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Advancing Infrastructure

Oregon DOT Saves USD 6.1 Million Over Five Years with AssetWise Linear Network Management

Connected Data Environment Improves Efficiency by 60 Percent

Project Summary

Organization
Oregon Department of Transportation

Solution
Road and Rail Asset Performance

Location
Oregon, United States

Project Objectives
- Provide an accurate, up-to-date record of ODOT's current and future linear assets.
- Develop capabilities to capture more detailed geo-referenced data to create an accurate inventory for planning and budgeting.
- Support reporting requirements to determine high crash locations and key performance metrics related to traffic fatalities and injuries.

Products Used
AssetWise

Fast Facts

- TransInfo is an extendible system that will capture more detailed asset data.
- Connecting current and future datasets to TransInfo will create one common linear referencing system and geometry set for the state highway system.
- Consolidating features inventory data will minimize field data collection and verification, exposing ODOT personnel and the public to less risk.

ROI

- Using Bentley applications reduced the time and effort required to prepare federal reports by 83 percent.
- Data management efficiency was increased by 20 to 25 percent and reporting efficiency increased by an average of 60 percent.
- ODOT estimates that its TransInfo system powered by Bentley's AssetWise will deliver a total return on investment of USD 6.1 million over five years.

Data Integrity

The Oregon Department of Transportation (ODOT) is responsible for managing over 8,000 miles of state and interstate highways within Oregon as well as managing programs related to highways, roads and bridges, railways, public transportation services, transportation safety programs, and motor carrier regulation. Until recently ODOT managed their transportation assets using legacy systems that ran on various technologies, performed functions they were not originally designed for, and duplicated data across multiple repositories. Meeting government reporting requirements involved months of custom coding, manual updating, and vigilant error-checking.

"Oregon DOT needed a faster, more efficient way to capture, aggregate, and analyze asset data," Lorena Lambert, ODOT project coordinator, said. "We needed to ensure accuracy, run reports, and make data readily available to downstream systems and processes."

TransInfo, a USD 3.3 million linear asset management system with a single source of truth, was created as the solution. TransInfo was built on Bentley's AssetWise asset performance software, a highly configurable solution that created a connected data environment where information integrity and availability is assured. TransInfo provides a unified view of the entire road network and associated features, integrates all assets into a single information and asset management system, and maintains seamless spatial representations of all the data.

Asset Integration

To meet state and federal reporting requirements, ODOT must know what assets they have and where they are located. This challenge is complex because the network with which they are associated is constantly changing and the linear nature of roadway information is not something that standard asset management or business intelligence capabilities can easily manipulate. In addition, with road network and feature information residing in a myriad of local repositories, ODOT struggled with issues of data and process duplication. ODOT needed a new, comprehensive, linear asset management solution – one that would enable more efficient data capture,

analysis, and information mobility that would streamline processes and improve regulatory reporting.

Overcoming Limitations

ODOT used AssetWise as the foundation for TransInfo, its new system that reconciles and connects disparate asset data, seamlessly maintains a spatial representation of all information, and integrates all network assets and asset information systems. It provides a unified view of their entire road network and its associated features, such as speed limits and number of lanes. All information and data are easily accessible to ODOT and all other consumers. The system also interfaces easily with other ODOT systems.

With its integrated linear network management capabilities, AssetWise provides a single source of truth for ODOT to manage all roadway asset information including spatial network data, inventory and maintenance data, asset data, road geometry data, and road classification data.

Soon after the initial implementation of AssetWise, Oregon DOT also began using Bentley's Transportation Intelligence Gateway (TIG). The Transportation Intelligence Gateway (TIG), which is part of AssetWise, provides powerful and flexible operational analytics that are integrated into ODOT's transactional system and uses linearly referenced data.
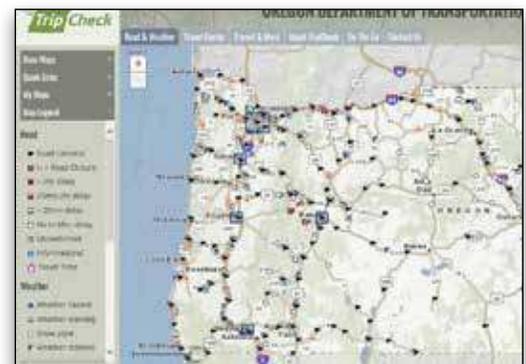
The map-based reports and extracts created for TransInfo are also used for the TripCheck website, which informs Oregon residents about road closures and traffic incidents.

The software supports the sophisticated reporting and analysis that ODOT needs to proactively manage transportation assets. Using the streamlined process, ODOT can perform analysis on any linear-referenced dataset, including the standard or custom aggregate and analytical functions to generate data extracts. Results can be displayed either on a map or in a tabular format depending on the need. TIG allows ODOT to dynamically segment the network and report against their road network in any way they wish to support crash statistics, federal reporting, and other measures. It also enabled Oregon DOT to overcome the linear reporting and analysis challenges that traditional asset management, business intelligence capabilities, and GIS software fail to address.

Efficient Reporting

In the United States, the amount of federal funding a state will receive is related to the total traffic measured across its highway network. Each year in June, every state must submit a Highway Performance Monitoring System HPMS report to the U.S. DOT Federal Highway Administration (FHWA). The HPMS report contains information regarding the road segments in the state based on a sample of the road segments. The requirements change every year and every state struggles to collect and submit this data accurately and on time.

In the past, it took a team of ODOT managers, data analysts, and programmers several months to meet the increasingly complex HPMS reporting requirements. The process relied heavily on custom coding and required collecting data scattered across multiple, homegrown legacy databases. Additionally, each year regulators require the inclusion of more data — even as delivery time frames decrease. The lack of automated error-checking impacted report accuracy, as well as downstream business.

ODOT has increased their efficiency for assembling data and producing the annual HPMS extract and other state and federal reports by 60 percent using AssetWise TIG. In addition, the state of Oregon is positioned to more easily comply with the requirements of MAP-21 and FAST Act legislation, which sets national performance measures for congestion, speed, safety, and other measures. New workflows and reports have been created for the extract supporting the federal All Road Network of Linear Referenced Data (ARNOLD) network submittal which requires DOTs to submit their LRS to include all public roads.

In addition to reducing the production costs and time required to produce reports, AssetWise increases the quality, accuracy, and flexibility of the resulting extracts and reports. It prevents many data errors by making it impossible for data to be entered incorrectly. AssetWise allows ODOT to monitor and analyze large amounts of data, gain insights into status, and proactively adjust course before it's too late.

TransInfo has increased ODOT's ability to respond to the ever-changing needs of various safety programs through better data accuracy, increased ability to produce both tabular and map-based reports, and the option to quickly add new fields to the database to track additional data as needed.

The extracts and reports have also been created for the TripCheck web applications, which benefit Oregon residents who use web applications to stay informed about road closures and traffic incidents on state highways. ODOT has been able to provide data that is quickly accessible, more comprehensive, and solidly defensible to customers through enhanced reporting functionality and increased accuracy of the captured data. This complex reporting was not possible before the implementation of AssetWise and the TIG reporting capability.

Payback in Five Years

ODOT is just beginning to exploit the full value of the AssetWise solution, which has established a single source for corporate highway data location referencing. The agency is using AssetWise to deliver transportation intelligence to stakeholders through a secure user interface, as well as to move asset data to Data Warehouse, GIS applications, intelligent transportation systems, and data consumers across the agency.

Before embarking on this project, ODOT identified the potential benefits of implementing Bentley's AssetWise solution and creating the TransInfo system. The department anticipated nearly USD 6.1 million in savings through increased productivity, decreased training time, and decreased features inventory support and maintenance. Given these tangible results, the project costs could be repaid within five years.

In just over two years' since deploying TransInfo, ODOT has already reported significant productivity gains. Using Bentley's AssetWise, annual spatial-layer updates can be done in less than three resource-months than before. Reporting processes are now 66 percent more efficient, with data preparation for federal reporting taking 83 percent less time. Costs related to duplicate data entry and downstream data checking have been eliminated, and data management is 20 to 25 percent more efficient. ODOT has also seen labor costs related to field data collection, data entry, and maintenance decrease by 10 percent and duplication of field-collected inventory data has been mostly eliminated.

Additionally, access to accurate, up-to-date information has simplified planning for construction projects on the State Transportation Improvement Project list. The data ensures issues that could delay or impact projects are known up front. Construction plan management now takes 15 percent less time using TransInfo.

TransInfo and AssetWise have enabled Oregon DOT to shift their focus from data assembly to data analysis, putting them firmly in the business of transportation asset management. The solution acts as a business intelligence capability to help the agency understand the current state of assets, make better maintenance decisions, and proactively manage transportation assets.

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