

Meeting SB I Transportation Systems Performance Goals

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Issue

The Road Repair and Accountability Act (SB I) invests \$5.4 billion annually over the next decade to help fix and repair California's transportation system. As part of the SB I package, the Solutions for Congested Corridors Program was created and will receive \$250 million annually to support multimodal corridor plans that make performance improvements along the state's most congested highways. This funding will be crucial in maintaining and enhancing the State's Transportation Management Systems (TMS).

The State's TMS, sometimes called Intelligent Transportation Systems (ITS), represents a broad class of technology assets on the state highway system, including field elements (e.g., ramp meters, traffic loops, electronic highway message signs), fiber and wireless communication systems, and central management systems (e.g., computer servers running software). To monitor progress and to assure accountability, SB I established a TMS performance outcome of "not less than 90 percent of the transportation management system units in good condition", which Caltrans must meet by 2027.

Research Findings

To gain a better understanding of the challenges with meeting the SB I defined 2027 performance goal, a review was conducted of Caltrans' current plans, practices, and evaluation methodologies as well as best practices from outside of Caltrans. Preliminary findings were presented to Caltrans at a workshop in July 2018 for comment and feedback. Main findings and recommendations from this work are as follows:

Monitoring and maintaining the state's TMS system is an enormous task. As of August 2017, Caltrans owns and operates a network of over 19,000 field systems that are connected and supported by a network of fiber and wireless communications, leased communication systems, and computer servers running software. These systems, which have become more advanced over the years, will require over 80,000 preventive maintenance checks and repairs annually to ensure maximum operability.

Caltrans is well-positioned to meet SB I TMS performance goals.

In response to federal and state regulations, Caltrans has established a number of asset management programs and practices over the past five plus years. Examples include the Caltrans Strategic Management Plan, Transportation Asset Management Plan (TAMP), State Highway Operations and Protection Program (SHOPP) Pilot Project, Caltrans Performance Monitoring System (PeMS) and other plans related to traffic signal management. The programs and practices Caltrans currently has in place provides a solid foundation to work from in meeting SB I performance goals.

KEY TAKEAWAYS

- Monitoring and maintaining the state's Transportation Management System (TMS) system is an enormous task.
- Caltrans is well-positioned to meet SB I TMS performance goals.
- The state of being in "good condition" must be more clearly defined.
- Caltrans should continue its work on defining deterioration rates or models for TMS elements.
- Innovations in asset management must be continuously monitored with the most promising new technologies, methods, and contracting approaches deployed when appropriate.

Findings (continued)

The state of being in “good condition” must be more clearly defined. Currently, the condition of TMS units is determined by whether the unit is working correctly and if it is within its life cycle. However, a TMS element, such as a changeable message sign, could be considered working correctly based on an automated self-diagnostic check while not performing correctly for motorists (e.g., message board has multiple burnt out bulbs making the message illegible). Caltrans should define inspection procedures that help District engineers define what it means for TMS elements to be “in good condition” and this definition should be consistent with the public’s expectation. Caltrans should also consider a “good”, “fair” and “poor” rating system in lieu of the current good vs. poor SB 1 performance ratings. Likewise for the TAMP, Caltrans should consider using quantifiable (numeric) performance metrics if possible.

Caltrans should continue its work on defining deterioration rates or models for TMS elements. Developing deterioration rates or models for TMS elements and systems is complex and the science of life cycle (i.e., deterioration) models is constantly improving. Also, newer technologies and equipment might not behave and deteriorate at the same rates as the older components being replaced, so forecasting longer term needs becomes difficult at best. Investigating the best methods to estimate asset management performance metrics, such as mean time till failure, useful service life, remaining service life, and deterioration rates, is well suited for a Caltrans and University of California research partnership.

Innovations in asset management must be continuously monitored with the most promising new technologies, methods, and contracting approaches deployed when appropriate. For example, Caltrans should explore opportunities to replace loop detector stations with newer technologies or data services when feasible. Caltrans should also perform an annual review of TMS units included in SB 1 monitoring and consider adding additional units if necessary, such as traffic signals, electronic toll collection devices, and express lane monitoring equipment. In the future, vehicle-to-infrastructure communications sites can also be added. Further, Caltrans should consider conducting more pilots of performance-based ITS maintenance contracts and use lessons learned from the successful pilot led by the Metropolitan Transportation Commission on the I-880 Corridor.

Further Reading

This policy brief is drawn from the “Meeting SB 1 Transportation Systems Performance Goals” research report prepared by Michael Mauch, Benjamin McKeever, and Alexander Skabardonis with Partners for Advanced Transportation Technologies (PATH) at the University of California, Berkeley. Link to download the report: <https://escholarship.org/uc/item/32t4p6h0>.

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