



## Traffic Engineering, Operations & Safety Manual

### Chapter 17 System Operations & Intelligent Transportation Systems

#### Section 2 Portable Changeable Message Signs (PCMS)

#### 17-2-1 PCMS Policies & Procedures

August 2013

##### TYPES OF SIGNS

PCMS are available in various types, including fiber optic, light emitting display diodes (LED), bulb matrix and various hybrids of light source/disk technology. The standard for the industry is a 3-line sign with eight characters per line. The Bureau of Traffic Operations maintains current literature on various manufacturers and specifications for PCMS. Currently PCMS are available and deployed by Regions, typically through county highway departments and contractors, for various uses. The use of these signs **shall** conform to the following guidelines. PCMS are official traffic control devices and NOT a public information tool.

##### APPLICATIONS

Since they are dynamic signs, PCMS must only be used to display "real-time" or changing traffic condition or traffic control information. They are used for work zone temporary traffic control, incident management, special events, and unusual/hazardous road conditions due to weather. This could include expected delay times in queue situations, warning of stopped traffic, ramp or lane closures, advisory speeds and alternate route advisories. They *may* also be used to provide advance notice (up to 10 days) prior to projects or events expected to cause congestion or that will require drivers to use alternate routes.

PCMS *should not* be used to replace static warning or regulatory signs; they *may* be considered as a supplemental device to a required static sign. In the case of a ramp or lane closure, the PCMS would supplement the static warning signs informing motorists of the closure. It is at the discretion of the Region whether static or changeable message signs are more appropriate for specific applications. Refer to [TEOpS 2-10-3](#) for special event signing applications.

Nonstandard words such as "Danger," "Hazardous" or "Caution" **shall not** be used. These words do not contribute any information and *may* overly concern drivers as they approach the work zone.

Signs owned by the Department and Counties **shall** only be used for the purposes of temporary traffic control for maintenance work, incident management, Intelligent Transportation Systems (ITS) applications, and adverse weather road condition advisories. See [TEOpS 6-2-55](#) for use of PCMS in work zones. State-furnished PCMS given to the County Highway Departments **shall** be used on State-owned facilities.

If the State-owned PCMS are currently not being used on State-owned facilities, the Counties *may* contact the Regional PCMS representative for permission to use the PCMS on County roads for maintenance or construction activities being done by County forces. It will be up to the discretion of the Region whether or not to allow the usage of the State-owned PCMS. The Counties are responsible for pick-up, delivery, maintenance, and return of the PCMS. The Counties **shall** keep the Regional PCMS representative aware of where the PCMS are at all times on County roads. Regional Work Zone Engineers should document the location of the PCMS on the state system for rapid deployment in case of major incidents. The County **shall** review the word message with the Regional PCMS representative prior to deployment. If the Region needs the PCMS, the Counties will be required to move the PCMS to the appropriate State-owned facility. The Counties **shall** provide an emergency phone number to the Regional PCMS representative in case of emergency.

PCMS **shall not** be used to display generic safety messages or any other messages not necessary for specific drivers action at the site. Examples of generic messages not to be used are "Buckle Up," "Welcome to Wisconsin" or "Drive Safely." Use of these types of generic messages will tend to lead to motorist disregard of critical messages and unnecessarily distract driver attention from the roadway.

The Department reserves the right to use/deploy signs from its inventory on an improvement project to improve safety and optimize the operational efficiency of a construction work zone. Contractor provided signs *should* be used for aforementioned purposes if they could be made available and deployed expeditiously and cost effectively.

##### WEATHER

Where unusual/hazardous conditions are caused by snow, ice, fog or wind, and have been verified by pavement weather sensors, law enforcement or maintenance officials, PCMS *may* be used to warn drivers in advance. This applies especially if the condition is significantly different on certain features of the highway, such as structures compared to the roadway. PCMS **shall not** be used for this purpose if the conditions cannot be

verified every 30 minutes to keep the PCMS message current. Sample messages are located at the end of this document. Some Regions have reported sign malfunctions when temperatures drop below zero. In extreme cold conditions, frequent monitoring of sign reliability *may* be needed.

### SPECIAL EVENTS

Local agencies *may* request to have special event messages displayed on the state highway system. They *may* request to have the Region supply the PCMS at the discretion of the Region or *may* request to station their own or contractor provided equipment on our system. Any of these options are acceptable, provided the following provisions are met:

1. The event will generate enough traffic to cause congestion and/or guidance problems;
2. The message will be made up of advisory traffic management content, not advertising for the event. A library of acceptable messages is provided in Section J of this policy.
  - a. The event **shall** be open to the public.
  - b. No commercial advertising is allowed on the signs. The inclusion of a brand name within the name of an event, such as “Brand X Racing Event” is not acceptable unless it provides better understanding for attendees. For example, use “Horse Show” rather than “Midwest Horse Show” or use “Golf Event” rather than “PGA Tour Event”.
  - c. The sign message *may* include the word “Event” or “Parking”.
  - d. Event names on signs *should* be as clear and concise as possible.
3. Certain attendance criteria *should* be met in order to justify use of PCMS. Due to population differences throughout the state, minimum special event attendance thresholds have been established. Refer to Table 1 for minimum attendance criteria. When the event involves more than one location, each signed location **shall** meet the minimum attendance required per day.

**Table 1. Special Event Attendance Criteria vs. Location**

Location of Special Event	Population of Influence Area	Minimum Attendance (per day)
Major Metropolitan Area	Over 500,000	30,000
Urbanized Area I	50,000 – 500,000	15,000
Urbanized Area II	20,000 – 50,000	10,000
Rural Area	Under 20,000	5,000

4. If attendance criteria are not met, PCMS *may* be used to address special traffic movements to inform motorists. Use of PCMS in this case, is at the discretion of the Regional Traffic Engineer for such events that *may* draw out of town traffic, have a large proportion of unfamiliar drivers or involve different types of large vehicles that require special directional information (i.e., horse trailers). It is also important that the Regional Traffic Engineer look at the capacity of the roadway system in case major congestion and delays are anticipated and PCMS will provide motorist information.
5. The state-owned devices are available and not being used elsewhere for incident management purposes;
6. The local agency has given the Region ample notice;
7. When the local agency is to supply the machines, the locations, messages, and other details are to be approved by the Region beforehand, and the PCMS **shall** be placed by the county highway department, approved traffic control contractor, or by WisDOT according to Section I., PCMS Usage, of this policy.
8. The content of the message **shall** be pre-approved by the Region office.
9. It is the Region’s discretion to charge for time spent establishing locations and other conditions of use.

See [TEOpS 2-10-3](#) for the guidelines on Special Event Signing. Any Region *may* elect not to allow this type of activity, for reasons such as lack of personnel to make arrangements, to monitor usage, etc.

### INCIDENT MANAGEMENT

The signs *may* be used to advise travelers of alternate routes around construction or maintenance projects or incidents, or to notify of traffic stoppages, delays, closures or other conditions that *may* require certain driver actions. General rules of the road messages *should not* be used (i.e. “Be prepared to stop”); drivers *should* always be prepared for adverse driving conditions.

### AMBER ALERT

WisDOT TMC will display Amber Alert information on the permanently placed PCMS throughout the state. A sample message is listed on page 10 of this policy. The message will be displayed for 5 hours from the time the Amber Alert is activated. Messages will be removed from the system at the direction of the Dane County Public Safety Communications Center if the alert is cancelled sooner.

### EMERGENCY BURN RESTRICTIONS OR FIRE DANGER

Upon declaration of an emergency burn restriction or a gubernatorial executive order, PCMS *may* be placed on the highway right-of-way for the purpose of warning drivers of extreme fire danger. PCMS *may* be placed and *may* display messages to warn drivers of fire/smoke conditions affecting the roadway only at the time the fire/smoke conditions occur. The use of PCMS and the message **shall** be approved by the Director of Traffic Operations and **shall** be remotely accessible to the TMC and State Patrol communications center. See Section J for acceptable messages.

When operational issues occur due to low visibility caused by smoke/fire, a gubernatorial executive order is not needed in order to deploy messages warning drivers of possible traffic impacts. See Section J for acceptable messages.

In order to maintain efficacy, messages *should* be displayed for a limited duration (less than two weeks) and during high travel times.

### **PURCHASE**

With limited exceptions, the temporary use of PCMS and portable ITS devices on Improvement Projects *should* always be included as a bid item in all construction projects when needed. This equipment *should* be contractor provided and the equipment **shall** meet all TMC specifications.

On an exception basis only, any purchase of capital equipment temporarily used on an improvement project, like PCMS, **shall never** be charged as a direct cost to that specific improvement project. "Temporarily used" means equipment whose useful life extends beyond the service period for a particular improvement project. Because this equipment will have a useful life extending beyond the service period of a particular project, it cannot be capitalized as part of the overall infrastructure cost of that initial project.

Instead, the device *should* be accounted for in the manner in which the Department accounts for acquisition of permanent personal property. For any assets to be used exclusively on highway improvement projects and purchased with highway improvement funds, these assets *should* be charged to a construction non-participating ID (e.g. 0657-xx-xx) using an object cost (e.g. 4321) for permanent property acquisition in excess of \$5,000.

Prior to this kind of acquisition, the purchasing Region or Bureau must also have budget authority on the contractual service line of its operating budget. When the procurement exceeds \$10,000, the DTSD Administrator's Office must approve it and the purchasing Region or Bureau *should* work with the DTSD budget office to secure the operating budget approval.

Furthermore, the acquisition of PCMS and portable ITS devices under a non-participating improvement ID *should* be a rare occurrence and it **shall**:

- (a) Be recognized as either a planned element of the TOIP or as a necessary extension of the TOIP;
- (b) Meet all the statewide network needs identified and managed by the TMC; and,
- (c) Be approved jointly by DTSD Bureau Director of Highway Maintenance and Bureau Director of Traffic Operations.

In the instance where PCMS or portable ITS device is already owned by WisDOT and is provided and employed on an improvement project, the cost of operating this equipment *may* be charged to the improvement project. However, the cost to maintain or repair this equipment, which extends its useful life, *should* be charged to a non-participating project ID.

Refer to Program Management Manual 6-10-45, ITS and the TOIP Project Setup for more information regarding the funding of ITS incidental items.

Specification and standards are to be developed by the Department to conform with Federal ITS Architecture requirements. All signs provided by contractors for various applications *should* also comply with this requirement, if warranted.

### **MAINTENANCE**

An MOU **shall** be developed for any county highway department operating state-owned PCMS on the state highway system. A sample MOU is included at the end of this guideline.

## PLACEMENT

PCMS must be placed to allow drivers enough time to comprehend the message and decide what action to take.

When the PCMS is used to warn of stopped or slowed traffic, place it far enough in advance of the longest anticipated queue of traffic so drivers have adequate distance to stop. If used to provide information on delays, current ramp closures or to inform of alternate routes, place the PCMS in advance of exits to alternate routes so drivers have adequate time to decide whether or not to exit without making erratic maneuvers.

When used to provide lane closure warning and there is an interchange between the sign and the lane closure, include enough information about location of the lane closure so exiting traffic is not encouraged to make unnecessary lane changes prior to the interchange.

It is possible to use multiple PCMS for adequate warning or if one PCMS cannot safely display enough information. When anticipated queue lengths vary, and queues could extend beyond an interchange, PCMS *may* be needed on each side of the interchange and *should* provide current information.

For advance notice (up to 10 days) of ramp or lane closures, PCMS *may* be placed at the actual closure location to give notice to repeat drivers.

## LATERAL PLACEMENT

Signs *should* be placed as far away from the live traffic lanes as possible without hampering visibility. In advance of Interstate construction projects, the signs *should* be placed on the backslope beyond the ditch. The location selected *should* be at or slightly above the elevation of the roadway. This improves the visibility, minimizes the chance of a vehicle hit, and also improves safety for the sign maintenance worker. For intermittent work such as freeway lane closure, or where site conditions do not allow otherwise, the signs *may* be placed on the shoulder. The site *should* be visited to assure visibility, safety and maintenance considerations. A taper of reflectorized drums, cones or barricades *should* be placed ahead of PCMS placed on the shoulder if it is not shielded by a barrier.

## CONTROL

Signs are capable of having manual on-site control or remote control. The manual on-site control allows a project engineer or maintenance supervisor to program the sign using the on-board computer keyboard. However, this does not supercede the requirements for compliance with message guidelines. There are two methods of remote control; (1) Utilizing a cellular telephone, and (2) utilizing a central base computer. The cellular telephone would be most applicable if the project engineer wanted control of the sign without having to travel to the sign location.

However, the cellular option is very restrictive since the programmer can only use the cellular number pad to program various functions. This limits the different features that can normally be used on the computer keyboard.

The central base computer remote control has been widely used in the state. The base computer is generally located at the local Traffic Management Center. Either hardwire telephone lines or cellular telephone services are used to communicate with the signs in the field using statewide ITS software. The base computer consists of personal computer and modem. A dedicated telephone number must be arranged for each sign. Hardwired telephone lines are preferred, if lines are available close to the sign locations. While cellular telephone provides savings in hardwire installation, the system is not entirely reliable. Near larger cities, peak hour business calls often over saturate the system, not allowing acceptance of further calls. Also, cellular service *may* not be available, particularly in rural areas. Users *should* consult with Bureau of Highway Operations Traffic regarding the availability of cellular phone services in specific locations.

## TRAINING

Training for State Patrol operators, project engineers and maintenance staff is available. Provisions *may* be included in the purchase spec, which would require the supplier to provide a certain number of hours training during the warranty period. Beyond warranty period, the training would be available for a fixed fee.

## PCMS USAGE

For PCMS placed on the State Highway System, the PCMS **shall** either be:

1. Owned and placed by WisDOT
2. Owned and placed by contractors under contract with WisDOT

3. Owned, rented, or borrowed and placed by county highway departments under contract or permit with WisDOT

County Sheriff's Departments and other local agencies **shall** work with the County Highway Departments to place the signs and display proper messages consistent with WisDOT policy. This includes any PCMS purchased by a County Sheriff's Department and other local agencies through funds received from Bureau of Transportation Safety (BOTS).

#### **ACCEPTABLE MESSAGES FOR SPECIAL EVENTS, WEATHER, INCIDENTS AND AMBER ALERTS**

The signs are generally capable of sequencing up to six frames. However, for driver comprehension, messages **shall** be limited to one or two frames (see MUTCD Section [6F.55](#)). Blank or other filler frames between the two frames of text **shall** not be used. It is desirable for the driver to be able to read the entire message sequence twice as they pass by the sign. For an Interstate highway application, the total viewing time is about seven seconds. Each frame is usually displayed for 2.0 seconds or less. Using more than two frames makes it difficult for drivers to read the entire message sequence twice. Do not flash any part of a message.

It is recommended that the first frame describe the traffic condition or problem ahead, which the motorist *may* encounter. The second frame would be used to advise the driver of an appropriate action. Examples are:

<u>1st Frame</u>	<u>2nd Frame</u>
CRASH	LEFT
AHEAD	LANE
1 MILE	CLOSED
TRAFFIC	NEXT
STOPPED	3
AHEAD	MILES
ROAD	USE
CLOSED	EXIT #
2 MILES	394

See the message list that follows for more examples.

When the State Patrol will be operating the signs for a specific project, a set of message guidelines *should* be prepared for use by the operators. This will provide consistency in the messages being displayed while various shifts of operators or troopers are working the project.

**PROBLEM/DISTANCE**

ALL LANES BLOCKED	DELAYS	FLASH FLOODING AHEAD	ICY BRIDGES AHEAD	NO OVERSIZE LOADS	
BRIDGE CLOSED	DENSE FOG	FRESH OIL	LEFT 2 LANES CLOSED	RIGHT 2 LANES CLOSED	SINGLE LANE
BRIDGE SLIPPERY	DISABLED VEHICLE	GRASS FIRE	LEFT SHOULDER CLOSED	RIGHT LANE NARROWS	SLIPPERY ROAD
CENTER LANE CLOSED	DUST STORM	HIGH WINDS	MAJOR DELAYS	RIGHT SHOULDER CLOSED	STALLED VEHICLES AHEAD
COLBY ROAD CLOSED	EMER VEHICLES ONLY	ICE	NEXT EXIT CLOSED	ROAD CLOSED	TOW TRUCK AHEAD
CRASH-ROAD CLOSED	EVENT PARKING	ICE ON BRIDGES	ONE-WAY TRAFFIC AHEAD	ROAD CLOSED 6 MILES	VEHICLE FIRE
CRASH 4 MILES AHEAD	EXIT 45 CLOSED	INCIDENT AHEAD	RAMP CLOSED	ROAD FLOODED AHEAD	WATER ON ROAD
CRASH NEAR I-94	FOG 3 MILES	LANE SHIFT	RAMP SLIPPERY	ROAD SLIPPERY	
DEBRIS AHEAD	FREEWAY CLOSED	LEFT LANE CLOSED	RIGHT LANE CLOSED	SHOULDER BLOCKED	

**ACTION**

ALL TRAFFIC EXIT RT	DO NOT PASS	ONE-WAY TRAFFIC	STOP AHEAD	USE DETOUR ROUTE
ALT ROUTE EXIT 25	FOLLOW ALT ROUTE	PASS TO LEFT	STOP 5 MILES	USE LEFT LANE
AVOID DELAYS USE US53	FOLLOW DETOUR	PASS TO RIGHT	TUNE RADIO 1510 AM	USE NEXT EXIT
BEST ROUTE TO I-94	FOLLOW SIGNS	STAY IN LANE	USE CENTER LANE	USE RIGHT LANE
DETOUR 2 MILES	MERGE RIGHT 2 MILES	STAY ON US 45	USE COLBY ROAD	WATCH FOR FLAGGER

<b>EVENT</b>	<b>PANEL 1</b>	<b>PANEL 2</b>
Access	CRASH AHEAD	USE ACCS RD NEXT RIGHT
Blocked	RIGHT 2 LANES CLOSED	AHEAD X MILES
Center	N I-39 TRAF USE CNTR LN (USE 2 PHASES)	
Commercial	OVERSIZE TRUCKS	USE EXIT 120
Congestion	MAJOR DELAY	NEXT 3 MILES
Emergency	EMER VEHICLES AHEAD	
Event Parking	EVENT PARKING AHEAD	USE NEXT RIGHT
Fire/Smoke Hazard	EXTREME FIRE HAZARD	NO OPEN BURNING

	EXTREME FIRE HAZARD	BURN BAN IN EFFECT
	SMOKE OVER ROAD	REDUCE SPEED
	FOREST (GRASS) FIRE AHEAD	TRAFFIC STOPPED
Freeway Closed	I-90 CLOSED	DETOUR EXIT 10
Hazmat	HAZMAT SPILL EXIT 130	USE EXIT 125
Traffic Information	TUNE TO 1240 AM	FOR TRAFFIC INFO
Oversize Vehicles	OVERSZ TRUCKS	MUST EXIT
Prepare	CRASH 3 MILES AHEAD	
Slippery	MUDSLIDE SLIP RD POSSIBLE	
Speed	REDUCED SPD ZONE AHEAD	
Amber Alert	CHILD ABDUCT ALERT	CALL 511

**PORTABLE CHANGEABLE MESSAGE SIGNS (PCMSs) MEMORANDUM OF UNDERSTANDING**

This MEMORANDUM OF UNDERSTANDING; issued \_\_\_\_\_ is designed to establish certain principles and procedures that the County of \_\_\_\_\_, (COUNTY) and the Wisconsin Department of Transportation (DEPARTMENT) agree to follow for the application, storage and maintenance of the PORTABLE CHANGEABLE MESSAGE SIGNS (PCMSs) owned by the DEPARTMENT.

**PROVISIONS**

- The COUNTY will follow the procedures and guidelines in the STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION TRAFFIC ENGINEERING, OPERATIONS & SAFETY MANUAL CHAPTER 6-2-55 AND THE FHWA MANUAL on UNIFORM TRAFFIC CONTROL DEVICES.
- The COUNTY will be responsible for maintenance, storage, repair and troubleshooting of the PCMSs. The PCMSs will be stored inside a secure location when not in use on the highway. Storage *should* provide cover and protection from the weather if at all possible. The DEPARTMENT will respond to functional problems that cannot be solved by the COUNTY during normal business hours.
- The DEPARTMENT **shall** have access to the PCMSs at all times. Keys to locks for any secure locations or sign **shall** be provided to the authorized DEPARTMENT personnel.
- The COUNTY will be reimbursed for all expenses related to the use of the PCMSs for the DEPARTMENT purposes through the Routine Maintenance Agreement, Traffic Control Activity Code 032.
- The COUNTY **shall** inform the DEPARTMENT contact person when and where the PCMSs are in use or scheduled to be used. When the PCMSs are in use a log **shall** be maintained with time and duration and message set recorded. The DEPARTMENT will supply the log.
- The DEPARTMENT will retain the authority to change messages on the PCMSs and move PCMSs. The DEPARTMENT will notify the COUNTY prior to the message change or move if time permits.
- The DEPARTMENT **shall** have access to the PCMSs by remote telecommunications whenever they are deployed.
- The DEPARTMENT **shall** provide training on use, maintenance, storage, hauling, setup and minor problem troubleshooting. The COUNTY **shall** send a minimum of TWO (2) representatives for training.
- The COUNTY will be responsible for emergency deployment. The DEPARTMENT will decide on emergency deployment if time permits.
- The COUNTY contact for coordination of the PCMSs is \_\_\_\_\_
- The DEPARTMENT contact for coordination of the PCMSs is \_\_\_\_\_

The parties agree to all provisions, which are made a part of this Memorandum of Understanding.

For the DEPARTMENT

By: \_\_\_\_\_  
Systems Operations Manager  
\_\_\_\_ Region

For the COUNTY

By: \_\_\_\_\_  
County Highway Commissioner