CHAPTER M2

Signs

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M2.01 Introduction

M2.01.01 Chapter Content and Resources

This chapter contains information relevant to all work performed to maintain permanent and temporary signs (excluding Construction Area Signs) placed on the State Highway System for the purpose of communicating rules, warnings, guidance, and other highway information.

This chapter provides an overview of policies, expectations, and strategies regarding Signs. For additional information and a complete description of materials, applications, and recommended highway maintenance strategies please see the following references:

Authorized Materials Lists (AML): https://dot.ca.gov/programs/engineering-services/authorized-materials-lists

California Manual on Uniform Traffic Control Devices (MUTCD): https://dot.ca.gov/programs/safety-programs/camutcd/camutcd-files

- Part 2 – Signs
- Part 7 – Traffic Control for School Areas

California MUTCD Sign Charts, contains commonly used signs in California: https://dot.ca.gov/programs/safety-programs/sign-charts

California Sign Specification Updates: https://dot.ca.gov/programs/safety-programs/sign-specs/updates

California Vehicle Code: Codes: Codes Tree - Vehicle Code - VEH (ca.gov)

Code of Safe Operating Practices: Manuals and Reference | Maintenance (ca.gov)

Employee Safety Manual, Authoritative source of information to assist personnel in their efforts to conduct Caltrans business in a safe and healthy manner consistent with applicable law, rule, policy, or regulation: https://hs.onramp.dot.ca.gov/employee-safety-manual-online

Level of Service Intranet Page: https://maintenance.onramp.dot.ca.gov/roadsidemgmt/level-service

Maintenance Program Strategic Plan (2022-2027): Strategic Plan 2022–2027 (ca.gov)

Standard Plans/Revised Standard Plans: https://dot.ca.gov/programs/design

Standard Specifications/Revised Standard Specifications: https://dot.ca.gov/programs/design

- Section 12 – Temporary Traffic Control
- Section 82 – Signs and Markers

Traffic Operations Policy Directive 14-02 Revision 1 - Overhead and Roadside Signs Policy on the State Highway System: https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/f0018451-14-02-rev1-a11y.pdf

M2.01.02 Definitions

DME – District Maintenance Engineer
DTO – District Traffic Operations
E-FIS – Enterprise Resource Planning Financial Infrastructure
FHWA – Federal Highway Administration
HM – Highway Maintenance
IMMS - Integrated Maintenance Management System
LOS – Level of Service
MUTCD - Manual on Uniform Traffic Control Devices
SHS – State Highway System
SHOPP – State Highway Operations and Protection Plan
SIO – Sign Installation Order
TTC – Temporary Traffic Control
VEH – California Vehicle Code (Previous abbreviation of CVC)

Definitions from California MUTCD Section 1A.13, "Definitions of Headings, Words, and Phrases in this Manual" referenced in this chapter:

Delineator: A retroreflective device mounted on the roadway surface or at the side of the roadway in a series to indicate the alignment of the roadway, especially at night or in adverse weather.

Detectable*:* Having a continuous edge within 6 inches of the surface so that pedestrians who have visual disabilities can sense its presence and receive usable guidance information.

Flashing: An operation in which a light source, such as a traffic signal indication, is turned on and off repetitively.

Freeway: A divided highway with full control of access. As per CVC 332, "Freeway" is a highway in respect to which the owners of abutting lands have no right or easement of access to or from their abutting lands or in respect to which such owners have only limited or restricted right or easement of access.

Guide Sign: —A sign that shows route designations, destinations, directions, distances, services, points of interest, or other geographical, recreational, or cultural information.

Highway: A general term for denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way. As per CVC 360, "Highway" is a way or place of whatever nature, publicly maintained and open to the use of the public for purposes of vehicular travel. Highway includes street. Also, refer to CVC 590 definition of "Street".

Overhead Sign: A sign that is placed such that a portion or the entirety of the sign or its support is directly above the roadway or shoulder such that vehicles travel below it. Typical installations include signs placed on cantilever arms that extend over the roadway or shoulder, on sign support structures that span the entire width of the pavement, on mast arms or span wires that also support traffic control signals, and on highway bridges that cross over the roadway.

Pedestrian: A person on foot, in a wheelchair, on skates, or on a skateboard. As per CVC 467, (a) A "pedestrian" is a person who is afoot or who is using any of the following: (1) A means of conveyance propelled by human power other than a bicycle. (2) An electric personal assistive mobility device. (b) "Pedestrian" includes a person who is operating a self-propelled wheelchair, motorized tricycle, or motorized quadricycle and, by reason of physical disability, is otherwise unable to move about as a pedestrian, as specified in subdivision(a).

Pedestrian Facilities: A general term denoting improvements and provisions made to accommodate or encourage walking.

Private Road Open to Public Travel*:* Private toll roads and roads (including any adjacent sidewalks that generally run parallel to the road) within shopping centers, airports, sports arenas, and other similar business and/or recreation facilities that are privately owned, but where the public is allowed to travel without access restrictions. Roads within private gated properties (except for gated toll roads) where access is restricted at all times, parking areas, driving aisles within parking areas, and private grade crossings shall not be included in this definition. The MUTCD national standard and Caltrans standards and specifications for traffic control devices shall not be applicable to privately owned and maintained roads or commercial establishments, unless the particular city or county enacts an ordinance or resolution to this effect. Refer to CVC Sections 21100, 21100.1, 21107, 21107.5, 21107.6, and 21107.7.

Regulatory Sign: A sign that gives notice to road users of traffic laws or regulations.

Retroreflectivity: A property of a surface that allows a large portion of the light coming from a point source to be returned directly back to a point near its origin.

Right-of-Way [Assignment]: The permitting of vehicles and/or pedestrians to proceed in a lawful manner in preference to other vehicles or pedestrians by the display of a sign or signal indications.

Road: See Roadway.

Road User: A vehicle operator, bicyclist, or pedestrian, including persons with disabilities, within the highway or on a private road open to public travel (see definition of private road open to public travel).

Roadway: That portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used in this Manual shall refer to any such roadway separately, but not to all such roadways collectively. Refer to CVC 527.

School: A public or private educational institution recognized by the state education authority for one or more grades K through 12 or as otherwise defined by the State.

School Zone: A designated roadway segment approaching, adjacent to, and beyond school buildings or grounds, or along which school related activities occur. As per CVC 22352(a)(2)(B) When approaching or passing a school building or the grounds thereof, contiguous to a highway and posted with a standard "SCHOOL" warning sign, while children are going to or leaving the school either during school hours or during the noon recess period. The prima facie limit shall also apply when approaching or passing any school grounds which are not separated from the highway by a fence, gate, or other physical barrier while the grounds are in use by children and the highway is posted with a standard "SCHOOL" warning sign.

Sidewalk: That portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements of private property that is paved or improved and intended for use by pedestrians. As per CVC 555, "Sidewalk" is that portion of a highway, other than the roadway, set apart by curbs, barriers, markings or other delineation for pedestrian travel.

Sign: Any traffic control device that is intended to communicate specific information to road users through a word, symbol, and/or arrow legend. Signs do not include highway traffic signals, pavement markings, delineators, or channelization devices.

Sign Illumination: Either internal or external lighting that shows similar color by day or night. Street or highway lighting shall not be considered as meeting this definition.

Sign Legend: All word messages, logos, pictographs, and symbol and arrow designs that are intended to convey specific meanings. The border, if any, on a sign is not considered to be a part of the legend.

Sign Panel*:* A separate panel or piece of material containing a word, symbol, and/or arrow legend that is affixed to the face of a sign.

Signing: Individual signs or a group of signs, not necessarily on the same support(s), that supplement one another in conveying information to road users.

Speed: Speed is defined based on the following classifications:

a) Average Speed: The summation of the instantaneous or spot-measured speeds at a specific location of vehicles divided by the number of vehicles observed.
b) Design Speed: A selected speed used to determine the various geometric design features of a roadway.
c) 85th-Percentile Speed: The speed at or below which 85 percent of the motor vehicles travel.
d) Operating Speed: A speed at which a typical vehicle or the overall traffic operates. Operating speed might be defined with speed values such as the average, pace, or 85th-percentile speeds.
e) Pace: The 10 mph speed range representing the speeds of the largest percentage of vehicles in the traffic stream.

Speed Limit: The maximum (or minimum) speed applicable to a section of highway as established by law or regulation.

State Highway: Any highway owned and operated by Caltrans.

Street: See Highway. As per CVC 590, "Street" is a way or place of whatever nature, publicly maintained and open to the use of the public for purposes of vehicular travel.

Symbol: The approved design of a pictorial representation of a specific traffic control message for signs, pavement markings, traffic control signals, or other traffic control devices, as shown in the MUTCD.

Traffic: Pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using for purposes of travel any highway or private road open to public travel (see definition of private road open to public travel). As per CVC 620, the term "traffic" includes pedestrians, ridden animals, vehicles, street cars, and other conveyances, either singly or together, while using any highway for purposes of travel.

Traffic Control Device: A sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, private road open to public travel (see definition of private road open to public travel), pedestrian facility, or shared-use path by authority of a public agency or official having jurisdiction, or, in the case of a private road open to public travel (see definition of private road open to public travel), by authority of the private owner or private official having jurisdiction.

Vehicle: Every device in, upon, or by which any person or property can be transported or drawn upon a highway, except trains and light rail transit operating in exclusive or semi-exclusive alignments. Light rail transit equipment operating in a mixed-use alignment, to which other traffic is not required to yield the right-of-way by law, is a vehicle. As per CVC 670, a "vehicle" is a device by which any person or property may be propelled, moved, or drawn upon a highway, excepting a device moved exclusively by human power or used exclusively upon stationary rails or tracks.

Warning Sign: A sign that gives notice to road users of a situation that might not be readily apparent.

Worker: A person on foot whose duties place him or her within the right-of-way of a street, highway, or pathway, such as street, highway, or pathway construction and maintenance forces, survey crews, utility crews, responders to incidents within the street, highway, or pathway right-of-way, and law enforcement personnel when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and disasters within the right-of-way of a street, highway, or pathway.

M2.01.03 References and Hyperlinks

Some of the references found in this chapter have hyperlinks that connect to the Caltrans intranet pages which are not displayable to the public. Until such time that the specific reference becomes available on the internet, the user will have to contact their district maintenance engineer or the appropriate Headquarters division to inquire about the availability of the reference.

M2.01.04 Chapter Contact

This chapter of the Maintenance Manual is maintained by Division of Maintenance, Office of Maintenance Traffic Guidance and Safety.

M2.02 Overview

M2.02.01 What is a Sign

Sign maintenance covers the maintenance of permanent signs placed on the State Highway System (SHS) to provide, warnings, and guidance information for road users. Signs must be maintained to help meet the needs of road users make good decisions. Signs not properly maintained present a poor appearance and have diminished effectiveness in authority as traffic control devices. Maintenance of signs includes repairing and/or replacing failed or damaged signs or posts with approved materials.

M2.02.02 Reporting Requirements

Only permanent regulatory, warning, and guide sign needs are to be reported to the M4 Family for recording in the Integrated Maintenance Management System (IMMS). All operational snow signs (including signs within roadside rest areas, park and ride lots, weigh stations, etc.), and construction zone signs are to be reported to the appropriate Family in the IMMS. Electrical work on signs is to be reported in the K Family. Complete Charging practice instructions for all Families can be found in the Volume 2 of the Maintenance Manual.

The Division of Maintenance has established “Activities” by Family identifying types of work performed, units of production, costs of work, and any E-FIS Project Code or an IMMS Project Code requirement. Management decisions are often based on analyses of the coded entries. Therefore, special care should be taken to assure that the coded information entered by Maintenance personnel in the IMMS is accurate.

When a sign is replaced, the new sign must essentially be the same as the one it is replacing to qualify for Maintenance funding. New installations, if performed by Maintenance or replacement signs that are new in shape, size, or message, or upgrades, shall be charged to improvement allocations, and must be authorized by a Sign Installation Order (SIO) issued by District Traffic Operations. New installations are considered work for others and are charged through the Y Family; see Volume 2, Chapter Y of the Maintenance Manual for details.

M2.02.03 Responsibility

Permanent signs should be installed by persons who are trained. Sign materials are relatively delicate and are easily damaged. An untrained person may not know proper methods of transporting or displaying sign messages, protecting sign materials, or using equipment to safely complete the installation.

New installations are not to be performed without approval of District Traffic Operations. Temporary signs required by unusual conditions or restrictions may be installed without an SIO from District Traffic Operations. However, such temporary signs shall be removed or covered immediately when those conditions cease to exist, or restrictions are withdrawn.

Sign Installation Orders should show location of the sign, type of sign, type of material, type of support, size of letters, and color. Questions regarding SIOs should be directed to District Traffic Operations.

Work with the District Traffic Operations for the latest chart of approved compliant signs.

The Office of Structures Maintenance and Investigation, Division of Maintenance, has inventory of overhead and changeable message signs and provides periodic engineering investigations. Sign numbers in the overhead sign inventory are assigned by the district. The district is responsible for maintenance of overhead signs and sign structures including both routine and special work recommended by the Office of Structures Maintenance and Investigation.

Snow removal activities can damage signs. It is important to avoid damaging signs and to repair or replace damaged signs.

In general, the California Department of Transportation (Caltrans) is responsible for installing and maintaining permanent signs on State highways within incorporated cities or counties. When maintenance agreements are in place for signs within incorporated cities or counties, districts should coordinate the installation and maintenance of warning and regulatory signs with cities and counties equipped to do the work. However, the responsibility for assuring that these signs are adequately maintained remains with Caltrans.

Maintenance of "Trailblazer" signs, which direct traffic on city or county streets and roads to the SHS, may be performed by local jurisdictions or with State forces. Caltrans, however, has the ultimate responsibility for maintenance of such signs placed by the SHS.

Caltrans will normally not install or pay for the installation of parking regulatory signs within cities or counties. These signs are usually placed to inform the motoring public of ordinances and police regulations within the local agency and may have little to do with operation of the State facility.

Caltrans is frequently called upon to install signs for private parties, including STOP signs for subdivisions, directional signs for golf clubs, and so forth. Other State agencies, cities and counties also request signs. All such requests are referred to District Traffic Operations. An encroachment permit will be required before work is performed for, or by, others. Costs are billed to the requesting party.

Maintenance of signs placed off the highway right-of-way may be an obligation of Caltrans when the sign is primarily placed for protection of traffic on the State facility. Examples are the R3-1 STOP AHEAD signs placed on roads approaching the State highway. It is standard practice for Caltrans to fund initial installation, and maintains such signs for existing road, after obtaining necessary permission from the local agencies involved.

Where a new entrance to a State highway is provided under an encroachment permit, the other agency will be responsible for initial installation of the signs. The signs will be maintained by Caltrans in the future.

Districts are responsible for the placement and maintenance of limit lines (stop bars) at both existing and new paved approaches to a State highway. A STOP pavement marking should also be placed and maintained when directed by District Traffic Operations. Districts will coordinate the work of the sign and stencil crews for these installations.

When STOP signs are replaced, the markings and striping associated should be coordinated so that permanent STOP signs have corresponding markings and Limit Line. For requirements on Limit Lines, see Volume 1, Chapter M1 of the Maintenance Manual.

Any unauthorized sign placed on the highway right-of-way constitutes a public nuisance and shall be removed.

Before relinquishment of any State route to a local agency, all signs must be in good repair.

Statutes providing for relinquishment exempt only the U.S., interstate, county, and State route shields that are to be removed prior to the time the route is actually turned over to the local authorities.

M2.02.04 Sign Materials

Specifications/materials for signs are the responsibility of Offices of Traffic Operations and only approved materials must be used. For approved materials, refer to Authorized Materials Lists (AML), provided in Section M2.01.01 of this chapter.

New materials must be approved before being used. Approval must come from the Traffic Devices New Products Committee.

This committee evaluates products before general use to assure that proposed materials provide adequate performance. In cooperation with the Office of Materials Engineering and Testing Services, the committee also evaluates the service life potential of new products. The Office of Bridge Design and/or the Office of Design and Technical Services, Division of Engineering Services, are responsible for structural design of the sign and supporting structure.

Materials used in the manufacture of signs serve three basic functions:

(A) Sign substrates provide stiffness as well as a suitable surface for background materials such as retroreflective sheeting. Most current sign substrates are made of aluminum with a single thickness. Other substrates use aluminum sheet for front and back surfaces with a paper core in between, forming a "sandwich" type laminated panel. Steel was used as substrate material for many of the older overhead signs. Substrates such as plywood may be used for special applications but are not approved for general use.

(B) Sign background provides a colored surface, which contrasts with the sign, message (legend) and border allowing road users to clearly read and understand the meaning of the sign message. The background also serves to attract attention of road users. Background colors are coded to explain the primary purpose of the message. Background materials for all warning, regulatory, guide and construction signs are made of retroreflective sheeting.

(C) Sign legends convey the message while borders outline the message making it more visible to road users. Sign legends and borders are retroreflective for most guide, service, and recreational signs. Warning, regulatory and construction signs generally utilize black non-reflectorized, legends and borders.

Type of posts used to replace roadside sign posts can either be wood, steel (metal), or laminated wood.

The following notation is usually stamped on the lower right side of the back of each sign:

1. PROPERTY STATE OF CALIFORNIA,
2. Name of the sign manufacturer,
3. Month and year of fabrication,
4. Type of retroreflective sheeting,
5. Manufacturer's identification and lot number of retroreflective sheeting.
6. Sign MUTCD Code

Signs having graffiti protection are sometimes marked with a 3/8th-inch dot. It is a black dot on white border or white dot on black border. The dot is placed on the lower border of the sign before application of the graffiti protection. The application method and exact location of the dot may vary depending on the manufacturer of the sign.

M2.02.05 Storage and Handling of Signs

Proper storage techniques prevent damage such as scratching of sign surfaces or warping of wood sign supports. Although proper storage is generally a matter of using common sense, certain types of sign supports, and signs may require special storage techniques. Direct inquiries regarding special storage requirements to the Office of Materials Engineering and Testing Services.

Transport and store sign panels in a manner that protects the face from damage. Protect signs from damage due to weather and movement during transportation by wrapping, tarping, or other appropriate methods. Keep signs dry during transit and ship on palettes, in crates, or tier racks. Place padding and protective materials between signs as appropriate.

Store signs in a dry environment. Do not let signs rest directly on the ground or become wet during storage. Maintain signs in a freestanding position whether stored indoors or outdoors. When stored outdoors, maintain 4-inch minimum spacing between signs. In areas of high heat and humidity, do not store signs in an enclosed non-climate-controlled spaces. Store signs indoors if duration of the storage will exceed 30 days.

Laminated panel signs normally have small weep holes in the channel at the bottom edge. This allows moisture that enters the panel to drain, thereby preserving the sign's structural integrity. If the panel is stored upside down or if it is reused and installed upside down, the weep holes allow water to enter the panel rather than helping drain accumulated water. Any unneeded holes observed in laminated panel signs should be plugged or sealed to prevent moisture intrusion.

Storage of signs in vehicles used by sign crews is of special concern. Rubbing and marring of surfaces of on-board signs is caused by the vibration of the vehicle during travel. A sign can be seriously damaged in this manner before it is installed.

Signs carried in a sign repair vehicle should be kept to the minimum quantity and types necessary to adequately respond to short-term needs. Do not allow retroreflective sheeting signs to rub against each other or against abrasive parts of the sign repair vehicle.

Proper storage of wood sign supports in Maintenance yards is important. Sign posts stored flat on the ground or on asphalt can be warped beyond use. Care should be taken to support wood posts above ground level. This provides better air circulation for uniform moisture and temperature condition around the sign support, which reduces the risk of warping and cracking. Refer to Section M2.02.11 of this chapter for storage of laminated box-beam sign posts.

Treated wood posts must be stored under cover or tarped to prevent chemical runoff from entering drainage systems. Special care is needed in storage and transporting large signs to prevent warping the entire sign structure, marring the sign surface, or bending edges. Large signs should be stored on edge rather than flat. Flat storage can cause warping and entraps moisture, which often damages sign materials. When stored on edge, it is important that the edge of one sign is not bearing directly against the face of an adjacent sign. Sign edges can easily damage retroreflective sheeting.

M2.02.06 Installation of Signs

Installation of signs should be a carefully planned activity. Good planning improves efficiency of the installation procedure, minimizes interference with the traveling public, and promotes safety. An important part of the planning process for installing signs is determining the location of underground and overhead utilities. Prior to digging, notify utility companies of intended work through Underground Service Alert (USA), as outlined in Volume 1, Chapter 1of the Maintenance Manual. Serious consequences can result if this step is overlooked. Exercise care when digging in landscaped areas to avoid buried water lines.

Current details for the location and position of signs are available in the Standard Plans and in the California MUTCD. These details are periodically updated, and field crews should make sure they have the latest Standard plans when maintaining signs.

The desired result of the sign installation process is that signs effectively communicate information to road users. Placement of signs along a highway should be spaced to allow road users time to assimilate the message. Spacing should be determined in "Units of Time" based on the expected approach speed. However, the following general rule is good practice:

> If possible, signs should be at least 500 feet apart. A desired minimum spacing for Guide Signs is 800 feet on freeways and expressways, and 200 feet on conventional roads. District Traffic Operations should be contacted to resolve questions about location or position of a sign.

Sign installation can be as simple as digging a hole for a small one-post roadside sign, or as complex as mounting large multi-panel signs on overhead sign structures. In either case, use care to avoid damaging the sign while handling. Retroreflective sheeting is easily damaged when

pressure is applied to the face of the sign during installation. The sign might look good in daylight, but the damaged section will appear blacked-out at night. In a multiple-post installation, install posts before the large sign is installed. This will reduce possible damage to the signs. Use fixtures that have been specifically designed for sign handling.

Proper installation procedure is important to ensure long-term service life. Position post holes correctly. The bottom of holes for wood posts should be wetted, tamped, and leveled before posts are installed. In all cases, signs should be level and posts should be plumb.

Safe work practices, including wearing gloves, hard hats, safety glasses, and other equipment as necessary to avoid injury to sign crew members. Supervisors should regularly review the appropriate Maintenance Codes of Safe Operating Practices, provided in Section M2.01.01 of this chapter, with their crews.

Different sign support systems require different hardware and installation procedures. Hardware is approved for use based on testing procedures designed to assure maximum safety for the motorist. Maintenance personnel shall not use alternate hardware without prior approval of the Division of Maintenance.

M2.02.07 Sign Maintenance and Preventable Measures

No definite rule has been established to determine when a sign is damaged beyond repair or when a sign should be repaired and retained in service. When replacement is necessary, the sign shall be replaced in kind with same or equal support. In general, a sign should be replaced if it cannot economically be repaired to present a neat appearance and provide minimum required retroreflectivity. Sign Maintenance personnel should rely on experience, historical data and best judgment to arrive at cost-effective decisions regarding sign maintenance. For identifying distresses and the associated maintenance needs, refer to Section M2.05 of this chapter. In addition, California MUTCD, Section 2A.08 provides guidance on minimum retroreflectivity.

Washing or cleaning signs is a proper sign maintenance activity, but only if it is cost-effective. In certain situations, the better alternative may be to replace rather than wash or clean a sign. Special Programs People may be used to make washing signs a cost-effective alternative to replacement.

Functional maintenance of traffic control devices should be used to determine if certain devices need to be changed to meet current traffic conditions. This should be coordinated with District Traffic Operations.

Physical maintenance of traffic control devices must be performed to retain the legibility and visibility of the device, adequate retroreflectivity, and to retain the proper functioning of the device.

Specific methods and materials are recommended for repairing different types of signs.

Questions regarding materials used for repairing and cleaning signs should be directed to the Office of Materials Engineering and Testing Services. This is especially important with regard to retroreflective sheeting signs because the sheeting surface is easily damaged by use of improper cleaning agents. Questions regarding specific methods of sign installation or maintenance may

be directed to the Division of Maintenance.

The variety of tasks involved in the maintenance of signs means that districts must exercise judgment to arrive at cost-effective choices in terms of how best to utilize available Maintenance resources. Ultimately, the districts are responsible for making proper, cost-effective decisions regarding sign maintenance.

Sign Specification Updates

Refer to CA Sign Specification Updates, provided in Section M2.01.01 of this chapter, for information regarding new, revised, and deleted signs.

Districts should take action as follows to reduce preventable sign damage to the greatest extent possible:

(A) Identify large signs that may be subject to damage from careless drivers. Damage usually occurs when the lower left corners of these signs are hit by large, slow-moving vehicles.

(B) When relocation is not feasible, a guide marker (delineator post) may be installed in alignment with and in advance of the sign in a position that may keep vehicles from hitting the sign. These markers should be retroreflective only where such installation will not diminish the effectiveness of existing roadside guide markers (to the extent of confusing the motorist).

(C) District Traffic Operations should be contacted for approval of any unusual measures that may be necessary to protect signs from vehicular damage.

(D) When replacing either damaged guide or regulatory signs, consider relocating these signs where they will be less susceptible to damage. This may mean that some signs will be located in less than the ideal position. Written authorization must be obtained from District Traffic Operations before any significant relocation of a sign.

(E) Landscape irrigation systems are another source of sign damage. Water spots, streaking, loss of retroreflectivity, and corrosion can result from sprinkler heads directing water onto the sign panels. In addition to damage to the sign panels, wood sign posts (especially laminated wood sign posts) can be severely damaged by repetitive spraying from landscape sprinkler systems. Damage can be eliminated or reduced by making minor field adjustments to the sprinkler system to avoid spraying adjacent sign panels and wood posts.

(F) Nonstandard installations may be justified where special circumstances exist.

(1) Damage to signs can be reduced in heavy snow removal areas by modifying normal installation procedures. Laminated panels may be offset so the overhang on the roadside edge is reduced. In addition, laminated panel signs should be ordered in the 2-½ inch thickness to provide the stiffness necessary to resist snow loads. This has proven effective in reducing the number of signs damaged during snow removal activities.

(2) Upon request, District Traffic Operations can reduce the size of a sign by "stacking the message" thereby reducing the surface area exposed to the elements.

(3) Single sheet warning and regulatory signs may be reinforced, by backing the new sign, with a salvaged aluminum blank. The new sign can be riveted to the salvaged sign to obtain greater stiffness.

(4) One-post directional signs for installation within sidewalk areas of cities and towns should generally be ordered for off-center installation. The post, located at the left-hand edge of the sign face, may then be placed near the curb where it will not interfere with pedestrian traffic.

(5) Two-post signs are more difficult to install in sidewalk areas. When necessary, one post should be placed at or near the curb line with the second post at or near the property line. The sign may then be mounted on 2-inch x 4-inch lumber placed horizontally between the posts. It should only be used when a sign is too long for one-post mounting.

M2.02.08 General Sign Support Information

Types and sizes of ground-mounted sign supports should be initially chosen based on the following:

(A) Safety in the event of a hit by an errant vehicle.

(B) Ability to withstand a "blow down" in heavy wind, depending on the size of the sign.

(C) Cost analysis considering both the initial cost of the support and the ongoing, future cost of maintenance.

(D) Aesthetics or compatibility with surrounding features.

Current Statutes prevent the use of Maintenance funds for upgrading posts (bringing existing posts to current standards). However, districts have the option of reviewing each sign location using future maintenance costs as a criterion for recommending a change in type of sign support.

With proper documentation and concurrence of District Traffic Operations, the type of support can be changed to provide a more cost-effective installation when replacement is warranted. Safety of the public shall always be included in such a review.

Holes shall not be drilled in for the purpose of installing signs. Signs at these locations shall be banded to the post using standard hardware designed for this purpose. Install signs per Standard Specifications Section 82-3.03B and Section 82-4.

Hidden depressions resulting from post removal present a hazard to workers and should never be left unfilled when installations are abandoned.

M2.02.09 Wood Posts

Dimensioned wood posts have a long history of success as sign supports for smaller ground-mounted signs. Wood posts may still be the most cost-effective installation, especially in locations where it is unlikely, they can be hit (e.g., behind guardrail). Unless conditions otherwise dictate, the wood post is the primary sign support structure used.
Refer to Standard Specification Section 57 for wood general specification.

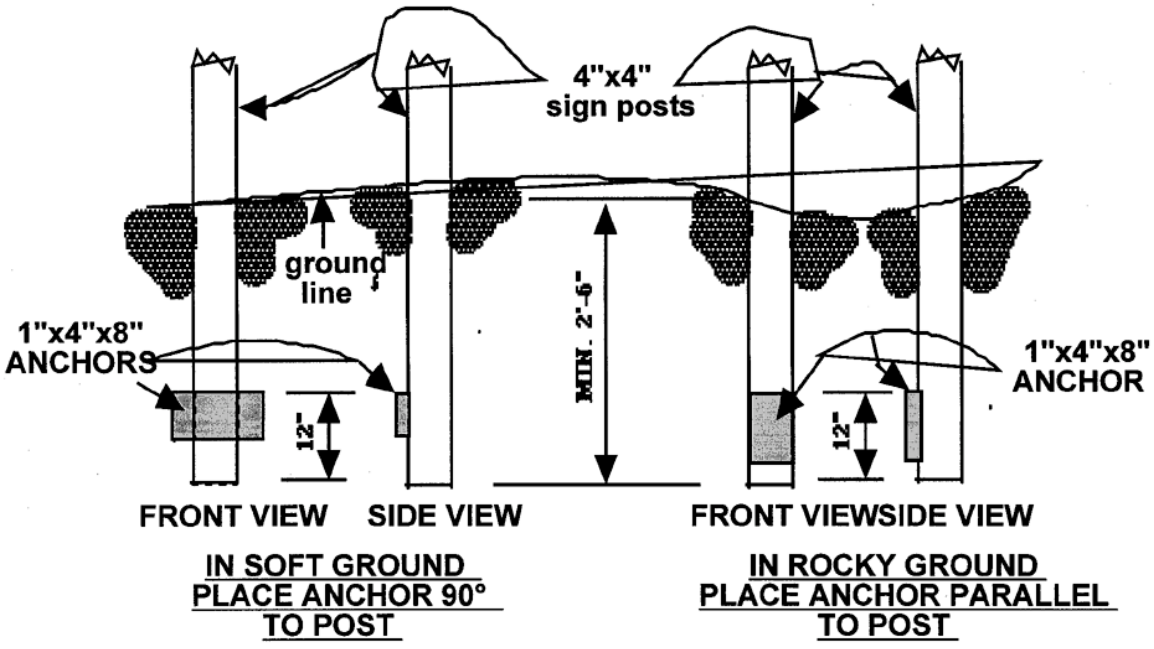
Where needed, holes are to be drilled in the larger wood posts to provide a weakened plane for breakage when the post is impacted by a vehicle. It is important to make sure the breakaway holes are drilled at the specified height above the ground. The holes are placed at this height so the broken end protruding above the ground will not snag the bottom of a car. See current Standard Plan sheets for details on hole locations.

Anchor blocks may be used on wood posts where signs are located in soft ground, near schools, and at locations frequently used by pedestrians. The anchor blocks prevent the sign from being rotated in the hole, lifted out, or stolen.

Wood sign posts shall not be painted.

When handling treated wood posts, skin contact shall be avoided. Wear long sleeved shirt and gloves and avoid breathing wood dust when sawing or drilling posts.

ANCHOR BLOCKS FOR WOOD SIGN POSTS



M2.02.10 Steel Posts - Small Signs

Several patented breakaway metal post systems for small signs have been approved for operational use. The use of breakaway metal post systems has both advantages and disadvantages.

(A) Advantages of breakaway metal post systems:

(1) Improvement in motorist safety provided by the breakaway feature.

(2) Relative ease of installation (no need to dig a hole).

(3) Possible reuse of the base post after vehicular impact, with resultant long- term cost savings.

(B) Disadvantages of metal post systems are:

(1) Posts are not interchangeable. Once a base post is placed, there is no economically feasible alternative except to purchase replacement posts of the same design.

(2) A variety of driving heads, bolts, and other materials must be carried in the sign truck to permit repairs or modifications to different installations.

(3) Underground utilities may be damaged when driving the post. Call before you dig or drive post.

(4) Different methods of attaching signs to posts may require strengthening of some sign panels to prevent excessive bending and distortion of the sign message.

(C) Special installations where the breakaway metal sign post system can be an acceptable alternative to wood posts, based on life-cycle cost, are:

(1) Areas with a high incidence of hits.

(2) Locations where wood posts are vandalized.

(3) Where driving a post is easier than digging a post-hole (in granular, loose, or rocky soil).

(4) Where the post is required to blend with the surrounding environment.

Decisions to use steel sign supports for replacement purposes will be the responsibility of the district and should be based on consideration of the above factors. Warehousing of all types of breakaway metal sign post systems is not anticipated at this time. Some orders may have to be placed through local distributors. Orders for a particular type of post must be justified.

M2.02.11 Laminated Wood Posts

Breakaway holes must be placed at the proper height above ground to prevent the remaining stub from snagging the bottom of an impacting vehicle. See current Standard Plan sheets for hole locations.

A laminated wood post (high-grade plywood in appearance) is acceptable for installation of large signs in areas exposed to traffic, where timber poles were formerly the standard.

Laminated posts are designed to meet federal requirements for change in momentum during an impact by breaking cleanly when impacted by a lightweight vehicle traveling at 20 mph.

Laminated posts are relatively fragile and must be stored and handled carefully. Techniques for storing laminated box-beam signposts require a minimum 6-inch clearance at the base of the pile, in addition to placing stickers between each layer of posts. Posts should be stacked on edge, and the top of the pile should be covered with a layer of plastic or tarp to prevent rain from damaging the posts.

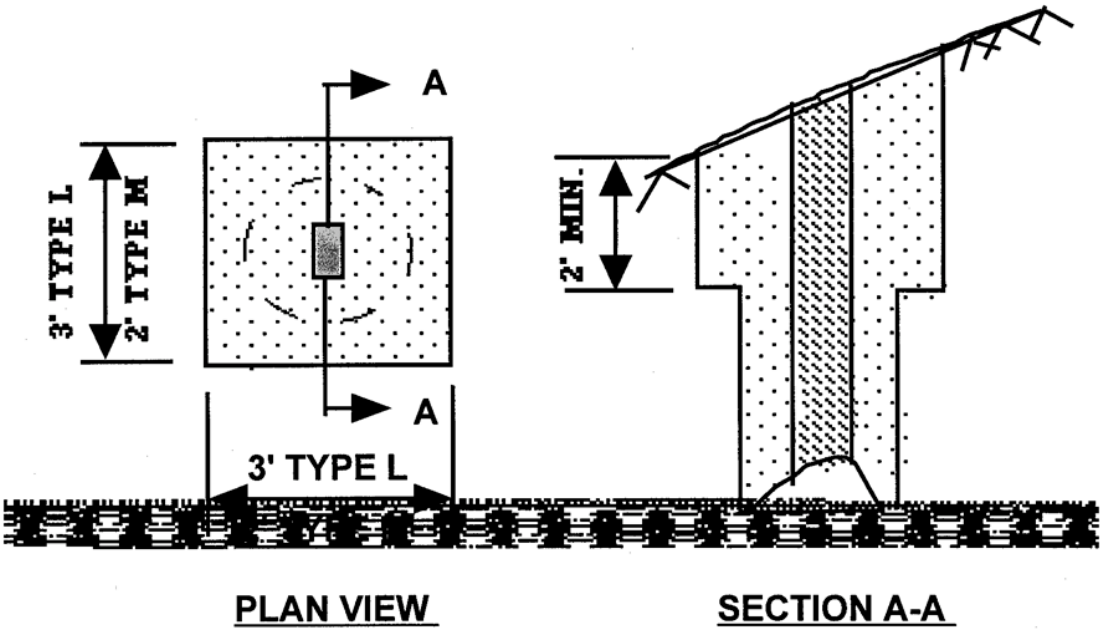
Some of the newer laminated wood posts are coated with special waterproofing material to minimize cracking and warping and give a longer service life. Re-coating of these posts may be beneficial in the future if field inspections indicate that the coating film is breaking down.

To ensure that laminated wood sign posts will break away properly when hit and still not be damaged by high winds, it is important that posts be installed in holes as specified and back-filled with a granular material. The relationship of hole size and soil condition is critical in assuring that there is a proper breaking away of the upper portion of laminated wood box beam posts when hit. The bottom must be held firmly in place to allow a clean break of the post at ground level. Soft or yielding ground will permit movement of the entire post and the desired type of breaking will not be accomplished.

Two alternative post-hole configurations have been approved for use:

(A) If the ground is very firm, similar to compacted highway fill, the hole diameter may be reduced six (6) inches in diameter. For these conditions, the permissive size of hole is 18 inches for the type "M" post and 24 inches for the type "L" post.

(B) If the foundation material surrounding the post is not firm when in a saturated condition, the 18-inch and 24-inch diameter holes mentioned above may be used only if the upper portion of the hole is modified to provide satisfactory lateral support. This modification is to be accomplished by removing at least 2 feet of the upper portion of the existing soil to the dimensions shown below and replacing with a granular backfill material.



M2.02.12 Breakaway Steel Posts for Use with Large Signs

The wide flange breakaway steel sign post, which meets the federal requirements for change in momentum during vehicular impact, has been available for many years. Carefully follow plans that cover standard installations. Correct alignment of post sections and placement of bolts in the slip base is critical to proper functioning of the breakaway feature.

A major disadvantage of the steel breakaway post is the need to fabricate a new post every time an existing post is hit. This requires field measurement of the exact length required for replacement. Some time lag is inevitable before the steel post can be replaced.

M2.02.13 Overhead Steel Sign Supports

Overhead steel sign supports are designed by the Division of Engineering Services. Repairs should be performed by contract unless the district has workers proficient in structural steelwork and painting.

M2.02.14 Hardware

All signs shall be affixed to posts with galvanized hardware. Fiber or nylon washers shall be used to protect the face of the sign. Placing a metal washer between the fiber/nylon washer and the bolt head is recommended to provide more bearing and reduce rocking of the sign on the post. Use 5/16-inch by 7/8-inch washers for 1/4-inch bolts and 3/8-inch by 7/8-inch washers for 5/16-inch bolts. An additional washer placed between the nut and the post will prevent the nut from digging into the post during tightening.

The threads near the ends of bolts protruding from sign posts may be "upset" or deformed to prevent the nut from being removed by vandals. Districts may also purchase commercially available "anti-theft" hardware for use in areas subject to vandalism and theft.

Large signs placed on laminated box beam sign posts must be installed using 1/2-inch lag screws for attaching sign panels to the post. Lag screw pilot holes drilled in wood flanges for attaching sign panels must be 5/16 inches in diameter so that the panels will not blow down in heavy winds.

Bolting completely through the post is not acceptable practice because the sign panel will not readily release from the support post during impact.

Overlay plates for making changes to existing signs (not made from steel) shall be attached using aluminum rivets. Stainless steel rivets shall be used on the older porcelain on steel signs.

Galvanized back braces should be used for installation of all large single sheet signs placed on one post. A special back brace is available for one-post directional signs installed "off-center."

One-post installations of signs (with a height of 18 inches or more) require a small wood block between the center of the sign and the post to stiffen the sign and prevent "flutter" under some wind conditions. This block also causes the sign face to distort slightly, which reduces glare.

For details, see Standard Plan RS2. Do not use a block more than one (1) inch thick, as distortion will make the sign ineffective for night retroreflectivity.

M2.02.15 Supplemental Information

District Traffic Operations can provide current standards for each sign truck. Supervisors should have, and rely on, the current drawings and standards available for performance of work.

Upgrading (improving) existing installations to meet current standards is not normally funded from Maintenance allocations. Exceptions may occur where formerly used materials are no longer available, or where new materials can be expected to provide a longer service life, thereby reducing future maintenance costs.

These exceptions are normally justified at the Headquarters level, and instructions are transmitted to the districts for implementation.

Sign crews should retain copies of old Standard Plans and other reference documents for maintaining existing installations. The intent of this instruction is to eliminate "upgrading" of existing installations using funds dedicated for maintenance purposes in conformance with the law.

M2.03 Types of Signs

M2.03.01 Classifications of Signs

Highway signs, both permanent and Temporary Traffic Control (TTC) signs are grouped into three general classifications: Warning, Regulatory, and Guide signs. Designated shapes and colors are used to differentiate between the different sign classifications. Persons installing signs must make certain that the distinctive silhouette shape of a sign is not blocked by other signs mounted above, below, alongside, or behind the sign. Other signs shall not be mounted back-to-back with the R1-1 STOP or the R1-2 YIELD signs.

All classifications of signs shall be retroreflective and/or illuminated to show the same shape and color day and night. The California MUTCD contains detailed information on signs and sign policies. All persons installing signs should have a copy of Part 2 and Part 6 of the California MUTCD readily available for reference. Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility

The Uniform Sign Chart is a listing of some of the more common signs. A copy of the Uniform Sign Chart should be in every sign truck. The Uniform Sign Chart is available from the Divisions of Safety Programs web site. In addition, the web site has links to traffic sign specification sheets (Caltrans and federal) that contain detailed layouts and dimensions for all signs. Installation details are shown on Standard Plans RS1 to RS4. Typical plans and locations for signs and pavement markings are shown in the California MUTCD.

(A) Warning Signs

Warning Signs are placed to give notice to road users of a situation that might not be readily apparent.

Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.

Warning signs are generally diamond shaped with black legend and border on a yellow background. Exceptions are the railroad crossing sign (round), the symbolic school crossing sign, changeable message signs, and the rectangular shape used for supplemental signs (such as advisory speed signs) mounted below and on the same post with other warning signs.

School warning signs, including any supplemental plaques used in association with these warning signs, shall have a fluorescent yellow-green background with a black legend and border unless otherwise provided in the California MUTCD for a specific sign. Refer to Part 7 of the California MUTCD, provided in Section M2.01.01 of this chapter, for additional information on school zone signs.

If vertical clearance is temporarily reduced due to maintenance activities to 15.5 feet or less, place low clearance warning signs in compliance with the California MUTCD, in accordance with Standard Specification Section 7-1.04 and recommendation from District Traffic Operations. Signs must comply with the dimension, color, and legend requirements of the California MUTCD and Standard Specification Section 12-3.11

except that the signs must have black letters and numbers on an orange retroreflective background. W12-2P signs must be illuminated so that the signs are clearly visible.

(B) Regulatory Signs

Regulatory signs are placed to give notice to road users of traffic laws or regulations.

Regulatory signs are used to inform road users of regulations that apply at definite locations, specific times, or where the regulations are not self-evident. This group includes signs regulating the movement, speed, stopping, or parking of vehicles. Regulatory signs are generally black and white or red and white.

The general shape of a regulatory sign is rectangular. The shape of a stop sign is an octagon, and a yield sign is an inverted triangle. Two signs for different purposes should not normally be mounted on the same post.

The R5-1 DO NOT ENTER, and the R4-1 DO NOT PASS signs are examples of regulatory signs which have high priority for early replacement or maintenance.

(C) Guide Signs

Guide signs are placed to show route designations, destinations, directions, distances, services, points of interest, other geographical, recreational, or cultural information.

The priority for maintenance or replacement of guide signs depends on the needs of road users in a particular area.

Flashing lights or distracting legends shall not be placed on guide signs.

Unless otherwise approved by District Traffic Operations, a minimum spacing of 200 feet between guide signs shall be maintained on conventional highways.

A minimum spacing of 800 feet should be maintained on freeways and expressways.

(D) Colors of Construction and Maintenance Work Zone Signs (i.e., Temporary Traffic Control Signs)

These signs are used to caution motorists in advance of (and through) work zones. The colors for regulatory signs in work zones shall follow the standards for regulatory signs in Table 2A-4 and Chapter 2B of the California MUTCD. Warning signs in work zones shall have black legend and border on an orange background, except the W10-1 Railroad Crossing signs shall have a yellow background. If additional temporary guide signs are used in work zones, they shall have black legend and border on an orange background. The contractor shall remove all temporary traffic control signs at the end of a project. In maintenance work zones, Maintenance crews shall remove all temporary traffic control signs when the work is complete.

All work zone signs shall be retroreflective when used during the hours of darkness.

Fluorescent orange or orange colors may be used in work zones for temporary warning signs and temporary guide signs. Retroreflective fluorescent orange or retroreflective orange signs may be used day or night. Fluorescent orange signs or orange signs that are not retroreflective shall only be used during daylight hours. Fluorescent orange is a color and is not a substitute for retroreflectivity. Fluorescent orange appears brighter than orange in daylight and is more conspicuous during twilight hours. Fluorescent orange appears orange at night. Fluorescent orange and orange should not be mixed in the same work zone. Signs should be all fluorescent orange or all orange in the same work zone.

M2.03.02 Selection of Signs

The broader use of symbol signs, in preference to word messages, is desirable. Educational plates accompany some symbol signs to explain in words the meaning of the new symbol. Only symbol signs included in the California MUTCD may be used.

Unless otherwise directed by the Traffic Branch, educational plates should remain in place for at least three (3) years after initial installation. No special effort will be made to remove educational plates as long as they are in serviceable condition.

Signs placed on State highways must comply with provisions of the California MUTCD, Vehicle Code, and other Statutes. The basic requirements of a highway sign are that it be legible and understood in time to permit a proper response.

Flashing beacons may only be used as allowed by the California MUTCD.

M2.03.03 Sign Acquisition

Signs listed in the Material Operations Warehouse Catalog shall be ordered through the Material Management system on a Local Request, EDP Form ADM-1001C.

Special signs, not listed in the catalog, should be ordered on a Purchase Request, using proper forms in accordance with current instructions. Except for signs placed in stock, District Traffic Operations is responsible for ordering most signs.

Attention is directed to emergency clauses in sign procurement contracts, which are available from District Sign Coordinators. Sign orders may specify either a 5-day or a 21-day emergency order. Signs made under this provision will be directly shipped to the ordering district. Under emergency orders, the sign manufacturer will make and ship signs within 5 days (or 21 days) upon receipt of a valid Purchase Order. Allow for additional time to finalize Purchase Orders and transit time after signs leave the manufacturing plant. The State is charged 15 percent and 10 percent more respectively for 5-day and 21-day emergency orders. Except for temporary and emergency signs, there is minimal need, if any, for Maintenance personnel to fabricate signs.

M2.03.04 Obsolete Signs

Periodically, some signs are eliminated, or changes are made in messages, designs, sizes, or colors. The result is that existing signs become obsolete, even though they may adequately serve the intended purpose for many years. Unless otherwise directed by District Traffic Operations,

such signs should remain in service until normal maintenance replacement is required. Directed replacement of signs before the end of normal service life is considered "betterment", and such costs must be from capital improvement funds. Replacement signs must be those included in the current version of the California MUTCD.

Obsolete signs in inventory that have not yet been installed should be returned to a Material Operations warehouse for disposal.

Due to the adoption of the California MUTCD, a number of signs have been designated as obsolete, and target dates to remove and replace these signs have been established by Traffic Operations. Please refer to California Sign Specification Updates, in Section M2.01.01 of this chapter, for information regarding new, revised, and deleted signs.

M2.03.05 Temporary Signs

Temporary signs shall be maintained only as long as the need for that sign exists. When the need no longer exists, temporary signs shall be removed or covered completely. It is not an acceptable practice to cover the sign message only.

Temporary signs shall have a retroreflective background and/or legend and border depending on the standards for that particular sign. Temporary signs shall also conform to the color, size, material, and other requirements, which apply to permanent signs of that type, unless otherwise specifically authorized in writing by District Traffic Operations. Depending on the type of sign and expected usage, the service life of temporary sign materials may be somewhat less than that used for permanent signs.

Districts shall keep an adequate inventory of materials available for immediate fabrication of emergency signs.

M2.03.06 Compliance

Compliance with Standard statements noted in the California MUTCD is required by federal regulations. All replacement signs must comply with the latest California MUTCD. Regulations related to maintenance activities for sign maintenance include the following:

- Per Title 23, Code of Federal Regulations, Section 655.603 (d) Compliance (1) Existing highways: “Each State, in cooperation with its political subdivisions, and Federal agency shall have a program as required by 23 U.S.C. 402(a), which shall include provisions for the systematic upgrading of substandard traffic control devices and for the installation of needed devices to achieve conformity with the MUTCD. The Federal Highway Administration (FHWA) may establish target dates of achieving compliance with changes to specific devices in the MUTCD.”

- For California, target compliance dates established by the FHWA are shown in Table I-2 of California MUTCD.

Paragraphs 22-24 of the Introduction of the California MUTCD require the following:

When a non-compliant sign is being replaced or refurbished because it is damaged, missing, or no longer serviceable for any reason, it shall be replaced with the compliant device unless as provided below.

A damaged, missing, or otherwise non-serviceable device that is non-compliant maybe replaced in kind if engineering judgement indicates that:

(A) One compliant device in the midst of a series of adjacent non-compliant devices would be confusing to road users.

(B) The schedule for replacement of the whole series of non-compliant devices will result in achieving timely compliance with California MUTCD.

Maintenance-related updates to the California MUTCD will be provided during annual maintenance sign conference. Refer to the link provided in Section M2.01.01 of this chapter, for the latest version of the California MUTCD.

Revisions to the California MUTCD may set specific dates for upgrading certain signs. Routine maintenance of signs will incorporate sign changes that include specific deadlines.

M2.04 Condition Measurement and Inventory

M2.04.01 General

Signs conditions are measured as per Section M2.04.02 of this chapter.

A formal night inspection of all traffic signs shall be completed once each year. The inspections shall take place between April 1st and May 31st annually. Each inspection record shall use the Highway Facilities Night Inspection form (MTC-0108) available on the Caltrans Electronic Forms system (CEFS) or contact Headquarters Division of Maintenance for a copy of the form.

The completed MTC-0108 forms shall be stored at the district office and shall be readily available to be sent electronically to the Headquarters Division of Maintenance upon request for Quality Assurance/Quality Control (QA/QC) of the Annual Night Inspection Program.

At the district level, the records should be kept on file for a minimum of three (3) years.

Routine or informal sign inspections are performed on an "as-needed" basis, or under the general guideline of twice a year. Informal sign inspections are not reported to the Headquarters Division of Maintenance.

M2.04.02 Asset Condition

Asset condition is a rating system applied to different distresses and needs to help best assess current status in meeting promised goals, funding needs, and priorities set forth in the State Highway System Management Plan. Its primary use is for allocating Major Maintenance (HM) and SHOPP (State Highway Operation and Protection Program) funds for engineering and construction projects. Asset condition can also be used for establishing needs and allocating resources in the absence of or to support Level of Service (LOS).

Asset conditions are typically categorized into 3 basic categories (good, fair, and poor) and are further described in Section M2.05.02 of this chapter. In some cases, these categories could be further subdivided into additional categories, or different categories may be used for management and funding purposes. For Maintenance forces, these conditions provide general guidance as to the level and extent of maintenance needs.

M2.04.03 Level of Service Survey

There are three (3) types of LOS criteria (Pass, Need 1 and Need 2) as described below:

Pass - Regulatory sign functioning as intended.

Need 1 – Three (3) or less guide signs or one (1) regulatory/warning sign not functioning as intended within 0.1 mile (one localized instance) of inspection.

Need 2 – Four (4) or more any signs or two (2) or more regulatory/warning signs not functioning as intended within 0.1 mile (one localized instance) of inspection.

Please refer to the Level of Service web site, provided in Section M2.01.01 of this chapter, for the latest LOS scores and other pertinent information:

The LOS targets and scores are used to inform the public, the California Transportation Commission (CTC), and the Legislature what level of maintenance can be accomplished with resources allocated. These LOS targets also budget resources for statewide and district wide Maintenance forces to identify and prioritize their work to meet LOS goals. Because existing conditions, priorities, and resources can change, LOS targets are reviewed and updated annually, and provided to districts.

M2.05 Identifying Distresses and Maintenance Needs

M2.05.01 General

The following summaries of common distresses provide an overview of typical examples of Sign related distresses and expected maintenance. The Maintenance Supervisor should periodically review this information with staff to make all aware of what distresses to look for.

M2.05.02 Sign Distresses

(A) Distress Rating and Maintenance Activity

Condition	Description	Typical Maintenance Activity
Good	No apparent physical defects and deemed in satisfactory condition.	Little to no repairs needed.
Fair	Visible physical defects or color fade but otherwise serviceable within acceptable parameters: tree sap, dirty, weathering, and cracking. Expected remaining service life of 1-5 years.	Repairs needed to return to good working condition.
Poor	No longer functioning as intended as faded, missing, down, knockdown, vandalized (paintball, gunshot, eggs, graffiti) or not legible. Extreme physical damage or deterioration; significant improper use of sign.	Significant distress requiring rehabilitation, reconstruction, or replacement to return to good working condition.

(B) Distress Examples

Good Fair Poor

Good Fair Poor

(C) Probable causes of sign distresses include, but are not limited to:

1. Vehicular damage
2. Vandalism
3. Weather condition
4. Landscape irrigation systems causing loss of retroreflectivity, corrosion and damages to wood posts
5. Maintenance snow removal activities
6. Poor illumination
7. Age

(D) Sign Inspection

Sign inspection may be performed during daylight hours or nighttime. Effects of age, weathering, and vandalism are sometimes difficult to detect unless the sign is observed at night. A night check should be made immediately following a grass or range-land fire as heat can cause loss of retroreflectivity.

The following are Best Practice Guidelines for performing sign inspections at night:

1. Inspection vehicle headlamps must be properly adjusted. Headlamps should be in the dimmed position for night sign inspections.

2. Conduct inspections safely. Try to blend with the flow of traffic. If it is absolutely necessary to slow or stop on the shoulder close to the traveled way, use a flashing light, amber rotating light, or light bar. A hard hat and retroreflective vest shall be worn if the sign inspector leaves the inspection vehicle. Retroreflective material on the hard hat is optional. Please refer to the current Code of Safe Operating Practices (COSP) provided in Section M2.01.01 of this chapter, for required and suggested personal safety equipment for night work.

3. The inspection shall consist of a minimum of two (2) employees. One member

of the team should be a qualified sign Maintenance person and at least one team member have good color vision for evaluating sign colors. District Traffic Operations employees should be invited to participate.

4. Decisions regarding the adequacy of borderline signs should be based on the combined judgment of the team.

5. Signs should be observed at the "distance of driver need." This distance varies depending on factors such as average speed and roadway alignment. However, for the average highway, observations should be made 250 feet to 500 feet in advance of the sign. For city streets, where average speeds are generally lower, sign observations may be made closer to the sign.

6. The inspection vehicle should normally be driven in the outside lane of multilane highways. This is generally the safest path of travel for the night inspection team. It also places the team in a position where signs hidden by vegetation will be noted. The team should not park on the shoulder to evaluate retroreflectivity of a sign unless such practice is necessary for reasons of safety (shoulder mounted signs appear brighter when viewed from the shoulder than when viewed from the traveled way).

7. Median mounted signs may be observed from the number one lane if it is safe to do so.

8. It may be necessary to make two inspection passes for sections of highway where both median mounted and shoulder mounted signs are to be observed. R1-1 STOP signs and W3-4 STOP AHEAD signs on county road approaches to State highways shall be checked.

9. Do not use a spotlight to evaluate night sign retroreflectivity. The spotlight is several times brighter than vehicle headlamps. This causes false observations of sign brightness.

10. The adequacy of sign retroreflectivity is not based on specific levels of brightness. Rather, it is based on the best judgment of the night inspection team to determine whether reflectivity is above or below 50 percent. Typical factors to consider when making decisions regarding sign adequacy are:

    a. Whether the sign is difficult to see because it is in front of a lighted background (as may be the case in urban areas).

    b. Whether there is competition for driver attention around the sign. If the answer to either of these questions is "yes", a brighter sign may be needed at those specific locations.

    c. The "degree of hazard" associated with the sign message.

11. All pedestrian crosswalk signs on State Highway System shall be inspected.

The Night Inspection report for signs needing work must be completed accurately to assure that appropriate corrective action will be taken.

(E) Goals

Conducting periodic inspection to detect deficiencies, which require corrective action, is an important part of proper sign maintenance.

M2.06 Maintenance Level of Service Goals and Expectations

M2.06.01 Response to Deficiency List and Other Notifications

Priority of signs getting repair or replacement is dependent on time and upon how critical the sign is, as listed below in the order of priory:

Priority 1. Regulatory signs such as STOP, YIELD, WRONG WAY, DO NOT ENTER, DO NOT PASS should be replaced or repaired immediately after notice of missing, down, or damaged.

Priority 2. Maintenance and/or replacement of warning signs should have the second highest priority after the regulatory signs in Priority 1 above. Warning signs should be repaired or replaced as soon as possible.

Priority 3. Other regulatory (such as speed limit) and Guide signs should be repaired or replaced depending upon its urgency.

If prompt corrective action is not possible, a temporary sign should be installed until permanent repair or replacement can be made. Sign deficiencies not critical to traffic safety or operations should be taken care of as soon as practicable to prevent the loss of capital investment.

The proper maintenance of traffic control devices is important in maximizing safety and efficiency for the users of the State Highway System. Caltrans Division of Maintenance has established a system performance goal to maintain a statewide level of service score of 90 or greater for traffic control devices. As outlined in the Maintenance Program Strategic Plan (2022-2027), provided in Section M2.01.01 of this chapter, the Division of Maintenance priorities focus on safety, people, stewardship, and equity.

M2.07 Non-Motorized Travelers on State Highways

M2.07.01 Pedestrians and Bicyclists

Proper maintenance of pedestrians/bicyclists crossing signs is important for the road users' safety.

Advance notification and adequate access shall be provided when maintenance work affects the movement of pedestrians and bicyclists. If the temporary traffic control zone affects an accessible and detectable pedestrian facility, the accessibility and detectability shall be maintained along the alternate pedestrian route.

M2.08 Other Requirements and Considerations

M2.08.01 Work for Others

Use of Y Family directed by District Traffic Operations using Sign Installation Order (SIO).

M2.08.02 Training

The Division of Maintenance provides on-going sign training for all maintenance personnel that inspect signs. This training is intended for the lead workers, supervisors, superintendents, and regional managers. This formal training course is tracked in the Learning Management System (LMS).

All maintenance personnel are required to take the sign training to qualify as sign inspectors.

APPENDIX M2

Signs

Fact Sheets

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Regulatory Signs	
Example	**Features**
	1. Questions to ask to prioritize signs urgency for repair or replace. What condition is the sign in? What classification is the sign? Is the sign critical to traffic safety or operations? Review the priority list before commencing work. 2. Sign Maintenance personnel should rely on experience and best judgement to arrive at cost-effective decisions regarding sign maintenance.
	**General Maintenance Notes** 1. Conduct routine visual sign inspection during daylight hours and nighttime. 2. Report to IMMS and initiate service request if the sign need to be repaired or replaced. 3. Review priority list of deficient signs to be repaired or replaced. 4. Repair or replace sign with high-performance retroreflective sheeting per California MUTCD. 5. If prompt corrective action is not possible, a temporary sign should be installed until permanent repair or replacement can be made.

Regulatory Signs **- continued**			
Condition	**Example**	**Description**	**Maintenance Actions**
Good		• No apparent physical defects and deemed in satisfactory condition.	• No maintenance needed. • High performance retroreflective sheeting of regulatory roadside sign
Fair		• Visible physical defects or color fade but otherwise serviceable within acceptable parameters such as tree sap, dirty, weathering, and cracking	• Minor repairs needed to return to good working condition. • Priority of signs getting repaired or replaced is dependent upon time and how critical the sign is. “Yield” is a high priority regulatory sign; therefore, the action should be taken immediately.
Poor		• No longer functioning as intended, such as, faded, missing, down, vandalized (paintball, gunshot, eggs, graffiti) or not legible. Extreme physical damage or deterioration; significant improper use of sign. This example shows loss of effectiveness in conveying message.	• Regulatory signs that are high priority (STOP, YIELD, WRONG WAY, DO NOT ENTER or DO NOT PASS) should be replaced immediately. • Warning and Guide signs should be repaired or replaced depending upon its urgency. • Significant distress requiring rehabilitation, reconstruction, or replacement to return to good working condition.