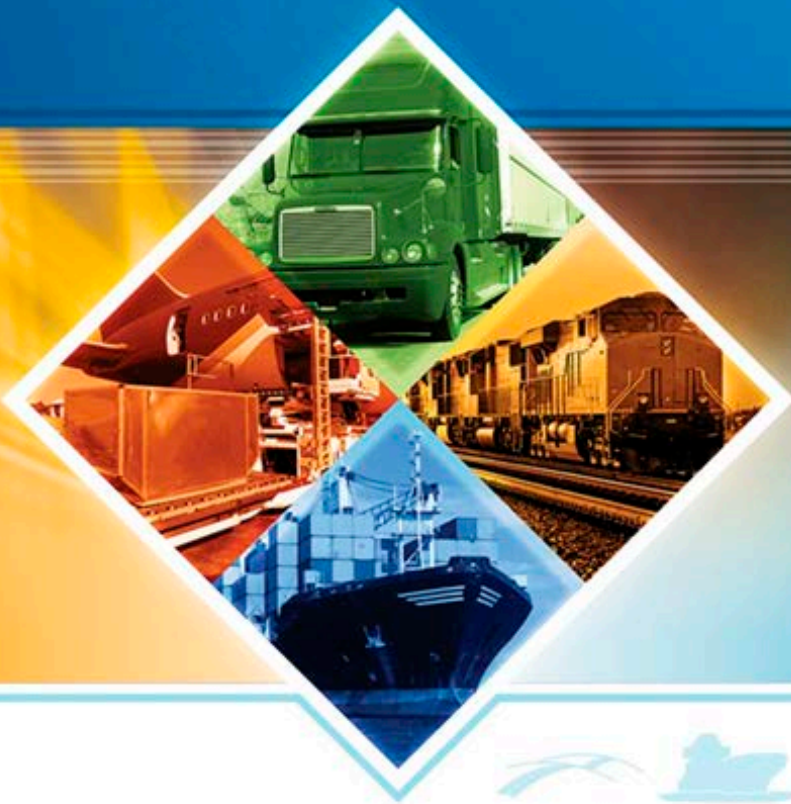


Best Practices in Permitting Oversize and Overweight Vehicles

Final Report



U.S. Department of Transportation
Federal Highway Administration

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1.OVERVIEW

In May 2013, a commercial motor vehicle crossing the Skagit River Bridge along Interstate 5 (I-5) collided with the structure, causing a partial collapse. The subsequent National Transportation Safety Board (NTSB) investigation and U.S. Government Accountability Office (GAO) study identified safety issues and recommended the Federal Highway Administration (FHWA) take certain actions. FHWA, through the “Pilot Escort Vehicle Training Materials and State Certification Harmonization” project, addressed the key NTSB recommendations¹ for action listed below. The GAO report contained a key recommendation for Executive Action:

“To improve stewardship over the nation’s highways and bridges, we recommend that the Secretary of Transportation direct the FHWA Administrator to take the following action:

Conduct a study on State oversize – and overweight-permitting practices, including automated vehicle routing and escort driver certification, to identify areas of best practice and share the results with States.”²

This report, summarizing the FHWA-sponsored Oversize-Overweight (OS/OW) Permitting Best Practices Research Project, is intended to respond to the GAO recommendation. The objective was to conduct a study of State OS/OW permitting practices to identify best practices, including the identification of best practices for automated permitting systems and pilot escort certification.

The OS/OW Permitting Best Practices Research Project includes a comprehensive environmental scan of all information available on current permitting practices with an emphasis on conducting research into automated permitting services and on pilot escort vehicle State certification programs. The objectives of this deliverable were to:

- Conduct a comprehensive environmental scan of information available on OS/OW permitting.
- Develop criteria for best practices in OS/OW permitting.
- Develop criteria for best practices in Pilot Escort Vehicle Operator certification.

The environmental scan included the following:

¹ See NTSB Accident Report NTSB/HAR-14/01 PB2014-10639. “Collapse of the Interstate 5 Skagit River Bridge Following a Strike by an Oversize Combination Vehicle Mount Vernon, WA” p. 60-61 May 23, 2013 <http://www.nts.gov/investigations/AccidentReports/Reports/HAR1401.pdf>

² See “GAO Transportation Safety Federal Highway Administration Should Conduct Research to Determine Best Practices in Permitting Oversize Vehicles,” p. 24 February 2015 <http://www.gao.gov/assets/670/668711.pdf>

- A comprehensive web search to identify documents and other relevant information sources.
- A meeting with the FHWA Office of Bridges and Structures to identify National Bridge Inventory data of relevance to the research.
- Interviews with select States currently using automated OS/OW permitting systems.
- Interviews with select vendors who currently offer OS/OW permitting systems.

The study also looked at criteria for best practices. The subsequent report identified the specific criteria that track to enhanced safety, to improved efficiencies, or to both. The criteria were derived primarily from the results of State and vendor interviews.

This final State best practices report summarizes the research above and presents the inventory and identification of the State best practices for OS/OW vehicles.

Summary of Findings

As States implement and enhance automated permitting systems at an increasing rate nationwide, a consensus regarding the safety and efficiency benefits has also grown. These benefits, as described by both government officials and industry leaders, include:

- The average permit turnaround time (PTA) decreased from several days and hours to just minutes for most routine and some OS/OW permits.
- Nearly all States (30+) that have implemented automated systems report a moderate increase in total permits applications and issuance.
- Increased automated permit volume has proportionally increased revenues.
- Accuracy of permits has dramatically improved.
- A higher percentage of carriers have ordered, obtained, and traveled on State-issued permits following implementation of automated permit systems.
- Roadway safety for all motorists has improved.
- The infrastructure integrity, including the maintaining of bridges and overhead structures, has improved.
- As a result of moving to automated permitted, States are able to achieve staff efficiencies and reduce costs. Fewer people or less time is needed to review and process OS/OW permits, freeing up employees to handle customer service inquiries.
- States have more flexibility with internal headcount issues.

The lightning speed at which technology develops is creating new opportunities for the industry. Moving forward, specialized transportation will reap the benefits of accurate global positioning system (GPS) data, geo-fencing, and software integration strategies. Similarly, as the technology expands, the cost of using these applications should decrease. This will provide State and local authorities with a broader list of options to serve carriers.

2. Literature Review

The literature review component of the environmental scan produced several documents that either identified best practices or included recommendations on best practices for improving the permitting of oversize/overweight (OS/OW) loads. The results were used to identify key OS/OW permitting issues that are either being addressed through automation or have the potential to use automation. This list of issues was incorporated into the questions used to guide the interviews with officials from the States with automated permitting systems selected for inclusion in the current study.

Reference #1: Government Accountability Office (GAO), Transportation Safety: The Federal Highway Administration Should Conduct Research to Determine Best Practices in Oversize/Overweight Permitting, GAO-15-236 (Washington, DC: GAO, February 2015). Available at: <http://www.gao.gov/assets/670/668711.pdf>

The Joint Explanatory Statement of the Consolidated Appropriations Act for Fiscal Year 2014 required GAO to review how the Federal Highway Administration (FHWA) and States regulate the movement of oversize vehicles. This report discusses (1) how the Department of Transportation (DOT) regulates and provides oversight of oversize vehicles and (2) how States regulate oversize vehicles. Congress directed the development of this report study as a response to the incident involving a bridge strike by an OS/OW load, resulting in a collapse of a portion of the Skagit River Bridge in Washington State and significant disruption to traffic and freight movement along the I-5 Corridor.

GAO conducted a comprehensive review of FHWA and State regulations, permitting practices, and size and weight enforcement activities. The study's primary conclusions were that State permitting practices vary significantly and States would benefit from the development of a best practices guidance document. The study's primary recommendation was that the Secretary of DOT should direct FHWA to conduct the necessary research and develop a best practices guidance document with an emphasis on automated permitting systems.

Reference #2: CPCS Transcom Ltd., Perkins Motor Transport, Inc., and Portscape, Inc., National Cooperative Highway Research Project (NCHRP) Report 830: Multi-State, Multimodal Oversize/Overweight Transportation, (Washington, DC: Transportation Research Board of the National Academies, 2016). Available at: <https://www.nap.edu/read/23607/chapter/1#vi>

This study, sponsored by the Transportation Research Board (TRB), included a comprehensive review of State requirements for the permitting of OS/OW freight load movements throughout the United States. The study examined existing challenges facing industry, looking at both the intrastate (movement of loads on State and local roads) and interstate (between States) movement of freight and estimated the public costs resulting from the inefficient movement of OS/OW loads. The study also identified areas for improving the movement of OS/OW loads, including:

- Improve the use of technology to facilitate route planning and permitting by automating State permitting processes.
- Integrate local permitting processes so that carriers can obtain all permits needed for a route that includes State and local roads.
- Communicate regularly with carriers that are using open permits, in order to provide regular information on changes in permit status resulting from issues such as work zones and construction, weather events, or traffic incidents. This will enable carriers to know when to update and revise permitted routes, and
- Improve the availability of information regarding physical restrictions along proposed routes to ensure improved permit accuracy and better alignment of the movement of OS/OW loads along routes that are designed to accommodate the permitted loads.

Reference #3: D. Middleton, Y. Li, J. Le, and N. Koncz, Accommodating Oversize and Overweight Loads: Technical Report, FHWA/TX-12/O-6404-1 (Austin, TX: Texas Transportation Institute: July 2012). Available at: <http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/O-6404-1.pdf>

The Texas Department of Transportation-sponsored study resulted in a statewide map that proposed primary and alternate OS/OW routes for the most commonly used origins and destinations. The study included a comprehensive international and national review of the use of technology to improve the movement of OS/OW loads, including such applications as:

- Permit issuance and auto-route generation.
- Bridge safety assessments to support routing decisions.
- Enhanced en-route surveillance and notifications to carriers of changes in route restrictions.

Reference # 4: Arora and Associates, P.C., NCHRP Report 20-68A, Scan 1201 Advances in State DOT Superload Permit Processes and Practices, April 2014. Available at: http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_12-01.pdf

The American Association of State Highway and Transportation Officials (AASHTO)/TRB-sponsored scan focused on identifying the current processes and criteria used by States for OS/OW permitting. The scan was designed to collect information on current practices, identify best practices, and recommend potential improvements that could be made to OS/OW permitting procedures. Key recommendations included promoting the use of automated permitting systems that include the following functionality:

- 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.³

3. Federal Highway Administration Office of Bridges and Structures

The Study Team met with representatives from the FHWA Office of Bridges and Structures to discuss the study and the availability of relevant information from the National Bridge Inventory. The purpose of the meeting was to identify:

- Information available by State and by location within each State on bridge height restrictions.
- Information available on bridges with variable lane clearance heights.

The Office provided two datasets for reference by the Study Team:

- A summary list of total bridges by State that included a subset of bridges with a “minimum of the maximum” clearance of 30 meters or less. “Minimum of the maximum” refers to the minimum height clearance on a bridge with variations in lane clearance height.
- A detailed list of bridges by height and location that match the above criteria for five States identified for inclusion in the study – Kansas, Iowa, Illinois, Texas, and Nebraska.

This information was used to help frame specific questions on bridge height restrictions in the eight States ultimately selected for inclusion in the study.

³ Information source: http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_12-01.pdf, p. 4-1.

4. Inventory of State Permitting Practices

For the purpose of this report, Automated Permit Systems were defined as systems which:

- Accept, analyze, process, and issue permits.
- Issue single trip permits for oversize/overweight (OS/OW) vehicles.
- Issue OS/OW permits for width, height, length, and weight.
- Are operational 24-hours per day, seven days per week.
- Operate on behalf of the State, without human involvement.

When asked to compare their permitting process both before and after implementation, State officials reported the following positive results after implementation:

- Improved accuracy of permits issued.
- Increased number of permits issued/revenue to State.
- Decreased permit turnaround time (PTA).
- Increased time for State permit office staff to devote to analysis, processing, and issuance of larger OS/OW permits.

Status of Automated Permit Systems Nationwide

Figure 1 identifies the 30 States currently using Automated Permit Systems, 6 States in various stages of using Automated Permit Systems, and 13 States that have no imminent plans to use Automated Permit Systems.

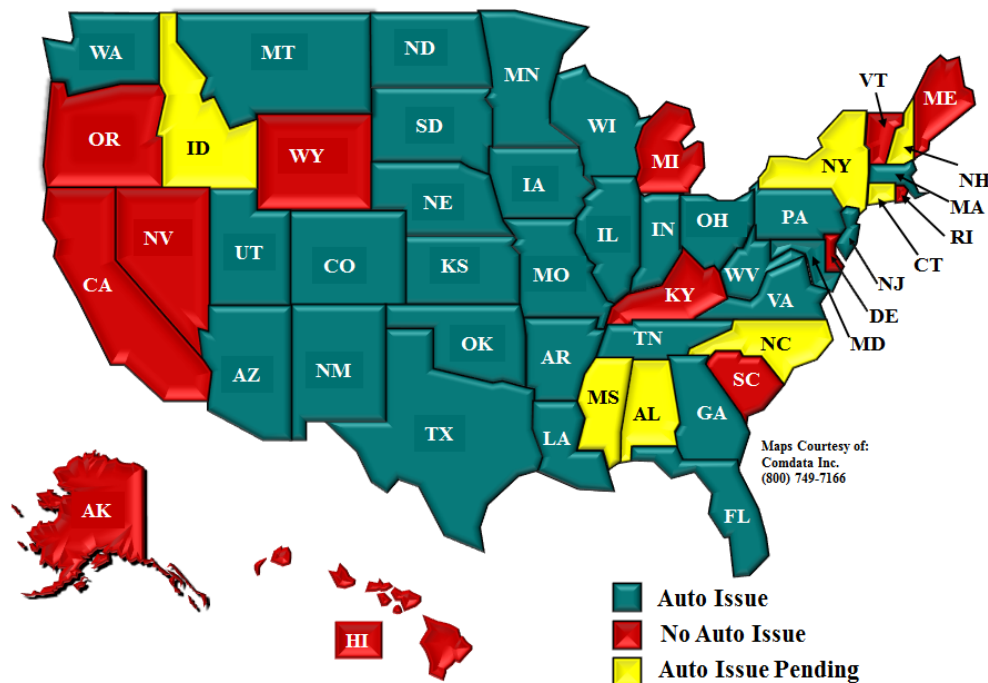


Figure 1. Oversize/overweight automated permit system – self-issue, single-trip permits – U.S. data collected 2017.

Automated Permit Systems

Figure 2 shows 20 States that meet or exceed industry recommended, harmonized minimum thresholds for dimension and weight issued by Automated Permit Systems either provided by vendors or developed in-house.

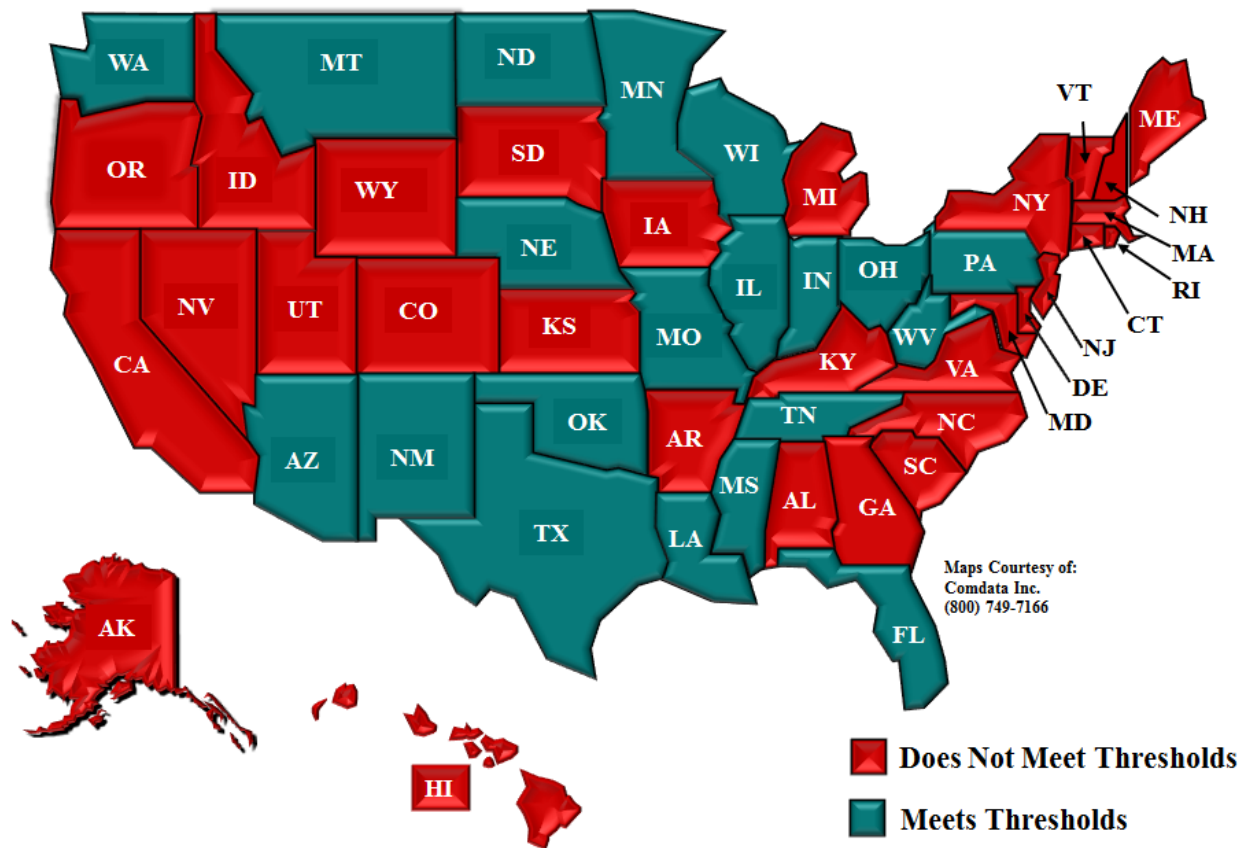


Figure 2. Permit auto issue – 14' wide, 14' 6" high, 110' long, 150K – U.S.

State Permit System Threshold

[Table 1. U.S. jurisdiction oversize/overweight auto issue thresholds is the U.S. jurisdiction oversize/overweight auto-issue thresholds. It displays the following:](#)

- Maximum width, height, length, and gross vehicle weight thresholds for which the Automated Permit System will auto-issue single trip permits.
- Automated Permit System vendor name.
- Future plans, as reported by the State regarding the use of Automated Permit Systems.

Table 1. U.S. jurisdiction oversize/overweight auto issue thresholds.

Jurisdiction	Auto/ Self Issue	Width	Height	Length	Weight	Current System	Future Plans
AL - Alabama	N					Internal System	Ability to Auto/Self-Issue with Bentley System
AK - Alaska	N						
AR - Arkansas	Y	14'	14'	90'	120K	Bentley	Not at this time.
AZ - Arizona	Y	14'	16'	120'	250K	Bentley	Not at this time.
CA - California	N					Internal System	Not at this time.
CO - Colorado	Y	14'	15'	110'	140K	ProMiles	Not at this time.
CT - Connecticut	N					Bentley	Not at this time.
DE - Delaware	N						
FL - Florida	Y	16'	18"	150'	Tractor/ Trailer -199K; Crane -140K	Internal System	
GA - Georgia	Y	16'	16'	100'	150K	Promiles	Not at this time.
HI - Hawaii	N						
IA - Iowa	Y	11'	14' 6"	120'	120K	Bentley	Not at this time.
ID - Idaho	N					Internal System	
IL - Illinois	Y	16'	17'	200'	299K	GIS Solutions / Bentley (weight analysis)	Local permitting option
IN - Indiana	Y	16'	3" less of lowest VC on route	110'	200K	Internal System	Indiana is exploring different options for an updated or new automated system.
KS - Kansas	Y	16' 6"	15'	126'	120K	ProMiles	Not at this time.
KY - Kentucky	Y	8' 6"	13' 6"	Legal	120K	Internal System	Current auto issue applies to Metal Commodity Single Trip and Annual Permits only. All other Annual Permits and threshold (to be determined) Single Trip permits will be available July 1, 2018. Bentley implementation is currently underway.

Table 1. U.S. jurisdiction oversize/overweight auto issue thresholds. (continued)

Jurisdiction	Auto/Self Issue	Width	Height	Length	Weight	Current System	Future Plans
LA - Louisiana	Y	16'	15'6"	125'	232K	Hexagon	Going live with new automated system December 2017.
MA - Massachusetts	N					ProMiles	New ProMiles system launched 2016, no auto issue yet.
MD - Maryland	Y	12'	14' 6"	90'	150,000	Bentley	Upgraded May, 2016
ME - Maine	N					ProMiles	New System expected by end of 2017.
MI - Michigan	*N *					Bentley	Not at this time. * mobile homes only 16' w, 15' h, 150' l
MN - Minnesota	Y	14'6"	14' 6"	110'	36K tandem ; 54K tridem	Bentley	New System RFP 2018, New System Implemented possible 2019.
MO - Missouri	Y	16'	16'	150'	160K	Bentley	18'W on interstate
MS - Mississippi	Y-Daylight Move Only	16"	15'6"	120'	180K	ProMiles (pending)	ProMiles system to launch October, 2018 and will auto issue up to 20' wide, 17 high, 120 long and 190K gross.
	Y - 24 Hour Movement	12'	13'6"	99'	150K		
MT - Montana	Y	18'	17'	150'	175K non-interstate, 250K interstate	Celtic	Dynamic Routing
NC - North Carolina	N					Bentley	
ND - North Dakota	Y	18'	17'	200'	250k	ProMiles	Not at this time.
NE - Nebraska	Y	16' 1"	16'	150'	180K	Bentley	Not at this time.
NH - New Hampshire	N					ProMiles	New System expected October 2018.
NJ - New Jersey	Y	No Trigger	15'	100'	250K	Bentley	Not at this time.

Table 1. U.S. jurisdiction oversize/overweight auto issue thresholds. (continued)

Jurisdiction	Auto/ Self Issue	Width	Height	Length	Weight (lbs.)	Current System	Future Plans
NM - New Mexico	Y	16'	15'5"	120' (Trailer not greater than 90'	170K (No axle width greater than 8'6")	ProMiles	Not at this time.
NV-Nevada	N					No System	by 2017 – 250K; 12'W; 15'H; 110'L long
NY - New York	N					Internal System	New Promiles system spring 2018. Will self- issue permits up to 14' wide, 13'-11" high, 99' long that do not need a NYSDOT Structures review.
OH - Ohio	Y	14'	14'6"	No Limitation	159,999	Bentley	Upgrade being done.
OK - Oklahoma	Y	16'	15'	110'	200K; Weight – as long as they match OL-1 drawing;	Cambridge/ Intergraph	Not at this time.
OR - Oregon	N					Internal System	Not at this time.
PA - Pennsylvania	Y	16'		160'	201K	Internal System	Not at this time.
RI - Rhode Island	N					Internal System	Not at this time.
SC - South Carolina	Y	14'	13'6"	100"	100K	Bentley	New Hexagon system to be released early 2018.
SD - South Dakota	Y	14'	18'	100'	130K	Bentley	Not at this time.
TN - Tennessee	Y	16'	14'6"		150K	Cambridge	Not at this time.
TX - Texas	Y	16'	16'6"	110'	180K	ProMiles	Not at this time.
UT - Utah	Y	14'	14'6"	105'	125K	Internal System	Not at this time.

Table 1. U.S. jurisdiction oversize/overweight auto issue thresholds. (continued)

Jurisdiction	Auto/ Self Issue	Width	Height	Length	Weight (lbs.)	Current System	Future Plans
UT - Utah	Y	14'	14'6"	105'	125K	Internal System	Not at this time.
VA - Virginia	Y	14'	14'	100'	115K	Bentley	Working towards future upgrade.
VT - Vermont	N					Internal System	Not at this time.
WA - Washington	Y	16'	16'	125'	200K	Internal System	Not at this time.
WI - Wisconsin	Y	14'	14'6"	125'	250K	Internal System	Under consideration - 16' W, 16' H, 160' L, 270K.
WV - West Virginia	Y	16'	15'	150'	250K	Bentley	Not at this time.
WY - Wyoming	N					No System	Not at this time.

5. Review of State Oversize/Overweight Permitting Systems

As noted, the results of the previous components of the environmental scan identified topics and issues to explore with States that have implemented and are using automated permitting systems. The automated permitting process comprised four components which were grouped into the previously identified topics and issues. The resulting list guided the interviews with the selected States.

The Specialized Carrier & Rigging Association identified the key States to include in the study. The rationale for this is that the industry deals with State permitting agencies and automated State permitting systems on a daily basis and has the most experience with those States and systems that offer the potential for identifying best practices.

Once this list had been compiled, a subset of States were identified that included ones using systems provided by each of the primary oversize/overweight (OS/OW) permitting system vendors and one State that developed its own system. Using these combined criteria, five States were identified as being highly representative for inclusion in the study: Kansas, Iowa, Illinois, Texas, and Nebraska.

In addition, several States that met the additional criteria were identified in the Work Plan for the study, in particular, those that offered a potential best practice for issuing OS/OW permits for ports. Maryland issues permits for the Port of Baltimore and was therefore included in the study.

The State of North Dakota was also selected for inclusion in the study. The threshold limits that States set for auto-permitting systems vary significantly; there is a continuing dichotomy between States interested in protecting infrastructure and those with industry-driven interests in expanding permit thresholds available through automated systems. North Dakota is a State that has set limits at much higher levels than most other States and could thus serve as a potential example of a best practice in this area.

Finally, the State of Georgia issues permits on behalf of local agencies. A concern noted by the industry was the challenge in obtaining local permits for moves off of the State highway system. Some issues include identifying the point of contact to obtain the permit or having access to information about permit requirements. The State of Georgia offered an additional opportunity to identify a best practice; in this case, how the State and local jurisdictions established the protocols for “one-stop-shop” permitting.

The four components and topics/issues included:

1. Automated Route Identification.

- Does the State route map include all State and local roads?
- How does the State coordinate, if at all, the State and local permit requirements?
 - Does the State issue local permits?
 - Does the State include hyperlinks to local permitting agencies?
- Does the State auto-issue route permits?
- Does the State identify route restrictions?
 - Are permanent restrictions, such as bridge height or per axle and gross vehicle weight (GVW) weight limits identified?
- Are temporary restrictions, such as construction, work zones, weather events, or traffic incidents identified?

2. Thresholds.

- What is the threshold and how was it established (include height, weight, width, and length)?
- What were the criteria for setting the threshold?
- What type of analysis was completed?
- Who was involved in determining the thresholds?
- Have the thresholds been changed since they were first established and if so, why?
- Have the established thresholds reduced the number of incidents involving OS/OW loads such as reduced infrastructure damage or fewer hits related to height – or width-related hits?

3. Application Process.

- User interface.
 - Quality of graphics and maps.
 - Ease of use.
- Edit checks.
- Library function – ability to store.
 - Previous routes or permits.
 - Company data.
 - Power units and trailer configurations.

4. System Operations.

- Data quality.
- Types of payments accepted.
- Notification of real-time changes in route restrictions and changes in permit status.

6. State Case Studies

Nebraska

Automated Route Identification

Component	Description
Complete map of all suitable roads • State roads • Local roads	The system map includes only State roads and does not show county roads. The State indicated that there are plans to upgrade the State map to include local roads.
Coordination of State and local permit requirements • State has ability to issue State and local permits • State map contains hyperlink to local jurisdiction	If a carrier's requested route passes over local roads, the carrier is responsible for obtaining any local permits. The State website has a listing of each local jurisdiction's point of contact but the carrier is responsible for contacting the local agency.
Auto-issuance of permit	The State noted that permit accuracy has improved significantly.
Identification of route restrictions	The system includes both permanent and temporary route restrictions. The permit office receives updates on changes in route restrictions on a regular basis from the Nebraska DOT regional offices. These are uploaded to the system and posted on the State website.

Thresholds

Threshold	Description
Height	The State uses the “minimum of the maximum” for any bridges or structures with variances in height thresholds by lane. The State also allows a buffer of 3 inches. The State now requires that a permit request include a specific load height number. Previously, the system threshold did not require a specific number and carriers could state the requested height was legal and under the State threshold of 14 feet 6 inches. Only four bridges in Nebraska have a clearance less than 14 feet 6 inches but the system was not accurately identifying routes that passed over these bridges. A route survey is required for loads greater than 16 feet.
Weight	180,000 pounds
Width	A load width exceeding 18 feet requires Nebraska DOT district approval.
Length	A combined length of 150 feet or greater requires district approval.

Application Process

Component	Description
User interface • Quality of graphics and maps • Ease of use	The State indicated that the current map and graphics need to be updated. As noted, the State is planning to implement these updates.
Edit checks	The system contains basic edit checks that verify permit applications comply with State rules regarding axle weight, GVW. The system also ensures the permit applications match the correct permit.
Library function • Company data • Power unit and trailer configuration • Saved routes	The system has a library function that permits carriers to store company information, power unit and trailer configurations, and previous routes. The system does not, however, automatically pull this data from the library to populate fields in a new permit request. Carriers must enter power unit and trailer information for each request.

System Operations

Component	Description
Data quality	The State noted that the development and implementation of the system required significant improvements in the quality of data and information sharing between Nebraska DOT regions.
Ease of payment	The State accepts credit and debit cards on-line. Carriers may pay for permits using checks or cash if applying in person.
Notice of real-time changes in route restrictions	The State does not currently notify permit holders of changes in route restrictions. These changes are, however, posted to the State's website and carriers monitor the website to determine if a newly posted route restriction impacts their existing permits. The State also operates a 511 traveler information system, which is updated on a regular basis to include changes in route restrictions or other information affecting permit status.

Maryland

Automated Route Identification

Component	Description
Complete map of all suitable roads • State roads • Local roads	Maryland's system map includes State and local roads.
Coordination of State and local permit requirements • State has ability to issue State and local permits • State map contains hyperlink to local jurisdiction	The only local jurisdiction in Maryland that requires a permit is the city of Baltimore. The State system, known as Maryland One (MD1), is a joint permitting system that issues all OS/OW permits within the State. The city of Baltimore, having access and jurisdiction over their permits, is now able to issue their permits in a more efficient manner through this system. The Port of Baltimore is a primary beneficiary of the MD1 system, as it has greatly reduced the amount of time formally required to process permit applications. Maryland does not have jurisdiction over local roads. The State's policy is that carriers must contact a local jurisdiction to obtain permission to use the jurisdiction's road system. Maryland is actively working to add the bridge data for two counties to the MD1 system as a pilot (Baltimore and Montgomery counties).

Component	Description
Auto-issuance of permit	At present, about 70% of all permits are auto-issued. The State reported that permit accuracy has increased since the automated system was implemented. Permit processing time has decreased significantly and processing time for non-auto-issued permits (200,000 pounds and above) is now on average 2 days.
Identification of route restrictions	Route and bridge restrictions are all included in the MD1 system. The system is designed to auto-route carriers around any identified route and bridge restrictions. Maryland receives regular updates on changes on route and bridge restrictions; these are entered into the system as received.

Thresholds

Threshold	Description
Height	The Maryland One system is a Maryland DOT program operated by the Maryland State Highway Administration (MD SHA). The system incorporates multiple jurisdictions – MD SHA, Baltimore City DOT, the Maryland Transportation Authority (toll roads and toll facilities), and the Port of Baltimore – and each individual agency is responsible for ensuring that the system has correct structural information for bridge ratings, clearance and lane width are accurate, and other threshold data. The State reported plans to add Maryland's counties to assist carriers with routing. Maryland is actively working to add bridge data to the MD1 system as a pilot for Baltimore and Montgomery counties.
Weight	Currently auto issuing at 150K (looking to move to 200K).
Width	Auto-issuing at 12 feet.
Length	Auto-issuing at 90 feet.

Application Process

Component	Description
User interface - Quality of graphics and maps - Ease of use	The State indicated that the system's maps and graphics were acceptable. The State is working to upgrade the map data to a 2015 global information system (GIS) map and a hauling permit preferred network.
Edit checks	The system has a knowledge base that includes all State rules. Each permit request is checked against this knowledge base to ensure that the permit is accurate. The application is also validated against route and bridge restrictions prior to issuance.

Application Process

Component	Description
Library function • Company data • Power unit and trailer configuration • Saved routes	Carriers are required to pre-register and establish an account with the State. Once the account is approved, the carrier has access to a library function that stores carrier data, power unit and trailer information, and the carrier's permit history. A carrier can pull previous permits and power unit/trailer configurations to use in requesting a new permit. The State also preapproved routes on State and county roads for which carriers may request a permit.

System Operations

Component	Description
Data quality	The State noted that the implementation of the automated permitting system has improved the quality and timeliness of information exchange between State agencies and also with local agencies. The result has been more accurate data available for analyzing and processing permits. The State system has the data necessary to do real-time bridge and weight analyses for every permit request received through the automated system. Previously, the weight analysis was only conducted for loads of more than 120,000 GVW. An additional benefit was that all route restrictions were consolidated into a single system. The system also includes the functionality to match load dimensions with requested routes to ensure that the carrier is applying for the correct type of permit. The State is now able to capture better statistics on permitted loads and is able to use this information for planning, budgeting, enforcement, paving maintenance, and other program activities.
Ease of payment	Payments can be made by credit card, escrow account with bond, checks, wire transfers, or irrevocable letters of credit. The State no longer accepts cash payments.
Notice of real-time changes in route restrictions	Open permits are monitored to determine if a route restriction changes the status of a permit. The system generates an automatic email notice to each carrier with an open permit that has a status change, and the carrier is asked to contact the permit office to revise the permit.

North Dakota

Automated Route Identification

Component	Description
Complete map of all suitable roads - State roads - Local roads	The State route map shows both State and local roads. The State has statutory authority to permit only on State roads.
Complete map of all suitable roads - State roads - Local roads	The State route map shows both State and local roads. The State has statutory authority to permit only on State roads.
Coordination of State and local permit requirements - State has ability to issue State and local permits - State map contains hyperlink to local jurisdiction	There are 17 oil producing counties in Western North Dakota that require a permit. The State's webpage contains a link to the permit application for these counties, and if a carrier has been issued a State permit, the carrier simply enters the permit number into the county application accessed through the web-link. The application pulls information through an interface with the State system to populate the application. The application is then processed, and if all criteria and thresholds are met, the local permit for the 17 counties is issued to the carrier. Presently, it is manual process but they are working towards automation in near future
Auto-issuance of permit	The State noted that permit accuracy has improved significantly with automation. The State also noted that permitted loads are now using the same routes more consistently and the State is better able to track the movement of permitted loads.
Identification of route restrictions	North Dakota noted that all route restrictions are shown on the State map as red dots. If a requested route contains a red dot, the system will auto-route the carrier around the restriction. The system is designed so that if a carrier clicks on a red button, a pop-up will appear that explains what the restriction is. The State reported that information on changes in route restrictions – construction, work zones, weather events, traffic incidents – is received on a regular basis. The system automatically updates route restrictions within approximately 15 minutes of receiving the information.

Permit Processing Components – Thresholds

Threshold	Description
Height	The current height threshold is 17 feet with a buffer of 4 inches.
Weight	Up to 250,000 GVW depending on the route.
Width	Up to 20 feet wide depending on the route.
Length	Up to 200 feet depending on the route.

The North Dakota system contains a database that includes all data on height, weight, width, and length thresholds by road system. The system also includes an inventory and operating rating for each bridge that was developed and maintained by the State bridge engineers. When a State route is requested and load dimensions entered, the system is capable of completing an automated bridge analysis to determine if the permit should be issued; if not, the system auto-routes the permit around the bridge in question.

Permit Processing Components – Application Process

Component	Description
User interface • Quality of graphics and maps • Ease of use	The State indicated they are happy with the overall system graphics and the road map.
Edit checks	The system contains basic edit checks that match an application with route restrictions and permit types. If an error is noted, for example an axle weight that exceeds thresholds, the system will not process the permit. The applicant receives a notice stating why the permit was not processed and what the applicant should do next.
Library function • Company data • Power unit and trailer configuration • Saved routes	The State has a library function that is still under development. Currently, carriers can store company data and information on power units. Carriers may also pull up a previous permit and copy the route information into the system when applying for a new permit on the same route.

Permit Processing Components – System Operations

Component	Description
Data quality	The State noted that overall data quality and information sharing has improved. The database developed to support the system is updated on a regular basis to reflect route restriction and other changes received from the North Dakota DOT.
Ease of payment	The State accepts credit cards and checking account transfers. In person, applicants may pay using cash or check.
Notice of real-time changes in route restrictions	The State requires that both the permit applicant and driver provide email addresses.

Texas

Automated Route Identification

Component	Description
Complete map of all suitable roads - State roads - Local roads	The Texas system includes both State and local roads but has the statutory authority to route carriers only on State roads.
Coordination of State and local permit requirements - State has ability to issue State and local permits - State map contains hyperlink to local jurisdiction	Texas does not provide contact information for local agencies. The State indicated that the individual carrier is responsible for identifying the local agency and obtaining the necessary permits needed to travel on local roads.
Auto-issuance of permit	Texas conducted extensive testing of the automated system before the system went live. The result was that the system was debugged and the State reports a permit accuracy rate for auto-issued permits of close to 100%.
Identification of route restrictions	The Texas system includes both temporary and permanent route restrictions. The Texas Department of Motor Vehicles (DMV) is the agency responsible for issuing permits. The Texas DOT includes 25 districts and all provide regular information on any construction, work zone, or other activities that change route restrictions. The DMV requests at least five days advance notice for any major change in route restrictions. The DMV reviews and verifies all information received and then posts the information to the system. The DMV indicated that most information is posted within 30 minutes of receipt, which is very close to real-time.

Thresholds

Threshold	Description
Height	The auto issue threshold is set at 16 feet 6 inches and has not been changed since the system was first implemented. The State does not issue permits if any variances in height clearance between lanes exists. To this end, the system is designed to use the “minimum of the maximum” height that is the lowest point of clearance. If a requested permit contains a load height that exceeds a height threshold on the route but is still under the system’s 18 feet 11 inches threshold, the system will route the permit around the height restricted-structure. The State may issue a permit for a structure with lane clearance height variations, but the permit is not auto-issued.
Weight	Up to 180,000 gross pounds
Width	Up to 16 feet, 6 inches
Length	Up to 110 feet

Application Process

Component	Description
User interface • Quality of graphics and maps • Ease of use	The State is satisfied with the quality of the system graphics and user interface.
Edit checks	The system contains basic edit checks that a carrier is applying for the correct permit. This includes route selection, axle weight, GVW, and other criteria that link the permit application to the correct permit.
Library function • Company data • Power unit and trailer configuration • Saved routes	The Texas system has a library function that enables carriers to store company data and formation on power units. The system does not save previous routes but does have a feature where each carrier designates an Administrator who has the authority to create user-level accounts for the carrier. Any user created by the carrier can access previous permits by permit number and use them as a template in the creation of new permit requests.

System Operations

Component	Description
Data quality	The State reported that data quality and data sharing have significantly improved. The system required accurate data on permanent route restrictions – height, weight, length, and width thresholds – to establish the criteria for auto-issuing permits. The real-time transmittal of information from each of Texas DOT's 25 districts on changes in route restrictions has established the procedures for improved data sharing between Texas DOT and DMV.
Ease of payment	The on-line system accepts credit cards and payments from escrow accounts. In-person applicants also may pay with cash or a check. A carrier can also establish an account with Frost Bank and receive a debit card that can only be used to pay for permits. This prevents unauthorized use of the card.
Notice of real-time changes in route restrictions	The Texas system analyzes all open permits when a new route restriction is posted. If the route restriction impacts an approved permit the systems generates an email notice stating that the permit is no longer valid and the carrier must contact the State to change the permit.

Colorado

Automated Route Identification

Component	Description
Complete map of all suitable roads • State roads • Local roads	The Colorado system shows both State and local roads on the State map. The system will display local roads, but the State does not have the statutory authority to issue local permits.
Coordination of State and local permit requirements • State has ability to issue State and local permits • State map contains hyperlink to local jurisdiction	The State maintains a spread sheet on the Colorado DOT website that has contact information for local permit agencies. The State is also conducting a pilot test with the city of Denver to issue a city permit through the State system. When a carrier submits a permit application through the State that includes city of Denver roads, the system will generate a pop-up telling the carrier that a local permit is required. The pop-up allows the applicant to continue without purchasing the local permit or select to proceed to the local permit page where the applicant may apply and pay for a city permit on a real-time basis. The city permit is issued through the State system. The pilot test will use the State's self-issue envelope vehicle thresholds for city-issued permits. The city of Denver estimates that up to 70% of their permits will be issued electronically through the new system.

Component	Description
Auto-issuance of permit	The State noted that the permit error rate is close to zero and that the time to process permits has been reduced significantly for those movements that meet automated permitting criteria. Single trip permits can be processed in 12 minutes and the State has also reduced the permit processing time for loads that exceed automated permitting thresholds. For example, loads between 200,000 and 500,000 pounds can now be processed in less than 3 hours as compared to the previous 3 to 5 days under the old permit system and loads above 500,000 pounds can now be processed in 2 days or less as compared to 2 weeks with the previous system. The system is also designed so that any supporting documentation required from a carrier to process a permit can be uploaded electronically. The State noted that documents can be scanned or emailed and that the State encourages electronic communications to improve the efficiency of the permitting process. The Colorado system is linked to the State's Commercial Vehicle Information Exchange Window (CVIEW) system. The State submits the DOT number for every carrier applying for a permit to identify any outstanding Federal Motor Carrier Safety Administration (FMCSA)-issued out-of-service (OOS) orders. If an OOS is found, the application is flagged and the permit rejected. The State also has an application that is available to carriers who have an established account and have obtained an annual permit. A carrier accesses their account and enters the load dimensions, origin, and destination, and the application identifies a safe route for the move through the system's routing component.
Identification of route restrictions	Permanent route restrictions are hard-coded into the system. The system will route carriers around a route restriction as feasible. The Colorado system also receives updates from the DOT districts and the State's 511 system on route restrictions created by construction, work zones, weather events, incidents such as accidents, or rock falls. These updates are received by the permit office and uploaded into the system as they are verified. Future permits are routed around these restrictions and active permits are tracked and notified of any route restriction changes.

Thresholds

Threshold	Description
Height	Maximum height for a self-issued single trip permit is 15 feet 6 inches. Maximum height for an annual permit uses the Colorado envelope vehicle threshold, which is up to 16 feet.
Weight	Maximum for self-issued single trip permit currently is 140,000 pounds. Annual permit maximum is 200,000 pounds.
Width	Maximum for self-issued single trip permit is currently 14 feet. Annual permit maximum is 17 feet.
Length	Maximum for self-issued single trip permit is currently 110 feet. Annual permit maximum is 130 feet.

The State noted that the height threshold has increased as the quality of the data on bridge and other structure heights has improved. The State further noted that most bridge hits are caused by violators either operating without a permit or deviating from a permitted route. This information is used for enforcement purposes, and violators are notified that the State will suspend any further permit applications until a violator completes a State size and weight training program.

Annual permitted vehicles are self-routed and instructed to use routing tools made available by the department. These tools includes maps (Bridge Weight Limit map, Pilot/Escort Map and Height map), the routing component of our permitting system, departmental website listing bridge vertical clearances, and the department listing construction related roadway restrictions. Annual permitted vehicles may run on any State-maintained highway but must meet the specific requirements of the roadway which may include such items as pilot/escort vehicles or specific additional permit types (e.g., Chapter 6 Special permit) depending upon the dimensions of the load and must also abide by any construction related highway restrictions.

Application Process

Component	Description
User interface • Quality of graphics and maps • Ease of use	The – indicated they are happy with the system graphics and maps.
Edit checks	
Library function • Company data • Power unit and trailer configuration • Saved routes	The system includes a library function that allows carriers to store company information, power unit and trailer configuration information, and previous routes. Previous routes can be copied into an application if a carrier is applying for a new permit on the route.

System Operations

Component	Description
Data quality	Implementation of the system required all offices and regions within Colorado DOT to improve the quality and quantity of data sharing to ensure permit accuracy. The State reported that data quality has significantly improved as a result of this action.
Ease of payment	The State accepts credit cards and PayPal on-line. Applicants may also mail in checks or pay with cash or check if picking up a permit in person.
Notice of real-time changes in route restrictions	The Colorado system tracks open permits and generates an email notice to a carrier of any change in route restrictions in the previous 24 hours. Each applicant must supply an emergency contact email address, and the notice advises the carrier that there is a problem with the route and the carrier must cease operations and contact the permit office immediately. The text of the message is shown below: “IMPORTANT NOTICE! Your load may now be affected by a new restriction. The route on permit number 14S60064761 issued to your company starting on 12/2/2014 now violates one or more new restrictions. The restriction(s) it violates is/are restriction number(s) 1009532 – REPORT – I 76, MP 75.1 to MP 91.5, 12’0” Width. To find more information of the restriction(s), go to the Colorado DOT OS/OW Restriction Report at: http://www.coloradodot.info/business/permits/truckpermits/restrictions.html. If you have not completed travel for this permit or passed the restricted area, it is very important for you to contact the Colorado DOT permit office for routing guidance or for an amended route for this permit. Failure to contact the Colorado DOT permit office may result in delay of your trip or damages to the vehicle, load, or highway. Please call between the hours of 7:30 a.m. and 4:30 p.m. mountain time at 303-757-9539. Please have this permit number and the restriction number(s) available when you call.”

Automated Route Identification

System Component	Description
Complete map of all suitable roads - State roads - Local roads	The Kansas system has a complete map of State and local roads. The map is provided by the system vendor, who obtains GIS data from the TOMTOM product. Permits are issued to cover travel on State roads only.
Coordination of State and local permit requirements - State has ability to issue State and local permits - State map contains hyperlink to local jurisdiction	Kansas does not issue permits on local roads. Some local jurisdictions require permits, and if a permit either originates or terminates at a site off of a State road, the State indicated it is the responsibility of the carrier to obtain any local permits.
Auto-issuance of permit	The Kansas system has a link to the State CVIEW system and each applicant's status is checked on the SAFER system and the Unified Carrier Registry. The State checks each carrier's USDOT number and the vehicle identification number (VIN) for each vehicle to verify credentials and flag outstanding OOS orders or any other violations that may result in a permit not being issued. The system automatically flags any permit application, including auto-issued permits, for human intervention if the check identifies enforcement or credentialing issue. The State reported that approximately 70% of all permits are now auto-issued.
Identification of route restrictions	The Kansas system includes route restrictions and will reroute a carrier around a route restriction. Kansas DOT operates a 511 traveler information system that is updated multiple times a day to show construction and work zones, planned special events, weather events, and traffic incidents. This information is provided to the permit office and uploaded as received. The State has an application and hardware developed by the vendor to use in updating the system, and permit office staff check for and provide route restriction updates throughout the day. All updates pushed from the 511 system are reviewed and verified by the permit office before being uploaded to the system. The State requests that information construction, work zone, planned special events, and other such activities be provided 20 days prior to the scheduled start date so that the system can be updated and permitted loads routed around these restrictions. The State tracks all open permits and notifies each permit holder by email if there is a change in their permit status. The notice states that the permitted route is affected and the permit holder needs to contact the State to update the permit.

A combination upgrade of data and technology provided improved data sharing opportunities that helped with their overall planning process.

Thresholds

Threshold	Description
Height	Kansas DOT provides information on all bridge and other structure heights and clearances. For structures where there are variances between lane clearances, the system selects the “minimum of the maximum,” that is, the lowest clearance for the structure in question.
Weight	Loads with a GVW of 120,000 or less are eligible for auto-issued permits if all other criteria are satisfied. Standard permits are also available for loads up to 150,000 GVW. Any load above this GVW is flagged for additional analysis.
Width	Loads up to 16 feet 6 inches are eligible for auto-issued permits if all other criteria are satisfied.
Length	

Kansas reported that while there has not been a significant reduction in bridge hits, most bridge hits are caused either by non-compliant carriers without a permit or operator error. For example, a carrier may not properly secure a boom or crane and the device opens and hits a bridge or structure. The State also noted that some bridge hits were caused by carriers deviating from an approved route.

Application Process

Component	Description
User interface • Quality of graphics and maps • Ease of use	The State noted that the system has been improved on an incremental basis with all agencies providing input. Overall, the State indicated that they are happy with the quality of the user interface and graphics.
Edit checks	The system will verify that a permit application meets the specified tolerances for the requested route. If, for example, the GVW is within tolerances but the axle weight is too heavy, the system will flag the application and notify the carrier that a different permit is required.
Library function • Company data • Power unit and trailer configuration • Saved routes	The State has a library function that allows carriers to store company information, power units and trailer configuration data, and previous routes.

System Operations

Component	Description
Data quality	The State noted that implementation of the system required improved sharing of information between DOT offices and regions to ensure system accuracy. The State also noted that data on the type and number of permits issued is being used to support planning for corridor management and freight operations.
Ease of payment	The State accepts credit card payments and also allows carriers to establish escrow accounts. The State no longer handles cash payments for permits. Checks may be used to add funds to an escrow account but not to make direct payments for permits.

Iowa

Automated Route Identification

System Component	Description
Complete map of all suitable State and local roads	The State permit map includes local roads, but this is done as a courtesy to help permit applicants identify and complete routes. The State does not conduct any analyses of or make available the results of any analyses on local structures. Permits are issued only for approved State routes.
Coordination of State and local permit requirements - State has ability to issue State and local permits - State map contains hyperlink to local jurisdiction	The State does have a separate ArcGIS (vendor) map on the DOT website that identifies which counties have route restrictions. When a carrier hovers over a particular county, a pop-up box appears that states if a county has route restrictions and provides local agency contact information. The State noted that the accuracy of the map is dependent on local agencies responding to an annual request from the State that updates route restriction and contact information. Iowa County Route Restriction Map Link: http://www.iowadot.gov/mvd/motorcarriers/systemmap.htm#county Iowa is conducting a pilot test in partnership with Sioux City and Woodbury County to assess the feasibility of the State issuing local permits. The State will conduct all structure analyses and auto-issue permits on approved city routes.

System Component	Description
Auto-issuance of permit	The State noted that the auto-issuance of permits has decreased the permit error rate and the average permit turnaround time. The State noted that as part of the automated permitting process, an applicant's credentials are checked using the State's CVIEW system. A motor carrier's DOT number and vehicle license plate numbers to verify credentials status, ensure the carrier has no outstanding OOS orders, and other credentialing and safety information checks that would result in a permit not being issued.
Identification of route restrictions	The Iowa system identifies route restrictions on the State map and will automatically route a permit applicant around any identified restrictions on the requested route.

Thresholds

Threshold	Description
Height	Iowa conducted an analysis of all vertical clearances for bridges and other structures using Light Detection and Ranging (LiDAR). This information is used by the automated permitting system to identify route restrictions based on height. The State noted that their maximum buffer on vertical clearances is 2 inches above the permitted load height. The State further noted that for any bridge with height variances by lane, the State uses the "minimum of the maximum," that is, the lowest vertical clearance in any lane to set the height threshold.
Weight	Permit requests stating per axle weight of 20,000 pounds or less and a GVW of 120,000 are approved for auto-issue under the weight threshold limits established by the State if the carrier meets other permit requirements. The automated process analyzes and permits overweight loads to only cross those structures approved for the load.
Width	11 feet.
Length	120 feet.
Height	14 feet 6 inches.

The Iowa DOT Bridge Office conducts the structural and pavement analysis that determine auto-issue thresholds for per axle and GVW. The structural analysis includes bridges and other infrastructure, such as intersections.

The State indicated that while the number of bridge hits in particular and incidents involving OS/OW loads has not changed significantly since the automated system was implemented, most reported hits are caused by operator error or by carriers who are not permitted or have deviated from the permitted route. This, in turn, has helped the State to target enforcement activities on non-compliant carriers.

Application Process

System Component	Description
User interface - Quality of graphics and maps - Ease of use	The State is negotiating a renewal of their leasing agreement with the vendor who provides the automated system. As part of this negotiation, the State is requesting an updated map. The current map runs on a Java application that is no longer supported by many browsers and the State wants an updated map that is compliant with current web technology.
Edit checks	The current system performs edit checks to ensure that the permit application is the correct permit for the types of vehicle(s) listed in the application. The State also checks a carrier's International Registration Plan (IRP) registration to ensure that the weight listed on the cab card matches the permit requested weight. The system permits carriers to scan and upload their cab cards.
Library function - Company data - Power unit and trailer configuration - Saved routes	Carriers who establish an account with the State can upload company information, number and type of power units, and trailer configurations. The system will automatically populate carrier information for a permit application and the carrier can pull power unit and trailer configurations from the stored data. The system also allows carriers to save their previous routes and pull route information from the stored data when applying for a permit. The State has also pre-approved routes for certain commodities and makes this approved route data available to carriers moving these commodities.

System Operations

Operational Component	Description
Ease of payment	The State accepts on-line credit card payments and allows account holders to establish an escrow account for payment of permit application fees. A permit applicant may also pay in cash or with a check if applying in person.
Notice of real-time changes in route restrictions	Iowa DOT maintains a 511 traveler information system that is updated on a regular basis by the State DOT field offices. These updates include construction activities, work zone locations, weather, and/or incidents, and any changes to threshold restrictions. The 511 and Automated Permit Systems contain an interface that provides hourly updates to the permitting system. The permit system in turn tracks all active permits and, if a 511 update is received that makes any changes in a permitted load's route, generates an email notice to the motor carrier notifying the carrier. The permit notice advises the carrier that their permit status has changed and they need to contact the permit office to update the permit and reroute the load.

Illinois

Automated Route Identification

System Component	Description
Complete map of all suitable State and local roads	The Illinois system contains both State and local road maps. If a carrier requests a route that includes local roads, the system will include these in the route but the carrier may be required to obtain a local permit.
Coordination of State and local permit requirements • State has ability to issue State and local permits • State map contains hyperlink to local jurisdiction	The State will issue a permit even if the route includes local roads. The State does not issue local permits but does notify local agencies that a permitted load will pass through their jurisdiction at the time when the State permit is issued. The State reported that this has helped with enforcement against non-compliant carriers and served as an incentive for carriers to obtain any needed local permits. The Illinois system provides carriers with local agency contact information if a local permit is required. A pop-up box with the contact information appears when a carrier hovers over the local road included in the permit requested route.

System Component	Description
Auto-issuance of permit	The State reported that the automated system has significantly reduced permit error rates and reduced permit turnaround time. The State reported that there also is no permit backlog.
Identification of route restrictions	The Illinois system routes a carrier around route restrictions. The system also provides the carrier with an explanation of what the restriction is and why the carrier's requested route was rerouted. The Illinois DOT provides regular updates on any changes in route restrictions, such as construction, work zones, planned special events, weather events, and traffic incidents. The State requests 21 days advance notice for construction, work zone, and other events that result in a route restriction. All permanent and temporary restrictions are posted on the State route map, as shown in the link below: http://www.gettingaroundillinois.com/gai.htm?mt=tpr

Thresholds

Threshold	Description
Weight	Up to 299,000 gross pounds.
Width	Up to 17 feet
Length	11 feet.
Height	120 feet.

Application Process

System Component	Description
User interface - Quality of graphics and maps - Ease of use	The Illinois system is a web-based interactive mapping site that provides the ability to search and display several sources of transportation data. You can find information on winter road conditions, annual average daily traffic, road construction, trucking routes, and planned road projects.
Edit checks	The system contains edit checks that verify the vehicle and trailer configurations and weights are approved for the requested route and that the permit application is the correct application.

System Component	Description
Library function • Company data • Power unit and trailer configuration • Saved routes	The Illinois system contains a library function that allows carriers to store company information, power units, and trailer configurations. When a carrier applies for a permit, they can pull this information from the database to populate the permit request. The system also saves previous routes and permits. A carrier can pull a saved route from the database for a new permit request.

System Operations

Operational Component	Description
Data quality	The State noted that data quality has significantly improved. This includes State-provided information on available routes and route restrictions as well as carrier permit applications.
Ease of payment	Carriers may pay for permits using electronic funds transfer or credit cards. Carriers may also establish an escrow account. A carrier obtaining a permit in person may also pay cash.
Notice of real-time changes in route restrictions	The State updates the permitting system on a regular basis throughout the day. If any updates result in a change in route restrictions or any other change to a permitted load, the carrier is notified that their permit is no longer valid and they need to contact the State to update their permit. This is done for all open permits. The State noted that as part of the permit application, carriers are required to provide an emergency contact to receive a permit change notice.

Automated Route Identification

System Component	Description
Complete map of all suitable roads - State roads - Local roads	The State of Georgia has the statutory authority over both State and local roads and includes all roads.
Coordination of State and local permit requirements - State has ability to issue State and local permits - State map contains hyperlink to local jurisdiction	The State of Georgia also has the statutory authority to issue permits that cover both State and local roads. The permits cover all routes traveled from load origin to destination.
Auto-issuance of permit	The State noted that 80% of permits are now auto-issued.
Identification of route restrictions	GeorgiaPro was developed to include route restrictions. The State road map shows all route restrictions in red and will generate a message explaining the route restriction if an applicant hovers over the identified restriction. The software is designed to route around restrictions. The State noted that the software will default an application for review by permit office personnel only when a route accommodating a load that meets State threshold requirements cannot be established. Information on temporary route restrictions is provided by Georgia DOT and pulled from the State's 511 traveler information system. The State noted that because permits in Georgia are valid for 10 days, in general the State only posts temporary route restrictions that exceed 10 days. All information on route restrictions – incidents, minor construction, and inclement weather – is posted on the State's 511 system. The State noted that updates on temporary route restrictions are posted to the GeorgiaPro system on a real-time basis and that carriers contact the permit office to revise permits on an as-needed basis.

Thresholds

Threshold	Description
Height	GeorgiaPro is developed to include bridge clearances height plus a 3-inch buffer for every bridge in the State. Georgia DOT maintains all bridge data and provides updates on changes in bridge data as necessary. GeorgiaPro does not issue permits for bridges that have variable clearances by bridge lane. The system is designed to either route loads around these bridges or the application can be sent to the permit office for manual processing.
Weight	150,000 pounds.
Width	16 feet.
Length	110 feet.

Georgia DOT is responsible for maintaining a comprehensive inventory of infrastructure for all routes that permitted loads utilize. This includes maintaining a detailed database on bridges. Georgia has established an envelope vehicle that includes the height, weight, and length thresholds noted above and the height thresholds approved for the requested route. An automated permit will be issued for any load that meets route-approved height clearances and the other envelope vehicle threshold requirements.

Application Process

System Component	Description
User interface • Quality of graphics and maps • Ease of use	The State is satisfied with the current graphics and user interface. The State noted that the development of the updated State road map was significantly improved by the incorporation of GIS data.
Edit checks	Will not let carrier proceed if a particular value entered is not correct – hovering over field generates message explaining what the issue is.
Library function • Company data • Power unit and trailer configuration • Saved routes	Each carrier establishes an account that includes a library function for storing company data and information on power units and trailer configurations. A carrier can download an Excel spreadsheet at the time the account is established. Every company has a dashboard on the account that shows prior routes, can store company, power unit, can drop data into excel spreadsheet, and store data. Stored routes can be retrieved.

The State indicated that they are very happy with the quality of the new vendor offered platform to integrate Georgia GIS data into the State road map and gave a comprehensive map showing all roads with route restrictions.

All threshold data also were provided – data were current and are maintained routinely.

System Operations

Operational Component	Description
Data quality	The development of the GeorgiaPro system required that all information on permanent route restrictions be included, in particular on bridge clearance heights. The State also noted that this significantly improved the quality of the initial data and that data quality is maintained by the addition of major temporary route restriction information. The State also noted that the development of the new State road map incorporating GIS data significantly improved the quality of the route map display.
Ease of payment	The State accepts payments via credit cards, electronic funds transfers, or carrier-established escrow accounts. Payments can also be made by check if a carrier applies in person or mails in payments.
Notice of real-time changes in route restrictions	The Georgia system has the functionality to generate email notices, but the State does not utilize this on a regular basis. Permits in Georgia are valid for 10 days and the State posts information on temporary route restrictions on the Georgia DOT 511 system. This information is available to the industry and traveling public.

The State offers weekly classes for industry on how to use the GeorgiaPro system. Georgia also has posted a series of educational videos on YouTube that provide a carrier with information on how the permitting process works and what steps are needed to complete an application. Links to these tutorials are shown below:

- [GAPROS Creating Accounts Video Tutorial](#)
- [GAPROS Using the Company Dashboard Video Tutorial](#)
- [GAPROS Ordering Permits Video Tutorial](#)
- [GAPROS Combining Multiple Permits Video Tutorial](#)
- [GAPROS How to Set Axle Weights and Groups Video Tutorial](#)
- [GAPROS Modifying a Trip Using VIA Points Video Tutorial](#)
- [GAPROS Saving a Trip Video Tutorial](#)

7. State Best Practices for Oversize/Overweight Permitting

Based on all of the State interviews conducted, the following table highlights the best practices for OS/OW permitting.

Table 2. State best practices for oversize/overweight permitting.

Criteria	Safety Benefit	Efficiency Benefit
Automated Route Selection 1. The State system has the authority to issue most or all nonstate jurisdiction permits (e.g., local, toll, turnpike, private port) as well as State permits. 2. The State system's map includes comprehensive road system, including State, local, toll, turnpike, private port, etc. road systems. 3. The State system's map has embedded links that provide point of contact information for local permit agencies. 4. The State OS/OW permitting webpage has a link that connects to local permitting portals. 5. The State OS/OW permitting webpage has a link that provides point of contact information for local agencies. 6. The State system enables carriers to generate route maps both for purchase and for purpose of preparing for potential moves (e.g., bid proposals). 7. The State system includes and displays permanent and temporary route restrictions along the user's preferred/requested route. 8. The State system includes a hyperlink that provides information on the restriction. 9. The State system will auto-route carriers around restrictions.	• Improved permit accuracy, safety for all motorists. • Industry more likely to obtain all permits with one-stop-shop, resulting in fewer carriers moving without permit. • Automated system accurately routes permitted loads around permanent and temporary route restrictions and bridges. • Permitted loads directed onto appropriate routes and reduces potential for infrastructure damage. • Permitted loads directed away from potential congestion, which reduces potential for traffic incidents.	• One-stop-shop for industry. • Local permits issued at same time as State permits. • Reduces permit turnaround time • Cost savings to carriers, manufacturers, etc. • Increased permit fee revenue to States and locals. • Frees up permit office staff time to focus on more complicated OS/OW load movements.

Table 2. State best practices for oversize/overweight permitting. (continued)

Criteria	Safety Benefit	Efficiency Benefit
Thresholds - Height restrictions - The State system contains information on all bridge and other height restrictions. - The State system automatically routes carriers around bridge and height restrictions. - The State uses the “minimum or the maximum” criteria for issuing permits on bridges with variations in lane clearance heights. Permits include specific language as to which lane(s) may be used to clear height restrictions. - Auto-issue permits for a minimum 14 feet 6 inches high. - Weight restrictions - The State system automatically routes carriers on routes that are approved for State weight thresholds. - Auto-issue permits for a minimum 150,000 pounds gross (46,000 pounds tandem, 60,000 pounds tridem, 80,000 pounds quad). - Length restrictions - The State system automatically routes carriers on routes that are approved for State length thresholds. - The State should auto-issue permits for a minimum 110 feet long. - Width restrictions - The State system automatically routes carriers on routes that are approved for State width thresholds. - The State should auto-issue permits for a minimum 14 feet wide.	- Permitted loads are routed around threshold route restrictions. - Permitted loads directed onto appropriate routes and reduces potential for infrastructure damage.	- Reduced permit turnaround time. - Frees up permit office staff time to focus on more complicated OS/OW load movements. - Automates bridge analysis for OS/OW loads that meet established thresholds. - Reduces number of oversize loads incorrectly hung up in construction zones. - Cost savings to carriers, manufacturers, etc.

Table 2. State best practices for oversize/overweight permitting. (continued)

Criteria	Safety Benefit	Efficiency Benefit
Application Process 1. The State system includes edit check functions that link the requested OS/OW load movement route to the correct permit for the particular load. 2. The State system includes a library function that enables carriers to store company data, information on power units and trailer configurations, and previously issued permits. 3. The State system includes pre-approved routes for the movement of particular OS/OW loads.	• Permitted loads directed onto appropriate routes and reduces potential for infrastructure damage.	• Reduced permit turnaround time.
System Operation 1. The State system includes electronic payments options – electronic funds transfer, credit/debit cards, escrow accounts. 2. The State system updates route restrictions in a timely manner and tracks all open permits. All open permit holders are notified if a change in a route restriction changes the status of a permit.	• Permitted loads directed onto appropriate routes, which reduces potential for infrastructure damage. • Permitted loads directed away from potential congestion, which reduces potential for traffic incidents.	• Permitted loads avoid congestion and delays. • Electronic payments save State and industry time and reduce transaction costs.
Other Best Practices 1. The State system has the authority to issue permits for a port. 2. A vendor system has the functionality to issue permits for multiple States for a single OS/OW load. The State permits are only issued along a route where the requested permit and proposed route are in compliance with each State's threshold requirements. 3. A vendor system has the ability to issue local permits for carriers whose OS/OW load includes local as well as State roads. 4. A vendor system has the ability to notify local governments of State permit loads traveling through their local jurisdiction.	• Industry more likely to obtain State permits with one-stop-shop. • Industry more likely to obtain local permits with one-stop-shop. • Permitted loads directed onto appropriate routes and reduces potential for infrastructure damage. • Local agencies know when a permitted load is using their road system.	• One-stop-shop saves public and private sectors time and money. • Enhances operating efficiencies for public and private sectors. • Promotes harmonization in movement of OS/OW loads between States.

8. Review of Oversize/Overweight Permitting Vendor Systems

This section of the report highlights the oversize/overweight (OS/OW) permitting vendor system available in the market today.

Bentley Systems

Bentley Systems provides an OS/OW permitting software package called SUPERLOAD.⁴

SUPERLOAD functionality includes:

- Routing software that conducts real-time route analysis that ensures that the permit request is compliant with the State-specified thresholds on particular routes.
- Automated issuance of OS/OW permits.
- A roadway restriction software application that enables a State to enter permanent and temporary route restrictions and update the routing software as notice of route restrictions are received and processed by a State permitting office.
- A live-load bridge analysis software application that enables real-time analysis of the specific permit vehicle configuration over each structure. The analysis is based on State-established thresholds and temporary and/or permanent route restrictions.

The Bentley system is designed to include local roads on a permit route if State business rules provide for this. The Bentley system is currently being used by the State of Maryland to issue local permits for the city of Baltimore as well as permits for the Port of Baltimore.

Additional functional features include:

- Tracking open permits and notifying permit holders of changes in permit status.
- Electronic payments – credit cards, electronic funds transfer, escrow accounts.
- Library function that stores company data, power unit and trailer configuration information, and previously issued permits and routes.

Several screen shots from the Bentley system are shown below. The first shows the Maryland One (MD1) application screen that carriers must complete to establish an account with the State. The second shows the results of a requested permit route that was not approved due to an existing bridge height route restriction. The system generated a notice to the applicant explaining the restriction and a map showing the location of the restriction, in this case a bridge that did not meet State thresholds for the requested OS/OW load movement. The third screen shot is historical routing data, showing a heat map of where the permitted trips had occurred. This historical routing data can be filtered for a variety of factors, such as timeframe and vehicle configurations.

⁴ The information on the SUPERLOAD product is adapted from: <https://www.bentley.com/en/products/brands/superload>

Application My Queue My Vehicles My Reports My Admin Help Logoff

Step 1 Travel Dates

From Date* To Date* And Return

Step 2 Vehicle Configuration

Stored Vehicles/Units[-]

Vehicle Information

Vehicle Type*

Truck Make* No. of Axles* License Number* License State* Weight* Type*

Trailer Make* No. of Axles* License Number* License State* Weight* Type*

Load Information

Description* Load Description*

Load Weight* Make/Model Number Serial Number

Overall Vehicle Dimensions

Length* Width* Height* GVW* Registered Weight*

Axle Information

Permit Type: Single Trip Special Hauling

Continue Save Go To Close

Figure 3. Maryland One automated oversized/overweight permit application screen shot.

Application My Queue My Vehicles My Reports My Admin Help Logoff

Height 16' 0" Width 8' 6" Length 65' 0" GVW 82000 Axle Details [-] Truck Display [-]

Trip Definition

Trip Comments

Tools

Analysis Results & Directions

Analysis Failed

The highlighted trip has been analyzed and found to have 2 clearance problems.

The problem areas are shown on the trip drawn in red (or your customized failure color). Zoom in to see the problem areas and for details, hover over the failed items.

You can define a new trip and analyze that trip to try to avoid these problems.

Trip Description

1 START ON US-47 WB AT BOLLING RD AT BP BALTIMORE 1400N CATONSVILLE AT MIDDLETOWN RDN US-29 SB MD-100 EB I-95 SB MD-212 SB END ON MD-212 AT BP PRINCE GEORGES T21.

Request Permit Office Review Override Clearance. By selecting, you agree to the Clearance Override Terms and Conditions.

Permit Type: Single Trip Special Hauling

Continue Save Go To Close

Figure 4. Real-time route analysis screen shot.

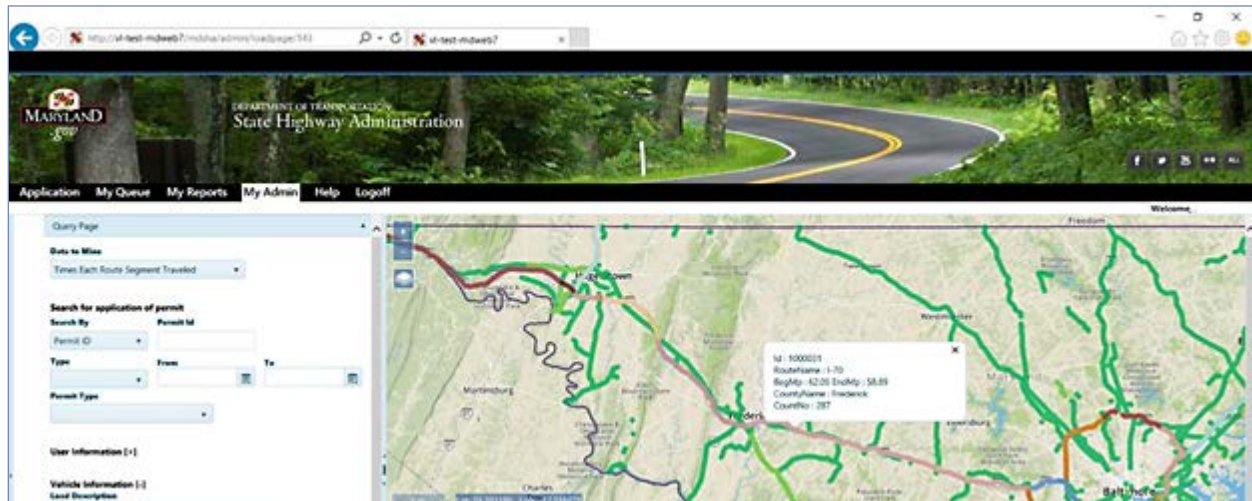


Figure 5. Historical route library function screen shot.

Bentley Systems has also developed an innovative product called GotPermits. As noted on the Bentley webpage, GotPermits enables a carrier to submit a permit application for a multistate route. The application is entered into a user interface that in turn links to all States participating in GotPermits. The permit application is processed in compliance with each State's requirements and if the requested load meets each State's requirements and is within thresholds, GotPermits then issues the carrier permits for each of the States along the requested route. A screen shot of the historical route library function in GotPermits is shown above in Figure 5.

The Bentley webpage provides the following information on specific GotPermits functionality:

- “Maintain information about your entire fleet and use that information to request permits from all the agencies supported by the site
- Make requests for more than one agency via a single application process, addressing all permit and routing requirements
- Perform your own routing using a variety of different routing techniques
- Perform your own job/bid reviews without any cost
- Track your job numbers with specific agency permits
- Request a variety of reports to assist with your accounting and reconciliation
- Pay for any permit with an escrow account or credit card
- Receive immediate, system issued permits for most permit requests.”⁵

The GotPermits system architecture is shown in Figure 6. As the figure shows, the user interface is linked to each State system and processes the permit application according to each State's requirements. An example of how this works is shown in Figure 7, which shows how GotPermits consolidates the information required by each State from the carrier's application so the permits can be processed and issued in accordance with State requirements and thresholds.

⁵ Information source for GotPermits: <https://www.bentley.com/en/products/product-line/asset-performance/gotpermits>

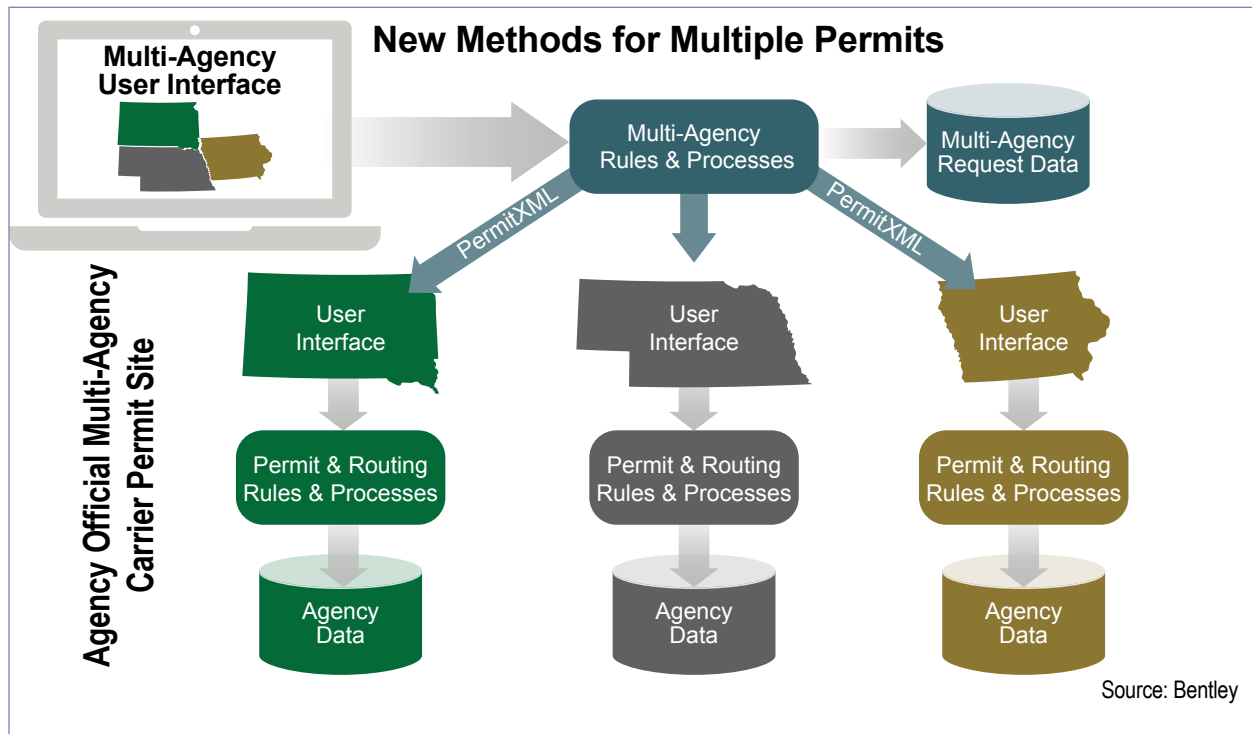


Figure 6. Bentley Systems GotPermits system architecture.

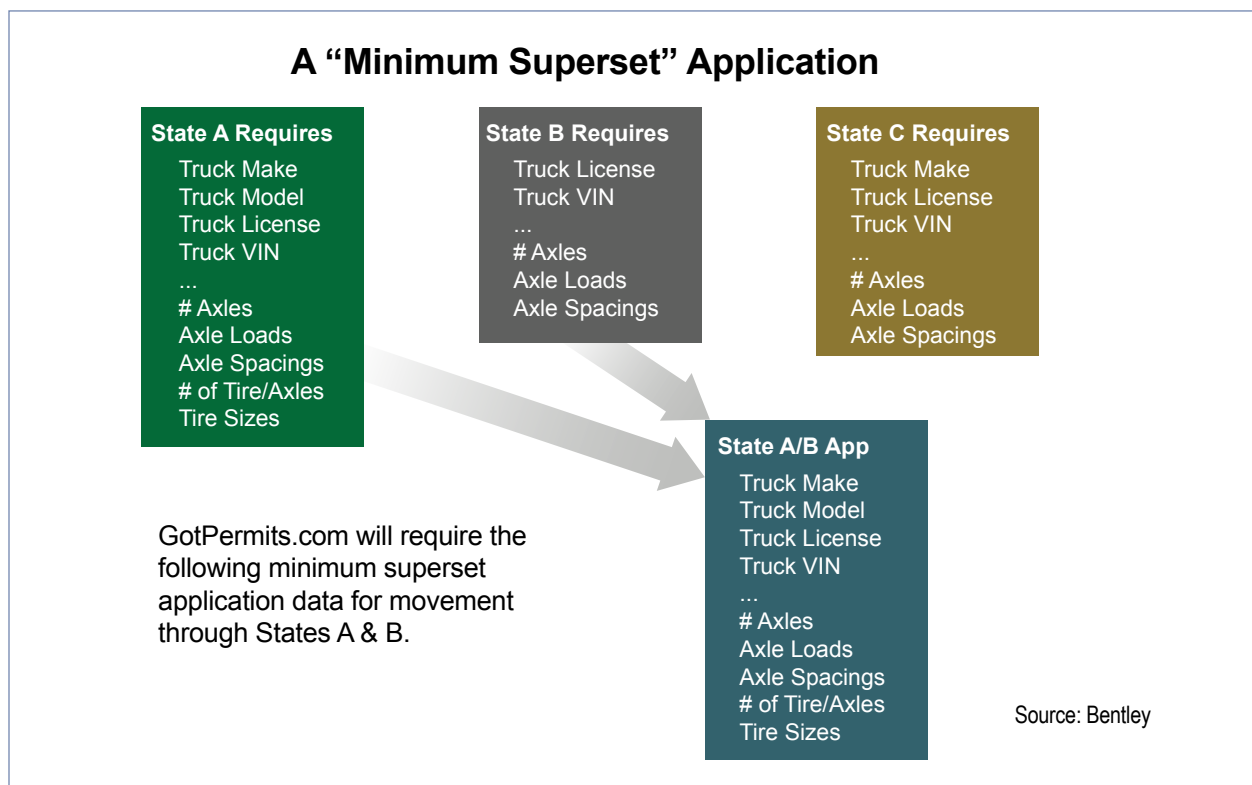


Figure 7. GotPermits permit application data consolidation.

ProMiles Software Development Corporation

ProMiles Software Development Corporation (PSDC) is one of the two primary vendors providing States with automated OS/OW permit systems. The PSDC solution consists of a commercial off the shelf (COTS) system that was originally developed for Texas. PSDC has utilized this same system as the basis for each of the other nine systems it has developed. PSDC customizes its system to meet the exact needs of the client and does not require the client to change their processes to fit the system. Because of this, each State or province utilizes a separate code base. The code in each code base is very similar, but has been modified to meet the needs of the State or province. Table 3 summarizes the system components of the ProMiles system:

Table 3. System components.

Component Name	Description
Web Interface	The Web Interface is a .NET web-based application that provides the End User functionality for all system interfaces except mapping.
Route Server	The Route Server is a .NET application that provides routing and route endpoint location lookup for the system.
Tile Server	The Tile Server is a .NET application that provides the base mapping and the restriction mapping for the system.
Runtime Files	The Runtime Files are binary files that the Route and Tile Servers utilize to route trips and create maps.
Runtime File Creation Software	This software component consists of .NET applications that together take GIS datasets built by the GIS Import Application to make the Runtime Files utilized by the Route and Tile Servers.
Drag Route Server	The Drag Route Server is a .NET application that provides support for the Drag Route function. Once the Drag Route Server has been set up with a session, it interacts directly with the user.
GIS Import Application	This software pulls in the Department GIS data, and GIS data from other sources, and combines it into a single GIS dataset. PSDC GIS Specialists ensure the data is routable and correct.
Aerial Imagery/Topo Maps/Etc.	These are aerial imagery base tiles and other base tiles provided by the State, province, or other services.
Integrated Bridge Analysis	The Integrated Bridge Analysis is a port of Alberta Transportation's FORTRAN or similar Moment Comparison tool into the OS/OW application.

Table 3. System components. (continued)

Component Name	Description
External Bridge Analyses	External Bridge Analyses are optional integrations with external Bridge Analysis Systems.
Alberta Transportation Bridge Rating Data Source(s)	Bridge Rating Data Sources are State or provincial DOT systems that provide bridge rating data to both internal and external Bridge Analysis Systems.
Database Tables	The database is a standard Microsoft SQL Server relational database that stores all data except the Runtime Files.
Restriction Manager Application	The Restriction Manager Application is a web-based application that provides Agency Users access to the OS/OW routing restrictions.
Restriction Data Import Program	This software component will consist of one or more .NET applications that will import the restriction data and record it in the Restriction Database.
Restriction Data Sources	Restriction data sources are travel alert systems that provide real-time data for OS/OW restrictions.
Reroute Notification Application	The Reroute Notification Application is a .NET application that runs as a scheduled task. This application identifies active permits that violate restrictions and sends notifications to the Department and to the customer.
Credit Card Payment Interface	This interface is integrated with a credit card processing system.
CVIEW/SAFER	This is an integration with SAFER data using either the jurisdiction's CVIEW system or a file from the USDOT SAFER database. The integration includes carrier and credential information pulled from these sources as well as permit data pushed to these sources.
IFTA/IRP, Other Jurisdiction Data Sources	This is integrated with various State systems to obtain carrier and credential information for these systems and to push permit data to these systems.
Email/Fax Services	The Email/Fax Services are either provided by the State or province or by PSDC for delivering communication.

The PSDC system has the capability to generate maps that show all State and local roads in a State using GIS data. The decision to include local roads on State road and individual permit route maps is up to the State or province.

PSDC's OS/OW Permit and Routing Systems are designed with a flexible Permit Definition Interface. This easy to use interface allows Administrative Users to create new Permit Definitions, deactivate Permit Definitions, and change existing Permit Definitions without any

programming. All Permit Definition configuration settings are stored in the database. The permits can have very complicated fee calculation methods that can be changed by authorized users without programming. PSDC's systems utilize this web interface to define permits within the system instead of using a business rule middleware system. The permit definition fields are defined in Table 4.

Table 4. Permit definition fields.

Item	Description
Permit name	The name of the permit that is displayed on the screen when selecting the permit type.
Printed name	The name printed on the permit. This allows a template to be used for multiple, similar permit types.
Template Number	The template number that is used for the permit
Permit description	A description of the permit. This description will not be displayed to the end user.
Duration	How long the permit is valid. This can be expressed in days, months, or years, or can be fixed start and end dates.
Load description	If the load description is fixed or is one of a set of options.
Commodity type	If the commodity type is fixed or is one of a set of options.
Number of days the permit can be ordered prior to effective date	Number of days in advance a permit can be ordered.
Permit end date can be changed flag	Flag stating whether the user can shorten the duration length of the permit. This is used in Texas for routed permits so that a load can be completed before a restriction starts.
Effective date and final date	The dates the permit type becomes valid or the date the permit type retires. Allows for the creation of a permit type in the system before it has been authorized for use.
Min, max, preset width, length, height, overhang, gross vehicle weight (GVW)	Minimum, maximum, and preset values for each of width, length, height, front overhang, rear overhang, and GVW.
Width, length, height, overhang entry required flag	Flag governing whether the user is required to enter dimension values.
Width, length, height, overhang entry allowed flag	Flag governing whether the user can enter dimension values.
Combined length, weight limit	Combined length and gross vehicle weight limit.

Table 4. Permit definition fields. (continued)

Item	Description
Axle weight limits	Flags for selecting the axle weight and spacing limits for the permit type.
Trailer, truck selection options	Flags governing whether the user can or must enter truck and/or trailer information and the number of trailers that can be added to the permit. Note: If the permit is for a company or is not vehicle specific, the truck entry flag will be set to not display a vehicle selection or entry option.
Registration, fuel selection options	Flags controlling whether temporary registration or temporary fuel permits can be added to the permit.
Error messages	Customizable error messages to display if the user exceeds dimensions for the permit. Messages can be set for individual dimensions. For example, a different message can be displayed if the user attempts to enter a height or a length that exceeds the permit type limits.
Error selection permits	Used in conjunction with the error message. This allows the user to change the permit type if he enters a value that exceeds the requested permit type limit.
Routing required flag	Flag stating whether the permit type requires routing.
Self-issue flag	Flag stating whether the permit type can be self-issued.
Multiple permit selection flags	Flags stating whether the permit type can be used to apply for multiple permits for multiple vehicles on the same application.
Western Association of State Highways and Transportation Officials (WASHTO) flag	Flag stating whether the permit type is for the Western State Regional permit. A similar flag can be used to denote multiple agency permits.
County selection flag	Flag stating whether the user must select counties with the application. has been authorized for use.
Must mail flag	Flag stating whether the permit portable document format (PDF) can be created by the customer or must be created by an agency user. This is used for permits that must be printed on special paper or forms, or if a valid decal must be included with the permit.
Insurance requirements	Codes stating what type of valid insurance is necessary for the permit to be issued.

Table 4. Permit definition fields. (continued)

Item	Description																	
CVIEW validation flags	Flags controlling whether the permit type requires CVIEW validation or other credential validations. Note: This permit definition field may require customizations for each jurisdiction’s solution. All such customizations are included in this offer.																	
Feesoptions	Permits that require money to be collected for their issuance will have one or more fee items. A fee item has the following components. <table><tr><td>Name</td><td>Description</td></tr><tr><td>Description</td><td>Description for the fee item. For example: permit fee, registration fee, weight fee, etc.</td></tr><tr><td>Fund number</td><td>An identifier that identifies the State/province fund the fees for this item are to be deposited.</td></tr><tr><td>Fee amount</td><td>The amount of the fee.</td></tr></table> Note: If the fees for a permit are to be split between two or more funds, but the description of the fee item is the same, the user would create two fee item records for the permit type. For example, suppose the fee for a permit is \$60, the fee is to be described as the permit fee, and \$20.50 is to go to fund 367 and \$39.50 is to go to fund 362. The two fee item records would be as described below: <table><tr><td>Description</td><td>Fund</td><td>Fee amount</td></tr><tr><td>Permit fee</td><td>367</td><td>20.50</td></tr><tr><td>Permit fee</td><td>362</td><td>39.50</td></tr></table> In addition, since the description is the same, the two amounts will be combined into a single amount on the permit. The order in which the fees are listed on the permit is specified in the template.	Name	Description	Description	Description for the fee item. For example: permit fee, registration fee, weight fee, etc.	Fund number	An identifier that identifies the State/province fund the fees for this item are to be deposited.	Fee amount	The amount of the fee.	Description	Fund	Fee amount	Permit fee	367	20.50	Permit fee	362	39.50
Name	Description																	
Description	Description for the fee item. For example: permit fee, registration fee, weight fee, etc.																	
Fund number	An identifier that identifies the State/province fund the fees for this item are to be deposited.																	
Fee amount	The amount of the fee.																	
Description	Fund	Fee amount																
Permit fee	367	20.50																
Permit fee	362	39.50																
Special items	Special items are additional questions or certifications that the permit applicant must complete. For example, this is used to implement information used with manufactured housing permits for property tax reasons and is used to allow the user to certify that they understand axle weight limits for special hauling permits.																	
Companion permits	This is used to indicate permits that can be, or must be, used in conjunction with the permit type.																	
Curfews	This provides a method to put curfews on a permit that is not routed. Curfews can be statements like: Houston City Limits: All loads over 8’6" wide, 14’0" high, and/or over legal length; No movement; 6-9 am and 4-7 pm; Monday-Friday. Overweight only not affected. Curfews for routed permits are added using restrictions.																	

Table 4. Permit definition fields. (continued)

Item	Description
Permit conditions	This provides a configurable list of conditions that can be printed on the permit. These conditions can be based on the vehicle dimensions or other factors such as vehicle type and load description. Conditions added to a permit based on the roads traveled are implemented using restrictions. In PSDC's current systems, this is where the majority of permit conditions are added to the permits.
Where a permit can be ordered	A set of locations where the permit can only be ordered.
Holiday blackout flag	Flag stating whether the permit has an exception to holiday blackout periods.
Sunday travel flag	Flag stating whether the permit can run on Sundays.
Saturday travel flag	Flag stating whether the permit can run on Saturdays.
Self-propelled equipment flag	Flag stating whether the only vehicle type that can be selected for the permit is self-propelled equipment.
Renewal letter template	Template number for renewal letter if applicable.
Include in select list flag	Flag stating whether the permit type is included in customer permit type selection list.
Surety bond requirements	Codes indicating what type of surety bond is required for the permit type.
Others as required by the State or province	TBD

PSDC noted that developing and testing the technical capability to electronically import an OS/OW permit into an on-board navigation system represents the next significant step for automated OS/OW permitting. This functionality will incorporate the permit route directly into the on-board navigation system and provide voice-directions to the driver. While there are liability issues involved with this practice (i.e., a permit error would place liability on the issuing State), there is a potentially significant safety benefit offered by a driver being able to access permit route information in a hands-free environment.

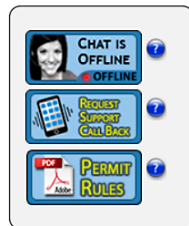
The following representative screen shots in Figure 8. Company dashboard and Figure 9 show the Company Dashboard a customer accesses when logging into a PSDC OS/OW system, in this case Colorado and Georgia, and the agency dashboard an agency user accesses, respectively. Both screen shots include the functional links each type of user will be able to access when using the system.



COLORADO

Department of Transportation

- Renew Annual Permits
- Bid Route
- Company Data
- Reports
- Annual Permit Route
- Escrow
- Vehicle Import
- Route Surveys
- Bridge Studies
- Saved Trips



Company Dashboard

Permits issued and permits requiring further processing.

[New Permit...](#) Show: [Refresh](#) [Search Permits](#)

Permit No/ID	Type	Submitted	Status	Action
1008624	Chapter 6 Special		Bridge study	Select...
16SS0001271	Single Trip OS		Expired	Select...
1006491	Chapter 6 Special		Unfinished	Select...
16AS0000981	Annual OS		Issued	Select...
1006415	Single Trip OS	3/14/2016 09:51 AM	Pending	Select...
16LF0000971	LVC Fleet		Issued	Select...
16LV0000961	Longer Vehicle Combination		Issued	Select...
16AW0000951	Annual OW		Issued	Select...
16AB0000801	Annual OSOW		Issued	Select...
1006346	Annual OSOW		Unfinished	Select...
1006345	Non-Interstate Overweight Divisible Quad Annual		Unfinished	Select...
16QF0000631	Non-Interstate Overweight Divisible Quad Fleet		Issued	Select...
1006316	Single Trip OSOW		Unfinished	Select...
16A40000151	Non-Interstate Overweight Divisible Quad Annual		Issued	Select...
16A20000141	Non-Interstate Overweight Divisible 2/3 Annual		Issued	Select...
16AW0000131	Annual OW		Issued	Select...
16AB0000121	Annual OSOW		Issued	Select...
16AS0000111	Annual OS		Issued	Select...
16AC0000101	Annual (Company Fleet)		Issued	Select...

Messages

- No new messages.

Statistics

[Refresh](#)

Permits Issued Today: 0
Permits Self-Issued Today: 0
Escrow Balance: \$561.41

Insurance

Insurance has expired.

[Upload Acord](#)

Fleet Permits

Company Fleet - Expires 1/12/2017
8 Free Permits Remaining

LVC Fleet - Expires 3/2/2017

NIOWD Quad - Expires 1/20/2017

NIOWD 2/3 - Coming January 1

Figure 8. Company dashboard.

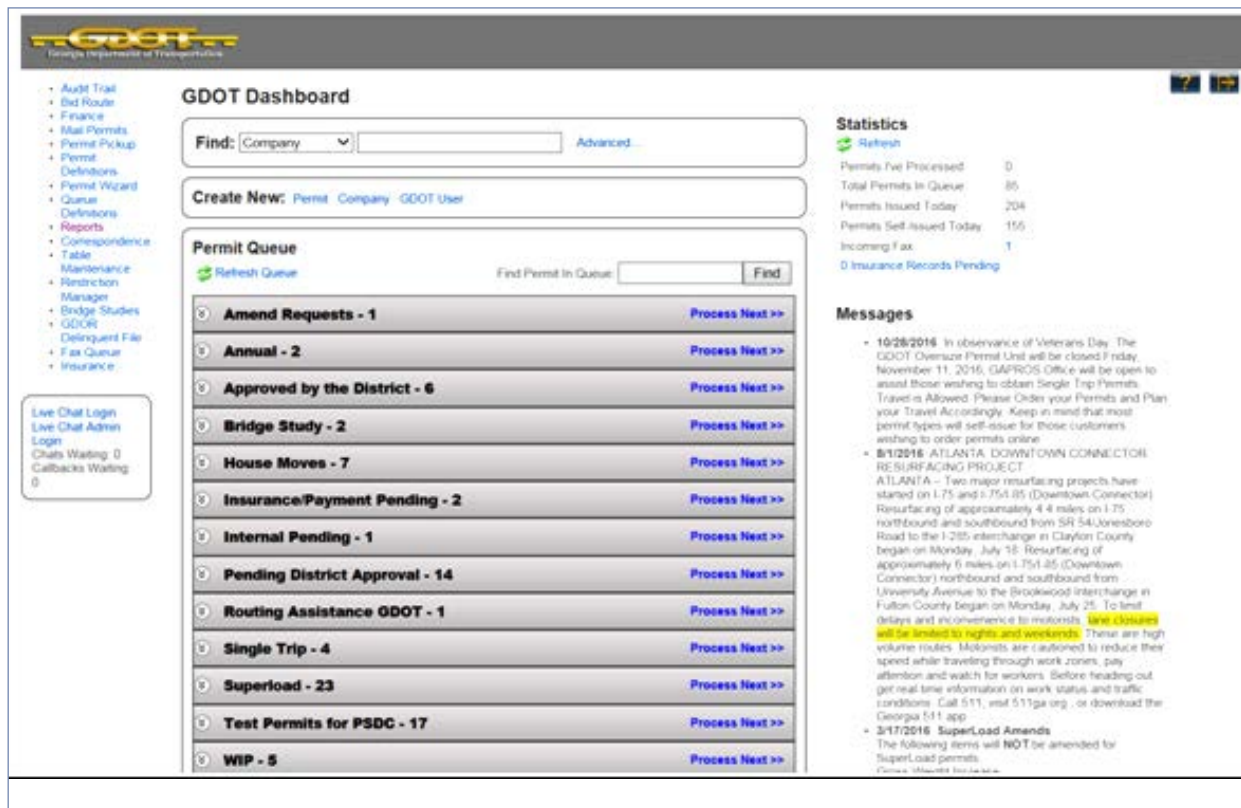


Figure 9. Agency dashboard.

Oxcart Permits Systems

Oxcart Permits Systems offers a web-based application that links local permitting agencies and trucking companies in need of permits.

To utilize the Oxcart application, carriers and local government permitting agencies need to establish a free account with Oxcart. For government permitting offices, the Oxcart application is tailored to meet local ordinances and threshold requirements. Oxcart is developing a GIS mapping system that will allow users to expand, collapse, and manipulate a map to identify routes and restrictions. Local government agencies will be able to drag and drop permanent and temporary route restrictions and the system will be updated to generate a notice to all open permit holders of changes in route restrictions.

For carriers, they will submit all local permit applications, including the requested route through the Oxcart Web-based application. Oxcart in turn processes and submits the permit application with the requested route and all other required permit information to the appropriate local permitting agencies. Once the application is completed, Oxcart submits the permit application to the local permitting agencies for review and approval. Once the permit is approved and

Oxcart receives notice, Oxcart in turn provides the carrier with the permit. The carrier may download and print the permit or access the permit on a smartphone, tablet, or other electronic communications devices.

The Oxcart application currently provides a vehicle library function where carriers can add, delete, and clone an unlimited number of vehicles and combinations of vehicles. Oxcart will have a complete route library function with the development of their new GIS mapping system. Oxcart also allows carriers to store company information and payment data to speed the submission process. Payments are routed through Oxcart via credit card, which is the only form of payment that Oxcart currently authorizes.

Additional information on the Oxcart application is available at: <https://www.oxcartpermits.com/>

9. Literature Review Findings

The survey of State oversize/overweight (OS/OW) automated permitting systems identified functionalities common to all or most States, as shown in Table 5. All States include permanent and temporary route restrictions in their permit routing algorithms and all include height restrictions. The States either use “minimum of the maximum” height thresholds for bridges or other structures with variable lane heights or do not auto-issue permits for these types of structures. All systems include edit checks based on existing State rules that ensure permit applications are linked to the correct type of permit. Each State’s system also includes a library function that allows carriers to store company data, power unit and trailer configuration information, and information on previously issued permits. Some States have also developed State-approved routes for certain types of loads that carriers may also use when requesting permits. Where there is significant variation between States is with respect to local roads and local permit requirements. While most States include local roads on their State road maps, very few issue local permits. Most States do provide at a minimum a web-link to local permit agency points of contact.

Table 5. Summary of State information scan.

System Feature	Kansas	North Dakota	Iowa	Colorado	Nebraska	Maryland	Illinois	Texas	Georgia
Map with complete State and local roads	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Ability to issue local permits			Pilot Test	Pilot Test		Yes			Yes
Imbedded link to local permit information			Yes				Yes		
Separate link to local permit information		Yes		Yes	Yes				
Auto-routing around route restrictions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Permanent route restrictions identified on map	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Temporary route restriction information updated to system as received	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Height threshold included in system – permanent and temporary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edit checks linking permit application with correct permit type	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Library function including carrier information, power units, trailer configurations, and previous permits	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electronic payment – credit card, PayPal, escrow account	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Notice of changes in route restrictions and permit status issued to all holders of open permits	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes

The results of the environmental scan on OS/OW permitting best practices provide strong support for the use of automated OS/OW permitting systems. All States interviewed for the environmental scan indicated that:

- Data quality and information exchange between State agencies and districts/regions has significantly improved as a result of implementing automated permitting systems. The use of automated systems requires substantial baseline data on such issues as route restrictions (bridge height, per-axle, and gross vehicle weight limits) so that permits can be properly processed and issued within specified thresholds.
- Improved data quality has significantly improved permit accuracy for auto-issued permits.
- The continuing updates of potential route restrictions – construction activities, work zones, traffic incidents, weather events – provided to permitting offices by State districts/regions ensures that new permits issued for OS/OW loads can reroute around restrictions that change the status of a permit, thus avoiding potential safety issues and infrastructure damage.
- The tracking of open permits and notification to carriers of changes in permit status provides the same safety and infrastructure protection benefits. Carriers are able to update permits and reroute around unexpected route restrictions.
- Most infrastructure damage, in particular bridge hits, is caused by carriers deviating from a permitted route or operating without a permit with operator error cited as the primary cause.

In addition, States are expanding the use of automated permitting systems to enhance the safe and efficient movement of OS/OW loads:

- Maryland and Georgia both issue permits on behalf of local jurisdictions and Maryland also issues permits for the Port of Baltimore. Colorado is conducting a pilot project with the city of Denver to issue local permits on behalf of the city.
- Colorado and Iowa have established interfaces with each State's CVIEW to check if a carrier applying for a permit has any outstanding OOS or other violations that would prevent the carrier from receiving an OS/OW permit. Colorado has further established a program whereby a non-compliant carrier must resolve any outstanding OOS orders and receive a training from the State before additional permits will be approved.

Based on the comprehensive environmental scan and State and industry survey responses, the benefits of automated OS/OW permitting can be grouped under two primary criteria:

- Safety: for example, enhancing safety through improved information sharing and better quality data, reducing permit error rates and, notifying open permit holders on a near real-time basis of changes in route restrictions that require amendments to existing permits.
- Efficiency: for example, reduced permit turnaround time for carriers and an increase in the number of auto-issued permits that in turn allow State permit office personnel to focus on the more complicated OS/OW load movements.

10. Pilot Car Training and Certification Programs

The pilot car training and certification programs environmental scan was conducted by:

- Reviewing the deliverables from the Pilot/Escort Vehicle Operator training materials and model certification whitepaper project, in particular the following documents:
 - 2016 Pilot/Escort Vehicle Operator (P/EVO) Best Practices Guidelines.
 - 2016 P/EVO Best Practices Guidelines for Law Enforcement Escorts.
 - 2016 P/EVO Model Certification Whitepaper.
 - 2016 P/EVO Training Manual.
- Conducting an interview with the National Pilot Car Association.

Reference #1: Federal Highway Administration, P/EVO 2016 Best Practices Guidelines, FHWA-HOP-16-051 (Washington, DC: FHWA, 2016).

The Best Practices Guidelines document summarizes the results of extensive research, review, and analysis of existing P/EVO training materials, laws and rules relevant to P/EVOs, and case studies and other information focused on the movement of oversize loads. The document includes sections on:

- Pre-trip planning, including assignment confirmation, route review, escort vehicle and equipment preparation, and driver document checklist.
- Pre-trip safety meeting, including a review of task assignments, communications planning, communications equipment testing, and a review of load limitations and the permitted route.
- Load movement, including knowing the load, knowing the laws and regulatory requirements for each jurisdiction that is included along the route, knowing how to position vehicles in compliance with State regulations and permit requirements, and preparing for load movement.
- Traffic control, including knowing the laws about flagging and traffic control authority in each jurisdiction, what equipment to have and how to use it, and defensive flagging guidelines.
- Special challenges, such as railroad crossing, operating with a tillerman on a steerable trailer, and tall loads and overhanging obstructions.
- Emergency planning and preparedness, including what to plan for and ensuring that contact information is on-hand.
- Conducting post trip activities once the load is delivered.
- Conducting a post-trip evaluation and assessment.

The document was used to identify the technical content that State training and certification courses should include to ensure that P/EVOs have the necessary core competencies to operate safely and meet State certification requirements.

Reference #2: Federal Highway Administration, 2016 P/EVO Model Certification Whitepaper, FHWA-HOP-16-052 (Washington, DC: FHWA 2016).

At present, there is neither a national certification program for P/EVOs nor any national guidelines for States to follow to harmonize training and certification requirements. The intent of the Model Certification Whitepaper is to provide States with a framework that can be used in conjunction with the 2016 P/EVO Best Practices Guidelines and training course to harmonize training and certification requirements. The Whitepaper is based on the use of the Best Practices Guidelines as de facto national guidelines and outlines the process by which States can use these and establish harmonized certification programs. The Whitepaper is designed to be flexible to accommodate State-specific requirements and the use of the Whitepaper by a State or States is voluntary.

The proposed model certification framework includes the following provisions:

Purpose	Voluntary program to promote harmonization of State pilot/escort vehicle operator (P/EVO) training and certification requirements. To encourage reciprocity among States based on consistent training requirements.
Program Governance	State designates a lead agency responsible for program management and oversight. State establishes certification and recertification criteria. The lead State agency is responsible for determining the delivery model of training and certification programs – State personnel, third-party service provider, or academic institution. The lead State agency is responsible for issuing certification credentials to P/EVOs and maintaining a database of certified P/EVOs in the State both newly certified and recertified.
Initial Certification	Certification is based on demonstrating understanding of training materials and any State-specific requirements. Certification is based on passing a post-course test that assesses understanding of materials presented in each course module and overall course. Certification is valid for 4 years.
Recertification	State will establish recertification criteria. Recertification is based on demonstrating continued understanding of training materials, State-specific requirements, and the passing of a post-course test. Lead State agency will oversee recertification program and issue P/EVO recertification credentials.

Program Operations	Training and certification program materials available to all States. Best Practice Guidelines serve as nationally accepted guidelines for training and certification. Training is conducted using model training program materials. Lead State agency will oversee distribution of training materials and test bank questions to trainers – State personnel, third-party service providers. Lead State agency will review test results and other certification criteria established by the State and issue P/EVO certification credentials to successful applicants.
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The model framework was used to identify best practices criteria for program governance and certification/recertification requirements.

National Pilot Car Association Interview

An interview with the National Pilot Car Association included a wide-ranging discussion of many topics, including the identification of States with training and certification programs that match well with the Best Practice Guidelines and the Model Certification Framework. The States identified were Washington State, Utah, Colorado, Oklahoma and Florida. The details of that interview are provided in the next section of this report.

11. Pilot Car Training and Certification Best Practices

The Pilot Car Training and Certification Best Practices Criteria were developed using the results of the National Pilot Car Association interviews and the reviews of the 2016 Pilot/Escort Vehicle Operator (P/EVO) Best Practices Guidelines, the P/EVO Law Enforcement Best Practices, and the P/EVO Model Certification Framework Whitepaper and are presented in Table 6

Table 6. Proposed pilot car training and certification best practices criteria.

Best Practice	Safety Benefit	Efficiency Benefit
FHWA Pilot Car/Law Enforcement Best Practice Resources 1. Best Practices Guidelines. 2. Best Practices Guidelines for Law Enforcement Escorts. 3. Training Manual. 4. Student Study Guide. 5. Certification Course.	• Safer Roads. • Preservation of Infrastructure.	
Program Management 1. State had designated lead agency responsible for program management and oversight. 2. State-established certification and recertification criteria. 3. State-approved training and certification program.	• Training satisfies State certification requirements.	• Training is consistent with and meets State requirements.
Reciprocity with Other States	• Pilot/Escort Vehicle Operator (P/EVO) crossing State lines have received training in core competencies and safe operations.	• P/EVOs able to operate in multiple States with approved training certificate.
Enforcement	• Law enforcement are trained in P/EVO operations. • Enforcement inspections of OS/OW loads includes check of P/EVO certification.	• Law enforcement are trained in P/EVO operations.

Table 6. Proposed pilot car training and certification best practices criteria. (continued)

Best Practice	Safety Benefit	Efficiency Benefit
Training and Certification - Addresses core competencies. - Pre-trip planning, including route surveys. - Pre-trip safety meeting. - Load movement and communications. - Traffic control. - Railroad crossings. - Tall loads and overhead obstructions. - Tillerman operations. - Emergency procedures. - Post-trip review. - Issuance of certificate contingent on passing final course exam.	- P/EVOs are at a minimum provided with training on all aspects of pilot escort operations. - P/EVOs must demonstrate at a minimum understanding of core competencies.	Training can be delivered by any State-approved provider as long as training is consistent with State requirements.

State Pilot Certification Programs

Table 7 lists 14 States currently with some form of pilot training/certification programs. Column two lists States that accept/honor certifications from other States. Column three lists the websites for reference.

Table 7. State pilot car certifications.

State	Reciprocity States	Website
AL		
AL	CO, FL, NC, UT, VA, WA	
CO	AZ, FL, MN, OK, UT, WA	http://www.codot.gov/business/permits/truckpermits/pilot-car-certification-information.html
FL	AZ, CO, GA, MN, NC, OK, PA, VA, WA, WI	http://www.techtransfer.ce.ufl.edu/t2ctt/pe_faqs.asp
GA	AZ, CO, FL, NC, OK, OR, UT, VA, & WA. We accept AZ, CO, UT but they do not reciprocate with us. We reciprocate (it goes both ways) with NC, FL, OK VA, and WA.	http://www.dot.ga.gov/ps/permits/oversizepermits#tab-1
MN	CO, FL, NC, OK, UT, WA	http://www.dot.state.mn.us/cvo/oversize/escort_vehicles.pdf

Table 7. State pilot car certifications. (continued)

State	Reciprocity States	Website
NC	Reciprocity: FL, GA, OK, WA. Accept certifications: CO, MN, NY, NC, UT, VA	https://connect.ncdot.gov/business/trucking/pages/overpermits.aspx
NY	No other certifications accepted.	https://dmv.ny.gov/more-info/escort-driver-certification
OK	CO, FL, GA, MN, NC, UT, WA	
PA	Accept certifications in GA, CO/UT (RSA Network), NC, VA	
UT	AZ, CO, FL, MN, NC, OK, VA, WA	https://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:393,26372
VA	FL, GA, MN, NC, OK, UT, WA	https://www.dmv.virginia.gov/drivers/#escrt/index.asp
WI		http://wisconsindot.gov/Pages/dmv/com-drv-vehs/mtr-car-trkr/osow-requirements.aspx
WA	CO, GA, MN, NC, OK, UT, VA	https://www.wsdot.wa.gov/commercialvehicle/pilotcar.htm

National Pilot Car Association

NPCA <http://www.nationalpca.org/> and its representatives have played a significant role in recent developments involving State pilot training/certification, including participation in drafting the recently published FHWA Pilot Car Training and Certification Best Practices.

As part of this report, NPCA President Mike Morgan of Pit Row Services, Inc. was interviewed and provided the following response:

“After the Skagit River bridge collapse in 2013, it was apparent that we as a nation needed to revisit the idea of a National Certification Program for the nation’s P/EVOs. The 2004 Best Practices material no longer met the needs of an expanding industry. As the loads continue to grow ever larger, we must seek ways to protect the public, infrastructure, and the loads themselves. The newly released 2017 Best Practices is much more in depth as to the responsibilities of all parties that are required to move the oversize loads across this nation. The current dilemma we face now is getting all States on the same page and having them require PEVOs to be adequately trained. There are currently only 12 States that have some type of certification to ensure the safety of their motoring public. This needs to change as quickly as possible.

The questions that face us now is how do we get the remaining States to buy in and use the Best Practices to their advantage. Many new questions must be answered, as to the amount of insurance and type of insurance. Currently, States and trucking firms require General Liability and Auto Liability, which does not provide enough coverage to instill a professional atmosphere. The current PEVO bears no responsibility when accidents happen because their vehicle must be involved in the accident. The PEVO industry realizes this and with no responsibility comes a non-professional PEVO. The answer to this is to demand that every PEVO carry Errors and Omissions Insurance, which simply means that if due to deficient performance on the part of the PEVO they are tied to the accident without being involved in the actual crash or the damage to the State's infrastructure.

Another question that has surfaced is how do we measure the knowledge of a newly certified PEVO? Many programs currently allow for open book tests, and it is my belief that this allows for sub-standard PEVOs to make their way into our industry. Not everyone is able to become a PEVO and a closed book test would ensure that future PEVOs would commit the knowledge to memory, which would better serve the industry. We addressed the principal part of training, and the industry for the most part has totally ignored the practical side of training. The PEVO driver is not unlike the truck driver, they must understand how the load, trailer, terrain, and many other areas affect the movement of the OS/OW load. This can only be accomplished by some degree of actual hands-on training. The evolution of the current truck schools, which has allowed for better truck drivers, is a good example of where and how the PEVO education process should be approached. I feel that the practical side of training will be an outgrowth of the certification process as more and more States realize the dangers in moving OS/OW loads.

The PEVO industry is deficient in several areas and two that are contributing to accidents are the lack of training for High Pole loads and Route Surveys. The conversation currently is leaning toward a tiered training program that would allow separate training on each of these and for possible endorsements on State licenses, not unlike a commercial driver's license (CDL), which would help trucking firms hire qualified individuals. The industry is experiencing entirely too much infrastructure damage due to surveys being done on Google maps and PEVOs not having the proper training on how to move high loads.

We at the NPCA strive to keep the 2017 Best Practices at the forefront of our industry, and this in part and with the continued effort from the Best Practices Advisory Council has led to a natural outgrowth of another newly formed group known as NAPVSA – North American Pilot Vehicle Safety Alliance – a group of stakeholders from all segments of the industry. This group of industry representatives is striving to create an atmosphere of cooperation between States, national government, trucking, PEVOs, manufactures, and others to create a professional atmosphere for the benefit of the motoring public. They are

currently diligently working on an agreement that will benefit all concerned. This agreement is clearly defining the responsibilities of all parties and what each should expect from each other.”

Mr. Morgan is confident that the 2017 Best Practices is a good blueprint for advancing safety in an industry that is ready to embrace a better way of doing things. As States move forward with Best Practices and begin to realize that an effective way to improve safety, reduce infrastructure damage, and bring about harmonization is through the combined effort of certification. Another benefit is the PEVO industry will indeed begin to earn the respect it so desires.

North American Pilot Vehicle Safety Alliance

North American Pilot Vehicle Safety Alliance (NAPVSA) was formed in 2016 as an outgrowth of the Advisory Council of the FHWA Pilot Best Practices project. Organizers report the organization is expected to eventually contain a diverse group of stakeholders from industries of pilots, specialized transportation carriers, insurance, legal, law enforcement, and government. Among NAPVSA’s goals and objectives include:

- To aid, support, and promote the safe movement of over-dimensional loads by providing leadership to the Pilot/Escort Industry, Transportation Industry, Law Enforcement, Governmental Agencies, and other affected Industries.
- To be recognized as the international entity relating to the safe movement of over dimensional loads.

Leadership: To inspire, influence, and support all entities involved with the movement of over-dimensional loads.

Integrity: Providing aid, support, and assistance to those involved with the movement of over-dimensional loads.

Teamwork: Working together to achieve common goals and create partnerships to enhance our effectiveness.

Organization & Goals:

Identify individuals within the various industries and agencies that can aid and assist with the development of processes and procedures relating to the movement of over-dimensional loads

Develop a plan that would create a standardized format that will improve information dissemination between this entity, the Pilot/Escort Industry, the Transportation Industry and the effected Governmental Agencies.

Identify and utilize opportunities to convey the organizational message with the Pilot/Escort and Transportation Industry, elected officials, regulatory leaders, media, and the public as a whole.

Identify variations and or shortcomings in education and training requirements of all involved with the movement of an over-dimensional load and develop and promote standardization for North America.

Utilizing expertise, identify areas where information must be obtained so as to aid and assist in the decision-making processes.

Identify a format and or path to assist in the collection and use of accurate real-time data to drive insurance and risk issues.

Promote standardization of Laws, Rules, and Regulations relating to the movement of over-dimensional loads.

Promote standardized enforcement of size and weight Laws, Rules, and Regulations and education of Law Enforcement in compliance-related issues.

Promote the collaboration with national and international organizations with similar goals and values.

Influence positive public and private entity direction in all aspects of the movement of over-dimensional load throughout North America.

Charter members of NAPVSA include:

- Ed Bernard, General Manager, Precision Specialized Division Inc.
- Louis Juneau, President, NOVA Permits & Pilot Cars
- Maureen Mandich, President, New York Truck Escort & Permits
- Mike Morgan, President, Pit Row Services and National Pilot Car Association
- Rick Radcliffe, High Transit LLC
- Rob Simon, Vice President Heavy Haul, Bennett Motor Express
- Randy Sorenson, President, RSA Network Inc.
- Steven Todd, Vice President, Specialized Carriers & Rigging Association
- Dan Wells, Manager, Colorado Department of Transportation



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