

Using Portable Traffic Monitoring Devices (PTMDs) in Work Zones

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FACT SHEET

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Many agencies use intelligent transportation system (ITS) devices to monitor traffic flow and detect disruptions on transportation networks. These devices can measure average speed, occupancy, and travel time, which can be used to determine performance of the system and provide traveler information. In situations like work zones that are temporary and may disrupt regular ITS devices, a portable traffic monitoring device (PTMD) can provide valuable monitoring capabilities. Practitioners can use PTMDs to monitor operating speeds inside a work zone and the speed and traffic volume on alternate routes. The data can be used to identify traffic disruptions, such as crashes and queues forming at work zones, estimate delays through the work zone and on alternate routes, assess the need for intervention, and inform motorists.

What is a Portable Traffic Monitoring Device?

A PTMD is an easy-to-use, stand-alone device that uses radar or microwave detection to collect traffic-related data and promptly communicate this information in real-time to a central server and website that can be accessed by authorized users. The information can also be automatically conveyed to motorists via a public website or portable changeable message signs/dynamic message signs. Additional features include e-mail and text message alerts to practitioners if certain thresholds are met (e.g., speeds less than a certain number, indicating a queue forming). Practitioners can use this information to alert roadway users, change the traffic control setup, and/or evaluate the data for future lane closures and other work zone decisions. The PTMD data collection equipment can be provided in several ways, such as mounted on a trailer with telescoping poles and solar panels to power the equipment or housed in construction barrels and powered by rechargeable batteries.



Deployment of a PTMD in a construction barrel in California to support traffic monitoring for bridge work.

Photo Credit: Caltrans

How Are States Using PTMDs?

California. The California Department of Transportation (Caltrans) has used PTMDs, locally called automated work zone information systems (AWIS), to monitor work zone traffic conditions and provide real-time information to motorists. During the 2009 Labor Day Weekend closure of the Bay Bridge, Caltrans tested the devices for monitoring traffic flow on alternate routes around the construction site. Caltrans also used PTMDs along Highway 101 (the Golden Gate Bridge) to monitor traffic flow and watch for excessive work zone queuing. In addition, Caltrans used the devices along I-680 to monitor conditions where a three-lane merge ramp was reduced to a one-lane merge ramp during construction. Rather than installing traffic counting tubes, Caltrans deployed a PTMD, saving more than three hours of labor and traffic disruptions that would have occurred during installation.

In 2012, Caltrans used PTMDs during the North Red Bluff Rehabilitation Project. The project involved reconstruction of lanes along I-5, requiring lane closures and a median crossover to accommodate traffic during construction. A series of four PTMDs was installed



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in each direction on I-5 to monitor traffic speeds and identify slowed traffic and possible queues. The devices triggered pre-programmed messages on portable changeable message signs at key locations, which provided almost immediate message relay to drivers and the traffic management center about changing conditions.

On the Central Redding Interchange project, which required a two-week closure of two busy ramps, Caltrans used the AWIS to monitor traffic on planned detours and notify drivers in real-time about recommended routes based on speed and projected delay. Using the system allowed Caltrans to maximize the capacity of detour routes and help drivers make informed decisions.

Based on the positive results from using PTMDs on these projects, Caltrans is developing specifications that will facilitate the use of similar systems in future work zones.

Oregon. Oregon has deployed PTMD technology in work zones through the normal transportation management plan (TMP) process. The Oregon Department of Transportation (ODOT) developed a Portable Traffic Management System (PTMS) performance-based specification that helps ODOT staff determine when it is appropriate to deploy devices in a variety of conditions. ODOT used the PTMS for both congestion queue detection and advance warning of construction vehicle ingress. ODOT tried the PTMS on a US 26 reconstruction project near Portland in 2012, and is planning another demonstration during the I-84/US 97 interchange rehabilitation project in 2013.

Deployments of PTMDs in Oregon are considered on a project-by-project basis and are evaluated based on the complexity of the work zone and issues anticipated by practitioners. The practitioner can choose what ITS components (including PTMDs) are needed for the TMP, and then include the applicable special provisions in the construction contract. ODOT also has a Qualified Products List, which highlights vendors who are approved by ODOT to deploy PTMDs.

Benefits of PTMDs

There are several benefits of using PTMDs for work zone applications. PTMDs can be relatively low cost, and moved easily when key monitoring locations change. This may enable an agency to monitor a larger area with fewer devices. Data from PTMDs can be used to identify optimal windows of time for work zone activities; guide lane closure restrictions; enforce window-of-work time limits; monitor performance related to average speed and queuing through work zones; and provide real-time traveler information. The devices also may provide a safer alternative to traditional traffic studies because they limit the exposure of practitioners deploying traffic monitoring devices in the field. The data gathered from PTMDs can also guide the development and evaluation of statewide policies.

Challenges to Implementing PTMDs

Electronic devices such as PTMDs require maintenance (e.g., battery charging), and when issues arise they must be picked up by maintenance staff. Also, the inconspicuity of some PTMDs can cause them to “blend into” other regular channelizers deployed by an agency, making it difficult for road workers to identify devices during deployments. PTMDs could be vandalized, accidentally moved by contractors, or stolen. However, they can usually be located quickly and recovered due to the global positioning system (GPS) receiver installed in the device.

Benefits of PTMDs

- Easy to move and operate
- Relatively low cost
- Limit exposure of workers during deployment
- Help lane closure managers identify work zone time windows and enforce window-of-time work limits
- Monitor average speed and queuing through work zones
- Provide real-time traveler info
- Support development and evaluation of policies related to maintenance of traffic.

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