

CODE OF SAFE PRACTICES



State of California Department of Transportation
Division of Construction
August 2010



TABLE OF CONTENTS

INTRODUCTION 1

OBJECTIVE 3

GENERAL SAFETY 4

FIELD SAFETY 5

EQUIPMENT 6

TRAFFIC CONTROL SYSTEMS 7

HEAT ILLNESS 8

 How to Identify Heat Stress 8

 Types of Heat Stress 9

 Preventing Heat Stress—a Checklist 11

HAZARDOUS MATERIALS EXPOSURE 12

 Hazardous Substances 12

 Hazardous Wastes 12

 Hazardous Spills 13

VEHICLE OPERATIONS 13

 Parking 13

 Flashing Amber Lights 13

 Vehicle Backing 14

 Vehicle Accidents 14

FACILITIES 14

SPECIAL CONSIDERATIONS 16

- Night Work.....16
- Excavations16
- Elevated Work Areas17
- Electrical.....18
- Confined or Enclosed Spaces18
- Material Plant Sites20
- Field Testing.....21
- Safe Work Practices for Bridges With Bats22
- Lead-Contamination Soils.....23
- Yellow Traffic Stripe Removal24
- Rubberized Asphalt Concrete.....25
- Naturally Occurring Asbestos26

APPENDIX..... 29

- Appendix 1 Respirators in Caltrans Construction29
- Appendix 2 Confined Space Entry Checklist.....30

CODE OF SAFE PRACTICES

The Code of Safe Practices (COSP) is part of the California Department of Transportation (Caltrans) Accident Prevention and Safety Program and complies with requirements of Title 8, “Construction Safety Orders 1509,” of the California Division of Occupational Safety and Health (Cal/OSHA). The COSP defines standard safety practices for Caltrans staff and consultants working for Caltrans involved with inspecting construction activities and operations.

Each Caltrans resident engineer is responsible for ensuring that the COSP provides the required safety practices for all activities on the current project.

Caltrans Division of Construction will revise and update the COSP to keep current with new construction activities, methods, and changing construction environments. Employees should forward suggestions for improving the COSP, adding specific construction operation safety protocol, or questions concerning the COSP to the personnel responsible for maintaining the document, which can be found on the Division of Construction website:

<http://www.dot.ca.gov/hq/construc/safety/>

OBJECTIVE

The first goal of Caltrans' mission and vision is to "Provide the safest transportation system in the nation for users and workers." Caltrans construction employees and our contracting partners are part of this strategic mission and vision

The Code of Safe Practices (COSP) is part of the California Department of Transportation (Caltrans) Accident Prevention and Safety Program, which also includes the *Caltrans Safety Manual* (safety manual), portions of the *Construction Manual* and *Standard Specifications*, and contract specific standard special provisions dealing with safety. In addition to the COSP, the resident engineer should be familiar with Title 8, "Safety Orders" (Cal/OSHA Title 8), of the California Division of Occupational Safety and Health provisions applicable to your work to limit the potential for Caltrans exposure to Cal/OSHA multi-employer citations.

As a Caltrans construction employee, you have multiple safety missions to complete. When you perform your duties, you need to consider your own safety and the safety of the contractors' personnel. Are the contractors complying with the contract safety requirements, Cal/OSHA Title 8, the prime contractor's Injury Illness Prevention Program, and the prime's or subcontractors' company COSPs when doing specialty work? Are their operations safe for public travel and with minimal delays?

Accidents can be prevented. All employees should approach contractor operations with a "Safety First" attitude whether it is travel to and from the worksite, office functions, inspection procedures, observation of the contractors operations, or work-related activities. You must remember that you are on duty and representing the State of California at all times when in a state vehicle, leased state vehicle, your personal vehicle on state business, or when you are performing your duties within the state right-of-way.

The Division of Construction has developed the COSP as part of its safety program to provide a safe working environment for construction personnel. Following the COSP guideline and its overall intent will provide safe practices and procedures for most of our operations. Resident engineers and area construction engineers should review each project for other potential safety issues. If additional safe practices are needed, supervisors must instruct employees or request assistance from district construction safety coordinators to provide instruction on unique safety issues on their projects.

GENERAL SAFETY

The resident engineer must print Sections 1.0 through 10.0 of the COSP plus any portions of Section 10.0, “Special Considerations,” applicable to the project and post the COSP in Category 6 of the project file to comply with Section 2-105A, “Code of Safe Practices,” of the *Construction Manual*. The resident engineer may print the entire COSP and check boxes that apply to the project in Section 1, “Special Considerations,” of the Table of Contents.

Employees assigned to a project must read the “Construction Code of Safe Practices,” and sign and date the signature sheet when first assigned to the project, thereby agreeing to follow these guidelines. Employees should also review Section 2.1, “Safety,” of the *Construction Manual* and be familiar with the provisions and requirements of this chapter.

Employees must follow safety rules, laws, and procedures to ensure that their work environment is safe.

Zero Tolerance for Violence in the Work Place

Section 6.02, “Policy Statement,” of the *Caltrans Safety Manual* states, “It is Caltrans policy to conduct business, provide services, and protect its employees, and the public from harm, by providing a safe, secure and healthy environment that has zero tolerance for aggressive behavior, violence, threats, harassment, intimidation and/or weapons.” Report all acts of violence in the workplace to your district safety officer and report violations of this standard on your project to your resident engineer for follow-up with the contractor, so appropriate action can be taken.

Accident and Incident Reporting

Employees are responsible for reporting vehicle damage; accidents or incidents; and unsafe conditions, procedures, or work practices immediately to their resident engineers and supervisors. Personal injuries to employees must be reported in accordance with Chapter 10, “Reporting Personal Injuries and Illnesses,” and vehicle accidents in accordance with Chapter 18, “Motor Vehicle Accidents,” of the safety manual.

Personal Protective Equipment

Chapter 12, of the safety manual discusses these personal protective equipment requirements:

- All employees must wear a white hard hat with a Caltrans decal and American National Standard Institute (ANSI) 107-2004 Class 2 garments during daytime hours and ANSI 107-2004 Class 3 garments during hours of darkness when performing duties outside vehicles within the state right-of-way.
- All employees must wear ANSI Z87.1-rated eye protection when working within the state right-of-way.

- Additional safety equipment, such as gloves, face protection, hearing protection, and rain gear must be used or worn when the situation dictates to comply with Cal/OSHA Title 8, the safety manual, and the supervisor’s orders.
- Employees must wear clothing and footwear appropriate for the job to be performed and not shoes with soft, thin, or badly worn soles.
- Employees must follow the respirator guidelines in Chapter 15, “Respiratory Protection Program,” of the safety manual.

Employees must not drive or report to work if their abilities are impaired by fatigue, alcohol, prescription or non-prescription drugs, illness, or other causes that might expose themselves and others to injury.

By law, all employees must wear seat belts and harness devices when operating state, state-leased, or private vehicles on state business. Passengers must also wear such devices.

In active work zones, employees must not use personally owned communication devices including, but not limited to, cell phones, personal digital assistants, blue-tooth devices, or entertainment devices. Employees may use a communication device for business purposes in a work zone at a location where their safety or the safety of other workers and the traveling public will not be compromised.

FIELD SAFETY

Each construction field office must hold tailgate safety meetings at least every ten working days to discuss potential hazards or other safety concerns with the job. They must document the meetings and post the minutes in a conspicuous place at the field office.

Section 5-1.08, “Inspection,” of the *Standard Specifications* requires that the contractor provide the inspector safe access at all times during construction. If a contractor’s practice does not comply with contractual requirements or Cal/OSHA Title 8, follow the procedures in Section 2-103, “Managing Safety Hazards,” of the *Construction Manual* and consider starting a documentation trail. You might include these items in the documentation trail:

- Identified improper practices based on contractual requirements or Cal/OSHA Title 8 reference.
- Documented conversations with a contractor foreman or superintendent requesting immediate correction of the safety deficiency or, as necessary, provision of a timeline for correction and potential consequences for failure to abate the deficiency.
- How and when the safety deficiency was abated.
- Contractor’s failure to abate the deficiency within a reasonable time frame. Inform the resident engineer of the actions taken, and follow up with the appropriate contractor’s representative to request abatement.

- If the safety deficiency is not abated in a timely manner based on the resident engineer's request, or if the safety deficiency is repeated later, the resident engineer should write a letter to the contractor detailing the safety deficiency event with a timeline for correction and potential consequences for failure to correct the deficiency. All available contractual resources must be considered, including potentially stopping the operation, shutting down the job, removing personnel, and requesting Cal/OSHA enforcement visit the jobsite after consultation with the construction manager.

Employees should minimize their exposure to hazards and stay away from work areas when their presence is not required.

Employees must face oncoming traffic unless they have a clear reason for doing otherwise and must be alert to contractor equipment in the work zone.

When inspecting or sampling in isolated areas, employees must notify their supervisors or resident engineers of their location and time of return. It is desirable that each employee is accompanied by another (known as the buddy system).

EQUIPMENT

Work around construction equipment requires special precautions.

- Before entering a work area, employees must ascertain movement patterns of the contractor's equipment.
- The contractor must ensure that the equipment has alarms, guards, lighting, and so forth installed as required by Cal/OSHA Title 8.
- Employees must be sure that automatic backup alarms for mandated equipment—or appropriate administrative controls where backward movement would constitute a hazard to employees—are in operation on equipment backing in the work area as required by Cal/OSHA Title 8, "Construction Safety Orders 1592." Immediately stop any equipment not complying, and ensure that it does not return to service until the provisions of the CAL/OSHA orders are followed.
- Employees must not enter into areas potentially in a blind spot of the equipment operator. Employees should follow these rules around the work area:
 1. Never assume that an equipment operator can see you.
 2. Establish eye contact with the operator and use hand signals to show your intentions.
 3. Do not proceed until the equipment operator signals you that it is safe.
 4. Face moving equipment unless there is clear reason for doing otherwise.
 5. Do not ride on or operate any contractor's equipment.

Exceptions:

1. You may cross a paving operation by walking across the screed.
 2. You may ride in a contractor work truck if the vehicle complies with state law for seating and safety belts for the driver, passengers, and occupants.
- Always position yourself away from the path of overhead operations, paying special attention to crane operations. Avoid walking or standing under overhead operations, crane booms, suspended loads, or the fall path of a snapped cable.
 - Stay clear of pile driving operations. Pieces of broken piles or hammers can fly throughout the area causing injury.

TRAFFIC CONTROL SYSTEMS

Construction personnel must exercise due care where the contractor has operations going on in an established traffic control setup.

- When entering or leaving a work area adjacent to public traffic, use appropriate traffic signals and proceed with the normal traffic flow.
- Face traffic unless there is clear reason for doing otherwise. Plan an escape route in advance in case an errant vehicle enters the work area. Use another employee as a lookout.
- Plan your work in advance to keep employee exposure to public traffic to a minimum.
- When possible, park your vehicle as a barrier between oncoming traffic and the work location.
- When required to cross traffic lanes on foot, provide enough time to walk across the lanes safely. If necessary, walk back to the beginning shoulder. ***Do not run—tripping can be deadly.***
- Employees must stay in their vehicles while in a lane closure unless inspection duties require otherwise.
- Employees must minimize work within three feet of the traveled way without a lane closure.
- Employees must minimize work in or within six feet of the traveled way without proper signage or a lane closure.

Exception

Within six feet from the traveled way, you may conduct brief operations without using a lane closure or signage, if the following conditions are met:

1. Parking or working is limited to no more than 20 minutes.
2. Traffic volume is light.

- 3 Sight distance is at least 500 feet in each direction. If not, the resident engineer must work with the contractor to provide safe access for employees to work inside a lane closure.
 4. Employees feel it is safe to do so. If they do not feel safe or the above provisions cannot be met, they must speak with their resident engineer or their supervisor and ask to work behind a contractor-established lane closure.
- All traffic control devices must be clean and not faded. Traffic control devices must be rated for serviceability in accordance with the American Traffic Safety Services Association “Quality Guidelines for Temporary Traffic Control Devices,” 2006 Edition. If a traffic control item is deemed unacceptable, the inspector must inform the contractor immediately and request replacement within an acceptable time period.

HEAT ILLNESS

Cal/OSHA implemented a heat illness standard in Cal/OSHA Title 8, “General Industry Safety Orders (GISO) 3395,” on July 27, 2006. Employee training is the key element of GISO 3395. Provide training in the following information to all field employees:

- Environmental and personal risk factors for heat illness.
- Employer’s procedures for complying with the requirements of this standard.
- Importance of frequent consumption of small quantities of water up to four cups per hour when the work environment is hot and employees are likely to be sweating more than usual while performing their duties.

Importance of acclimatization.

- Different types of heat illness, and the common signs and symptoms of heat illness.
- Importance for employees to immediately report to their supervisor symptoms or signs of heat illness in themselves or their co-workers.
- Employer’s procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary.
- Employer’s procedures for contacting emergency medical services and, if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider.
- Employer’s procedures for ensuring that, in the event of emergency, clear and precise directions to the worksite can and will be provided as needed to emergency responders.

How to Identify Heat Stress

Our bodies have a natural mechanism that regulates a core temperature of 98.6°F by releasing excess heat into the air through the blood vessels near the skin’s surface and through sweat evaporation.



Under certain conditions, your body may have trouble regulating its temperature, so it overheats and suffers from some degree of heat stress. Moderate or severe heat stress can occur suddenly and be dangerous to your health.

Types of Heat Stress

Mild—Minor Heat Problems

The earliest and least serious form of heat stress, mild heat stress is reversible and usually not dangerous unless the symptoms persist. Although you can continue work soon after treatment, always inform your supervisor if you experience mild symptoms of heat stress at work.

Signs and Symptoms

- Excessive sweating.
- Painful spasms (heat cramps) in muscles during or several hours after activity.
- Tiny red bumps on the skin and a sensation called prickly heat.
- Irritability, mild dizziness, or weakness.

What Your Body is Doing

Sweating causes your body to lose water and minerals, an unbalance that causes muscles to cramp. Your sweat glands become blocked and inflamed, causing a rash. Too little blood flow to the brain causes dizziness and other symptoms.

Treatment

- Rest in a cool or shady area.
- Drink water or other fluids.
- Use warm moist compress over cramping muscles, followed by a gentle massage.
- Use a mild drying lotion to relieve the rash.
- Keep skin dry and clean.

Moderate—Heat Exhaustion

Heat exhaustion is a more serious form of heat stress, although the symptoms are usually reversible if treated quickly. Take a break from work and get medical attention. Inform your supervisor immediately if you experience symptoms of moderate heat stress.

Signs and Symptoms

- Excessive sweating
- Cold, moist, pale, or flushed skin

- Thirst
- Extreme weakness or fatigue
- Headache, nausea, or loss of appetite
- Dizziness or giddiness
- Rapid weak pulse

What Your Body is Doing

Losing too much water and minerals reduces the blood supply to your brain, muscles, and skin and makes your heart work harder to maintain the blood supply.

Treatment

- Rest in a cool shady area.
- Drink water or other fluids.
- Take additional salt, if instructed by a physician.
- Use a cool compress on your forehead, around your neck, and in your armpits.

Severe—Heat Stroke

Heat stroke is a serious, life-threatening, medical emergency. It can happen while someone is working in a hot environment for a few hours or less. The symptoms are reversible, but if you do not treat them promptly, heat stroke can lead to permanent brain damage or death.

Signs and Symptoms

- Lack of sweating.
- Hot, dry, and flushed skin.
- Deep rapid breathing.
- Rapid, weak, and possibly irregular pulse.
- Headache and nausea.
- Dizziness, confusion, or delirium.
- Loss of consciousness, and convulsions.

What Your Body is Doing

Your body becomes so overburdened that blood flow and sweat cannot cool sufficiently. Your body becomes overheated, and your sweat glands and other organs cannot function normally. Heat stroke can affect vital organs including your heart and brain and may cause permanent damage.

Treatment

- Rest in a cool or shady area.
- Remove outer clothing.
- Lower body temperature with cool compresses, or pour water on clothing.
- Increase air movement around body.
- Drink water or other fluids. ***Do not ice down.***

Preventing Heat Stress—a Checklist

Prevent heat stress by taking an active role in preventing heat-related problems. Know the factors that increase your risk and take steps to reduce them. Drink water and acclimatize yourself to the heat environment you may work in.

Supervisors and employees must be able to recognize health risks associated with working in areas or performing work activities that may contribute to heat stress. The following items are suggested ideas or steps that supervisors and employees can take to help prevent heat stress:

- Know which factors contribute to heat stress. Discuss the increased risk when employees are working in areas of high exposure to heat, such as hot and humid days or exposure to radiant heat from mechanical sources. Discuss ways to reduce the health risk. Drink plenty of water, but do not wait until you are thirsty. Thirst is not a good indicator of how much water your body needs.
- Increase the amount of water you drink to replenish the water you lose from sweating. Drink more water or other fluids than you need to satisfy your thirst.
- Replenish water regularly by drinking small amounts frequently throughout the work shift.
- Take frequent rest breaks. Depending on conditions—such as air temperature, sun exposure, or physical exertion—you may need more frequent breaks.
- Cover your head and wear personal protective equipment to guard against heat exposure. When possible, wear comfortable loose, lightweight clothing that allows release of body heat.
- Acclimatize to hot work, which usually requires several days of short periods working in the heat, and gradually increase your work time and intensity. Consider alternative work schedules and earlier or later work when the heat is less severe. Employees in good physical condition tend to acclimatize better because their cardiovascular systems respond better.

- Eat light meals. Hot, heavy meals add heat to your body and divert blood to your digestive system. It is better to eat lightly during the work day when exposed to heat.
- Avoid alcohol, caffeine, and some medications. They can act as diuretics and dehydrate the body. Medication used to control high blood pressure, allergies, and diabetes can increase your risk of heat stress.

In many job assignments, heat is a fact of life. Supervisors and employees must work together to reduce the risk of heat stress by monitoring and controlling the work environment. Supervisors must allow employees to adjust gradually to working in the heat.

HAZARDOUS MATERIALS EXPOSURE

Construction projects use many different materials, either individually or in combination, to meet contract requirements. Employees encounter different conditions on construction sites because of environmental conditions, such as wind velocity or direction, and wet conditions that may affect how hazardous materials disperse. The contractor may be using known or unknown materials that require special handling if the material spills. The contractor is responsible for responding to these spills based on direction provided by the product Material Safety Data Sheets and established requirements of the approved water pollution control plan.

You must not handle or transport hazardous substances under the contractor's control unless you have been specially trained to handle or transport hazardous materials (such as a materials tester) and your duties require it.

Hazardous Substances

The contractor must provide the resident engineer with a list of hazardous substances present at the project site, maintain Material Safety Data Sheets, and make them readily accessible to employees. Product names provided must match products in use in the field. Should you find a discrepancy, ask the contractor to obtain and provide the resident engineer with the appropriate Material Safety Data Sheets.

District offices must provide employees with the general information and training on hazardous substances to comply with the Caltrans Hazardous Materials Communication Program. They must post a copy of Chapter 16, "Caltrans Hazardous Materials Communication Program," of the safety manual and see that employees receive specific training, as required, on specific hazardous materials they may be exposed to.

Hazardous Wastes

When unknown and potentially hazardous wastes are discovered, construction work must cease immediately. The vicinity must be secured and construction personnel must not undertake any exploratory or investigative work that would result in further personal exposure.

Hazardous Spills

Employees must inform the traffic management center, district dispatch, or the radio room (after-hours California Highway Patrol) of any potential hazardous spill and must not undertake exploratory work. The resident engineer must review the water pollution control plan and provide hazardous spill emergency numbers to all field staff.

VEHICLE OPERATIONS

Drive vehicles defensively. The vehicle operator is responsible for the proper care and maintenance of assigned equipment and must not operate an unsafe vehicle. The operator must also maintain the vehicle's mileage log.

Do not transport hazardous materials in state vehicles unless specifically authorized. Fuel must be carried only in approved fuel containers.

Parking

- Park vehicles in accordance with legal requirements for parking on public streets and highways.
- Stay at least 25 feet clear of the tracks when parking within railroad rights-of-way.
- Unless you are using vehicles as protective barriers, park them as far from traffic as possible and out of the path of construction equipment.
- Avoid parking behind or in the operating area of the contractor's equipment.

Flashing Amber Lights

Flashing amber lights include such devices as flashing incandescence, rotating beacons, and light bars.

- General use—When the vehicle is equipped with an amber light, follow these guidelines:

Lights ON:

1. Entering or leaving a closure with the appropriate turn signal.
2. Moving at slow speed in or near traffic.
3. When using a vehicle as a barrier to protect workers.

Lights OFF:

1. When parked in a closure (emergency flashers may be used).
 2. Operating in normal traffic.
 3. When no danger to employees or motorists exists.
- Night use—Use discretion so you do not blind or distract traffic needlessly.

Vehicle Backing

Employees must review and follow Section 17.13, “Vehicle Backing Policy,” of the safety manual.

Vehicle Accidents

If an employee is involved in a vehicle accident with a state, leased, or privately owned vehicle used for state business, the employee must complete Form 270, “Vehicle Accident Report,” and mail it to the district safety office within 48 hours. Follow all other accident reporting procedures documented in Section 18.03, “Motor Vehicle Accident Reporting and Form,” of the safety manual.

FACILITIES

Consider field construction facilities as including field construction offices, resident engineer offices, field labs, and adjacent areas used by Caltrans.

- Each facility must post emergency telephone numbers and services in a conspicuous place.
- Arrange field construction facilities, furniture, and supplies safely for easy entrance and exit.
- Store or dispose of hazardous flammable substances properly.
- Employees must take responsibility for immediately reporting unsafe conditions, procedures, or work practices to their supervisors for corrective action.
- Employees must be aware of the location of fire extinguishers and first aid kits.
- Avoid leaving boxes, books, miscellaneous equipment, and so forth in aisles since they can cause employees to fall and injure themselves. Avoid leaving heavy objects on cabinets, bookshelves, and windowsills. In case of an earthquake, these objects can become airborne and cause injury. Refer to Chapter 5, “Office Worker Safety,” of the safety manual.
- Keep aisles clear of stacked materials and equipment. Maintain a minimum 24-inch width around office furniture and minimum 44-inch width in hallways for walking. Be familiar with walkways and use care. Slow down at hallway intersections, especially when carrying hot beverages. Refer to Section 5.05, “Physical Safety,” of the safety manual.
- Employees must not ride on or operate any contractor’s equipment.
- Be familiar with the location of emergency action plan exits and escape routes to use in case of fire or earthquake.
- Maintain electrical cords in good repair. Avoid laying electrical cords where they can tangle with chair legs or create a tripping hazard. If possible, reroute cords to avoid crossing pathways. If necessary, provide additional electrical outlets. Refer to Section 5.05, “Physical Safety,” of the safety manual.

- Use proper lifting and bending techniques for objects you can safely handle. If an object looks too bulky or heavy to lift—*get help*.
- Use care in opening top drawers of file cabinets, so they do not topple on you or other employees. Avoid leaving drawers open when not in use, even for brief periods of time, since open drawers create possible hazards for other employees. Secure cabinets in excess of five feet in height to the wall or floor to keep them from falling.
- Provide an ergonomic workstation and use proper body posture to minimize musculoskeletal and visual problems. Refer to Chapter 7, “Ergonomics,” of the safety manual.
- Employees must not move any furniture or equipment. If it must be moved, contact the facilities coordinator to arrange for the movers.
- Store office supplies in areas set aside for that purpose and not where they can contribute to injury. Do not store materials on top of bookshelves or file cabinets or in walkways, hallways, or stairwells.
- Do not attempt to reach high shelves without a proper ladder or step stool. Avoid awkward reaches.
- Smoking is prohibited in all state facilities, including vehicles, stairwells, and restrooms. Smoking is allowed only in designated areas outside the building.
- It is illegal for any employee or member of the public to bring a firearm or weapon into a state facility or vehicle. Immediately report violations to your supervisor. Refer to Chapter 8, “General Health, Medical Safety,” of the safety manual.
- All employees must use a sign-out board that provides location and approximate return time information for the office to contact them in the event of an emergency.
- Employees must take care while operating and using office equipment to ensure its future availability for all employees.
 1. Desktop computer—Plug your computer into an approved surge protector, and turn it off at the end of every day. Be aware of proper ergonomics and use to eliminate eyestrain and body aches.
 2. Alarm system—Be aware of proper operation, memorize passwords, and know emergency numbers to call during a false alarm.
 3. Copier, printer and fax machine—Only authorized personnel must attempt to maintain and repair the equipment. Avoid hazards associated with loading paper by following the sections on “Lifting,” and “Material/Office Supply Storage,” of the *Code of Safe Work Practices*. Avoid contact with toner and ink.

4. Paper cutter—Take extra precautions while using the paper cutter because of associated risk. Ensure that the device, especially the spring-balanced cutting arm, is in proper working order before using. Make sure the cutting arm is locked and in a closed position after use and during storage.
5. Coffee pot—At the end of the workday, be sure the coffee pot has been turned off to avoid unit overheating and potential damage, possibly resulting in a fire hazard.

SPECIAL CONSIDERATIONS

Night Work

Work during hours of darkness creates special hazards because of the loss of visibility.

- In addition to other required personal protective equipment, employees must wear ANSI 107-2004 Class 3 garments at night.
- Employees must always work in lighted areas to comply with Section 7-1.06, of the *Standard Specifications* and Cal/OSHA Title 8, “Construction Safety Orders 1523.” The minimum acceptable lighting is ten foot-candles. Section 5-1.08, “Inspection,” of the *Standard Specifications* requires the contractor provide employees with safe access to inspect the job.
- If employees believe the contractor is not providing sufficient light for their operations, they should call the construction safety coordinator and ask for a safety review. If the field office has a light meter, they should use it to check for compliance with Cal/OSHA Title 8.
- Employees must not work or allow contractors to work by vehicle headlight or streetlight. If the contractor attempts to work without sufficient lighting, stop the operation until appropriate lighting is provided.

Excavations

Excavations are defined as excavations, trenches, shafts, or earthwork where depths are five feet or greater.

- Employees must not enter an excavation unless it is necessary to perform their work.
- Employees who must enter an excavation must first determine that it is safe to do so.
- Employees must verify that required protection against ground movement and the prescribed access is in place. If the excavation is five feet or deeper, employees must review the excavation safety plan the contractor prepared and resident engineer approved, as required by Section 5-1.02A of the *Standard Specifications*.
- Employees must verify that excavated material spoils piles are placed at least two feet from the edge of the excavation.

- Employees must be alert because an excavation can become subject to the requirements for a confined space.
- Employees must be aware that changed soil conditions may require modifications to shoring or sloping systems, including excavations less than five feet in depth.
- Employees must know they may encounter hazardous waste during excavation processes. If they observe suspect material, they must stop the contractor's operation, restrict the area, and follow Section 7, "Hazardous Materials Exposure," of the COSP.
- Employees must be provided with adequate protection to delineate the perimeter of the excavation when the contractor is not conducting operations at the location. Delineation can be provided in a number of ways, including using plating to cover the excavation or establishing a perimeter with tape line delineators.

Elevated Work Areas

An elevated work area is an open-side end of all scaffolds, runways, ramps, elevated platforms, thrust-outs, surfaces, wall openings, bridge decks, or other elevations 7.5 feet or more above the ground, floor or level underneath, or other sloped surfaces steeper than 40 degrees (such as a slope) under CAL/OSHA Title 8, "Construction Safety Orders 1670. Follow these work practices in elevated work areas for safety:

- Before employees enter an elevated work area, they must ascertain that proper worker protection is in place or readily available for use. This protection includes hand railings and walkways; a contractor-installed, fall-prevention system with proper tie-off; or a personal, fall-restraint system with appropriate anchor points available. If the contractor has an approved fall-protection plan established for the project, employees should review and agree to it or to Caltrans established policy, whichever is more stringent.
- Each employee must use proper safety equipment and look for openings, loose covers, or other unguarded areas. Address safety deficiencies in Section 2.0, "General Safety," of the COSP.
- Contractors must provide standard fall protection (standard guardrail, catch platforms, safety nets) and use it on open sides and ends of elevated work areas.
- Before employees enter work areas where no fixed standard protection is applied, they must have the concurrence of the resident engineer or structures representative and use only approved fall-protection systems.
- Employees must be aware that elevated work areas may encompass deep or enclosed spaces that may meet requirements for confined space entry.
- Employees must not work or pass below elevated work areas where protection from falling objects has not been provided.

Electrical

- Before beginning any wiring inspection, employees must follow appropriate lockout or tag-out procedures. Employees must ensure that the contractor has completed work on the circuit and that the circuit is de-energized. Remember, all electrical equipment must be treated as energized until tested or otherwise proven de-energized.
- Before energizing a circuit, employees must ensure that the contractor has completed work on the circuit and all machinery operated by it.
- Most equipment with exposed metal surfaces is required to be grounded. Immediately remove from service equipment that has damaged or removed grounding prongs.
- Conductors or equipment must not be located in damp or wet conditions; exposed to gases, fumes, vapors, and liquids with a deteriorating effect; or exposed to excessive temperatures unless approved for that purpose.
- Flexible cords must be protected from accidental damage. Ensure not to place cords at points where they can be pinched or damaged by closing a door or window edge. Also, be sure to protect them from abrasion by adjacent materials.
- If a generator is used to power a temporary office, it must be grounded according to the provisions of Title 8, “Electrical Safety Orders,” of CAL/OSHA.

Confined or Enclosed Spaces

A confined space is a location that meets the following definitions:

- An employee can physically enter and perform assigned work.
- Access is limited or has restricted means of entry or exit.
- It is not designed for continuous employee occupancy.

NOTE: Contractors use a different rule for confined space entry as detailed in Cal/OSHA Title 8, “General Industry Safety Orders 5158.” Their rule has only two provisions: 1) existing ventilation is not sufficient to remove dangerous air contamination or oxygen enrichment or deficiency, and 2) ready access or exit for the removal of a suddenly disabled employee is difficult because of the size and location of the opening.

Confined spaces include such structures or facilities as tanks, bridge cells, shafts, pits, bins, tubes, pipelines, deep trenches, tunnels, vaults, vats, pump houses or compartments, sewage lift stations, culverts, coffer dams, or elevator pits.

Chapter 14, “Confined Spaces,” of the *Caltrans Safety Manual* and Cal/OSHA Title 8, designate two distinct types of confined spaces. Cal/OSHA Title 8, “General Industry Safety Orders 5157,”

discusses “Permit-Required Confined Spaces,” and CAL/OSHA Title 8, “General Industry Safety Orders 5158,” discusses “Other Confined Spaces Operations.”

- Employees must not enter any contractor’s designated permit-required confined space. If the contractor has such a work location and inspection is required, immediately contact your resident engineer and the construction safety coordinator to request assistance. No employee must enter or remain in a confined space or an area otherwise known to be deficient in oxygen and containing harmful amounts of dusts, gases, or other substances.
- Employees must not enter a non-permit-required confined space work area where the contractor is basing entry on Cal/OSHA Title 8, “General Industry Safety Orders 5158,” provisions unless they have done the following:
 1. Attended a confined space course.
 2. Reviewed the procedures in Chapter 14, “Confined Space,” of the safety manual.
 3. Filled out the appropriate forms before entering.
 4. Obtained calibrated atmospheric testing equipment and the training to use it.

Construction Program Code of Safe Operating Practices—Confined Space Entry Procedures

Employees must follow confined space entry procedures to identify if the work location is a confined space.

- Immediately before entry, verify radio communications with the radio dispatcher, resident engineer office, or California Highway Patrol for possible emergency rescue.
- Review emergency and rescue procedures. Post at each worksite the name of and way to contact the rescue response agency.
- To the extent feasible, the space must be emptied and flushed or otherwise purged of flammable, injurious, or incapacitating substances.
- Ensure that the space has continuous natural or mechanical ventilation.
- Test the air with an appropriate device to determine whether dangerous air contamination, oxygen deficiency, and explosive hazard exist.
- Maintain a written record of the testing results at the worksite. Hazardous atmosphere is defined as an oxygen level below 19.5 percent by volume or a combustible gas content of greater than 1 percent lower explosive level (LEL); carbon monoxide greater than 25 parts per million (ppm); or hydrogen sulfide greater than 10 ppm.

If the space atmosphere tests hazardous—Stop! Do not enter!

CODE OF SAFE PRACTICES

- Maintain a log at the worksite for recording:
 1. Name of person entering enclosed space.
 2. Name of standby person.
 3. Date and time of each entry and exit.
 4. Initial percentage of oxygen.
 5. Initial percentage of LEL value.
 6. Periodic meter readings or notation of the use of continuous monitoring equipment.
- Ensure that suitable lighting is provided in the work area.
- At least one standby person must remain outside the enclosed space with an effective means of communicating with anyone in the enclosed space and with the radio dispatcher, resident engineer office, or California Highway Patrol.
- Conduct testing of the atmosphere with sufficient frequency to ensure that dangerous air contamination and oxygen deficiency do not develop during the performance of an operation.

If the atmosphere becomes hazardous, everyone must vacate the closed space immediately. Do not re-enter!

- Notify the radio dispatcher, resident engineer office, or California Highway Patrol upon exiting the enclosed space.

Material Plant Sites

The materials plant site has its own potentially hazardous conditions common to this type of operation. When entering the two types of plant sites—jobsite and commercial, employees must follow:

- Onsite use of the hard hat, ANSI 107-2004 compliant garments, and safety glasses is required at all times except when inside office areas. Some areas require the use of hearing protection.
- When entering or driving within the facility, be aware of access roads and their direction of travel.
- Report your presence to the plant operator before you enter the plant. Familiarize yourself with the plant operating procedures by reading the contractor's plant COSP before beginning work, and follow the rules.
- Do not enter an unsafe work area. Specific work areas requiring inspection must have safe access and comply with Cal/OSHA Title 8 requirements at all times. Be alert for overhead wires, tripping hazards, floor openings, and loose material on stairways or walkways. Look for exposed electrical sources.



- Avoid work areas where your presence is not required. Do not walk behind equipment and look before moving into “blind” areas.
- Be particularly aware of the following conditions:
 1. Conveyors that start and stop without notice.
 2. Hot asphalt lines and hot aggregate.
 3. Flammable fuel storage tanks and lines.
 4. Revolving and reciprocating parts, including chains and pulleys that should be guarded at all times.
 5. Restricted areas during time of plant operation.
 6. Loud-sounding horns, which signal that the plant is about to begin operations.
 7. Loader backing operations.
 8. Noise, dust, and no smoking areas (flammable materials hazards).

Field Testing

The field lab has unique conditions that require special attention for radioactive sources. Only trained personnel may use specialized equipment. Nuclear gauges and microwave ovens are normal items of equipment in this operation.

- Operators of radioactive sources must work within all safety regulations.
- Operators must get training in the proper use, transportation, and storage of nuclear gauge devices.
- Operators must wear film badges when operating gauges or are within ten feet of the gauges. Instruct all other persons to keep away.
- Use the three-lock system on transportation and storage of devices. Keep transportation or shipping papers within reach of vehicle operators.
- This job often requires the lifting of heavy objects. Use proper lifting methods by balancing the load and lifting with the legs. Do not risk back injury. If necessary, get help.
- Do not, under any circumstances, attempt to repair, modify, or open the nuclear sealed source.
- Operators must notify radiation safety officers and their supervisors in the event of an accident with the gauge.
- Follow manufacturer’s specifications when using microwave ovens.

Other Test Methods

- In the case of laboratory equipment or procedures, follow the applicable *California Test Method Manual*.
- Maintain proper safeguards on equipment.
- Use proper protective gear.

Safe Work Practices for Bridges With Bats

Bats may be inside bridges and abutments. Although normally docile and shy animals that avoid human contact, they can pose a health risk to workers from direct contact and from contact with the feces (guano) and urine left behind.

Live bats may carry rabies. A virus can be transmitted to humans through bat bites, direct bat saliva, and nervous tissue contact with open wounds, abrasions, or mucous membranes. Human infection from bat contact is extremely rare (as of 1993 there were 28 cases worldwide). The guano from bats in the mid-western and eastern states may contain histoplasma capsulatum, a fungus that causes the respiratory illness histoplasmosis. The California Department of Health Services indicates that no cases have occurred in California. Bat guano may also contain cryptococcus neoformans, encapsulated yeast that the Department of Health Services says is primarily a hazard to immune suppressed individuals.

Follow these work practices to protect employees from the hazards of bats at locations where bats or bat guano is present:

- If work procedures will disturb bats, remove or exclude them from the work area before starting work. Contact your local Caltrans district environmental branch for guidance about removal or disturbance.
- Train employees in the hazards of bats and the requirements of these work procedures. Employees who enter confined spaces or wear respirators must comply with Chapter 14, “Confined Spaces,” and Chapter 15, “Respiratory Protection Program,” of the safety manual. Training, medical evaluation, and testing are required before respirator use is allowed. Individuals with facial hair that interferes with facepiece seal may not wear respirators. Have your supervisor contact the district safety office for more information and training on the use of respirators.
- Do not touch, handle or allow personal contact with live, sick, or dead bats. Do not harass, capture, or kill bats. They are protected under state and federal law.
- Use work procedures that minimize airborne dust and wet guano, or cover it with a tarp to control dust.

- Avoid contact or inhalation of bat guano or urine and contamination of personal clothing by using the following personal protective equipment:
 1. Cloth or Tyvek coveralls.
 2. Rubber or disposable boots.
 3. Gloves and safety glasses or goggles.
 4. National Institute for Occupational Safety and Health-approved high efficiency particulate air (HEPA) dust mask or half-face respirator with HEPA cartridges.
 5. Do not eat, drink, or smoke in the contaminated work area.
 6. Use good personal hygiene practices. Provide wash water, soap, and towels onsite. Wash hands and face before eating, drinking, or smoking.
 7. When leaving the contaminated work area, follow these procedures:
 - Wash boots and remove boot covers.
 - Remove coveralls.
 - Remove gloves.
 - Remove respirator.
 - Wash face and hands with soap and water.
 - Place coveralls in a plastic bag for disposal or washing.
 - Have coveralls commercially laundered.

Lead-Contaminated Soils

Lead enters the body through inhalation or ingestion of lead-containing materials and is not readily absorbed through the skin. The primary concern is exposure through ingestion of contaminated soil. Another concern is that shoes or clothing contaminated with lead-containing soils will enter vehicles, offices, or homes and provide a source for lead contamination and exposure to others.

An evaluation of the soil contamination levels and expected dust levels indicates that exposure to airborne lead should be well below the Cal/OSHA permissible exposure limit (average of 50 micrograms of lead per cubic meter of air for 8 hours).

Recent testing of soils along some urban freeways has revealed that the soils contain low levels (<3000 ppm) of lead. Two purposes of the COSP are to address the possible health risk this contamination poses to Caltrans employees and to outline safety measures to protect employees exposed to the contaminated soil.

Eating, drinking, smoking with hands or faces contaminated with lead-containing materials is the usual way that ingestion occurs. If you use food, cigarettes, chewing tobacco, makeup, or drinks with lead-contaminated soils in them or handle these items with soil-contaminated hands or utensils, you could ingest lead.

Lead exposure can cause serious short-and long-term health effects, including damage to the nervous and blood forming systems, kidneys, reproductive system, and digestive system. Young children absorb lead much easier than adults and can suffer additional severe and delayed effects, including slow learning and behavioral problems from exposure.

Once in the body, lead is a potent systemic poison that serves no useful function. Some leads are quickly filtered out and excreted, but some remain in the blood and other tissues, often for a long time.

Jobsites with elevated lead levels must adopt the following work practices to minimize the potential for contamination and ingestion of lead-contaminated soils:

- Do not permit visible dust. Work on soil when it is wet, or use approved dust-reducing agents.
- Minimize contamination of personal clothing and footwear. Stay clear of operations that generate dust. If contamination cannot be avoided, use protective or disposable clothing and footwear to keep personal clothes clean. So contamination will not spread, store or dispose of used protective clothing by leaving it at the jobsite or placing it in a plastic bag. Clean your shoes before leaving the jobsite. If contaminated clothing must be laundered, wash it separately.
- Prevent soil ingestion by not eating, drinking, or smoking near work operations. Wash your hands and face before eating, drinking, or smoking. Clean your hands, clothing, and shoes before entering vehicles or buildings. Store food and water to avoid exposure to dust.
- Read and review the contractor's written compliance plan (health and safety plan and code of safe practices) for the project. Know who the contractor's site safety person is, and report problems to them. If you have questions about the compliance plan, ask!

NOTE: You must follow the contractor's requirements for the site if they are more restrictive than the COSP. However, as a minimum, Caltrans employees will follow this Caltrans COSP for lead-contaminated soils.

Yellow Traffic Stripe Removal

Yellow traffic paint, thermoplastic stripe, and permanent marking tape use lead chromate pigments to achieve their yellow color. White markings do not contain lead. Although some of the new yellow paints do not contain lead, all older yellow paints do. When the markings are removed by grinding, scraping, burning, abrasive blasting, or other mechanical methods, the dust created can contain lead. This section of the COSP addresses the possible health risk this lead-contaminated dust poses to Caltrans employees and outlines safety measures to protect employees exposed to it.



To minimize the potential for lead exposure, when removing yellow traffic paint marking or stripe by grinding, scraping, burning, abrasive blasting, or other mechanical methods, jobsites will adopt the same work practices as those outlined for lead-contaminated soils in the previous section.

Hazardous Waste Concerns

Under California Environmental Protection Agency regulations, materials that contain over 1000 ppm or 5 milligrams per liter of soluble waste must be handled, stored, transported, and disposed of as “Hazardous Waste.” Waste material with 350 ppm of lead is also hazardous waste. Removal of yellow paint stripe or markings could include these materials. Contact your district hazardous waste coordinator or environmental department for assistance with this issue.

Rubberized Asphalt Concrete

Background

Rubberized Asphalt Concrete (RAC) is composed of petroleum asphalt, ground tire, natural rubbers, and aggregate. In the creation of RAC, the asphalt and rubber are mixed and heated until the rubber swells and blends with the asphalt. The mixture is applied to the heated aggregate to create RAC. Diluent or extender oils are sometimes added to the rubber-asphalt mixture to lower viscosity and improve aggregate coverage. Materials temperature is important at all stages. Caltrans specifications require a rubber-asphalt reaction temperature between 375°F and 425°F for at least 45 minutes before application to the aggregate. The aggregate is heated to 325°F before mixing. RAC cannot be heated above 325°F.

RAC is sticky and requires care in handling, because of the rubber content, many not familiar with RAC assume it is too cold and apply heat. This action causes the rubber-asphalt to break down and creates excessive emissions and smoke. Typically, if the RAC is smoking and stinking, it is too hot. Caltrans specifications call for a maximum windrow and mat temperature of 325°F.

Caltrans collected extensive industrial hygiene air-monitoring data during paving operations using RAC. Materials monitored included asphalt, volatile organic compounds, polynuclear aromatic hydrocarbons, and cyclohexane extractable particulates. Results showed paving worker exposures to be low for all materials and well below established Cal/OSHA limits for materials with a limit. Unfortunately, local incidents of nausea, irritated throat, headache, and irritation continued to occur on isolated RAC paving jobs. Most of these incidents have been accompanied by reports of excessive smoke and RAC temperatures in excess of 325°F.

Before starting paving work involving RAC, follow these rules to assist Caltrans employees in working with and inspecting RAC paving jobs:

- Obtain and review the Material Safety Data Sheet for RAC supplied by the RAC manufacturer (hot plant). Be sure to include sheets for diluents or extender oils if used.

- Review project specifications and note allowable temperatures for RAC manufacture and paving.
- Review the COSP.
- Minimize personal contact with RAC and RAC smoke. Stay upwind and out of the smoke if possible. If irritation or other symptoms occur, move farther away from the smoke. Wear a half-face cartridge respirator with P-100 (HEPA) or Organic Vapor combination cartridges (magenta and black). Respirator use must comply with Chapter 15, “Respiratory Protection Program,” of the safety manual, which requires medical exam, training, fit testing, clean-shaven wearers, and National Institute for Occupational Safety and Health-approved equipment and documentation before respirators are issued or worn. Contact the local district safety officer or construction safety coordinator for assistance.
- Use personal protective equipment to minimize contamination of clothing and skin. Wear coveralls if necessary, and wear gloves if handling RAC. Remove contamination from your shoes and clothing when leaving the site and before entering vehicles or offices.
- Monitor windrow and mat temperatures regularly, and take appropriate action. If smoke is present, measure temperature more often.
- Prevent ingestion by observing good personal hygiene. Do not eat, drink, or smoke near the paver. Wash hands before eating, drinking, smoking, and entering vehicles or offices.
- Notify your supervisor and obtain medical treatment if RAC ingestion or RAC smoke occurs. File a Report of Minor Injury (PM- S-0066) with your supervisor, who will immediately notify and send a copy to the local construction safety coordinator and district safety officer. The district construction safety coordinator tabulates these reports and submits an annual summary on January 1 to the Division of Construction safety coordinator. If the contractor’s personnel are affected, document the occurrence and notify the district construction safety coordinator.

Naturally Occurring Asbestos

You may encounter asbestos at a construction site in the following areas or during the following operations:

- Excavations where asbestos-bearing rock outcroppings are at or near the surface.
- Demolition, salvage, alteration, repair, or maintenance of structures where asbestos is present.
- Transportation, disposal, storage, and containment involving asbestos activities or materials containing asbestos.
- Pipe and boiler insulation.
- Insulators of electrical conductors, plaster, cement, drywall, and taping compounds.

Cal/OSHA regulates exposure and removal of asbestos containing construction materials subject to “Construction Safety Orders 1529.” Employees need to know the following:

- Training is required for employees engaged in work where they are likely to be exposed to asbestos in excess of the permissible exposure limits.
- The employer must ensure that exposure to employees does not exceed permissible exposure limits of 0.1 fibers/cc for an 8-hour time weighed period.
- The employer must provide appropriate respirators and have a written respiratory protection program available onsite.

APPENDIX

Appendix 1—Respirators in Caltrans Construction

Paving

- HEPA with organic vapor or with acid gas.
- PBA 3, 6, and 7—use optional.
- Rubberized HMA—use optional.
- Regular HMA—not required.

Bridge Decks

- Organic vapor or with P100 cartridge.
- Methacrylate—ready to wear, use optional.
- Polyester concrete (styrene)—**mandatory**.

Painting and Retrofit

- Inside containment enclosures—P100 cartridge—**mandatory**.
- Outside containment enclosures—ready to wear, use optional.

Hazardous Waste Cleanup Sites

- Follow site safety plan.
- Minimize contact; do not enter exclusion zone, generally respirators not required.

Confined Spaces

- Not allowed to enter if hazardous atmosphere exists.

Materials Labs

- Use hoods and ventilators.
- Some cartridge respirators available.

Shop

- Polyurethane paints—supplied air required.
- Welding and cutting—use local exhaust.

Geologist and Archeologist

- P100 cartridge—organic vapor.

Appendix 2—Confined Space Entry Checklist

CONFINED SPACE ENTRY CHECKLIST

PM-S-0040B (REV. 5/1998)

NOTE: THE ENTRY SUPERVISOR INITIALS ITEMS 1-3 AND 5-7. ENTER SPACE ONLY AFTER THE PROCEDURES LISTED BELOW HAVE BEEN COMPLETED.

INITIAL

- 1. Review *Code of Safe Practices* for entry and work in confined spaces. _____
- 2. Review emergency/rescue procedures. Ensure emergency rescue equipment/personnel are available for removing disabled worker from space. _____
- 3. Assure that confined space has adequate ventilation. _____

4. Atmospheric testing	ENTRANCE		INSIDE	
	METER READING	INITIAL	METER READING	INITIAL
% Oxygen				
Combustibles (%Lower Explosive Limit - LEL)				
Carbon Monoxide				
Hydrogen Sulfide				

NOTE: If the atmosphere tests hazardous - **STOP - DO NOT ENTER**; contact entry supervisor. Hazardous is defined as oxygen level below 19.5%, or a combustible gas content greater than 1% LEL, or carbon monoxide greater than 25 ppm, or hydrogen sulfide greater than 10 ppm.

INITIAL

- 5. Suitable lighting provided in work area. _____
- 6. Effective means of providing continuous communication between standby person and worker(s) in confined space. _____
- 7. Assure that atmosphere will be tested during work with in confined space.
NOTE: If atmosphere becomes hazardous, all workers shall STOP WORK and LEAVE CONFINED SPACE IMMEDIATELY - DO NOT RE-ENTER; contact entry supervisor. _____

I have determined to my satisfaction that the above procedures have been completed and it is safe to enter and work in this confined space.

ENTRY SUPERVISOR'S SIGNATURE

LOOKOUT PERSON/ATTENDANT'S SIGNATURE

INITIALS OF OTHER WORKERS/ENTRANTS ENTERING CONFINED SPACE

_____	_____	_____	_____	_____
-------	-------	-------	-------	-------