State of California
California State Transportation Agency
Department of Transportation

Changeable Message Sign Guidelines

Prepared by the Division of Traffic Operations

December 2013

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http://www.dot.ca.gov/hq/traffops/systemops/tim_tmt/cms/

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

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The purpose of this Guideline Change Transmittal is to issue the new *Changeable Message Sign (CMS) Guidelines – December 2013*. These guidelines supersede the *Changeable Message Sign (CMS) Guidelines - April 2006*.

The CMS Guidelines were developed by the Division of Traffic Operations and the districts, in order to provide clear guidance to the personnel of the California Department of Transportation (Caltrans) and our external partners on the use of CMS on California's highways.

Further information on the use of CMS on California's highways is contained in the *California Manual on Uniform Traffic Control Devices - January 13, 2012* (2012 California MUTCD). The use of "shall" in these guidelines is intended to ensure consistency and compliance with the 2012 California MUTCD and is an indication of policy which must be followed. The words "should" and "may" used in these guidelines refer to best practices that should be utilized whenever possible. If a conflict exists between these guidelines and any current or future adopted version of the California MUTCD, the California MUTCD shall take precedence.

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PREFACE

This document provides policy and guidance for the use of changeable message signs (CMS) on the State's highway system. California Department of Transportation (Caltrans) personnel should use this document when making decisions on when, where, and how to effectively deploy CMS for providing real-time motorist information. For the purpose of this document, CMS will refer to both permanent and portable changeable message signs unless otherwise noted.

All standards cited in these guidelines are required by the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices for Streets and Highways – 2009* (2009 MUTCD) and the *California Manual on Uniform Traffic Control Devices - January 13, 2012* (2012 CA MUTCD). Exceptions or deviations from these guidelines should be discussed with Caltrans' District Traffic Managers (DTMs), Transportation Management Center (TMC) Manager, or the Headquarters CMS Coordinator.

For additional information, contact the Headquarters CMS Coordinator at (916) 654-6104.

Acknowledgements

These guidelines contain a compilation of national research, state and federal policies and Caltrans' current operational practices. The concepts in this document consist of best practices and policies identified by the Caltrans CMS Guidelines Taskforce contained in the FHWA's "Traffic Management Center Pooled-Fund Study" dated December 12, 2002, FHWA Policy Memoranda, FHWA's 2009 MUTCD, Caltrans' 2012 CA MUTCD and various Caltrans memoranda and policy documents. Additional information on these references is located in the Appendices.

The assistance of the members of the Caltrans CMS Guidelines Taskforce is recognized and appreciated. The authors acknowledge the guidance from the taskforce members listed below:

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CALTRANS CHANGEABLE MESSAGE SIGN
POLICY AND SUMMARY

Changeable message signs (CMS) shall:

- Display only information that is associated with unexpected conditions, nonrecurring congestion, incidents, adverse weather conditions, special events, travel times, America's Missing Broadcast Emergency Response (AMBER) Alerts and assaults on law enforcement officers (Blue Alerts) that have been approved and requested by the California Highway Patrol (CHP) Emergency Notification and Tactical Alert Center (ENTAC), current and future road closure information, and Caltrans Headquarters approved safety messages or emergency security messages.

- Comply with Caltrans' Standard Specifications and Standard Special Provisions.

- Adhere to Caltrans policy when used to display messages for other states or agencies (i.e. AMBER Alerts, Blue Alerts, emergency security messages, etc).

- Display messages that consist of no more than two phases, with each phase consisting of no more than three lines of text that shall be understood by itself regardless of the sequence in which it is displayed (2012 CA MUTCD, Section 2L.05.04).

- When displaying two phase messages, a display time should be selected that will allow the motorist time to read the entire message at least twice at the posted speed, the off-peak 85th –percentile speed prior to commute hours, or the anticipated operating speed. If needed, more than one sign may be used to meet this requirement (2012 CA MUTCD, Section 2L.05.08).

- Have messages updated for accuracy as conditions change. This is essential to preserving the credibility of the CMS in the eyes of the public.

CMS should:

- Have a minimum of 1,000 feet of separation between signs when using multiple signs.

- Display consistent messages along a roadway corridor or adjacent corridors when used to display messages related to a specific situation.

- Be monitored for malfunctioning disks, lamps or panels. At least 90 percent of the CMS characters should be functioning properly before displaying the message.

- Display the traffic problem and location statements as the minimum information that needs to be contained in a message traffic message. An action or effect statement should be included if deemed relevant.

- Display exit numbers in the location statement when available.

- Use standard abbreviations when creating a message. A list of standard abbreviations is available in Appendix C.

- Display one-phase messages whenever possible. The CMS operator should attempt to limit the units of information displayed to a one-phase message. Two phase messages may be used only when it is determined that a motorist has enough time to read the entire message at prevailing speeds.

- Be placed one to two miles in advance of a major decision point whenever possible.

<u>CMS shall not:</u>

- Display advertising messages or public service messages that could be considered similar to advertising displays.

- Detour motorists to arbitrary routes. Prior to displaying a detour route, the CMS operator should know the current traffic conditions and route constraints.

- Use message techniques that include fading, flashing, exploding, dissolving, or moving messages.

- Display any type of graphics with the exception of full matrix signs displaying:

  - An exact duplicate of a standard sign or other sign legend using standard symbols, the Standard Alphabets and letter forms, route shields, and other typical sign legend elements in the appropriate color combinations and with no apparent loss of resolution or recognition.
  - A flashing flagger symbol on a portable changeable message sign (PCMS) in lieu of a live flagger.
  - An arrow display on a PCMS.

- Provide information that is already obvious to the motorist.

- Display any safety or transportation-related message if doing so would adversely affect the public's respect for the sign.

PCMS shall:

- Comply with Caltrans' Standard Specifications and Standard Special Provisions when utilized in work zones.

- Be raised to a minimum height of seven feet from the roadway in urban areas and five feet from the roadway in rural areas. The top of the sign shall be no more than 14.5 feet above the ground.

- Be removed and stored outside of the clear recovery zone or behind a protective barrier when not being used.

Districts should consult with their DTMs, TMC Manager, or the Headquarters CMS Coordinator before using a CMS for purposes not described in the CMS Guidelines. At a minimum, the sponsor or District should perform an effectiveness study when using the CMS for such activities.

Chapter 1 – USAGE

Both CMSs and PCMSs may be used to give motorists real-time traffic safety and guidance information about planned and unplanned events that significantly impact traffic on the State's highway system.

CMS usage for planned events includes advance notice of upcoming roadwork or special events that will adversely affect travel, and to notify the travelling public of work zones ahead (See Appendix G). Advance notification should not be displayed more than seven days prior to the special event or upcoming roadwork. Days of the week (Monday-Friday) should be used in lieu of Calendar dates (May 11-May 15) when displaying messages.

Examples of CMS usage for unplanned events include displaying messages related to traffic congestion information, America's Missing: Broadcast Emergency Response (AMBER) Alerts (see Appendix G), Blue Alerts (see Appendix G), and safety campaign messages approved by Caltrans' Headquarters and distributed to the districts on the annual statewide CMS safety campaign calendar. Any additional guidance regarding the use of CMSs to display safety related messages on the State Highway System will be disseminated to the TMC Managers and appropriate staff via e-mail.

Tables 1.1 through 1.3 provide examples of typical applications for CMSs and PCMSs.

TABLE 1.1

CMS MESSAGE TYPES AND USES

MESSAGE TYPE	USES - INFORMATION RELATED TO
Early Warning	**Traffic Safety/End of Queue Protection** • Unexpected Traffic • Slow Traffic • Stopped Traffic
Advisory	**Guidance** • Post-Event Congestion • Advance Notice • Major Closure • Major Special Event • Emergency Security Messages • Adverse Roadway Conditions • Lanes Blocked (Temporary Duration) • Lanes Closed (Long Duration) • Freeway/Highway/Ramp/Connector Closed **Congestion** • Expected Travel Times • Expected Delays **Alerts that have been approved and requested by CHP's ENTAC:** • AMBER Alert - Child Abduction Information • Blue Alert - Assault on a law enforcement officer
Alternative Route	**Guidance** • Soft Detour (Optional Detour) • Hard Detour (Required Detour)

APPROPRIATE AND INAPPROPRIATE CMS USAGE

A CMS should be used to inform motorists of unexpected conditions but should not be used until such conditions warrant their use. Caltrans recognizes the benefits of properly using a CMS to manage traffic and inform motorists. Caltrans is also aware that improper use of a CMS can adversely affect travel on our highways. In areas where both permanent and portable signs are used, it is important that no conflicting messages are displayed. CMSs should be used as a supplement for conventional traffic control devices and not as a substitute.

An important consideration in successfully operating a CMS system is to maintain credibility with the motorist. Drivers expect the CMS to provide useful and accurate information. The CMS message should not provide information that is already obvious to the motorist (such as HEAVY RAIN, ROAD WET AND SLIPPERY). In general, a CMS should remain in a blank mode when conditions do not warrant the display of a message. The decision to blank a sign is determined by the operator and is based on field conditions and the message being displayed.

Safety campaign messages are to be limited to the messages and dates listed on the annual statewide CMS safety campaign calendar distributed by Caltrans' Headquarters.

All law enforcement requests for messaging on the CMSs must be approved by the California Highway Patrol's (CHP's) ENTAC and be in compliance with the CMS Guidelines.

TABLE 1.2
CMS USAGE FOR PLANNED EVENTS

PLANNED EVENT	EXAMPLES
Construction Activity	Lane Closures, Detours, Change in Lane Pattern, Special Speed Control Measures
Maintenance Activity	Lane Closures, Moving Closures
Permit Activity	Utility Work, Encroachment Work, Special Event, Filming, Transportation Loads
Special Event	Ballgames, Concerts, Festivals, Parades
Operational Feature	High-Occupancy Vehicle, Reversible, Exclusive or Contraflow Lanes, Ramp Meters
Design Feature	Drawbridges, Tunnels, Ferry Service
Safety Campaigns	Seat belts, Phone use, DUI

TABLE 1.3
CMS USAGE FOR UNPLANNED EVENTS

UNPLANNED EVENT	EXAMPLES
Accident	Jackknife, Fatal, Overturn, Spilled Load
Hazardous Material (HAZMAT) Spill/Release	Chemical Spill, Oil Spill, Toxic Cloud, Refinery Fire
Natural Disaster	Flood, Slide, Fire, Earthquake, Tornado
Police Activity*	Bomb Threat, Terrorist Attack, Hostage/Kidnap Situation, Suicide Attempt
Severe Weather	Fog, Dust, Wind, Snow, Ice

*A CMS may be used for police activity that directly impacts the motorist or travel way.

Requests to display information for other states or agencies will be determined by the appropriate district and should adhere to Caltrans policy. Requests received by Caltrans to display messages that are not consistent with these guidelines shall be denied. Public service messages or advertising should not be displayed, see Table 1.4

Districts that are planning to use a CMS for pilot programs or other purposes not described in these guidelines, should consult with their DTM and TMC Manager. At a minimum, the sponsor or District should perform an effectiveness evaluation of the pilot.

TABLE 1.4

INAPPROPRIATE CMS USAGE

APPLICATION	EXAMPLES
Commercial Logo Advertising	"NIKE RACE", "GOOD GUYS CAR SHOW"
Local Identifier Advertising	"RALEY FIELD", "PAC BELL PARK"
Normal Recurrent Congestion	"HEAVY CONGESTION"
Public Service Announcement	"SUPPORT RED CROSS"
Political Message	"VOTE FOR JOE"

RESPONSIBILITIES FOR USAGE

Use of the CMS for traffic management on the State Highway System is the joint responsibility of Caltrans' TMC personnel, Traffic Management Team (TMT) members and field personnel, resident and permit engineers and the California Highway Patrol (CHP) as designated below. Personnel should always review the message composition and location of the sign, and if needed, request assistance from Traffic Operations personnel. In addition, the CMS should be monitored to assure the sign is on or off at the correct times; there is no legibility or safety problems; and the sign is effective for traffic management.

- TMC personnel compose and display messages for the permanent CMS based on information gathered from field personnel, CHP Computer Aided Dispatch (CAD), and Traffic Management System (TMS) field elements such as Closed Circuit Television (CCTV) cameras and Vehicle Detectors.

- TMT and field personnel compose messages and deploy the PCMS. Field personnel are responsible for coordinating with the TMC to request permanent CMS support. Field personnel can gather information on Estimated Time of Opening (ETO), travel times, delays, and the status of the detour route.

- The Caltrans Headquarters CMS coordinator is responsible for providing guidance to all Caltrans personnel on when, where, and how to use a CMS.

- Resident and permit engineers are responsible for providing guidance to the contractor on when, where and how to use their PCMS.

  Note: PCMS used in construction zones shall comply with Caltrans' Standard Specifications and Standard Special Provisions.

- CHP should refer to the Joint Operational Policy Statements and Caltrans CMS Guidelines when requesting CMS usage.

2012 CA MUTCD LIMITATIONS - USE OF CMS CAPABILITIES

- When a CMS is used to display a safety, emergency homeland security, AMBER Alert or transportation-related message, the display format shall not include advertising, animation, rapid flashing, dissolving, exploding, scrolling, or other dynamic elements or be of a type that could be considered similar to advertising displays.

- CMS shall display only traffic operational, regulatory, warning, guidance information and AMBER Alert messages. Advertising messages shall not be displayed on CMS or its supports or other equipment.

- When a CMS is used to display a safety or transportation related message, the message should be simple, brief, legible, and clear. A CMS should not be used to display a safety or transportation-related message if doing so would adversely affect respect for the sign.

- "CONGESTION AHEAD" or other overly simplistic or vague messages should not be displayed alone. These messages should be supplemented with a message on the location or distance to the congestion or incident, estimated delay time, travel time, alternative route, or other similar messages.

- CMS that use a black background should use legends with the following colors: White for regulatory, yellow for warning, orange for temporary traffic control, red for stop or yield, fluorescent pink for incident management, and fluorescent yellow-green for bicycle, pedestrian, and school warning.

- If a CMS message uses a green background for a guide message or a blue background for a motorist services message, the background color shall be provided by green or blue lighted pixels such that the entire CMS would be lighted, not just the white legend.

Chapter 2 - LOCATION

INSTALLATION AND PLACEMENT

Caltrans Divisions of Traffic Operations, Maintenance, and Design should work closely to determine the proper location of each permanent CMS before it is designed and installed. Proper placement of a PCMS should be determined in real-time by field personnel.

The most appropriate locations for installing or placing a CMS is in advance of major decision points, such as interchanges or intersections where motorists can respond to specific information displayed on the CMS. A CMS should be located as close to the edge of the traveled way (ETW) as possible to maximize visibility (Figure 2.1).

- **A CMS should be located so motorists can:**
  - Detect the sign.
  - Read and understand the sign.
  - Initiate a response.
  - Make appropriate decisions based on the information gained from the message.

A CMS too close to a decision point will not provide motorists adequate time to react to the message and will reduce the opportunity to respond. A CMS too far in advance of a decision point may reduce the overall impact or recall of the message. The recommended placement of a CMS is one to two miles in advance of a major decision point.

- **Permanent and Portable CMS Locations**

  Below are the recommended locations for installation or placement of the permanent and Portable CMS:

  - Upstream of major special event facilities (stadiums and convention centers).
  - Upstream of locations which may experience severe weather conditions (fog, dust, wind, ice or snow).

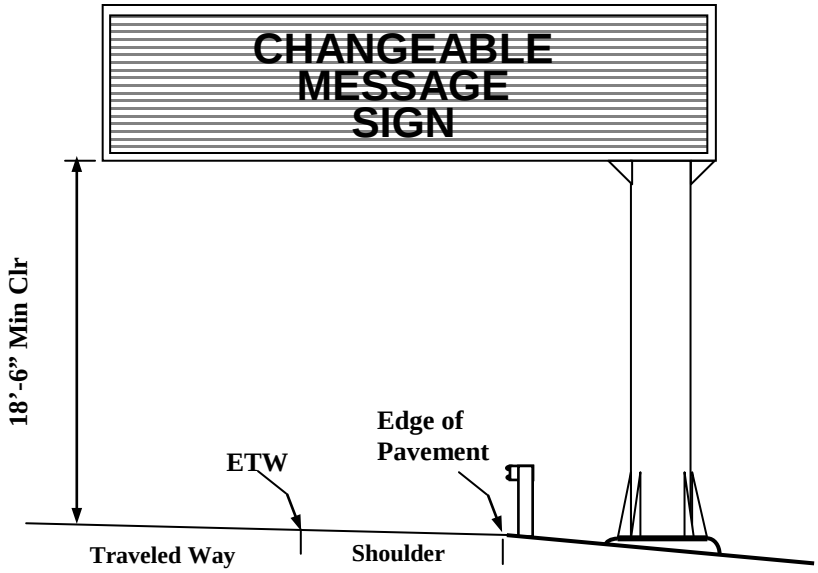

FIGURE 2.1
CHANGEABLE MESSAGE SIGN
TYPICAL INSTALLATION

- Upstream of locations where information regarding travel times and delays are appropriate (for example, construction zones and airports).

➢ **Trailer Mounted PCMS Locations**

When practical, trailer mounted CMS should be placed:

- On the right and/or left shoulder of the highway.
- Strategically upstream of bottlenecks.
- On the same side of the highway if multiple signs are needed to give additional information or for redundancy. The distance between units should be based on speed, terrain and visibility. A minimum of 1,000 feet separation should be provided between signs.
- Behind an existing barrier, such as metal beam guardrail or concrete provided the message is not obstructed.
- Before or at the crest of vertical roadway curves to maintain maximum visibility.
- Placed upstream of an event or condition to give adequate time for motorists to react (primary function of a truck mounted CMS).

Note: Placement within or immediately after horizontal curves should be avoided.

VISIBILITY

Visibility is the distance at which a motorist can first detect a sign on the roadway. The components of visibility for a CMS are as follows:

- The ease with which a sign can be detected and how well it attracts the driver's attention (target value).
- The ease in which the message can be seen (brightness).
- The ease in which the message can be read (legibility).
- The ease in which the message can be read from the side (cone of visibility).

➢ Target Value is the distance from which the CMS is first noticed by the motorist. It is dependent on the CMS unit being more visible than the rest of the highway features. The early recognition that a sign is present plays a key role in the motorists' ability to react to the message. The proper placement of a CMS should insure that structures, curves, roadside signs and landscaping do not obscure visibility of the unit (Figure 2.2).

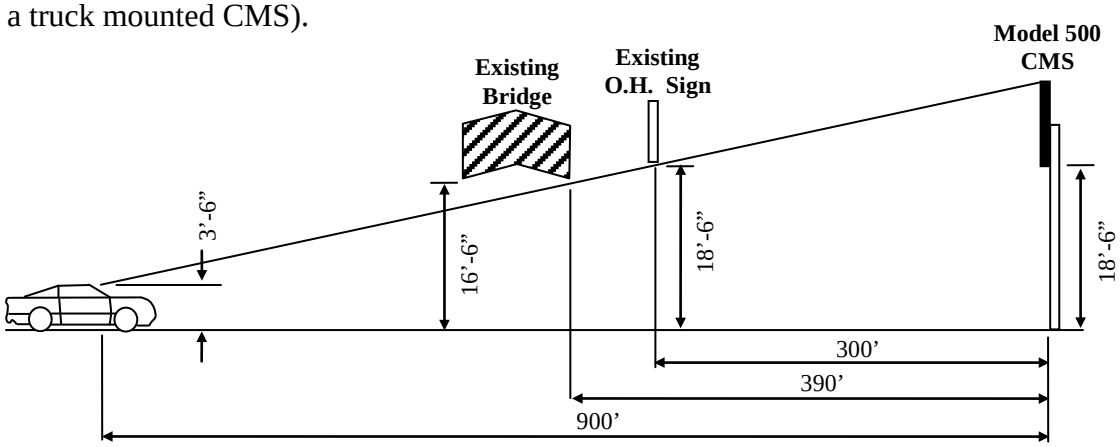

FIGURE 2.2
CHANGEABLE MESSAGE SIGN
OVERHEAD OBSTRUCTIONS

Looking at Figure 2.2, a vehicle traveling at 65 mph will have approximately 9.5 seconds to read the sign:

$$\text{Time} = \frac{900 \text{ ft}}{(65 \text{ mi/hr})(1 \text{ hr}/3600 \text{ sec})(5280 \text{ ft/mi})}$$

$$= 9.5 \text{ sec}$$

It takes a motorist at least one second to read each unit of information (see chapter 3), so if a sign will frequently be displaying longer messages, relocation of existing highway and/or construction signs may be necessary in order to install a permanent CMS and allow the motorist time to read the messages.

Vertical and horizontal curves on freeways may have an effect on the visibility of a CMS. A CMS should be installed or placed before, or at the crest of a vertical curve and never within or immediately after a horizontal curve.

Care should be taken to prevent objects being located too close to the PCMS since they are more likely to impact the visibility of the sign. A motorist in the lane closest to the CMS may not be able to see around the object and fully read the message.

Obstructions such as trees, bridge abutments, overhead signs, or construction vehicles may impact the legibility of both permanent and PCMS.

Semi-trucks in the traffic stream can be a major cause of sight obstructions to the CMS. Motorists in vehicles traveling closely behind or adjacent to a truck may have limited time to read a CMS. In cases where this is prevalent, using multiple PCMS on the same side of the highway will provide an additional opportunity for motorists to comprehend the message.

For maximum visibility a PCMS should be raised to a minimum height of seven feet from the roadway in urban areas and five feet in rural areas.

- Brightness or luminance of a sign is the amount of light that is coming from the CMS. Weather conditions such as fog, dust, snow, or rain, and other conditions such as heat or cold can affect the visibility of messages. Rain, fog and snow can scatter and block light rays from a CMS as that light travels through the atmosphere, and reduce the contrast between the sign and its background. If the contrast becomes too low, motorists cannot read the message. Most signs are equipped with an automatic dimmer mechanism that will account for these conditions.

- Legibility is the maximum distance at which a motorist can first correctly identify letters and words on a CMS. A short message with a large font has greater legibility than a longer message with a smaller font.

  Current California MUTCD guidelines and Caltrans' Standard Specifications (Sec. 12-3.12) require the following minimum distances for visibility and legibility:

  Visibility = 1,500 feet

  Legibility = 750 feet

  A CMS should be routinely monitored for malfunctioning disks, lamps or panels. At least 90 percent of the CMS characters should be functioning and the message should also remain legible to motorists.

  The legibility distance of a CMS may be significantly reduced if the sun is shining directly on the sign or into the eyes of the motorist.

- The Cone of Visibility identifies how many degrees from the sign's center axis the message remains legible. Care should be taken not to place the CMS so far off the roadway that the sign is not in the motorist's cone of vision long enough to read the message. The exposure time to read a message increases as the cone of visibility increases. The PCMS should also be slightly tilted toward the traveled way to reduce glare.

SAFETY

Along with considering the traffic management and visibility aspects of a CMS, safety of staff that will be maintaining the signs and the motorists should also be considered when proposing CMS locations.

- Permanent CMS installed to the right of the traveled way is preferred because it allows maintenance personnel to use shoulder closures during inspection or repair. Providing a parking area or pullout for maintenance (Figure 2.3) shall be considered in the design. If the sign is installed behind a sound wall, an access door should be provided at a safe location.

  Permanent CMS installed in a median or on an existing over-crossing provide high visibility. Unfortunately, they are also difficult for maintenance to access and may impact the vertical limits for transporting tall loads.

  The controller cabinet should be located at least 40-60 feet upstream from the sign to allow good visibility for testing. Security from theft and vandalism should also be considered.

- Portable CMS should be placed as far from the travel way as reasonable, while still making the message visible to motorists. If the portable CMS is located within 15 feet of the edge or the traveled way, it should be delineated with a taper consisting of 9 cones placed at a spacing of 15 feet apart (California MUTCD, Section 6F.55).

  - For freeways and expressways – 30 feet from traveled way.
  - For conventional highways (no curb) – 20 feet from traveled way.
  - For conventional highways (with curb) – 1.5 feet from face of curb.

  Whenever a PCMS is not being used, it shall be removed, placed or stored outside of the clear recovery zone or behind a protective barrier.

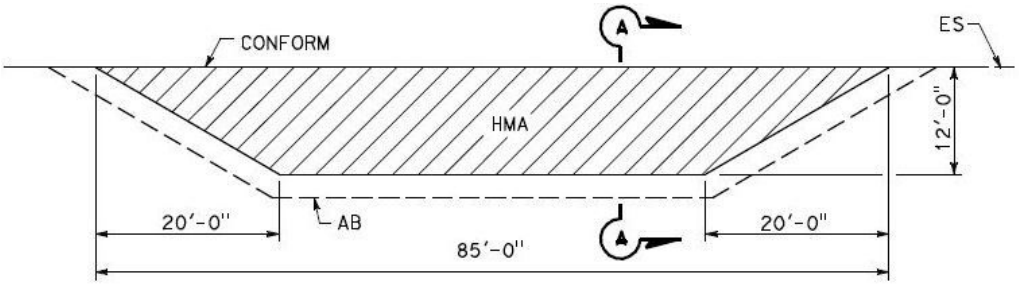

FIGURE 2.3
CHANGEABLE MESSAGE SIGN
MAINTENANCE VEHICLE PULLOUT
(2010 Standard Plan H9)

Chapter 3 – MESSAGES

CMS messages inform motorists of accurate and real-time problems and in some cases, a suggested course of action.

Motorists have difficulty perceiving, processing, and remembering a large amount of traffic information at one time. Consequently, the CMS and TMC operators are responsible for deciding what information is most important and how to present that information to motorists. Messages should encourage motorists to make appropriate driving decisions. This chapter will assist CMS and TMC operators in creating message displays that avoid confusion on the roadway, improve traffic flow, and enhance safety.

MESSAGE ANATOMY

CMS messages are divided into information components that when read separately or collectively, convey a complete thought or message to motorists (Table 3.1).

- A unit of information is typically one to three words of text and usually occupies one line on a CMS phase (Table 3.2). Each unit answers a question that a motorist might ask about an event, or provide information to assist the motorist in making a decision. Units of information should be arranged in a logical order that effectively conveys the message to motorists. Generally this order is the Problem, Location and Effect statement.

  It is important to remember that it takes a motorist at least one second to read each unit of information. A motorist traveling at freeway speeds of 65 miles per hour (mpg) on average has 4 - 7 seconds to read a CMS message under ideal conditions. Unless a motorist is in a queue or traveling at a low rate of speed, the operator should limit the units of information displayed to a one-phase message and no more than two phases.

TABLE 3.1
MESSAGE ANATOMY EXAMPLE

PHASE 1			
UNITS OF INFO.	**INFORMATION**	**MOTORIST QUESTION**	**CMS ANSWER**
1 1 1	Problem Location Effect	What happened? Where? What is the effect on traffic?	ACCIDENT AT EXIT 12 TRAFFIC JAMMED

PHASE 2			
UNITS OF INFO.	**INFORMATION**	**MOTORIST QUESTION**	**CMS ANSWER**
1 1	Audience Action	Who is message for? What is advised?	STOCKTON TRAFFIC USE HWY 99

TABLE 3.2
UNITS OF INFORMATION BREAKDOWN

UNITS OF INFO.	INFORMATION	MOTORIST QUESTION	CMS ANSWERS (examples)
1	Problem/Descriptor	What happened?	ACCIDENT HIGH WINDS FLOODING
1	Location	Where?	AT EXIT 12 AT LONG BEACH BL 15 MILES AHEAD
1	Lane Closed (blocked)	What is Closed (blocked)?	2 LT LANES CLSD FREEWAY CLOSED SINGLE LANE ONLY
1	Effect	What is the Effect on Traffic?	TRAFFIC JAMMED 25 MIN DELAY
1	Audience	Who is the Message for?	COLLISEUM STOCKTON TRAFFIC
1	Action	What is Advised?	USE HWY 99 PREPARE TO STOP USE EXIT 24

A few key points regarding units of information:

- Limit each line of the CMS to one unit of information whenever possible. No more than two units of information on a line.
- It is acceptable (when space is needed) to convey a unit of information over multiple lines.
- No more than **three units** of information on a **single message phase**.
- No more than **four units** of information in the entire message when traffic operating speeds are **35 mph or more**.
- No more than **five units** of information in the entire message when traffic operating speeds are **less than 35 mph**.
- Only one unit of information on a single line. Finish one unit of information before starting another.
- Compatible units of information should be displayed on the same message phase.
- A single unit of information should not be split among two phases.

Location statement information should be useful whether motorists are familiar or unfamiliar with the area. If exit numbers are posted, the operator should use them in

the location statement. Since exit numbers are determined by mile-based increments, they are a preferred location reference. The location can also be referenced by distance or prominent landmarks.

Note: Location Statement - If the incident is on the same freeway as the CMS, there is no need to display the freeway route number or name because motorists will assume the event is on the same freeway.

- A phase is one frame of a message, which includes the units of information and the display time. Each phase of a message should be independently understood by motorists, whether it is read before or after an adjoining phase

  Single-phase messages should be used whenever possible.

  Two-phase messages should be used only when it is determined that motorists have enough time to read the entire message at prevailing speeds.

  If a two-phase message is needed, the Problem and Location units of information should appear together on one phase. An example of a two-phase message showing units of information is shown in Diagram 3.1.

DIAGRAM 3.1
<55 mph

Phase 1

ACCIDENT AT EXIT 35 45 MIN DELAY

Phase 2

STOCKTON TRAFFIC USE HWY 99

Note: A message of this length (five units of information) should only be used in prevailing speeds less than 55 mph to assure adequate time for motorists to read and comprehend the message.

Three-phase messages should never be used.

- A message consists of all the text or characters being displayed on a CMS. The minimum information that needs to be contained in a message is the traffic Problem and Location. The Effect or Action statement should be included, if relevant. Messages should be brief and concise but sufficient for the motorists to make an informed decision. When used, abbreviations should be easily understood (see appendix C).

  The following are factors that enhance motorists' understanding of CMS messages:

- **Display Time**
  A display time should be selected for multi-phase messages which will allow the motorist time to read the message at the prevailing speed.

  The display time for a permanent CMS is generally three seconds per phase. However, two phases with a three second display time for each is not adequate for traffic moving at 60 mph. Therefore, a single-phase three line message is preferred. Keep in mind; in order for motorists to read a two-phase message with three second display times, they would need to be in a queue for 12 seconds to read the full message twice.

A PCMS displays less text and fewer units of information per phase. Therefore, a shorter display time may be used. When a motorist can read the message twice at prevailing speeds, the operator knows the CMS has a proper display time. This should be the intended outcome for all messages, however, it may be difficult to achieve under less than ideal conditions.

Two examples of permanent and portable CMS messages for a freeway closure are shown in Diagrams 3.2 and 3.3. Diagrams 3.2A and 3.3A show two-phase messages that are used when the prevailing speeds are less than 55 mph (four units of information). The second example, Diagrams 3.2B and 3.3B show a single-phase sign used when the prevailing speeds are greater than 55 mph (3 units of information).

- **Message Length**
  Messages should provide motorists with enough information to make a timely driving decision. CMS operators should resist the urge to lengthen a message simply because there is space available on the sign. A driver has a limited amount of time to read a message. A message that is too long to read while traveling at normal speeds will cause traffic slowing especially since motorists cannot devote their full attention to reading the CMS while driving. Operators should look for ways to reduce the message length without losing the intent of the message. Achieve this by deleting unimportant and redundant information.

  Empty spaces in a CMS message may be used for visual clarity.

  Abbreviations may be utilized when creating or editing a CMS message. The example message shown in Diagram 3.2B was shortened by displaying USE S-99 in lieu of USE SOUTH 99. Use of appropriate abbreviations is very important.

DIAGRAM 3.2
PERMANENT MESSAGES

A. (<55 MPH)

Phase 1

FWY CLOSED AT EXIT 12

Phase 2

STOCKTON TRAFFIC USE HWY 99

B. (>55 MPH)

Single Phase

FWY CLOSED AT EXIT 12 USE S-99

DIAGRAM 3.3
PORTABLE MESSAGES

A. (<55 MPH)

Phase 1

FWY CLOSED AT EX 12

Phase 2

USE S- 99

B. (>55 MPH)

Single Phase

FWY CLSD AT EX 12 USE S-99

Certain words or abbreviations are evident to the driver. For instance, the use of "Street," "Avenue" or "Boulevard" following a familiar arterial name is not required and could be omitted. There is no need to use the phrase "east bound" to describe a direction. The direction is already described in the term east or "E" if using an abbreviation. When used in conjunction with a prompt word, the motorist understands most commonly used words and abbreviations (see Appendix C).

Abbreviations are useful to help reduce the message length and to make the message fit within the limited CMS line capacity. In order to facilitate ease of comprehension, keep the following in mind when using abbreviations:

- Avoid two consecutive abbreviations if possible.
- Do not use three or more consecutive abbreviations.

➢ **Standardized Messages**

CMS operators statewide should follow the same messaging as described in these guidelines. Message familiarity reduces motorist reading and comprehension time, thereby enhancing delivery. In general, motorists need more time to read unfamiliar messages.

The information below should be understood before composing a CMS message.

- When referring to an off ramp, the word **EXIT** is preferred.
- The verb **USE** should be selected to indicate a route that will carry the motorist to a destination.
- The term **BLOCKED** may be used when an unexpected event is blocking lanes and no formal closure is in place.
- The term **CLOSED** is recommended after traffic control is in place.
- When using the word **AHEAD (**without referencing miles) to describe a location, the CMS should not be over one mile upstream of the incident. Also, the CMS should be on the same route as the incident.
- The verb **FOLLOW** carries the inferred meaning that motorists will be guided by other signs along the route. **FOLLOW** should not be used unless detour signs are in place.

In areas where both permanent and portable CMS are used, it is important that no conflicting messages are displayed simultaneously.

➢ **Message Type**

See Table 1.1 on page 3 of these guidelines for reference for this section.

Early warning messages give motorists advance notice of unexpected, slow or stopped traffic and queuing due to a planned or unplanned event.

Early warning messages are effective in reducing secondary crashes. Examples of early warning messages are shown in Diagram 3.4.

Note: CMS displaying early warning messages should be blanked if the queue builds beyond the sign

DIAGRAM 3.4
EARLY WARNING MESSAGES

PERMANENT

Incident less than a mile ahead

Problem:	SLOW TRAFFIC
Location:	AHEAD
Effect:	EXPECT DELAY

Problem:	ONE LANE AHEAD
Action:	PREPARE TO STOP

Incident more than a mile ahead

Problem:	STOPPED TRAFFIC
Location:	2 MILES AHEAD

Problem:	ACCIDENT
Location:	2 MILES AHEAD
Action:	PREPARE TO STOP

PORTABLE

Phase 1	Phase 2
SLOW	PREPARE TO STOP

- **Advisory Messages**

Advisory Messages provide motorists with real-time information about a specific problem along their route. Advisory messages can be used to provide guidance, congestion notification and future closures.

The message should use days of the week and not dates (for example Mon, Tues - not 12/15 to 12/17).

Examples of Advisory Messages for a ramp closure are shown in Diagram 3.5.

DIAGRAM 3.5
ADVISORY MESSAGES

PERMANENT

GRAND ST EXIT
TO BE CLOSED
MON-FRI 10PM-2AM

PORTABLE

Phase 1	Phase 2
RAMP CLOSURE	MON-FRI 10PM-2AM

- **AMBER Alert Messages**

AMBER Alert messages are typically a one-phase, three line message that provides information to motorists on the abduction of a child. The message should display a vehicle description and license plate number (or partial number). An example of an AMBER Alert message is shown in Diagram 3.6.

DIAGRAM 3.6
AMBER ALERT MESSAGES

CHILD ABDUCTION
BLUE FORD VAN
CA LIC# 1ABC123

Care should be used to compose the second line of an AMBER Alert message. The second line of an AMBER Alert message is undoubtedly the most important component of the message. It defines the message, and either makes or breaks the effort to convey information to the motorist. Oftentimes, the information provided from ENTAC on the vehicle description

is more than what will fit on a single line. The CMS operator may need to omit some information and display only what is most helpful for the public. *Past experience has shown that motorists are less familiar with the vehicle year as compared to the vehicle color.* For example, it is more effective to show*: WHITE FORD WAGON* rather than *1986 FORD WAGON*

- **Blue Alert Messages**

Blue Alert messages consist of a one-phase, 3 line message that provides information on a suspect's vehicle to motorists following an attack on a law enforcement officer. The message should display a vehicle description and license plate number (or partial number). An example of a Blue Alert message is shown in Diagram 3.7

DIAGRAM 3.7
BLUE ALERT MESSAGES

CALL 911
BLUE FORD VAN
CA LIC# 1ABC123

As with the AMBER Alerts, care should be used to compose the second line of the message. The information provided by ENTAC on the vehicle description may be more than what will fit on a single line. The CMS operator may need to omit some information and display only what is most helpful for the public.

- **Travel Time and Delay Messages**

Travel Time and Delay Messages give motorists the estimated travel time or expected delays from a CMS to a specific downstream destination (target). Travel time information is especially useful for the local daily commuter since the destination(s) listed on a given CMS will remain the same from day to day.

CMS selected to display travel times are at locations that are decision points for commute drivers. Approximately 15 percent of the total CMS statewide display travel times during the morning and evening commute hours.

Travel time messages should only be used in regions or corridors that experience recurring congestion, where traffic conditions are dynamic enough that they are not viewed as static messages, which can result in credibility problems.

The format of the message will differ slightly depending on the number of destinations (targets) shown in the message, but should be limited to one-phase. The recommended formats are shown in Diagram 3.8.

Travel times are automatically calculated based on data from field devices and posted on the CMS using software algorithms. Like any CMS message, accuracy is key to maintaining credibility. The difference in posted and actual travel times should not differ significantly.

Delay times should only be displayed if there is a high level of confidence in the calculated delay time based on information from field elements and personnel in the field.

DIAGRAM 3.8
TRAVEL TIME MESSAGES

Single Destination

```
MINUTES TO
DOWNTOWN    35
```

Two Destinations

```
MINUTES TO
BEACH BL        11
WESTMINSTER     19
```

Three Destinations

```
SFO ARPT     11 MIN
RTE 92       19 MIN
DALY CITY     7 MIN
```

Alternate Routes

```
MINUTES TO RTE57
VIA RTE 10      14
VIA RTE 210     20
```

- **Alternative Route/Detour**

Alternative route/detour messages are used when an incident blocks or closes an exit or freeway interchange. This event requires motorists to use or take another route than originally intended. Motorists should not be detoured to arbitrary routes. The suggested detour route should be a route that contains adequate road signs so motorists can travel without getting lost. Before a recommended detour route is displayed on a CMS, the operator should know the current traffic conditions and current route constraints. The operator should also consult with the DTM to identify if alternate routes are available to detour motorists.

A simple message is needed to allow motorists a quick return to their original route. Examples of alternate route messages are shown in Diagram 3.9.

DIAGRAM 3.9
ALTERNATIVE ROUTE MESSAGES

PERMANENT

```
ACCIDENT
AT HARBOR BL
USE E 91 TO S 57
```

```
ACCIDENT
AT HARBOR BL
2-3 HR DELAY
```

PORTABLE

Phase 1

```
ACCIDENT
AT
HARBOR
```

Phase 2

```
USE
E-91 TO
S-57
```

Phase 1

```
ACCIDENT
AT
HARBOR
```

Phase 2

```
OVER
2 HOUR
DELAY
```

Alternate route messages are divided into two categories: Soft Detours and Hard Detours. A Soft Detour is an optional detour, for example USE OTHER ROUTES. A Hard Detour is a required detour, for example USE NEXT EXIT / USE HIGHWAY 99. If a detour route is not available, a message should be posted with an estimate of the delay time.

- **Safety Campaigns**

Safety Campaigns - Caltrans is an active participant in safety campaigns and displays safety messages on CMS in conjunction with media campaigns by the CHP and the Office of Traffic Safety (OTS) as well as during enhanced enforcement periods by the CHP.

Safety campaigns shall be limited to those that are approved by Caltrans' Headquarters and distributed to the districts on the annual statewide CMS safety campaign calendar.

Examples of safety campaign messages are shown in Diagram 3.10.

DIAGRAM 3.10
SAFETY CAMPAIGN MESSAGES

DUI

REPORT DRUNK DRIVERS CALL 911

Texting Ticket

TEXTING TICKET $159+ NOT WORTH IT

Motorcyclists

SHARE THE ROAD LOOK TWICE FOR MOTORCYLISTS

Slow/Move Over

MOVE OVER OR SLOW FOR WORKERS IT'S THE LAW

Handsfree Ticket

HANDHELD CELL TICKET $159+R NOT WORTH IT

Seatbelts

CLICK IT OR TICKET

Maintenance Cleanup

DON'T TRASH CALIFORNIA

- **Emergency Security Messages**

  Emergency Security Messages originate in the Caltrans Director's office at the request of the Secretary of Emergency Management under the authority granted in California Government Code 8587(a) (see below). Requests for these messages should come to the TMC via the Director's office or the Headquarters Division of Traffic Operations. Questions about the message priority of Emergency Security Messages should be directed to the Headquarters Statewide CMS Coordinator or the Caltrans Director's office. The priority of Emergency Security Messages will vary depending on other events occurring at the time.

  California Government Code 8587(a): During a state of war emergency, a state of emergency, or a local emergency, the Secretary shall coordinate the emergency activities of all state agencies in connection with that emergency, and every State agency and officer shall cooperate with the secretary in rendering all possible assistance in carrying out the provisions of this chapter.

Message priority will be determined by the staff within the TMC, but should comply with these guidelines.

Safety is Caltrans number one priority and any message related to an unforeseen traffic condition downstream of a sign should be given priority on that sign.

In cases where multiple signs are available along a route or corridor, travel times may be displayed in conjunction with AMBER and Blue Alerts, but in the immediate vicinity of a kidnapping/assault, or along a corridor or route that has been identified as a most likely

route for the vehicle of interest, priority should be given to the AMBER and Blue Alert messages.

The list provided is a guideline, and it is understood that a mixture of signs may be used on any given corridor in order to best serve the travelling public (see Table 3.3 for an example of possible sign combinations along a route).

1. Incident Ahead
2. Lane Closures/Work Zones
3. Weather Related
4. Special Events
5. AMBER Alert
6. Blue Alert
7. Future Lane/Ramp Closures
8. Travel Times
9. Safety Campaigns

- Emergency Security Message*

*The priority of Emergency Security Messages will vary depending on other events occurring at the time – See pages 19, 32 and 47 of these CMS Guidelines

The priority list primarily applies to permanent CMS, but it would also apply to remotely-operated PCMS that function in the capacity of a permanent CMS.

TABLE 3.3
MESSAGE PRIORITY EXAMPLE

(Vehicle in area, no other information)

CO	RTE	PM	DIR	MESSAGE
LA	5	21.8	NB	Travel Time
LA	5	37.4	NB	AMBER Alert
LA	5	44.4	NB	Travel Time
LA	5	54.6	NB	Accident Ahead
LA	5	78.1	NB	AMBER Alert

(Vehicle last seen NB on I-5)

CO	RTE	PM	DIR	MESSAGE
LA	5	21.8	NB	AMBER Alert
LA	5	37.4	NB	AMBER Alert
LA	5	44.4	NB	AMBER Alert
LA	5	54.6	NB	Accident Ahead
LA	5	78.1	NB	AMBER Alert

Chapter 4 - EQUIPMENT

PERMANENT AND PORTABLE CMS MODELS

When installed or placed, the CMS becomes a part of the total motorist information system, acting in partnership with existing roadway signs. Roadway signs display an unchanging message to motorists; therefore, the need for a CMS is prevalent for situations requiring time sensitive information. For this reason, both permanent and portable CMS are utilized. Permanent signs are placed in the median, shoulder or on existing over-crossings. Portable truck or trailer mounted signs can be temporarily placed in desired locations.

- **Permanent CMS Model 500**
  - Size 306” x 79.5”
  - Fixed Location
  - 3 lines of text
  - 16 characters per line
  - 18” characters
  - Full Matrix Display
  - Installed on freeways and expressways

AMBER Alert on Model 500 CMS

- **Permanent CMS Model 510**
  - Size 230” x 53.75”
  - Fixed Location
  - 3 lines of text
  - 16 characters per line
  - 12” characters
  - Full Matrix Display
  - Installed on freeways, expressways, and conventional highways

Safety Message on Model 510 CMS

- **Permanent CMS Model 520**
  - Size 84” x 43.75”
  - Fixed Location
  - 3 lines of text
  - 8 characters per line
  - 12” characters
  - Full Matrix Display
  - Installed on conventional and rural highways

Message on Model 520 CMS

- **Portable CMS Trailer**

  Characteristics vary

  - Sizes 80”wx 56”h or 115”w x 80”h
  - Movable Location
  - 3 lines (based on 12” characters)
  - 8 characters per line
  - Can be left at location for duration of event

Advisory on Portable CMS

- **Portable CMS Truck-Mounted-**

  Characteristics vary

  - Size 80”w x 56”h
  - Movable Location
  - 2-3 lines
  - 8 characters per line
  - Can be constantly repositioned

Incident Warning on Truck Mounted CMS

A number of design options exist for both permanent and portable CMS devices. Detailed equipment and option descriptions can be found on the following Caltrans internet websites:

PERMANENT CMS

http://www.dot.ca.gov/hq/traffops/elecsys/reports/Chapter8.pdf

PCMS

http://www.dot.ca.gov/hq/eqsc/QualityStandards/Electric/Electric-16.htm

SIGN TECHNOLOGY

There are several types of sign technology currently available for CMS. Listed below is the technology used by Caltrans Maintenance and Operations:

- **Light-Emitting Diode (LED) Signs** use a cluster of LED lamps instead of incandescent bulbs to produce light. A bright amber LED currently produces the highest light output. The key advantage is the advertised theoretical 100,000-hour life and solid state design. Disadvantages include inconsistency of color, need for adequate ventilation and require screening from the sun. Currently, the entire fleet of PCMS is LED. Caltrans has also introduced a few permanent LED signs in selected locations around the state.

CMS COORDINATION WITH OTHER FIELD ELEMENTS

A CMS can convey only a limited amount of information; therefore, when there is a need to provide extensive information to motorists, a CMS can be used in conjunction with other traveler information devices. These devices include the entire traffic

operations system network. The traffic operations system network includes but is not limited to the following field elements:

- **Highway Advisory Radio (HAR)**

  HAR units are used when there is a need to provide extensive roadway information to motorists, such as chain control or adverse weather conditions.

- **Extinguishable Message Sign (EMS)**

  An EMS is used to display a fixed message such as TUNE RADIO TO 1610 AM or ALL TRUCKS EXIT AT SCALES. Another type of EMS is a roadside sign which display fixed messages with flashing beacons to draw attention to the activated sign.

- **Flashing Beacon**

  Flashing beacons can be used in conjunction with the CMS/EMS to draw attention to the sign and its message.

- **Flashing Arrow Sign (FAS)**

  An FAS is also known as an arrow board; it is sometimes used to supplement a CMS. The electronic FAS typically direct traffic away from a downstream lane closure. At times, a PCMS may be used to simulate an arrow panel display.

Chapter 5 - DOCUMENTATION

Consistent documentation is used to evaluate the Caltrans CMS system and its benefits to the motoring public and to determine the workload for budgetary purposes.

TYPE OF INFORMATION

The following information should be recorded whenever a CMS is operated within the State right-of-way:

- Location/Route/Direction
- Messages displayed
- Date of usage
- Time on and off
- Reason for use, such as incident, traffic guidance, traffic congestion, severe weather advisory, AMBER Alert, approved PSA, etc.
- Name of operator
- Name and Unit of person requesting the message or providing incident information

RETENTION OF DOCUMENATION

A copy of all documentation should be kept on file by the District for three years.

Appendix A – ACRONYMS

ACRONYM	MEANING
AMBER	America's Missing Broadcast Emergency Response
CAD	Computer Aided Dispatch
CHP	California Highway Patrol
CMS	Changeable Message Sign
CRZ	Clear Recovery Zone
DOT	Department of Transportation
DTM	District Traffic Manager
EMS	Extinguishable Message Sign
ENTAC	Emergency Notification Tactical Alert Center
ETO	Estimated Time of Opening
FAS	Flashing Arrow Sign
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
JOPS	Joint Operational Policy Statement
HAR	Highway Advisory Radio
HAZMAT	Hazardous Material
LED	Light Emitting Diode
MEP	Maximum Enforcement Period (CHP)
MUTCD	Manual on Uniform Traffic Control Devices
PCMS	Portable Changeable Message Sign
RE	Resident Engineer
TMC	Transportation Management Center
TMP	Transportation Management Plan
TMS	Traffic Management System
TMT	Traffic Management Team

Appendix B – GLOSSARY

AMBER Alert: .....The America's Missing Broadcast Emergency Response Alert is a Plan through which emergency alerts are issued to notify the public about abductions of children

Blue Alert: .....Blue Alerts are activated by CHP's ENTAC, when a law enforcement officer has been assaulted and the suspect(s) are believed to be fleeing on a state highway.

Bottleneck:.....A location where traffic demand wanting to use a section of roadway is greater than that section's capacity

Clear Recovery Zone ..The unobstructed, relatively flat area beyond the edge of the traveled way which affords the drivers of errant vehicles the opportunity to regain control

Cone of Visibility: .....The area inside which a CMS sign is visible, which is narrow near the sign and gradually increases in width as the distance from the sign increases, effectively creating a "cone" shaped foot print on the pavement

Congestion: .....A condition where a breakdown of traffic flow has occurred and a queue begins to form because the amount of traffic approaching a section of highway exceeds the amount of traffic passing through it

Credibility:.....Believability (credit, belief or trust; confidence)

Cycle:.....For multi-phase messages, the complete series of phases for a given message; the time within which a set of phases is complete

Decision Point:.....An interchange or intersection where a motorist must decide on a route

Display Time: .....For multi-phase messages, the time in seconds that each phase will appear

Downstream: .....Beyond a certain location, in the same direction of traffic

End of Queue:.....The last cars to arrive in a queue; the upstream end of congestion

Extended Message:.....Multi-phase message

Frame:.....A set of text displayed as one phase of an extended message

Full Matrix Display: ...A bulb or LED array capable of displaying graphics, animation, and various sizes of text

Gawk:.....Slowing down to look at some incident or distraction

Head of Queue:.....The downstream most area of congestion, usually used during dissipation

LED:.....A type of technology used for CMS luminance; light emitting diode

Legibility:.....The ease in which a sign can be read or deciphered

Appendix B – GLOSSARY (Contd.)

Luminance: .....A measure of the brightness of a luminous surface

Message: .....All the text or characters being displayed, including all panels in multi-phase operation

Panel: .....The physical part of a sign which displays the message; also used to reference a part of a message that is held by one panel, as in a multi-phase message

Phase: .....One panel of a multi-panel message, and the display time of that panel

Queue: .....A waiting line (of vehicles); the area of congested traffic upstream of a bottleneck or incident scene

Recurrent: .....Appearing or occurring again, or typically

Secondary Collision: ...Collisions which occur in the queue of an initial collision

Skew: .....To turn aside, or to one side; slanting; oblique

Special Event: .....A sporting event, concert, or other event likely to attract large numbers of attendees, potentially causing heavy traffic or congestion

Taper: .....A section of cones laid out to divert vehicles out of a lane, shoulder, or away from an obstruction

Target Value: .....How well a CMS attracts the motorists' attention?

Traveled Way: .....The portion of the roadway for the movement of vehicles, excluding shoulders

Upstream: .....Against, or in the same direction of traffic, but ahead or in advance of a certain location

Appendix C – ABBREVIATIONS

Acceptable Abbreviations

Note: **Where shown, prompt words should be used for clarification**

WORD	ABBREVIATION	POTENTIAL PROMPT WORD
Access	ACCS	ROAD
Afternoon/Evening	PM	
Ahead	AHD	ACCIDENT *
Alternate	ALT	ROUTE
Avenue	AVE, AV	
Bicycle	BIKE	
Blocked	BLKD, BLOCKD	LANE *
Boulevard	BLVD, BL	
Bridge	BRDG	(*Name*) *
Canyon	CYN	
Center	CNTR	
Chemical	CHEM	SPILL
Circle	CIR	
Closed	CLSD, CLOSD	LANE *
Condition	COND	TRAFFIC *
Congested	CONG	TRAFFIC *
Construction.	CONST	AHEAD
Crossing (other than highway-rail)	XING	
Do Not	DONT	
Downtown	DWNTN	TRAFFIC
Drive	DR	
East	E	(*Route #*)

* These prompt words should precede the abbreviation

Appendix C – ABBREVIATIONS (Cont'd)

Acceptable Abbreviations

Note: **Where shown, prompt words should be used for clarification**

WORD	ABBREVIATION	POTENTIAL PROMPT WORD
Emergency	EMER	
Entrance, Enter	ENT	
Exit	EX, EXT	NEXT *
Express	EXP	LANE
Expressway	EXPWY	
Feet	FT	
FM Radio	FM	
Freeway	FWY, FRWY	
Friday	FRI	
Frontage	FRNTG	ROAD
Hazardous	HAZ	CONDITIONS
Hazardous Material	HAZMAT	
Highway	HWY	
Hour(s)	HR	
Information	INFO	
Interstate	I	(*Route #*)
Junction/Intersection	JCT	
Lane	LN	
Lanes	LNS	
Left	LT, LFT	LANE
Local	LOC	TRAFFIC
Lower	LWR	LEVEL

* These prompt words should precede the abbreviation

Appendix C – ABBREVIATIONS (Cont'd)

Acceptable Abbreviations

Note: **Where shown, prompt words should be used for clarification**

WORD	ABBREVIATION	POTENTIAL PROMPT WORD
Maintenance	MAINT	
Major	MAJ	ACCIDENT
Mile	MI	
Miles Per Hour	MPH	
Minor	MNR	ACCIDENT
Minute(s)	MIN	(*Number*) *
Monday	MON	
Morning/Late Night	AM	
Nights	NITES	
Normal	NORM	
North	N	(*Route #*)
Oversized	OVRSZ	LOAD
Parking	PRKNG	
Parkway	PKWY	
Pavement	PVMT	ROUGH *
Pedestrian	PED	
Prepare	PREP	TO STOP
Required	REQ	CHAINS *
Right	RT, RHT	LANE
Road	RD	
Roadwork	RDWK	(*Distance*) AHEAD
Route	RTE	(*Route #*)

* These prompt words should precede the abbreviation

Appendix C – ABBREVIATIONS (Cont'd)

Acceptable Abbreviations

Note: **Where shown, prompt words should be used for clarification**

WORD	ABBREVIATION	POTENTIAL PROMPT WORD
Saturday	SAT	
Service	SERV	
Shoulder	SHLDR	
South	S	(*Route #*)
Speed	SPD	
Street	ST	
Sunday	SUN	
Telephone	PHONE	
Temporary	TEMP	
Thursday	THURS	
Traffic	TRAF	
Tuesday	TUES	
Two-Way Intersection	2-WAY	
Two-Wheeled Vehicles	CYCLES	
Upper	UPR	LEVEL
US Numbered Route	US	(*Route #*)
Vehicle(s)	VEH	ALL *
Visibility	VISB	REDUCED *
Warning	WARN	
Wednesday	WED	
West	W	(*Route #*)
Will Not	Wont	

* These prompt words should precede the abbreviation

Appendix C – ABBREVIATIONS (Contd.)

Abbreviations to be Avoided

ABBREVIATION	INTENDED WORD	MISINTERPRETATIONS
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
STAD	Stadium	Standard
WRNG	Warning	Wrong

Appendix D – PERMANENT CMS SAMPLE MESSAGES

EVENT/SCENARIO	PREFERRED	AVOID	COMMENTS
Accident	ACCIDENT AHEAD		➢ Use the word "ACCI-DENT" when signing for an accident - Only use the word "AHEAD" if the sign is less than a mile from the incident.
N, S, E, W Dashes or Slashes	E-60 AT AZUSA 2 RT LANES CLSD	2 RT LNS CLOSED EAST 60 AT AZUSA EB 60 AT AZUSA 2 RT LANES CLSD E/60 2 RT LANES CLSD AT AZUSA	➢ Use the letter designating direction (N, S, E, W) for the abbreviation. ➢ Don't use the abbreviation "EB", "WB", "NB", "SB" - this is an internal abbreviation and not familiar to all motorists. ➢ The dash between the direction and route number is optional. It is acceptable to leave it as a blank space. ➢ Avoid using slashes.
Order of Units of Information	E 60 AT AZUSA 2 RT LANES CLSD 3 LT LANES CLSD AT ARCHIBALD AVE W 10 AT CITRUS 2 RT LANES CLOSD	2 RT LANES CLSD EAST 60 AT AZUSA W 10 2 RT LANES CLOSED AT CITRUS	➢ The general order of information is the *Problem*, *Location*, and *Lanes Closed / Effect* statement. ➢ State the *Location* before the *Lanes Closed* information whenever possible. ➢ Separate the units of information (don't intermingle them) to make the message easier to comprehend. (such as keep the *Location* and *Lanes Closed* information separate).
Closed vs. Blocked	ACCIDENT AHEAD LEFT LANES BLKD 2 RT LANES CLOSED AT MILLWOOD		➢ The term "BLOCKED" would be preferred for an accident, unless Maintenance had arrived and closed the lane with a formal closure. ➢ Use "CLOSED" when lanes are closed via a formal closure (such as cones, arrow boards, early warning signs, etc)

Appendix D – PERMANENT CMS SAMPLE MESSAGES (Contd.)

EVENT/SCENARIO	PREFERRED	AVOID	COMMENTS
Abbreviation	E 10 AT MILIKEN 3 LT LANES CLSD	E 10 AT MILIKEN 3 LT LNS CLSD	➢ A string of abbreviations makes it more difficult to comprehend. ➢ Avoid using 3 or more *consecutive* abbreviations.
Use of *ST*, *RD*, and *AVE*	ACCIDENT AT GENESEE AV LT LANE BLOCKED ACCIDENT AT LOS CARNEROS SINGLE LANE ONLY 3 RT LANES CLOSD AT 8TH AVE TRAFFIC JAMMED	ACCIDENT LOS CARNEROS RD SINGLE LANE ONLY	➢ The modifiers of surface street names (such as, ST, RD, AVE) are not required and can be omitted. ➢ The modifiers should be omitted if doing so allows room for more important words. ➢ The modifiers are required if more than one street in the area have identical numeric names. - In this case, there was an 8th St and an 8th Ave.
Use of Numbers	ACCIDENT AT 17TH ST N 5 AT GENESEE 2 LT LANES CLOSD	ACCIDENT AT SEVENTEENTH ST N 5 AT GENESEE TWO LT LNS CLSD	➢ Use numbers whenever possible.
"HWY", "FWY",. "RTE", "I", or "SR"	ACCIDENT AT 5-FWY ACCIDENT AT HWY-57 ACCIDENT AT I-5	ACCIDENT AT SR-55	➢ .Common Caltrans practice is to use "HWY", "FWY" or "RTE" to address the subject route. Be careful "RTE" doesn't get confused with "RT". "CA" can also be used for state routes. ➢ "SR" is not considered a common abbreviation to the public and should not be used. ➢ "I" is still used to indicate "Interstate," especially when space is limited

Appendix D – PERMANENT CMS SAMPLE MESSAGES (Contd.)

EVENT/SCENARIO	PREFERRED	AVOID	COMMENTS
Single phase messages are preferred	3 RT LANES CLSD AT ROSEMEAD BL TRAFFIC JAMMED	3 RT LANES CLSD AT ROSEMEAD BL TRAFFIC JAMMED	➢ . This information can be displayed on a single phase 3 line message, rather than a 2 phase message.
	3 RT LANES CLSD AT MICHILLINDA TRAFFIC JAMMED	3 RT LANES CLSD MICHILLINDA AVE TO BALDWIN AVE TRAFFIC JAMMED	➢ The location of the beginning of the closure is useful to motorists. The lane closure limits are not as critical. In this case, forgoing the closure limits kept the message to a single phase.
Congestion after an incident is cleared from the roadway	TRAFFIC JAMMED CITRUS TO GRAND 30 MIN DELAY		➢ Providing congestion limits is very effective and useful for motorists. ➢ When pressed for space, a dash can be used to replace the word "TO," when conveying the limits between two points.
	HEAVY TRAFFIC ROSEMEAD – GRAND		
	TRAFFIC JAMMED TO ROSEMEAD		➢ Use "TO instead of "AT" if the CMS is located in the traffic queue.
	SOUTH 880 JAMMED FRUITVALE TO HEGENBERGER RD		➢ Advising of congestion that is on a different freeway than the CMS.
CMS is on the same route as the incident	2 LFT LANES BLKD AT LAKE AVE	2 LEFT LANES AT LAKE BLOCKED	➢ No need to display the freeway route number. ➢ *Problem* stated on one line and *Location* stated on another.

Appendix D – PERMANENT CMS SAMPLE MESSAGES (Contd.)

EVENT/SCENARIO	PREFERRED	AVOID	COMMENTS
Only one lane is open.	E 60 AT PECK RD SINGLE LANE ONLY	E 60 AT PECK 3 RT LANES BLKD	➢ ."Single Lane Only" has a great impact, and provides a good description of the conditions to the motorists.
	SINGLE LANE ONLY AT GOVERNOR DR		
Off ramp or Freeway Connector closed	FAIRFAX EXIT CLOSED	FAIRFAX OFF-RAMP CLOSED	➢ The word "Exit" is preferred when referring to an off ramp or freeway connector
	EAST 580 EXIT CLOSED	E 580 CONNECTOR CLOSED	
Freeway Connector closed with recommended detour	W 10 EXIT CLOSED DETOUR USE VALLEY EXIT	W 10 CONNECTOR CLOSED	➢ If a detour is in place, the word "Exit" is preferred when referring to a freeway connector.
	EAST 60 EXIT CLOSED USE EAST 10 TO SOUTH 710		
	SOUTH 5 EXIT CLOSED DETOUR USE WEST 60 TO S 710		

Appendix D – PERMANENT CMS SAMPLE MESSAGES (Contd.)

EVENT/SCENARIO	PREFERRED	AVOID	COMMENTS
Freeway Connector (both directions) closed	RTE 10 EXITS CLOSED		
	ACCIDENT HWY 101 EXITS BLOCKED		
Off ramp partially blocked	ACCIDENT FAIRFAX EXIT BLOCKED		
Freeway Connector closed on another route	N 710 TO W 105 EXIT CLOSED		
	NORTH 710 TO WEST 105 EXIT CLOSED		
Freeway Closed with recommended Detour	FREEWAY CLOSED AT CAPITOL AV USE NEXT 2 EXITS		
	FREEWAY CLOSED AT WESTLAKE BL DETOUR USE LINDERO CYN EXIT		

Appendix D – PERMANENT CMS SAMPLE MESSAGES (Contd.)

EVENT/SCENARIO	PREFERRED	AVOID	COMMENTS
More Example Messages	TRAFFIC INFO TUNE TO 1620 AM SLOW DENSE FOG AHEAD TOLL LANES CLOSED ANAHEIM POND EXIT BALL RD		**ADDITIONAL INFORMATION** ➢ The only desirable punctuation is a dash - avoid periods, commas, quotes, etc. ➢ The dash in between the *direction* and *route #* is optional and can be omitted. In some cases, the dash can improve the "aesthetics" of the message. ➢ Make sure reference is a major cross street with signing on freeway. ➢ Always use the word accident if accident involved.
More Example Messages	CAUTION FLOODING AHEAD HIGH WINDS THRU TEJON PASS		➢ For off route incidents, use affected route and direction after the word "ACCIDENT". ➢ Only use the word "AHEAD" on signs one mile or less from an accident scene or event. ➢ Limit messages to two lines or one phase when possible

Appendix E – PORTABLE CMS EXAMPLES

EVENT/SCENARIO	PHASE 1	PHASE 2	COMMENTS
Accident	ACCIDENT AHEAD	PREPARE TO STOP	➢ One of the most commonly used PCMS messages to manage the end of queue. This message is generally used on TMT trucks.
N, S, E, W	S-133 EXPECT DELAY	MON – FRI 9 AM – 3 PM	➢ Use the letter designating direction – use a dash or space between the direction designation and the route number – avoid using "NB", "SB", etc.
Advance Closure Notice	N-405 EXIT CLOSURE	FRI – 9 PM THRU MON – 5 AM	➢ If a major ramp closure will have a significant impact on traffic, this advance notice is effective. Use days of the week (such as, MON, TUES) – avoid using calendar dates (such as, 3/14, SEPT 10).
Special Traffic Handling	ALL VEHICLES	CARPOOL LANE OK	
Special Traffic Handling	ALL VEHICLES	OK TO USE CARPOOL	
End Mixed HOV Lane	CARPOOL LANE	2 OR MORE PER VEHICLE	
Route Guidance	N – 5 DETOUR >>>>>>		
Route Guidance	NORTH 5 EXIT CLOSED	DETOUR USE TELEGRPH	

Appendix E – PORTABLE CMS EXAMPLES (Cont'd)

EVENT/SCENARIO	PHASE 1	PHASE 2	COMMENTS
Route Guidance	N 101 EXIT CLOSED	DETOUR S 5 TO BROADWAY	
Advance notice	RAMP TO BE CLOSED	WED NIGHT 10 PM	
Advance notice	TRAFFIC INFO	TUNE TO 1620 AM	
Advance notice	CHAINS REQUIRED	SNOW TIRES 4 X 4 OK	
Advance notice	DENSE FOG AHEAD		
Advance notice	ACCIDENT EXIT 123 CLOSED		
Advance notice	TRAFFIC JAMMED	CITRUS TO GRAND	
Advance notice	EAST 60 AT PECK RD	SINGLE LANE ONLY	

Appendix E – PORTABLE CMS EXAMPLES (Cont'd)

EVENT/SCENARIO	PHASE 1	PHASE 2	COMMENTS
Advance notice	LOCAL TRAFFIC ONLY		
Advance notice	HWY 123 CLSD AT LINCOLN	UNTIL 5 AM MONDAY	
Advance notice	HWY 123 TO BE CLOSED	NIGHTLY 8PM-5AM	
Advance notice	SLOW	RT LANE STOPPED AHEAD	
Advance notice	WORK ZONE AHEAD	WATCH FOR WORKERS	Per "Use of Changeable Message Signs for Work Zones" memorandum, dated August 5, 2011, portable CMS should be placed within one (1) mile of the work zone

Appendix F – FHWA POLICY MEMORANDA

Information: Use of Changeable Message Sign (CMS) (FHWA, January 19, 2001), states that "FHWA supports the use of a CMS as a traffic control device to safely and efficiently manage traffic by informing motorists of roadway conditions and required actions to perform. The appropriate use of a CMS and other types of real-time displays should be limited to managing travel, controlling and diverting traffic, identifying current and anticipated roadway conditions, or regulating access to specific lanes or the entire roadway. A national survey of 26 transportation agencies in 1997, indicated that 77 percent had a policy of displaying messages only when unusual roadway conditions are present, leaving the CMS blank during other times. The use of a CMS for the display of general public information or other nonessential messages is discouraged. Only essential messages should be displayed on a CMS."

Information: AMBER Alert Use of Changeable Message Sign (CMS) (FHWA, August 16, 2002), was prepared to clarify FHWA policy on the use of CMS to display child abduction messages as part of the AMBER Plan Program. The memo states that "If public agencies decide to display AMBER Alert or child abduction messages on a CMS, FHWA has determined that this application is acceptable only if (A) it is part of a well- established local AMBER Plan Program, and (B) public agencies have developed a formal policy that governs the operation and messages that are displayed on CMS." The memo further outlines what needs to be included in the policy.

Use of Changeable Message Sign (CMS) for Emergency Security Messages (FHWA, March 21, 2003), was prepared by FHWA to clarify the conditions required and the criteria that must be met for state and local agencies to utilize CMS to convey emergency and homeland security information to the motorists. The memo states that "general messages that are not related to transportation or specific emergency conditions requiring actions by motorists are discouraged." "it is unsafe to request motorists to write telephone numbers, websites, addresses, or other lengthy information while they are moving. When there is a need to provide extensive information to motorists, it is critical that other types of traveler information based media (e.g., 511, highway advisory radio, web sites) be used, or that the messages displayed on a CMS supplement these other media." "If public agencies decide to display emergency or security alert messages on a CMS, FHWA has determined that this application is acceptable if public agencies have developed policies and procedures that govern the messages that are displayed on CMS and their operation." The memo further outlines the issues that the policy and procedures must address.

Dynamic Message Sign (DMS) Recommended Practice and Guidance (FHWA, July 16, 2004), was prepared by the FHWA to encourage and give guidance on how to implement the display of travel time messages on the signs, and provide guidance on the display of AMBER Alerts, national security and other emergency messages. The memo states that "A campaign of public awareness is critical in order for the time messages to have to have an initial positive effect. New types of messages often cause motorists to slow down, so any efforts to reduce those "surprise" effects will help motorists more easily adapt to the new messages. . . Travel times must be generated automatically and not require a human operator to manually enter

travel time data. . . Traffic conditions must be dynamic enough - such as in major metropolitan areas and along heavily traveled corridors - so that travel time messages are not viewed as merely static messages, which may result in credibility problems. . . By including the distance to the destination in addition to the travel time, even those travelers unfamiliar with the area can determine the approximate level of congestion ahead. . . messages related to national security or emergencies are relatively rare and typically directed by State executives. Existing guidance for DMS operations has proven successful in most locations in ensuring that only messages relevant to motorists and requiring actions by motorists are displayed."

These memoranda are enclosed in this Appendix and can be found on FHWA's website at: **http://www.fhwa.dot.gov/legsregs/directives/policy/index.htm**

Use of Changeable Message Sign (CMS)

Memorandum

U.S. Department of Transportation
Federal Highway Administration

Subject: **INFORMATION:** Use of Changeable Message Sign (CMS)

Date: January 19, 2001

From: Christine M. Johnson
Program Manager, Operations
Director, ITS Joint Program Office

Reply to Attn of: HOTM

To: James A. Chetham
Division Administrator (HAD-PA)
Harrisburg, Pennsylvania

Thank you for your correspondence regarding the operation of a CMS. Section 2A.07 of the Manual on Uniform Traffic Control Devices (MUTCD) requires that a CMS shall conform to the principles established in the MUTCD related to the use of signs within the right-of-way of all classes of public highways, and to the extent practical, the design and applications prescribed in Sections 6.F.02 and 6F.52. Section 2E.21 of the MUTCD specifies that "Changeable message signs shall display pertinent traffic operational and guidance information only, not advertising."

The FHWA supports the use of a CMS as a traffic control device to safely and efficiently manage traffic by informing motorists of roadway conditions and required actions to perform. The appropriate use of a CMS and other types of real-time displays should be limited to managing travel, controlling and diverting traffic, identifying current and anticipated roadway conditions, or regulating access to specific lanes or the entire roadway. A national survey of 26 transportation agencies in 1997, indicated that 77 percent had a policy of displaying messages only when unusual roadway conditions are present, leaving the CMS blank during other times.

The use of a CMS for the display of general public information or other nonessential messages is discouraged. Only essential messages should be displayed on a CMS. As per MUTCD

Section 1A.01 "Guide and information signs are solely for the purpose of traffic control and are not an advertising medium."

The content of a CMS message should be based on requiring the motorist to take an action. However, operational, road condition, and driver safety focused messages are acceptable to be displayed on a CMS. If driver safety focused messages are to be displayed on a CMS, they should be kept current and relate to a specific safety campaign. The period of time that a specific messages is displayed for a safety campaign should be limited to a few weeks. Motorists tend to ignore messages that are displayed for long periods of time.

The improper operation and display of outdated or inaccurate information on a CMS has the potential to adversely affect traffic flow. Inaccurate, incomprehensible, or inappropriate information displayed on a CMS can also cause motorists to question the credibility and ignore all CMS messages. The CMS message should be continuously updated to display the action required by motorists, or to present essential information related to either the current or expected future roadway conditions.

The CMS can convey only a limited amount of information. When there is a need to provide extensive information to travelers, it is critical that the messages displayed are used in conjunction with other traveler information media. Agencies should follow the recommended national CMS practices related to the development, the use of text, and the manner in which messages should be displayed. A list of the key technical references that identify these recommended national practices is attached. Also, attached for your reference is a report that has summarized some of these practices.

If State and local agencies decide to use a CMS, a corresponding commitment must also be made to provide the necessary resources to effectively manage and operate each device, in-real time in response to changing roadway conditions. Agencies are strongly encouraged to develop and maintain both regional and agency specific policies, standards, and procedures that govern the operation of both permanent and portable CMSs. This framework should provide the direction related to the design, product specifications and standards, implementation, maintenance, operations manual, allowable messages, methodology used to develop messages, standard words and abbreviations, manner to display messages, and conditions or criteria that correspond to the use of specific messages.

If you need any further assistance or information related to CMSs, please contact
Mr. Jon Obenberger at (202)366-2221. For information related to the MUTCD, please contact
Mr. Ernie Huckaby at (202)336-9064.

AMBER Alert Use of Changeable Message Sign (CMS)

Memorandum

U.S. Department of Transportation
Federal Highway Administration

Subject: INFORMATION: AMBER Alert Use of Changeable Message Sign (CMS)

Date: August 16, 2002

From: Jeffrey F. Paniati /s/ ***Jeffrey F. Paniati***
Acting Associate Administrator for Operations
Acting Director, ITS Joint Program Office

Reply to Attn of: HOTM-1

To: Division Administrators

The AMBER (America's Missing: Broadcast Emergency Response) Plan Program is a voluntary program through which emergency alerts are issued to notify the public about abductions of children. The FHWA recognizes the value of the AMBER Plan Program and fully supports the State and local governments' choice to implement this program. These child abduction alerts may be communicated through various means including radio and television stations, highway advisory radio, changeable message signs (CMS), and other media. The purpose of this memorandum is to clarify the FHWA policy on the use of CMS for displaying AMBER Alert child abduction related messages. Under certain circumstances, using CMS to display child abduction messages as part of an AMBER Plan Program has been determined to be consistent with our current policy governing the use of CMS and the type of messages that are displayed.

The AMBER Plan Program encourages use of the most effective methods to communicate with the public on behalf of abducted children. We note that CMS is not always the most effective or safest method to disseminate information related to child abductions. The CMS can convey only a limited amount of information to motorists. When there is a need to provide extensive information to motorists, it is critical that other types of traveler information based media (e.g., 511, highway advisory radio, web sites, commercial radio) be used, or that the messages displayed on a CMS supplement these other media. We continue to discourage the display of general public information or other nonessential messages on CMS.

As stated in the January 19, 2001, Policy Memorandum, "**INFORMATION**: Use of Changeable Message Sign (CMS)" (www.fhwa.dot.gov/legsregs/directives/policy/pame.htm), FHWA supports the use of a CMS as a traffic control device to safely and efficiently manage traffic by informing motorists of roadway conditions and required actions to perform. It is FHWA policy that the appropriate use of a CMS and other types of real-time displays should be limited to managing travel, controlling and diverting traffic, identifying current and anticipated roadway conditions, or regulating access to specific lanes or the entire roadway. The memorandum does, however, provide for limited use of CMS for driver safety-focused messages. If driver safety- focused messages are to be displayed on a CMS, they should be kept current, be of short duration, and relate to a specific safety campaign.

If public agencies decide to display AMBER Alert or child abduction messages on a CMS, FHWA has determined that this application is acceptable only if (A) it is part of a well- established local AMBER Plan Program, and (B) public agencies have developed a formal policy that governs the operation and messages that are displayed on CMS.

(A) A local AMBER Plan Program would include written criteria for issuing and calling off an AMBER Alert, procedures on issues to coordinate with local agencies and other interests, and conforms to the recommendations of the national program (www.missingkids.org). Specific criteria for issuing an Alert and the associated procedures may include:

1. Confirmation that a child has been abducted,
2. Belief that the circumstances surrounding the abduction indicate that the child is in danger of serious bodily harm or death, and
3. Enough descriptive information about the child, abductor, and/or suspect's vehicle to believe an immediate broadcast alert will help.

(B) The formal public agency policy and procedures relating to displaying AMBER Alert or child abduction messages on CMS must address the following issues:

1. The criteria under which CMS will be used for AMBER Alerts.
2. Clear identification of the law enforcement agency responsible for issuing the alert (e.g., State police, local police department, etc.).
3. Agencies, interests, and persons to be contacted and information to be disseminated to initiate or call off an AMBER Alert.
4. Specific recognition that traffic messages, such as lane closures, fog alerts, detours, etc., are the highest priority, and circumstances under which the AMBER Alert message could or could not be displayed.
5. Length of time to display the message (should be of short duration, typically a few hours).
(Note: 4 and 5 should be defined in cooperation with the responsible law enforcement agency based on the specific circumstances of the abduction.)

(Note: 4 and 5 should be defined in cooperation with the responsible law enforcement agency based on the specific circumstances of the abduction.)

6. Geographic area over which the information is to be displayed (should be limited to a reasonable search distance that is reachable within a few hours).

7. Circumstances that would cause the discontinuation of use of the CMS if the AMBER Alert message creates an adverse traffic impact such as queues, markedly slowing of traffic, etc.

8. Format and content of the messages to be displayed. Agencies should follow the recommended national CMS practices related to the development, use of text, manner in which messages should be displayed, and how CMS are operated.

A list of references that identify these recommended national practices is attached. Additionally, the 25 agencies in the TMC Pooled Fund Study will be publishing this fall a technical reference that will provide guidance on agency policies and procedures governing CMS operation, how to develop and display messages, and how to operate CMS. Additional information about the TMC Pooled Fund Study and this project is available at: http://tmcpfs.ops.fhwa.dot.gov.

Finally, questions have surfaced on the linkage between this CMS policy and the Manual on Uniform Traffic Control Devices (MUTCD). Section 2A.07 of the MUTCD states that a CMS shall conform to the principles established in the MUTCD related to the use of signs within the right-of-way of all classes of public highways, and to the extent practical, the design and applications prescribed in Sections 2E.21 (General: Changeable Message Signs), 6F.02 (Temporary Traffic Control Zone Devices: General Characteristics of Signs), and 6F.52 (Temporary Traffic Control Zone Devices: Portable Changeable Message Signs). Through the Notice of Proposed Amendment (NPA) process FHWA is proposing revisions to the MUTCD language regarding use of driver safety-focused messages.

Questions regarding this policy statement should be directed to Mr. Jeff Lindley at (202) 366-6726. For further information regarding message content, display, and CMS operation, please contact Mr. Jon Obenberger at (202) 366-2221, or for information on the MUTCD contact Mr. Ernie Huckaby at (202) 366-9064.

Use of Changeable Message Sign (CMS) for Emergency Security Messages

Memorandum

U.S. Department of Transportation
Federal Highway Administration **ELECTRONIC MESSAGE**

Subject: INFORMATION: Use of Changeable Message Sign (CMS) for Emergency Security Messages
Date: March 21, 2003

From: Jeffrey F. Paniati /s/ ***Jeffrey F. Paniati***
Associate Administrator for Operations
Acting Director, ITS Joint Program Office
Reply to Attn of: HOTM

To: Division Administrators

The Federal Highway Administration (FHWA) recognizes the value of using changeable message signs (CMS) to convey timely and important information to motorists. State and local transportation agencies have used CMS in times of emergency to convey information to motorists, and ongoing activities related to homeland security may introduce additional opportunities to use CMS. However, messages displayed on CMS must continue to be based on good practice. The purpose of this memorandum is to provide guidance on the use of CMS for displaying emergency or security alert messages.

While CMS can be a very effective method of providing information to motorists, they can convey only a limited amount of information and may not be the safest or most effective method in many cases. Therefore, whatever messages are displayed must be readable and understandable by motorists in the amount of time that the CMS can be viewed. Factors such as prevailing travel speeds, letter height, lighting, and roadway geometrics approaching the CMS (i.e., when motorists can see the CMS) must all be considered in developing the messages to be displayed. Also the messages must consider the desired actions or response by the motorists. For example, general messages that are not related to transportation or specific emergency conditions requiring actions by motorists are discouraged. Additionally, it is unsafe to request motorists to write telephone numbers, websites, addresses, or other lengthy information while they are moving. When there is a need to provide extensive information to motorists, it is critical that other types of traveler information based media (e.g., 511, highway advisory radio, web sites) be used, or that the messages displayed on a CMS supplement these other media.

We continue to discourage the display of general public information or other nonessential messages on CMS. As stated in the January 19, 2001, Policy Memorandum, "**INFORMATION**: Use of Changeable Message Sign (CMS)" (www.fhwa.dot.gov/legsregs/directives/policy/pame.htm), FHWA supports the use of a CMS as a traffic control device to safely and efficiently manage traffic by informing motorists of roadway conditions and required actions to perform. It is FHWA policy that the appropriate use of a CMS and other types of real-time displays should be limited to managing travel, controlling and diverting traffic, identifying current and anticipated roadway conditions, or regulating access to specific lanes or the entire roadway.

If public agencies decide to display emergency or security alert messages on a CMS, FHWA has determined that this application is acceptable if public agencies have developed policies and procedures that govern the messages that are displayed on CMS and their operation. The public agency policy and procedures relating to displaying emergency or security alert messages on CMS must address the following issues:

1. The criteria under which CMS will be used for emergency or security alert messages, including the necessary coordination with public safety or security agencies. Formal policies among critical stakeholders (such as law enforcement, security, transportation, and public safety) can be used to establish these agreed upon criteria.

2. Protocols or hierarchy for prioritizing messages and determining which messages are to be displayed.

3. Geographic area over which the information is to be displayed, to be determined in cooperation with public safety and security agencies.

4. Identification of the circumstances under which transportation-related messages, such as lane closures, fog alerts, detours, or other messages that may be needed because of dangerous travel conditions in the immediate vicinity, would preempt emergency or security alert messages.

5. The criteria that would cause the discontinuation of use of the CMS if the emergency or security alert message creates an adverse traffic impact such as queues, markedly slowing traffic, etc.

6. Methodology for developing and displaying messages that are appropriate for CMS display including but not limited to standard message sets. Agencies should follow the recommended national CMS practices related to the development, use of text, manner in which messages should be displayed, human factors related to understandability of the messages, and how CMS are operated.

A list of references that identify these recommended national practices is attached. Additionally, the State transportation agencies in the Transportation Management Center (TMC) Pooled Fund Study will be publishing, this summer, a technical reference that will provide guidance on agency policies and procedures governing CMS operation, how to develop and display messages, and operate CMS. Additional information about the TMC Pooled Fund Study and this project is available at: http://tmcpfs.ops.fhwa.dot.gov.

Finally, questions have surfaced on the linkage between this CMS policy and the Manual on Uniform Traffic Control Devices (MUTCD). Section 2A.07 of the MUTCD states that a CMS shall conform to the principles established in the MUTCD related to the use of signs within the right-of-way of all classes of public highways, and to the extent practical, the design and applications prescribed in Sections 2E.21 (General: Changeable Message Signs), 6F.02 (Temporary Traffic Control Zone Devices: General Characteristics of Signs), and 6F.52 (Temporary Traffic Control Zone Devices: Portable Changeable Message Signs).

Questions regarding this policy statement should be directed to Mr. Jeff Lindley at (202) 366-6726. For further information regarding message content, display, and CMS operation, please contact Mr. Jon Obenberger at (202) 366-2221, or for information on the MUTCD contact Mr. Ernie Huckaby at (202) 366-9064.

Dynamic Message Sign (DMS) Recommended Practice

Memorandum

U.S. Department of Transportation
Federal Highway Administration

Subject: **INFORMATION and ACTION**: Dynamic Message Sign (DMS) Recommended Practice

Date: July 16, 2004

From: Jeffrey F. Paniatii
Director, HOTM-1
Associate Administrator for Operations

Reply to Attn of: HOTM-1

To: Division Administrators
Directors of Field Services
Resource Center Managers
Federal Lands Division Engineers

Over the years, transportation agencies have invested millions of dollars to acquire and install dynamic message signs (DMS) as ways to provide information to motorists en-route. Based on the numbers of DMS reported in the 2002 Intelligent Transportation Systems (ITS) deployment tracking database, at least $330,000,000 have been spent on DMS. During adverse road conditions, traffic incidents and construction the signs have been used very effectively. The DMS have also been valuable assets for child abduction (AMBER) alerts and national security messages. But, we have also seen too many instances where the DMS are underutilized or providing generic information even though traffic conditions are deteriorating. As noted in Christine Johnson's December 21, 2001, memorandum, "Congestion Ahead Messages" (enclosed for ready-reference), there are many reasons why ineffective or questionable messages are displayed. However, regardless of the underlying reasons, the public sees only an ineffectively used, expensive piece of technology.

I want to reiterate and reinforce a couple of items noted in the December 2001 memorandum. Better DMS messages, based on travel times, can be displayed with the information currently available. There is no need to wait for more complete or "full" data coverage to begin providing better information to motorists. I also ask that you raise the importance of this issue regarding effective messages on DMS in discussions with your State, and furthermore, raise the issue of providing travel time messages on DMS. Our goal should be to have travel time information as the default information available to motorists throughout the day. A "dark" or blank DMS is a transportation investment that is not being fully utilized. We should be asking why is it dark and what will it take to get travel times posted on an ongoing basis. Furthermore, no new DMS should be installed in a major metropolitan area or along a heavily traveled route unless the operating agency and the jurisdiction have the capability to display travel time messages.

Recommended Practice

An examination of databases and a sampling of locations reveal at least 12 metropolitan areas that are providing travel time messages on DMS. But at least 25 other metropolitan areas are gathering travel time data and have DMS deployed. A list of all of these metropolitan areas is attached for your reference. We want to encourage the locations that are not currently providing travel time messages on DMS to investigate doing so. Travel time messages are not appropriate for every location, but they have proven successful in regions or corridors that experience periods of recurring congestion - congestion generally resulting from traffic demand exceeding available capacity and not caused by any specific event such as a traffic incident, road construction or a lane closure. The DMS can provide dynamic travel time information instead of providing generic messages such as "congestion ahead" or "stay alert."

While travel time messages may be overridden by traffic incident or road construction messages, they can provide valuable motorist information in conjunction with the event messages, as well as after the incident or construction has been cleared if there is residual congestion. Also, special events that typically generate traffic demand that exceeds capacity - fairs, concerts, sporting events - provide additional opportunities for providing travel time information to motorists.

The areas that have been providing travel time messages have found solid public support for the messages. Their experiences have provided a number of recommendations summarized here from the guidance report referenced below.

- Seek feedback from and educate the public before starting to post travel time messages. A campaign of public awareness is critical in order for the time messages to have to have an initial positive effect. New types of messages often cause motorists to slow down, so any efforts to reduce those "surprise" effects will help motorists more easily adapt to the new messages. Also engaging the public and the media in helping determine destinations and message forms will improve the quality of service and help achieve a positive response to the messages.

- Travel times must be generated automatically and not require a human operator to manually enter travel time data. All but one of the locations surveyed that provide travel time messages use automated processes to calculate the travel times. They use different technologies to measure the traffic flow, including loop detectors, video detection systems, automatic vehicle identification transponders and toll tags. The traffic data are processed to produce travel time over specified links between identified destinations. It is important to note that effective travel time messages do not require the data to be 100% accurate. Research has indicated that data with error rates of 20% produce useful traveler information. When presenting a range of travel times on DMS the acceptable error rate may be even higher.
- As noted above, travel time messages are not appropriate for every DMS or for every hour of the day. The travel times noted on the signs must reflect reality and must change. In other words, the traffic conditions must be dynamic enough - such as in major metropolitan areas and along heavily traveled corridors - so that travel time messages are not viewed as merely static messages, which may result in credibility problems.
- Where there is a mixture of types of travelers, travel time messages can be constructed to benefit more than the local commuter. Successful practices from the Atlanta area demonstrate that a relatively simple change to local information can benefit unfamiliar travelers as well. By including the distance to the destination in addition to the travel time, even those travelers unfamiliar with the area can determine the approximate level of congestion ahead.
- Travel time messages are different than emergency messages or AMBER Alert messages where the information is unique for each occurrence. Motorists require time to comprehend the message and determine what actions, if any, are needed. Once established in an area, motorists can become accustomed to reading travel time messages, being able to understand their format and picking out the pertinent information quickly. Therefore, the guidance for constructing dynamic messages that recommends allowing one second per word can be relaxed somewhat when dealing with a knowledgeable motorist base.

Guidance Report

We have seen from the growing use of DMS for posting AMBER Alert, national security and other non-typical messages that DMS are viewed as valuable roadway "real estate" for providing information. Because of the increased use of DMS for non-typical messages over the past year, we have developed a guidance report that deals with three specific types of messages: AMBER (America's Missing: Broadcast Emergency Response) Alert messages, national security or emergency messages, and travel time messages. The report is complete and available electronically at http://www.ops.dot.gov. The goal of the report is to help ensure that DMS are used appropriately and safely, and to increase the credibility of DMS messages with motorists.

The report is based on interviews and surveys of selected States and locations to gather their successful practices when providing these types of messages. The report also drew heavily from prior research work including very recent guidance from the Transportation Management Centers Pooled Fund Study dealing with agency policies and procedures governing DMS operations. This fundamental guidance includes how to develop and display messages, and how to operate DMS. Additional information about the TMC Pooled Fund Study and this project is available at: http://tmcpfs.ops.fhwa.dot.gov.

The report notes that messages related to national security or emergencies are relatively rare and typically directed by State executives. Existing guidance for DMS operations has proven successful in most locations in ensuring that only messages relevant to motorists and requiring actions by motorists are displayed.

Regarding AMBER Alert messages, the report notes that providing AMBER Alert information on DMS is the result of requests from the law enforcement agency that is responsible for issuing the AMBER Alert. There has been significant variety in the AMBER Alert messages that have been displayed, from the "AMBER ALERT / CALL 9-1-1" message that resulted in a flood of calls to the 911 center, to the three panel display with full victim and vehicle description, license plate number, and 10-digit telephone number to call in sightings. While it may be impractical to develop specific message standards because of the variety in DMS physical design, the fundamentals of constructing dynamic messages apply. We recommend against using the phrase "AMBER Alert" as part of the message to avoid confusion with security or other types of alerts that may be posted; however, we do suggest that when the size of the DMS permits, "AMBER" be included with the message to take advantage of the national branding resulting from the national AMBER Alert program. An example message might read, "AMBER CHILD ABDUCTION" or "AMBER ABDUCTION." Also, because of the limited amount of information that can be safely conveyed by the DMS, AMBER Alert messages should direct the public to other information sources where they can get more details. Examples of other sources include local media, highway advisory radio and 511 travel information telephone services. But even when used in cooperation with other information sources, it is valuable to include some minimal but specific information about the suspect vehicle so that motorists who do not have immediate access to the other information sources can still provide assistance toward recovering abducted children. The license plate number is suggested as the most useful specific information for identifying suspect vehicles.

Conclusion

As stated in the January 19, 2001, Policy Memorandum, "Use of Changeable Message Sign (CMS)" (www.fhwa.dot.gov/legsregs/directives/policy/pame.htm) and reiterated by subsequent policy memorandums in 2002 ("AMBER Alert Use of Changeable Message Sign" - http://www.fhwa.dot.gov/legsregs/directives/policy/ambermemo.htm) and 2003 ("Use of Changeable Message Sign for Emergency Security Messages" - http://www.fhwa.dot.gov/legsregs/directives/policy/securmemo.htm), FHWA supports the use of dynamic message signs as traffic control devices to safely and efficiently manage traffic by informing motorists of roadway conditions and required actions to perform.

It is FHWA policy that the appropriate use of DMS and other types of real-time displays should be limited to managing travel, controlling and diverting traffic, identifying current and anticipated roadway conditions, or regulating access to specific lanes or the entire roadway. But it is also important that these assets and investments be used more effectively to provide motorists with meaningful and useful information. Providing travel time information is an excellent method of notifying motorists about current conditions in a manner that can be easily interpreted and understood.

If you have any questions or need further information, please contact Bob Rupert at (202) 366-2194 or Robert.Rupert@fhwa.dot.gov.

Appendix G – CALTRANS POLICY MEMORANDA

Caltrans AMBER Alert Policy

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: **CHIEF DEPUTY DIRECTOR**
DEPUTY DIRECTORS
DISTRICT DIRECTORS
DIVISION CHIEFS
PROGRAM MANAGER

Date: **August 2, 2002**

File:

From: DEPARTMENT OF TRANSPORTATION
TRAFFIC OPERATIONS

Subject: New Interim Policy Regarding Use of CMS Signs for Child Abduction (AMBER) Alert Messages

Attached is a new Interim Policy regarding the use of Changeable Message Signs (CMS) for child abduction (AMBER) alert messages.

AMBER is American Missing Broadcast Emergency Response. Caltrans policy is to display only real-time information that conveys current traffic safety and congestion information on CMS. An exception to this policy will be made only for AMBER alerts requested from the CHP

Districts TMC's staff are to consult with local CHP and make joint decisions regarding message content(s) and length of time of display.

This Interim Policy is consistent with COM Nets issued to CHP staff.

CALTRANS AMBER ALERT POLICY

Caltrans Policy regarding the use of CMS signs for child abductions (AMBER) alert messages

A primary mission of the department is the safe and orderly movement of traffic. It is the policy of Caltrans to display only real-time information that conveys current traffic safety and congestion information on Highway Changeable Message Signs (CMS).

An exception to Caltrans policy on the use of CMS signs will be made only for AMBER Alerts. Only credible real-time information, where it is crucial to the safety of the victim to disseminate the information to the public in the near term, will be displayed on these CMS signs. Law enforcement activates an Amber Alert when circumstances meets the following criteria: the missing child is of a pre-determined age; the law enforcement agency believes the child has been kidnapped; the agency believes the missing child is under threat of serious bodily harm or death.

The CHP will consult with the investigating agency prior to requesting any CMS sign activation. Caltrans will only respond to AMBER alert requests from the CHP. District TMC staff and local CHP staff shall jointly agree upon the most appropriate CMS sign message content(s). TMC staff shall also consult with CHP staff regarding the length of time to display messages (initially 2-3 hours), and extent of roadway system to display the messages (i.e. radius and/or directions and specific routes).

TMC personnel should discuss with the requester the limitations on message content, the number of signs that can be deployed within a given time period, conflicts with other necessary sign messages etc. There is a concern that messages that are too general in describing vehicles might result in inappropriate vigilantism. The preferred response is to display a radio frequency (thus referring the public elsewhere for details) - Caltrans Highway Advisory Radios (HAR) or appropriate commercial radio. Alternatively, a license plate number (or partial number) might be displayed along with a vehicle description. The display of any contact phone number is discouraged.

Nothing in this policy suggests a requirement to pre-empt true motorists safety messages, e.g. unexpected “end of queue” motorist alerts, severe weather advisories (fog, smoke), road closure and detour information etc. It may be necessary to turn off an AMBER alert sign that creates a traffic hazard.

This Policy primarily applies to the use of permanently installed overhead CMS signs. Should the use of mobile CMS signs be necessary and appropriate at a specific location(s); Caltrans can expect CHP assistance with mobile sign deployment as needed. TMCs should notify the Caltrans HQ Communications Center when responding to an AMBER alert request. TMCs should monitor and save traffic data in order to determine if unintended consequences of displaying such a message occurred on the highway. A joint debriefing of Caltrans and CHP personnel shall follow every event.
In all cases, messages shall maintain the credibility of the CMS system.

Caltrans/CHP Blue Alert JOPS

DEPARTMENT OF TRANSPORTATION

AND

CALIFORNIA HIGHWAY PATROL

Joint Operational Policy Statement

Blue Alert Activation

GENERAL.

The California Department of Transportation (Caltrans) and the California Highway Patrol (CHP) have developed several special programs that increase safety and provide service to motorists. Safety is a primary concern for both agencies, and is central to the mission of each department. This policy statement discusses the use of the Changeable Message Signs (CMS) to support Blue Alerts and specifies the responsibilities of the two departments.

Section 8594.5 of the California Government Code requires the CHP to issue a Blue Alert upon the request of an authorized person at a law enforcement agency that is investigating an offense in which all of the following conditions are met:

1. A law enforcement officer has been killed, suffers serious bodily injury, or is assaulted with a deadly weapon, and the suspect has fled the scene of the offense.

2. A law enforcement agency investigating the offense has determined that the suspect poses an imminent threat to the public or other law enforcement personnel.

3. A detailed description of the suspect's vehicle or license plate is available for broadcast.

4. Public dissemination of available information may help avert further harm or accelerate apprehension of the suspect.

BLUE ALERT CMS ACTIVATIONS.

The CHP's Emergency Notification and Tactical Alert Center (ENTAC) has the responsibility for issuing Blue Alerts in order to solicit help from the public in the safe and swift apprehension of violent suspects who have killed or seriously

injured law enforcement officers and who continue to pose a threat to public safety. To assist in performing this duty, the CHP and Caltrans have agreed to activate the CMS in the area of the offense and in areas where the suspect vehicle is likely to be located.

Upon issuing a Blue Alert, ENTAC will contact the Transportation Management Center (TMC) in the district where the offense occurred and the TMCs in the districts they believe the suspect(s) may be fleeing towards and request activation of the CMS. The ENTAC will provide the TMC with the vehicle description, the license plate information, the location of the incident, and the direction the suspect(s) were last known to be heading.

The CHP and Caltrans have agreed on standard content and format for Blue Alert CMS messages. Any variation to the agreed format shall be jointly approved prior to Caltrans activating the CMS.

When the signs have been activated, Caltrans will notify ENTAC. The Blue Alert message may be preempted by Caltrans on specific signs when traffic conditions warrant posting of traffic management messages. Unless amplifying information is provided by ENTAC, Caltrans will discontinue the Blue Alert message on the CMS three hours after the message is first displayed. When ENTAC deactivates the Blue Alert, ENTAC personnel will immediately contact Caltrans and advise the message can be terminated

If Caltrans is contacted by a law enforcement agency other than the CHP for CMS activation, the call will be immediately forwarded to ENTAC for consideration.

For each Blue Alert in which a CMS is activated, the CHP will provide a copy of an after action report that contains at a minimum the statement that the suspect(s) were or were not apprehended due to a tip from a motorist who saw the CMS message.

MALCOLM DOUGHERTY, Acting Director
California Department
of Transportation

4/2/2012
Date

J. A. Farrow

JOSEPH A. FARROW, Commissioner
Department of California
Highway Patrol

4-19-12
Date

Use of PCMS in Workzones

State of California | Business, Transportation and Housing Agency

Memorandum

To : **ALL DISTRICT TRAFFIC, CONSTRUCTION, AND DESIGN ENGINEERS**

Date : February 16, 1993

File No. :

From : **DEPARTMENT OF TRANSPORTATION**
Division of Traffic Operations

Subject : Use and Placement of Portable Changeable Message Signs in Work Zones

Attached is an excerpt from a "Report to the Legislature" dated July 1991 which proposed numerous recommendations for improving safety in work zones. The report was the result of a multi-disciplinary committee comprised of members from various California Department of Transportation' (Caltrans) Divisions, the California Highway Patrol, member Unions, industry, Cal-OSHA, etc.

Recommendation (A-l-f.) was proposed to increase the use of Portable Changeable Message Signs (PCMS) in maintenance and construction work zones. The object is to improve motorist guidance through and around Caltrans' work zones as effectively as possible by use of PCMS placed2 at carefully selected locations. The PCMS should be placed in advance of locations where traffic queues and delays can be anticipated due to construction activities and/or potential accidents within the work zone. It may even be necessary to increase the project limits to provide for the placement of PCMS, or even possibly supplemental static signing. They should be placed at strategic locations i.e., freeway interchanges, exit ramps, etc., to inform motorists of the conditions ahead and allow (or recommend) voluntary diversion from the system.

PCMS are one of the best methods available for giving real-time information to motorists, especially when conditions are subject to rapid change. Consideration for their use should be addressed in early project development stages, and included in the Traffic Management Plans. Resident Engineers who identify PCMS needs on ongoing projects could incorporate them through contract change order.

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ALL DISTRICT TRAFFIC, CONSTRUCTION
AND DESIGN ENGINEERS
February 16, 1993
Page 2

This memorandum has been discussed with the Division of Construction and they concur with its content. If you have any questions regarding any of the above you can call Mr. Fred Jager, of my staff, at 8-464-5528.

P. R. Lowden Jr.
P. Chief
Division of Traffic Operations

Attachment

Use of CMS for Work Zones

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: DISTRICT DIRECTORS
DEPUTY DISTRICT DIRECTORS

Date: August 25, 2011

From: RICHARD D. LAND
Acting Chief Deputy Director

Subject: **Use of Changeable Message Signs for Work Zones (Revised)**

Recent California Department of Transportation (Caltrans) highway worker fatalities have demonstrated the need for additional safety measures to help protect our employees. I want to emphasize that the use of changeable message signs (CMSs) to inform motorists they are approaching a Caltrans work zone can be invaluable. Using these signs will improve communication to the public and encourage them to slow down when they approach active work zones. This protocol does not apply to construction work zones. Construction has existing standards for CMS usage.

The following protocol should be used to display work zone messages on CMSs in advance of work zones:

1. Caltrans district staff should coordinate with their field staff and notify the Transportation Management Center (TMC) managers of estimated beginning and ending work times and locations where permanent CMSs should be activated (see attached TMC contact list).

2. Immediately prior to setting up a work zone, Caltrans field staff should notify the TMC that they are about to begin work to ensure that the CMSs are activated prior to the commencement of work.

3. TMC staff should consider using additional CMSs at decision points upstream of the work zone to indicate slow traffic ahead and suggest detours. These additional signs should help reduce the volume of travelers passing the work zone.

4. Permanent CMSs should only be activated for Caltrans work zones when Caltrans staff will be working at a location longer than one hour and only when workers are present.

5. Use of permanent CMSs for Caltrans work zones should be considered only when a sign is located five miles or less in advance of an active work zone.

6. Caltrans field staff should inform the TMC when work is completed and workers have cleared the work zone in order to deactivate the CMSs in a timely manner.

"Caltrans improves mobility across California"

DISTRICT DIRECTORS et al.
August 25, 2011
Page 2 of 3

7. **Permanent CMSs** posted in advance of Caltrans work zones should display the following message:

WORK ZONE AHEAD
WATCH FOR
HIGHWAY WORKERS

8. **Portable CMS** should be placed within one mile of the work area with the following two-phase message:

(Phase 1) WORK
ZONE
AHEAD

(Phase 2) WATCH
FOR
WORKERS

9. The worker safety message on permanent CMSs should be preempted when the signs are needed for emergency notifications, AMBER alerts, incidents, and major closures. Since Caltrans fieldwork normally is not scheduled during peak commute times, travel time usually will be placed on a CMS during those peak commute times. However, if urgent or emergency work requires land closures during peak commute times, the worker safety message should be placed on the CMS. When there are multiple demands for different messages on the CMS, the message priority should be discussed with the TMC Manager. TMC staff will do everything they can to display the safety message on the CMS in order to slow down drivers as they enter a work zone or to provide alternate route information so drivers can avoid the work zone.

This protocol will be incorporated into the appendices of the next revision of Caltrans *Changeable Message Sign Guidelines*, expected to be published in the next six months.

The goal is to create a safer work environment for all highway workers that are in temporary work zones and are vulnerable to vehicles that drive past them.

For more information about using CMSs, please contact Diana Gomez, chief or the Office of System Management Operations in the Division of Traffic Operations, ad (916) 651-1255 or via Internal e-mail.

Thank you for your efforts to create the safe work environment our employees deserve.

Attachment

"Caltrans improves mobility across California"

Attachment Deleted

Appendix H – BIBLIOGRAPHY

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Note: *Every attempt was made to cite reference sources used for this document. Please accept our apology if we overlooked any sources. For questions, please contact the Headquarters CMS Coordinator at (916) 654-6104.*

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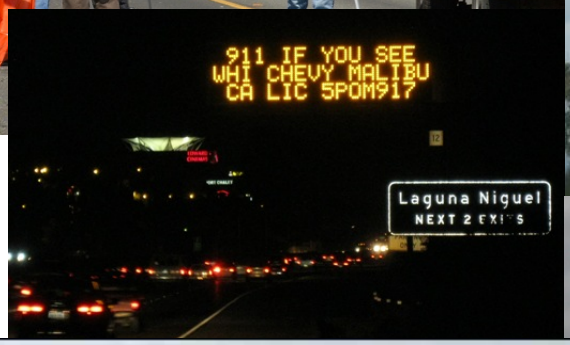

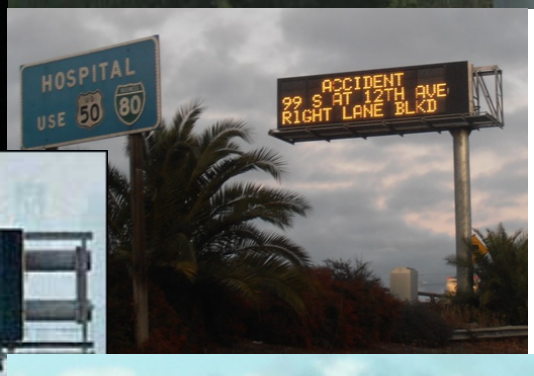

State of California

California State Transportation Agency

Department of Transportation