I-270 North Design-Build

By Missouri Department of Transportation

11/8/2024

Benefits Statement

The I-270 North Design-Build Project enhances safety, mobility, and reliability for one of Missouri's busiest interstates. It saves lives by eliminating dangerous ramps and improving pedestrian access, while advanced traffic management enables swift incident response. Time is saved through better traffic flow and real-time updates, allowing informed routing decisions. Economically, the project reduces travel delays, boosts local businesses, and lowers future maintenance costs by investing in infrastructure now. Overall, this project significantly benefits the St. Louis County community by improving safety, efficiency, and economic growth.

In this case study you will learn:

1. How Missouri DOT (MoDOT) enhanced safety, reliability, and mobility along I-270 by addressing issues such as aging infrastructure, congestion, and limited access for pedestrians and cyclists.
2. How extensive public engagement efforts, including a dedicated website, community newsletters, and direct outreach ensured that the community was informed about construction impacts and updates.
3. How MoDOT's implementation of advanced traffic management technologies and real-time mapping systems optimized traffic flow and enhanced overall safety on the corridor.

Case Study #188

Version Number: 1

BACKGROUND

The completion of the I-270 North Design-Build Project is the culmination of more than a decade's work to improve safety, reliability and mobility for those using I-270 in North St. Louis County as well as to improve access to opportunity for those living in the greater St. Louis County community. I-270 is one of the heaviest traveled interstates in Missouri and a route of local, regional, and national significance carrying over 140,000 vehicles per day, 18% of which are heavy trucks. Built in the 1960s, the corridor serves as a primary freight route for commercial vehicle traffic around St. Louis and is designated on both National Highway Freight and Strategic Highway Networks.

In 2012 MoDOT partnered with East-West Gateway Council of Governments (EWG), Metro, and St. Louis County Department of Highways and Traffic to conduct the "I-270 North Corridor Study" to fully investigate the problems, needs, and opportunities. The study documented the problems faced on the I-270 corridor including aging infrastructure, significant congestion and safety issues, and minimal accessibility for local pedestrians and bicyclists. The 2012 Corridor Study led to the completion of a I-270 North Environmental Assessment in 2016 with a stated purpose and need to: 1) maintain the aging infrastructure along I-270, 2) improve mobility and operations within the I-270 corridor, 3) achieve accessibility consistent with the designated uses of I-270, and 4) improve safety within the I-270 corridor.

In 2019 MoDOT began procurement for the I-270 North Design-Build Project intending to: reconstruct and/or rehabilitate deteriorated pavement and bridges; improve traffic operations, geometrics, and safety; improve accessibility along and across the corridor for transit, bicycles, and pedestrians; and make improvements to the interchanges and outer roads. This project has improved the safety and reliability of the I-270 corridor and better-connected communities by eliminating all crossover slip ramps on the outer roads, mitigating bottlenecks on the freeway, updating interchange designs, deploying a robust and innovative TSMO program, and enhancing pedestrian and bike facilities.

TSMO PLANNING, STRATEGIES AND DEPLOYMENT

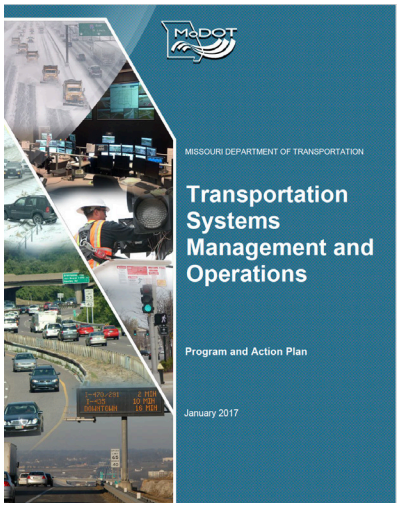
One unique aspect of this project is the ability to enhance the corridor's mobility and travel reliability through the implementation of Intelligent Transportation Systems (ITS) and Transportation System Maintenance & Operations (TSMO). The project's ITS/TSMO plan enables enhanced integrated corridor operations through an array of equipment, techniques, and methodologies to fully integrate the freeway, outer roads, arterials, public transit, and non-motorized transportation into a cohesive system. This ITS program builds off existing components with upgrades to devices and incorporates new state-of-the-art technologies.

The project's ITS elements include full-color, full-matrix Dynamic Message System (DMS) boards, high-definition CCTV cameras, a new Road Weather Information System (RWIS), freeway and arterial data collection devices, new traffic signals with Automated Traffic Signal Performance Measures (ATSPM), fiber/wireless communications, and an innovative use of a new Dynamic Trailblazer System.

The Dynamic Trailblazer System was installed along the one-way outer road sections to enhance MoDOT's traffic incident management capabilities. These Dynamic Trailblazer signs include changing arrow directions and the confirmation message of "Bypass" illuminated in bright LEDs, integrated into the ATMS to give drivers a final message on the best path. During incidents, the arrow points away towards the next outer road signal to sign drivers away from the interstate. In this way MoDOT TMC operators can make use of the one-way outer roads to guide traffic around freeway incidents.

In addition, MoDOT was awarded an Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant, focused on utilizing three main technologies while being supported by an extensive ITS coverage. The three technologies included predictive analytics, advanced video analytics, and weather analytics. The deployment of these technologies has demonstrated substantial potential for improvements in crash reduction and emergency response times.

COMMUNICATIONS PLANNING AND EXECUTION



The I-270 North Design Build project included a robust public engagement effort. The hub of this effort was the project's website (www.i270north.org) that includes background information about the project as well as real time construction and detour information and an interactive construction map. The project team produced monthly newsletters highlighting active and upcoming closures, project updates, and a community spotlight that featured local community members. The project team also developed content for MoDOT news releases regarding traffic impacts throughout the project and distributed detour flyers and utilized door hanger messaging to local businesses and residents to keep them informed about upcoming construction closures or lane restrictions. Team sponsored community informational booth at events such as the Florissant Fall Festival to inform the public about the project. The team met one on one with local businesses, emergency responders, and public transportation agencies to discuss and mitigate the impacts of upcoming closures. One area to spotlight is that the team hosted around 200 weekly conference calls to provide updates and feedback to emergency responders, school districts, business leaders, hospitals, and various public work and transportation agencies.

With a recognition of the immense changes to the traffic patterns along the I-270 North corridor because of the new interchanges and the conversion to a one-way outer system, a need was identified to be more proactive in notifying both internal MoDOT mapping systems and external mapping partners of changes to the highway system. Given the importance of accurate maps to safe and efficient movement around the corridor, the project team recognized the need to be proactive in contacting MoDOT's Traffic Management System (TMS) which is a department wide ArcGIS system that incorporates databases of several roadway features, and various map providers versus waiting for these groups to notice the changes. The team created an Open Street Map tool which was updated with daily changes to roadway configuration or construction phasing. Open Street Map is an open-source mapping program that allows users to edit maps directly which is widely used modeling software, in-vehicle GPS, etc. To have the map update as roadway geometry changes results in less driver confusion which will improve safety.

OUTCOME, BENEFITS AND LEARNINGS

MoDOT staff are using these tools to proactively operate rebuilt I-270 North corridor. MoDOT freeway operations staff, located at MoDOT's TMC, can utilize the combination of ATCMTD technologies along with traffic cameras and the Advanced Traffic Management System (ATMS) to detect incidents in real time. Incidents are immediately relayed to MoDOT's Motorist Assist team and/or local authorities who are dispatched to the site of the incident. Motorist Assist and the local authorities clear the incident as efficiently and as safely as possible so that traffic flow can resume uninterrupted. Meanwhile, staff at the TMC is monitoring freeway and arterial travel time and performance to assess the best routes for impacted traffic during construction. If traffic begins to divert onto local roads, signal timing is adjusted to compensate for this additional traffic. DMS and Dynamic Trailblazers are populated with information about the incident along with expected travel times along the interstate. This array of devices thus enables MoDOT traffic operators to make efficient and rapid decisions which are sent to incident response crews and the affected travelers.

ATCMTD technologies also exhibited the ability to enhance transportation management by improving safety, mobility, and traveler information, while IMRCP can improve maintenance decision support when utilized in an area with a significant number of weather events.