	Width is measured from the outside points of the widest extremities, excluding safety devices.
Legal width limit	8', 6" (102")

Maximum width permitted

On holidays	14', except for manufactured housing
On controlled access highways[a] (Interstate Highway System)	16', except for manufactured housing
Without route and traffic studies and certification by applicant on file	20'
For new houses	34'
For existing houses	40'
For new tanks	34'
For existing tanks	40'
For portable buildings	No limit
For manufactured housing	No limit

[a] Controlled access highways are those highways that must be entered from an access road, not from a stop sign. Traffic can cross the highway only by way of an overpass or underpass. Controlled access highways are usually considered to be the Interstate Highway System.

Height	14'	
	16'	Maximum permitted on holidays
	< 19'	Maximum permitted without a route and traffic study and route certification on file
Length	180'	Based on truck or truck-tractor combination
	Unlimited	For super-heavy permits
	125'	Maximum permitted without route and traffic study and route certification by applicant on file

Virginia

Weight		
Any one axle	20,000 lb	
Tandem axles	34,000 lb	> 40 inches but ≤ 96 inches spacing between axle centers
Single unit	40,000 lb	2 axles
	54,000 lb	3 axles
	–	4 axles; see chart page 5[84]

Tractor-semitrailer	60,000 lb	3 axles
	74,000 lb	4 axles
	80,000 lb	5 axles
	80,000 lb	6 axles
Tractor-twin trailers	80,000 lb	5 or more axles
Other combinations	80,000 lb	5 or more axles
Per inch of tire width in contact with road surface	650 lb	
Length (Interstate and Designated Highways)		
Truck	40'	Excluding load
Semi-trailer	48'	Including load
Semi-trailer	53'	Including load*
Twin trailers	28'6"	Each, including load
Combinations		No restriction on overall length
Automobile and watercraft transporters		
	65' + 3' overhang to front and 4' overhang to rear	
	75' + 3' overhang to front and 4' overhang to rear (stinger-steered)	
Length (Non-Interstate and Non-Designated Highways)		
Truck	40'	Excluding load
Semi-trailer	53'[a]	
Twin trailers	Not permitted[b]	
Tractor semitrailer combinations	No overall length limitations except where prohibited	
Combination of a towing vehicle and any manufactured home	65'	Including load[c]
Width		
All vehicles	102'	Excluding mirror and any warning device installed on a school bus
Height		
All vehicles	13'6"	

[a] Provided the spacing between the kingpin of the semitrailer and rearmost axle or a point midway between the rear tandem axles does not exceed 41 feet.

[b] However, these vehicles may be operated on any highway designated by the Commonwealth Transportation Board (STAA Approved Routes).

[c] Vehicles designed and used exclusively for the transportation of motor vehicles may have additional load overhang not to exceed 3 feet on the front of the vehicle and 4 feet on the back of the vehicle. (See below for additional information on extended loads.)

Washington

GVW	105,500 lb	
Single (steer)	20,000 lb	Subject to tire size
Single	20,000 lb	Subject to tire size
Tandem	34,000 lb	Based on federal formula
Tridem	± 42,000 lb	Based on federal formula

[84] Virginia's Size, Weight and Equipment Requirements for Trucks, Trailers, and Towed Vehicles, Virginia Department of Motor Vehicles, http://www.dmvnow.com/webdoc/pdf/dmv109.pdf

—Federal Bridge Formula applies

Tolerance	None	
Width	8'6"	
Height	14'	
Length	40'	Single unit
	53'	Semitrailer
	61'	Doubles (two trailers including coupling device)
	75'	Truck/trailer
	65'	Standard autotransporter
	75'	Autotransporter/truck and stinger steered trailer plus overhangs (3' front, 4' rear); no restriction on overall length
Overhang	3' front	
	15' rear measured from center of last axle	
Tire width	600 lb per inch width on steer	
	500 lb per inch width of all other axles equipped with single axles	

Wisconsin

GVW	80,000 lb	
Single (steer)	20,000 lb	
Single	20,000 lb	
Tandem	34,000 lb	
Tridem	42,000 lb	

—Federal Bridge Formula applies

Width	8'6"	
Height	13'6"	
Length	45'	Single vehicle and load
	53'	Semitrailer (43' kingpin/rear axle limit)
	28'6"	Doubles
	66'	Autotransporter (48' tractor limit; 4' front, 5' rear overhang within 66')
	70'	Overall length for straight truck and trailer and local roads
	75'	Tractor/semi-trailer on most state highways
Overhang	3' front, 4' rear, must be within legal limits	

Appendix E:

State DOT Superload Permit Processes and Practices – Permit Limits

Alabama

Single axle	22,000 lb
Tandem axles	44,000 lb
Tridem	66,000 lb
4 axles	88,000 lb
5 axles	110,000 lb
6 axles	122,000 lb
7 axles	142,000 lb
8 axles	150,000 lb
Width	16' (16' on 24' pavement, designated routes) (>16' wide considered superload)
Height	16' (>16' considered superload)
Length	150' (maximum overhang 20')
Weight	All weights subject to bridge analysis (>250,000 lb considered a superload)

California

Single axle	20,000 lb in general
	20,000 lb maximum on a steering axle
	22,500 lb on a single drive axle of a two-axle tow truck
	28,000 lb on a single-axle mechanical distribution unit heavy haul configuration and some fixed load applications
Tandem axles	46,725 lb with 4'6" axle spacing, 8' width, 4 tires/axle
	58,406 lb with 4'6" axle spacing, 10' width, 8 tires/axle
	60,000 lb with a minimum 5'9"axle spacing, 10' width, 8 tires/axle
Tridem	51,450 lb with 9'0" axle spacing, 8' width, 4 tires/axle
	52,500 lb with 10'0" axle spacing, 8' width, 4 tires/axle
	Note: Maximum allowable axle spacing for tridem axles is 10'4"

Florida

No tire may exceed 550 lb per inch of tire section width (plus scale tolerance) as defined by the rating molded in the tire sidewall. Over 199,000 lb is considered a superload.

Idaho

Check colored coded charts for permit limits for various routes. Annual permits may not be issued for gross weights >200,000 lb for any colored route. Gross weights >200,000 lb must operate by single trip permit.

Illinois

Length	145'
Width	14'6"
Height	15'
Weight	
Single:	>20,000 lb but <25,000 lb

2-axle tandems (axles spacing 4' to 8') > 34,000 lb but < 48,000 lb

3-axle tandems (outside axles 8' to 10') > 42,000 lb but < 60,000 lb

Axles	**Maximum weight**	**Minimum outside axle spacing**
2	36,001–48,000 lb	10'

3	68,000 lb	14'
4	76,000 lb	36'
5	80,001–100,000 lb	40'
6	80,001–120,000 lb	44'

Vehicles not within the weight and axle spacings limits for a routine issue permit are designated a superload and require a special analysis.

Indiana

GVW	120,000 lb
Width	16'
Length	110'
Height	15'

Louisiana

	≤ 120,000	**> 120,000 lb**
Single	24,000 lb	20,000 lb
Tandem	48,000 lb	40,000 lb (45,000 lb with 12' or more of spacing)
Tridem	60,000 lb	60,000 lb
4 axles	80,000 lb	80,000 lb
5 axles	108,000 lb	
6 axles	120,000 lb	
7 axles	132,000 lb	
8 axles	152,000 lb	
Maximum	254,000 lb	Loads > 232,000 require analysis if off designated highway system
Width	16'	Interstate
Height	Depends on clearances	
Length	No specific limit (steerable dolly required for loads > 125')	

Maine

(without a special and detailed review)

Special Mobile Equipment		**Tractor-semitrailer**	
2 axles	39,100 lb	4 axles	120,000 lb
3 axles	62,100 lb	5 axles	130,000 lb
4 axles	110,000 lb	6 axles	140,000 lb
7 axles	159,000 lb (with specific axle loadings)		
8+ axles	177,000 lb		
Width	≥ 16' or more require police escorts		
Height	16' contact utilities, pole car required		
Length	≥ 125' require police escorts		

Additional conditions may be applied to extreme loads. Allow minimum of 2 days for application review.

Michigan

Weight	Depends on routes, vehicle gauge, and tire size
Length	50'
Width	16' and 14' during spring restrictions
Height	15'

Minnesota

Single	20,000 lb
Tandem	40,000 lb (46,000 lb w/bridge check)
Tridem	60,000 lb
4 axles	72,000 lb
5 axles	92,000 lb GVW (104,000 lb)
6 axles	112,000 lb GVW
7 axles	132,000 lb GVW
8 axles	144,000 lb GVW

Weights on axle groups must be equally divided within group; if adequate tire on steer, GVW can be higher.

Trunnion Axles

	26,000 lb	Single axle
	52,000 lb	Tandem axle group (with bridge check)
	30,000 lb	Single axle
	60,000 lb	Tandem axle group
Width	14'6"	Depends on routes w/o escort(s), but always escort(s) when over 14'6" wide. If load/vehicle cannot stay on right side of centerline on nondivided highways, then a lead Peace Officer (police) escort is required.
Height	15'6"	When > 15'6" high, a physical route survey at 6" higher than permit height required to be done by move within 1 week before start of move.
Length	95'	Depends on routes > 95'0" up to 110' requires 1 escort > 110'0" up to 120' requires 2 escorts > 110'0" up to 130' requires minimum 2 escorts and may require district check when > 150' > 170' (for true rear steering dolly) requires minimum 2 escorts and may require district check; may require special hours of move

New York

Weight	199,999[a] lb	Over 140,000 lb must have bridge review
Single	Depends on routes, axle spacings, and vehicle configuration	
Tandem	Depends on routes, axle spacings, and vehicle configuration	
Tridem	Depends on routes, axle spacings, and vehicle configuration	
4 axles	Depends on routes, axle spacings, and vehicle configuration	
Width	16'[a]	
Height	15'11"[a]	
Length	159'11"[a]	

a Above these limits are superloads that require supplemental paperwork have additional restrictions and bonding. Allow 2 weeks for approval.

Ohio

Maximum axle/axle group weight limits

Single axle	29,000 lb
Short tandem	36,000 lb (axles are < 4 ft)
Long tandem	50,000 lb (axles are < 16 ft)

Short tridem	47,000 lb (axles < 16 ft with < 4 ft spacings)
Long tridem	60,000 lb (axles < 16 ft)
Short quad	60,000 lb (axles < 16 ft with < 4 ft spacings)
Long quad axle	80,000 lb (axles < 16 ft)
Width	No specific limit; dependent upon route
Height	Dependent on clearances
Length	No specific limit

Pennsylvania

Single	27,000 lb
Tandem	52,000 lb
Tridem	63,000 lb
4 axles	72,000 lb
5 axles	116,000–120,000 lb
6 axles	127,000–147,000 lb
7 axles	136,000–174,000 lb
8 axles	136,000–201,000 lb
Width	16'
Height	14'6" (depends on route)
Length	160' (4-lane highway)

South Dakota

Weight:	Permits may be issued up to 1.533 times the legal bridge limit. All combinations will be considered. All axles except steering must be dual. Maximum weight on an axle is limited to 600 lb per inch of tire width.
Trunnion axles	65,000 lb
Width	24" depends on route
Height	Depends on clearance
Length	No set limits

Texas

Maximum axle weight limits

Single	25,000 lb
Tandem	46,000 lb
Tridem	60,000 lb
4 axles	70,000 lb with a 4' spacing
5 axles	81,400 lb with a 4' spacinga
6 axles	94,200 lb with a 4' spacing[a,b]
7 axles	Depends on configuration[b]

[a] May have more weight depending on configuration

[b] Must be steerable or articulating axles

Trunnion tandem	60,000 lb	A minimum of a 10' wide gauge with a 5' spacing and 8 tires on each axle (30,000 lb each axle)

Maximum height, width, length, and weight requirements

Height	18'11"
Width	20'

Length	180' maximum
Rear overhang	30'
Front overhang	25'
Weight	254,300 lb

Permits may be obtained for higher limits, but route analysis will be required or processed as a super heavy permit. For more information, visit the MCD website[85].

Virginia

	Interstate	Non-Interstate
Single	24,000 lb	24,000 lb
Tandem	44,000 lb	44,000 lb
5 axles	*110,000 lb	102,500 lb (64' spacing)[a]
6 axles	*135,000 lb	108,500 lb (64' spacing)[a]
7 axles	*150,000 lb	115,000 lb (64' spacing)[a]
8 axles	*150,000 lb[a]	

[a] 30' of spacing between the last axle on the tractor to the first axle on trailer to carry these weights-must have 64' of axle spacing overall.

Washington

Weight	> 200,000 lb	Superload
Single (steer)	600 lb/in. width	
Single	22,000 lb	
Tandem	43,000 lb	Subject to axle spacing and tire size
Tridem	65,000 lb	Subject to axle spacing and tire size
Tandem		
Axles	> 43,000 lb	Depending on trailer width
Width	14'-32'	Nondivisible load (depends on lanes); > 16' is superload
Height		Nondivisible load (depends on clearances); > 16' is superload
Length	56'	Semitrailer carrying divisible loads
	68'	Doubles (including coupling device) carrying divisible load
	> 125'	Nondivisible load is superload (depends on route)

[85] Texas Department of Motor Vehicles, http://www.txdmv.gov

Wisconsin

Single	20,000 lb
Tandem	60,000 lb
Tridem	81,000 lb
4 axles	90,000 lb
5 axles	100,000 lb (maximum on any number of axles on one end of vehicle)
6 axles	166,000 lb (see above; depends on spacing, configuration)
7 axles	182,000 lb (see above; depends on spacing, configuration)
8 axles	191,000 lb (see above; depends on spacing, configuration)
Width	No set limit
Height	Depends on route
Length	No set limit
	110' overall mobile homes
	80' homes

Appendix F:
Scan Team Contact Information

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Appendix G: Scan Team Biographical Sketches

MATTHEW M. FARRAR (AASHTO CHAIR) is the State Bridge Engineer for the Idaho Transportation Department (ITD). His primary duties include development and supervision of bridge program planning, bridge design, and bridge inspection and evaluation. He has been with ITD for 28 years, holding positions in structural design and construction; he has been in his current position since 1997. Farrar chairs the Technical Committee T-18 Bridge Management, Evaluation, and Rehabilitation for the AASHTO Subcommittee on Bridges and Structures. He holds bachelor's and master's degrees in civil engineering from the South Dakota School of Mines and Technology. He is a licensed professional engineer in Idaho.

SCOT BECKER is the Director of the Bureau of Structures at the Wisconsin Department of Transportation (WisDOT). As Director, he leads the bureau, which oversees program, policy, design, maintenance, and administration of the state's 13,000 transportation structures. He also serves as the State Bridge Engineer representative to AASHTO. He has been with WisDOT for 19 years and worked three years for a consultant prior to joining the department. He holds bachelor's and master's degrees in civil engineering from the University of Wisconsin–Madison and is a licensed professional engineer.

RANDY BRADEN has been with the Alabama Department of Transportation (ALDOT) 42 years and is currently the Assistant Bureau Chief for Permits and Operations, a position he has held since 2001. He supervises the Oversize/Overweight Permit Operations for the state and helped design the very efficient ALPASS Oversize/Overweight Permitting System with superload elements. He is responsible for creating the state's Weight Enforcement Plan and works closely with the Alabama Department of Public Safety to develop enforcement strategies and to protect the highway infrastructure. Braden has been a member of the AASHTO Subcommittee on Highway Transport for 26 years and currently serves as Chairman of the Oversize/Overweight Task Force, focusing on permit harmonization between the regions. He is past Chairman of the SASHTO Oversize/Overweight Permit Group and continues to work toward improving best practices for the movement of permitted loads safely and economically while preserving the public's investment in our highways. He studied engineering at the University of Alabama, Birmingham.

LUBIN GAO is the Senior Bridge Engineer–Load Rating in the Federal Highway Administration's (FHWA's) Office of Bridges and Structures in Washington, DC. At his current position, he leads the national bridge load rating program area through developing policy guidance, providing technical assistance in the development, acceptance, and deployment of new and innovative bridge load rating techniques, and initiating national research needs in collaboration with the FHWA's Resource Center and Turner-Fairbank Research Center. Gao is a member of numerous committees, including the AASHTO Subcommittee on Bridges and Structures, T-5 Loads and Load Distribution. Prior to joining FHWA in 2010, he Gao held numerous academic and professional positions involved in the research, design, and construction engineering services of different types of bridges. Gao received bachelor's, master's, and doctoral degrees from Southwest Jiaotong University in Chengdu, China, in 1984, Tsinghua University in Beijing, China, in 1986, and China Academy of Railway Sciences in Beijing, China, in 1989, respectively.

JEFF G. HONEFANGER is the Manager of the Ohio Department of Transportation (ODOT) Special Hauling Permits Section. He Honefanger is a member of the Ohio PrePass Steering Committee, the Ohio Commercial Vehicle Information System Network (OCVISN) Committee, and instructs classes on Oversize/Overweight vehicles at several state-level professional training academies. Honefanger serves as Vice Chair of the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Highway Transport; is an Executive Board member of AASHTO's Standing Committee on Highways; is a member of the AASHTO Select Task Force on Commercial Vehicle Highway/Rail Crossing Safety; served as Panel Chair for A Synthesis of Safety Implications of Oversize/Overweight Commercial Vehicles (prepared by the University Transportation Center for Alabama); chaired the National Cooperative Highway Resource Program (NCHRP) 20-7 Task 254, Commercial Motor Vehicle Size and Weight Management panel; chaired

the NCHRP 20-7 Task 303, Synthesis of Truck Size and Weight Research Panel; is a member of the NCHRP 20-36: Highway Research and Technology–International Information Sharing Panel; serves on the Multi State Permit Group; and completed two terms as a member of the Transportation Research Board (TRB) Vehicle Size and Weight Committee (AT055). Honefanger holds a bachelor's degree from Wittenberg University, Springfield, Ohio, with a major in Organizational Leadership and a minor in Russian/Central European Studies. He is a member of Eta Chapter of Alpha Sigma Lambda, National Honor Society.

KEVIN I. KEADY is the Load Rating Engineer for the California Department of Transportation (Caltrans). He manages the Office of Structural Design and Analysis within Structure Maintenance and Investigations, Division of Maintenance. In this position, he oversees the load rating, bridge maintenance design, hydraulic scour evaluation, and the encroachment and transportation permitting functions. Keady's office is responsible for load rating for all of the nearly 25,000 bridges in California and performs the structural analysis for all transportation permit "variances" or "superloads." He has been with Caltrans for 27 years, holding a position in Bridge Design and Earthquake Engineering before joining Structure Maintenance and Investigations in 2009. Keady received a bachelor's degree in civil engineering from the University of California at Davis and is a licensed professional engineer in California.

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MICHAEL WIGHT is a Senior Structural Designer with the Maine Department of Transportation (MaineDOT) and has been with the MaineDOT Bridge Program since 1990. He has been a both a structural engineer and a project manager and has special expertise in the area of hydraulics, scour, and load posting. He currently oversees engineering activities on bridge projects with the Northern Maine Bridge Team. Wight is a member of the MaineDOT Load Posting Committee and the AASHTO T5 Loads Committee. He received his bachelor's degree in civil engineering from the University of Maine.

HANI H. NASSIF (SUBJECT MATTER EXPERT) is Professor of Civil and Environmental Engineering at Rutgers, The State University of New Jersey, where he has established the Bridge Engineering program. His expertise includes live load spectra and load rating of bridges, structural health monitoring, and field testing of bridges. He has directed and worked on many projects sponsored by federal and state agencies related to non-destructive testing and infrastructure monitoring as tools for inspection, evaluation, and load rating of bridges and has several years of practical experience in the area of structural design and construction. Nassif has developed live loads models for design and analysis of bridges based on Weigh-In-Motion truck weight data and probabilistic methods. He was involved in the pioneering work of code calibration for the AASHTO LRFD Bridge Design Specifications (1994) and the Ontario Highway Bridge Design Code; he has concluded an NCHRP project for the calibration of AASHTO's design of concrete bridges at the Serviceability Limit States. Nassif is a Fellow of the American Concrete Institute, past member of its Technical Activity Committee, chair of the Institute's newly established Committee 444 – Structural Health Monitoring and Instrumentation, and is the past President of the New Jersey chapter. He is active in TRB's committees, including its Committee on General Structures, and is a past member of the Committee on Dynamics and Field Testing of Bridges. He has received various awards, including AASHTO's

Research Activities Committee (2013) "Sweet Sixteen," Project Implementation Award from NJDOT (2013), American Council of Engineering Companies Educator of The Year Award (2006), and American Society of Civil Engineers Central New Jersey's Educator of The Year Award (2005) for excellence in education and his dedication to student learning. He served as president of the Rutgers' Chapter of the Scientific Research Society and is a member of the Engineering Honor Societies Tau Beta Pi and Chi Epsilon. Nassif obtained his bachelor's and master's degrees in civil engineering from The University of Detroit and his doctorate degree in structural engineering (Civil and Environmental Engineering Department) and a graduate certificate in intelligent vehicle-highway systems (Electrical Engineering and Computer Science Department) from the University of Michigan–Ann Arbor.

Appendix H:
Recommended Procedure for Permitting Automation

The recommended procedure for permitting automation presented here is based on SDDOT's and FDOT's practices. SDDOT runs an automated on-line permit site, and FDOT uses a completely automated permitting system. The applicant simply files the permit application via an automated web-based permitting system, which expedites the permit process; however, additional analysis might be needed for superload permitting.

Based on the successful experiences of South Dakota and Florida, the following key elements are needed for permitting automation:

- Central database
- Data entry and verification interface (graphical user interface)
- Routing system module with geographical database that contains the network and detailed link and restriction information (e.g., roadway and bridge widths, clearances, and other information that would affect the routing decisions)
- Bridge structural analysis module
- Payment and billing system with user interface

Figure H.1 shows composition of the automated permitting system. The applicant inputs all required information and selects the route on the user interface. The selected route is subject to bridge structural analysis and other restriction checks. If all of the requirements are fulfilled, the permit is issued and the system directs the applicant to the payment and billing module to finalize the permit. Otherwise, the applicant must select an alternate route. Automatic routing functionality may also be a part of this system.

System maintenance (e.g., data backups, server monitoring, and system and information updates) should be performed regularly to ensure the system's security and continued operation. In addition, the following are required to ensure a smooth transition from a manual application process to an automated practice:

- A user manual or demo to help familiarize users with the system
- Training for both the end user and the agency staff when the system is first adopted

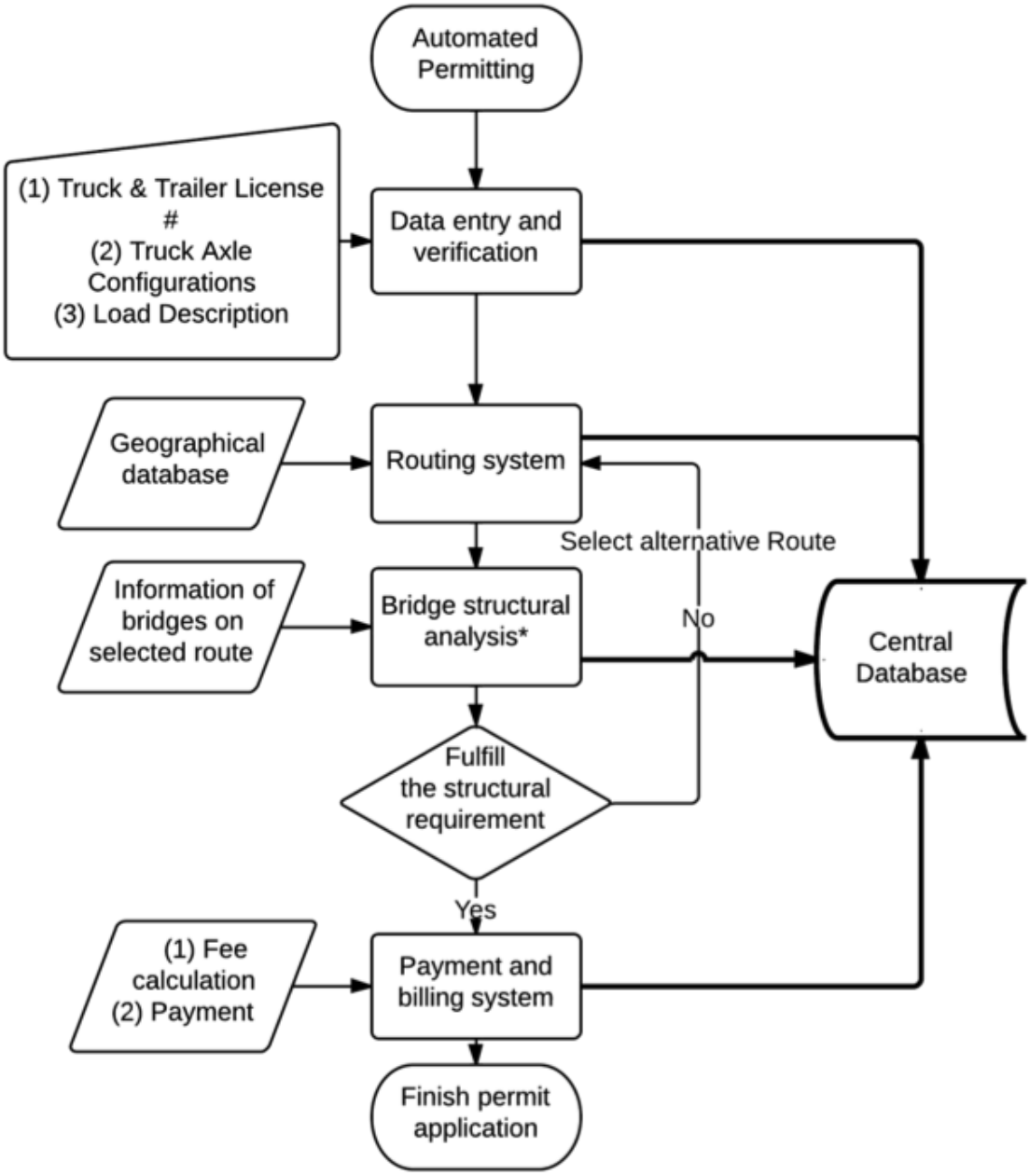

Figure H.1 Structure of automated permitting system

Note: Additional structural analysis for special structures and/or special loads may be required outside the automated system since the structural analysis module and information fed in the system might have limited structural analysis capabilities.


OVERSIZE LOAD


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