



**PDHonline Course L101 (2 PDH)**

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# **Land Surveying Safety Guide**

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# 2 Safety

## 2.1 Introduction

This section of the *Surveys Manual* is intended to: a) provide safe operating procedures, guidelines, and practices, specific to Caltrans surveying operations; and b) supplement the policies, procedures, and practices set forth in the *Caltrans Safety Manual*.

The *Caltrans Safety Manual* provides detailed instructions for managers, supervisors, and employees to assist them in their individual efforts to conduct Caltrans business in a safe and healthy manner consistent with current law, rule, and technology.

### 2.1-1 The Caltrans Safety and Health Policy Statement

Caltrans safety and health policy is defined in the *Caltrans Safety Manual*. Every supervisor and leadworker should have a copy of the manual available for use. According to the manual:

*“It is Caltrans policy to conduct its business, provide services, and to construct and maintain transportation facilities in the safest possible manner consistent with applicable policy, procedure, or work practice, and promote, through an effective injury and illness prevention program, a safe, healthful, and secure work environment for employees and visitors, including persons with disabilities, that is free from violence, threats, harassment, and intimidation, and protects the public from harm in connection with its operations.”*

## 2.2 Caltrans Code of Safe Surveying Practices

The *Caltrans Code of Safe Surveying Practices* was developed to summarize the “Safety Chapter” of this *Manual*. The code should be posted as a reminder of the importance of safety. Copies of the code suitable for posting and distribution (Figure 2-1 on page 2-3) can be obtained from the Office of Land Surveys.

Replace with 11" x 17" *Caltrans Code of Safe Surveying Practices*

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## 2.3 Safety Responsibilities

For a complete description of safety responsibilities see the *Caltrans Safety Manual* Chapter 1, “The Management Structure and Operating Details of the Caltrans Safety Program” and Chapter 12, “Personal Protective Equipment”.

### 2.3-1 Individual Responsibilities

- Employees shall have a practical working knowledge of, and adhere to, the provisions of the *Code of Safe Surveying Practices* and this Chapter of the *Surveys Manual* and the *Caltrans Safety Manual*.
- Employees shall be alert for possible unsafe conditions and/or unsafe acts. Report unsafe conditions and/or acts to the supervisor or lead worker “in charge.”
- Employees shall promptly report all incidents, accidents and personal injuries to their supervisor after rendering or finding aid for injured persons.
- Employees who fail to comply with safety and health policies, procedures, regulations, laws, or rules shall be subject to disciplinary action in accordance with the provisions described in the *Caltrans Guide to Employee Conduct and Discipline*.
- Employees must report for work properly dressed to protect themselves from exposure to conditions found on the work site. Garments that expose upper body parts (midriff and shoulders) and bare legs are prohibited. Employees shall wear appropriate footwear for the assigned task and work area.
- Maintenance and replacement of safety equipment shall comply with all applicable policies, regulations and laws.

#### Personal Protective Equipment

Each employee is furnished personal protective equipment which shall be consistently used. Specifications for personal protective equipment shall comply with all state and federal laws.

**Hard Hat:** Employees are responsible for wearing hard hats with chin straps during any work activity that may expose them to a head injury. The hard hat must be worn when working within any street or highway right of way or on a construction site.

**Safety Vest:** High visibility apparel (vest, shirt, or jacket) of orange, strong yellow-green or fluorescent versions of these colors must be worn whenever working within any highway right of way or on a construction site. Orange is the only approved color for vests or shirts when working on railroad rights of way.

When conditions warrant the following personal protective equipment should be provided to employees:

- Safety glasses (see note below)
- Safety Goggles
- Dust masks
- Gloves
- Hearing protection
- Chaps
- Rainwear
- High visibility apparel

See the *Caltrans Safety Manual*, Chapter 12, “Personal Protective Equipment (PPE)” for details.

**Note:** Employees who wear prescription eye glasses and are assigned to work in field locations generally qualify for at least two pair of State-furnished prescription safety glasses annually. For complete details see Section 12.11 of the *Caltrans Safety Manual*.

## 2.3-2 Party Chief

A designated Party Chief, whether a supervisor or a lead worker, is responsible for the work methods and safety practices of the survey party. It is the Party Chief’s responsibility to ensure that all safety rules and procedures are followed and that all work is performed safely. The Party Chief must ensure the use of the safest possible method for each operation. This responsibility may not be delegated.

The following summarize common responsibilities of the Party Chief:

- Ensure that a copy of the *Code of Safe Surveying Practices*, the *Caltrans Safety Manual*, and the *Caltrans Surveys Manual* is always available to employees.
- Give safety first priority in planning each survey.
- Before starting work, inspect all traffic controls for conformance to Caltrans standards as stated in the *Manual on Uniform Traffic Control Devices* (and the *California Supplement* thereto) and Chapter 8 of the *Caltrans Maintenance Manual*. Continue to monitor conditions to ensure that controls are adequate for any change in conditions.
- Cease work and notify the field supervisor immediately if any field conditions are such that safety is jeopardized.
- Train and provide lookouts whenever necessary.
- Train and provide flaggers whenever necessary.
- Utilize protective vehicles whenever appropriate.
- Avoid assigning party members to independent tasks that isolate them from the other party personnel. Try to have each member working with a buddy. (This is especially important in high-hazard areas, such as along roads, and in remote desert and mountain areas.)
- Ensure that each subordinate possesses the required personal protective equipment and uses the equipment as required.
- Train new employees to safely perform required work tasks before assigning them to work independently.
- Ensure that tools are used and stored safely.
- Do not allow employees to work if they refuse to work safely. Refer the matter to your supervisor.
- Report all violent acts, threats of physical violence, verbal abuse, property damage, security hazards, and other inappropriate activities to the field supervisor or security guard.
- Conduct a tailgate safety meeting with party members at least once every ten working days.
- Report and document all occupational injuries and illnesses.

### 2.3-3 Field and Office Supervisor Responsibilities

**Note:** Field and office supervisors may be first or second line supervisors. Field supervisors generally supervise more than one field party.

According to the *Caltrans Safety Manual*, “Supervisors are responsible to conduct Caltrans business in the safest possible manner consistent with Departmental policies, procedures, and work practices.” This includes:

- Ensuring that employees who fail to comply with safety and health policies, procedures, regulations, laws, or rules are disciplined in accordance with the provisions described in the *State of California Supervisor’s Handbook – A Guide to Employee Conduct and Discipline*.
- Ensuring that all employees receive required first aid and defensive driving training, as well as any required specific training for hazardous tasks such as operating a chainsaw. For classes, refer to the training catalog published by the Division of Training.
- Ensuring that all employees receive Safety Training for special circumstances including construction surveys on superstructures.
- Ensuring that employee safety and health issues are discussed and assessed annually at the time of issuing the “Individual Development Plan/Performance and Appraisal Summary” report and when employee probationary reports are issued.
- Scheduling all required safety meetings. Supervisors should provide sample tailgate meeting topics and outlines to party chiefs and utilize regular staff meetings to disseminate information on accident prevention and on new safety policies and devices.
- Periodically inspecting field and office work sites to identify, document, and eliminate hazards that might cause injury or illness.
- Ensuring that each field crew have access to:
  - *Caltrans Surveys Manual*.
  - *Caltrans Safety Manual*.
  - *Caltrans Maintenance Manual*, Chapter 8, “Protection of Workers”



- *Manual on Uniform Traffic Control Devices* (and the *California Supplement* thereto).

When assigning field crews to projects, field supervisors are responsible for:

- Approving work within six feet of moving traffic.
- Obtaining an approved traffic control plan, if necessary, and providing a copy to the party chief.
- Approving all surveys without traffic controls.

Supervisors are responsible to report and document occupational injuries and illnesses, and arrange for appropriate workers' compensation benefits to employees who are injured or contract an illness arising out of their employment. For details on reports, see *Caltrans Safety Manual*, Chapter 10, "Reporting Personal Injuries and Illnesses."

When assigning field crews to projects or sending office personal on field trips, consider:

- The experience of personnel in undertaking hazardous tasks.
- Possible health problems for specific employees (such as poison oak allergies).
- Traffic hazards (plan for any controls that are needed).
- Unusual hazards associated with the work.

Field/office supervisors are responsible for new employee orientation, as follows:

- Provide new employees a copy of the *Code of Safe Surveying Practices* and make available a copy of the *Caltrans Safety Manual* and the *Surveys Manual*. Require that new employees read each document.
- Show the employee Std. 621, Notice to State Employees, which includes a list of facilities that are approved for treating industrial injuries. Inform the employee that each office and survey party has a copy of the list.
- Ensure that the employees assigned to the field are scheduled for first aid training as soon as available or within the first three months of their assignment if possible, and at least once every two years thereafter.

- Describe hazards that are likely to be encountered in the employee's first assignments and the protective measures to be used.
- Brief the employee on:
  - Medical care available throughout the State.
  - State Compensation Insurance Fund benefits.
  - The role of the District Accident Prevention Committee.
  - The supervisory accident investigation process and its purpose in preventing accidents.
  - Accident and injury reporting and their purposes.
  - The right to refuse to perform tasks that are dangerous or hazardous.
  - Responsibilities in case of personal and motor vehicle accidents.
  - The Employee Assistance Program.

**Note:** Employees who fail to comply with safety and health policies, procedures, regulations, laws, or rules, shall be subject to disciplinary action in accordance with the provisions described in the *State of California Supervisor's Handbook – A guide to Employee Conduct and Discipline*.

## 2.4 Safety Meetings

### Policy

Supervisors shall schedule, conduct, and document safety meetings with their employees to discuss occupational safety and health issues. Document all safety meetings with the Safety Meeting Report (Form PM-S-0110). For a complete guide to safety meetings see the *Caltrans Safety Manual*, Chapter 2.

### Tailgate Safety Meetings for Field Personnel

At least once every ten working days, or as necessary for special circumstances, each Party Chief shall conduct a tailgate safety meeting. The tailgate safety meeting should focus on safety considerations for the survey party's current assignment.

### Office Personnel Safety Meetings

Meetings for office personnel to discuss safety or health concerns must be held at least once every three months.

## 2.5 Construction Surveying Operations

The Resident Engineer and the Structure Representative are responsible for safety on all Caltrans construction sites. Notify the Resident Engineer of any unsafe operations or conditions on the project. Before beginning a construction survey, determine potential hazards that might arise from the natural environment, the public, and the contractor's operations and plan the survey accordingly.

During the course of the work, observe the following safety guidelines:

- Be extremely cautious around heavy and fast-moving equipment, especially on haul roads and around equipment with limited driver visibility.
- Do not rely on the operator's visibility, judgment, or ability. Make eye contact with the operator before walking in front of or behind any piece of equipment.
- Use lookouts as conditions dictate. See Section 2.7-4, "Temporary Traffic Control, Lookouts."
- Suspend survey operations when uncontrollable hazards develop. Resume work only when safe working conditions have been restored

## 2.6 Surveying Near Traffic

### 2.6-1 General Procedures

**Required "Free Space":** Maintain at least six feet of space between moving traffic and your work area. This includes work on shoulders as well as on the traveled way. Survey at the maximum space possible between moving traffic and your work area. Any surveying that requires working within six feet of moving traffic must be approved by the Field Supervisor or the Surveys Manager.

**Face Traffic:** Whenever feasible, each employee must face moving traffic at all times. If it is not possible to face traffic, a lookout should be used.

**Move Deliberately:** Do not make sudden movements that might confuse a motorist and cause an accident.

**Signal Cautiously:** Whenever feasible, use radio communication. Carefully and deliberately use surveying hand signals so they will not startle or confuse motorists or be mistaken for a flagger's direction.

**Avoid Interrupting Traffic Flow:** Minimize crossing traffic lanes and never attempt to run across traffic lanes.

**Physical Barriers:** Whenever feasible, place a barrier vehicle or a shadow vehicle between moving traffic and workers. See Figure 2-2.

**Distractions to Motorists:** Minimize working near moving traffic, especially on high-speed roads, when the motorists' attention may be distracted by other ongoing activities, such as vehicular accidents, maintenance activities, and construction operations; or distracting objects on or along the highway. Do not work along streets or highways within 2000 feet of such activities or objects.

## 2.6-2 Lookouts

While working on foot on or near the traveled way, workers should normally be protected by barrier vehicles, guardrail, or other physical means. Where the absence of such physical protection exposes workers on foot to errant vehicles, a person shall be assigned as a lookout. A lookout is an employee whose only duty is to provide immediate warning to coworkers of vehicles or equipment that have become imminent hazards to their safety. The lookout shall not try in any way to direct traffic. A lookout is used only to warn of impending traffic hazards, not direct or control it.

**Note:** When work occurs within any railroad right of way, railroad provided or approved lookout and permit to enter is required.

Lookouts are required when all of the following conditions exist:

- Work occurs on a roadway with a posted speed of 55 mph or more.
- Workers are without physical protection (barrier vehicle, k-rail, natural or man-made terrain features, etc.).

- Working on foot within 30 feet of moving traffic.

Lookouts should be considered whenever:

- Working without traffic controls on streets and highways.
- Working within 25 feet of the centerline of an actively-used railroad track outside of a railroad right of way.
- Where there are conflicting or multiple vehicular and equipment movements.
- In areas with restricted sight distances.

Lookouts must be in constant communication with the employee under their protection. If restricted sight distance or other factors preclude verbal communication, use a “lookout alarm device” (LAD) or radios. Whenever possible, lookouts should be stationed in the immediate vicinity of those they are protecting. In some cases, more than one lookout may be necessary. When it appears that a vehicle or some equipment has become a threat to personnel, the lookout will immediately and repeatedly use the word “scramble,” or activate a LAD.

### 2.6-3 **Flaggers**

A flagger is a trained person who gives motorists, pedestrians, and cyclists exact instructions, enabling them to move through temporary traffic control zones safely. Flaggers should be carefully chosen because they are responsible for public safety and make the greatest number of public contacts of all highway workers. Because of their importance and responsibility, flaggers should be rotated and relieved periodically to maintain alertness.

Flaggers must be used any time two-way traffic must share the same lane because of work in the other lane. Generally, flaggers should not be used along freeways. See *Caltrans Standard Plan T13*.

Flaggers shall be trained in flagging procedures and use the proper equipment and warning garments outlined in the *Manual on Uniform Traffic Control Devices-California Supplement*, Section 6, “Temporary Traffic Control”. A copy of the the *Manual on Uniform Traffic Control Devices-California Supplement* should be available to each survey party. For additional requirements for flaggers see the *Caltrans Safety Manual*, Section 12.20, “Warning Garments.”

## 2.6-4 Protective Vehicles

Protective vehicles can be especially important at sites, such as instrument set-ups, where surveyors might be located for an extended period of time. There are two types of protective vehicles:

**Barrier Vehicle:** A vehicle, usually unoccupied, which is parked between the oncoming traffic and a stationary work site.

**Shadow Vehicle:** A vehicle with an attenuator which follows a survey operation moving in the direction of traffic.

Position protective vehicles so they are effective barriers to the traffic. Keep a protective vehicle close enough to employees to give actual physical protection but not so close that it is a hazard to employees. To determine appropriate spacing between protective vehicles and personnel, see Figure 2-2 which provides data on “roll-ahead” for protective vehicles of various weights.

## 2.6-5 Amber Warning Lights and Emergency Flashers

Amber lights should only be used to alert traffic of workers on foot or operations near the traveled way. Do not use the amber lights when driving, when parked in an established lane closure, or when no danger to the employee or motorist exists. Misuse and overuse of warning lights seriously reduces their effectiveness. When working during the hours of darkness, use the amber lights with discretion. Do not blind or distract traffic needlessly. At times, the vehicle’s emergency flashers may be more effective.

Impacting Vehicle		Shadow Vehicle (SV)		Speed of SV after Impact (mph)	Roll Ahead of SV (feet)
Weight (lbs.)	Speed (mph)	Weight (lbs.)	Speed (mph)		
2,250	55	6,000	0	15	15
		10,000	0	10	6
		24,000	0	5	1
		6,000	25	33	172
		10,000	25	30	54
		24,000	25	28	40
4,500	55	6,000	0	24	47
		10,000	0	17	20
		24,000	0	9	4
		6,000	25	38	120
		10,000	25	34	81
		24,000	25	30	50
10,000	55	6,000	0	34	150
		10,000	0	28	72
		24,000	0	16	18
		6,000	25	44	243
		10,000	25	40	152
		24,000	25	34	77
24,000	55	6,000	0	44	462
		10,000	0	39	244
		24,000	0	27	72
		6,000	25	49	572
		10,000	25	46	346
		24,000	25	40	152

6,000 pounds = Loaded 3/4-ton pickup

10,000 pounds = Loaded 1-ton cargo truck

24,000 pounds = Loaded 4 yard dump truck

Shadow Vehicles: Roll-ahead stopping distances are for worst case where the vehicles remain in contact after the collision and all braking is done by the shadow vehicle under ideal conditions (dry pavement, good tire tread, good brakes, brakes locked, etc.)

**Figure 2-2**

## 2.6-6 Temporary Traffic Control

Temporary traffic controls are used to establish a “working area-of-protection” for employees. Methods of temporary traffic control include use of: a) portable warning/control devices, b) prescribed procedures (*see below*), and c) personnel such as flaggers and lookouts. Traffic movement should be disrupted as little as possible by traffic controls. Optimum safety can be achieved most effectively through controlling the activities of surveyors rather than restricting vehicular movements.

### Procedures

- Do not undertake any form of temporary traffic control without consulting and following the directives of the *Manual on Uniform Traffic Control Devices – California Supplement*, and Chapter 8 of the *Caltrans Maintenance Manual*.
- Lane closures should only be undertaken with the approval of the District Traffic Manager.
- Set-up and removal of lane and shoulder closures should generally be undertaken by Maintenance using the guidelines found in the *Manual on Uniform Traffic Control Devices – California Supplement*, and Chapter 8 of the *Caltrans Maintenance Manual*.
- The protection of employees and the public shall be the primary consideration when temporary traffic control measures are used.
- All reasonable measures shall be used to avoid interference with vehicular movement. Lane and shoulder closures shall not be considered until other alternatives have been evaluated for employee protection.
- Minimize the time temporary control devices are used. Employee breaks should be scheduled so that temporary control devices are utilized for the entire period they are in place.
- The party chief is responsible for inspecting and monitoring traffic controls set by surveyors or others. If controls are inadequate or conditions change, surveying activities shall be halted until a safe condition is established.
- Except for special surveys or because of lack of reasonable daylight alternatives, surveys on or adjacent to roads shall be done only during full daylight hours.



- In general, limit the length of a work area to 0.5 mile. When the scope of the survey is longer than 0.5 mile, divide the survey into lengths of 0.5 mile or less. When using lane or shoulder closures, limit the total closure length to an area that can be surveyed during an uninterrupted period of work.

### **Planning**

When planning a surveying project that requires temporary traffic controls, be sure to:

- Use standard traffic control layouts shown on Caltrans Standard Plans T10 through T17 or those shown in the *Manual on Uniform Traffic Control Devices – California Supplement*.
- Use surveying methods that minimize exposure to traffic hazards.
- Consider factors that will affect traffic hazards and implement temporary traffic controls to minimize the hazards. Some factors to consider are:
  - Prevailing traffic speed.
  - Peak traffic hours.
  - Motorists' sight distances.
  - Effect of unusual survey activities on traffic.
  - Pavement conditions – wet, frosty, etc.
  - Special conditions and events, such as school hours and large public gatherings.
- Inform District Traffic Operations and obtain necessary approvals, if any survey activity is going to significantly affect the normal flow of traffic for 20 minutes or longer.
- Observe local district/region policies and procedures regarding traffic controls.
- Coordinate traffic control activities with Maintenance, Construction and CHP, as appropriate.
- Assign adequate personnel to survey parties to meet special safety needs, such as flaggers or lookouts.

## 2.6-7 Surveying Without Traffic Controls

Even when traffic is light, the closing of a lane or setting of other controls might be the most dangerous aspect of a survey. Under certain conditions some surveys can be undertaken safely without including the risk of establishing traffic control. Exposure and risk can be minimized without purposely affecting the flow of traffic. An example is determining elevations of edges and centerline of roadways. Short term surveying operations may be undertaken without traffic controls if all of the following conditions exist:

- Approval of the Surveys Field Supervisor or Surveys Manager.
- The traffic volume must be light. This means that surveyors can walk from the shoulder to the site on the traveled way, perform their duties, and walk back to the shoulder without interfering with traffic.
- Sight distance in each direction is at least 550 feet. When 550 feet of site distance is not available, one or more lookouts may be posted to extend visual coverage.
- Vehicles must be parked completely off the traveled way.

If all of the above conditions are met, the survey can be undertaken without traffic controls using ALL of the following methods:

- One surveyor shall be used as a lookout. See Section 2.6-2, “Lookouts.”
- All surveyors shall be off the traveled way when traffic passes.
- Surveyors shall face traffic whenever possible.
- Surveyors have a planned escape route.

## 2.6-8 Yellow-Stripe Surveys

The term “yellow-stripe” survey is used to designate those surveys along the centerlines, or lane stripes, of conventional roads. A yellow-stripe survey without a lane closure shall be approved by the Field Supervisor or Surveys Manager. A yellow-stripe survey with a lane closure shall be recommended by the Field Supervisor and approved by the Surveys Manager after consultation with the District Traffic Manager.

Yellow-stripe surveys should only be undertaken after considering and rejecting all alternatives, including remote sensing. See Sections 12.7-2, “Pavement Elevation Surveys” and 12.7-3, “Pavement Elevation Survey Methods.”

Yellow-stripe surveys shall be performed during off-peak hours. Traffic control procedures for yellow-stripe surveys are described in the *Manual on Uniform Traffic Control Devices – California Supplement*. For surveys on high volume roads, see Standard Plans T10 through T13. See Section 2.6-7, “Surveying without Traffic Control,” to determine if conditions warrant a survey without traffic controls.

## 2.7 First Aid

First aid is defined in Section 2582.1 of the State Administrative Manual as follows:

*“The assistance provided the sick or injured before medical help is available but only with the express purpose of controlling the loss of blood, sustaining breathing, and reducing the effects of shock. Suitably trained personnel are highly recommended. Medical diagnosis, treatment, and provision of medicines or drugs (aspirin included) are not appropriate.”*

The following are basic requirements that must be met to ensure adequate response to a situation requiring the use of first aid. For more detail see Chapter 9 of the *Caltrans Safety Manual*.

- All surveys field personnel shall be trained in first aid during the first three months of their assignment and at least every two years thereafter.
- Each survey vehicle and office shall be equipped with a 16-unit first aid kit.
- Each survey vehicle and office shall have a readily available copy of a current *Red Cross First Aid Manual* or equivalent.

## **2.8 Environmental Hazards**

### **2.8-1 Animal Hazards**

#### **Precautions Concerning Snakes**

The following precautions should be taken when working in rattlesnake habitat:

- Always assume snakes are active.
- Do not work alone in remote snake habitat.
- Avoid stepping over logs and large rocks into unseen areas. The safest policy is to walk around such obstacles. If this is not possible, first step on top of the object, then look at the back side of the obstacle before stepping down.
- Do not jump down from overhangs onto areas where snakes might be hidden from view.
- Never climb vertical or near vertical faces using unseen handholds above your head.
- Do not attempt to capture or kill snakes.
- When necessary to move low-lying logs, large rocks, and boards, use a pry bar, not your hands.
- Double your precautions at night, especially in warm weather.
- When possible, maintain radio contact with isolated employees.
- Know the location of the nearest medical facility where anti-venom is available and the quickest route there.

### **First Aid Treatment for Snake Bites**

Symptoms indicating that venom has been injected are immediate severe pain, swelling, and discoloration. Look for the symptoms and follow these procedures:

- Identify the snake, but do not take the time to kill it. The fang marks, rattles, and marking and coloration of the snake should be sufficient for identification.
- Immobilize and reassure the victim. Keep the bite below the level of the heart, if possible.
- Thoroughly cleanse the wound with antiseptic.
- If possible, carry the victim to a vehicle, then drive him to a medical facility where anti-venom is available for injection.

### **Precautions Concerning Insects**

Some persons are highly allergic to insect stings. Symptoms of a severe allergic reaction (anaphylactic shock) are: difficulty breathing; swollen lips, throat, and tongue; flushed, blotchy skin; and lowered level of responsiveness. It is recommended that employees who know they are susceptible to such reactions should inform supervisor and co-workers of their condition and the appropriate treatments.

### **First Aid Treatment for Suspected Anaphylactic Shock**

- Assist the victim with emergency medication, such as an Ana-Kit or EpiPen, if prescribed.
- Apply cold packs to minimize swelling.
- Immediately take the victim to a medical facility for treatment.

## **2.8-2 Poison Oak and Other Plant Hazards**

Medical authorities agree that avoidance is the best prevention for poison oak (*Toxicodendron diversilobum*) or Rhus dermatitis. Avoidance can be difficult because Rhus-sensitive people can react, often severely, from contact with implements, clothing, and other objects that have touched poison oak bush. Poison oak is not the only plant that triggers dermatitis. In desert areas, avoid contacting grease wood (or creosote bush) and encelia. Persons allergic to these plants have a reaction similar to that

caused by poison oak. Precaution and treatment are the same as for poison oak.

### **Precautions Concerning Plant Hazards**

The following precautions should be taken when working in poison oak areas:

- Keep highly allergic employees away from poison oak and tools and clothing that have been in contact with the plant during all seasons of the year.
- Adopt a survey plan which minimizes exposure.
- Be able to recognize the plant.
- Wear long sleeves and gloves to minimize contact with the plant. Close cuffs and collars by taping. Wear State-issued, disposable, paper coveralls or work suits of white or fluorescent orange for extra protection.
- Change clothes and wash boots each day after exposure. Use a strongly-alkaline laundry soap for cleaning work apparel. (Dry cleaning is the one safe method for cleaning the clothing of highly sensitive persons.)
- Clean “contaminated” tools with a commercial cleaning fluid or a very strong laundry soap. Use cleaning fluid out-of-doors. Wear neoprene or other waterproof gloves with cleaning agents.

### **First Aid Treatment After Exposure to Hazardous Plants**

- Immediately after exposure, wash thoroughly with strong soap and warm water. Rinse thoroughly with clear water after washing. Application of rubbing alcohol as a solvent may help remove plant oils, but will also remove protective lipid coatings from the skin, making a person more vulnerable to secondary exposure.
- Use medications which are made specifically for poison oak dermatitis.
- If the severity of the dermatitis warrants or if it persists, see a doctor who is approved for treatment of industrial injuries.

## 2.9 Special Operations

### 2.9-1 Night Operations

Hazards are more difficult to neutralize at night. Therefore, surveying shall not be done at night unless reasonable daylight alternatives are not satisfactory. Night surveys can disrupt traffic and arouse the curiosity of local residents. If this seems likely, notify local law enforcement agencies and the Highway Patrol. Consider giving advance public notice through local news media. (Note: Public notices should be handled by the District Public Affairs Office.)

#### **When planning night surveys:**

- Make safety the number one priority.
- Allot extra time for all night operations.
- Make certain you have enough personnel, equipment, and supplies.
- Prepare all party members by proper briefing and issuance of adequate equipment.

#### **In mountainous areas be sure to:**

- Always use the “buddy” system.
- Use reflective flagging to guide personnel along safe roads and trails into work areas and to specific points.
- Provide radio communication for each work area.
- Double your precautions against snakebites in warm weather and fires in dry seasons.

#### **For night surveys in traffic:**

- Only consider night surveys as a last resort.
- Always seek advice and assistance from the District Offices of Traffic and Maintenance.
- Consider use of CHP or other law enforcement agencies.
- Require all personnel to wear white coveralls and orange or strong yellow-green vests or jackets with retro-reflective material that is

visible at a minimum of 1000 feet when working anywhere in the right of way or where vehicles are likely to be moving.

## **2.9-2 Railroads**

Railroad operations are not to be interrupted. Observe the following guidelines when working within an operating railroad right of way:

- Always have a written permit to enter railroad right of way.
- A railroad provided or approved lookout is required.
- Whenever possible, use reflectorless instruments or remote sensing equipment, such as laser scanning, to survey the railroad tracks.
- Orange is the only approved color for safety vests or shirts within railroad right of way.
- Although you have a lookout, always be alert around railroads. Railroad equipment may not be heard, especially on noisy work sites.
- All crewmembers must be familiar with the safety provisions of the permit to enter railroad right of way, and abide by the requirements and procedures.

### **Basic rules to follow include the following:**

- Do not crawl under stopped railroad cars or over couplings, and do not cross railroad tracks between closely-spaced cars. They might be bumped at any time.
- Do not leave protruding stakes or any holes within 10 feet of the railroad tracks.
- Do not park vehicles within 10 feet of the railroad tracks.
- Do not tape across railroad tracks.
- Do not leave instruments or other equipment unattended, on or near railroad tracks.



### **2.9-3 Water Operations**

When surveying in or around bodies of water, use the following precautions:

- Wear a Coast Guard approved life jacket whenever working in a boat or in water over waist deep.
- Always perform work with a buddy.
- Never wade barefoot.
- Use a tautly stretched lifeline as a handrail when wading if stream velocity is high or the streambed is rough or slippery.
- Schedule work on beaches during low tides.
- Do not walk on floating debris.

## **2.10 Special Work Activities**

### **Power Lines**

Regard all power lines as dangerous. Be particularly careful when using 25 foot, aluminum or fiberglass rods.

### **Radio Transmitters**

Mobile radio transmissions can set off explosive charges. If you are near blasting operations, always check with the blasting supervisor before transmitting.

### **Pressurized Spray Cans**

Serious injuries and costly cleanup may result from improper handling of pressurized spray cans. Observe the following rules when using spray cans:

- Do not puncture or incinerate.
- Store at temperatures lower than 120° F.
- Do not carry in vehicle passenger compartments.
- Do not discard any spray can in a receptacle that is normally accessible to children.
- Always wear safety glasses with using spray cans.

### **Hazardous Materials**

A hazardous material is any substance which is a physical or health hazard. Materials that are physical hazards include combustible liquids, compressed gases, explosives, etc. Materials that are health hazards are substances for which there is scientific evidence that acute or chronic health effects may occur in exposed employees. For specific Caltrans policy on handling hazardous materials see Chapter 16 of the *Caltrans Safety Manual*.

### **Hazardous Material Spills**

When an employee encounters a spill or a quantity of an unknown material or substance on or near a highway, the employee should:

- During regular working hours, call the Maintenance Region Managers, or call the Caltrans Communications Center, the CHP, or other emergency number including 9-1-1.
- Stay clear and “up wind” if possible, and avoid contact with the unidentified material.
- Provide traffic control if necessary.

If an unknown material is encountered on a job site, work should be stopped and the supervisor should be notified. The supervisor shall request the District Hazardous Materials Coordinator to determine if the job site is safe before work is continued. If you determine that your personal safety may be in jeopardy, leave the immediate area, and telephone the appropriate authorities from another location. Do not leave the general area without notifying the proper authorities.

### **Lead Contaminated Soils**

Recent testing of soils along some urban freeways has revealed lead levels that are not hazardous. Even in the face of these tests, because lead enters the body through ingestion or inhalation, it is prudent to observe the following safe practices:

- Avoid working in dusty work conditions without a proper mask.
- Prevent soil ingestion by not eating, drinking, or smoking near work operations. Wash hands and face before eating, drinking or smoking. Clean hands, clothing, and shoes before entering vehicles or buildings. Store food and water so it will not be exposed to dust.