Portable Changeable Message Sign Handbook

2nd Edition – September 2018

Oregon Department of Transportation

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INTRODUCTION

The purpose of this handbook is to provide basic information for the safe and effective use of a Portable Changeable Message Sign (PCMS). This handbook will illustrate proper setup and delineation for a PCMS, as well as provide users with a variety of example messages for a broad range of roadway activities.

A PCMS is a large electronic sign used to display programmable, dynamic messages to provide traffic with timely warnings, guidance, or notification of approaching roadway conditions.

Also known as a portable variable message sign (PVMS), this handbook may be used in Oregon for roadway maintenance activities, incident management, other short-term activities, and long-term construction projects on Oregon roadways.

National and Oregon state standards, policies, and specifications that apply to PCMS are found in the Manual on Uniform Traffic Control Devices (MUTCD) [1], the Oregon Standard Specifications for Construction [2], the Oregon Temporary Traffic Control Handbook (OTTCH) [3], and ODOT Standard Drawing TM 800.

The contents of this handbook are based on guidance found in the following:

- Manual on Uniform Traffic Control Devices (MUTCD) [1]
- FHWA's *Portable Changeable Message Sign Handbook* [4]
- Oregon Temporary Traffic Control Handbook (OTTCH) [3]
- Texas Transportation Institute's (TTI) *Development of a Field Guide for Portable Changeable Message Sign Use in Work Zones* [5]

Other available studies, guidelines, and research were also referenced in the compilation of this handbook. A complete list of referred works is available in the References section.

WHEN TO USE A PCMS

A PCMS is a proven effective tool in a variety of temporary traffic control conditions where modifications are made to the existing roadway environment, traffic operations, traffic patterns, or other changes that strain driver expectancy and demand increased driver attention, including where:

- Posted traffic speeds are reduced to enhance work zone safety.

- Normal traffic speeds are expected to drop substantially or fluctuate regularly due to increased traffic congestion.

- Anticipated increases in traffic queuing and travel delays are expected.

- Changes are made to roadway alignments or pavement surfaces.

- Advance notification for ramp, lane, or roadway closures is needed.

- Lane usage changes (e.g. lane closures, turn lane closures, loss of climbing/passing lane, etc.).

- A supplement to temporary signs or pavement markings would enhance road user safety.

- Permanent signing has failed (e.g. sign structure failure, blocked visibility, vandalism, etc.).

- A special event (e.g. sporting event, concert, parade, protest, etc.) impacts normal traffic operation.

- Emergency situations or incident response create a need for dynamic advance warnings or detour information.

- Adverse weather or environmental conditions exist (e.g. dust, smoke, fog, etc.).

EQUIPMENT

PCMS are divided into three categories based on character height and the number of message lines that can be displayed (See Table 1).

- **Type A – Full Size PCMS**
  - o   Where posted speed $\geq$ 45 MPH.
  - o   May be used on low speed facilities where adequate space allows for safe roadside placement.

- **Type B – Mini PCMS**
  - o   Where posted speed < 45 MPH.
  - o   May be used on high speed facilities in emergency situations.

- **Type C – Truck-mounted PCMS**
  - o   Mounted on a work trucks (e.g. dump truck, 1-ton flat bed, Incident Response vehicle, etc.); or,
  - o   Other Equipment (e.g. roller compactor, motor grader, etc.)

Table 1 – PCMS Panel Display Requirements by Type

PCMS Type	Type A Full Size	Type B Mini	Type C Truck-mounted
Min. Character Height*	18 inches	12 inches	10 inches
Number of Message Lines per Character Height	3 lines @ 18 in.	3 lines @ 12 in. 2 lines @ 18 in.	2 lines @ 10 in.
Max. Number of Characters per Line **	8 Characters		

* Character heights less than 18 inches, or more than 3 lines shall not be used on Full Size PCMS.
** Characters shall have a height-to-width ration of 1.4:1 (e.g. 5x7 character matrix.)

For mobile operations, a series of truck-mounted PCMS may be used to display warning messages, or be set to "Caution" mode. Truck-mounted PCMS are recommended for mobile operations for all roads [3].

NOTE: Use of vehicle-mounted flashing warning lights placed in front, or in the line of sight of the PCMS can affect the legibility of the PCMS message and blind drivers – particularly at night. Consider turning off flashing warning lights mounted between the PCMS and approaching traffic.

Operate the PCMS according to the manufacturer's instructions, the temporary traffic control plan, and the project specifications, where applicable.

Trailer Mounted PCMS

Truck Mounted PCMS

For work activities on Oregon highways, use a PCMS listed on ODOT's Qualified Products List (QPL). The ODOT fleet procurement process addresses specific needs for ODOT purchases.

PLACEMENT

Locate and align the PCMS to provide maximum legibility and time for public traffic to interpret and respond appropriately to the message.

Site Selection

Locate a suitable site for the PCMS and adjust for road conditions as follows:

1. Straight, flat, level sections of roadway where practical.
2. Site should be safely accessible by maintenance/towing vehicle.
3. PCMS unit should be visible from ½ mile in day and nighttime conditions.
4. PCMS message using 18 inch characters should be legible from 600 feet (min.) at night and 800 feet (min.) during daylight conditions.
5. Mini or Truck-mounted PCMS should be legible from 650 ft (min.) under daylight or nighttime conditions.
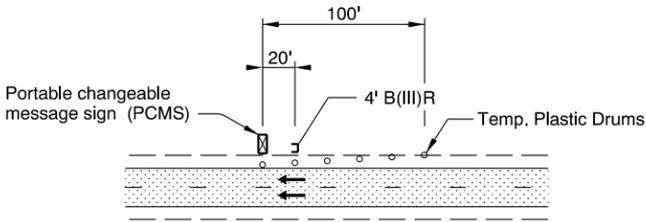

PCMS located near a pullout for accessibility

6. PCMS unit shall be located behind a traffic barrier or delineated using the *PCMS Installation Detail* on ODOT Standard Drawing TM 800, or as shown in the OTTCH [3], Chapter 4.

Delineated PCMS using TM800 detail

NOTES:

- Install PCMS beyond the outside shoulder, when possible.

- Use the appropriate type of barricade panels for PCMS location.
  Right shoulder, use Type B(III)R
  Left shoulder, use Type B(III)L

- Use six drums in shoulder taper on 20' spacing. The drums and barricade may be omitted when PCMS is placed behind a roadside barrier.

- Detail as shown is used for trailered and non-crashworthy components of:
  - Portable Traffic Signals
  - Smart Work Zone Systems

PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) INSTALLATION

TM800 PCMS installation detail

7. When not displaying messages, the PCMS should be turned off and the panel should be rotated away from traffic. When practical, and if not being used for a long period of time (e.g. more than 24 hours), PCMS should be moved behind a traffic barrier or to a location that minimizes exposure to live traffic.

8. If relocating or shielding the PCMS behind a traffic barrier is not practical, turn the PCMS panel away from traffic and delineate using the PCMS Installation Detail on ODOT Standard Drawing TM800, or as shown in the OTTCH [3], Chapter 4.

PCMS Lowered and Turned Away from Traffic

9. For detours, locate PCMS far enough in advance of route decision points to allow road users to perform necessary lane changes or turns to access the alternate route.

10. PCMS should be located away from existing or temporary regulatory, guide, warning or other critical signs according to Table 2, below:

Table 2 – PCMS Spacing Table

Roadway Type	Posted Speed (mph)	Spacing (ft)*
Freeways	≥ 55	1000
Non-Freeway, Rural Highway	≥ 60	700
Non-Freeway, High-Speed	45 – 55	500
Urban Arterials	30 – 40	350
Urban, Low-Speed	< 30	100

* Consider increased spacing on multi-lane roads.

11. Locate PCMS away from high driver workload areas (e.g. busy intersections, ramps, freeway decision points, etc. [6]). If ideal sites are limited, place PCMS as far into driver's cone of vision, as practical, to optimize visibility of the messages.

High driver workload areas can affect PCMS visibility

PCMS too far beyond driver's cone of vision

12. When multiple PCMS are needed, place them on the same side of the roadway, and separate them by a minimum distance of:

- 1,000 feet on freeways and expressways
- 500 feet on all other roadways

Do not install temporary signing between the two PCMS to preserve the integrity of the complex message sequence.

See *Message Exceptions* section, for additional guidance in using two PCMS.

13. When possible, place PCMS to minimize visual clutter, and to avoid other roadside features affecting PCMS messages.

On multi-lane roads with sufficient median width, PCMS may be placed in the median for additional visibility.

Roadside clutter affecting message

14. Place PCMS on level ground, where practical. Use leveling jacks to plumb the PCMS. Rotate PCMS panel face 5-10 degrees toward the roadway to improve legibility [7].
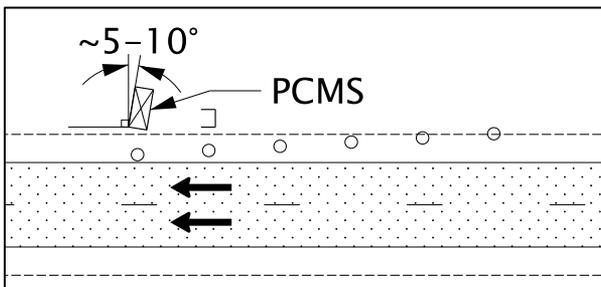
Rotate sign to improve legibility

Sight Distance & Visibility

Horizontal and vertical curves, foliage, buildings, or other roadside features may hide a PCMS. The PCMS may need to be located further from the decision point to give motorists enough time to read the messages.

NOTE: PCMS message using 18 inch characters should be legible from 600 feet (min.) at night and 800 feet (min.) during daylight conditions.

Mini or Truck-mounted PCMS should be legible from 650 ft (min.) under daylight or nighttime conditions.

When displaying messages, the bottom of the panel shall be a minimum of 7 feet above the roadway in urban areas, and 5 feet above the roadway in rural areas, measured at the edge of the nearest traffic lane.
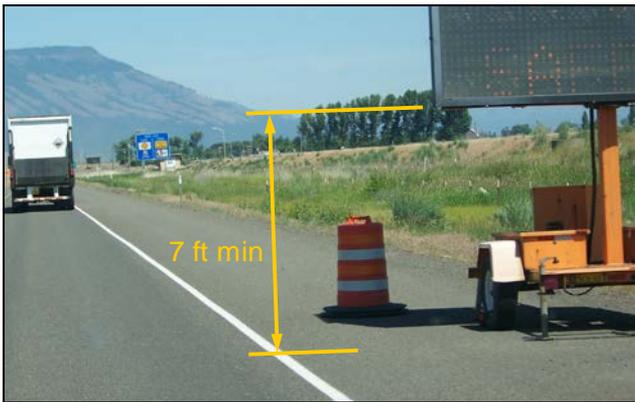
Proper height provides maximum message visibility

After the PCMS has been positioned, with the panel at the proper height and rotated to face traffic, verify the PCMS is unobstructed and the messages can be read from the distances shown above.

Field verify PCMS visibility after installation

MESSAGES

The primary purpose of a PCMS is to provide traffic with timely information to facilitate safe movement through the area or work zone.

Display

A complete PCMS "Message" is made of two individual, alternating messages. Each individual message is known as a "Phase" or "Panel".

Each phase should be displayed for at least 2 seconds. Complex phases may take longer to process and understand [6]. The total display time for both phases should be no greater than 8 seconds.

Drivers traveling at the posted speed should be able to read the entire message at least twice – allowing time to read the message, process it, and take an appropriate action.

A PCMS message shall conform to the following:

- A maximum of 3 lines per phase.
- A maximum of 8 characters per line.
- A maximum of 2 phases (panels) per complete message unless stated otherwise in *Message Exceptions.*

In developing a message for a PCMS, use the following best practices:

- Each phase contains an independent piece of information and can be understood on its own.
- Use all upper-case letters, and center justify each line.
- If using only one phase, display the phase continuously. Avoid flashing the same phase repeatedly.
- Do not use animation, rapid flashing, dissolving, exploding, horizontal or vertical scrolling, or other techniques for displaying phases.
- Requirements for character heights and number of message lines can be found in Table 1.
- Characters shall have a height-to-width ration of 1.4:1 (e.g. 5x7 character matrix).
- Spacing between characters in a word shall be 25% – 40% of the character height. Spacing between words in a message shall be 75% – 100% of the character height. Spacing between lines shall be 50% – 75% of the character height.

- A PCMS may be used to display arrows and chevrons to simulate a sequential arrow board. Do not combine arrows/chevrons and text on the same phase. Arrows and chevrons used on a PCMS must comply with the MUTCD.

Symbols and Graphics

Messages shall be displayed in amber color (590 nanometers (nominal) wavelength) and use upper-case letters and numbers unless stated otherwise, below.

Newer PCMS technologies allow graphical displays that duplicate many standard signs or sign legends – including route shields and other common sign symbols with no apparent loss of resolution or recognition when compared to a static version of the same sign. PCMS having this ability are known as, "full matrix" signs, many of which have the ability to display messages/graphics in full color. See Table 2A-5 in the MUTCD for a list of common uses of sign color.

Route shields and common sign symbols (e.g. "Flagger Ahead" symbol) shall only be displayed if they can duplicate exactly the standard sign symbol in the correct color(s), as shown in the FHWA Standard Highway Signs (SHS) and ODOT Sign Policy and Guidelines. Information on displaying symbols on a PCMS is given in Chapter 2L of the MUTCD.

NOTE: A PCMS shall not display animation, rapid flashing, dissolving, exploding, scrolling, or other graphic elements that distracts road users.

Message Content

PCMS shall only display traffic operational, regulatory, warning, and guidance information, and shall not display advertising messages on a PCMS or its supports. A PCMS should be used to supplement conventional signing and pavement markings, not substitute for them.

The message should be as brief as practical and should contain three thoughts – with each thought preferably shown on its own line:

1. The problem or situation that the road user will encounter.
2. The location or distance to or the timing of occurrence.
3. The recommended driver action.

For Oregon State highways, advance notification of extended road or lane closures shall be limited to two weeks (max.) before the closure takes place [6], unless otherwise shown in a Traffic Control Plan; or, as directed by an ODOT Region Traffic Engineer/Manager, ODOT Construction Project Manager, District Manager, or their representative.

Avoid displaying messages that could adversely impact a facility operated or maintained by another jurisdiction. Contact the affected agency and have the agency provide their approval in writing before displaying the message.

If an emergency action plan or other interagency agreement exists regarding rerouting or detouring traffic, follow the procedures within that plan or agreement.

PCMS shall not be used to display the following types of messages:

- Test messages
- Public Service Announcements (PSA)
- "Amber Alerts"
- Messages that conflict with Highway Advisory Radio (HAR) broadcasts in the area.

Avoid repeating-line messages – where a portion of the message (e.g. the first line, or first two lines) is held constant between the two phases, while the remaining line(s) alternates two different pieces of information.

With Repeating Lines   *Without Repeating Lines*

ROAD CLOSED AHEAD	ROAD CLOSED 1 MILE

ROAD CLOSED 1 MILE	DETOUR 1 MILE AHEAD

Research [8][9] has shown that while driver comprehension may not be affected, reading time greatly increases with these types of messages.

When environmental conditions reduce visibility and legibility, or when legibility distances cannot be achieved, consider limiting the message to a single phase.

Rain, fog, smoke, or dust can reduce PCMS legibility

Credibility

Message credibility is an extremely important consideration in properly operating a PCMS. Messages must provide timely, reliable, accurate, and relevant information.

Messages should avoid using generic 'signal' words – DANGER, WARNING, CAUTION, etc. Research [7] indicates these types of words may not be interpreted as intended, and often do not affect motorist driving patterns or behaviors.

Many factors reduce PCMS credibility [10], including information that is:

- **Inaccurate** – Messages do not reflect current roadway conditions (e.g. warning of Flaggers ahead when no flagging work is being conducted).

- **Outdated** – Poorly timed PCMS messages impair their effectiveness (e.g. Ramp closure warnings for a ramp that reopened one week ago).

- **Irrelevant** – Messages displayed on mainline for a distant side road location (e.g. PCMS message displayed on a freeway for a local street paving operation that makes no impact to freeway traffic).

- **Repetitive** – Displaying the same, generic message for 2 continuous weeks or more in a high-traffic, urban area. Motorists will likely begin to ignore the message, rendering the PCMS ineffective.

- **Poorly Designed –** Poorly structured, misspelled, overly-abbreviated, slang messages result in confusion and ineffectiveness (e.g. "TK NXT EXT 201A – RD CLOSD AHD").

- **Obvious** – Displaying messages that describe a condition already apparent to drivers (e.g. Displaying, "EXPECT DELAYS" to three lanes of bumper-to-bumper traffic).

- **Trivial** – "USE CAUTION", "SLOW", even "ROAD WORK AHEAD" on a PCMS quickly become ignored by drivers, forcing PCMS to lose their effectiveness in changing driver behavior.

Avoid displaying overly simplistic messages that add little value to other signs or devices used in the work zone. Provide drivers with clear reasons for focusing their attention and changing their driving behaviors as they enter and drive through the work zone – e.g. "WORKERS IN ROAD" or "LANE NARROWS".

Standard Messages

Motorists need more time to read unusual or complex messages – specific road names, dates, times, etc. Being able to quickly read and process a message results in faster driver response times. Standard messages should be used wherever practical [7][10]. See Appendix A for a variety of Standard Messages.

Non-Standard Messages

If the Standard Messages from Appendix A are not adequate for a given condition or application, a custom message may be developed.

On state highways, if a custom, non-standard message is needed, the message shall be approved by an ODOT Region Traffic Engineer/Manager, ODOT Construction Project Manager, District Manager, or their representative, where applicable.

Use the **PCMS Message Worksheet** in Appendix B to plan the message [11]. Following approval, store the Message Worksheet with the PCMS.

Consider the following factors when creating a custom message:

1. Keep the message simple, brief, legible, and clear. An effective message provides adequate information to drivers. Ineffective messages result in frustration, confusion, even decreased safety.

    Messages that are too short, vague or generic may cause drivers to:

    - Drive in a manner different than intended
    - Misinterpret the message
    - Become confused, angry, frustrated, even violent
    - Ignore the message completely

    Too much information – overly complex, 3 or more phases, etc. – may cause drivers to:

    - Not be able to read entire message
    - Become overly distracted by the message trying to read it all
    - Ignore the message.

    Keep messages concise. Motorists can only process a limited amount of information in a given amount of time. Research [12] suggests the maximum number of words in a message, including both phases, should not exceed:

    - 8 words on roads with a posted speed of 55 mph and less
    - 7 words on freeways

2. Messages should address the following items:

   a. **Problem –** e.g. Left lane is closed, detour is ahead

   b. **Location** – e.g. Lane closure in 1 mile, drivers use Exit 214 for detour

   c. **Time** – e.g. Closures occur Tuesday – Friday, 8 p.m. – 6 a.m.

   d. **Action** – e.g. Drivers must exit and prepare to stop

The above list is generally in order of importance. Choose the most important information to display – given the circumstances, message size limit, and desired driver response.

Add an attention statement if the message is being directed at a specific group of drivers or vehicle classification (e.g. Through-traffic; or, All trucks).

In the example of an approaching low bridge, a problem statement is needed, plus a height restriction announcement and the detour route(s). A PCMS message might look like the following:

HT LIMIT XXFT XIN 1 MILE	TRUCKS DETOUR NEXT RT

NOTE: If a height limit measurement includes 10" or 11", the message may be rounded down to 9" to save on character needs.

If the roadway is closed to all vehicles, the message may become:

ROAD CLOSED 1 MILE	DETOUR NEXT RIGHT

3. Avoid using unnecessary words – articles of speech (a, an, the) unless the intent of the message becomes unclear without them.

4. Avoid using abbreviations, when possible.

   a. If necessary, follow guidance in the *Standard Abbreviation* section below.

    b. For abbreviations not listed, create an abbreviation using the following techniques:

        i. By removing one or more vowels – commonly near the end of the word:

        "EXIT" may become, "EXT"

        "CANYON" may become, "CANYN"

        "SEASIDE" may become, "SEASID" or "SEASD"

        ii. If necessary, a combination of vowels and extra consonants may be deleted:

        "WILLAMETTE" might become, "WILLAMET"

        iii. A combination of removing vowels and letters from the end of a word until it is the desired length.

        "OVERWEIGHT" may become, "OVRWEIGH"

    Research [7] shows truncated abbreviations are easier to recognize and comprehend than conventional or contracted abbreviations.

    Example: EMERGENCY: "EMERGENC" may be more recognizable than, "EMERGNC" or, "EMRGNCY"

    Example: SHOULDER: "SHOULDR" may be more recognizable than, "SHLDR" or "SHLDER"

    c. Do not use a period with abbreviations.

5. Messages should be made of meaningful pieces of information understood as independent phases.

    a. A single phase display is preferred.

    b. Use a maximum of two phases for a given message.

    c. Split message components where it makes the most sense.

AVOID		*PREFERRED*	
TRUCKS **MUST** **USE**	**DETOUR** **1 MILE** **AHEAD**	**TRUCKS** **MUST USE** **DETOUR**	**TRUCK** **DETOUR** **1 MILE**

    d. Reduce the message length or complexity during heavy traffic volumes, bad weather, or other demanding driving environments.

    e. Use two signs for complex or longer messages.

6. Do not display expected, unessential, or implied actions or information [7]. For example:

    a. Drivers will expect to have to merge right when they read:

<div align="center">

LEFT
LEFT
LANE
CLOSED

</div>

    Displaying, "TRAFFIC MERGE RIGHT" on the second panel may be used; but, a description of the work activity, condition, or hazard on the second phase may be more useful to drivers:

<div align="center">

PAVING
PAVING
NEXT
2 MILES

</div>

    b. "FOLLOW DETOUR" uses fewer words than, "FOLLOW DETOUR ROUTE" to display the same critical information.

    c. "FLAGGER AHEAD" is more critical than, "EXPECT DELAYS", and still implies potential delays.

Message Exceptions

Under limited conditions, a message may be composed of three phases. The following represent cases where a third phase may be displayed on a single PCMS:

- Emergency situations

- Cases of inclement weather

- For regulatory snow zone messages
  (See Appendix A: Snow and Ice – Regulatory Conditions)
  (OAR 734-17-0015, OAR 734-17-0025)

- Locations with limited right of way precluding placement of a second PCMS

- Lack of PCMS availability

- Other site restrictions or conditions, when approved by an ODOT Region Traffic Engineer/Manager, ODOT Construction Project Manager, District Manager, or their representative.

Sight distance to the PCMS should be maximized under these conditions to provide drivers with the best chance of reading all three phases.

See Appendix A – Standard Messages for example messages that may provide useful alternatives to using a third phase.

In some instances, a third phase may be needed to convey additional information. If a third phase is needed, a second PCMS should be used.

If two PCMS are needed, set up both PCMS, program the three desired phases and test the message sequence. Then, display the two PCMS to traffic, as timely as practical.

If a second PCMS is added to provide additional information to an existing operating PCMS, set up, program and test the second PCMS. Then, display the second PCMS message to traffic.

If a second PCMS is used, the message on the additional PCMS does not need to repeat any part of the first PCMS message. If two PCMS are available, one static (unchanging) phase should be displayed on the first PCMS. The second PCMS should be used to display the second and third phases.

In choosing to use longer PCMS messages (including adding a second PCMS), it should be noted that research indicates motorists have difficulty comprehending long, complex messages, even when using two PCMS to display the message [12].

Speeds

Speed messages on a PCMS should be limited to advisory or warning messages. Speed messages should be used to supplement regulatory posted speed signs, such as:

<div align="center">

| WORKZONE SLOW TO XX MPH | or | REDUCE SPEED TO XX MPH |

</div>
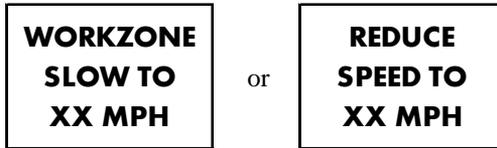
When displaying speed reduction messages [6]:

- Provide a reason drivers should slow down, such as:

<div align="center">

| XX MPH SLOW FOR WORKERS | or | SLOWED TRAFFIC AHEAD |

</div>
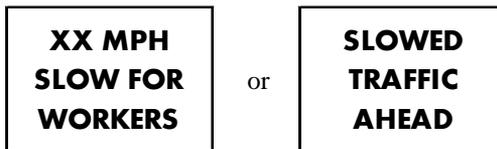
- Do not display safety campaign messages on PCMS, such as, "CLICK IT OR TICKET", "DONT DRINK & DRIVE", or other public service messages.

- For extended work (i.e. 1 year or longer), use a PCMS during the first week or two of the project, and after any major condition changes. Use passive traffic controls at other times.

- Place the first PCMS 500 to 1000 feet upstream from the condition or hazard. The PCMS may be placed before or after the initial advance warning sign (e.g. ROAD WORK AHEAD), but should not block this critical sign, nor have the PCMS messages blocked by it.

Speed Detection Feature on PCMS

Speed detection devices can be fitted onto a PCMS and used to provide vehicle speed information on the display. A PCMS used to display instantaneous vehicle speeds can be used for a wide range of conditions – roadside hazards, adverse weather conditions, traffic incidents, pavement condition, heavy congestion, etc. [13]. A PCMS with this feature can encourage speed limit compliance and reduce the speed of vehicles through a work zone. Speed zone compliance is increased when a reason for the reduced speed is displayed on the PCMS [14].

When displaying approach speeds:

- Display the PCMS in conjunction with a Speed Limit sign.

- Use the following message:

> **YOUR**
> **SPEED IS**
> **XX MPH**
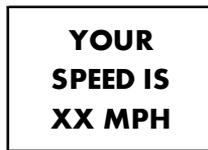
Consider the following before using a PCMS with speed detection capability:

- If used for more than 4 weeks, periodic police enforcement should be arranged to reinforce and maintain the effectiveness of the PCMS.

- Check the radar each time the PCMS is set up. Calibrate and adjust, as necessary, to ensure accuracy.

- The radar should be aimed to measure the speeds of vehicles traveling in the fastest moving lane, at no more than 10 seconds of distance upstream from the PCMS location.

- On roadways with posted speeds of 50 mph or greater, speeds of vehicles traveling more than 25 mph over the speed limit should not be displayed on the PCMS.

- In work zones, the first PCMS should be positioned 500 to 1000 feet upstream of the hazard, so drivers have time to read and interpret the message, and react before reaching the hazard.

Locations and Distances

Often times, using a specific distance to indicate an approaching condition or hazard provides better information than the more generic, "AHEAD". If using distances in a message, use the following practices:

MILES

- For distances beyond 1/4 mile, it is more practical to use "MILES" to describe the distance. Drivers struggle determining 1500, 2000 or more feet – and will try to convert it to miles anyway.

- Fractions – 1/4 or 1/2 should be used.

- Distances in miles may be written as, "MILE" (singular), "MILES", or the abbreviation, "MI"

- Mile points (MP), while understood by truck drivers and law enforcement agencies, may not be clear to public traffic. Therefore, distances in miles to/from closure points, specific locations or other landmarks should be used in messages instead of references to mile points.

FEET

- Distances less than 1/4 mile should be shown in feet, and rounded to the nearest 100 feet – e.g. "USE DETOUR 1000 FT"

- A distance in feet may be written as, "FEET" or abbreviated as, "FT"

- If using feet to describe smaller dimensions (e.g. lane widths), it is most common to use the abbreviation, "FT"

- "11 FT / LANES / NEXT MI", versus writing it out completely (e.g. "11 FOOT / LANES / NEXT MI").

EXITS

If Exit numbers or proper names for places are shown on existing guide signs before a PCMS, or just beyond it, the Exit number or place name (e.g. Medford, Crater Lake, Mt. Hood) should be used, when practical.

- Use Exit numbers on interstate highways for consistency and to meet driver expectations.

- For multiple, consecutive exits less than 1 mile apart, or where multiple "Exit XXX" signs can be seen in the same field of vision, consider using, "NEXT EXIT", "2ND EXIT", etc. instead of distances or Exit numbers.

- If displaying place names, try to use the same name as shown on existing guide signs in the vicinity of the PCMS.

- Avoid using local nicknames or adjacent landmarks, unless the name is shown elsewhere on other existing guide signs in the area.

- Unfamiliar motorists will have difficulty understanding local street and highway names (e.g. 'McLaughlin Blvd.', 'Sunset Hwy', etc.), and local landmarks or bridges (e.g. 'The Waterfront', 'Marquam Bridge', etc.).

Times, Days and Dates

Research shows displaying time, day, and date information approaches driver information processing limits [12][15]. Time, day and date messages should be used sparingly.

Regardless of the format, over 25% of drivers viewing time/date information will be unable to, or will incorrectly, determine if the work activity will affect their trip.

If time, days, or dates are needed in a PCMS message, consider the following:

- Do not display the Date, Day, and Time information across two-phases.

DAYS

- For day ranges within the current week, or the following week, days of the week may be displayed as:

-	Monday:	MON	- Friday: FRI
-	Tuesday:	TUE or TUES	- Saturday:SAT
-	Wednesday:	WED	- Sunday: SUN
-	Thursday:	THU, THUR, or THURS	

- Day ranges may be displayed using a hyphen. "THRU" or "THROUGH" is not necessary – e.g. "TUE-THUR", "WED-SAT".
- "NITE" may be used in place of, "NIGHT".
- "WEEKEND" may be used if the event or condition begins on Saturday morning and ends Sunday evening.

DATES

- Typically, only Month and Day are needed. Do not display the year in the date, unless condition spans multiple years.
- For date ranges in the same month:
  - Use three-letter month abbreviations – "APR", "SEP", "JAN"
  - Use the Month only once in the message: "JUL 8-12"
- Avoid displaying the month as a number (e.g. April as, "4"), unless the date range spans multiple months, and no other options are available.
- If using numbers for Months, display without leading "0". Example: July 30-Aug 9 becomes, "7/30-8/9"
- Avoid using, "FOR 1 WEEK" or similar messages as the start and end dates are ambiguous.

TIMES
- Use Time messages sparingly.
- Use standard 12-hour format for time, using "AM" and "PM".

EXAMPLES
1. A road is being closed next week. The following might be posted the weekend before and left in place until the end of the shift on Friday:

```
MAIN ST
CLOSED
MON-FRI
```

2. If the closure is two weeks away, the message might read:

```
MAIN ST
CLOSED
JUL12-14
```

NOTE: "JUL12-14" with no space between "JUL" and "12-14" is still legible on a PCMS due to the spacing between individual characters on the message board and the mix of alpha and numeric characters.

3. If the closure is within July and August, for a limited time, and uses a detour, the message may read:

```
MAIN ST        7/31-8/2
CLOSED         MAIN ST
7/31-8/2       DETOUR
```

This PCMS would be used to supplement other temporary closure and detour signing.

4. If the detour is in effect between 7am and 7pm, the message might read:

```
MAIN ST        5AM-7PM
CLOSED         MAIN ST
5AM-7PM        DETOUR
```

Security

A high level of security should be exercised when operating a PCMS. Authorized personnel are responsible for the messages displayed and for the equipment itself.

Access to the control console and electronics must be controlled by authorized personnel only. The control console shall include a locking lid and remain locked when not being serviced by authorized personnel.

Password protection should be utilized to avoid unauthorized access to the control panel. The password shall be changed from the factory default and shall not be posted in the cabinet. Any tampering or vandalism should be reported immediately to the authorities.

Standard Abbreviations

Due to limitations in the number of characters used in a line (8 characters) or phase (3 lines) of a PCMS message, abbreviations may be necessary.

If abbreviating, use the abbreviations in Table 3 – Standard Abbreviations. For additional abbreviations, see Section 1A.15 of the MUTCD.

If abbreviating word messages see Table 4 for a list of Prompt Words that should precede or follow the abbreviation.

Do not use the abbreviations shown in Table 5 as they are commonly misinterpreted by road users.

TABLE 3 – Standard Abbreviations

Word Message	Abbreviation	Word Message	Abbreviation
Access	ACCS	Monday	MON
Afternoon/Evening	PM	Morning/Late Night	AM
Alternate	ALT	Motorcycles	CYCLES
AM Radio	AM	North	N
Avenue	AVE, AV	Northbound	NB
Bicycle	BIKE	Parking	PKING
Boulevard	BLVD*	Parkway	PKWY*
Cannot	CANT	Pedestrian	PED
CB Radio	CB	Pounds	LBS
Circle	CIR*	Right	RT
Crossing (other than highway-rail)	XING	Road	RD*
Crossing (Hwy-Rail Grade Crossing)	RR XING	Saturday	SAT
Do Not	DONT	Shoulder	SHLDR
East	E	Slippery	SLIP
Eastbound	EB	South	S
Emergency	EMER	Southbound	SB
Entrance, Enter	ENT	Speed	SPD
Expressway	EXPWY	Street	ST*
Feet	FT	Sunday	SUN
FM Radio	FM	Temporary	TEMP
Freeway	FRWY, FWY	Terrace	TER*
Friday	FRI	Thursday	THURS
Highway	HWY	Traffic	TRAF
Hour(s)	HR, HRS	Trail	TR*
Information	INFO	Travelers	TRVLRS
Junction/Intersection	JCT	Tuesday	TUES
Lane	LN	Two-Way Intersection	2-WAY
Left	LFT	2-Wheeled Vehicles	CYCLES
Maintenance	MAINT	Vehicle(s)	VEH, VEHS
Maximum	MAX	Warning	WARN
Mile(s)	MI	Wednesday	WED
Miles Per Hour	MPH	West	W
Minimum	MIN	Westbound	WB
Minutes	MINS	Will Not	WONT

* This abbreviation **shall** not be used without the formal name of a roadway.

The abbreviations for the words listed in Table 4 should not be used unless the prompt word listed in Table 4 either precedes or follows the abbreviation.

TABLE 4 – Acceptable Abbreviations with Prompt Word

Word Message	Abbreviation	Prompt Word
Ahead	AHD	Fog, Dust, Ice, Fire *
Blocked	BLKD	Lane, Road *
Bridge	BR	[Bridge Name]*
Center	CNTR	Lane**
Construction	CONST	Ahead**
County, or other non-US, non-Interstate, or non-Oregon numbered Route	[Abbreviation determined by Roadway Agency]***	[Route Number] **
Downtown	DWNTN	Traffic, Event **
Frontage	FRNTG	Road**
Interstate	I-	[Route Number] **
Lane	LN	[Roadway Name], Right, Left, Center *
Oregon Numbered Route	OR	[OR Route Number] **
Oversized	OVRSZ	Load**
Right	RT	Keep, Next *
Right	RT	Lane**, Turn
Roadwork	RDWK	Ahead, [Distance] **
Route	RT, RTE	Best, Alt, Other*
US Numbered Route	US	[US Route Number] **

* Prompt Word should precede the abbreviation.

** Prompt Word should follow the abbreviation.

*** Use a space (no dash) between the abbreviation and the Route Number.

TABLE 5 – Unacceptable Abbreviations

Abbreviation	Intended Word	Common Misinterpretation
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
WRNG	Warning	Wrong

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APPENDIX A – STANDARDIZED MESSAGES

The following list of standardized messages may be used for a variety of temporary work zone activities, maintenance operations, traffic incidents, weather conditions, or special events. The list of messages below is not all-inclusive. Messages shown are meant as examples of possible phases and combinations of phases used to develop a complete, informational, and valuable PCMS message.

Message Details

- For the message examples below, one or two phases may be used in developing the PCMS message. Phases from different examples may be combined to meet specific needs.
- If using only one phase for the message, DO NOT FLASH the message.
- For special events or specific activities, custom PCMS messages should be created using the guidelines in this document.
- The "/" (slashes) in each message indicates the separation between lines on the phase, and are not part of the message.
- Center each line of the message on the panel.

Programming Messages

- Each line can have up to 8 characters.
- For conditions in the right, left, or center lane, only one location is shown. Use RIGHT, LEFT, CENTER or the appropriate abbreviation, as needed.
- "XXX" is commonly used to signify numbers that must be filled in at the time of placement and use.
- If an Exit number (XXX) is known, the message, "USE / EXIT / XXX" may be substituted for, "USE / NEXT / EXIT" – especially if the PCMS is placed more than 2 miles from the exit.
- For posted speeds 45 MPH or higher, minimize wording to promote faster read/response times for drivers.
- Avoid using abbreviations. If necessary, use only those in Table 3 or Table 4.
- Periods are not needed for abbreviations.

Message Categories

- Advance Notification
- Flagging and Signals
- Bridge and Tunnel Work
- Road Surface Conditions
- Slow Moving Operations
- Rolling Slowdown Operations
- Snow and Ice – Regulatory Conditions
- Crash, Stalled Vehicle or Other Incident
- Detours and Road Closures
- Dust, Fog, Fire and Smoke
- Shoulder and Median Work
- Trucks
- Motorcycles
- Snow and Ice – Warnings
- Lane Closures, Traffic Pattern Changes
- Other General Warnings

Advance Notification

#	Phase 1	Phase 2
0100	WORKERS / IN ROAD / X MILE(S)	SLOW FOR / WORKERS / IN ROAD
0101	WORKERS / AHEAD / SLOW	WORKZONE / SLOW TO / XX MPH
0102	WORKERS / AHEAD IN / LFT LANE	SLOWDOWN / IN / WORKZONE
0103	REDUCE / SPEED IN / WORKZONE	WORKERS / X MILE(S) / AHEAD
0104	PAVING / NEXT / X MILE(S)	CAUTION / WORKERS / ON RIGHT
0105	OR XXX / CLOSED / JUL15-18	TO COAST / USE / OR XXX
0106	ROADWORK / MON-THUR / NIGHTS	MON-THUR / DETOUR / 9PM-6AM
0107	NIGHT / LANE / CLOSURES	EXPECT / DELAYS / XPM-XAM
0108	2 LANES / CLOSED / MON-THUR	EXPECT / DELAYS / XPM-XAM
0109	ROADWORK / PAST / OR XXX	THRU / TRAFFIC / USE I-XX
0110	USE / DETOUR / THUR-SUN	THUR-SUN / BAKER RD / CLOSED

Detours and Road Closures

#	Phase 1	Phase 2
0200	DETOUR / AHEAD / X MILE(S)	FOLLOW / DETOUR / SIGNS
0201	DETOUR / NEXT / LEFT	FOLLOW / SIGNS / TO ORXXX
0202	DETOUR / AHEAD / 1000 FT	USE / EXIT XXX / TO ORXXX
0203	DETOUR / X MILE(S) / AHEAD	FOLLOW / DETOUR / TO I-XXX
0204	FREEWAY / BLOCKED / AHEAD	PREPARE / TO / STOP
0205	FREEWAY / CLOSED / AHEAD	ALL VEH / MUST / EXIT
0206	FREEWAY / CLOSED / 2 MILES	USE / NEXT / EXIT
0207	I-XXX / CLOSED / AT EX(XXX)	DETOUR / USING / HWY XXX
0208	RAMP / CLOSED / XX MILES	DETOUR / NEXT / EXIT
0209	ROAD / CLOSED / AHEAD	LOCAL / TRAFFIC / ONLY
0210	ROAD / CLOSED / X MILE(S)	USE / DETOUR
0211	ROAD / CLOSED / AT MP XX	USE / CANYN RD / DETOUR
0212	ROAD / NARROWS / AHEAD	LANES / NARROW / 1/2 MILE
0213	ROADWORK / NEAR / DOWNTOWN	THRU / TRAF USE / I-XXX
0214	US XXX / CLOSED / XX MILES	US XXX / DETOUR / EXIT XX
0215	USE / DETOUR / ROUTE	FOLLOW / DETOUR / SIGNS
0216	USE / DETOUR / AHEAD	TURN / NEXT / RIGHT
0217	DETOUR / USE / I-XXX	TURN / RIGHT / 1/4 MILE

Flagging and Traffic Signals

#	Phase 1	Phase 2
0300	24 HOUR / FLAGGING / AHEAD	PREPARE / TO / STOP
0301	FLAGGER / AHEAD	PREPARE / TO / STOP
0302	FLAGGER / AHEAD / 1 MILE	BE / PREPARED / TO STOP
0303	PILOT / CAR / 1 MILE	BE / PREPARED / TO STOP
0304	PILOT / CAR / AHEAD	PREPARE / TO STOP / 1/2 MILE
0305	SIGNAL / AHEAD / 1/2 MILE	PREPARE / TO STOP
0306	TRAFFIC / SIGNAL / OUT	ALL-WAY / STOP / AHEAD
0307	SIGNAL / OUT	YIELD / RIGHT / OF WAY
0308	SIGNAL / WORK / AHEAD	PREPARE / TO / STOP
0309	SIGNAL / WORK / 1/2 MILE	LEFT / TURN LN / CLOSED
0310	SIGNAL / WORK / AHEAD	USE / RIGHT / LANE
0311	SIGNAL / OUT / AHEAD	FLAGGERS / IN / ROAD

Lane Closures or Traffic Pattern Changes

#	Phase 1	Phase 2
0400	CROSS / TRAFFIC / AHEAD	YIELD TO / CROSS / TRAFFIC
0401	DO / NOT / PASS	STAY / IN / LANE
0402	DO NOT / STOP ON / SHOULDER	NO / SHOULDER / PARKING
0403	EXIT (XXX) / CLOSED / AHEAD	USE / NEXT (THIS, SECOND) / EXIT
0404	HEAVY / TRAFFIC / AHEAD	PREPARE / TO / SLOW
0405	HEAVY / TRAFFIC / AHEAD	PREPARE / TO / STOP
0406	LFT LANE / ENDS / 1/2 MILE	SLOWED / TRAFFIC / AHEAD
0407	RT LANE / NARROWS / 1000 FT	SLOWED / TRAFFIC / AHEAD
0408	LANES / SHIFT / TO LEFT	STAY / IN (YOUR) / LANE
0409	LEFT / 2 LANES / CLOSED	MERGE / INTO (WITH) / RT LANE
0410	LEFT / LANE / CLOSED	RT LANE / FOR ALL / TURNS
0411	LEFT / LANE / NARROWS	TRUCKS / USE / RT LANE
0412	NARROW / LFT LANE / AHEAD	TRUCKS / RT LANE / ONLY
0413	LEFT LN / CLOSED / 1000 FT	RT LANE / SLOWED / AHEAD
0414	LEFT LN / CLOSED / AHEAD	EXPECT / SLOWED / TRAFFIC
0415	LEFT LN / CLOSED / 1(/2) MILE	PREPARE / TO MERGE / RIGHT
0416	MERGING / TRAFFIC / AHEAD	TRAFFIC / ENTERS / ON RIGHT
0417	MERGE / INTO LFT / LANE(S)	RT LANE / MUST / TURN RT
0418	MERGE / RIGHT	LFT LANE / TURN LFT / ONLY
0419	RT LANE / CLOSED / X MILE(S)	NO RIGHT / TURN / AHEAD
0420	SHARP / CURVE / AHEAD	CURVE / SLOW TO / XX MPH
0421	SLOW / TRAFFIC / AHEAD	PREPARE / TO / SLOW
0422	STAY / IN / LANE	NO / LANE / CHANGES
0423	TRAFFIC / CONTROL / CHANGE	YIELD / AHEAD
0424	TRAFFIC / CONTROL / CHANGE	STOP / AHEAD
0425	TRAFFIC / CONTROL / CHANGE	SIGNAL / AHEAD
0426	TRAFFIC / DELAYS	PREPARE / TO / SLOW
0427	TRAFFIC / DELAYS	PREPARE / TO / STOP
0428	TWO-WAY / TRAFFIC / AHEAD	DO / NOT / PASS
0429	YIELD / AHEAD	YIELD / TO / ONCOMING

Bridge or Tunnel Work

#	Phase 1	Phase 2
0500	CROSS / TRAFFIC / AHEAD	YIELD TO / CROSS / TRAFFIC
0501	DO / NOT / PASS	STAY / IN / LANE
0502	DO NOT / STOP ON / SHOULDER	NO / SHOULDER / PARKING
0503	EXIT (XXX) / CLOSED / AHEAD	USE / NEXT (THIS, SECOND) / EXIT
0504	HEAVY / TRAFFIC / AHEAD	PREPARE / TO / SLOW
0505	HEAVY / TRAFFIC / AHEAD	PREPARE / TO / STOP
0506	LFT LANE / ENDS / 1/2 MILE	SLOWED / TRAFFIC / AHEAD
0507	RT LANE / NARROWS / 1000 FT	SLOWED / TRAFFIC / AHEAD
0508	LANES / SHIFT / TO LEFT	STAY / IN (YOUR) / LANE
0509	LEFT / 2 LANES / CLOSED	MERGE / INTO (WITH) / RT LANE
0510	LEFT / LANE / CLOSED	RT LANE / FOR ALL / TURNS
0511	LEFT / LANE / NARROWS	TRUCKS / USE / RT LANE
0512	NARROW / LFT LANE / AHEAD	TRUCKS / RT LANE / ONLY
0513	LEFT LN / CLOSED / 1000 FT	RT LANE / SLOWED / AHEAD
0514	LEFT LN / CLOSED / AHEAD	EXPECT / SLOWED / TRAFFIC
0515	LEFT LN / CLOSED / 1(/2) MILE	PREPARE / TO MERGE / RIGHT
0516	MERGING / TRAFFIC / AHEAD	TRAFFIC / ENTERS / ON RIGHT
0517	MERGE / INTO LFT / LANE(S)	RT LANE / MUST / TURN RT
0518	MERGE / RIGHT	LFT LANE / TURN LFT / ONLY
0519	RT LANE / CLOSED / X MILE(S)	NO RIGHT / TURN / AHEAD
0520	SHARP / CURVE / AHEAD	CURVE / SLOW TO / XX MPH
0521	SLOW / TRAFFIC / AHEAD	PREPARE / TO / SLOW
0522	STAY / IN / LANE	NO / LANE / CHANGES
0523	TRAFFIC / CONTROL / CHANGE	YIELD / AHEAD
0524	TRAFFIC / CONTROL / CHANGE	STOP / AHEAD
0525	TRAFFIC / CONTROL / CHANGE	SIGNAL / AHEAD
0526	TRAFFIC / DELAYS	PREPARE / TO / SLOW
0527	TRAFFIC / DELAYS	PREPARE / TO / STOP
0528	TWO-WAY / TRAFFIC / AHEAD	DO / NOT / PASS
0521	YIELD / AHEAD	YIELD / TO / ONCOMING

Shoulder or Median Work

#	Phase 1	Phase 2
0600	MEDIAN / WORK / KEEP RT	WORKERS / IN / MEDIAN
0601	MEDIAN / WORK / AHEAD	USE / RIGHT / LANE
0602	LEFT (RIGHT) / SHOULDER / WORK	CLOSED / SHOULDER / X MILE(S)
0603	LEFT (RIGHT) / SHOULDER / WORK	WORKERS / ON / SHOULDER
0604	SHOULDER / WORK / AHEAD	YIELD TO / WORKERS / ON LEFT
0605	SHOULDER / WORK / AHEAD	USE / LEFT / LANE
0606	SHOULDER / WORK / AHEAD	WORKERS / IN LEFT / SHOULDER

Road Surface Conditions (Rough, debris, oil, fresh paint, etc.)

#	Phase 1	Phase 2
0700	ABRUPT / EDGE / RIGHT	
0701	ACTIVE / SLIDES / AHEAD	REDUCE / SPEED
0702	DEBRIS / ON / ROAD	KEEP / LEFT
0703	DEBRIS / ON / ROAD	RIGHT / LANE / CLOSED
0704	DEBRIS / ON / ROAD	PREPARE / TO / STOP
0705	DEBRIS / ON / ROAD	EXPECT / DELAYS
0706	FRESH / OIL / ON ROAD	
0707	NO / CENTER / STRIPE	KEEP / RIGHT
0708	NO / LANE / LINES	
0709	NO / LANE / LINES	KEEP RT / EXCEPT / TO PASS
0710	NO / SHOULDER	DO / NOT / STOP
0711	ROAD / FLOODED / 1/2 MILE	
0712	ROCKS / ON / ROADWAY	
0713	ROUGH / PAVEMENT / AHEAD	PREPARE / TO / SLOW
0714	ROUGH / ROAD / AHEAD	
0715	ROUGH / ROAD / AHEAD	DIP / AHEAD / 1/2 MILE
0716	SLIDE / BLOCKS / ROAD	PREPARE / TO / STOP
0717	SLIDE / ON / ROAD	KEEP / RIGHT
0718	SOFT / SHOULDER	
0719	WATER / ACROSS / ROAD	
0720	WET / PAINT	STAY / IN / LANE
0721	WET / PAINT	PASS TO / LEFT

Trucks

#	Phase 1	Phase 2
0800	ALL / TRUCKS / EXIT	EXIT / ALL / TRUCKS
0801	ALL / TRUCKS / KEEP RT	TRUCKS / KEEP / RIGHT
0802	TRUCKS / USE / LOW GEAR	STEEP / DOWNHILL / X MILE(S)
0803	ESCAPE / RAMP / CLOSED	NEXT / ESCAPE / X MILE(S)
0804	OVERSIZE / MUST / EXIT	OVERSIZE / EXIT / X MILE(S)
0805	OVERSIZE / USE NEXT / EXIT	OVERSIZE / VEH EXIT / AHEAD
0806	STEEP / GRADE / AHEAD	TRUCKS / SLOW / DOWN
0807	ALL / TRUCKS / EXIT	EXIT / ALL / TRUCKS
0808	TRUCKS / OVER 80K / EXIT	TRUCKS / EXIT / ON RIGHT
0809	OVER 80K / TRUCKS / EXIT	TRUCKS / USE / RT LANE
0810	TRUCKS / XING / ROAD	WATCH / FOR XING / TRUCKS
0811	CAUTION / TRUCKS / ON RIGHT	TRUCKS / ENTERING / RIGHT
0812	XXFT XIN* / HT LIMIT/ 1 MILE	TRUCKS / DETOUR / NEXT RT
0813	EXIT XX / XX TON / LIMIT	OVER WT / DETOUR / EXIT XX

Slow Moving Operations

#	Phase 1	Phase 2
0900	MOWERS / IN / MEDIAN	WORK IN / MEDIAN / AHEAD
0901	MOWERS / IN / MEDIAN	MOWING / NEXT / X MILE(S)
0902	SLOW / MOVING / WORK	PREPARE / TO / SLOW
0903	SLOW / MOVING / WORK	LEFT / LANE / CLOSED
0904	SLOW / MOVING / WORK	KEEP / RIGHT
0905	SLOW / MOVING / WORK	(RIGHT) / SHOULDER / CLOSED
0906	SLOW / MOVING / WORK	MEDIAN / (SHOULDER) / CLOSED
0907	STRIPING / TRUCKS / AHEAD	CENTER / LANE / CLOSED
0908	STRIPING / CENTER / LANE	KEEP / RIGHT
0909	STRIPING / RIGHT / FOG LINE	USE / LEFT / LANE
0910	SWEEPER / AHEAD	USE / CAUTION
0911	SWEEPER / AHEAD	USE / LEFT / LANE

Motorcycles

#	Phase 1	Phase 2
1000	BUMP / AHEAD	CYCLES / STAY / IN LANE
1001	ROUGH / PAVEMENT / AHEAD	CYCLES / NO LANE / CHANGES
1002	ROUGH / PAVEMENT	CYCLES / USE CARE
1003	GROOVED / PAVEMENT / NEXT XMI	CYCLES / KEEP / RIGHT (LEFT)

Rolling Slowdowns

#	Phase 1	Phase 2
1100	SLOWED / TRAFFIC / AHEAD	XX MPH / NEXT / XX MILES
1101	XX MPH / TRAFFIC / AHEAD	XX MPH / NEXT / XX MILES
1102	SLOW / VEHICLES	DO / NOT / PASS
1103	SLOWED / TRAFFIC	DO NOT / PASS

Snow and Ice – Warnings

#	Phase 1	Phase 2
1200	BLACK / ICE / LIKELY	ROAD / MAY BE / SLIPPERY
1201	BLOWING / SNOW / AHEAD	NEXT / X MILE(S)
1202	BLOWING / SNOW / AHEAD	TURN ON / LIGHTS
1203	ICE / ON / BRIDGE(S)	BRIDGE(S) / MAY / BE ICY
1204	ICE / ON ROAD / AHEAD	ROAD ICY / NEXT / XX MILE(S)
1205	SNOW / BLOWERS / AHEAD	DO NOT / PASS / ON RIGHT
1206	SNOW / BLOWERS / AHEAD	DO / NOT / PASS
1207	SNOW / PLOWS / AHEAD	USE / LEFT (RIGHT) / LANE
1208	SNOW / PLOW / AHEAD	DO NOT / PASS / ON RIGHT (LEFT)
1209	WATCH / FOR / ICE	ICY / NEXT / XX MILE(S)

Snow and Ice – Regulatory Conditions

#	Phase 1	Phase 2	Phase 3
1250	CARRY / CHAINS	OR / TRACTION / TIRES	
1251	SNOW / ZONE	CHAINS / REQUIRED / ALL VEH	
1252	SNOW / ZONE	CARRY / CHAINS	OR / TRACTION / TIRES
1253	SNOW / ZONE	CHAINS / REQ'D ON / VEHICLES	TOWING / OR OVER / 10000
1254	SNOW / ZONE	CHAINS / REQ'D ON / VEHICLES	TOWING / OR OVER / 10K GVW
1255	SNOW / ZONE	CHAINS / REQ WHEN / TOWING	OR SINGL / AXLE OVR / 10000
1256	CHAINS / REQ WHEN / TOWING	OR / SINGLE / DRIVE	OVER / 10000 / GVW
1257	SNOW / ZONE	CHAINS / REQUIRED	UND 10K / TRACTION /TIRES OK
1258	CHAINS / REQUIRED	TRACTION / TIRES / ALLOWED	VEHICLES / UNDER / 10K GVW

* Messages shown above are based on messages in OAR 734-017-0025 intended for use on permanent signs or variable message signs (VMS).

** For regulatory snow and ice conditions, a third phase may be added.

Dust, Fog, Fire, or Smoke

#	Phase 1	Phase 2
1300	BLOWING / DUST / AHEAD	NEXT / X MILE(S)
1301	BLOWING / DUST / AHEAD	TURN ON / LIGHTS
1302	DENSE / FOG / AHEAD	TURN ON / LIGHTS
1303	DENSE / FOG / AHEAD	REDUCED VISION
1304	FREEZING / FOG / AHEAD	TURN ON / LIGHTS
1305	FREEZING / FOG / LIKELY	IF FOGGY / ROAD MAY / BE ICY
1306	BURN / AREA / AHEAD	SLOW / TURN ON / LIGHTS
1307	DENSE / SMOKE / AHEAD	STOP ON / SHOULDER / ONLY
1308	DENSE / SMOKE / AHEAD	SLOW / TURN ON / LIGHTS
1309	DENSE / SMOKE / AHEAD	PREPARE / TO / SLOW (STOP)
1310	FIRE / AHEAD	PREPARE / TO / SLOW (STOP)
1311	FIRE / AHEAD	STOP ON / SHOULDER / ONLY

Crash, Stalled Vehicle, or Other Incidents

#	Phase 1	Phase 2
1400	WRECK / AHEAD	CENTER / LANE / CLOSED
1401	TRAFFIC / CRASH / AHEAD	EXPECT / DELAYS
1402	WRECK / AHEAD	LEFT / LANE / CLOSED
1403	TRAFFIC / CRASH / AHEAD	LEFT / 2 LANES / BLOCKED
1404	WRECK / AHEAD	PREPARE / TO / STOP
1405	CRASH / AHEAD / LFT LANE	USE / RIGHT / 2 LANES
1406	CRASH / RT LANE / 1 MILE	MERGE / LEFT
1407	STALLED / VEHICLE	PREPARE / TO / SLOW
1408	STALLED / VEHICLE / AHEAD	SHOULDER CLOSED
1409	STALLED / VEHICLE / 1/2 MILE	RIGHT / LANE / CLOSED
1410	STALLED / VEHICLE / ON RAMP	TRAFFIC / ON RAMP / KEEP LFT
1411	DEBRIS / IN ROAD / KEEP RT	KEEP RT / WORKERS / IN LANE
1412	YIELD TO / EMERGNCY / WORKERS	CRASH / IN LEFT / LANE
1413	YIELD TO / EMERGNCY / CREWS	RESCUE / WORKERS / AHEAD
1414	MOVE LFT / FOR FIRE / FIGHTERS	CRASH / AHEAD / ON RIGHT

Other General Warnings

#	Phase 1	Phase 2
1500	CHILDREN / XING / HIGHWAY	CHILDREN / XXX FT / AHEAD
1501	CHILDREN / X/X MILE / AHEAD	WATCH / FOR / CHILDREN
1502	HEAVY / MERGING / TRAFFIC	THRU / TRAFFIC / LFT LANE
1503	BICYCLES / IN LANE / AHEAD	SHARE / THE / ROAD
1504	STOP / AHEAD / 1/2 MILE	PEDSTRN / EVENT / AHEAD
1505	TRAFFIC / ADVISORY / XXX.X AM	XXX.X AM / FOR ROAD / INFO
1506	BICYCLE / EVENT / NEXT XMI	WATCH / FOR / BICYCLES
1507	TRAFFIC / SLOW AT / STADIUM	STADIUM / EVENT / APR 30
1508	SLOW FOR / EXPO CTR / TRAFFIC	EXPO CTR / EVENT / SATURDAY
1509	FAIRGRND / TRAFFIC / AHEAD	THRU / TRAFFIC / USE ALT
1510	CO FAIR / TRAFFIC / KEEP LFT	THRU / TRAFFIC / RT LANE

APPENDIX B – SETUP CHECKLIST

Need

- ☐ Could a static sign be used to send the same message?
- ☐ Is the static sign readily available?

Placement

- ☐ Is the PCMS visible from at least ½ mile away?
- ☐ Can the message be read from at least 800 feet away during the day? At least 600 feet away during the night?
- ☐ If two PCMS are used, they are separated by at least 1000 feet and on the same side of the road?

Message

- ☐ Is each phase understandable by itself?
- ☐ Does the PCMS Message give drivers new information or add clarity?
- ☐ Does the PCMS warn the motorist of a problem ahead?
- ☐ Have standard abbreviations been used?
- ☐ Are there no more than 2 phases on each PCMS?
- ☐ Is each phase displayed for at least 2 seconds?
- ☐ Is the total display time for both phases less than 8 seconds?
- ☐ Is the message free of animation (scrolling or flashing)?
- ☐ Are correct lanes, highways, exit numbers, days, dates, and/or times displayed?
- ☐ Are messages, display characteristics, and dates and times of display documented in the project diary?
- ☐ When work is to begin within seven days, replace calendar dates (e.g. MAY 25-27) with days of the week (e.g. TUE-THUR).
- ☐ Turn PCMS off and rotate display away from traffic when not in use.

PCMS MESSAGE WORKSHEET

LOCATION: _____

_____

USED: From: _____/_____/_____ at _____:_____ am/pm

        To: _____/_____/_____ at _____:_____ am/pm

Message Programed By: _____

PHASE 1

PHASE 1 will run for_____sec. (2.0 sec minimum)

PHASE 2

PHASE 2 will run for_____sec. (2.0 sec. minimum)

Total Display Time =_____sec. (8.0 sec. maximum)
(Total Display Time includes two blank times between Phases)