Texas Department *of* Motor Vehicles

Texas Permitting & Routing Optimization System

Introduction and Overview

The Texas Permitting and Routing Optimization System, or TxPROS, is a web-based software system that allows trucking companies in Texas to apply for an oversize/overweight permit, pay fees, and route trucks on the best roads for the load's size and weight, all online, anytime. Along with the permit, the system analyzes and generates a custom route with turn-by-turn driving directions.

Trucks transporting cargo that is taller, longer, wider or heavier than legal limits need a permit and route from the Texas Department of Motor Vehicles (TxDMV) Motor Carrier Division (MCD). Safe routing is critical to reduce risks and avoid weak pavements and bridges, low underpasses and obstructions, such as construction. This keeps loads and motorists safe, and prevents highway, bridge and overpass damage.

Safe and timely transport of this high value cargo is crucial to the nation's infrastructure and economy. All 50 states permit and route such traffic. With a 32 percent increase in business between 2002 and 2011, and few added staff or other resources, Texas needed a solution. The now retired Central Permitting System allowed carriers to apply online anytime, but permit specialists processed applications only during business hours and routed loads using paper maps. MCD issued almost 600,000 permits in Fiscal 2011, more than any other state, and issued 741,080 permits in Fiscal 2012, a 25.4 percent increase in the first year after TxPROS launched.

TxPROS modernized the process, allowing online, 24/7 permit application and approval with custom – not pre-set – routes generated that include turn-by-turn directions. TxPROS was launched Aug. 29, 2011, and from day one customers self-issued more than half of all permits through the new streamlined system. Staff uses the time saved to improve service and to more quickly handle complex permits. Customers save money because TxPROS eliminates waiting.

MCD asked its customers and other stakeholders to help develop TxPROS. As a result, features are included that customers wanted and needed, such as a "Permit Wizard" that guides them to select the right permits for the load, and many other features.

TxPROS is the first system in the nation to use real-time restriction management and true automated routing. Several states are pursuing the TxPROS model.

A truck loaded and ready to go in the middle of the night previously might have waited hours for a permit and route. Now, in many instances, a carrier can pay, print and go. The equipment and driver don't sit idle, the cargo moves quicker for shippers and receivers, and everyone benefits from the savings.

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Narrative on Development and Performance

What if you could serve your customers instantly ***and*** enable more than half of them to serve themselves?

That happened at 6 a.m., Aug. 29, 2011, when the Texas Permitting and Routing Optimization System (TxPROS) went live, streamlining oversize/overweight (OS/OW) permitting and routing in Texas. Since then motor carriers have self-issued more than half of all permits. TxPROS is a web-based system that allows Texas motor carriers to apply for size and weight permits online 24/7. TxPROS also maps a GIS-based route customized for each permitted load, with road restrictions, all in real time. TxPROS provides beginning-to-end permit processing, tracking, financials and workflow/performance management capabilities for both customers and the state.

Background

The Texas Department of Motor Vehicles (TxDMV) issues OS/OW permits to protect the traveling public, transported loads and highway pavement, bridges and overpasses. Motor carriers ordered 791,556 permits in Fiscal 2015 to transport OS/OW loads on Texas highways. Permit fees generated $183.6 million in Fiscal 2015[1] that can be used to improve/maintain Texas' roadways. Texas issues more OS/OW permits than any other state.

Motor carriers are required to obtain an OS/OW permit to transport loads that cannot be broken down to comply with legal size and weight limits. Loads that exceed 80,000 pounds, or 8.5 feet wide, or 14 feet tall are oversize or overweight and need one of 27 different permit types. Typical permitted loads include construction and oil field equipment, bridge beams, generators and transformers, buildings, wind tower components, and other high value products. Many of these loads require mapping a route to avoid overhead structures, weak bridges, construction zones and other obstructions. The quality and efficiency of TxDMV's permit and routing services are significant to freight transport, the Texas economy, and other U.S. states. Texas is the number one exporting state for 10 years running. About 17 percent of all U.S. exports pass through the state.[2] The nation depends on moving cargo through Texas.

Before TxPROS, carriers could apply for permits online using the now-retired Central Permit System (CPS), a legacy application launched in the late 1990s. CPS required permit staff to manually process permit applications and to route loads using paper maps with hand-written notations representing road and bridge restrictions. Processing a routine permit with CPS could take minutes, hours, or even days, including wait time.

[3]To keep road, bridge and overpass restrictions current for 52,536 bridges, 80,268 centerline miles and 195,022 lane miles of highways, TxDMV's map coordinators work closely with Texas Department of Transportation (TxDOT) personnel across the state. Typically an average of about 9,000 temporary and permanent restrictions for weight, width, height of overhead obstructions, turning radius, construction zones and other conditions are in place statewide. TxDMV works closely with TxDOT to update restrictions every business day.

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[1] State of Texas fiscal year is Sept. 1 to Aug. 31.

[2] "Texas is the Top State for Exports for the 14th Consecutive Year," Feb. 9, 2016, press release from Texas Governor's Office (http://gov.texas.gov/news/press-release/21941).

[3] Note: The Texas Legislature transferred the Motor Carrier Division and its duties from the Texas Department of Transportation to the Texas Department of Motor Vehicles effective Jan. 1, 2012.

The TxPROS Era Begins

Trucking firms can now apply for an OS/OW permit, pay fees and route trucks on the best route to handle the load's size and weight, all online, anytime. Along with the permit, the system analyzes and generates a custom route with turn-by-turn directions for drivers. A motor carrier with a truck loaded and ready to go in the middle of the night previously might have waited hours for a permit and route under CPS. Now they just pay, print and go. The equipment and driver don't sit idle; the cargo moves quicker for shippers and receivers. TxDMV permit specialists are now free to speed up processing of more complicated permits that still require hands-on attention, such as super heavy loads[4] and house moves.

Since the TxPROS launch, permit fee collections are up and the number of permits issued have jumped. For Fiscal 2015 ended Aug. 31, 791,556 permits were issued, a 39.7 percent increase. Customers are using TxPROS to self-issue more than half of all permits.

Access TxPROS here: https://txpros.txdmv.gov/

Benefits

TxPROS provides integrated, GIS-based permitting and mapping with real-time restriction management that provides "true" automated routing. Customers self-issue permits online 24/7 for loads within a certain "envelope" of characteristics. TxDMV determines the self-issue envelope – currently up to 16-feet wide, 16-feet-6-inches high, 110-feet long and 180,000 pounds gross vehicle weight – and can adjust as needed. While several states have online systems, Texas is the first state to successfully implement "real-time" versus "static" routing and restriction management.

TxPROS dramatically reduces permit routing and issuance time, allowing TxDMV to meet increasing demand for services, to increase safety for the traveling public, and to improve tracking of obstacles to OS/OW routing. Through TxPROS, TxDMV can provide data on OS/OW roadway usage to more accurately project future maintenance and funding needs.

Positive impacts include:

- TxPROS includes information "dashboards" for both customers and TxDMV permit specialists. This allows TxDMV to manage workflows in real time, to issue permits more efficiently, and to capture data and revenue more effectively. The customer dashboard includes real-time messaging that allows dissemination of critical information quickly.
- Improves customer service by reducing permit issuance time and allowing customer self-issuance 24/7.
- Reduces risks to the public and infrastructure by analyzing routes and improving routing accuracy. Results in decreased infrastructure wear and damage.
- TxPROS makes getting a permit so easy that compliance may have increased; TxDMV removed compliance roadblocks inherent in the legacy CPS.
- Frees permit specialists to focus on more difficult, time-consuming permits as well as to increase response times for other duties, such as assisting phone customers.
- Tracks OS/OW routes used to help TxDOT forecast maintenance, design and funding needs.

Customer Focused

Motor carriers expressed strong interest in the potential benefits of TxPROS before development even began. After the TxPROS launch, customers have demonstrated acceptance of the system through an initial customer survey, through feedback and by their usage levels. Customers self-issued an average 71.4 percent of all self-issue eligible permits during Fiscal 2015. Customers now submit 83 percent of all permit applications online through TxPROS versus phone or fax (some require assistance and are not self-issued).

Because customers and staff were included in the development process from the beginning, TxPROS includes customer-focused tools. The "Customer Dashboard" allows a customer to:

- self-issue most permit types 24/7,
- use a "Permit Wizard" tool to determine which of 27 permit types meets their need,
- access real-time, map-based restriction information,

[4] Super Heavy single-trip permits are available for the movement of vehicles and loads that exceed 254,300 pounds (total gross weight), or exceed the maximum permitted weight on any axle or axle group, or exceed 200,000 pounds with less than 95 feet of axle spacing.

- manage their own accounts including vehicle inventory, yards, equipment, account users and rights, financial transactions, escrow accounts and generate reports, and
- generate "bid routes" for planning and proposal purposes.

Feedback

A TxPROS customer survey within the first month after launch helped identify initial issues that needed attention, but 71 percent of respondents then said TxPROS helped their business. A follow-up survey conducted in June 2012 showed 96 percent of customers said TxPROS benefits their business. TxDMV continuously addresses stakeholder feedback through TxPROS enhancements and continuous improvement.

A 2015 suvey of all Motor Carrier Division customers showed that 68.5 percent of respondents were using TxPROS to issue permits.

Technical details

TxPROS' user facing website software is a .NET application written mostly in C# programming language and uses an Oracle database. Routing is provided to the website using web services calls. The routing analysis, generation and mapping software is a C++ program component that accesses GIS data in optimized binary files. This component is incorporated into routing engines and tile servers that run on the servers as services. Map display is provided using a modern map tile delivery system. Map tiles are archived within the system for fast delivery. Routing and mapping is based on a complete Texas street routing database licensed from TomTom NV and augmented by TxDOT data. OS/OW routing is based on about 9,000 restrictions that staff maintains in real time using a GIS-based restriction management program built into TxPROS. TxPROS provides turn-by-turn driving directions customized to meet very specific safety needs for OS/OW routing. GIS data is updated regularly with input from TxDOT, creating the most up-to-date and accurate map available. Many other functions are table-driven, allowing designated staff to make changes as needed. All system functionality is available using only a modern browser. The system uses no plug-ins or components. TxPROS is considered a critical State system, runs in a very high availability network, has achieved uptime of more than 99.93 percent since launch, and has a hot backup site.

TxPROS never will be "finished" because the search to improve is continual. TxPROS was purposefully designed so that TxDMV can make many types of changes without going through the contractor, a cost saving measure.

Quality Process and Results

TxPROS took four years to develop in collaboration with commercial motor carriers, a private contractor, and agency stakeholders. After reviewing products used by other states, the project team determined these would not meet TxPROS goals. So TxPROS was designed from the ground up to meet the needs of stakeholders, TxDOT and TxDMV. Agency staff, permit customers and industry association representatives helped design, develop and test TxPROS. The project contractor is ProMiles Software Development Corp. The project cost $1.6 million.

A cross section of stakeholders was included in Joint Application Development (JAD) meetings from the beginning. Ten motor carrier companies were included in the TxPROS "soft launch" in June 2011. During this soft launch, participants issued their own permits and routed their trucks using TxPROS. Agency staff also used the program as part of its testing protocols to fully "shake out" the system prior to hard launch.

An "Enterprise Project" website gave team members constant access to development documents. The site includes all planning, process and project evaluation materials.

Outreach

TxDMV markets TxPROS to the motor carrier industry, manufacturers, shippers and logistics firms.

- Project development communication was maintained by a dedicated web page that links all development documents.
- Staff has demonstrated TxPROS to potential users at numerous industry and association events, including American Association of State Highway and Transportation Officials (AASHTO), Western Association of State Highway and Transportation Officials (WASHTO), and Southern Association of State Highway and Transportation Officials and other trucking associations.

- Project update publications went out electronically and on paper.
- News about TxPROS was posted on the splash page of the old system, CPS, and the active website.
- Email blasts went to all current users of CPS to spread news about the system launch.
- TxPROS tutorials are posted on the TxDMV's web site (http://www.txdmv.gov/motor-carriers/oversize-overweight-permits/txpros-info-and-tutorials).
- News about TxPROS also went out via:
  - a dedicated Facebook page,
  - a Twitter feed,
  - partner association newsletters and notices,
  - the "Dispatch" newsletter (www.txdmv.gov/publications-carriers).
- Post launch, a news release was issued and widely reported.

Awards

TxPROS received recognition from five state and national awards:

- Best Application Serving an Agency's Business Needs, Center for Digital Government-Best of Texas.
- Best Fit Integrator Award for Exceptional Service Award in Transportation, Center for Digital Government, awarded to ProMiles Software Development, the contractor for TxPROS.
- Smart Solution Spotlight Award, Intelligent Transportation Society of America.
- Best Use of Innovation, America's Transportation Awards, WASHTO/AASHTO.
- 2012 Government Computer News Awards, winner.

Conclusion

Even though Fiscal 2011 set a record with 590,980 permits issued, Texas issued 741,080 in Fiscal 2012, or 25.4 percent more.

- Customers used TxPROS to self-issue an average 71.4 percent of all self-issue eligible permits during Fiscal 2015. In addition to economic growth, TxDMV may have captured "latent demand" from customers who had difficulties getting permits in the past because of the time and effort previously needed to comply. TxPROS makes obeying the law so easy that it's not worth the risk to "run hot."
- Though master paper maps are retained for disaster recovery, using TxPROS to keep track of restriction changes allows permit specialists to update these maps in less than half the time. The Oversize/Overweight Program has about 50 permit and mapping specialists, so saving this much time is like having an extra employee.
- Reduces the risk of routing mistakes because of human error in the old manual process.
- Agency staff can manage workflow, staffing and performance in real time with TxPROS.
- Increased data collection for evaluating business processes and future needs.
- Initial return on investment was projected to take 7-8 years, but took less than a year. TxDMV has already realized a positive return on the original investment of $1.6 million in contracted costs. TxDMV collected $183,622,473 in permit fees in Fiscal 2015, exceeding the $113,349,391 collected for all of Fiscal 2011 by 62 percent.
- TxPROS will reduce damage to highway infrastructure long term and also will add funds to highway maintenance during a time when other sources of revenue are shrinking.
- Saves customers time and money.

In sum, TxPROS streamlines permitting and routing, analyzes and produces more accurate routes, eliminates many manual processes, increases safety, raises more revenue, stretches limited resources, exceeds customer expectations, and has caught the attention of other states nationwide.

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