

TRAFFIC AND SAFETY MANUAL

Chapter 2 - Signing

2 F – Permanent Changeable Message Signs

General

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The section on Permanent Changeable Message Signs consists of four parts. The first two contain general information and guidelines (policy issues) for CMS usage. The third one, [2F-3, Operating Fundamentals](#) and the fourth one, [2F-4, Message Design](#), contain the specifics of operating permanent changeable message signs. Most of the information in this section is based on the Federal Highway Administration Technical Report [Guidelines for Changeable Message Sign Messages Manual](#) published in preliminary form in September of 2002. Other sources of information are the incident management plans for the Des Moines and Davenport urbanized areas.

Introduction

Road signs exist to communicate information to motorists. Static guide signs are permanent and are limited to presenting information that is largely "geographically linked." Changeable message signs (CMSs), sometimes referred to as variable message signs or dynamic message signs, can present up-to-the-moment traffic information.

CMSs are programmable traffic control devices that can usually display any combination of characters to present messages to motorists. These signs are permanently installed above or on the side of the roadway. When installed, CMSs become a part of the total motorist information system so the placement of the signs and the information presented must be consistent and compatible with static signs used on that section of highway.

Purpose

The purpose of a CMS is to provide real-time traffic advisory and route guidance information to road users. The specific information conveyed on a CMS may relate to traffic management, incident management or environmental conditions. These signs are used to provide information as far in advance of a condition or situation as is reasonable to give road users a chance to react and take action that they deem appropriate for their needs. CMS effectiveness is dependent on providing information that is timely, accurate and reliable.

CMSs perform a critical role on freeways. They can furnish motorists with real-time information that warns them of a problem and a suggested course of action, improving motorist safety and reducing traffic congestion and delay. They can also be used to manage traffic by displaying advisory and alternative route messages prior to preplanned activities.

Warning Messages

Warning messages give motorists notice of incidents and are effective in reducing secondary crashes. When used in conjunction with freeway work zones, early warning messages also give notice of new detours, changes in detour route, changes in lane patterns, special speed control measures, etc.

Advisory Messages

Advisory messages provide motorists with useful information about a specific problem along their route. This information allows motorists to change their speed or path in advance of the problem area, or may encourage them to voluntarily take an alternative route to their destination.

Alternative Route Messages

Alternative route messages influence motorists to travel to their chosen destination by using different routes than originally intended. The alternative route is one designated by the transportation agency. In cases when the freeway is physically closed as a result of construction, crash, or natural disaster, the motorists are notified that an alternative route must be used.

Benefits

Benefits of use of permanent changeable message signs include:

- Reduction of speeds as vehicles approach incidents, resulting in fewer secondary crashes.
- Increased diversion from primary routes during downstream incidents.
- Increased lane changes away from lanes that are closed downstream.
- Improved traffic operations during special events.
- Improved traffic operations during maintenance and construction activities.

Location

The most critical locations for installing permanent CMSs are in advance of interchanges or highways where drivers can have the opportunity to take action in response to messages displayed on CMSs. A CMS should not compete with existing roadway signs. At times, relocation of some static signs may be required in order to install a CMS at a critical location.

In general, permanent CMSs should be installed at the following types of locations:

- Upstream from major decision points such as exit ramps, freeway-to-freeway interchanges, or intersection of major routes that will allow drivers to take an alternate route.
- Upstream of bottlenecks, high-accident areas, and/or major special event facilities such as stadiums and convention centers.
- Where information concerning unusual weather conditions such as fog or frost caused by a nearby industrial plant is essential.

Credibility

Changeable message signs must provide timely, reliable, accurate and relevant information and they must be operated properly to be effective. Credibility is an extremely important consideration in properly operating a CMS system. Regardless of how well a message is designed, motorists will eventually come to distrust the signing system if the messages are not changed at the correct times and updated to reflect current traffic conditions. Each time the information displayed is disproved, the credibility of the system decreases. Eventually the messages are ignored and the CMS system is in jeopardy.

There are at least eight reasons why message credibility suffers:

- Information is *inaccurate* (e.g., a crash is observed at a different location than displayed on a CMS).

- Information is **not current** (e.g., the message is not consistent with current conditions).
- Information is **irrelevant** to essentially all motorists using that facility.
- Information is **obvious** by inspection, and hence, is redundant (e.g., displaying *HEAVY CONGESTION* when motorists are driving bumper to bumper in peak traffic).
- Information is **repetitive** (the message is the same each morning when motorists pass the sign). Displaying the same information on a CMS each day for recurrent congestion can result in many motorists ignoring the CMS after a time. When an important message is displayed that will impact their trip, the motorists may not read the message.
- Information is **trivial** (e.g., *DRIVE CAREFULLY*, *SUPPORT YOUR LOCAL RED CROSS*, time and temperature). Displaying trivial information can result in many motorists, particularly commuters, ignoring the messages that have no direct impact on their trips and consequently will begin ignoring the CMS. When an important message is displayed that will impact their trip, the motorists may not read the message.
- Information is **erroneous** and can be easily checked and disproved. Traffic speeds and time to reach a destination are examples of information that can be easily disproved. Delay time is more difficult to disprove by motorists.
- Messages are **poorly designed**. The information is poorly structured resulting in messages that are difficult to read and comprehend, or are confusing. The messages may also contain misspelled words.

Application

Permanently mounted CMSs are used primarily for the following applications:

- **Non-recurrent problems** – Caused by random, unpredictable incidents such as crashes, stalled vehicles, spilled loads; or caused by temporary, preplanned activities such as construction, maintenance, or utility operations.
- **Environmental problems** – Caused by acts of nature such as fog, floods, ice, snow, etc.
- **Special event traffic problems** – Problems associated with special events (e.g., ballgames, parades, etc.).

Permanently mounted CMSs are used secondarily for the following applications:

- **Advance notice** – to inform repeat users of upcoming events such as roadwork or special event traffic that will reduce capacity or increase traffic, encouraging diversion to other routes.
- **AMBER Alerts** – to supplement law enforcement efforts to recover abducted children.
- **Driver safety campaigns** – to supplement driver safety media campaigns on the same topic.

Changeable message signs shall not be used to advise motorists of normal daily recurrent peak period traffic congestion conditions.