

The Benefits of Automated Permitting, Routing, and Bridge Analysis Systems

A Bentley White Paper

Meg Davis

Industry Marketing Director,
Road Enterprise & Engagement Marketing

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Introduction

Over-the-road trucking is an important component of the transportation system in North America. It requires over 3.6 million heavy-duty Class 8 trucks, more than 3.5 million truck drivers, and nearly 39 billion gallons of diesel fuel to move all that freight across the continent. The economy depends on trucks to deliver nearly 70 percent of all annually transported freight in the U.S. and Canada, accounting for USD 671 billion worth of manufactured and retail goods transported by truck in the U.S. and another USD 295 billion in trade with Canada. Trucks move more than 10.5 billion tons of freight per year, and approximately 5 percent of that tonnage was oversized/overweight loads.



A tractor-trailer moving an oversized load on a state highway requires an OS/OW permit and routing.

An oversized/overweight (OS/OW) load is any load that exceeds the maximum legal width, height, length, and/or weight as defined by each state or province.

What is an Oversize/Overweight Load?

An oversized/overweight (OS/OW) load is any load that exceeds the maximum legal width, height, length, and/or weight as defined by each state or province in the United States and Canada. An OS/OW vehicle permit is required when a vehicle or load that surpasses the maximum legal size and/or weight will travel on a highway for which the state or province is responsible. Permit applications are also reviewed for bridge tolerances, construction zones, height clearance, and several other safety concerns. Any load more than 8.5 feet wide is defined as an oversized load and will require a state or provincial permit to travel on public highways. Sometimes the maximum legal width is only 8 feet on narrower, local roads. The legal height typically varies between 13.5 feet and 14 feet high, and the legal length varies significantly from state to state and can be dependent on the vehicle configuration, especially the number of axles.

Depending upon the state or province, once the width and height of a load exceeds 14 to 15 feet, the length surpasses 100 feet, or the weight is greater than 120,000 pounds, there are additional requirements and/or restrictions. For instance, sometimes the department of transportation requires pilot or escort vehicles (P/EV) and limits permitted travel times and routes for OS/OW vehicles. These “superloads” are subject to more requirements to ensure that the load can be transported safely. Some superloads may require temporary road closures and attendance of police or other law enforcement. For operators and drivers of oversize loads, the challenge is not so much loading and moving the cargo but negotiating the myriad of state and provincial regulations and permitting processes.

Best Practices for Routing and Permitting

As states and provinces implement and enhance automated permitting systems at an increasing rate, the safety and efficiency benefits have also grown.

The benefits of automated permitting systems include:

- The average permit turnaround time (PTA) has decreased from several days or hours to minutes for most routine loads, and the turnaround for superload permits has also quickened.
- Increased compliance with a higher percentage of carriers who have ordered, obtained, and traveled on state-issued permits.
- Increased automated permit volume has proportionally boosted revenues.
- Permit accuracy has dramatically improved.
- Roadway safety for all motorists has improved.
- The structural integrity of infrastructure, including bridges and overhead structures, has improved.

Other permitting system best practices include:

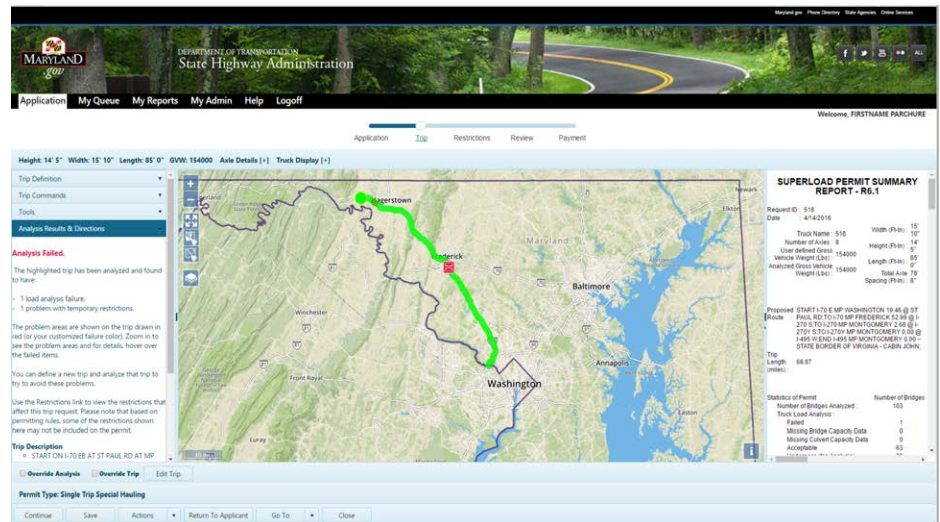
- The state or province has the authority to issue permits for a port.
- The system has the functionality to issue permits for multiple states or provinces for a single OS/OW load, which promotes coordination of the OS/OW loads between states.
- Issuing local permits for carriers whose OS/OW load includes local and state roads.
- Notifying local governments of state permit loads traveling through their local jurisdiction.

The rapid development of technology creates new opportunities for the transportation industry. Moving forward, specialized transportation will reap the benefits of accurate global positioning system (GPS) data, geofencing, and software integration strategies.

Automated permit systems are defined as systems that accept, analyze, process, and issue permits. They can issue single trip permits for OS/OW moves for width, height, length, and weight.

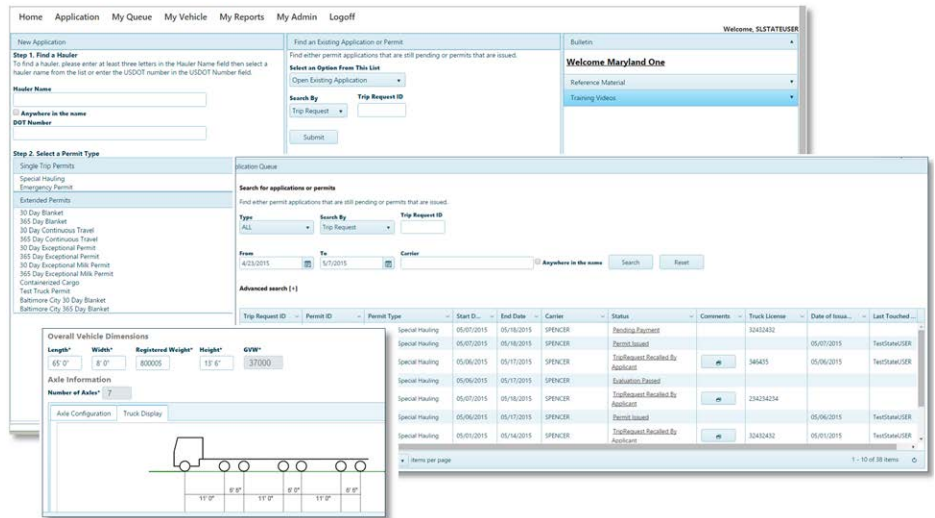
The Benefits of Automated Permitting, Routing, and Bridge Analysis Systems

Automated permit systems are defined as systems that accept, analyze, process, and issue permits. They can issue single-trip permits for OS/OW moves for width, height, length, and weight. The permits must be operational 24 hours per day, seven days per week and operate on behalf of the state or province without human involvement. States achieve staff efficiencies and reduce costs by moving to automated permitting because fewer people are needed to review and process routine permits because they take less time. This frees up employees to conduct superload reviews and customer service inquiries.



Permit requests from the Maryland One System automatically trigger accurate, up-to-date data searches to determine which route for an OS/OW vehicle will have the least amount of impact on the infrastructure.

For example, the Motor Carrier Division of the Maryland State Highway Administration's (MDSHA) automated hauling permit system, "Maryland One," can achieve an automated issuance rate of more than 83 percent, freeing up 10 full-time employees for other duties. The one-stop process is fast, easy, user-friendly, and accurate. MDSHA estimates that carriers will save USD 24.6 million per year by obtaining permits faster and avoiding costly fees, delays, and penalties. A higher compliance rate will also decrease the number of illegal moves and increase safety for motorists on roads and bridges.



With an average hourly load expense of USD 200,000, carriers using the Maryland One system will save USD 24.6 million per year and at least one hour on every move in the state.

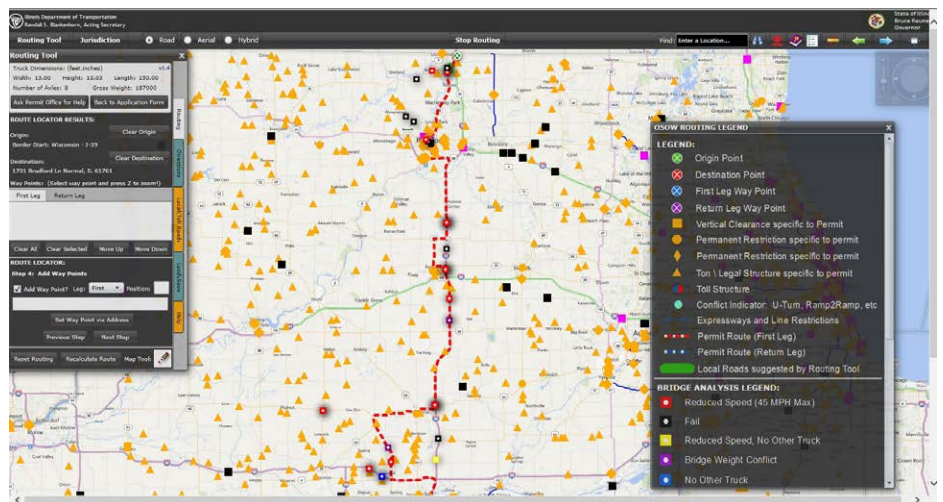
Automated route selection gives the state or province the ability to issue most or all nonstate jurisdiction permits (e.g., local, toll, turnpike, private port) as well as state permits. Consequently, all permits are obtained simultaneously, so fewer carriers are traveling without permits. An automated system accurately routes permitted loads around permanent and temporary route restrictions and bridges and routes direct loads away from potential congestion, reducing traffic incidents. Additionally, permitted loads can be directed onto appropriate routes that reduce the potential for infrastructure damage. Overall, automated route selection improves permit accuracy and safety for all motorists.

Automated live-load bridge analysis enables real-time route validation based on the size and weight of the permit vehicle and the constraints and conditions of specified routes. Bridge clearances, bridge live-load analyses, and temporary restrictions are all considered to help determine optimal routing feasibility. The system should perform bridge analysis for the specific permit vehicle configuration over each specific structure. An integrated live-load bridge analysis of each structure on the route determines safe passage feasibility and any speed or lane restrictions. Data from multiple sources should be considered, including AASHTOWare Bridge Management software to ensure complete and accurate information.



Illinois DOT used the Illinois Transportation Automated Permits (ITAP) system to manage the routing and bridge analysis for an oversized load, weighing nearly 900,000 lbs., moving from Tulsa, Oklahoma to Robinson, Illinois.

For example, Illinois DOT utilized bridge analysis software to analyze all the roadway structures on the route chosen by the Illinois Transportation Automated Permits (ITAP) system to determine if the infrastructure around the route could support the weight and size dimensions of the truck's load. Bridge clearances, live-load analyses, and temporary restrictions were all considered to determine the feasibility of the route. Structure ratings were applied to each structure based on the load's characteristics and the structure's features and if the structures could not support the weight or were too small for the load's measurements, another route was determined. If no failed structures were found, a permit was automatically issued.



The Illinois ITAP system analyzes all the roadway structures on the route chosen by the ITAP system to determine if the infrastructure around the route can support the weight and size dimensions of the truck's load.

An important element of managing OS/OW loads is to have the capabilities to maintain a digital model of the highway system. This includes the location of all structures, detailed interchange configurations, bidirectional clearances, and all temporary restrictions.

Protection for Infrastructure and The Public

An important element of managing OS/OW loads is to have the capabilities to maintain a digital model of the highway system. This includes the location of all structures, detailed interchange configurations, bidirectional clearances, and all temporary restrictions. All structures and other appurtenances involved in the route must have a split-second analysis of vertical and horizontal clearances. Bridge analysis must be performed for the specific permit vehicle configuration over each specific structure. An integrated live-load bridge analysis of each structure on the route determines safe passage feasibility and any speed or lane restrictions.

Summary

State departments of transportation are charged with regulating the movement of oversize and overweight (OS/OW) vehicles on the state highway system and ensuring the safety of the traveling public by preserving the transportation infrastructure through accurate routing and permitting. Transportation and law enforcement agencies in North America are challenged to effectively and efficiently permit, route, and monitor OS/OW vehicles. The review, approval, and issuance process for OS/OW vehicle permits is labor intensive, time-consuming, and prone to human error. The increasing demand for OS/OW permits further challenges this process. Automated permitting and routing systems offer significant efficiency, productivity, and cost-effectiveness gains in the permitting and routing process while improving service to the motor carrier industry.