

POST EARTHQUAKE INVESTIGATION TEAM (PEQIT) MANUAL



OCTOBER 2007

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INTRODUCTION

The Post Earthquake Investigation Team (PEQIT) gathers information about the performance of bridges and other highway structures after a large earthquake. This information is used to evaluate Caltrans' current design and retrofit procedures. Because highway damage is removed or repaired very quickly after an earthquake, the PEQIT must be single-minded in their pursuit of data. Although there are constant demands from professors, reporters, engineers, and residents after an earthquake, the PEQIT cannot allow itself to be sidetracked. A successful post earthquake investigation depends on preparation, organization, coordination, communication, and cooperation. It depends on a commitment on the part of all members, but it also depends heavily on safety. The highway is a particularly dangerous place after an earthquake and the PEQIT must remember that no piece of information is worth endangering one's life.

CURRENT PEQIT ROSTER (September 2007)											
PEQIT/OEE HOTLINE 227-8804											
Coordinator Mark Yashinsky / Home 485-3448 / Cell 826-6609 / Work 227-8719 / Pager 948-1851											
#	NAME	OFFICE	Work Phone	Home Phone	Cell Phone	H	I	J	K	L	M
1	Fadel Alameddine (L,DC)	Earthquakes	227-8512			X	X	X	X	X	
2	Bob Tanaka <i>Asst. Coord</i>	Earthquakes	227-8784			X	X	X	X	X	X
3	Steve Mitchell (DC)	Earthquakes	227-8083			X		X	X	X	X
4	Don Lee	Earthquakes	227-8191			X	X	X	X	X	X
5	Jaro Simek (<i>EIC Liaison</i>)	Earthquakes	227-8095			X	X	X	X	X	
6	Richard Heninger	Earthquakes	227-1997			X	X	X	X	X	
7	Jim Gutierrez (L, DC)	Earthquakes	227-8256				X	X	X	X	
8	Saad El Azazy	Earthquakes	227-8124				X		X	X	
9	Allaoua Kartoum	Earthquakes	227-9529				X	X	X	X	X
10	Ski Brown	Earthquakes	227-8495					X		X	X
11	Chris B Campbell	Earthquakes	227-8236							X	X
12	Rod Simmons (DC)	SFOBB Support	227-8168					X	X	X	X
13	Robert Zezoff	Local Assistance	227-8892							X	
14	Sue Hida (L)	Design Branch A	227-8738			X	X	X	X	X	X
15	Pete Soin	Design Section 4	227-7331				X	X	X	X	
16	David Alvarez	Design Section 6	227-8511				X			X	X
17	Ron Bromenshenkel	Design Section 14	227-8151				X		X	X	X
18	Traci Holden	Design Section 15	227-8763								X
19	Marc Friedheim	Design Section 17	227-8480								
20	Paul Chung	Bridge Design South	909-595-7020							X	
21	Chung-Yuan Wen	Bridge Design South	909-598-6161								

(* Cell Phone #, L-Laptop, DC-Digital Camera)
H Attended 2002 Meeting
I Attended 2003 Meeting
J Attended 2004 Meeting
K Attended August 2004 Confined Space Training
L Attended September 2005 Meeting
M Attended September 2006 Meeting

EARTHQUAKE INVESTIGATION PROCEDURE

- **PEQIT Coordinator is notified of a large, damaging earthquake.**

Caltrans' Highway Communication Center (CHCC) will telephone the Chief of the Office of Earthquake Engineering (OEE) or the PEQIT coordinator, usually within half an hour after an $M > 5.5$ earthquake occurs. The CHCC will report the magnitude and time of the event, the latitude and longitude, and the geographical location. Alternatively, the Coordinator may receive notification of a large earthquake on the CGS Strong Motion Instrumentation Program (SMIP) pager, the California Integrated Seismic Network (CISN) Computer, or from another source. After receiving notification, the Coordinator should contact the OEE Chief, the OEE Chief, the SD Chief, and the DES Director.

- **Coordinator determines geographic area to be investigated.**

The Coordinator can estimate the extent of strong ground shaking by drawing a contour line around the fault rupture. For well-compacted soils a magnitude 7.5 earthquake will cause strong shaking in an area 80 miles long by 40 miles wide. A magnitude 7.0 earthquake will cause strong ground shaking in an area approximately 30 miles long (in the direction of the fault rupture) by 15 miles wide. A magnitude 6.5 earthquake will cause strong shaking in an area about 12 miles long by 6 miles wide. Weak soil and other geologic (and topographic) features can cause higher ground shaking to a wider area. The coordinator may call on the staff seismologist for assistance in determining the area of strong ground shaking. Bridges and highways within the area of strong shaking should be investigated.

GIS software can create a map of the area of suspected damage and a list of bridges that have been strongly shaken based on the above-described geologic and seismic features. The Coordinator has a copy of ARC-VIEW Software that can be used to produce maps and lists of bridges after an earthquake. This program needs to be updated periodically with lists of bridges and the newest seismic hazard map. Moreover, the coordinator receives maps from the ShakeCast Server on Lotus Notes.

Shakemap (<http://pasadena.wr.usgs.gov/latest/shakingmaps.html>) will provide a detailed map showing the intensity of ground shaking, it will notify subscribers with an email after a $M > 4.0$ earthquake occurs, and can be used with ARC-VIEW to create lists of potentially damaged bridges following large earthquakes.

The Log of Bridges on State Highways lists all bridges by post mile for every route in each district. Once the area to be investigated is determined, the coordinator can use the 'Log' to create a list of all the bridges in the impacted area.

Local bridges are difficult to locate. The coordinator has a set of county maps with local bridges identified on them. The PEQIT investigators assigned to investigate the performance of local agency bridges should copy relevant county maps.

- **Coordinator uses roster to contact sufficient engineers for investigation.**

The goal in selecting engineers is to obtain a mixture of experienced and new earthquake investigators so that everyone can gain experience without jeopardizing safety, efficiency, or the quality of the final report.

- **Coordinator obtains information for PEQIT.**

There is a great deal of information that can help the team conduct a thorough, productive investigation. This information may include lists of routes and bridges in the area of strong shaking, maps of roads, areas of weak soils, and as-built plans of affected bridges. The coordinator will attempt to obtain relevant damage and road closure information for use by the PEQIT.

- **Coordinator makes arrangements for transportation and lodging of PEQIT.**

Vehicles may be obtained from the Engineering Service Center, Translab, Headquarters, and many other sources. Please read the chapter on 'Resources' for more information.

- **Coordinator assembles, packs, and writes list of equipment for PEQIT.**

Cellular phones are a useful way of providing breaking information between PEQIT members, between the team leader and the coordinator, with district engineers, maintenance engineers etc. The coordinator has three cellular phones for use by the PEQIT. The Coordinator also has pagers and a portable Caltrans radio. Immediately after the Northridge earthquake, the cellular telephone system was unable to handle the huge demand placed on it. However, the PEQIT Leader should still be able to keep in contact by tuning the portable Caltrans radio to the appropriate district. Instructions for using the radio are included, and PEQIT candidates should practice using the radio before an earthquake occurs.

Other equipment such as hard hats, orange vests, cameras, etc. are also available. The PEQIT members must sign out all equipment and are responsible for its safe return to the coordinator. Since the amount of equipment available is limited, during very large earthquakes the PEQIT members may have to use some of their own supplies. The equipment section provides a list of what is available for the PEQIT.

- **Members pack and assemble at the Division of Engineering Services (DES).**

When engineers are notified by the coordinator, they should immediately pack all personal items that are needed for an investigation. This may include suitable outdoor clothing for several days away from home, cameras, water, food, and anything else that will allow the investigator to survive in harsh conditions, possibly without lifelines during the investigation. The members should keep a checklist of necessary items, including any prescription drugs, and be able to assemble these items quickly. They should then quickly assemble in Room 212 of Farmers Market Plaza I (FMPI) at 1801 30th Street or in the Coordinator's cubicle by column 5J on the 2nd floor of FMPI.

- **Meeting between Coordinator and PEQIT.**

Once the PEQIT has assembled at the OEE, the coordinator will provide the team with whatever information, equipment, and material are available. The coordinator will attempt to obtain special identification to enter restricted areas. The coordinator will designate a team leader for each PEQIT. A daily communication schedule will be arranged between the team leader and coordinator and between the team leader and team members. The PEQIT will divide into groups of 2 or 3 for the investigation. Preliminary assignment of routes will be given for each PEQIT group.

- **PEQIT obtains vehicles, loads vehicles and leaves for area of damage.**

Occasionally, a special route will be assigned to avoid damaged roads. In areas of heavy damage the CHP may meet and chaperone the PEQIT to the site. In especially remote areas, special cargo planes may be used to transport the PEQIT and their equipment into the area. One team should leave ASAP to begin recording damage and taking photos before demolition activities have removed seriously-damaged bridges. Contact OSC (Construction) for demolition locations and to possibly take photos of activities before PEQIT arrives at site.

- **Coordinator communicates daily with all those involved in the earthquake.**

It is the coordinator's job to provide support for the PEQIT. Thus, the Coordinator tries to keep abreast of all facts by talking to and attending meetings with Structures Maintenance, Translab, Office of Emergency Services (OES), California Geology Survey (CGS), etc. If the PEQIT has questions or needs help, it's the Coordinator's job to find a solution. The Coordinator should call the California Highway Communication Center (CHCC) and the District Director to let them know the daily location of the PEQIT.

- **PEQIT has tailgate safety meeting before going into the field.**

Every morning before going out into the field, a tailgate safety meeting must be held. The team leader should remind the investigators of potential hazards and safety procedures.

- **PEQIT performs investigation while maintaining contact with coordinator.**

Early each day the team leader calls the coordinator to discuss aspects of the investigation. The Coordinator's cellular phone, pager, and home phone number are provided in the PEQIT Roster. After talking with the coordinator, the leader meets with the members and gives each of them the day's assignment. This assignment may be to investigate an area, a route, or a specific bridge. The team should not delay the investigation if contact with the coordinator is not successful. However, in that case the leader should attempt to establish contact at a later time. A description of what should be recorded during an investigation is provided in the Appendix. Because damaged structures blocking transportation routes will be removed as quickly as possible, the investigation should continue from dawn to dusk. The PEQIT should obtain newspapers everyday for information and a possible source of photographs. If construction or maintenance personnel were able to take photos before damaged bridges were removed, the PEQIT should interview the person and get their phone number as an additional source of photos. At the end of the day, the PEQIT will meet with the leader and discuss the results of the investigation. The PEQIT members should then organize their day's notes and write down everything significant that was observed that day. The team leader should call the coordinator to review the events of the day and plan for the next day's investigation. The extent of the investigation shall be determined by the PEQIT Coordinator in consultation with the Office Chiefs of the PEQIT members.

- **Coordinator posts daily updates on the Internet**

As road conditions and bridge performance become known, the coordinator will write summaries and post them on the OEE Website.

http://www.dot.ca.gov/hq/esc/earthquake_engineering/damage_report/EarthquakeNotice.pdf

If the PEQIT has access to digital cameras, laptop computers, and modems, they should email photos, drawings, and documents to the coordinator for posting at the end of each day's investigation.

- **PEQIT returns to DES and provides digital or hard copies of all photos with labels describing important features.**

A digital copy (compact disk, memory card, etc.) or at least five prints of all photographs should be made. All photos should be labeled as thoroughly as possible with the bridge name, number, bridge member, and a brief description of important features. The master set of photos should include where the photo should be placed in the report.

- **PEQIT provides a completed report (hard copy and compact disk) to coordinator and returns to normal duties.**

The Coordinator will provide the PEQIT with the scope and direction of the report as directed by the OEE Chief. The contents of a typical PEQIT report are provided on page 8 of this manual. All team members are expected to participate in this process and complete their assignment before returning to normal duties.

- **Coordinator edits report and gives draft to OEE and SD Chiefs for review.**

Coordinator edits the report for grammar and content. Coordinator adds sections by the OEE seismologist (and by geotechnical, underground structure, retaining structure, and other specialists when appropriate). Coordinator adds an introduction and conclusion and sends to OEE and SD Chiefs for review.

- **Coordinator takes OEE and SD Chiefs comments and recommendations, makes final draft of report, and sends to reprographics for publication.**

Coordinator will normally give OEE and SD Chiefs one week to review the report. Coordinator and OEE Chief may discuss the number of copies, the type of binding, whether color or black and white figures should be used, etc. The final draft should be converted to a PDF file and checked for errors before sending to reprographics.

- **Coordinator writes a summary of the report for inclusion in the Caltrans OEE Internet Site.**

The daily summaries on the OEE Website will be replaced by a summary of the completed report.

- **Coordinator distributes published PEQIT Report.**

After publication, the Coordinator provides copies of the report to the PEQIT, to the DES, SD and OEE chiefs, to the Seismic Advisory Board (SAB), to Technical Publications, the Technical Resource Center, and the HQ Library, and gives the “original” and any remaining copies to the DES publications unit for general distribution. Normally, the copies remaining after the general distribution are sent to the Document Center by the DES publications unit for sale to the public.

✓	COORDINATOR'S CHECKLIST
	Monitor reports and make a rough estimate of extent of highway/bridge damage.
	Call a sufficient number of engineers from the roster and select a team leader.
	Round up and write down equipment to be used by PEQIT
	Call Structures Maintenance to coordinate lodging and transportation.
	Call airlines, rental agencies, garages, etc to arrange transport into area of damage.
	Continue monitoring reports to determine areas of damage.
	Obtain maps, bridge logs, and bridge plans for investigators.
	Meeting w/ team to plan investigation and arrange communication.
	PEQIT leaves for area of investigation.
	Obtains information from EQ Investigation Clearinghouse and share with PEQIT.
	Coordinator obtains info & communicates daily with PEQIT.
	Coordinator provides updates for the OEE Website
	PEQIT returns from investigation.
	Coordinator organizes the writing of the PEQIT report.
	Coordinator edits the PEQIT report.
	Coordinator sends report for final review by OEE and SD Chiefs.
	Coordinator makes relevant changes and sends report to reprographics.
	Coordinator provides summary of report for the OEE Website
	Coordinator distributes published report.

PEQIT CHECKLIST

1. Constitute and assemble an investigative team as quickly as possible after the event.
2. Transport the investigative team to the earthquake site as fast as possible in order to obtain undisturbed data with the least possible delay. If necessary, one member with camera should leave immediately.
3. Alert District and Bridge Maintenance forces to take as many photos as possible before disturbing or removing any damaged structures.
4. Notify District Director that a Structures team is in the area for gathering technical information. (See "RESOURCES")
5. If you have a Caltrans radio, notify the District Communications dispatcher when you enter or leave the District. (See "RESOURCES")
6. Provide the PEQIT Coordinator with your motel name, location and phone number.
7. Gain as much information as possible about damaged bridges and related transportation structures, in the event of an earthquake.
8. In areas of serious bridge damage, it is sometimes helpful to make a cursory investigation of adjacent building damage, or search for signs of ground surface distress. Sometimes these sources can help establish the primary direction of the ground motion or other factors.
9. Get names and addresses of persons who may have taken photos before you got there. Buy local newspapers -- we may want to buy some of their photos.
10. It is impossible to set up an exact procedure which will take care of every situation. The guidelines given here are based on past experience and should necessarily be modified to suit the situation.
11. Report results of the investigation in a timely and usable manner. A brief summary of the damage may be required within one week of the investigation. A final report should be ready for final typing and publication within one month for most investigations.

The following table can be used to identify the severity of damage to bridges.

EARTHQUAKE BRIDGE DAMAGE LEVEL CATEGORIES

Damage State	Functionality	Repairs Required	Expected Outage
None (pre-yield) (1)	No Loss.	None	None
Minor/Slight (2)	Slight Loss.	Inspect, Adjust, Patch	< 3 days
Moderate (3)	Some Loss.	Repair Components	< 3 weeks
Major/Extensive (4)	Considerable loss.	Rebuild Components	< 3 months
Complete/Collapse (5)	Total loss.	Rebuild Structure	> 3 months

OBSERVE - NOTE - PHOTOGRAPH

- Views of structures in elevation and foreshortened views to show general condition.
- Ground cracks, displacements, liquefaction, slides, settlement, etc.
- Structure cracks and failures - Determine if due to bending, shear, compression, etc.
- Abutments, piers, wingwalls, retaining walls, etc. Check for signs of movement; alignment, plumb, cracking.
- Take samples of rebar at failures. (At bond and tension failures. Samples should be about 3 feet long. Take one sample from where it failed and another where it probably wasn't stressed beyond yield. Label and note location where obtained. Maintenance people or Resident Engineers on nearby jobs may be able to get assistance for cutting the bars.)
- Indications of movements at hinges, joints, railing, curbs. Some bridges have scribes at rail joints. If so, check amount of movement.
- Damaged utilities in, on or near the bridge. Signs of electrical shorting. Disconnected power lines.
- Distress, cracking or movement -- signs, electroliers, barriers, etc.
- Exposed piles.
- Connection of widenings to original structures.
- Scrape marks, dents, holes, indicating parts of structures sliding or hitting each other.
- Direction of leaning or falling.
- Deformed or displaced bearings.
- Condition of equalizing bolts, restrainers, shear keys.
- Broken welds, rivets or bolts.
- Warping or tearing of steel.
- Condition of structures, equipment and facilities in vicinity of bridges -- record location and compass heading or direction the camera is facing.
- Comments from eyewitnesses.

MISCELLANEOUS COMMENTS

It is likely that a heavily damaged area will be well guarded to keep out sightseers, unauthorized persons, looters, etc. Caltrans Photo ID's, business cards with title, hard hats with Caltrans Labels, state autos or private autos with magnetic door seals should facilitate entry into the area.

The object of these investigations is to get as much accurate information as possible before the evidence is destroyed. Getting to the site as quickly as possible is of prime importance. Tape recorders can document comments quicker than writing. Transcribing the tapes and desired editing can be done at a later date. Don't skimp on taking notes.

Immediate attention should be given to structures over railroads and heavily traveled highways or critical routes since damaged structures blocking these facilities are likely to be removed as quickly as possible in order to restore normal traffic or remove a hazard to traffic underneath. Little information can be obtained from those structures after removal or demolition operations have started.

Don't avoid taking a picture because you'll be back later to get a better one. Take it anyway. The cost and time involved in taking pictures is negligible compared to all other expenses. They are the most accurate records that can be obtained and the cost is very minor. Don't trust your memory. Identification is very important.

Use the tape recorder to describe each picture as it is taken -- which bridge, exact location, direction, etc. The first couple pictures of each roll should have some distinguishing detail to identify it from other rolls. When necessary, include a person, pencil, rule, hard hat or other common object to relate area of view, size of detail location, etc. Take photos of critical details from several angles. When exposures or details are critical take three pictures -- "correct" exposure, one stop under and one stop over.

Positive recording that there is no damage may be as important as recording damage. Take photos and note in the recorder that columns are not cracked, abutments not affected, hinges did not show signs of abnormal movements, wing-walls not cracked or settled, approach fills didn't settle, horizontal and vertical alignment appears to be normal, etc. Keep in mind that "no damage" evidence as well as "damage" evidence may eventually be used in court. Photograph the entire bridge and any pertinent geological features near it.

Special attention should be given to structures if injuries or fatalities are involved.

It is better to use more tape and film than necessary and edit later than to find out that you didn't use enough. Each photograph and/or slide should be labeled with the photographer's initial, roll number, number of pictures on the roll, as well as the route, postmile, bridge name, and a brief description of the damage. For digital cameras, create separate folders for each bridge or write in notebook the photo numbers for each bridge with a brief description about the photo.

The team leader should make certain that there aren't any gaps in the photo coverage because each person is assuming that someone else is doing it. Your one and only purpose for being on this team is to get as much accurate information as possible concerning the damage in the shortest feasible time. Don't allow yourselves to be sidetracked by outside engineers, professors, reporters, citizens, or anyone else attempting to get information, opinions, evaluations, etc. However, cooperation with the bridge maintenance engineers can be mutually beneficial.

WRITING A PEQIT REPORT

- **Binding and Cover should use District Color**

District 1: White	District 7: Dark Green
District 2: Ivory	District 8: Red
District 3: Gray	District 9: Dark Blue
District 4: Orange	District 10: Light Green
District 5: Brown	District 11: Yellow
District 6: Light Blue	District 12: Goldenrod

- **Contents**

- **Title Page**

- **Acknowledgments**

The PEQIT report depends on the efforts of many people. Those individuals who went out of their way to make the investigation and report a success should be acknowledged in this section.

- **Table of Contents**

- **Seismological Data**

Only the most essential data should be included in this section. This would include the magnitude, the rupture location and direction, the type of fault, whether the rupture broke the surface, strong motion record information, and comments with reference to Caltrans seismic hazard map.

- **Geological Data**

A general description of the geology, soil characteristics, and fault system in the area of bridge damage. Any unusual conditions should be recorded.

- **Geographical Data**

The topography, location of bays, lakes, and rivers, and other geographical conditions that have a bearing on the performance of bridges for the earthquake.

- **Summary**

This section should typify the performance of bridges and highway structures due to this earthquake. The damage severity should be documented in terms of local and global categories.

- **Collapse**

- **Major Damage**

- **Moderate Damage**

- **Minor Damage**

- **No Damage**

- **Performance of Retrofits**

- **Performance of Post-1980 Bridges**

- **Performance of Post 1990 Bridges**

- **Performance of other Highway Structures**

- **Design Recommendations**

- **Conclusions**

- **Appendices**

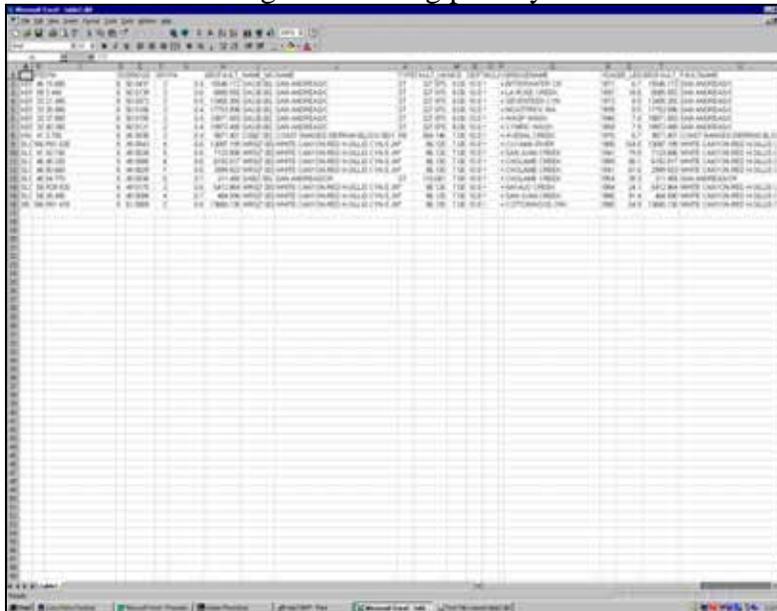
IDENTIFYING EARTHQUAKE LOCATION AND IMPACTED BRIDGES

Procedure for Using ArcView and ShakeMap to Create a List of Bridges

- 1) Download the 1-second spectral acceleration shapefile from ShakeMap web site:
 - Go to ShakeMap homepage at <http://www.trinet.org/shake/>
 - Navigate to “Most Recent Earthquake”
 - Select “Download” from top menu bar.
 - Select “shape.zip” under GIS files to download a compressed shapefile.
 - Uncompress “shape.zip”. This will create about 15 GIS files.
- 2) Do ArcView Analysis as follows:
 - Open default project “Post-EQ Priorities.apr” which has 3 shapefiles loaded:
 - state bridges (st-br.shp),
 - state highways (st-hwys.shp),
 - district boundaries (district)
 - Add the following theme: “psa10.shp”
 - Edit the theme legend using the legend editor as follows:
 - use “graduated color legend”
 - use “Value” for the classification field
 - modify the classification field as follows:

Symbol	Value	Label
Red	0.9 to 5.0	Severe Damage Possible (All Bridges)
Yellow	0.4 to 0.899	Severe Damage Possible (Pre-1975 Bridges)
Green	0.2 to 0.399	Some Damage Possible
Clear	0 to 0.199	Damage Unlikely

- Use “Geoprocessing Wizard” to perform a spatial join of “st-br.shp” w/ “psa10.shp”
- Scale and print map products!!
- Export tabular data for sorting and creating priority lists.



Shakecast automatically produces a list of vulnerable bridges and emails it to participants

Caltrans ShakeCast Preliminary Earthquake Bridge Impact Report Event Summary

Magnitude: 5
 Location: 2 km S of Lower Lake, CA
 Latitude: 38.89
 Longitude: -122.61
 Time: 2007-09-14 05:29:56

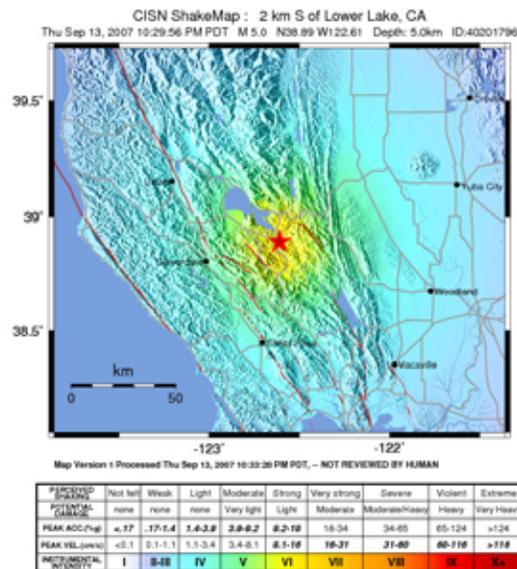
Additional Resources

- [Caltrans ShakeMap Product Downloads](#)
- [View ShakeMap in Google Earth \(Northern CA\)](#)
- [View ShakeMap in Google Earth \(Southern CA\)](#)
- [View Caltrans Bridge Inventory in Google Earth](#)
- [View Real-time Traffic Conditions in Google Earth](#)
- [View Real-time Earthquakes in Google Earth](#)

Estimated Bridge Damage Summary

Maximum Peak 1.0 sec Spectral Acceleration (PSA): 455.3486 (1/100 g)
 Maximum Acceleration: (not measured)
 Number of bridges evaluated: **349**

RED: 94 YELLOW: 137 GREEN: 118



Bridges presented in the table below are sorted in order of potential damage level.

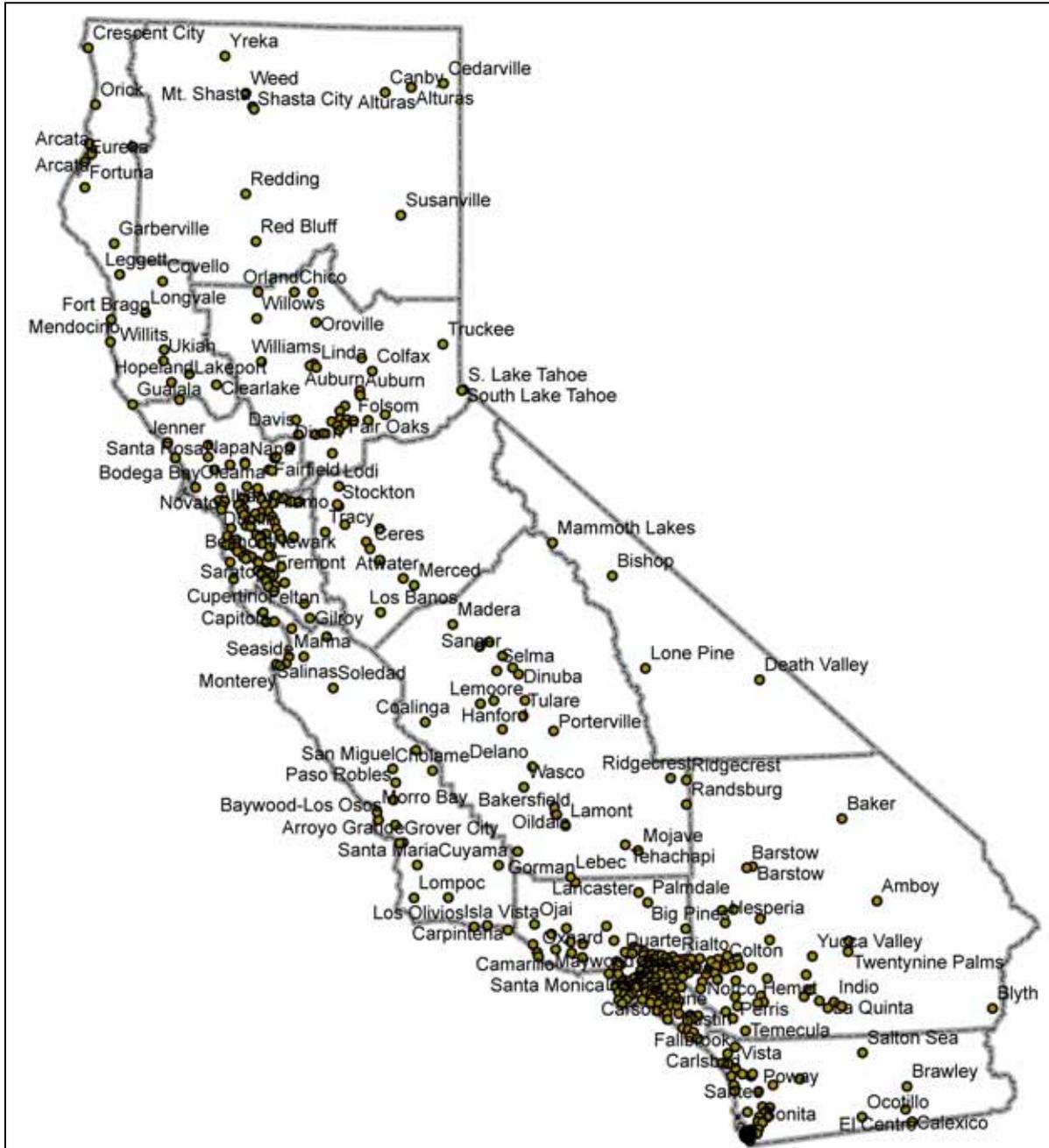
Bridge Name	Bridge No	Dist-Cty-Rte-PM	Damage	Value	Exceedance
North Fork Cache Creek	14 0012	01-LAK-020-37.07	RED	354.297	3.981
Seigler Creek	14 0058	01-LAK-029-20.37	RED	455.3486	3.859
Coyote Creek	14 0051	01-LAK-029-11.89	RED	433.5289	3.770
Seigler Creek	14 0054	01-LAK-053-.02	RED	455.3486	3.476
Kelsey Creek	14 0064	01-LAK-029-R34.97	RED	178.3989	3.130
Saint Helena Creek	14 0016	01-LAK-029-6.31	RED	277.7358	2.924
Meyers Road OC	15 0063	03-COL-005-R13.75	RED	79.7259	2.278

Map showing Caltrans Counties and Districts



C O U N T Y	C O U N T Y	C O U N T Y	N U M B E R S
ALAMEDA-----33-00	ORANGE-----55-00	1-00 D.N.	30-00 CAL.
ALPINE-----31-00	PLACER-----19-00	2-00 SIS.	31-00 ALP.
AMADOR-----26-00	PLUMAS-----9-00	3-00 MOD.	32-00 TUO.
BUTTE-----12-00	RIVERSIDE-----56-00	4-00 HUM.	33-00 ALA.
CALAVERAS-----30-00	SACRAMENTO-----24-00	5-00 TRI.	34-00 S.F.
COLUSA-----15-00	SAN BENITO-----43-00	6-00 SHA.	35-00 S.M.
CONTRA COSTA-----28-00	SAN BERNARDINO-----54-00	7-00 LAS.	36-00 S.CR.
DEL NORTE-----1-00	SAN DIEGO-----57-00	8-00 TEH.	37-00 S.CL.
EL DORADO-----25-00	SAN FRANCISCO-----34-00	9-00 PLU.	38-00 STA.
FRESNO-----42-00	SAN JOAQUIN-----29-00	10-00 MEN.	39-00 MER.
GLENN-----11-00	SAN LUIS OBISPO-----49-00	11-00 GLE.	40-00 MPA.
HUMBOLDT-----4-00	SAN MATEO-----35-00	12-00 BUT.	41-00 MAD.
IMPERIAL-----58-00	SANTA BARBARA-----51-00	13-00 SIE.	42-00 FRE.
INYO-----48-00	SANTA CLARA-----37-00	14-00 LAK.	43-00 S.BT.
KERN-----50-00	SANTA CRUZ-----36-00	15-00 COL.	44-00 MON.
KINGS-----45-00	SHASTA-----6-00	16-00 YUB.	45-00 KIN.
LAKE-----14-00	SIERRA-----13-00	17-00 NEV.	46-00 TUL.
LASSEN-----7-00	SISKIYOU-----2-00	18-00 SUT.	47-00 MNO.
LOS ANGELES-----53-00	SOLANO-----23-00	19-00 PLA.	48-00 INY.
MADERA-----41-00	SONOMA-----20-00	20-00 SON.	49-00 S.L.O.
MARIN-----27-00	STANISLAUS-----38-00	21-00 NAP.	50-00 KER.
MARIPOSA-----40-00	SUTTER-----18-00	22-00 YOL.	51-00 S.B.
MENDOCINO-----10-00	TEHAMA-----8-00	23-00 SOL.	52-00 VEN.
MERCED-----39-00	TRINITY-----5-00	24-00 SAC.	53-00 L.A.
MODOC-----3-00	TULARE-----46-00	25-00 E.D.	54-00 S.BD.
MONO-----47-00	TUOLUMNE-----32-00	26-00 AMA.	55-00 ORA.
MONTEREY-----44-00	VENTURA-----52-00	27-00 MRN.	56-00 RIV.
NAPA-----21-00	YOLO-----22-00	28-00 C.C.	57-00 S.D.
NEVADA-----17-00	YUBA-----16-00	29-00 S.J.	58-00 IMP.

Map showing Caltrans Cities and Districts



RESOURCES

EARTHQUAKE INFORMATION CLEARINGHOUSE

The California Geological Survey (CGS) currently is in charge of establishing an Earthquake Investigation Clearinghouse (EIC) in order to provide a convenient, on-site means for coordination of immediate post-earthquake investigations. The CGS will establish an office in the field near the scene of any damaging earthquake in California and operate it in cooperation with the Earthquake Engineering Research Institute (EERI), the California Office of Emergency Services (OES), the Federal Emergency Management Agency (FEMA), and many other organizations. The Caltrans-Structures Post-Earthquake Investigation Team (PEQIT) shall work in close cooperation with the EIC.

The EIC will maintain a register of authorized investigators at the scene showing organizations represented, field of expertise, location of activity, field address and phone numbers. The EIC will provide a large-scale situation map on which will be plotted areas of damage, areas of hazard, and other details of geologic and engineering concern. An EIC information coordinator will conduct news media briefings and prepare appropriate news releases.

The EIC operation will include at least one information exchange meeting of all interested groups. This meeting is to be held the first evening after the event, if feasible, either at the EIC facility, if space is available, or at an alternate location to be announced by CGS. Currently, Jaro Simek is assigned to represent Caltrans at the EIC.

The location of the EIC will be established as soon after a damaging event as physically possible, ideally within a few hours. Notification of the location will be provided by Bill Bryant. His email is bbryant@consrcv.ca.gov and his phone number is 916 323-9672.

CALTRANS' EMERGENCY PLANNING SECTION

In the event of a disaster involving highways, Caltrans' Emergency Planning Section will coordinate all of Caltrans' operations with the California Highway Patrol, the Office of Emergency Services, the National Guard, the Bureau of Aeronautics, and other Federal, State and Local agencies. Although the PEQIT is primarily interested in studying how Caltrans seismic criteria is reflected in bridge performance during earthquakes in contrast with the emergency operations of other agencies, our team may be able to obtain assistance in transportation, communications and information gathering through Caltrans' Emergency Management Coordinator Srikanth Balasubramanian at 916-208-2348.

. The existence and location of our team should be made known by contacting the Caltrans Highway Communications Center at (916) 653-3442 or ATSS 8-464-3442.

ACCOUNTING

- Time Sheets
Charge District 59-() / Source (your source)
Expense Authorization 910076 Special Designation 6PEQIT Activity 2003
- Travel Expense Authorizations (TEC's)
Team members are expected to handle their own financial arrangements. Reimbursement is made by submitting a Travel Expense Claim (TEC) with appropriate receipts. Refer to the current Caltrans' "Pocket Travel Guide" for more information.

AUTOS

1. State cars are available from the State Garage at 1416 Tenth Street in Sacramento. Their hours are Monday to Friday, from 7:00 AM to 7:00 PM. (returns are 6:00 AM to 9:00 PM). To get a car, the following steps are required.
 - a) Set up an account on line at www.ofa.dgs.ca.gov
 - b) You will need an e-mail address, DL# with Exp Date and a DGS card #
 - c) You contact the Garage at 657-2327
 - d) Only one car per driver. If you need more than one car, another driver has to reserve it.
2. The Department of General Services also has contracts with Alamo, Budget, and Enterprise. You may have to use your own credit card to rent cars from other rental agencies. It is preferable to go through Navigant Travel to rent a car (as well as to obtain airplane reservation or a hotel room). **After hours or on weekends Carlson Wagonlit Travel can be reached at 1-877-409-5862 (Code S6NFA).** PEQIT members should contact the TEC Unit at 227-9061 with any questions about arranging travel.
3. Vehicles may be obtained from Terri Hardesty at the Office of Business Services (227-8163), from Gary Goff at Local Assistance (227-8038 or 227-8049), or from Lawrence Lew or Angelo Lopez at Preliminary Investigations (227-9546 or 227-8594). It may also be possible to borrow a vehicle the Mechanical and Electrical Sections (227-8337) from the Office Engineer (227-6292), from Design (227-3982), or from Hydraulics (227-9466 or 227-8035).
4. Translab has radio cars and other specialty vehicles that may not be available from the State Garage. Contact Stacey Weld at the Transportation Lab (227-7021), Rhonda Reynolds at Pavement Testing (227-1985), or Kendra Callahan at Testing Services (227-7020).
5. Although their vehicles may be in use, Roy Bibbens at 227-7178 (Geotechnical Services North), John Ehsan at 227-4575 (Geotechnical Services South 1), Abbas Abghari at 227-7172 (Geotechnical Services South 2), and Henry Brimhall at 227-4475 (Foundation Drilling) may be contacted to see if an extra vehicle is available.
6. Personal Autos. State cars should be used, if possible, to facilitate entry into restricted areas. Use the 12" x 12" magnetic Caltrans door signs on private or rental cars. Do not drive autos while magnetic signs are attached (they blow off). The Coordinator has one sign and more can be obtained from the Translab or from your supply clerk.
7. If available, a District car equipped with a District radio (and an AM/FM radio) is preferred (see District phone numbers on Page 16 and District radio channels on Page 13).

AIR TRAVEL

Airline tickets can be obtained through the usual channels during regular working hours. On weekends or after hours, PEQIT team members should call Carlson Wagonlit Travel at the **1-877-409-5862 (Code S6NFA)**. If our travel agent for some reason is not available, the PEQIT could possibly use their own money or credit cards for airline tickets and be reimbursed.

Under some circumstances it may be possible to get transportation by the CHP, Bureau of Aeronautics or from other sources. If the need arises, contact Caltrans' Emergency Management Coordinator Srikanth Balasubramanian at 916-208-2348.

The Division of Aeronautics will supply air transportation only for severe emergencies and usually only for the CALTRANS Director. If a disaster situation arises, it may be possible to secure space for one additional person.

EQUIPMENT

The following is a list of useful equipment for a post earthquake investigation. Some of it is supplied by the PEQIT Coordinator but much of it needs to be brought by the members.

Essential Equipment	Additional Equipment
Hard hat and orange vest (from Caltrans PEQIT)	Coveralls
Magnetic placards (from Caltrans PEQIT)	Rock Hammer
Log of Bridges on State Highways (from Caltrans PEQIT)	Maps
Notebook to record observations.(from Caltrans PEQIT)	Bridge Plans
Camera and film (from Caltrans PEQIT)	Radio
Tape measure (from Caltrans PEQIT)	Binoculars
Food	Tape Recorder
Water	Walkie-talkies
Boots	Aerial Photos of site
Rugged clothing and rain gear	As Built Bridge Plans

Identification Badges

Each team member should carry a Caltrans Emergency Pass if they are available. These were provided by OSC after Loma Prieta and by the Director of Engineering Services after Northridge. Caltrans Employee ID may be used to obtain access to damaged structures. Magnetic Caltrans signs should be attached to auto doors unless autos with permanent signs are used. Remember not to attempt driving with magnetic signs as they will blow off. Areas of damage are likely to be guarded by police or CHP. Some form of identification is necessary to be admitted into these areas. The Office of Emergency Services provides photo ID's for engineers taking the 1/2 day seminar. However, OES workers are issued special colored passes that change for every event.

Clothing

Each person is responsible for furnishing their own hard hat, boots or shoes with heavy soles, and suitable clothing. Nail-proof inserts are recommended for shoes. Take raingear during the rainy season. Bring cold weather gear for earthquakes in the mountains or near a bay or ocean.

Communication Equipment

- *Cellular Phones*

The PEQIT Coordinator has three cellular phones. They should work well in most areas of California. If you are not transmitting, try moving a few hundred yards away and try again. These digital phones have chargers that should be taken when you anticipate being gone for several days. If you have trouble using a cell phone contact Steven Halsey at 227-8989.

Cell Phone #		Cell Phone #		Cell Phone #	
916-730-0580	Nextel	916-417-5055	Nextel	916-947-9649	Nextel

- *Pagers*

The PEQIT Coordinator has four MobileComm pagers. These pagers will display the caller's phone number, or they can be used to receive an email message. Simply type the address <http://www.mobilecomm.com/message/> on the Internet address bar and type the phone number and your message on the Arch Wireless screen that appears. The same message will appear on the pager. For more information, on pagers or cell phones contact Steven Halsey at 227-8989.

Pager Phone #	PIN	Pager Phone #	PIN
916-592-7629	0104617	916-592-2191	0103185
916-592-1298	0104619	916-592-2862	0104616

- ***Caltrans Radio***

The PEQIT Coordinator has a MTS 2000 portable radio. This radio can be used to contact District Dispatchers and Caltrans' vehicles equipped with radios. The radio can be used to monitor District communication for information on bridge damage and to establish contact when other communication facilities are damaged. The radio comes with an operating instruction manual and a charger. The radio should be set to the correct District and Channel using the selector knob. Then the switch on the side is pushed to begin communications. The radio can be set to monitor conversations in the area or on a direct setting to speak with another radio operator. The following Settings are for Caltrans repeater stations in California.

- TURN RADIO ON WITH THE VOLUME CONTROL KNOB
- 16 POSITION ROTARY KNOB SELECTS DISTRICT 1, POSITION 1, ETC.
- TO CHANGE CHANNELS:
 1. PRESS (>)
 2. PRESS BUTTON (1) UNDER MENU DISPLAY 'CHAN'
 3. PRESS (>) OR (<) TO SELECT A DESIRED CHANNEL OR CHANNEL NUMBER ON THE KEY PAD.
 4. PRESS (HOME)
- TO SELECT DIRECT OR REPEATER MODE OF OPERATION:
 1. PRESS (>)
 2. PRESS BUTTON (2) UNDER MENU DISPLAY 'DIR'
 3. PRESS BUTTON (1) FOR 'DIRECT' OR BUTTON (3) FOR 'REPEATER'
 4. '→' IN THE DISPLAY INDICATES DIRECT
- TO TURN SCAN 'ON' OR 'OFF':
 1. PRESS (>)
 2. PRESS BUTTON (3) UNDER MENU DISPLAY 'SCAN'
 3. PRESS BUTTON (1) UNDER MENU DISPLAY 'ON' OR PRESS (3) UNDER MENU DISPLAY 'OFF'
 4. DISPLAY 'Z' INDICATES RADIO IS SCANNING
 5. NOTE: CH. 1 IN EACH DISTRICT LIST IS A FIXED SCAN LIST
- TO VIEW A SCAN LIST:
 1. PRESS (>) TWO TIMES
 2. PRESS BUTTON (1) UNDER MENU DISPLAY 'VIEW'
 3. PRESS BUTTON (1) UNDER MENU DISPLAY 'SCAN'
 4. 'Z □' INDICATES RADIO IS IN THE SCAN LIST VIEW MODE
 5. PRESS (>) OR (<) TO VIEW THE CHANNELS THAT ARE CURRENTLY IN THE SCAN LIST
 6. PRESS (HOME) TO EXIT VIEW MODE
- TO EDIT A SCAN LIST:
 1. PRESS (>) TWO TIMES
 2. PRESS (2) UNDER MENU DISPLAY 'PROG'
 3. PRESS (1) UNDER MENU DISPLAY 'SCAN'
 4. FLASHING '□' INDICATES RADIO IS IN THE SCAN LIST EDIT MODE
 5. PRESS (<) OR (>) TO ADD OR DELETE THE CHANNEL FROM THE SCAN LIST
 6. PRESS THE BLUE/GREEN BUTTON ON THE LEFT SIDE OF THE RADIO TO ADD OR DELETE THE CHANNEL FROM THE SCAN LIST
 7. 'Z' INDICATES THE CHANNEL IS IN THE SCAN LIST
 8. SCAN LIST CAN INCLUDE UP TO TEN CHANNELS
 9. PRESS 'HOME' TO EXIT EDIT MODE
 10. District Channels for Caltrans Radio

DIST	CH. NO. & NAME	DIST	CH. NO. & NAME	DIST	CH. NO. & NAME	DIST	CH. NO. & NAME
1	1-01 C/C SCAN *	2	1-02 C/C SCAN*	5	1-05 C/C SCAN'	6	1-06 C/C SCAN'
1	2-SR 199W	2	2-DORRIS	5	2-FREEMONT PK	6	2-MADERA
1	3-CRESCENT CITY	2	3-SEIAD	5	3-MONTEREY	6	3-COURSEGOLD
1	4-KLAMATH	2	4-GAZELLE	5	4-CARMEL	6	4-HUNTINGTON I-AK
1	5-ORLEANS	2	5-EAGLE LAKE	5	5-LITTLE RIVER	6	5-AUBERRY
1	8-SR 299 W	2	8-MC CLOUD	5	6-KING CITY	8	6-5R 180
1	7-EUREKA	2	1-BUCK HORN	5	7-SAN SIMEON	6	7-VISALIA
1	8-SCOTIA	2	8-HAYFORK	5	8-CAMBRIA	6	8-SR 178
1	9-GARBERVILLE	2	9-PLATINA	5	9-SAN LUIS	6	9-SR 58
1	10-LONGVALE	2	10-RED BLUFF	5	10-SAN LUIS MS	6	10-MARICOPA
1	11-UKIAH NORTH	2	11-COLBY	5	11-SANTA MARIA	6	11-BAKERSFIELD
1	12-NAVARRO	2	12-ST JOHNS	5	12-SANTA BARBARA	6	12-FRESNO
1	13-BOONVILLE			5	13-SANTA BARB MS	6	13-ONST GI
1	14-UKIAH SOUTH			5	14-BIG BASIN	6	14-CONST G2
1	15-CLEAR LAKE			7	1-C/C SCAN'	8	1-C/C SCAN'
3	1-03 C/C SCAN'	4	1-04 C/C SCAN'	7	2-GRAPEVINE	8	2-INDIO
3	2-115 NORTH	4	2-SANTA ROSA	7	3-GORMAN	8	3-CABAZON
3	3-OROVILLE	4	3-BERRYESA	7	4-PALM DALE	8	4-BOX SPRINGS
3	4-CHICO	4	4-NAPA	7	5-15/SR 14	8	5-JOHNSTONE
3	5-CHICO NORTH	4	5-FAIRFIELD	7	6-BURBANK	8	6-CAJON PASS
3	6-WOODLAND	4	6-SAN RAFEL	7	7-SAN DIMAS	8	7-VICTORVILLE
3	7-SACTO LOCAL	4	7-OAKLAND	7	8-POMONA	8	8-BARSTOW
3	8-SOUTH SACTO	4	8-WALNUT CRK	7	9-TORRANCE	8	9-TEMECULA
3	9-PLACERVILLE	4	9-PLEASANTON	7	10-WEST LAKE	8	10-BIG BEAR
3	1-STOCKTON	4	1-ALTAMONT PS	7	11-SANTA PAULA		
3	11-KYBURZ	4	11-BENICIA TOW	7	12-VENTURA		
3	12-ECHO/SLTAHOE	4	12-NILES CANYON	7	13-OJAI	10	1-C/C SCAN'
3	13-AUB/MARYSV L	4	13-SAN FRANCISC	7	14-MALIBU	10	2-CABBAGE PATCH
3	14-NEV CITY/I 80	4	14-HALFMOON BAY	9	1-C/C SCAN'	10	3-TELEGRAPH
3	15-BAXTER	4	15-HWY 92135	9	2-TOPAZ	10	4-PEDDLER HILL
3	16-WHIT/KINGVALE	4	16-LA HONDA	9	3-HOT SPRINGS	10	5-MT BUWON
3	17-KINGVALE/TRKE	4	17-PIGEON PT	9	4-MONO LAKE	10	6-MT OSO
3	18-TRUCKEE	4	18-SAN JOSE	9	5-REST VIEW	10	7-LEVIATHON
3	19-BOCA/RENO	4	19-HECKER PASS	9	6-BISHOP	10	8-MT ZION
3	2-TRKI/TAHOE CITY	4	2-PACHECO PASS	9	7-LONE PINE		
3	21-TAHOE			9	8-RIDGE CREST		
3	22-NEV CITY			9	9-MOJAVE	12	1-C/C SCAN*
3	23-CAL IDA			9	10-TEHACHAPI	12	2-SANTA ANA COM
3	24-DOWNIEVILLE			9	11-LITTLE CREEK	12	3-ORANGE
3	25-SIERRA CITY			11	1-C/C SCAN*	12	4-BREA
3	26-YUBA PASS			11	2-ESCONDIDO	12	5-SAN JUAN
3	27-SIERRAVILLE			11	3-METRO	12	6-REGION 2
3	28-RED BLUFF			11	4-EL CAJON	12	7-YORBA LINDA
3	29-PU LGA			11	5-EL CENTRO	12	8-WESTMINSTER

*CHANNELS LABELED [C/C SCAN] ARE CAR TO CAR CHANNELS WITH FIXED SCAN LISTS. SCAN FEATURE MUST BE ACTIVATED VIA THE MENU.

- **Two-Way Radios**

We have a pair of 'walkie-talkies' that can be strapped to the investigators clothing for hands-free operation. These can be used for rope climbing or when traffic noise makes conversation impossible. The main unit is hung from a belt and the microphone clipped to a shirt collar. We also have a newer pair of 'walkie-talkies' that are smaller but don't provide hands-free operation.

Tape Recorders

Currently, the PEQIT Coordinator has one Olympus Microcassette recorder. It comes with 10 blank tapes and a supply of AA batteries. PEQIT members should either become familiar with using the tape recorder or bring a stenographer's pad to take their notes.

Cameras And Film

Currently, the PEQIT Coordinator has five digital cameras of varying capabilities. We also have two Olympus OM-1 single lens reflex film cameras. Members of the PEQIT should either bring their own cameras or practice taking pictures with the PEQIT cameras, particularly for taking pictures in shadow when there is bright background light. This is too often the case when photographing under bridges. Some cameras have a 2X setting to compensate for bright backgrounds. Usually focusing on the dark area will set the aperture and shutter speed for the area of darkness. Familiarity with the camera is essential for clear pictures. Bring lots of film or memory cards. It is not unusual to shoot 5 or 6 rolls of film every day. Film can be obtained from the supply room or it can be purchased.

The Olympus digital cameras come with 4 Mb and 8 Mb smart media cards. The older Sony cameras use 128 Mb memory sticks and the newest camera has 2 – GB memory sticks. A single photo can use as much as 5Mb (in high resolution) or as little as 200 Kb (in the lowest setting). Digital photos must either be downloaded to a computer with the appropriate camera software or to a computer with the appropriate card reader.

Digital cameras come with lithium batteries, chargers, AC adapters, connection cables, and manuals. Investigators should not take the digital cameras unless they are familiar with their operation. The use of laptops with modems and digital cameras will allow the PEQIT to send the coordinator photos from the field, which can then be put on the Internet to update the public. It is essential that investigators take the time to identify each photo as it is taken. Labels can be made in ‘Word for Windows’ and affixed to the back of the photos. Investigators are encouraged to study the labeling system used after the Northridge earthquake. These are available from the coordinator.

Bridges Plans

The following steps can be used to obtain bridge plans in the field:

- 1) Access the Caltrans network through a Caltrans computer or from an outside computer with a modem by dialing 1-800-561-1553 and logging on with *username.es.fmp1.sac.caltrans* and your Novell Network password.
- 2) Navigate to *smi.dot.ca.gov*
- 3) Click on the BIRIS link.

The software will prompt the user for any needed plug-ins. Paul Cooley (227-8827) manages BIRIS and can assign staff to help with the investigation.

Maps

The best maps for locating state bridges are the California State Highway Maps that have post-miles corresponding to the bridge logs. The best maps for locating local bridges are the county township and range maps that show every street and local bridge. The Coordinator has a complete set of these county maps under his desk. The PEQIT Coordinator also has a complete set of AAA maps for the state of California. To preserve these maps, they should be ‘Xeroxed’ and the copies should be taken out into the field.

The PEQIT Coordinator also has ARC-VIEW GIS software installed for locating faults and creating lists of bridges for investigation. Most mapping software (such as “Delorme Street Atlas”) can take a text file of Caltrans bridge latitude and longitudes and overlay it onto a map of California. The investigator can then zoom in on the area to locate state and local bridges.

Aerial Photographs

Aerial photos of earthquakes that cause vehicle damage or loss of life on state highways are usually taken by aerial photography firms under contract to Caltrans within 24 hours of the event. To obtain aerial photos of earthquake damage, call 'Photogrammetry' under Contacts or check at the following website: <http://www.dot.ca.gov/hq/esc/photogrammetry/contacts.html>

Water

Potable water may be difficult to obtain. Consider buying one or more plastic folding type containers or canvas waterbags. Large, rigid plastic type containers may be available near the destination in some cases. Individual members should consider bringing their own filled canteens or water bottles.

Food

Consider taking a sack lunch when you leave Sacramento. If restaurants and grocery stores are severely damaged or cannot operate due to lack of water and power, obtain canned and dehydrated foods and canned juices before you enter the area.

PEQIT EQUIPMENT

Quantity	Description	Model No.	Location
3	Nextel Cellular Phones w/ chargers, etc.	I530	Cabinet
4	Motorola Pagers	A05MVB5861AA	Cabinet
2	ICOM Two Way Radios	IC-F4-4	Cabinet
2	Garmin Walkie-Talkies / GPS Receivers	Rino 120	Cabinet
1	Motorola Portable Radio	MTS2000	Cabinet
1	Canon Powershot Digital Camera	A700	Cabinet
2	Olympus Digital Cameras	D-600L	Cabinet
2	Sony Digital Cameras	DSC-F707 &Mavica	Cabinet
-	Memory Sticks, Flash Memory, etc.		Cabinet
2	Olympus 35mm Film Cameras	OM-1	Cabinet
-	Print and Slide Film		Cabinet
1	Camera Bag Containing Lenses and Flash		Cabinet
1	Olympus Microcassette Recorder and Tapes	Pearlcorder S710	Cabinet
1	Toshiba Tecra running Win2000		Cabinet
1	IBM ThinkPad running XP Pro		Cabinet
3	Binoculars		Cabinet
-	Batteries		Cabinet
1	Envelope of Keys		Drawer
1	Bandages and First Aid Kit		Drawer
1	100' Tape Measure		Drawer
-	Replacement Locks & Bag of Caltrans Keys	12B130	Drawer
1	Magnetic Caltrans Auto Decals	20M1543	Drawer
-	AAA Maps		Drawer
-	Bridge Logs and District Maps		Drawer
1	Hacksaw and Replacement Blade		Closet
-	Hard Hats, Orange Vests, and Coveralls		Closet
3	Flashlights		Closet
1	Pick		Closet
1	Plumb Bob		Closet
3	Tape Measures		Closet
1	Bolt Cutters		Closet
3	Suitcases		Closet
5	Canvas Tote Bags with a variety of equipment		Closet

MAKING CONTACT

Contact the Coordinator when you arrive at your location (i.e., at the airport or at the EQ site) for an update on the damage. The team leader will notify the District Director that a Structures team will be in his/her district to gather technical information. Give names of team members and name of motel - if known. If you have a Caltrans radio, notify the District Communications dispatcher when you enter or leave the District (use the District Headquarters as the call number; i.e., "San Francisco," "Marysville," etc.). The PEQIT can use the following call number for its use: 59-"(last name of team leader)." District offices can relay messages to and from Sacramento via radios on Caltrans frequencies. Caltrans and the CHP monitor each other's frequencies.

Transportation Districts			
District 1	1656 Union St., Eureka (95501)	Traffic Management/Dispatcher	
	Public Info. (707) 445-6600	707-441-5747	
District 2	1657 Riverside Dr. , Redding		
	Public Info. (530) 225-3426	530-225-3273	
District 3	703 B St., Marysville (95901)		
	Public Info. (916) 741-4211	916-859-7900	
District 4	111 Grand Avenue, Oakland (94612)		
	Public Info. (415) 286-4444	510-286-6359	
District 5	50 Higuera St. , San Luis Obispo (93401)		
	Public Info. (805) 549-3111	805-549-3212	
District 6	1352 W. Olive Avenue, Fresno (93728)		
	Public Info. (559) 488-4020	559-488-4152	
District 7	100 S. Main St., Los Angeles (90012)		
	Public Info. (213) 897-3656	213-897-0383	
District 8	247 W. Third St., San Bernardino (92402)		
	Public Info. (909) 383-4561	909-383-2594	
District 9	500 S. Main St., Bishop (93514)		
	Public Info. (760) 872-0601	760-872-0718	
District10	1976 East Charter Way, Stockton (95205)		
	Public Info. (209) 948-7543	209-948-7556	
District11	2829 Juan St., San Diego (92110)		
	Public Info. (619) 688-6699	858-467-3085 [858-467-3090 (LATE)]	
District12	2501 Pullman Street, Santa Ana (92705)		
	Public Info. (714) 724-2000	949-559-7895	
DEPUTY DISTRICT DIRECTORS FOR MAINTENANCE			
Name	District	Work Number	Cell Number
Mark Suchanek	D01	707-445-6393	707-498-0536
Ed Lamkin	D02	530-225-3545	530-949-7059
Steve Kirkpatrick	D03	530-741-4318	530-218-2672
Usen Inyang	D04	510-286-5893	510-385-7059
Steve Price	D05	805-549-3281	805-748-8421
Brian Everson	D06	559-488-4144	559-288-2731
Dan Freeman	D07	213-897-8150	213-792-8144
Basem Muallem	D08	909-383-6320	909-214-5995
Craig Holste	D09	760-872-3143	760-937-7826
Dinah Bortner	D10	209-948-7883	209-608-5777
Mike Mcmanus	D11	858-616-6552	619-892-5181
James Pinheiro	D12	949-936-3600	949-279-5452

TECHNICAL SUPPORT	
Pat Hipley Bridge Instrumentation	Pager 916-592-1939 (885092)
Steven Sahs is the OSMI Emergency Coordinator	Cell Phone 916-804-0603
Abbas Abghari Geotechnical Engineering Chief	Office 916-227-7172
Dallas Forester Underground Structures	Office 916-227-8674
Overcomer Hor Earth Retaining Structures	Office 916-227-8482
Tim Delis Bridge Bearings	Office 916-227-315
Eric Tavenier provides Internet Support	916-227-4114
George Williford Safety Officer	916-227-9548
Ke Zhou GIS	916-227-2624
Martha Merriam Geologist	916-227-7221

Caltrans Management and Emergency Support

Robert Buckley is the Director of the DSC	Office 916-227-8800 Cell Phone 916-801-5397
Tony Tavares is the Director's Assistant	Office 916-227-9848
Kevin Thompson is the Deputy Chief Structure Design	Office 916-227-8807 Cell Phone 916-825-5971
Dolores Valls is the SC Chief	Office 916-227-8845 Home 707-678-1106
Rob Stott is the SDS&EE Chief	Office 916-653-4686 Cell Phone 916-240-3798
Mike Kever is the OEE Chief	Office 916-227-8806 Home 530-621-2741
Srikanth Balasubramanian is Chief of Staff for the Director	Cell Phone 916-208-2348
Don Fogel – Acting Chief of Emergency Management	Cell Phone 916 416-6464
California Highway Communication Center	Phone Number 653-3442

IMPORTANT WEB SITES

Shake Map	http://pasadena.wr.usgs.gov/latest/shakingmaps.html
Recent Eqs USGS/NEIC	http://www.neic.cr.usgs.gov/neis/bulletin/bulletin.html
California & Nevada	http://quake.wr.usgs.gov/recenteqs/
U.S.G.S. Strong Motion Program	http://agram.wr.usgs.gov
Caltech Seismological Laboratory	http://www.seismolab.caltech.edu/
University at Nevada Seismic Lab	http://www.seismo.unr.edu/
Strong Motion Data Center	http://docinet3.consrv.ca.gov/csmip/
TriNet Shake Maps	http://www.trinet.org/
Bridge Motions from CDMG	ftp://ftp.consrv.ca.gov/pub/dmg/csmip/BridgeData/
COSMOS Strong-Motion	http://www.cosmos-eq.org/SiteMap.html
Earthquake Information Network	http://www.eqnet.org/index.asp
Southern California EQ Center	http://www.data.scec.org/catalog_search/index.html
Advanced National Seismic System	http://www.anss.org/
Engineering Strong Motion Data Center (CISN)	http://www.quake.ca.gov/cisn-edc/

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<p>Ruddy O. Pascua Signs & Walls Senior - (213) 897-2014 : (213) 479-5486 ry_o_pascua@dot.ca.gov</p>	<p>Xing Fang ABME Coronado Bay Br. - 11A Ph: (213) 897-2019 Cell: (213) 479-8845 xing_fang@dot.ca.gov State: SD,</p>	<p>Mikhael T. Zaarour ABME - 11C Ph: (213) 897-0884 Cell: (213) 440-4100 mikhael_t_zaarour@dot.ca.gov Local: IMP, ORA, SD, State: LA,</p>	<p>Matthew M. Monajemi ABME - 07C Ph: (213) 897-2006 Cell: (213) 479-8124 matthew_m_monajemi@dot.ca.gov Local: LA, State: LA,</p>	<p>Gerald Joo Bridge Maint Design - Ph: (213) 897-0046 Cell: gerald_joo@dot.ca.gov</p>	<p>Stevenson Lim Signs & Walls Los Angeles - Ph: (213) 897-0153 Cell: (213) 435-4583 stevenson_lim@dot.ca.gov</p>
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BOAL, BRIAN	BCE	Q	567		333 BURMA ROAD OAKLAND, CA 94607	(510) 622-5171			(510) 714-7074
KENNEDY, SCOTT	BCE	K	562	District 05	P.O. Box 1434 (3230 RIVERSIDE AVENUE #130, PASO ROBLES, CA 93446) Templeton, CA 93465	(805) 226-9482	(805) 226-9469	(805) 542-7429	(805) 610-2729
ABERCROMBIE, JEFF	ACM	K	550	Districts 05, 06 & 10	P.O. Box 12616 (1352 West Olive Avenue) Fresno, CA 93778	(559) 444-2442	(559) 488-4167	(559) 971-3736	(559) 260-6742
LAMMERS, JOHN	BCE	O	580	Dist 05, 06, 09 & 10	1801 30th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8445	(916) 227-8179		(916) 208-8445
LOW, KELVIN W.	BCE	K	563	District 06	505 N STREET FRESNO, CA 93721	(559) 488-4218	(559) 488-4343		(209) 815-3666
SALINAS, ENRIQUE	BCE	K	564	District 06	505 N STREET FRESNO, CA 93721	(559) 445-5883	(559) 488-4848		(559) 260-4508
INAGAKI, LES	BCE	K	565	Districts 06 & 09	P.O. Box 81197 (1824 Norris Road) Bakersfield, CA 93380	(661) 859-2451	(661) 395-3854		(661) 301-2675
KIM, JU	BCE	E	582	District 07	6231 MANCHESTER BLVD BUENA PARK, CA 90621		(714) 367-2074		(949) 279-4821
KIRZHNER, GUENNADY	BCE	D	573	District 07	13171 Telfair Avenue #101, #102 Sylmar, CA 91342	(818) 364-2760	(818) 367-4754		(818) 262-8913
SALEH, ZOUHEIR	BCE	D	578	District 07	18730 South Wilmington Avenue #103 Rancho Dominguez, CA 90220	(310) 609-0268	(310) 609-0288	(213) 203-2167	(310) 345-6262
PONZI, ANDY	BCE	E	574	District 07	501 N. PASADENA AVENUE PASADENA, CA 91105	(626) 568-3047	(626) 568-0320		(626) 255-8892
ALISHAHI, HOOSHANG	BCE	D	575	District 07	5160 Haskell Avenue Encino, CA 91436	(818) 788-3303	(818) 788-2612		(310) 629-8608
BURAN, HUSSAM	BCE	D	572	District 07	1525 Rancho Conejo Boulevard, Suite 102 Thousand Oaks, CA 913201440	(805) 375-9247	(805) 375-9249	(213) 717-8322	(805) 857-7040
BURKLE, KENNETH	BCE	D	577	District 07	11229 South Woodruff Avenue Downey, CA 90241	(562) 401-3333	(562) 401-3383		(562) 254-7894
HAN, TED	BCE	D	576	District 07	2090 FERN LANE GLENDALE, CA 91208	(818) 637-2524	(818) 637-7872	(213) 203-2857	(818) 262-8911
FISHER, ROY	ACM	D	543	District 07	11229 South Woodruff Avenue Downey, CA 90241	(562) 401-3333	(562) 401-3383		(310) 345-6261

ZEHNDER, JOHN	BCE	E		District 07	3337 Michelson Drive, Suite 380 Irvine, CA 92612	(714) 803- 2588		(714) 803- 2588
FRANCIS, MICHAEL	BCE	D		District 08	21073 Pathfinder Road, Ste 200 Diamond Bar, CA 91765	(909) 305- 1261	(909) 305- 1294	(909) 322- 4662
BEAUCHAMP, MICHAEL	ACM	C	542	District 08	1746 Spruce Street Riverside, CA 92507	(951) 788- 1892	(951) 788- 2721	(909) (909) 841- 216-5850 5853
CORONA, JOSE	BCE	C	587	District 08	9225 STELLAR COURT, STE B CORONA, CA 92883	(951) 277- 8584	(951) 277- 8581	(951) 232- 3937
ENWEDO, EDWIN	BCE	C	588	District 08	1746 Spruce Street Riverside, CA 92507	(951) 788- 1403	(951) 788- 2721	(951) 232- 3883
CHAO, CHING	BCE	C	589	District 08	3474 Niki Way, Room D Riverside, CA 92507	(951) 275- 9625	(951) 275- 9043	(951) 232- 6000
ANGHA, ESKANDAR	BCE	C	592	District 08	1746 Spruce Street Riverside, CA 92507	(951) 788- 2483	(951) 788- 2721	(951) 830- 6027
POZZO, STEPHEN	BCE	K	561	District 10	611 SAN JUAN AVENUE Stockton, CA 95203	(209) 948- 7206	(209) 948- 7742	(209) (209) 610- 942-8219 8650
ACERO, GABRIEL	BCE	B	598	District 11	13560 EVENING CREEK RD, NORTH SAN DIEGO, CA 92128	(858) 748- 4250	(858) 748- 7964	(858) 688- 1390
WILDER, DENNIS	ACM	B	541	District 11	P.O. Box 85406 (1450 Frazee Road Suite 500, S.D. 92108) San Diego, CA 92186	(619) 688- 6981	(619) 688- 6848	() - (619) 607- 9062
COLLINS, THOMAS	BCE	B		District 11	4050 TAYLOR STREET SAN DIEGO, CA 92160	(619) 688- 6893	(619) 688- 6848	(858) 688- 1365
YEE, STEVEN	BCE	B	599	District 11	13560 EVENING CREEK RD, NORTH SAN DIEGO, CA 92128	(858) 748- 7017	(858) 748- 7964	(858) 688- 1465
DOUGHERTY, ROBERT	BCE	B	596	District 11	11803 Sorrento Valley Road, #B San Diego, CA 92121	(858) 720- 2119	(858) 720- 2130	(856) 688- 1528
NICKERSON, NANCY	BCE	B	597	District 11	817 Sweetwater Road Spring Valley, CA 91977	(619) 697- 0217	(619) 697- 7182	(858) 688- 1391
BOCCHICCHIO, KENNETH	ACM	E	544	Districts 12 & 07 E	3337 Michelson Drive, Suite 380 Irvine, CA 92612	(949) 724- 2059	(949) 724- 2519	(949) 279- 8474
CHAO, CHING	BCE	C	586	District 12	3474 Niki Way, Room D Riverside, CA 92507	(951) 275- 9625	(951) 275- 9043	(951) 232- 6000
DE SANTOS, GERARDO	BCE	E	583	District 12	4000 W METROPOLITAN DR, STE 201 ORANGE, CA 92868	(714) 712- 1117	(714) 712- 1582	(949) 279- 8476
MC COOK, ANSON	BCE	E	584	District 12	3251 1/4 UNIVERSITY DRIVE IRVINE, CA 92612	(949) 279- 8469	(949) 509- 5060	(949) 279- 8469

RAILROAD COMPANY EMERGENCY PHONE NUMBERS

If you discover railroad damage, immediately call 911 to prevent a derailment. Then you may call the railroad dispatcher at one of the numbers listed below.

The two major freight railroad companies in California are the Union Pacific and the Burlington Northern and Santa Fe Railway Company. Their emergency hotlines are shown below.

The Union Pacific Railroad Company (UPRR) 1-888-877-7267 (Emergency - Railroad Police) & Emergency Crossing Hotline # 1- (800) 848-8715

The Burlington Northern and Santa Fe Railway Company (BNSF) Emergency Number is 1-800-832-5452 followed by prompts.

The Southern California Regional Rail Authority (SCRRA) also known as Metrolink operates and runs commuter train system for the six transportation authority in Southern California. Their listed 24-hr Number is 1-888-446-9721.

The Metropolitan Transit Development Board (MTDB) also known as San Diego Trolley, Inc. Their 24/7 emergency number is (619) 595-4961.

Caltrain in the Bay Area, 24 Hr (877) 723-7245 and the Dispatch # for Amtrak is 1-(800) 872-4600.

RR	TITLE	LAST NAME	FIRST NAME	OFFICE No.	CELL No.
ABL	Supt.	Copple	Phil	510-832-8464	
ABL	Gen Mgr	Pattison	Phil	510-832-8464	925-286-7008
AL	RR Supv	Simpson	Greg	530-258-4417	530-258-9229
AL	After Hours			530-258-2111	
ARZC	Supt.	Cecil	Tanya	602-669-6662	
CCT	Superintendent	Copple	Phil	209-466-6927	
CCT	Gen Mgr	Garrison	Cindy	209-466-6927	
CCT	Track	Martinez	Jerry		209-479-3252
CNFR	Mec Supervisor	Deem	Robert	707-642-1826	707-333-3081
CNFR	Gen Mgr	Jones	Bob	707-638-1315	916-717-1727
CNFR	Chief Dispatcher	Jones	Blake		707-557-2868
CNFR	Mgr Train Oper	Kerruish	Jon	707-638-1313	707-333-3078
CNFR	Sr. Roadmaster	Nevins	John		530-330-1301
CNFR	Mgr Train Oper	Purdy	Doug	530-668-9490	530-330-1303
CORP	Chief Trans Ofc	Carter	Gerald	541-957-2504	541-915-0796
CORP	Gen Mgr	Lovelady	Dan	541-953-2512	541-912-7437
CORP	Dispatcher	Nugent	Shannon	541-957-2503	
CORP	Chief Mec Ofc	Reeves	Ron	541-957-2509	541-953-4994
CORP	Roadmaster	Underwood	Jim	541-957-2506	541-968-4178
CZRY	MGR	Scheueman	Geoffrey	619-938-1943	
FWRV	RR Owner	Wilkinson	Dave	805-524-2546	
FWRV	RR Line Manager	Wyatt	Dale		
IRTV	Gen Mgr	Servin	AF	951-685-9551	
LAJ	Gen Mgr	Edwards	Bill	323-277-2004	
LCR	RR Supervisor	Gray	Barry	541-947-2444	541-219-0097
LCR	RR Director	Simms	Ray	541-947-6003	
MCR	Mech Officer	Brunello	Albert	530-964-2141	
MCR	Roadmaster	Harris	Jeff	530-964-2141	
MCR	Passenger OPS			800-733-2141	
OTR	Superintendent	Copple	Phil	209-466-6927	
OTR	Track	Copple	Brvan	510-832-8464	
OTR	General Manager	Pattison	Joe	510-832-8464	925-286-7008

OTR	Mechanical	Wise	Howard	510-832-8464	
PHL	Chief Eng	Giannoble	Bob	310-984-5780	
PHL	Gen Supt	Stolzman	Mike	310-984-5770	
PHL	Supt Trans	Tomren	Russell	310-984-5765	
PHL	Trans Mgr	Magana	Howard	310-830-0753	
PHL	Trans RFE	Prince	Merve	310-984-5769	
PHL	Trainmaster	Peters	Greg	310-984-5775	
PHL	Trainmaster	Dixon	Greg	310-984-5781	
PHL	Trainmaster	Moore	Steve	310-984-5771	
ORR	Gen Supt	Breaux	John	530-283-2820	
ORR	Dir of Trans	Rogers	George	530-378-8252	
SDIV	MGR	Jaspersen	Peter	619-239-3262	
SJVR	Chief Trans Ofc	Barksdale	Keith	661-323-4157	661-201-9566
SJVR	Dispatcher	Garza	Norma	559-592-1857	
SJVR	Chief Mec Ofc	Goins	Paul	559-592-1857	
SJVR	Asst. GM	Hardy	Jackie	559-592-1857	707-479-6603
SJVR	Roadmaster	Kelsey	Craig	559-592-1857	559-469-2625
SJVR	Gen Mgr	Littlefield	Chuck	559-592-1857	561-213-8917
SMV	General Manager	Jennings	Dave	805-922-7941	
SMV	President	Parry	Michael	805-922-7941	
ST&E	President	Carney	Gregory	209-466-7001	
VCRR	Mec Foreman	Contreras	Mario	619-690-0945	619-571-1875
VCRR	Chief Trans Ofc	Jespersion	Pete	619-239-3262	619-572-6771
VCRR	Roadmaster	Rhoads	Curtis	805-240-7743	805-331-8161
VCRR	General Manager	Verity	Douglas	805-488-7467	619-572-6777
WFS	General Manager	Engleka	Merle	559-949-8576	559-740-9781

SAFETY

The PEQIT needs to be cognizant of safety while in the field. It is both the team leader's and the team members' responsibilities to ensure the safety of the PEQIT throughout the investigation. The team leader should hold a tailgate safety meeting at the start and at the end of each day. At the start of the day all possible hazards that the PEQIT might encounter should be discussed and methods to prevent injury must be formulated. At the end of the day the hazards that were encountered and whether the PEQIT can improve their response needs to be discussed. On the following pages are forms and procedures to protect worker safety in the field. These include information:

1. Information on the Emergency Notification System for Caltrans Employees
2. Procedures for Office Workers who occasionally go into the field
3. Code of Safe Work Practices
4. STD 270: Vehicle Accident Report
5. PM –S- 0110 Safety Meeting Report
6. Instructions for State Employees before they drive a car on state business
7. Approved Medical Care Facilities listed by District

The following bulleted items are directed to help the PEQIT perform their investigation safely. Be aware of the possibility of hazardous materials after an earthquake and do not approach such locations. Keep your eyes open for overturned, placarded trucks and people or animals lying unconscious along the road. The PEQIT should make use of the resources offered by the District and by the Office of Maintenance in order to conduct a safe, incident-free inspection.

- **PEQIT members should take confined space training.** Do not attempt to enter the cells of box girder bridges or other confined spaces unless you are trained to do so. Seek assistance from OSMI to get information about damage in confined spaces.
- To get a lane closure, contact District Maintenance Region Manager
- Consider adding air horn for lookout to use when monitoring traffic, unstable structure, or unstable earth.
- District Maintenance Equipment Manager can rent lights or other needed equipment.
- Contact the District Maintenance Hazardous Materials Officer regarding spills in or under a bridge
- Contact Maintenance Permits Office to find out about utility easements within affected bridges

Although the PEQIT's first priority is to collect perishable data, if you are the first person to find a severely damaged bridge, roadway, railway, or utility, you must immediately notify the responsible party to prevent possible injury or death.

Immediately call **911** if you discover a dangerous situation while inspecting bridges.

Another useful phone number is the OES State Warning Center at **1-916-859-8911**

Other important phone numbers like the District Dispatcher and the emergency phone numbers for railroads are listed under 'Making Contact' in the previous chapter.

**OFFICE WORKER SAFETY (from Chapter 5 of Caltrans Safety Manual)
July 1996**

PREPARING FOR FIELD TRIPS

- 5.20 *Trip planning*
- 5.21 *Motel, hotel, dining out, and sightseeing safety*
- 5.22 *Personal clothing*
- 5.23 *Use of seat belts and shoulder harnesses*
- 5.24 *Visiting a construction or maintenance project*

USING PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 5.25 *Head protection*
- 5.26 *Eye and face protection*
- 5.27 *Warning garments (vest, shirt, or jacket)*
- 5.28 *Foot protection*

SPECIAL WORK ACTIVITIES

- 5.29 *Parking and/or stopping along highways*
- 5.30 *Using physical barriers*
- 5.31 *Using a lookout*
- 5.32 *Working in median areas*
- 5.33 *Amber warning lights*
- 5.34 *Night work*
- 5.35 *Hazardous spills*

PART 2. SAFETY AND HEALTH FOR OFFICE WORKERS WHO OCCASIONALLY TRAVEL

PREPARING FOR FIELD TRIPS

This information in this section applies to all employees, but its primary focus is for supervisors and employees who work in an office setting and because of the nature of their work assignment, occasionally or routinely travel.

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5.20 Trip planning

In preparation for a field trip (*) the supervisor shall discuss the following items with his/her employee(s) before the trip begins to:

1. Define the scope of work.
2. Identify the characteristics of the work area, facility, or highway, including such things as traffic volume, number of lanes, shoulder widths, possible sites for parking, fences, gates, etc.
3. Review the Code of Safe Work Practices (***) applicable to the work.
4. Discuss working on foot with the employee(s).
5. Assemble all safety equipment (PPE), materials, and other equipment that will be required to perform the work.
6. Arrange for transportation, remind employees to use seat belts and shoulder harnesses while in the vehicle.
7. Ensure that all materials are assembled and all potential hazards have been reviewed and discussed.
8. When arriving at the worksite, drive through the designated work area in the field to identify if any work is on-going, and meet with the supervisor in charge.

* Field trips can include visiting another building or facility.

*** A Code of Safe Work Practices titled - FIELD TRIPS is included at end of this chapter.

See Chapter 11 - CODE OF SAFE WORK PRACTICES for more details.

- WORKING ON FOOT

Supervisors shall have pre-job discussions with employees to discuss hazards unique to the job assignment, the hazards associated with working-on-foot, or performing pedestrian type activities, and working near highway traffic.

Supervisors shall talk to employees to improve their awareness of the increasing incident of drug and alcohol impaired drivers on the highways, and instruct them to make periodic visual observations of moving traffic during their work activities.

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5.21 Motel, hotel, dining out, and sightseeing safety

Supervisors shall also discuss information about travel status, visiting other cities, and the potential hazards associated with being in a different working environment. Discussions should include personal safety and precautions about motel/hotel safety, dining out, shopping and sightseeing.

NOTE:

National media reports continue to focus attention on employees in both the public and private sector that have become victims of assaults or other forms of violent acts while working. Many of these assaults result in serious injury or fatality, or the threat of injury. It is important that managers, supervisors, and employees are aware of the potential for violence while working and what actions can be taken when an employee is confronted with an act of violence, threat, verbal or personal harassment, or intimidation.

Although limited in information about violence in the workplace, managers, supervisors, and employees are encouraged to review Chapter 6 - WORKPLACE VIOLENCE, for information that may help them understand and/or handle a situation that they may encounter while on travel status.

5.22 Personal clothing

Employees are expected to report to work reasonably dressed to protect themselves during routine assignments and from exposure to usual and/or predictable physical and environmental conditions found in the work place.

Employees shall be given adequate advance notice of field trips so they may properly dress to protect themselves during the new work assignment, and/or be protected from exposure to the conditions in the new assignment.

5.23 Use of seat belts and shoulder harnesses

It is Departmental policy that whenever an employee operates a state-owned, privately-owned, or rented vehicle while on official state business, he/she shall wear a seat belt and shoulder harness. The Departmental policy is based on the California mandatory seat belt law as contained in the California Vehicle Code (CVC) Section 27315(d)(1), which states in part:

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“No person shall operate a motor vehicle on a highway unless that person and all passengers . . . are *properly* restrained by a safety belt.”

This CVC section and Departmental policy means:

The driver or operator of any vehicle shall be responsible to ensure that **all passengers "BUCKLE-UP" before the vehicle is placed into operation.**

5.24 Visiting a construction or maintenance project

Whenever office employees are required to perform any work activity within the limits of a construction or maintenance project, they must contact the project Resident Engineer, or Region Manager before they enter the work zone and begin their work.

The purpose is to advise the engineer-in-charge (Resident Engineer) or maintenance supervisor of the reason for the visit, gain permission to enter the project or work zone and to proceed with their planned work activity.

The person-in-charge, or his/her designee, then can provide a brief orientation about safety hazards on the project and explain any particular operations, such as haul roads and detours that must be observed.

The person-in-charge may deny entry to the project if conditions warrant.

USING PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section only briefly covers personal protective equipment (PPE) and has been condensed from Chapter 12 - PERSONAL PROTECTIVE EQUIPMENT (PPE).

See Chapter 12 for specific and detailed information about each type and category of personal protective equipment, and specific Departmental and Cal-OSHA regulations covering the use of personal protective equipment.

5.25 Head protection

All employees are responsible to wear hard hats during any work activity that may expose them to a head injury, and shall always wear a hard hat while working on foot near vehicular traffic.

5.26 Eye and face protection

Employees who are directed to work where there is a risk of contact with flying particles shall be required to wear appropriate eye and face protection.

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Employees **shall always wear** safety glasses or goggles while working near moving traffic or in highway work zones.

Employees who wear prescription corrected lenses should be provided with state-furnished safety glasses or goggles to cover their prescription eye glasses.

Only safety glasses that have approved design features of the American National Standards Institute (ANSI), standard known as ANSI Z87.1, shall be used. The "Z87.1" logo must be embossed on glasses used by Caltrans employees.

Supervisors may maintain a supply of state-furnished safety glasses or goggles in their offices as conditions warrant. Safety glasses can be obtained from District or Headquarters warehouse stock.

Contact lenses do not provide eye protection. Therefore, employees who wear contact lenses shall wear approved eye protection over their contact lenses if they are required to take a field trip, or work where there is a risk of receiving eye injuries.

5.27 Warning Garments (Vest, Shirt, or Jacket)

Departmental policy requires employees working on foot, and exposed to vehicular or equipment traffic, shall wear warning garments such as vest, coveralls, jacket, or shirt (button or pull-over style). The warning garments must be orange, strong yellow-green, or fluorescent versions of these colors.

- A vest of appropriate color equipped with reflective material is the standard for all Caltrans operations.
- A vest of appropriate color equipped with reflective material worn over white coveralls is required for Caltrans nighttime operations. Coveralls with reflective material conforming to the ANSI/ISEA 107-1999 standard may be used in lieu of the colored reflective vest.

Supervisors shall read Section 12.20 WARNING GARMENTS, in Chapter 12 - PERSONAL PROTECTIVE EQUIPMENT (PPE), before directing employees to leave the office and work where they may be exposed to vehicular traffic.

Employees should also read and become familiar with these instructions.

5.28 Foot protection

Employees are responsible to furnish their own footwear.

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Whenever an employee is directed to leave his/her office and travel to a field work location, his/her normal footwear may not provide adequate foot protection. Before the trip begins, the supervisor and the employee must ensure that the footwear is acceptable for the job which he/she is being assigned and the hazards to which they may be exposed. If an employee is going to visit a construction or maintenance work zone, he/she should wear a work shoe or boot with soles made of neolite, neoprene, crepe, rubber, or similar material which will retain a nonslip surface when wet, damp, oily, or muddy.

Unacceptable footwear for visiting a construction and/or maintenance work zone are shoes with the following features:

- sandals and slippers
- any type of loose or open weave upper
- footwear with leather soles
- open toes and/or open heels

SPECIAL WORK ACTIVITIES

This section discusses safety tips about how equipment and employees can be used to provide an extra measure of safety while working near vehicular traffic.

5.29 Parking and/or stopping along streets and highways

When parking and/or stopping on the shoulder area of a highway, and the vehicle will not be used as a physical barrier, always park the vehicle as far off the paved shoulder area as possible. Choose a location carefully, so the vehicle will not affect passing traffic, and will not interfere with employee sight distances.

Where possible, park motor vehicles in a manner that will minimize exposure to moving vehicular traffic and provide a physical barrier between employees and any traffic that may enter the work zone.

5.30 Using physical barriers

Whenever employees work on a highway, freeway, or city street, the work should be planned and organized to minimize exposure to moving vehicular traffic.

Employees working on foot near a highway or street should always try to protect themselves from injury by utilizing some type of physical barrier such as a motor vehicle, guardrail, a fence, or other physical barrier.

Where possible, park motor vehicles in a manner that will provide a physical barrier between themselves and any traffic that may enter the work zone.

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5.31 Using a lookout

When it is impractical to use barrier vehicles, guardrail or other physical barriers, a person should be assigned to act as a lookout to provide warning from errant vehicles.

A lookout is a person responsible to lookout for approaching vehicular traffic to detect any unusual vehicle movement or errant driver behavior. The exclusive duty of the lookout is to continuously observe oncoming traffic to warn other workers whenever trouble is expected. The lookout assignment should be changed frequently to maintain a high degree of alertness.

5.32 Working in median areas

Employees who regularly work in an office should receive specialized training as to the hazards unique to median work areas, and working adjacent to moving highway traffic prior to working in median areas.

For work performed in a median area, the following precautions shall be taken:

1. Employees should park their vehicles within the median area where crossing the traffic lane on foot is not necessary. Exit the vehicle on the off-traffic side. In narrow medians, exit the vehicle on the side that will present the least exposure.
2. If the vehicle cannot be safely parked within the median area and the traffic lane must be crossed on foot, the following precautions must be taken:
 - (a) Wait for a break in the flow of vehicular traffic in all lanes that will allow you to cross a traffic lane.
 - (b) Do not carry any items or materials in your hands or arms that might hinder your visibility or movement.
 - (c) If the traffic volume is too heavy, wait until it is safe to cross the lanes.
3. If the work cannot be performed as planned due to high traffic volumes, the supervisor shall re-evaluate the work activity to prevent unnecessary exposure of employees to vehicular traffic.

The supervisor should contact the local Maintenance Region office or Construction office for information regarding planned lane closures or construction work in the area.

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5.33 Amber warning lights

Section 25256 of the California Vehicle Code (CVC) allows Caltrans vehicles to display flashing/rotating amber warning lights, ". . . when such vehicles are parked or working on the highway."

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 while driving, when parked in an established lane closure, or when no danger to the employee exists.

5.34 Night work

Supervisor shall discuss the hazards unique to working at night. If employees will be exposed to vehicular traffic, personal protective equipment including hard hat, eye protection, foot wear, and other (cold-weather, heat stress) clothing shall be discussed and/or required.

Warning garments of appropriate color equipped with reflective material are required whenever working on-foot, within the right-of-way or near vehicular or equipment traffic. See Section 5.27 WARNING GARMENTS (Vest, Shirt, or Jacket) for details.

Employees should be given sufficient advance notice of a night work operation to allow them to adjust their schedules and avoid unnecessary fatigue.

5.35 Hazardous spills

Whenever an employee discovers a spill of an unknown material or substance on a highway or street, the employee should:

1. During regular working hours, call the Maintenance Region Manager's office, if known, or the Caltrans Communications Center, or the California Highway Patrol (CHP), through 9-1-1.
2. Stay clear and "up wind" if possible, and avoid contact with the unidentified material.
3. Provide traffic control, possibly by closing a traffic lane or other traffic controls.
4. Call for assistance and wait for the experts.

If an employee determines that his/her personal safety may be in jeopardy, they should leave the area, and telephone appropriate authorities from another location.

CODE OF SAFE WORK PRACTICES

FIELD TRIPS

PREPARING FOR A FIELD TRIP

PHYSICAL AND ENVIRONMENTAL HAZARDS

TYPICAL FIELD TRIP HAZARDS:

1. Adverse weather conditions
2. Slippery roadways
3. Moving vehicular or equipment traffic/traffic congestion
4. Hazardous parking areas
5. Noise
6. Impaired drivers
7. Footing on uneven terrain
8. Poor visibility
9. Contact with flying particles
10. Bending, stooping and lifting objects

SAFE WORK PRACTICES

TYPICAL PRECAUTIONS TO AVOID INJURY:

1. Review Safety Manual for fieldwork safety items
2. Wear appropriate footwear, hard hat, safety glasses, and warning garments
3. Wear appropriate personal clothing
4. Perform pre-operation inspection on vehicle
5. Bend, stoop, and lift properly
6. Obey traffic laws
7. Be alert for other motorists
8. Stop and/or park vehicle in safe place
8. Exit vehicle properly, away from traffic
9. Avoid backing vehicle if possible
10. Use physical protection from traffic where practicable such as (a vehicle, guardrail, K-rail, etc.)
11. Work facing traffic and/or use lookout
12. Wear hearing protection as required.

STATE OF CALIFORNIA
VEHICLE ACCIDENT REPORT
 STD. 270 (REV. 04/2002)

THIS REPORT MUST BE MAILED WITHIN 48 HOURS AFTER ACCIDENT (ACCIDENTS INVOLVING INJURY SHOULD BE FIRST CALLED OR FAXED TO ORIM AT (916) 376-5300 - CALNET 480-5300 - FAX (916) 376-5277.

DISTRIBUTION:
 ORIGINAL -
District or Headquarters
Office of Safety and Health

ACCIDENT PREVIOUSLY REPORTED TO ORIM? (If yes, give date)
 YES NO _____

*** CONFIDENTIAL INFORMATION ***
DO NOT RELEASE TO OTHER PARTIES WITHOUT CONSENT OF THE OFFICE OF RISK AND INSURANCE MANAGEMENT

Page _____ of _____

STATE DRIVER	NAME		AGE	EMPLOYING DEPARTMENT CALTRANS -	AGENCY BILLING CODE
	DRIVER'S LICENSE NO.	ACCIDENT DATE	TIME	OFFICE ADDRESS	AGENCY DOCUMENT NO. District/Cost Center
	WAS VEHICLE BEING USED ON OFFICIAL STATE BUSINESS? (If NO, attach explanation) <input type="checkbox"/> YES <input type="checkbox"/> NO				
	APPROXIMATE DATE DRIVER LAST COMPLETED STATE DEFENSIVE DRIVER TRAINING _____ NOT TAKEN			JOB TITLE	BUSINESS TELEPHONE

STATE VEHICLE	VEHICLE LICENSE NUMBER	VEHICLE YEAR, MAKE, MODEL	VEHICLE OWNER <input type="checkbox"/> DEPT OWNED <input type="checkbox"/> DGS POOL <input type="checkbox"/> RENTAL <input type="checkbox"/> EMPLOYEE OWNED	EQUIPMENT ID NO.
	BRIEFLY DESCRIBE DAMAGES TO STATE VEHICLE		ESTIMATED REPAIR COST	IF DEPARTMENT OWNED OR RENTAL, ENTER OWNER'S NAME

ACCIDENT DETAILS <small>(See Reverse for Diagram and Description)</small>	ACCIDENT LOCATION (Address/Area)		ROAD CONDITIONS	
	(City/State)		WEATHER CONDITIONS	
	(County)		TRAFFIC CONDITIONS	
	POLICE REPORT MADE <input type="checkbox"/> YES <input type="checkbox"/> NO		NAME AND ADDRESS OF INVESTIGATING AGENCY	
	AGENCY <input type="checkbox"/> CHP <input type="checkbox"/> OTHER		NCIC# _____	BADGE # _____

OTHER VEHICLE	DRIVER'S NAME	AGE/DOB	VEHICLE LICENSE NO.	VEHICLE YEAR, MAKE, MODEL	NO. OF PASSENGERS
	DRIVER'S LICENSE NO.	HOME TELEPHONE	WORK TELEPHONE	REGISTERED OWNER	
	DRIVER'S ADDRESS (Street, City, State, Zip Code)			OWNER'S ADDRESS	HOME TELEPHONE
					WORK TELEPHONE
	BRIEFLY DESCRIBE DAMAGES TO OTHER VEHICLE OR PROPERTY			NAME AND ADDRESS OF OTHER PARTY'S INSURANCE COMPANY	

INJURED	NAME	AGE	ADDRESS	HOSPITAL
	NAME	AGE	ADDRESS	HOSPITAL

WITNESS	NAME	TELEPHONE	ADDRESS
	NAME	TELEPHONE	ADDRESS

VEHICLE PASSENGERS	STATE	NAME	ADDRESS
		NAME	ADDRESS
	OTHER	NAME	ADDRESS
		NAME	ADDRESS

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814. (CONTINUED ON REVERSE)

SAFETY MEETING REPORT

PM-S-0110 (REV. 10/1999)

ACTION AND DISTRIBUTION:

- 1. First-line supervisor conducts meeting, completes, and signs form.
- 2. First-line supervisor retains and posts one copy.
- 3. First-line supervisor sends original to second-line supervisor for review.
- 4. Second-line supervisor reviews, signs original, and returns to first-line supervisor to file.
- 5. Additional routing to:

Note: See Chapter 2, Safety Meetings, in the Caltrans Safety Manual for details.

MEETING DATE	OFFICE/CREW/PROJECT NAME	COST CENTER/PROJECT NUMBER
--------------	--------------------------	----------------------------

ATTENDANCE-SIGNATURE OF EMPLOYEES (Add additional sheets if required)

SAFETY TOPICS DISCUSSED

SAFETY SUGGESTIONS/COMMENTS

FIRST AND/OR SECOND-LINE SUPERVISOR'S COMMENTS

FIRST-LINE SUPERVISOR SIGNATURE	DATE	SECOND-LINE SUPERVISOR SIGNATURE	DATE
---------------------------------	------	----------------------------------	------

SUGGESTED TOPICS FOR DISCUSSION

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Safe work habits | <input type="checkbox"/> Maintenance, Chapter 8 | <input type="checkbox"/> Respirator safety | <input type="checkbox"/> Warning garments |
| <input type="checkbox"/> Safe work conditions | <input type="checkbox"/> Traffic control/flagging | <input type="checkbox"/> Confined spaces | <input type="checkbox"/> Body protection |
| <input type="checkbox"/> Codes of Safe Operating/Work Practice | <input type="checkbox"/> Slip/trip/fall hazards | <input type="checkbox"/> Hard hats | <input type="checkbox"/> Foot protection |
| <input type="checkbox"/> First aid treatment | <input type="checkbox"/> Protective vehicles | <input type="checkbox"/> Safety glasses | |

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

Before an Employee Drives a Vehicle on State Business

OK, YOU HAD A MOTOR VEHICLE ACCIDENT, SO NOW WHAT HAPPENS????

You are the State driver and it is immediately following the accident:

At the accident scene, keep safety in mind at all times, provide what help you are trained for to any injured, **do not admit fault or make any promises** that the State will pay for any damages. Using the STD. 269 Accident Identification card that should be in the glove compartment of all state vehicles, write down as much information as you can about the accident and other party. Complete and tear off the perforated part and give it to the other driver so they know who you are and how to contact our insurance carrier, the **Office of Risk and Insurance Management**. Complete the latest revision of the STD. 270 (rev. 3/2000)

immediately upon return to your office. If there were injuries to non-State parties or the other party suffered significant property damage, the supervisor must fax an advance copy to the Office of Risk & Insurance Management (ORIM) at 916-376-5277 or telephone the accident report to ORIM within 48 hours at (916-376-5300).

- 1. Complete all** sections of STD. 270
- 2. Enter** the Equipment ID number of state vehicle as appropriate
- 3. Enter** District and Cost Center numbers (Agency Doc. No.).
- 4. Give details** as to be understood by someone who was not a witness
- 5. Make** a simple diagram of the accident scene
- 6. Obtain** an inspection and estimate of damage from Division of Equipment
- 7. Sign** completed form and give to your supervisor

Be sure your supervisor reviews the STD. 270 **and signs it before** faxing an **advance** copy to ORIM (916) 376-5277 and the Caltrans Safety Office.

SUPERVISORS TAKE NOTICE!

THE REQUIREMENT FOR PROMPT REPORTING OF ALL DAMAGE TO STATE EQUIPMENT CANNOT BE OVERSTATED! TRAIN YOUR EMPLOYEES!

PEQIT Tailgate Safety Meeting Form

Name of Earthquake		Date Prepared	
Location		Start Date	
Specific Location Description		Finish Date	

Personnel

Position	By signing below, I agree that I have been briefed and understand the contents of this post earthquake inspection form.	Contact	Training	Emergency Contact Name/Phone
Prepared by	Name: Sign:	Ph: Cell: Email:		
Safety Supervisor	Name: Sign:	Ph: Cell: Email:		
PEQIT Member Name	Name: Sign:	Ph: Cell: Email:		
PEQIT Member Name	Name: Sign:	Ph: Cell: Email:		
PEQIT Member Name	Name: Sign:	Ph: Cell: Email:		
PEQIT Member Name	Name: Sign:	Ph: Cell: Email:		

Emergency Information

EMS Phone		Company Emergency Contact Name & Phone	
EMS Access Life-flight?			
Emergency Gathering Site			
Nearest Hospital Location & Phone			
Communication:	<input type="checkbox"/> Cell Phone (Check service on site <input type="checkbox"/> Y <input type="checkbox"/> N) <input type="checkbox"/> Radio (Channel:) <input type="checkbox"/> Phone (Note phone number, location, special dialing, other contacts, etc) Additional Notes:		

General Description of Work		
Sequence of Operations	Description of Steps and Tools Required	Hazards and Methods to Mitigate

	Condition	Description of Hazards		Control Measures
<input type="checkbox"/>	Falling	<ul style="list-style-type: none"> Gravity-induced injury or death 	<input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Always use appropriate fall-protection or rope-access equipment when 6 feet from unprotected edge with a fall potential of 6 feet or more All personnel must be properly trained (certified as required)
<input type="checkbox"/>	Human Error	<ul style="list-style-type: none"> Rigging Errors 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Use 2-rope system when working line is primary means of support Use independent anchorages Always do 4-point check: Ropes (including anchors), Hardware, Harness, Helmet
<input type="checkbox"/>	Communication Difficulty	<ul style="list-style-type: none"> Loud ambient noise (traffic, machinery, running water, wind, etc.) Malfunctioning or dropped radios Conditions change 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Agree upon and use standardized communication signals Check communication system Designate alternate communication system in case conditions change or technical difficulties arise Review hand signals (as appropriate)
<input type="checkbox"/>	Sharp, hot or abrasive	<ul style="list-style-type: none"> Rope or anchor damage and/or failure Abrasions or cuts to hands Melted rope Burns sustained by operator 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Use proper edge protection and padding Use re-direct or intermediate anchors as needed Wear gloves and proper clothing
<input type="checkbox"/>	Machinery	<ul style="list-style-type: none"> Inadvertent operation of machinery Injury sustained from machinery Hazardous condition created (e.g. release of water) 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Get appropriate clearances Follow lock-out/tag-out procedure Confirm lock-out/tag-out
<input type="checkbox"/>	Injury from Tools	<ul style="list-style-type: none"> Hazards depend on tools used Damage to rope-access or fall-protection system 	<input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Follow all manufacturers instructions and keep all protective guards in place Separate suspension rope may be required for tools greater than 10 kg
<input type="checkbox"/>	Dropped Tools or Materials	<ul style="list-style-type: none"> Possible injury to personnel and public Loss of important tools for work or egress Damage to structures or equipment 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Clearly mark and barricade Hazard Zone Helmets or hard hats must be worn in Hazard Zone Keep a clean and orderly worksite All tools and devices must be tethered or secured Avoid working or standing below other workers
<input type="checkbox"/>	Rock fall or loose detritus	<ul style="list-style-type: none"> Possible injury to personnel and public Damage to structures or equipment Severed ropes 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Careful scaling or clearing of slope may be needed prior to beginning work Loose materials or rock may need to be secured (either temporarily or permanently) Manage ropes carefully to avoid dislodging loose materials
<input type="checkbox"/>	Water (working around/over moving/standing water)	<ul style="list-style-type: none"> Wet surfaces can be slippery Potential for Drowning Trapped in current while tied off (drowning hazard) 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Stop work if conditions become dangerous Rescue boat shall be readily available if working directly over water, especially if descent is a viable method of egress. Fall protection or rope access equipment should not allow worker to fall into water (especially moving water) Personal flotation devices not required if proper fall protection in place
<input type="checkbox"/>	Weather-Rain/Snow/Ice	<ul style="list-style-type: none"> Insulating qualities of wet clothing decreases Possible hypothermia (dangerously low body temperature) Loss of dexterity in extremities Wet or icy surfaces can be slippery Decreased friction on descent and rope-grab devices Danger of stray current around improperly insulated and grounded electrical equipment Decreased visibility Frozen Ropes 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> Stop work if conditions become dangerous Wear proper footwear and clothing Waterproof rain gear should be available Be aware of slippery conditions Electrical equipment must be adequately grounded and equipped with GFCI's. Hand warmers should be available in case of emergency

	Condition	Description of Hazards	Control Measures
<input type="checkbox"/>	Sun/Heat	<ul style="list-style-type: none"> • Possible dehydration, heat exhaustion or heat stroke • Burns from tools, equipment, and structural steel • Adhesives and first-aid supplies may be degraded by heat 	<input type="checkbox"/> Stop work if conditions become dangerous <input type="checkbox"/> Ample water and/or electrolytes must be on hand for workers <input type="checkbox"/> Schedule proper breaks and work in morning or evening to avoid peak temperatures <input type="checkbox"/> Wear gloves and proper clothing to protect hands from hot surfaces
<input type="checkbox"/>	Cold/Freezing Temperatures	<ul style="list-style-type: none"> • Possible hypothermia, frostbite, loss of dexterity in extremities • Decrease in efficiency, adhesives and first-aid supplies may not function properly due to cold, water for drinking and work may be frozen; slippery surfaces 	<input type="checkbox"/> Stop work if conditions become dangerous <input type="checkbox"/> Wear proper footwear and clothing, including gloves and hat <input type="checkbox"/> Warm liquids should be available to workers
<input type="checkbox"/>	Wind	<ul style="list-style-type: none"> • Possible increased cooling or hypothermia risk, increased dehydration risk in dry humidity • Decrease in efficiency, hindrance to communications between team members • Danger of unsecured equipment or material being blown into the access zone • Difficulty communicating 	<input type="checkbox"/> Stop work if conditions become dangerous <input type="checkbox"/> Wear proper footwear and clothing, including gloves and hat <input type="checkbox"/> Secure loose materials at work site <input type="checkbox"/> Be wary of wind developing slack in ropes where they may be blown in to areas making retrieval difficult
<input type="checkbox"/>	Lightning	<ul style="list-style-type: none"> • Possible electrocution due to lightning strike, loss of consciousness or life • Rope-access equipment may provide a pathway to the operative for electrical strikes 	<input type="checkbox"/> Stop work when lightning threatens
<input type="checkbox"/>	Dimly lit or night work	<ul style="list-style-type: none"> • Sharp or protruding objects (metal, nails, bolts, etc.) may not be visible to moving operatives, drowsiness of employees 	<input type="checkbox"/> Provide adequate lighting: area lighting and/or head- and hand-lamps <input type="checkbox"/> Provide spare batteries, light sources, and bulbs
<input type="checkbox"/>	Confined space entry/toxic air	<ul style="list-style-type: none"> • Work areas may contain toxic gases or insufficient oxygen levels for work. • Space may have restricted entry/exit making access difficult. 	<input type="checkbox"/> Follow confined space procedures <input type="checkbox"/> Use air monitor- check batteries, recalibrate as needed <input type="checkbox"/> Toxic rescue plan may be needed
<input type="checkbox"/>	Dust/Chemical Exposure	<ul style="list-style-type: none"> • Difficulty in breathing, possible allergic reaction • Possible long-term health hazard • Chemical burns to skin, eyes, internal organs 	<input type="checkbox"/> Provide adequate engineering controls <input type="checkbox"/> Provide PPE where engineering controls not possible or impractical <input type="checkbox"/> Workers must have MSDS on site for all chemicals used in work <input type="checkbox"/> Respirators must be the correct type for the exposure and personnel may need medical clearance and be correctly fitted.
<input type="checkbox"/>	High-noise area	<ul style="list-style-type: none"> • Permanent or temporary damage to hearing • Communications between team members may be difficult • High-noise levels may mask warning buzzers or other alert sounds 	<input type="checkbox"/> Hearing protection required, in extremely loud environments (+120 dB), multiple types of protection may be necessary. <input type="checkbox"/> Agree on hand signals before work starts <input type="checkbox"/> Workers may be equipped with sound-isolating hearing protection for radios.
<input type="checkbox"/>	Insect or animal bites or stings	<ul style="list-style-type: none"> • Possible injury or incapacitation of personnel depending on severity of bite or venom 	<input type="checkbox"/> Careful access into areas where spiders, snakes, scorpions, or other creatures may reside. <input type="checkbox"/> Use of gloves at all times, equip first aid kit with medical supplies appropriate for bites and stings.
<input type="checkbox"/>	Vehicular Traffic	<ul style="list-style-type: none"> • Possible impact or crushing injury 	<input type="checkbox"/> Careful demarcation of access and hazard zones, <input type="checkbox"/> Use flags, signs, flag persons, lighting as needed <input type="checkbox"/> Provide high-visibility clothing for personnel
<input type="checkbox"/>	Animal/Bird Feces	<ul style="list-style-type: none"> • Possible inhalation of disease carried by feces 	<input type="checkbox"/> Personnel need to be wary of contact with the droppings. <input type="checkbox"/> Workers may need to wear protective gloves or respirators.

Post Job Debrief

Earthquake		Date/Time Completed	
Contributing Team Members			
What went especially well?			
What should we change for next time?			
Safety Concerns, Violations and Near Miss Incidents			

APPROVED MEDICAL FACILITIES AND PHYSICIANS**HEADQUARTERS****AUBURN**

Sutter Occupational Health
3288 Bell Road, Suite 200
(530) 887-0628

CITRUS HEIGHTS

MedClinic Occupational Health Clinic
8421 Auburn Blvd., Suite 120
(Riverside/Auburn Blvd., Exit off I-80)
1201 Alhambra Blvd., Suite 210
(916) 969-1160

ELK GROVE

MedClinic Elk Grove
9354 Elk Grove-Florin Road
(916) 686-5834
Sutter Medical Plaza/Laguna
8170 Laguna Blvd., Suite 210
(916) 683-3252

FAIR OAKS

MedClinic Fair Oaks
8055 Madison Avenue
(at Fair Oaks Blvd.)
(916) 966-2002

FOLSOM

Mercy Hospital of Folsom Occupational
Health
1650 Creekside Drive, Suite 3500
(916) 983-7496
Kaiser Occupational Health Center
2155 Iron Point Road
(916) 817-5660
[Case Manager: Kristiana Cooney
(916) 817-5683]

RANCHO CORDOVA

Rancho Cordova Occup. Health Clinic
9755 Lincoln Village Drive
(at Bradshaw Road)
(916) 363-2045
Sutter Health Care Center
1941 Zinfandel Drive
(916) 635-3570

ROCKLIN

MedClinic Rocklin
4804 Granite Drive
(916) 624-5666

ROSEVILLE

Kaiser Occupational Health Clinic
1001 Riverside Avenue
Mott Building, 1st Floor
(916) 784-4100
[Case Manager: Janet Stanger
(916) 784-4410]
Sutter Occupational Health
Two Medical Plaza, Suite 105

(916) 797-4700

MedClinic Occupational Health Clinic
406-1/2 Sunrise Avenue
(916) 536-2525

SACRAMENTO

Kaiser Occupational Health Center
2016 Morse Avenue
(916) 973-5499
[Case Manager: Susan Twining
(916) 973-7760]
MedClinic Occupational Health Clinic
3160 Folsom Blvd. (at Alhambra)
(916) 733-3390

Sutter Health @ Work

1014 N. Market Blvd.

(916) 565-8600

U. S. HealthWorks

1675 Alhambra Blvd., Suite B

(916) 451-4580

U. S. HealthWorks

4700 Northgate Blvd., Suite 100

(916) 929-6161

U. S. HealthWorks

3680 Industrial Blvd., Suite 550-H

West Sacramento

(916) 373-7575

U. S. HealthWorks

6830 Stockton Blvd., Suite 200

(916) 394-2969

Methodist Hospital Emergency Room

7500 Hospital Drive

(916) 423-3000

SOUTH SACRAMENTO

Kaiser Occupational Health Center
6600 Bruceville Road
Building 3, 2nd Floor
(916) 688-2005

[Case Manager: Darlene Schueller

(916) 688-2462]

MedClinic Occupational Health Clinic

8120 Timberlake, Suite 112

(916) 681-6088

District 1**ARCATA**

Mad River Community Hospital
3800 Janes Road
(707) 822-3621

Arcata-Mad River Ambulance

(707) 822-4166 **emergency only**

(707) 822-3353 business calls

BOONVILLE

See UKIAH

Anderson Valley Ambulance

(707) 895-3123

Dial 911

CLEARLAKE

Redbud Community Hospital_

18th Avenue & Highway 53

(707) 994-6486

Ambulance

Dial 911

COVELO

See WILLITS

Covelo Fire Dept. & Ambulance

(707) 983-6719

CRESCENT CITY

Redwood Medical Center

1240 Marshall Street

(707) 465-5566

Sutter Coast Hospital

800 E. Washington Blvd.

(707) 464-8511

Del Norte Ambulance Service

(707) 464-9551

EUREKA

General Hospital

2200 Harrison Avenue

(707) 445-5111

St. Joseph Hospital

2700 Dolbeer Street

(707) 445-8121

Emergency Room: 445-5040

City Ambulance of Eureka Inc.

(707) 445-4907

Dr. Salter/Dr. Smuckler

3116 Harrison Avenue

(707) 444-3885

FORT BRAGG

Mendocino Coast Dist. Hospital_

700 River Drive

(707) 961-1234

Fort Bragg Ambulance Services

(707) 961-5444

FORTUNA

Fortuna Family Medical Group

874 Main Street

(707) 725-3334

Humboldt Medical Group

3306 Renner Drive

(707) 725-6101

Redwood Memorial Hospital

3300 Renner Drive

(707) 725-3361

GARBERVILLE

So. Humboldt Community Clinic

509 Elm Street

(707) 923-3925

Gerald Phelps Humboldt Com. Hospital

733 Cedar Street

(707) 923-3921

Garberville Ambulance Service

Dial 911

GUALALA

Redwood Coast Medical Service_

46900 Ocean Drive

(707) 884-4005

Mendocino Coast Hospital – Fort Bragg

HOOPA

Kamow Medical Center

(530) 625-4261

Hoopla-Willow Creek Ambulance

(530) 625-4180

KELSEYVILLE

Kelsey Creek Medical Clinic

4241 Church Street

(707) 279-8813

LAKEPORT

Duane Bradley/Donald Joyce, M.D.

5375 Lakeshore Blvd.

(707) 263-5679

Sutter-Lakeside Community Hospital_

5176 Hill Road

(707) 263-5651

Ambulance

Dial 911

McKINLEYVILLE

See ARCATA

MIDDLETOWN

Middletown Medical Clinic

21337 Bush

(707) 987-3312

Ambulance

Dial 911

ORLEANS

See WILLOW CREEK

Ambulance

Dial 911

POINT ARENA

See FORT BRAGG or GUALALA

REDWAY

Redwoods Rural Health Center

101 Westcoast Road

(707) 923-2783

UKIAH

Ukiah Valley Medical Center Hospital_

275 Hospital Drive

(707) 462-3111

Ukiah Ambulance Service

(707) 462-3001

Dial 911

WILLITS

Frank R. Howard Memorial Hospital_

Madrone & Manzanita Avenue

(707) 459-6801

Willits Ambulance Service
(707) 459-7088

WILLOW CREEK

Six Rivers Medical Clinic
#8 State Highway 96
(530) 629-3116
Willow Creek Family Medical Group
38883 Highway 299
(530) 629-3111
Hoopa-Willow Creek Ambulance
(916) 625-4180

District 2**ALTURAS**

Modoc Medical Center
228 McDowell Street
(530) 233-5131

BIEBER

Big Valley Medical Service
100 N. Market Street
(530) 294-5241

BURNEY

Intermountain Family Practice Group
20641 Commerce Way
(530) 335-5457

CHESTER

Seneca Medical Group
372 Main Street
(530) 258-3191

CHICO

Chico Immediate Care
376 Vallombrosa Avenue
(530) 891-1676

FALL RIVER MILLS

Fall River Health Center
43563 Highway 229 East
(530) 336-6535

HAPPY CAMP

Happy Camp Health Services
38 Park Way Drive
(530) 493-5257

HAYFORK

Dr. Donald Krouse
Highway 3
(530) 628-5517

KLAMATH FALLS, OR

Basin Immediate Care
3150 South 6th Street
(541) 883-2337
Merle West Medical Center
2865 Daggett Avenue
(541) 882-6311

MT. SHASTA

Siskiyou Medical Group
822 Pine Street

(530) 926-5261

PORTOLA

Eastern Plumas Health Care
Appointment Only
480-1st Avenue
(530) 832-4211

QUINCY

Plumas District Hospital
1065 Bucks Lake
(530) 283-2121

RED BLUFF

Lassen Medical Group
2580 Sister Mary Columbia Drive
(530) 527-0414

REDDING

RIOH/Medical Clinics
1710 Churn Creek Road
(530) 226-0310
Everyday Health Care
3270 Churn Creek Road
(530) 222-6886

RENO

Washoe Medical Center
77 Pringle Way
(775) 982-4100

SUSANVILLE

Dr. Hal Meadows
Appointment Only
705 West Street
(530) 257-7251
Lassen Community Hospital
560 Hospital Lane
(530) 257-5325

WEAVERVILLE

Dr. Donald Krouse
252 Main Street
(530) 623-3735
Dr. Edward Dolci
310 Easter Avenue
(530) 623-4471
Dr. Harwood/Dr. Stemple
500 Trinity Lake Blvd.
(530) 623-3600

YREKA

Fairchild Group
475 Bruce Street
(530) 842-3507

District 3**AUBURN/COLFAX**

Sierra Doctors Center
275 Grass Valley Highway
(530) 885-0344
Auburn Faith Hospital
11815 Education Street

Highway 49 & Bell Road

(530) 885-7201

CAMERON PARK

Rapidcare

4062 Flying C Road, Suite 41

(530) 676-8234

CHICO

Convenient Care

(Pesticide Exposure Testing)

670 Rio Lindo Avenue, Suite 300

(530) 342-2273

Enloe Hospital

1531 Esplanade

(530) 332-7300

COLFAX

See AUBURN

COLUSA

See MARYSVILLE

DOWNIEVILLE

Frank Lang

Western Sierra Medical Clinic

209 Nevada Street

(530) 289-3298

ELK GROVE

See SACRAMENTO

GRASS VALLEY

Miners Community Clinic

700 Zion Street

(530) 265-7890

Yuba Docs Medical Group

12090 Nevada City Highway

(530) 274-5020

Sierra Nevada Memorial Hospital

155 Glasson Way

(530) 274-6000

LINCOLN

See ROSEVILLE

LOYALTON/SIERRAVILLE

Sierra Family Medical Group

700 West Third Street

(530) 993-1231

Sierra Valley Hospital

700 West Third Street

(530) 993-1225

MARYSVILLE/COLUSA/YUBA CITY

Sutter North Urgent Care

444 Plumas Blvd.

Yuba City

(530) 749-3420

Rideout Memorial Hospital

726 Fourth Street

Marysville

(530) 749-4300

NEVADA CITY

See GRASS VALLEY

OROVILLE

Premier Health Care

1940 Feather River Blvd., Suite 0

(530) 532-8824

Oroville Hospital

2767 Olive Highway

(530) 533-8500

PARADISE

Feather River Hospital

5974 Pentz Road

(530) 877-9361

PLACERVILLE

Marshall Hospital

Marshall Way

(530) 622-1441

Rancho Cordova

U.C. Medical Group

1100 Olson Drive, Suite 100

(916) 635-4120

U.S. HealthWorks

9261 Folsom Blvd., Suite 200

(916) 364-1733

ROCKLIN

U. S. Health Works

2305 Sunset Blvd.

(916) 632-9606

ROSEVILLE/LINCOLN

Kaiser Occupational Health Center

1001 Riverside Ave., Mott Bldg. 1st Floor

(916) 784-4100

[Case Manager: Janet Stanger

(916) 784-4410]

SACRAMENTO/ELK GROVE

UCD Medical Group

(Pesticide Exposure Testing)

11000 Olson Drive, Suite 100

Rancho Cordova

(916) 635-4120

Sacramento Medical Center

(Poison Center)

2315 Stockton Blvd.

(916) 734-2011

Sutter Occupational Health

Two Medical Plaza, Suite 105

(916) 797-4700

Urgent Care

(916) 797-4750

U. S. HealthWorks

1675 Alhambra Blvd., Suite B

(916) 451-4580

U. S. HealthWorks

4700 Northgate Blvd., Suite 100

(916) 929-6161

Sacramento/Elk Grove (continued)

Kaiser Occupational Health Center

2016 Morse Avenue

(916) 973-5499
 [Case Manager: Susan Twining
 (916) 973-7766]
 Kaiser Occupational Health Center
 6600 Bruceville Road
 Building 3, 2nd Floor
 (916) 688-2005
 [Case Manager: Darlene Schuller
 (916) 688-2462]
SIERRAVILLE
 See LOYALTON

SOUTH LAKE TAHOE

Tahoe Urgent Care
 2130 Lake Tahoe Blvd.
 (530) 541-3277
 Barton Memorial Hospital
 South Avenue & 4th Street
 (530) 541-3420

TAHOE CITY

Truckee Tahoe Medical Group
 925 N. Lake Blvd., Suite 201
 (530) 581-8864

TRUCKEE

Sierra Multi-Specialty Medical Group
 10978 Donner Pass Road
 (530) 582-1212
 Truckee Tahoe Medical Group
 10024 Pine Avenue
 (530) 587-3887
 Tahoe Forest Hospital
 10950 Donner Pass Road
 (800) 733-9953

WEST SACRAMENTO

See SACRAMENTO

WILLOWS

Glenn Medical Center
 1133 W. Sycamore
 (530) 934-1800

WOODLAND

Sutter Health
 475 Pioneer Avenue, Suite 100
 (530) 406-5616
 Woodland Clinic Medical Group
 1207 Fairchild Court
 (530) 668-2660
 Woodland Memorial Hospital
 1325 Cottonwood
 (530) 662-3961

YUBA CITY

Urgent Care
 444 Plumas Blvd.
 (530) 749-3420

District 4**ANTIOCH**

Contra Costa Industrial Medical Clinic
 2339 Buchanan Road
 (925) 777-9194
 Kaiser Occupational Health Center
 3400 Delta Fair Blvd., Adobe Bldg.
 (925) 779-5434
 [Case Manager: Marsha Rees
 (925) 372-1113]

BENICIA

Sutter Health @ Work
 836 A Southampton Road
 (707) 745-4370

CAMPBELL

Gateway Family Medical Center
 50 E. Hamilton Avenue, Suite 100
 (408) 364-7600

CONCORD

Muir/Diable Occupational Medicine
 2231 Galaxy Court
 (925) 685-7744

CORTE MADERA

Medical Center of Marin
 Marin Urgent Care Center
 101 Casa Buena Drive
 (415) 924-4525

DAVIS

Sutter Davis Hospital
 2000 Sutter Place
 (530) 756-6440
 Sutter Medical Plaza
 2020 Sutter Place, Suite 101
 (530) 750-5800

EMERYVILLE

Emeryville Occup. Med. Center (EOMC)
 6001 Shellmound Street, Suite 850
 (510) 653-5200

FAIRFIELD

North Bay Occupational Health
 1860 Pennsylvania Ave., Suite 300A
 (707) 429-7701

FOSTER CITY

Mariner Medical Center
 1261 E. Hillsdale Blvd., Suite #1
 (650) 570-2299

FREMONT

Fremont Urgent Care
 3161 Walnut Avenue
 (510) 796-1000
 Kaiser Occupational Health Center
 39400 Paseo Padre Pkwy., Mission Bldg.
 (510) 248-3015
 [Case Manager: Karen Rickett
 (510) 248-3724]

GILROY

Direct Care Medical Clinic
 7880 Wren Avenue, Suite C-134

(408) 842-1316
 Kaiser Occupational Health Center
 7520 Arroyo Circle
 (408) 846-2307
 [Clinic Manager: Jamie McGuire
 (408) 972-6806]
 South Valley Family & Occup. Health Ctr.
 9460 No Name Uno, Suite 230

(408) 842-1544
GREENBRAE
 Sutter Health @ Work
 1350 South Eliseo Drive, Suite 250
 (415) 925-7888

GUALALA
 Redwood Coast Medical Service
 46900 Ocean Drive
 (707) 884-4005

HAYWARD
 Medical Express
 22429 Hesperian Blvd.
 (510) 782-7111
 St. Rose Occupational Health Clinic
 27200 Calaroga Avenue
 (510) 785-9026
 24-Hour Emergency Room
 (510) 987-8611
 U. S. HealthWorks
 26120 Eden Landing Rd., Bldg. B., Ste. 1
 (510) 264-3700

HAYWARD/UNION CITY
 Kaiser Occupational Health Center
 3555 Whipple Road
 (510) 675-4807
 [Clinic Manager: Connie Perez-English
 (510) 675-2255]

HEALDSBURG
 James F. Carroll, M.D.
 421 March Avenue, Suite D
 (707) 433-3321

KENTFIELD
 Kentfield Occupational Medicine Center
 1125 Sir Francis Drake Blvd., Suite N
 (415) 485-3600

MARTINEZ
 Kaiser Occupational Health Center
 200 Muir Road, Hacienda Bldg., 1st Floor
 (925) 313-0301
 [Clinic Manager: Marsha Rees
 (925) 372-1113]

MILPITAS
 Alliance Occupational Medicine
 315 South Abbott Avenue
 (408) 790-2900
 Kaiser Occupational Health Center
 700 E. Calaveras Blvd.
 (408) 945-5801

[Clinic Manager: Marilyn Howard
 (408) 945-6142]
 U. S. HealthWorks
 1717 South Main Street
 (408) 957-5700

NAPA
 Work Health
 1100 Trancas Street, Suite 300
 (707) 257-4084
 Kaiser Occupational Health Clinic
 3285 Claremont Way, 2nd Floor
 (707) 258-4907
 [Clinic Manager: Carol Hodges
 (707) 651-2953]
 Occupational Health
 1700 Soscol Avenue, Suite 1
 (707) 257-7799

NEWARK
 BizMed Occupational Health Clinic
 5886 Mowry School Road
 (510) 226-8832

OAKLAND
 Sutter Health @ Work
 Occupational Health Center
 5700 Telegraph Avenue
 (510) 204-4455
 OakCare Occupational Health Center
 675 Hegenberger Road, Suite 121
 (510) 633-7654
 U. S. HealthWorks
 7817 Oakport Street #140
 (510) 465-0701
 Concentra Medical Center
 384 Embarcardero West
 (510) 465-9565
 Kaiser Occupational Health Clinic
 235 W. MacArthur Blvd., 3rd Floor
 (510) 752-1244
 [Clinic Manager: Sandie Weekes
 (510) 752-6427]
 U. S. HealthWorks
 401 Roland Way, Suite 130
 (510) 635-9515

PETALUMA
 North Bay Corporate Health Services
 1436 Professional Drive, Suite 302
 (707) 765-1111
 El Rose Medical Clinic
 24 W. El Rose
 (707) 763-9891
 Kaiser Occupational Health Clinic
 3900 Lakeville Hwy.
 (707) 765-3800
 [Clinic Manager: Mary Scala
 (415) 444-2355]

PLEASANTON

Premier COMP
5635 W. Las Positas Blvd. Suite 401
(925) 520-0055
Kaiser Occupational Health Clinic
7601 Stoneridge Drive.
South Bldg., 1st Floor
(925) 847-5160
[Clinic Manager: Marsha Rees
(925) 372-1113]

POINT REYES
Point Reyes Clinic
3 Sixth Street
(415) 663-8666

REDWOOD CITY
Sequoia Hospital Occup. Health Service
633 Veterans Blvd., Suite A
(650) 364-1565
Kaiser Occupational Health Center
1400 Veterans Blvd., 1st Floor
(650) 299-4785
[Clinic Manager: Kaye Walster
(650) 299-4301]

RICHMOND
Greater Richmond Industrial Med. Clinic
120 Broadway Avenue, Suite 23
(510) 236-7243
Concentra
2970 Hilltop Mall Road, Suite 202/203
(510) 222-8000
Kaiser Occupational Health Center
901 Nevin Avenue
(510) 307-1560
[Clinic Manager: Margaret Solon-Street
(510) 307-2484]

RIO VISTA
Northbay HealthCare Services
690 Main Street
(707) 374-6833

ROHNERT PARK
Sutter Health @ Work
6174 State Farm Drive
(707) 586-4320

SAN FRANCISCO
Concentra Medical Center
728-20th Street
(415) 648-9501
Kaiser Occupational Health Center
601 Van Ness Ave., Suite 2008
Opera Plaza, Mezzanine Level
(415) 674-7000
[Case Manager: Beatrice Ceccato
(415) 674-7002]
CHW Health Center @ Pacific Bell Park
24 Willie Mays Plaza
(415) 972-2249

SAN JOSE

Doctors on Duty
1910-N Capitol Avenue
(408) 942-0333
Samaritan Medical Care Center
554 Blossom Hill Road
(408) 281-2772
U. S. HealthWorks
636 E. Santa Clara Street
(408) 275-9097
U. S. HealthWorks
2011 South Monterey Road
(408) 288-3800

SAN JOSE/SANTA TERESA
Kaiser Occupational Health Center
275 Hospital Parkway, Suite 565
(408) 972-6800
[Clinic Manager: Jamie McGuire
(408) 972-6806]

SAN LEANDRO
Sutter Health @ Work
1555 Doolittle Drive, Suite 180
(510) 351-7833
U. S. Healthworks
15035 East 14th Street
(510) 614-3724
Concentra
2587 Merced Street
(510) 351-3553

SAN MATEO
Mariner Medical Center
1261 E. Hillsdale Blvd.
Foster City
(415) 570-2299

SAN PABLO
EMC Medical Group
2160 Vale Road
(510) 233-0984

SAN RAFAEL
Kaiser Occupational Health Center
99 Montecillo Road
(415) 444-2900
[Clinic Manager: Mary Scala
(415) 444-2355]

SAN RAMON
San Ramon Regional Medical Center
Hospital-Emergency Room
6001 Norris Canyon Road
(510) 275-8280

SANTA CLARA
U. S. HealthWorks
988 Walsh Avenue
(408) 988-6868
Alliance Occupational Medicine
2737 Walsh Avenue
(408) 228-8400

SANTA CLARA/CUPERTINO

Kaiser Occupational Health Center
10050 N. Wolfe Road, Ste. SW1-190
(408) 236-6160
[Clinic Manager: Rosalie Mikelson
(408) 236-6151]

SANTA CRUZ
Santa Cruz Medical Clinic
2025 Soquel Avenue
(408) 423-4111

SANTA ROSA
North Bay Corporate Health Services
95 Montgomery Drive, Suite 110
(707) 576-7300 NEED APPOINTMENT
Work Care
1287 Fulton Road
(707) 543-2441
Kaiser Occupational Health Center
401 Bicentennial Way
(707) 571-3000
[Clinic Manager: Sandra Hanson-Velloo
(707) 571-4847]
Sutter Health @ Work
3327 Channate Road
(707) 576-4932

SO. SAN FRANCISCO
Health South
192 Beacon Street
(415) 589-6500
Pacific Occupational Health Clinic
3 So. Linden Avenue
(415) 589-2647
U. S. HealthWorks
884 Dubuque Avenue
(650) 635-0400

SO. SAN FRANCISCO/SAN BRUNO
Kaiser Occupational Health Center
Bayhill Medical Office
801 Traeger Avenue, 2nd Floor
(650) 742-7110
San Bruno
[Case Manager: Darlene Schuller
(650) 742-7134]

SUNNYVALE
Peninsula Industrial Medical Clinic
1197 East Arques Avenue
(408) 773-9000
U. S. HealthWorks
1195 East Arques Avenue, Suite 1
(408) 773-9000

UNION CITY
Health South
33560 Alvarado-Niles Road
(510) 489-8700

VACAVILLE
Kaiser Occupational Health Center
3700 Vaca Valley Parkway, 1st Flr, South

(707) 453-5515
[Case Manager: Nancy Murchison
(707) 453-5538]

VALLEJO
Kaiser Occupational Health Center
975 Sereno Drive
(707) 651-1370
[Case Manager: Carrie Torres
(707) 651-2951]

WALNUT CREEK
Kaiser Occupational Health Center
1425 S. Main Street
(925) 295-6466
[Clinic Manager: Marsha Rees
(925) 372-1113]
Muir/Diablo Occupational Medical
1981 N. Broadway, Suite 190
(925) 932-7715

WALNUT CREEK/PARK SHADELANDS
Kaiser Occupational Health Center
320 Lemon Lane, Lassen Bldg., 2nd Floor
(925) 906-2060
[Clinic Manager: Marsha Rees
(925) 372-1113]

WATSONVILLE
Watsonville Community Hospital
COMPQUIK Dept.
298 Green Valley Road
(408) 761-5612 or (408) 761-5627

WOODLAND
Sutter Health @ Work
475 Pioneer Avenue, Suite 100
(530) 406-5616

District 5

CARPINTERIA
Santa Barbara Foundation Clinic
4806 Carpinteria Avenue
(805) 566-5000

GOLETA
Sansum/SBMF Immedicenter
101 S. Patterson Avenue
(805) 898-3311
Santa Barbara Medical Foundation Clinic
122 S. Patterson Avenue
(805) 681-1777

GREENFIELD
Urgent Care
634 Walnut Avenue
(831) 674-5066
So. Monterey Medical Group
806 Maple
(831) 674-5593

KING CITY
So. Monterey Medical Group
210 Canal Street

(831) 385-5471

LOMPOC

Santa Barbara Medical Foundation Clinic

1201 Ocean Avenue

(805) 737-8600

Santa Barbara Medical Foundation Clinic

217 West Central Avenue, Suite G

(805) 737-8686

MONTEREY

Doctors on Duty

501 Lighthouse Avenue

(831) 649-0770

Doctors on Duty

2260 North Fremont

(831) 372-6700

Convenient Medical Clinic

14 Ford Road

Carmel Valley

(831) 659-5531

Community Hos. of Monterey Peninsula

23625 W.R. Holman Highway

(831) 624-5311

SALINAS

Doctors on Duty

1212 S. Main Street

(831) 422-7777

Doctors on Duty

1137 N. Main Street

(831) 757-1110

SAN LUIS OBISPO

Med Stop

283 Madonna Road, Suite B

(805) 549-8880

Urgent Care Family Medical Center

47 Santa Rosa Street

(805) 542-9596

SANTA BARBARA

Urgent Care/SBMF

51 Hitchcock Way

(805) 563-6100

SANTA CRUZ

Doctors on Duty

615 Ocean Street

(831) 425-7991

Doctors on Duty

223 Mt. Herman Road

Scotts Valley

(831) 438-7555

Doctors on Duty

1505 Main Street

Watsonville

(831) 722-1444

Dominican Santa Cruz Hospital

1555 Soquel Drive

(831) 462-7700

Santa Cruz Medical Clinic

2025 Soquel Avenue

(831) 458-5537

Watsonville Community Hospital

75 Nielson Street

Watsonville

(831) 724-4741

SANTA MARIA

Santa Barbara Medical Foundation Clinic

2801 Santa Maria Way

(805) 938-3000

Industrial Medical Group of Santa Maria

3070 Skyway Drive

(805) 922-8282

Urgentcare Center

340 Betteravia Road, Suite C

(805) 922-0561

SOLVAG

Santa Ynez Valley/Cottage Hospital

700 Alamo Pintado Road

(805) 688-6431

TEMPLETON

Medi-Stop

225 Posada Lane, Suite C

(805) 434-3699

Twin Cities Community Hospital

1100 Las Tablas Road

(805) 434-3500

District 6**FRESNO**

Functional Industrial Rehabilitation

Medical Association

5084 N. Fruit, Suite 103

(559) 224-6754

Fresno Community Hospital

Fresno & R Street

(559) 442-6000

Concentra Medical Center

7265 North First Street, Suite 105

(559) 431-8181

Concentra Medical Center

2555 East Street

(559) 445-0606

St. Agnes Hospital

1303 Herndon

(559) 431-5000

Kaiser Occupational Health Center

7300 N. Fresno St., Oak 1 Bldg.

(559) 448-4886

[Clinic Manager: Joanne Jerome

(559) 448-4831

Valley Industrial & Family Medical Group

Main Office

2610 Tuolumne Street (at "P" St.)

(559) 268-0666

Valley Industrial & Family Medical Group
 North Office
 6011 N. Fresno Street, Suite #115
 (559) 440-9112
 Clovis Community Hospital
 2755 Herndon
 Clovis
 (559) 323-4000
 Concentra Medical Center
 6042 Fresno Street
 (559) 431-8181
 Sierra Meadows Medical Center
 48677 Victoria Lane
 Oathurst
 (559) 686-2199
 St. Agnes Occupational Health Center
 1189 E. Herndon Ave., Suite 103
 (559) 440-7777
 Palm Medical Group
 222 W. Shaw
 (559) 222-9200
 Sierra Kings Industrial Health Care
 1419 Acacia Avenue, Suite 110
 Reedley
 (559) 637-2355

WESTERN FRESNO COUNTY

Coalinga District Hospital
 Washington & Sunset
 (559) 935-2051

KERN COUNTY

Bakersfield Occupational Medical Group
 4580 California Avenue
 Bakersfield
 (661) 327-4527

Kern County (continued)

Central Valley Family Medical Group
 333 S. 10th Street
 Taft
 (661) 763-3338
 Delano Regional Medical Center
 1401 Garces Highway
 Delano
 (661) 725-4800
 Dr. A. Giffen
 109 Addison Way
 Taft
 (661) 765-2173
 Kaiser Occupational Clinic
 3501 Stockdale Highway
 Bakersfield
 (661) 398-5039

[Case Manager: Elise Gonzales
 (661) 398-3470
 Memorial Hospital
 420-34th Street
 Bakersfield

(661) 327-1792
 Mercy Hospital
 2215 Truxtun Avenue
 Bakersfield
 (661) 632-5275
 Mercy Medi Center
 Bernard & New Market Way
 Bakersfield
 (661) 632-5100
 Mercy Medi Center
 Stockdale & Old River Road
 Bakersfield
 (661) 663-6011
 Ming & Ashe Medical
 6501 Ming Avenue
 Bakersfield
 (661) 397-4004
 Valley Industrial Medical Group
 2501 "G" Street
 Bakersfield
 (661) 327-2225
 Westside District Hospital
 110 E. North
 Taft
 (661) 763-4211

EASTERN KERN COUNTY

Kern Valley Hospital
 6412 Laurel Avenue
 Lake Isabella
 (760) 379-2681

KINGS COUNTY

Immediate Care Center
 450 Greenfield Avenue
 Hanford
 (559) 582-9000
 Job Care
 500 Greenfield
 Hanford
 (559) 585-5126
 Sierra Valley Medical Group
 869 W. Lacey Blvd.
 Hanford
 (559) 582-9313

MADERA

Functional Industrial Rehabilitation
 Medical Association
 500 E. Almond, Suite 5B
 (559) 674-3153
 Concentra Medical Center
 509 S. I Street
 (559) 673-9020

TULARE COUNTY

Kaweah Delta Hospital
 400 W. Mineral King
 Visalia
 (559) 635-2211

Morinda Medical Group
 841 W. Morton
 Porterville
 (559) 781-8080
 Sierra View District
 465 W. Putman
 Porterville
 (559) 784-1110
 Valley Prompt Care Medical Corp.
 784 Prospect Street
 Porterville
 (559) 781-3014
 Valley Prompt Care Medical Corp.
 981 E. Prosperity
 Tulare
 (559) 684-8950
 Visalia Medical Clinic
 5400 Hillsdale
 (559) 627-5222

District 7**BALDWIN PARK**

Kaiser Occupational Health Center
 1011 Baldwin Park Blvd.
 (626) 851-5396
 [Case Manager: Irene Kuwaki-Chuman
 (626) 851-5641]

BELLFLOWER

Kaiser Occupational Health Center
 9449 E. Imperial Hwy. Bldg. D, Ste. #140
 (562) 803-2200
 [Case Manager: Kelly Zoern
 (562) 803-2013]

BURBANK

Providence St. Joseph Occupational
 Health Center
 3413 Pacific Avenue
 (818) 953-4408

CAMARILLO/OXNARD

Santa Rosa Walk-in Med Center
 4934 Verdugo Way
 Camarillo
 (805) 484-0095
 St. John's/Pleasant Valley Hospital
 2309 Antonio Avenue
 (805) 484-2831

CERRITOS/SANTA FE SPRINGS

Health First Medical Group
 11817 E. Telegraph Road
 Santa Fe Springs
 (562) 949-9328

COMMERCE

U. S. Health Works
 3430 South Garfield Avenue
 (323) 722-8481

EL MONTE

Health Care Partners Medical Group
 3144 Santa Anita Avenue
 (626) 582-7989

FILLMORE

Fillmore Medical Center
 852 Ventura Street
 (805) 524-2672

GARDENA/SOUTH LOS ANGELES

Centerpointe Medical Group
 16630 Broadway
 (310) 768-8155

HARBOR CITY

Kaiser Occupational Clinic
 25965 S. Normandie Avenue
 (310) 517-3739
 [Case Manager: Susan Ward
 (310) 517-3731]

IRWINDALE/MONROVIA

Foothill Medical Center
 6520 N. Irwindale Avenue
 (626) 812-0366

LANCASTER/PALMDALE

Antelope Valley Occupational Medical
 43845 N. 10th Street West, Suite 2E
 (661) 949-9126

LEBEC

Bakersfield Family Medical
 4580 California Avenue
 Bakersfield
 (661) 327-4411

LONG BEACH/COMPTON/CARSON

U. S. Health Works
 2107 East Del Amo Blvd.
 Rancho Dominguez
 (310) 637-9611

LOS ANGELES

Kaiser Occupational Health Center
 1526 Edgemont Bldg. G
 (323) 783-6621

[Case Manager: Connie Alvarez

(323) 783-6621]

Stacy Medical

1744 North Main Street

(323) 225-2261

U. S. Health Works-Metropolitan

1212 Flower Street

(213) 747-0634

MISSION HILLS/SAN FERNANDO**VALLEY**

Facey Medical Group
 11211 Sepulveda Blvd.

Mission Hills

(818) 365-9531

NEWHALL/SANTA CLARITA

First Medical Care

25327 Avenue Stanford, Suite 105

Valencia

(661) 253-8686

PANORAMA CITY

Kaiser Occupational Health Center
13652 Cantara Street

(818) 375-2233

[Case Manager: Susan Biag

(818) 375-2795]

PASADENA/GLENDALE

Verdugo Hills Urgent Medical Care
544 North Glendale Avenue

(818) 241-4331

POMONA

U. S. Health Works

801 Corporate Center Drive, Suite 130

(909) 594-7551

SIMI VALLEY/MOORPARK

Med Center

1980 Sequoia Avenue

(805) 583-5555

VAN NUYS

U. S. HealthWorks

16300 Roscoe Blvd.

(818) 893-4426

VENTURA

Community Memorial Industrial/Hospital

138 W. Main Street

(805) 667-2850

Community Memorial Hospital

147 N. Brent Street

(805) 667-2850

WEST LOS ANGELES

Kaiser Occupational Health Center

5971 Venice Blvd., 4th Floor

(310) 915-4400

[Case Manager: Nasmeeen Razak

(310) 915-4419]

Airport Urgent Care

1117 West Manchester Blvd.

Inglewood

(310) 216-7100

Citizens Medical Group

11560 West Pico Blvd.

Los Angeles

(310) 477-8285

WOODLAND HILLS

Kaiser Occupational Health Center

5601 De Soto Avenue

(818) 719-3006

[Case Manager: Youngsoon Lim

(818) 719-2413]

Woodland Hills (continued)

Dr. Allan L. Kurtz

Warner Medical Center

6325 Topanga Canyon Blvd, Suite 501

(818) 346-1440

District 8

PARKER, ARIZONA

LaPaz Regional Hospital

1200 Mojave Road

(520) 669-9201

APPLE VALLEY

Santa Fe Family Health

18182 Highway 18, Suite 105

(760) 242-1234

St. Mary Regional Medical Center

18300 Highway 18

(760) 242-2311

Desert Valley Medical Group

18077 Highway 18

(760) 242-8000

Central Occupational Medical Providers

16003 Tuscola Road, Suite F

(760) 242-8808

BANNING

San Gorgonio Pass Memorial Hospital

600 North Highland Springs Avenue

(909) 845-1121

BARSTOW

Desert Valley Medical Group Inc.

1301 E. Main Street

(760) 256-3864

Barstow Hospital

555 South 7th Street

(760) 256-1761

Dr. Mike's

716 East Main Street

(760) 256-6426

BIG BEAR

Bear Valley Community Hospital

41870 Garstin Road

(909) 866-6501

BLYTHE

Leon Peter Y. Chua, M.D.

500 W. Barnard/ 500 N. Broadway, Ste.17

(760) 922-2152

CATHEDRAL CITY

Desert Primary Care Express

68-325 Highway 111

(760) 323-6789

Eisenhower Immediate Care Center

67-780 E. Palm Canyon Drive

(760) 328-1000

COACHELLE VALLEY

Santa Rosa del Valle Medical Group

1293-6th Street

(760) 391-5151

COLTON

U. S. Healthworks

850 E. Washington Street

(909) 370-0572

CORONA

Comp Access
760 S. Washburn, Suite 4A
(909) 808-6700
Central Occupational Med. Providers
1690 West 6th Street, Suite K
(909) 736-9500

DESERT HOT SPRINGS

Desert Primary Care
13570 Palm Drive
(619) 329-1776

FONTANA

Fontana Industrial Medical Clinic
8110 Mango Avenue, Suite 106
(909) 357-1595
Kaiser Occupational Health Center
9961 Sierra Avenue, Bldg. 3B
(909) 427-3917
[Case Manager: Gloria Duck
(909) 427-6100]

HEMET

Talbort U.S. Family Care
1545 W. Florida
(909) 652-2961

HESPERIA

Friendly Medical Center
15462 Main Street
(760) 949-7000

JOSHUA TREE

Hi Desert Medical Center
6601 White Feather Road
(760) 366-3711

LA QUINTA

Eisenhower Immediate Care Center
78-822 Highway 111, Suite C
(760) 564-7000

LOMA LINDA

Central Occupational Medicine Providers
24630 Redlands Blvd.
(909) 478-7878

MIRA LOMA

Tri-Industrial Medical Center
10427 San Sevaine Way, Suite J
(909) 360-8333

MORENO VALLEY

U. S. Healthworks
6485 Day Street, Suite 302
(909) 653-5291
Moreno Valley Ambulatory Surgery Center
24384 Sunnymead Blvd.
(909) 247-8080

NEEDLES

Colorado River Medical Center
1401 Bailey Avenue
(760) 326-4531

ONTARIO

Milliken Medical Group
1101 South Milliken Avenue, Suite C
(909) 390-2799
Inland Industrial Medical Group
1910 South Archibald Avenue, Unit E-2
(909) 930-5270
U. S. Healthworks
3200 Inland Empire Blvd., Suite 100
(909) 945-5011
Central Occupational Medicine Providers
59 S. Milliken Avenue, Suite 100
(909) 605-8888
U. S. HealthWorks
2171 S. Grove Avenue, Suite A
(909) 923-4080

PALM DESERT

Desert Urgent Care
74-990 Country Club Drive #310
(760) 341-8800

PERRIS

First Care Industrial
2226 Medical Center Drive #101
(909) 657-6559

PHELAN

Phelan Clinic
3936 Phelan Road, Suite F1
(760) 868-6622

REDLANDS

Redlands Community Hospital
350 Terracina Blvd.
(909) 335-5500

RIVERSIDE

Parkview Ctr. for Occupational Medicine
9041 Magnolia Avenue, Suite 302
(909) 354-8020
U. S. Healthworks
1760 Chicago Ave., Suite J-3
(909) 781-2200
Riverside Industrial Medical Clinic
2002 Iowa Avenue, Suite 104
(909) 682-2222
Central Occupational Medicine Providers
4300 Central Avenue
(909) 222-2206
Kaiser Occupational Health Center
10800 Magnolia Ave., Module 4J
(909) 353-4322
[Case Manager: Sue Carter
(909) 353-4214]

SAN BERNARDINO

U. S. Healthworks
599 Inland Center Drive, Suite 105
(909) 889-2665
Fox Occupational Medical Center
1375 Camino Real, Suite 130

(909) 884-1500
 Cornerstone Medical Group Inc.
 201 E. Airport Drive, Suite B
 (909) 890-1888
TEMECULA
 Rancho Urgent Care
 27699 Jefferson Avenue, Suite 109
 (909) 676-6668

First-Care Industrial
 28991 Front Street #104
 (909) 699-8563

VICTORVILLE
 Desert Valley Medical Group
 15860 Bear Valley Road
 (760) 241-8000, ext. 8600

WILDOMAR
 Inland Valley Regional Medical Center
 36485 Inland Valley Drive
 (909) 677-1111
 Inland Urgent Care
 36243 Inland Valley Drive, Suite 180
 (909) 600-0110

YUCCA VALLEY
 Avalon Urgent Care Center
 58471 Twenty-Nine Palms Hwy., Ste. 303
 (760) 365-0851

HENDERSON, NEVADA
 Saint Rose Dominican Hospital
 102 E. Lake Mead Drive
 (702) 564-2622

LAS VEGAS, NEVADA
 Sunrise Hospital Medical Center
 3186 Maryland Parkway South
 (702) 564-2622

District 9

BAKERSFIELD
 Kaiser Occupational Health Center
 3501 Stockdale Highway
 (661) 398-5070
 [Case Manager: Eillen Lua
 (661) 398-5093]
 Memorial Hospital
 420-34th Street
 (661) 327-1792
 Bakersfield Occupational Medical Group
 4580 California Avenue
 (661) 327-4527
 Mercy Hospital
 2215 Truxtun Avenue
 (661) 632-5275
 Mercy Medi Center
 Bernard & New Market Way
 (661) 632-5100
 Valley Industrial Med Group

2501 "G" Street
 (661) 327-2225
EASTERN INYO
 Nevada Rural Health Centers, Inc.
 Beatty Clinic
 P. O. Box 431
 Beatty, NV
 (702) 553-2208
 Nevada Rural Health Centers, Inc.
 Amargosa Valley Medical Clinic
 845 Farm Road HCR 69, Box 401-V
 Amargosa Valley, NV
 (775) 372-5432
 Death Valley Health Clinic
 P. O. Box 158
 Shoshone, CA
 (760) 852-4383
 Desert Spring Hospital
 2075 E. Flamingo Road
 Las Vegas, NV
 (702) 733-8800
 North Las Vegas Community Hospital
 1409 E. Lake Mead Blvd.
 N. Las Vegas, NV
 (702) 649-7711

NORTHERN INYO
 Family Health Center
 686 W. Line Street
 Bishop
 (760) 872-4311
 Northern Inyo Hospital
 150 Pioneer Lane
 Bishop
 (760) 873-5811
 Rural Health Clinic
 153 Pioneer Lane
 Bishop
 (760) 873-2849

SOUTHERN INYO
 M. R. Jones, M.D.
 131 W. Whitney Portal Road
 Lone Pine
 (760) 876-8118
 501 E. Locust Street
 Lone Pine
 (760) 876-5501

EASTERN KERN
 Kern Valley Hospital
 6412 Laurel Avenue
 P. O. Box 1628
 Lake Isabella
 (760) 379-2681
 Drummond Medical Group, Inc.
 1111 China Lake Blvd.
 Ridgecrest
 (760) 446-0240

SOUTHEASTERN KERN

Alpine Medical Clinic
20211 Valley Blvd.
Tehachapi
(661) 822-5544
Antelope Valley Occupational Medical
43845 N. 10th Street West, Suite 2E
Lancaster
(661) 949-9126
Tehachapi Hospital
115 West E. Street
Tehachapi
(661) 822-3241
Gary Olsen, M.D.
20693 Valley Blvd.
Tehachapi
(805) 822-0583
Sierra Family Care
20797 Santa Lucia
Tehachapi
(661) 822-9105
Mojave Medical Clinic
2041 Belshaw Street
Mojave
(661) 824-4511

NORTHERN MONO
Mono County Medical Clinic
P. O. Box 677
Twin Lakes Road
Bridgeport
(760) 932-7011
Minden Medical Center
925 Ironwood Drive
Minden, NV
(775) 782-8181
Washoe Medical Center
77 Pringle Way
Reno, NV
(775) 982-4100
Carson-Tahoe Hospital
775 Fleischmann way
Carson City, NV
(775) 882-1361
Carson Valley Medical Center
1107 Hwy. 395 South
Gardnerville, NV
(775) 782-1500
(775) 782-1615 Occupational Center
Sierra Park Family Medical Clinic
P. O. Box 555
Mammoth Lakes
(760) 934-2511
Mammoth Hospital
Sierra Park Road
Mammoth Lakes
(760) 934-3311

Mono County Medical Clinic
P. O. Box 677
Twin Lakes Road
Bridgeport
(760) 932-7011

District 10**ANGLES CAMP**

Angels Camp Medical Clinic
222 South Main
(209) 736-0813

ARNOLD

C. A. Cunnington, M.D.
771 Highway 4
(209) 795-4193

JACKSON

(Emergencies Only)
Amador County Hospital
810 Court Street
(209) 223-7500

LOS BANOS

J. F. Mevi, M.D.
400 West "I" Street, Suite A
(209) 826-3200

MANTECA

Kaiser Occupational Health Center
1721 W. Yosemite Avenue
(209) 824-5059
[Clinic Coordinator: Denise Giordano
(209) 824-5019]

MARIPOSA

Mariposa Family Medicine & Assoc.
5300 Highway 49
(209) 966-3672

MARKLEEVILLE

Alpine County Health Dept.
75 B Diamond Valley Road
(530) 694-2146
Physician on duty Tues. & Thurs. ONLY

MERCED

Lifetime Health Care Medical Assoc.
and Mercy Urgent Care
374 West Olive, Suite B
(209) 383-3076
Mercy Medical Center
301 East 13th Street
(209) 385-7100
(Emergencies Only)
Mercy Hospital
2740 "M" Street
(209) 984-6501

MODESTO

Gould Medical Group
600 Coffee Road
(209) 524-1211
Healthsouth Center
2101 Tenaya Drive

(209) 527-0080
 Kaiser Occupational Health Center
 3800 Dale Road
 (209) 557-6145
 [Clinic Manager: Melanie Hatchel
 (209) 476-3324]
 U. S. HealthWorks
 1524 McHenry Avenue, Suite 500
 (209) 575-5801

MURPHYS
 Ryan Thompson, M.D.
 300 Church Street
 (209) 728-2021

PIONEER
 Sutter Amador Health Centers
 Highway 88
 (209) 295-5544

PLYMOUTH
 Sutter Amador Health Centers
 9279 Locust Street
 (209) 245-6968

SONORA
 (Emergencies Only)
 Prompt Care – Indian Rock
 14540 Mono Way
 (209) 532-3167

SOUTH LAKE TAHOE
 Tahoe Urgent Care
 2130 Lake Tahoe Blvd.
 (530) 541-3277
 (Emergencies Only)
 Barton Memorial Hospital
 South Avenue & 4th Street
 (530) 541-3420

STOCKTON/LODI
 Dameron Urgent Care Center
 525 W. Acacia Street
 (209) 461-3194
 Sierra Occup. Services Medical Clinic
 1429 W. Fremont Street
 (209) 546-7767
 Kaiser Occupational Health Center
 7373 West Lane, 1st Floor
 (209) 476-3694
 [Clinic Manager: Melanie Hatchel
 (209) 476-3324]
 Healthsouth
 3663 E. Arch Road, Suite 400
 (209) 943-2202

TRACY
 Dr. Jagdish Patel
 644 W. 12th Street
 (209) 832-8984

TURLOCK
 Turlock Medical Clinic
 1015 E. Main Street

(209) 632-3909

WOODFORDS

Carson Valley Medical Center
 1107 Hwy. 395, Suite F
 Gardenville, NV
 (775) 782-1615

District 11

BRAWLEY

Valley Comp. Health & Immediate Care
 608 G Street, Suite B
 (760) 344-7454

CARLSBAD

U. S. HealthWorks
 5814 Van Allen Way, Suite 210
 (760) 438-4466

CHULA VISTA

U. S. HealthWorks
 111 Broadway, Suite 305
 (619) 425-8212

EL CENTRO

Valley Comp. Health & Immediate Care
 2026 N. Imperial Avenue
 (760) 353-6600

ESCONDIDO

U. S. HealthWorks
 362 West Mission Avenue, Suite 104
 (760) 747-2330

HILLCREST

U. S. HealthWorks
 3930 4th Avenue, Suite 200
 San Diego
 (619) 297-9610

KEARNY MESA

U. S. HealthWorks
 5575 Ruffin Road
 San Diego
 (858) 227-2744

LA MESA

U. S. HealthWorks
 8090 Parkway Drive
 (619) 277-2744

MIRAMAR

U. S. HealthWorks
 7590 Miramar Road, Suite C
 San Diego
 (858) 549-4255

NATIONAL CITY

U. S. HealthWorks
 102 Mile of Cars Way
 (619) 474-9211

SAN DIEGO

Kaiser Occupational Health Clinic
 4647 Zion Avenue

(619) 528-5062

[Case Manager: Margaret Smith

(619) 528-6077]

SANTEE

U. S. HealthWorks

9745 Prospect Avenue, Suite 100

(619) 448-4841

SORRENTO MESA

U. S. HealthWorks

5897 Oberlin Drive, Suite 100

San Diego

(858) 455-0200

Sorrento Mesa (continued)

Kaiser Occupational Health Center

780 Shadowridge

(760) 599-2333

[Case Manager: Margaret Smith

(619) 528-6077]

VISTA

U. S. HealthWorks

2023 West Vista Way, Suite C

(760) 941-2000

District 12

ANAHEIM-ORANGE

Concord Medical dba

Goldenwest Medical

915 East Katella Avenue, Suite 200

(714) 517-2100

Kaiser Occupational Health Center

411 N. Lakeview Avenue

(714) 279-5500

[Case Manager: Deborah Lopez

(714) 279-5458]

FULLERTON

St. Jude Heritage Health Foundation

2151 N. Harbor Blvd.

(714) 992-3967

GARDEN GROVE

Kaiser Occupational Health Center

12100 Euclid Street

(714) 741-3688

[Case Manager: Wendy Green

(714) 741-3684]

Tustin Irvine Medical

7052 Orangewood

(714) 903-1100

IRVINE

San Canyon Urgent Care Med. Center

16100 Sand Canyon, Suite 150

(949) 417-0272

U. S. Healthworks

2362 Morse Avenue

(949) 863-9103

LAKE FOREST

Saddleback Urgent Care Center

22581 Lake Forest Drive

(949) 770-1023

MISSION VIEJO

Saddleback Urgent Care Center

23962 Alicia Parkway

(949) 770-6000

ORANGE

Convenient Medical Care

1045 North Tustin Avenue

(714) 921-0911

Sunrise Multispecialist Medical Center

867 South Tustin Avenue

(714) 771-1420

PLACENTIA

St. Jude Heritage Health Foundation

1501 N. Placentia Avenue

(714) 524-7333

SAN JUAN CAPISTRANO

South Coast Family

25500 Rancho Niguel Road, Suite 100

(949) 643-0500

SANTA ANA

East Edinger Medical Clinic

1530 East Edinger

(714) 542-8904

TUSTIN-SANTA ANA

Kaiser Occupational Clinic

1900 E. 4th Street

(714) 967-4600

[Case Manager: Gloria Soto

(714) 967-4600]

CSMP INSTRUMENTED BRIDGES															
#	Built	Installed	Bridge Name	Bridge No.	Post Mile	Location	Lat	Long	Type	Spans	Length	Sensors	Funding		
1	1965	4/13/95	Klamath River	01-0028	01-DN-101-R4.04	Klamath	41	31.1	124	1.8	RC Box	12	2038	6	Caltrans
2	1941	no power	Eel River	04-0016R		Rio Dell	40	31.6	134	7.1	Steel Truss	8	1643	18	Caltrans
3	1971	4/12/96	Samoa Channel	04-0228	01-HUM-255-1.2	Eureka	40	49.1	124	10.0	PC/PS Gir	20	2506	27	Caltrans
4	1971	4/10/96	Middle Channel	04-0229	01-HUM-255-0.7	Eureka	40	48.8	124	9.5	PC/PS I-Girder	9	1082	9	Caltrans
5	1971	4/9/96	Eureka Channel	04-0230	01-HUM-255-0.2	Eureka	40	48.5	124	9.2	CIP/PS Box Gir	15	1817	12	Caltrans
6	1976	9/29/77	Painter St. OC	04-0236	01-HUM-101-R52.89	Rio Dell	40	30.2	124	6.0	CIP/PS Box Gir	2	265	20	S M I P
7	1964	4/6/95	Murray Road	04-0170	01-HUM-101-R92.99	Arcata	40	57.4	124	6.9	RC T-Gir	4	182	12	Caltrans
8	1951	3/17/94	Salmon Creek	10-0134	01-MEN-1-43.00	Mendoc. Co.	39	12.9	123	46.1	Steel Truss	7	685	9	Caltrans
9	1933	2/7/98	Big Dann	10-0030	01-MEN-101-R9.53	Sonoma	39	50.8	123	41.8	RC Girder	7	585	12	Caltrans
10	1933	2/7/98	Cedar Creek	10-0031	01-MEN-271-4.9	Sonoma	39	50.9	123	42.1	RC Girder	7	609	12	Caltrans
11	1966	10/22/97	Hopland	10-0081	01-MEN-271-5.2	Ukiah	38	57.3	123	6.3	RC Box Gir	5	311	16	Caltrans
12	1989	11/14/95	Union Mills BOH	17-0058L	03-NEV-80-20.23	Truckee	39	22.0	120	6.9	CIP/PS Box Gir	3	962	8	Caltrans
13	1984	9/29/93	Russian River	20-0195	04-SON-1-19.72	Sonoma Co.	38	26.0	123	6.0	CIP/PS Box Gir	6	910	6	Caltrans
14	1973	5/4/95	Rohnert Park Express	20-0235	04-SON-101-13.88	Rohnert Park	38	20.9	122	42.7	CIP/PS Box Gir	2	282	12	Caltrans
15	1962	underway	Yolo Causeway	22-0045	03-YOL-80-7.25	Sacramento	38	34.4	121	34.9	RC Girder	220	8800	12	Caltrans
16	1958	3/1/99	Petaluma River	27-0013	04-MRN-37-14.47	Navato	38	6.9	122	30.3	PC/PS T-Girder	29	2183	12	Caltrans
17	1937	12/10/79	Caldecott Tunnel	28-0015	04-CC-24-R0.01	Berkeley	37	51.5	122	12.7	RC Arch Tunn	NA	3371	13	S M I P
18	1962	3/2/94	Benicia Toll Br.	28-0153	04-CC-680-25.04	Martinez	38	2.5	122	7.4	Steel Truss	18	6215	9	Caltrans
19	1979	4/6/98	San Joaquin River Toll	28-0009	04-CC-160-0.82	Antioch	38	1.8	121	45	RC Box Girder	70	9436.8	18	Caltrans
20	1988	6/11/93	580/238 Sep.	33-0214L	04-ALA-580-30.80	Castro Valley	37	41.5	122	5.5	CIP/PS Box Gir	14	2030	10	Caltrans
21	1970	5/20/93	North Conn.	33-0302H	04-ALA-580-45.23	Oakland	37	49.5	122	16.0	RC Box Gir	36	3284	6	Caltrans
22	1965	5/26/93	580 On-Ramp/13 Sep.	33-0347S	04-ALA-480-R39.15	San Leandro	37	46.8	122	10.0	RC Box Gir	3	290	6	Caltrans
23	1936	3/6/92	Bay Br.(Toll) East/West	33-25/34-3	04-ALA-80-0.0	Oakland	37	48.7	122	21.7	Truss/Suspen.	52/11	43262	12/6	Caltrans
24	1982	6/10/87	Dumbarton Toll Br.	35-0038	04-SM-84-29.0	Fremont	37	29.9	122	7.8	PC/PS Box Gir	85	8600	32	S M I P
25	1967	10/28/93	San Mateo Toll Br.	35-0054	04-SM-92-14.44	Hayward	37	36.0	122	12.8	Twin Steel Box	908	36069	27/61	Caltrans
26	1957	12/5/85	Sierra Point OH	35-0130	04-SM-101-23.7	S. San Fran.	37	40.5	122	23.2	Steel Gir	10	616	16	Caltrans
27	1973	11/19/93	Crystal Springs POC	35-0285	04-SM-280-10.56	Belmont	37	30.3	122	20.0	CIP/PS Box Gir	3	374	6	Caltrans
28	1962	4/16/97	Tunitas Creek	35-0031	04-SM-1-20.82	Half Moon Bay	37	21.5	122	23.8	PC/PS I-Girder	6	421	9	Caltrans
29	1990	11/23/94	Struve Slough	36-0088	04-SCR-1-R1.59	Watsonville	36	54.5	121	46.9	RC Slab	22	796	9	Caltrans
30	1995	10/10/96	South Alviso OH	37-0470R	04-SCL-237-6.10	San Jose	37	25.9	121	54.2	CIP/PS Box Gir	6	447	12	Caltrans
31	1995	10/10/96	South Alviso OH	37-0470L	04-SCL-237-6.10	San Jose	37	25.9	121	54.2	CIP/PS Box Gir	6	436	9	Caltrans
32	1958	5/24/77	156/101 Sep.	43-0031	05-SBT-156-3.02	Hollister	36	51.7	121	34.7	Steel Gir	6	326	12	S M I P

CSMIP INSTRUMENTED BRIDGES CONTINUED															
No	Built	Installed	Bridge Name	Bridge No.	Post Mile	Location	Lat	Long	Type	Spans	Length	Sensors	Funding		
33	1968	12/20/95	Pfeiffer Canyon	44-0060	05-MON-1-45.52	Big Sur	36	14.3	121	46.4	CIP/PS Box Gir	3	317	18	Caltrans
34	1969	8/30/95	Crowley Lake	47-0048	09-MNO-395-R13.93	Tom's Place	37	34.5	118	44.4	RC Box Girder	2	203	9	Caltrans
35	1979	8/4/93	Cholame Creek	49-0036	05-SLO-46-54.77	Parkfield	35	44.0	120	17.3	RC Slab	5	128	6	Caltrans
36	1984	10/26/95	San Simeon Creek	49-0046	05-SLO-1-52.92	San Simeon	35	35.7	121	7.6	CIP/PS Box Gir	4	423	12	Caltrans
37	1964	6/26/98	Lebec OC	50-0270	06-KER-5-1.61	Los Angeles	34	50.1	118	51.8	RC Box Girder	4	299	16	Caltrans
38	1966	2/22/96	Brown Road	50-0340	09-KER-395-R25.06	Inyokern	35	40.3	117	49.0	RC Box Girder	4	282	9	Caltrans
39	1973	3/22/95	South Mojave OH	50-0402	09-KER-14-15.32	Mojave	35	2.3	118	10.1	CIP/PS Box Gir	4	619	12	Caltrans
40	1984	9/2/96	San Roque Canyon	51-0104	05-SB-192-1.77	Santa Barbara	34	27	119	44	CIP/PS Box Gir	3	448	9	Caltrans
41	1960	9/4/97	Cuyama	51-0066	05-SB-1-R69.94	Cuyama	34	56.4	119	35.4	RC Box Gir	7	560	12	Caltrans
42	1968	5/15/00	El Jaro Creek	51-0090	05-SB-1-R6.78	Lompoc	33		117		RC Box Gir	5	401	11	Caltrans
43	1961	5/24/95	Telephone Road	52-0214	07-VEN-101-R26	Ventura	34	15.7	119	13.8	RC Box	4	204	12	Caltrans
44	1993	6/1/96	Arroyo Simi OH	52-0331L	07-VEN-023/118-21.	Moorpark	34	17.2	118	51.9	CIP/PS Box Gir	6	1360	12	Caltrans
45	1964	4/27/94	San Gabriel River	53-1185	07-LA-405-0.02	Los Angeles	33	47.4	118	5.5	RC Box Gir	5	390	6	Caltrans
46	1962	10/22/81	Vincent Thomas Br.	53-1471	07-LA-47-0.86	Long Beach	33	45.0	118	16.2	Suspension	27	6026	26	S M I P
47	1963	9/30/93	SW Conn. OC	53-1630G	07-LA-405-29.43	Los Angeles	34	1.9	118	26.0	RC Box Gir	10	1307	10	Caltrans
48	1965	12/9/94	Barrel Springs	53-1794	07-LA-14-R57.37	Palmdale	34	32.8	118	7.7	RC Box Gir	5	444	12	Caltrans
49	1973	5/1/96	Rte 118/210 Sep	53-2102G	01-LA- 118/210-6.0	Pasadena	34	17.3	118	24.3	CIP/PS Box Gir	10	1665	36	Caltrans
50	1974	3/31/94	East Conn. OC	53-2318G	07-LA-134-R13~25	Pasadena	34	9.0	118	9.3	RC Box Gir	12	1684	9	Caltrans
51	1994	11/1/94	La Cienega	53-2791	07-LA-10-8.8	Los Angeles	34	2.2	118	22.3	CIP/PS Box Gir	6	776	15	Caltrans
52	1994	12/20/95	14/5 Sep/OH Ramp	53-2795F	07-LA-14~24.5	Newhall	34	20.1	118	30.5	CIP/PS Box Gir	9	1582	38	Caltrans
53	1994	12/20/95	14/5 Sep/OH Ramp	53-2797F	07-LA-14-24.5	Newhall	34	20.1	118	30.5	CIP/PS Box Gir	8	1298	4	Caltrans
54	1989	12/18/92	15/215 Sep.	54-0783R	08-SBD-15-16.35	Devore	34	13.5	117	24.5	CIP/PS Box Gir	2	334	6	Caltrans
55	1966	11/10/92	Northwest Conn.	54-0823G	08-SBD-215-4.05	Colton	34	3.8	117	17.7	CIP/PS Box Gir	16	2540	37	SMIP
56	1962	6/21/99	Via California	55-0225	12-ORA-5-6.62	Capistrano	33	27.9	117	40	RC Box Gir	6	441	12	Caltrans
57	1961	12/16/92	60/10 Sep.	56-0452F	08-RIV-10-6.67	Beaumont	33	56.0	116	59.5	RC Box Gir	4	320	6	Caltrans
58	1962	6/30/93	62/10 Sep.	56-0474G	08-RIV-62-0.00	Palm Springs	33	54.9	116	36.1	Steel Gir	4	338	7	Caltrans
59	1989	9/29/94	15/91 Interchange	56-0586G	08-RIV-15-R41.57	Corona	33	52.9	117	32.9	CIP/PS Box Gir	12	1600	9	Caltrans
60	1969	11/17/93	San Diego Toll Br.	57-0857	11-5D-75-R20.49	Coronado	32	41.3	117	9.8	Steel/Ortho	32	7826	9	Caltrans
61	1966	7/4/96	Ardath Road Via.	57-0520L	11-SD-52-0.19	La Jolla	32	50.3	117	14	CIP/PS Box Gir	17	1763	24	Caltrans
62	1971	4/26/78	Meloland Rd. OC	58-0215	11-IMP-8-R44.04	El Centro	32	46.4	115	26.8	RC Box Gir	2	208	32	S M I P
63	1967	4/3/86	BART Elevated Struct.	BART	-	Hayward	37	40.3	122	5.2	PS Box Girders	3	77	19	S M I P

DOWNHOLE ARRAY SITES															
#	Built	Installed	Bridge Name	Bridge No.	Post Mile	Location	Lat		Long		Type	Spans	Length	Sensors	Funding
1	1971	8/30/95	Samoa Channel	04-0228	01-HUM-255-1.2	Eureka	40	49.1	124	10	Soil	20	2506	15	Caltrans
2	1973	Underway	Rohnert Park	20-0235	04-SON-101-13.88	Rohnert Park	38	20.9	122	42.7	Soil	2	282	9	Caltrans
3	1962	11/01/00	Tunitas Creek	35-0031	04-SM-1-20.82	Half Moon Bay	37	21.5	122	23.8	Soft Rock	6	421	12	Caltrans
4	1967	Underway	San Mateo Bridge E/W	35-0054	04-SM-92-14.44	Hayward	37	36	122	12.8	Soil	908	36069	15/12	Caltrans
5	1982	6/3/96	Dumbarton Toll Br.	35-0038	04-SM-84-29.0	Fremont	37	29.9	122	22.3	Rock	85	8600	3	Caltrans
6	1993	Underway	Arroyo Simi OH	52-0331L	07-VEN-023/118-21.0	Moorpark	34	17.2	118	51.9		6	1360	9	Caltrans
7	1994	5/14/97	14/5 Sep/OH (Ramp C)	53-2795F	07-LA-14-24.5	Newhall	34	20.1	118	30.5	Pile	9	1582	5	Caltrans
8	1962	9/10/98	Vincent Thomas Toll Br E/W	53-1471	07-LA-47-0.86	Long Beach	33	45	118	16.2	Soil	27	6026	12/21	Caltrans
9	1965	Underway	Barrel Springs	53-1794	07-LA-14-R57.37	Palmdale	34	32.8	118	7.7	Rock	5	444	9	Caltrans
10	1994	12/15/94	La Cienega	53-2791	07-LA-10-8.8	Los Angeles	34	2.2	118	22.3	Soil	6	776	12	Caltrans
11	1966	Underway	Northwest Conn E/W	54-0823G	08-SBD-215-4.05	Colton	34	3.8	117	17.7	Soil	16	2540	12/12	Caltrans
12	1989	underway	15/91 Interchange	56-0586G	08-RIV-15-R41.57	Corona	33	52.9	117	32.9		12	1600	12	Caltrans
13	1971	2/11/99	Meloland	58-0215	11-IMP-8-R44.04	El Centro	32	46.4	115	26.8	Soil	2	208	12	Caltrans

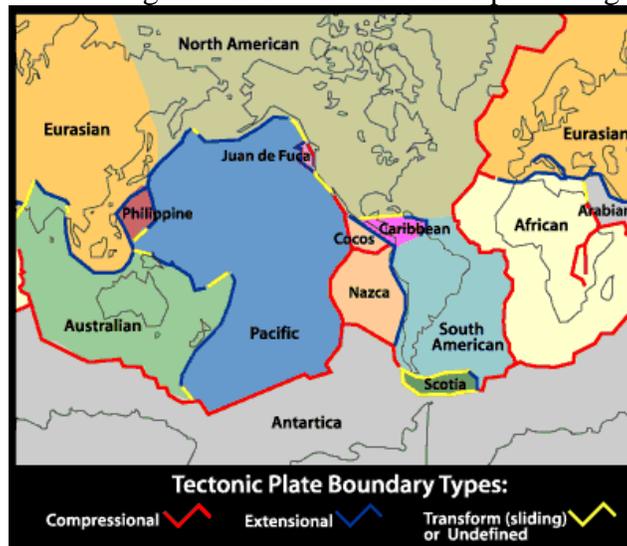
PEQIT investigators should be aware of bridges with special features such as those with accelerometers. Your observations may be the only correlation available between recorded performance and the condition of the bridge. Take extra time to record everything of relevance to instrumented bridges.

EARTHQUAKES

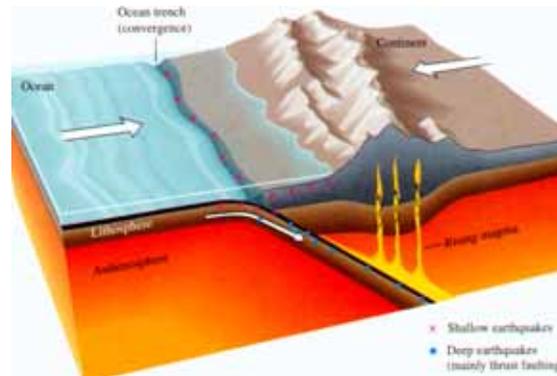
Sources of Earthquakes

Most earthquakes occur on faults at the boundaries of tectonic plates, especially in California. As the plates move, the faults become stressed until one suddenly ruptures, causing an earthquake. Plates move a few millimeters to centimeters in a year and it requires a few centimeters to meters of movement before an earthquake occurs.

There are different types of faults, reflecting the behavior of the prevailing tectonic forces. The figure below shows the earth's lithosphere divided into tectonic plates. The plate boundaries may be pushing together (compression or convergent boundaries), pulling apart (divergent or extensional boundaries), or sliding against each other (sliding or transform boundaries). Faults do not always follow the expected behavior from the global tectonic model due to significant local variation of prevailing forces.



Compressional plate boundaries are where heavy oceanic plates collide with lighter continental plates; pushing the oceanic plate downward and causing thrust faulting. Compression against the continental plate forms mountains and the ensuing friction melts rock causing volcanoes. An example is along the coast of Northern California, Oregon, and Washington State where the Juan de Fuca and Gorda Plates are being pushed under the North American Plate.



Compressional boundaries cause thrust faults.

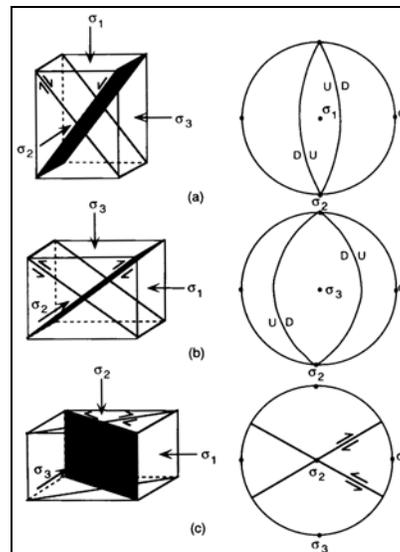
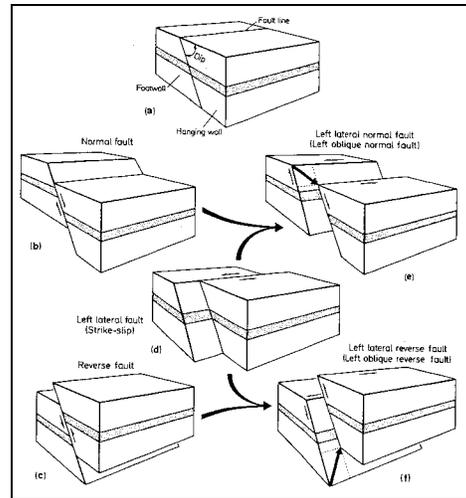
In California we are most familiar with the sliding action of the transform boundary between the Pacific and North American Plates. This has created many long strike-slip faults such as the San Andreas. We can also see transform fault zones between the extensional faults on the west side of the Juan de Fuca and Gorda fault ridges.

During actual earthquakes, faulting can be considerably more complicated depending on the state of stress in the earth's crust. The figures below show how normal faulting (b) can be combined with strike-slip faulting (d) to create an oblique normal fault. Similarly, reverse (or thrust) faulting (c) can be combined with strike-slip faulting to cause an oblique reverse (or thrust) fault. Faults are left or right lateral based on the movement of the rock on the other side of the fault from where an observer is standing. Figure (a) shows some of the features of a fault, such as the fault line (or trace), the fault dip, the footwall extending under the dipping fault, and the hanging wall extending above the fault (a thrust fault is a reverse fault where the dip angle is less than 45° and the fault line often does not reach the ground surface).

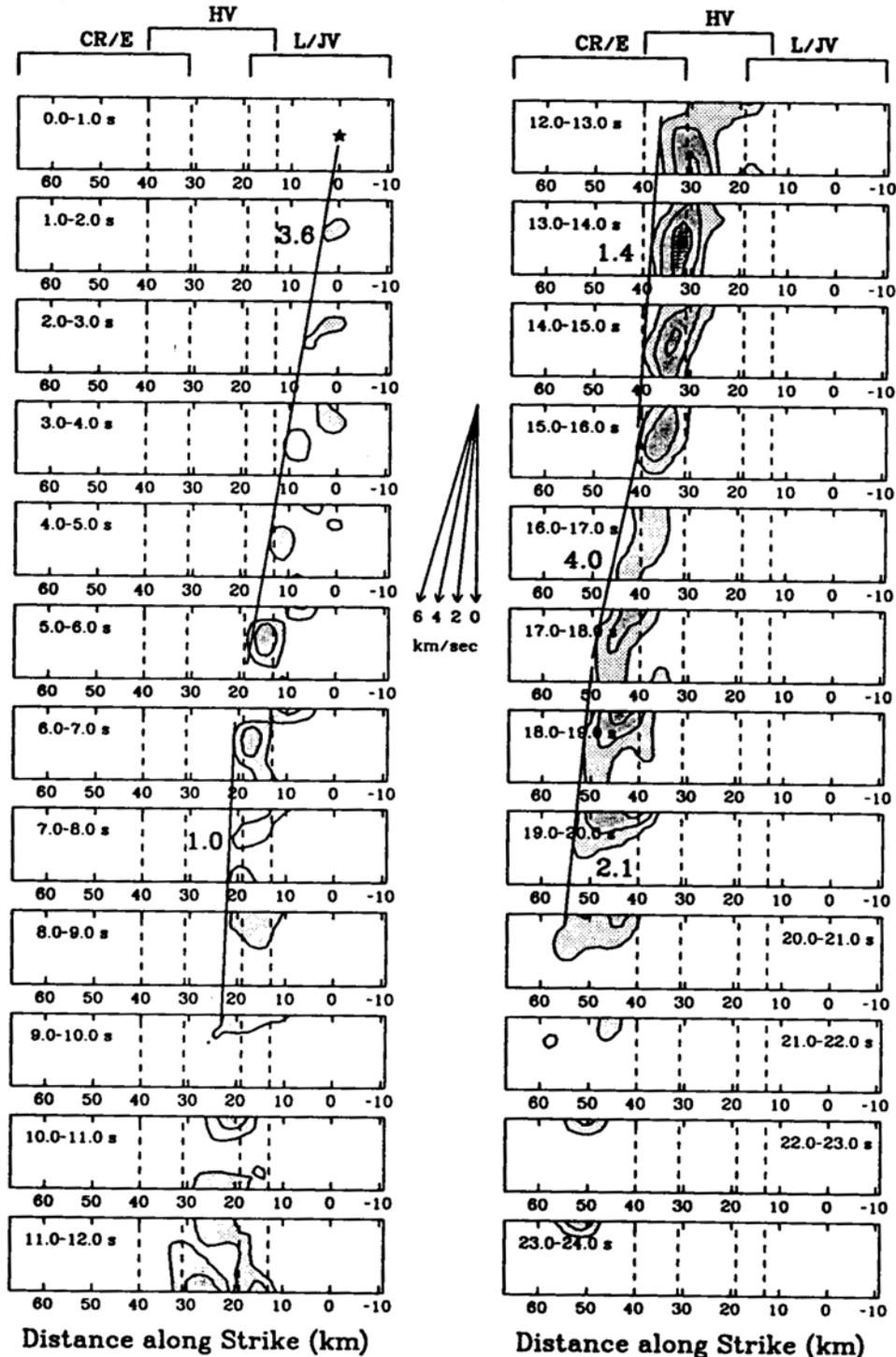
The drawing on the right shows stress blocks and stereographic projections of the maximum shear-planes in relation to principal stresses for a normal (a), reverse (b), and strike-slip (c) fault. The normal fault (with the hanging wall moving downward) occurs when the maximum principal compressive stress is vertical while a reverse fault (with the hanging wall moving upward) occurs when the minimum principal stress is vertical. However, pre-existing planes of weakness usually determine the location of the fault-plane rather than these models of isotropic material. However, the next section (on seismic waves) shows some additional uses for these 'beach-ball' diagrams.



Transform boundary and strike-slip fault.



A rupture will suddenly relieve the accumulated stress at a fault and cause an earthquake. The direction and velocity of the rupture has gained considerable attention to engineers because these 'velocity pulses' can cause very large, long period motion that may knock over a bridge. The figure below shows the movement of a rupture 'front' along the Camp Rock/ Emerson Faults to the Homestead Valley Fault to the Landers/Johnson Valley Faults during the 1992 Landers, California earthquake.



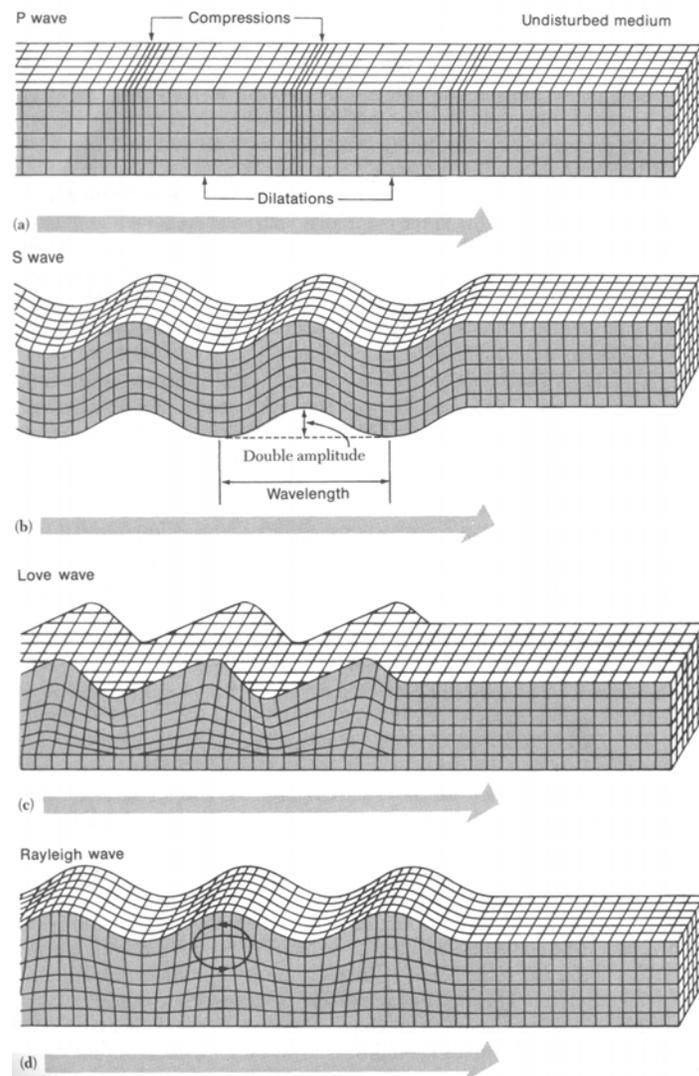
Seismic Waves

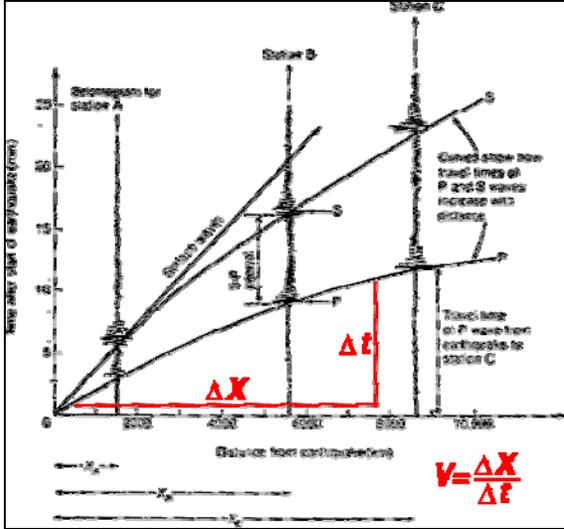
The fault rupture produces a series of waves moving out from the source. These waves cause the ground motion we feel during an earthquake. The compressive (or P) wave is the fastest wave at speeds between 1.5 and 8 kilometers per second through rock. It alternately pushes and pulls the ground in the direction of its motion. Next come the slower shear (or S) waves moving perpendicular to the direction of motion. P and S waves are called body waves because they propagate in a body of rock.

There are two slower waves called surface waves because they're confined to the ground surface. Love waves are similar to shear waves but without a vertical component of motion and the slowest Rayleigh waves move similar to ocean waves vertically and longitudinally in a retrograde motion along a vertical plane in the direction of travel.

All of these waves, but particularly the shear waves, can damage structures. In fact, the worst damage occurs when geologic or topographic conditions amplify the waves at a bridge site. Moreover, the length and frequency of the waves plays a role in the characteristics of the ground motion. For instance, long bridges are damaged when adjacent bents are at the peak and trough of a wave resulting in out-of-phase motion. Certain soils are sensitive to long or short shear-wave velocities and can create resonance for structures with similar sensitivities.

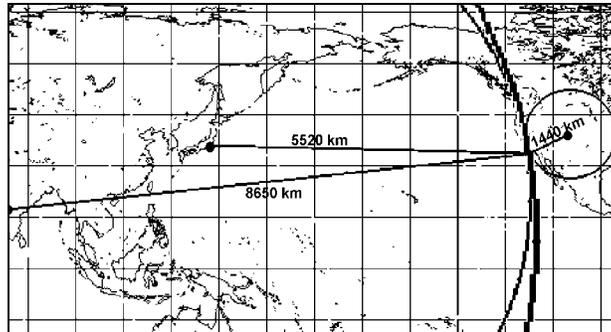
Although wave speeds vary, the ratio between the average speed of a P wave and the following S wave is approximately constant. This fact enables seismologists to use the delay between the arrival of the P wave and the arrival of the S wave to get a quick estimate of the distance of the earthquake from the observation station. By multiplying the S-minus-P (S-P) time, in seconds by the factor 8 km/sec (5 miles/sec) will provide the approximate distance in kilometers from the earthquake source.



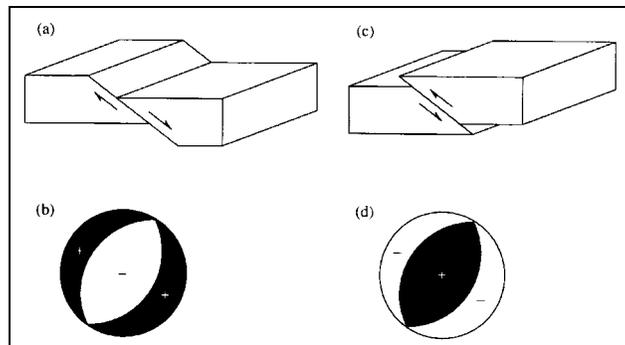


For instance, Station A has a separation of three minutes or 180 seconds between the P and S wave for a distance of 1440 km. Station B has 11.5 minutes or 690 seconds between the P and S waves for a distance of 5520 km from the source. Station C has 18 minutes or 1080 seconds between the arrival of the P and the S wave for a distance of 8650 km from the source. We can precisely locate the source of an earthquake from three recordings by drawing circles using the distances computed above as radii. Where the three circles intersect is the location of the earthquake.

For instance, if Station A is in Denver, Colorado, Station B is in Tokyo, Japan, and Station C is in New Delhi, India the intersection of circles drawn around these locations (and with radii derived above) would be Los Angeles, California. However, the error can be considerable, even for California’s dense network.



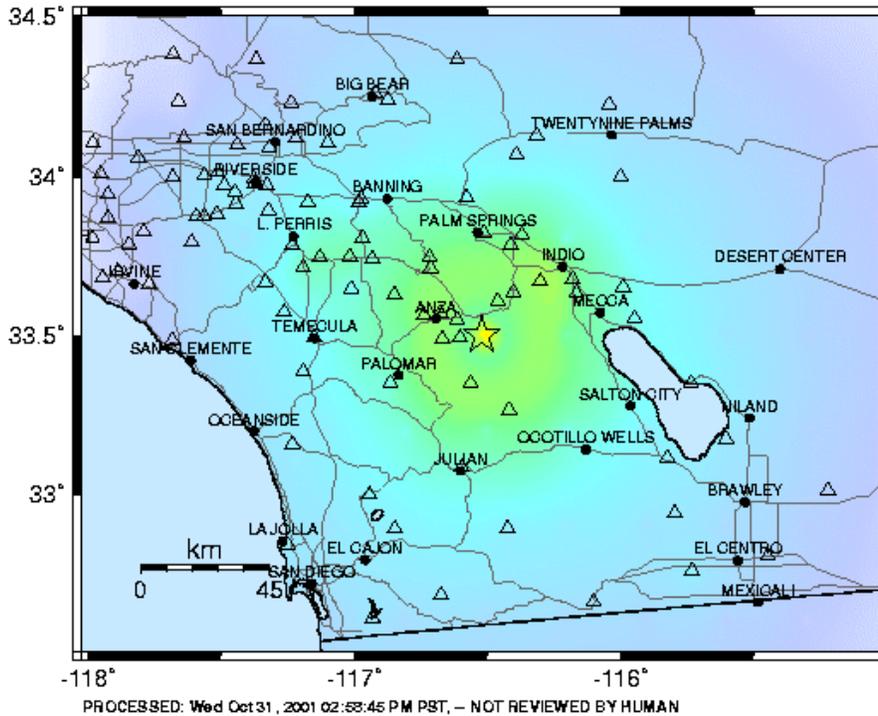
Seismograms have many other uses. For instance, a better way of deriving the stereographic projection of the fault plane is by mapping locations where the first P wave is dilatational (pulling) or compressional (pushing). Figure (b) shows dilation as white and compression as black for a normal fault and Figure (d) shows the areas for a thrust fault.



The Size of an Earthquake: Intensity and Magnitude

In the 19th century, the intensity of an earthquake was determined from the severity of damage at different sites. Iseismal maps were created showing areas of equal intensity based on interviews with local residents and a survey of the damage. Intensity is measured today using the Modified Mercalli Scale that relates damage to the peak ground acceleration (as shown below). This is not a measure of the size but of the effects on buildings and on common structures.

TriNet Rapid Instrumental Intensity Map Epicenter: 9.4 mi ESE of Anza, CA
 Tue Oct 30, 2001 11:56:16 PM PST M 5.1 N33.50 W116.52 ID:9718013



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-18	18-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

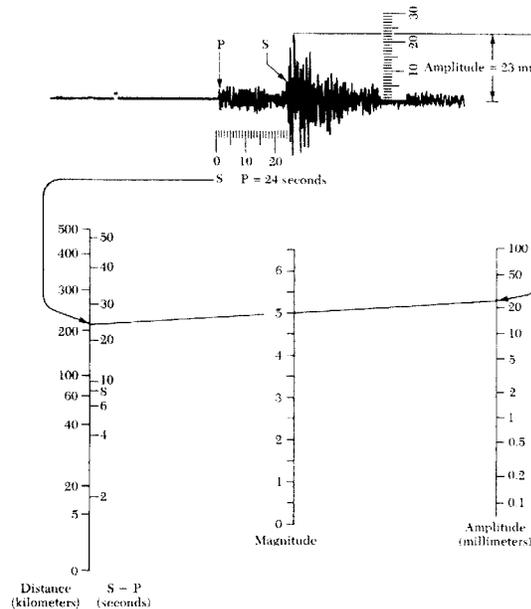
However, seismologists required a scale that could be used to compare the size of different earthquakes. Charles Richter developed the ‘size’ idea (in 1935) by using local magnitude (M_L) to measure earthquakes. Richter defined local magnitude as the base 10 logarithm of the maximum seismic wave amplitude (in thousandths of a millimeter) recorded on a standard seismograph at a distance of 100 kilometers from the earthquake epicenter. The standard seismograph had a mass suspended from a torsional spring that recorded the incoming waves as a function of time and of amplitude in millimeters. A logarithmic scale was used to make the magnitude a single digit number. Thus, when the amplitude of the waves increased by ten, the magnitude would increase one unit (from magnitude 4 to magnitude 5 - $10^5/10^4 = 10$). The following table shows how local magnitude is calculated from a seismograph of an earthquake but there are several modified or equivalent methods in use today.

Step 1: Measure the distance to the initial point of rupture from the time interval between S and P waves ($S - P = 24$ sec.).

Step 2: Measure the maximum wave amplitude on the seismograph (23 millimeters).

Step 3: Place a straight edge on the right using the previously derived distance (24 sec) and amplitude (23 mm) to obtain the local magnitude ($M_L = 5.0$).

Local magnitude was meant to measure earthquakes in Southern California. As acceptance of the magnitude scale grew, problems using the local magnitude were recognized by seismologists.



To obtain uniformity when measuring earthquakes, moment magnitude (M_W) was developed (shown below).

$$M_W = (2/3)[\log(M_o) - 16.05]$$

M_o is the equivalent seismic moment at the source as the two sides of the fault move in opposite directions during the earthquake

$$M_o = GAD \text{ (in dyne-cm)}$$

where ‘G’ is the shear modulus of the rock, ‘A’ is the area of the fault, and ‘D’ is the average slip or movement of the fault.

The maximum earthquake magnitude that can occur on a fault is related to the product of the fault length times its width (A, in cm^2) and the average slip (D, in cm). Caltrans uses the fault area and style of faulting in addition to other criteria to determine the moment magnitude of the maximum credible earthquake (MCE).

EARTHQUAKE INDUCED BRIDGE DAMAGE

Much of the bridge damage that occurs during earthquakes is a result of soil problems. Unstable soil can cause landslides and loose alluvium can settle or liquefy. Shaking of the bridge itself can cause failure of bridge members and connections or can cause excessive movement at expansion joints dropping bridge spans. There are also a variety of secondary effects such as surface ruptures occurring directly under a bridge, or tsunamis, avalanches, etc. During the 1958 Hebgen Lake earthquake in Montana, an enormous landslide changed the course of the Madison River causing floods that washed away several bridges. Bridges are sometimes damaged due to failure of nearby lifeline components. Broken water mains can wash away abutments, broken gas lines can incinerate bridges, and fallen buildings or other structures can damage and close bridges. On the following pages are examples of typical types of earthquake induced damage that have occurred to bridges.

SOIL RELATED BRIDGE DAMAGE

Bridges Supported on Cohesionless Material.



Struve Slough Bridge after Loma Prieta.

Bridges Supported on Liquefiable Soils.



Rio Vascaya Bridge after 1991 Costa Rica Quake



Approach Settlement on I-118 after Northridge.

Bridges Supported on Sloping Ground



Landslide Damage in the Philippines.

Foundation Damage



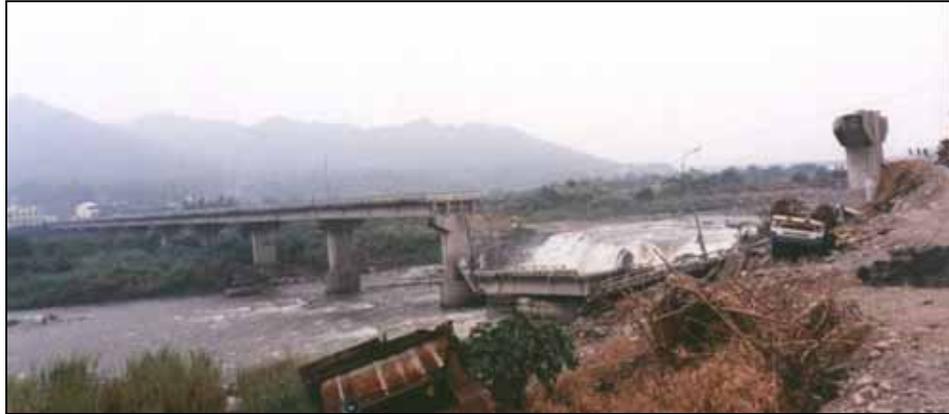
Foundation Movement at Kobe.

Abutment Damage



Tilting of Railroad Abutment in Kobe.

FAULT RUPTURE AND SURFACE DEFORMATION



Taiwan Fault Rupture.



Landers Fault Rupture.



Landers Surface Deformations

STRUCTURAL VIBRATION RELATED BRIDGE DAMAGE

Unseating



San Francisco Bay Bridge.



Minatogawa Interchange after Kobe.



Mission Gothic UC after Northridge.



Gavin Canyon After Northridge.

Expansion Joint, Restrainer, and Shear Key Damage



Expansion Joint Damage.



Restrainer Damage at Gavin Canyon.



Damaged Restrainer.



Broken Restrainers at Nishinomiya.



Restrainer Damage in Cell.



Shear Key Damage.

Bearing Damage



Missing Abutment Bearing After Northridge EQ.



Broken Bearing at Nishinomiya-ko Bridge.

Superstructure Damage



Superstructure Collapse on 14/5 Interchange during Northridge.



Damage at Takatori.

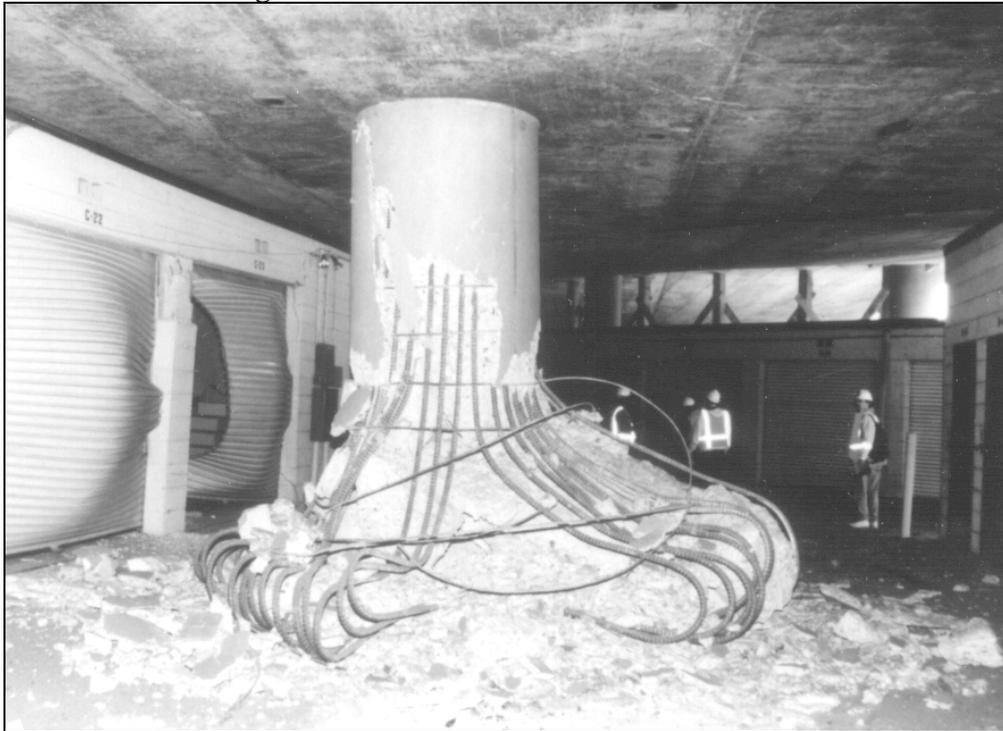


Napa River Bridge Precast Girder Damage.



Damage to Rokko Island Bridge During the Kobe Earthquake.

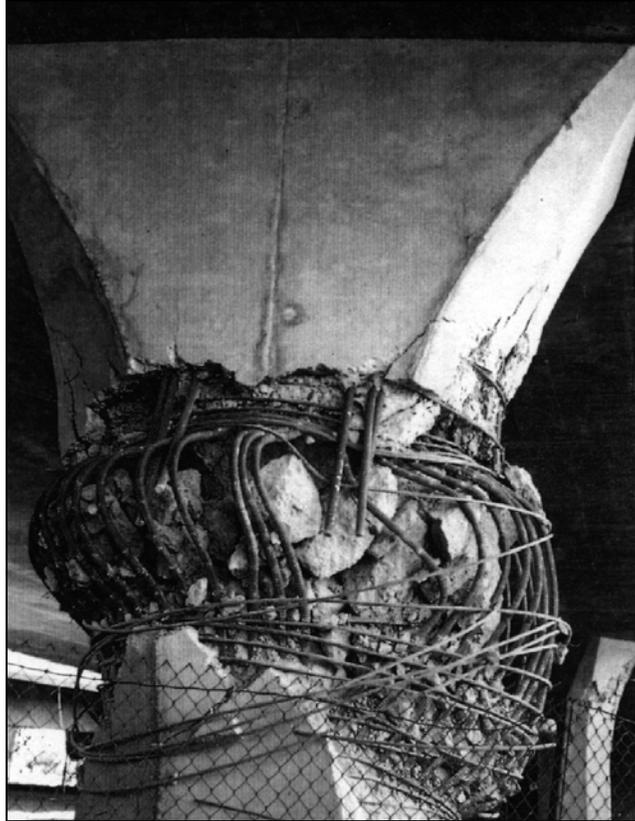
Concrete Column Damage



Damage at Santa Monica Fwy.



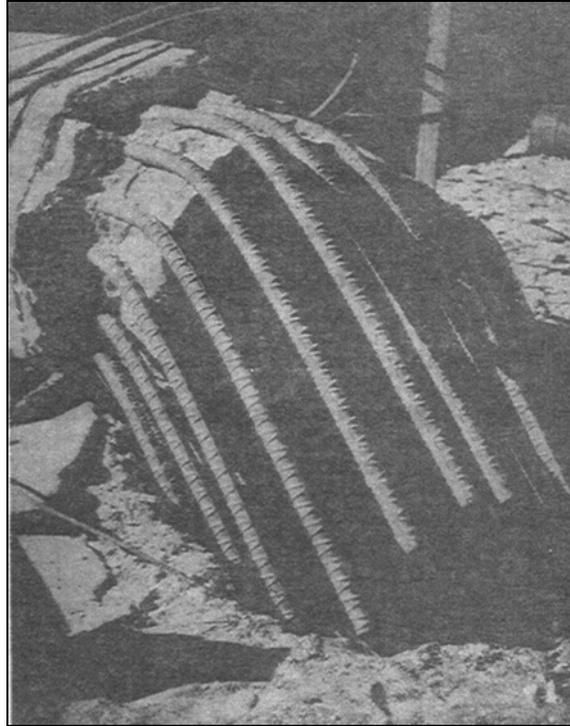
Minor Damage to Confined Bridge Column During Northridge EQ.



Column Flare Damage.



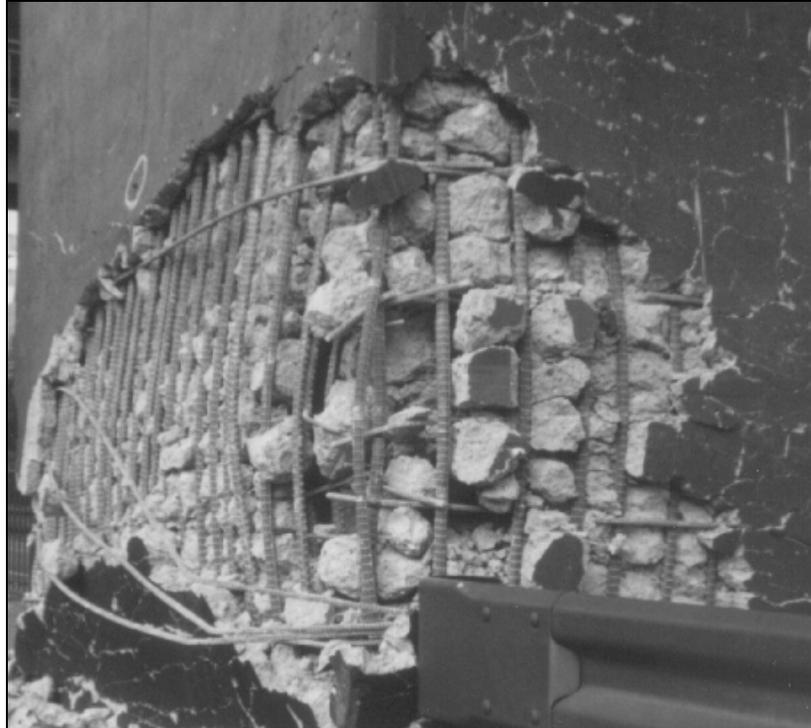
Midheight Flexural Damage.



Longitudinal Bar Pullout.



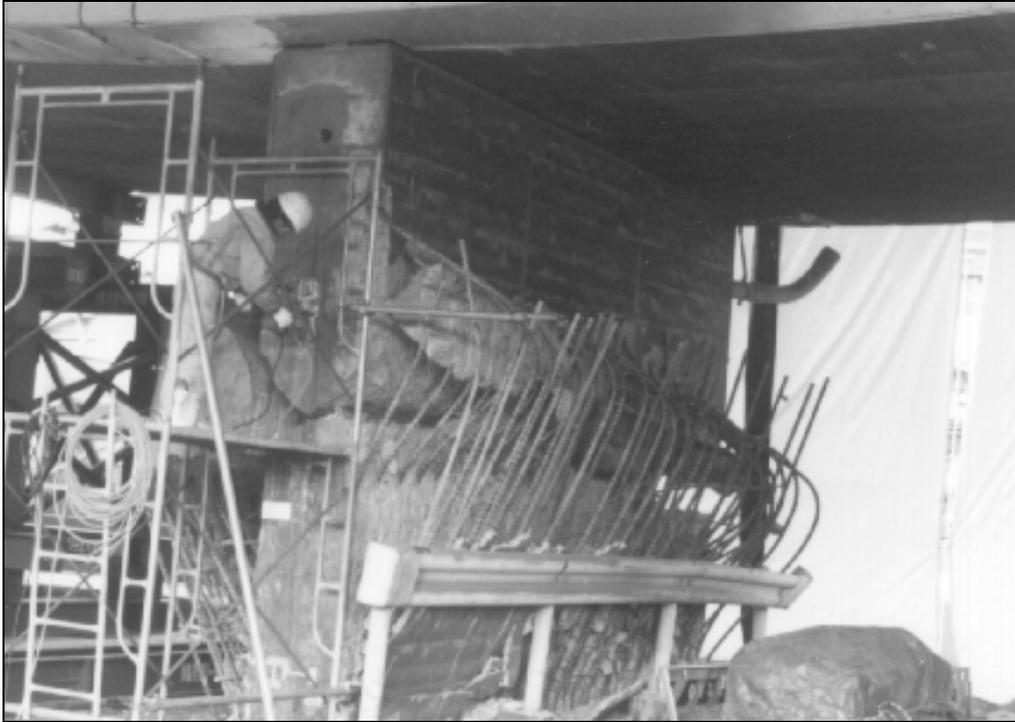
Shear Column Damage During the Kobe Earthquake.



Poor Transverse Reinforcement.



Torsional Column Damage at 5/118 Interchange during the Northridge Earthquake.



Pier Wall Damage after Kobe.



The North Connector on the 14/5 Interchange Collapsed as a Result of Failure of Short, Stiff Pier #2 During the Northridge Earthquake.

Steel Column Damage



Steel Column Damage at Kobe.



Fifth Avenue Overhead after Loma Prieta.

Connection Damage



Joint Shear Damage.



Cypress Viaduct Damage.



Kobe Joint Damage

Pounding Damage



Southern Freeway Pounding Damage from Loma Prieta

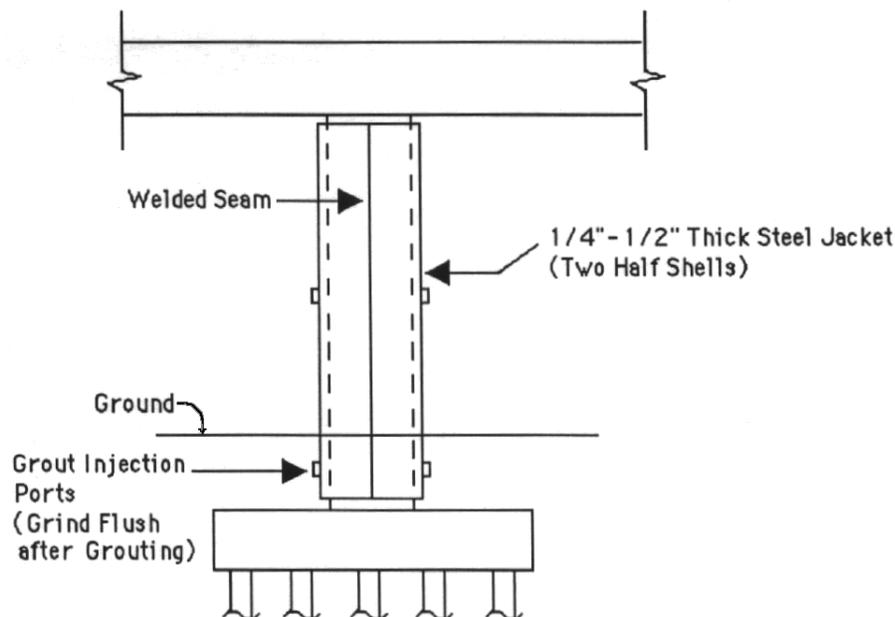
EVALUATING THE PERFORMANCE OF RETROFITTED BRIDGES

California has a large inventory of bridges retrofitted in the 1990's. There are columns wrapped in steel and fiber shells, hinges retrofitted with pipe-seat extenders, and abutments attached to large-diameter CIDH piles. One of the biggest responsibilities of the PEQIT is to evaluate the performance of retrofitted structures. Are there signs that the concrete columns have suffered damage inside the shells? Have the restrainers yielded (Structures maintenance is putting yield indicators on cable restrainers to alert engineers if the cables have yielded)? The PEQIT should carefully examine the retrofitted bridges to determine their performance. Typical (and not so typical) retrofits are shown below.

Caltrans Bridge Retrofit Program:

Not only are retrofits available for different bridge elements but they can be categorized by their ability to modify the strength, stiffness, ductility, or damping of bridge members. The following pages provide a sampling of some of these retrofits.

Bent Retrofits



Steel Column Casing Retrofit

The most common retrofit procedure for vulnerable columns is to wrap them in a steel shell. Steel shell retrofits are divided into two classes. A class F retrofit is when the space between the shell and the column is grouted to allow the columns to form plastic hinges during the earthquake. The class P retrofit is when the annulus is filled with compressible polystyrene that allows the columns to form pins. The class P retrofit protects the columns without the expense of having to design the entire bridge for the plastic column moment and shear. The class F retrofit greatly increase the ductility and shear capacity while adding only about 10% to the flexural strength of the columns. This has made them very popular and they are used in many situations. Sometimes, a short steel shell is just placed around a vulnerable area of the column. Steel shells are often used on rectangular columns that are so

wide that the shells must be restrained with bolts or wide flange beams. Steel shells have even been used on nonprismatic columns and column flares.



Non-Prismatic Column with Steel Shell.

A variety of other materials have been developed to provide ductility to existing concrete bridge columns. The figure below shows a fiberglass wrapped column near Griffith park in Los Angeles after the Northridge earthquake. Composite material retrofits are now used in many of the same situations as steel shells. The one exception being that if a plastic hinge is required in a region with a lap splice, only steel shells provide enough confinement to prevent slip. However, composite fibers can safely be used when a class P retrofit is needed.



Griffith Park OC with Fiberglass Wrapped Concrete Columns.

There are many other materials and techniques used to provide confinement and increased ductility for concrete columns. These include carbon-fiber wrapped columns, wire wrapped columns, and concrete encased columns. However, because of unfamiliarity with some of these materials, a cautious approach should be adopted in their use.

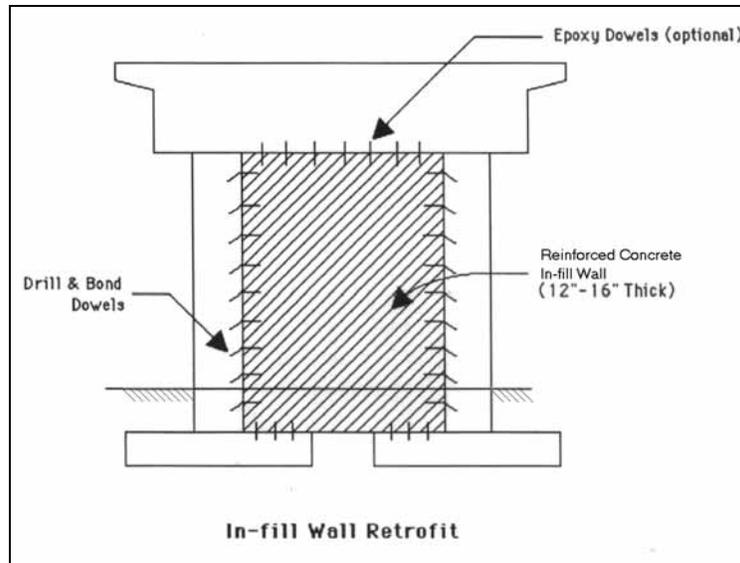
Bents are often retrofitted to increase their strength. A very popular retrofit for weak single column bents and pierwalls has been to built an outrigger bent cap and add pileshafts to the bent. Sometimes a single pileshaft is added to provide more strength but usually pileshafts are placed on each side of the bent. These retrofits may be used when the soil may liquefy and deep pileshafts can continue to support the structure. Or they may be used when a steel shell cannot provide enough displacement capacity to make the bent survive the earthquake.



Outrigger Pileshaft Retrofit for Pier Wall.

The figure above shows a pier wall with an outrigger pileshaft retrofit. Note that the pier wall also has a steel shell that allows it to continue provide support during the earthquake. The advantage of the outrigger pileshaft retrofit is that it provides a great deal more ductility and flexural strength without appreciably increasing its stiffness.

Another popular retrofit provides increased strength in both directions and increased transverse stiffness. These in-fill wall retrofits are an inexpensive method of protecting multicolumn bents. Dowels are drilled and bonded to the existing concrete (as below), reinforcement is placed between the columns, and new concrete is poured turning the multicolumn bent into a pier wall.



The ability to provide increased strength and stiffness in a particular direction is accomplished by attaching triangular shear walls to existing bents. These have been particularly popular for pedestrian overcrossings whose wandering geometry creates a center of mass far from the center of stiffness. Moreover, the single column bents for these delicate structures are usually incapable of handling earthquake forces. The shear wall is either placed to be normal to the curve or, as in this case, a wall is provided in two directions.



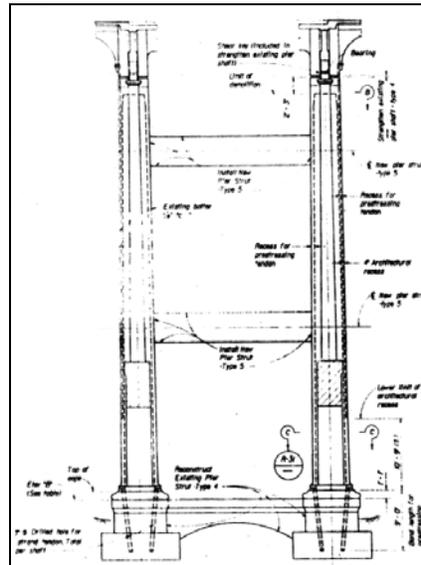
Triangular Shear Walls.

Isolation devices are often used to modify a bent's behavior during earthquakes. This is particularly effective for a stiff bent which is part of a flexible structure. We will look at this in more detail in the section on bridge system retrofit strategies. Another possible retrofit for bents is replacement. Sometimes a vulnerable portion of the bent will be replaced like an existing bent cap or connection. Often, a completely new bent is provided. Sometimes a single column will be used to support two structures. This can occur for double-deck viaducts or at interchanges. Since it would be exceedingly difficult for this column to survive a large earthquake, it is replaced with a separate column for each structure.



Link Beam Retrofit at the Santa Monica Freeway.

The use of link beams on multicolumn bents has been particularly effective. This method is used for very flexible columns that are too weak to handle large displacements. Link beams stiffen the bent and reduce the displacement. The figure above shows a link beam retrofit on the Santa Monica Expressway. Link beams can be designed to be weaker than the columns but to have great ductility. As the bent displaces transversely, the beams can absorb energy and protect the columns.

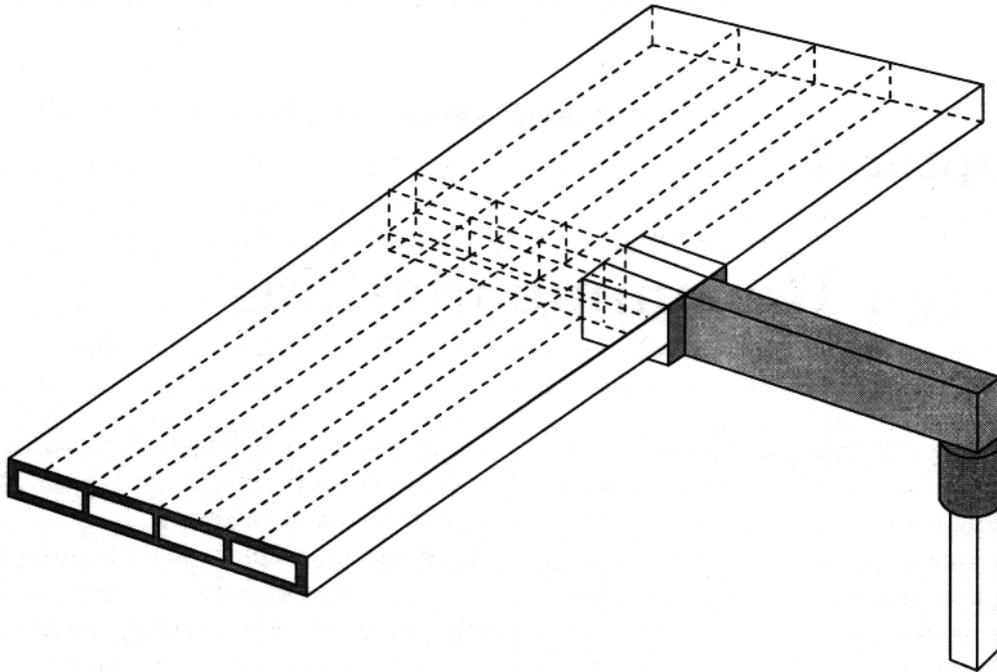


Link Beam and Post-Tensioned Column Retrofit.

Sometimes, the columns can be post-tensioned to provide them with added flexural and shear strength. This was done for the Colorado Street Bridge in Pasadena which had extremely weak columns with almost no reinforcement. A geology drilling unit was set up on the bridge deck and drilled straight down through the existing columns. Then prestressing strands were placed in the holes and post-tensioned. Also, link beams were added to stiffen the bents.

Steel bents have also been retrofitted. A common retrofit is to add steel plates to the flanges of steel bents. This increases their strength without adding much additional stiffness. Encasing steel bents in concrete is another alternative.

The preceding discussion is just a small sampling of the many bent retrofits that have been done in recent years. Most of these retrofits were the result of research and testing. Pier wall steel shell retrofits were investigated at UC Irvine. Most of the composite shell and link beam retrofits were tested at UC San Diego. UC Berkeley (Stojadinovic, 1995) has been looking at retrofitting Outrigger knee joints. Currently, older knee-joint connections have been removed and replaced with larger, more ductile joints. The testing program looked at the behavior of both long and short bent caps. A ductile retrofit and a strength retrofit strategy was studied using both a steel jacket and a post-tensioned reinforced concrete jacket. The final recommendation is for a strength retrofit using a steel plate jacket that forces plastic hinging in the column for both longitudinal and transverse motion. The figure below shows a retrofit which is composed of a concrete bolster that strengthens the connection to the superstructure, a steel plate jacket around the bent cap and the joint, and steel casing around the column.



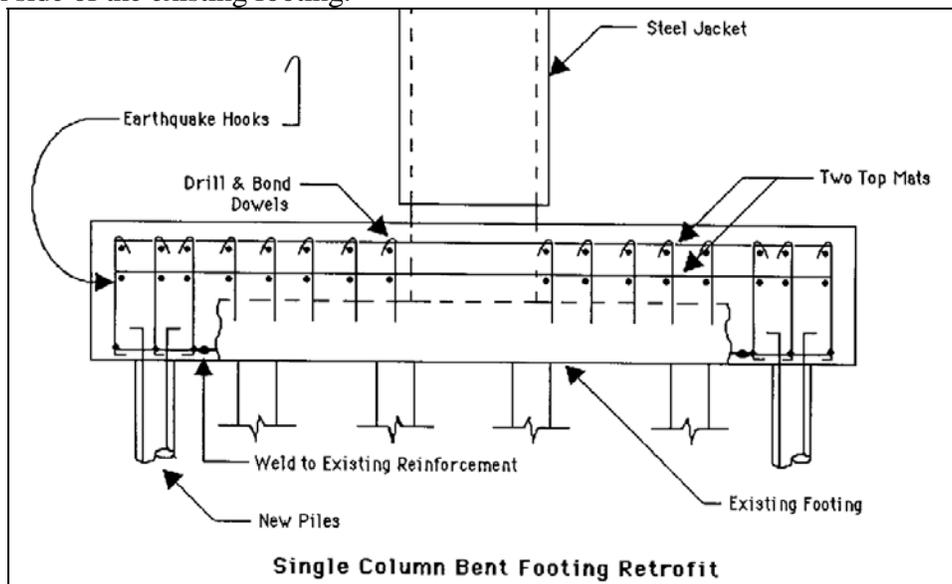
Final Recommended Knee-Joint Retrofit.

Foundation Retrofits



Reinforcement For Footing Retrofit.

If the columns are strengthened or the footing is found to be inadequate, then a footing retrofit is required. This is often the case for single column bents that are fixed for moment. Sometimes the existing footing has no top mat of reinforcement, no ties to join the top and bottom mats, inadequate piles (particularly for tension), and too small a section for shear and flexure. The retrofit shown below may have additional piles driven around the footing perimeter and additional reinforcement and concrete placed around the existing footing. Drill and bond dowels connect the new footing to the old. These are designed to handle the shear friction at the interface. A beam is designed above the existing footing that must be strong enough to handle the moment and shear of the column being transferred to the piles on each side of the existing footing.



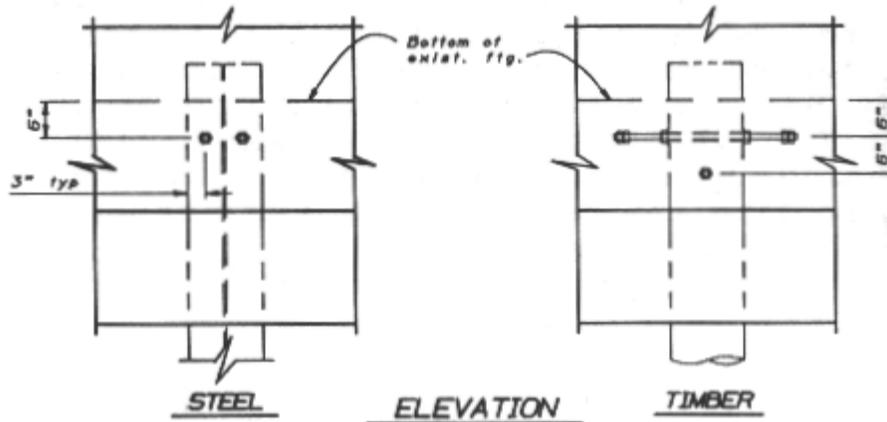
One of the problems that confronts engineers is the inability of many piles to act in tension as the foundation rocks back and forth. Both timber and steel piles (which are strong in tension) have very poor connections to the footing, older concrete piles have inadequate reinforcement, and many piles have inadequate friction to engage the surrounding soil. These problems have resulted in a number of innovative foundation retrofits. Sometimes

holes are drilled through the existing footings and tie-down anchors are placed and grouted in the holes.



Tie-Down Rods being Connected to Existing Footing.

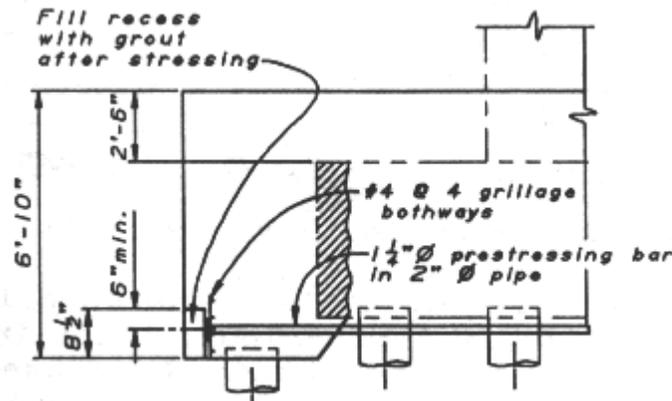
Sometimes the existing piles are reattached by excavating under the footing, attaching high strength bolts to the top of the piles, placing new reinforcement under the footing, and casting new concrete in the excavation.



Reattaching Existing Piles to Footing.

A testing program at Caltrans (Mason, 1995) identified a number of innovative new piles that are able to provide tension even in Bay mud. Some of these pile systems, like the Dutch Fundex System, are segmental and can be placed under bridge decks which make them well suited for retrofits.

In situations where there is not enough reinforcement in the bottom of footings to handle the moment, prestressing tendons can be used. This has the added advantage of increasing the shear capacity of the footing. The Coyote Wells Overhead on Route 8 in Imperial County had a footing retrofit. New piles were placed along the outside of the existing footing, and the footing was extended outward and below the existing footing. Then holes were drilled under the existing footing and through the new footing extension. Prestress ducts with prestress tendons were placed in the holes. When the tendons were stressed and anchored to the new footing, the required moment capacity was provided. The prestressing also helped to secure the footing extension and piles to the existing footing.

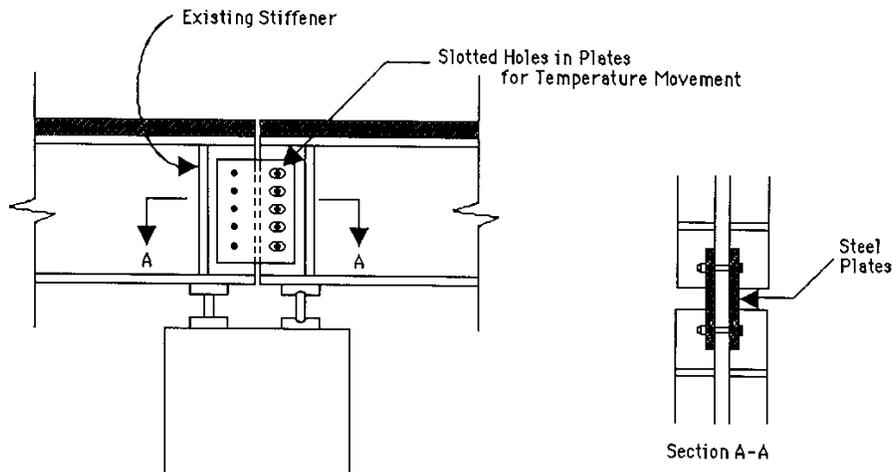


Prestressed Footing Retrofit at Coyote Wells.

Expansion Joint Retrofits

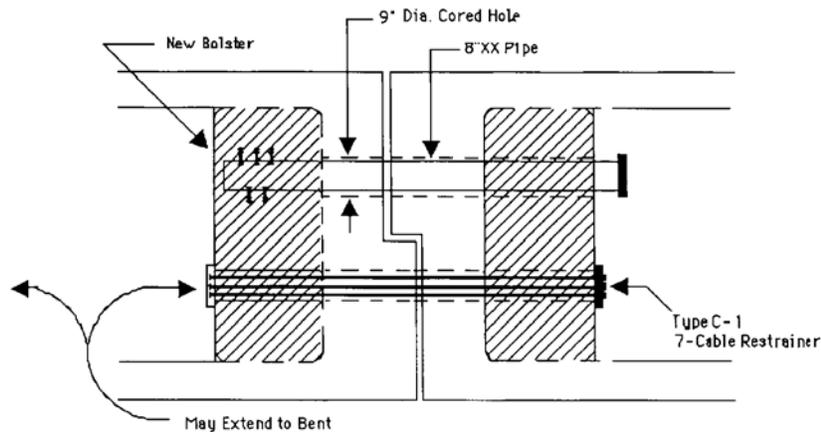
Retrofits to prevent the superstructure from falling at expansion joints have become more sophisticated over the years. Originally, cable restrainers were used to prevent superstructures from falling off narrow seats. However, because of the ambivalent performance of restrainers during past earthquakes, newer retrofits provide a more reliable method of preventing unseating, either by locking the joint or by extending the seat in

various ways. For steel superstructures, plates are sometimes used to connect the girders at expansion joints. This provides a strong, positive load path for the inertia force as well as providing a seat if one of the girders falls off of its support.



Steel Girder Hinge Plate Retrofit

Similarly, pipe seat extenders are placed at the hinges of reinforced concrete box girder bridges to prevent unseating. Holes are cored through the hinge, steel pipes are inserted in the holes, and concrete bolsters are cast at both ends. One end of the pipe is fixed to the bolster while the other end is free to translate back and forth. If the hinge opens too far, the double extra strong pipe can support the superstructure.



Retrofit Pipe Hinge Seat Extender

There are many variations to these devices that either lock or provide support at expansion joints. Steel girders were placed under the hinges at the Santa Monica Freeway in Los Angeles to provide a longer seat.



External Hinge Extenders on Santa Monica Freeway

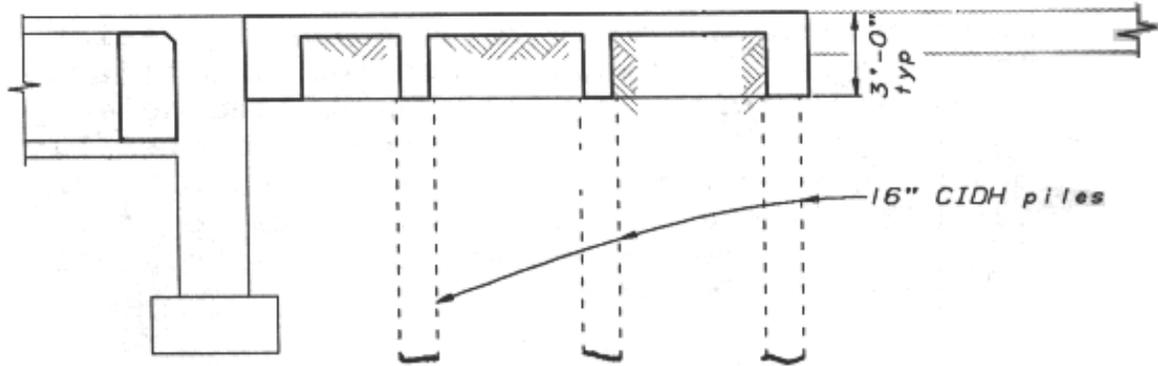
Catcher blocks are often cast in front of the ends of steel and concrete girders to prevent them from falling. Transverse and longitudinal shear keys, vertical restrainers, keeper plates, etc. are all common retrofits. Sometimes steel rods and brackets are used to lock a short seat. One must provide abundant strength for these connections, as they are otherwise likely to break during large earthquakes.



Locking Device at Abutment Seat of Pedestrian Overcrossing.

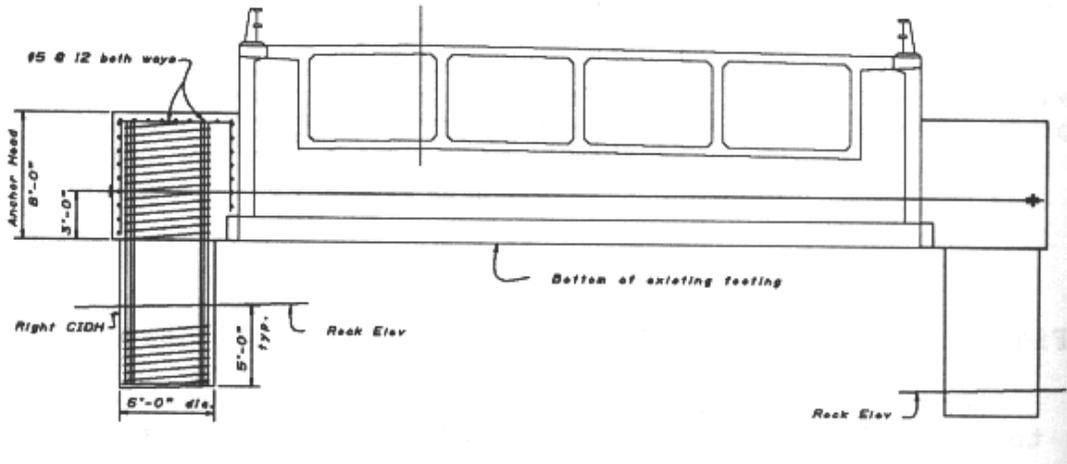
Abutment Retrofits

Stiffening and strengthening abutments to take more load and to immediately engage the soil has become a big part of new seismic retrofits. This is particularly helpful when the end bents are very stiff and would otherwise take much of the load and fail during a large earthquake. Timber is often placed between the abutment backwall and the superstructure end diaphragm to immediately engage the soil during an earthquake. Then special approach slabs, piles, and tieback systems help hold onto the bridge while absorbing energy. The figure below shows a waffle approach slab that is sometimes used to anchor the abutment to the surrounding soil.



Seismic Waffle Slab.

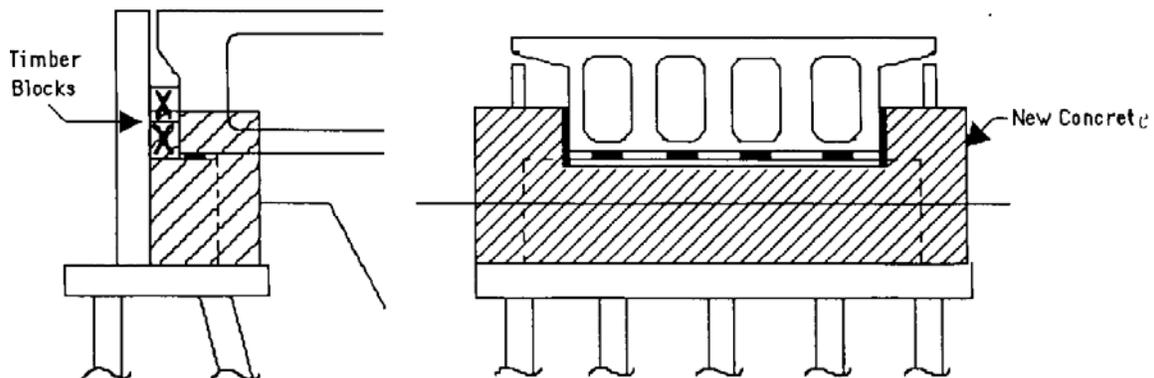
Similarly, concrete blocks and other devices extend behind the abutment to engage the soil. Concrete haunches (often supported on large diameter piles) are used to support the structure transversely. Often, the haunches on each side of the abutment are tied together with cables to make them work together as the abutment moves from side to side.



Abutment Haunch with CIDH Piles and Cable.



Photo of Abutment Retrofit with Haunches.



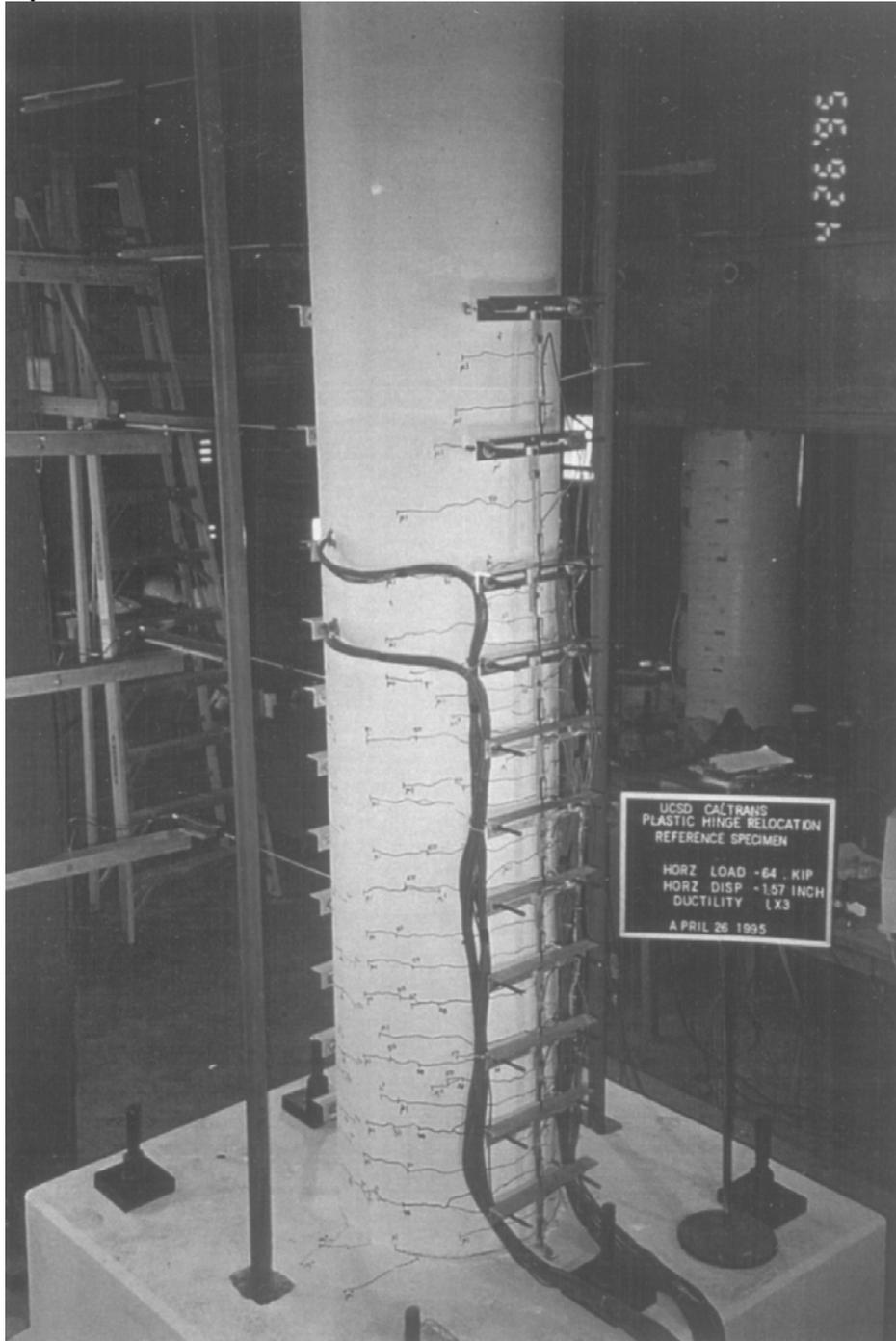
Exterior Shear Key Retrofit @ Abutment

Abutment Shear Key Retrofit

The figure above shows what used to be the most common bridge retrofit which was to provide exterior shear keys at abutments to prevent transverse movement of the superstructure. Note that timber blocking is provided in the gallery between the backwall and the superstructure so that the soil will be more quickly engaged during the earthquake, less banging will occur, and the brittle concrete backwall is protected.

DAMAGE PHOTOS FROM THE TESTING OF BRIDGE COLUMNS

A good way to determine the extent of damage to bridges in the field is by familiarizing yourself with damage in the lab. By studying these and other photos, the investigator will obtain a better perspective on what a column looks like after displacing two, three, or four times past yield.



Third Cycle at Disp. = Ductility 1.0 at UCSD for Reference Column

(Relocation of Plastic Hinge Tests).

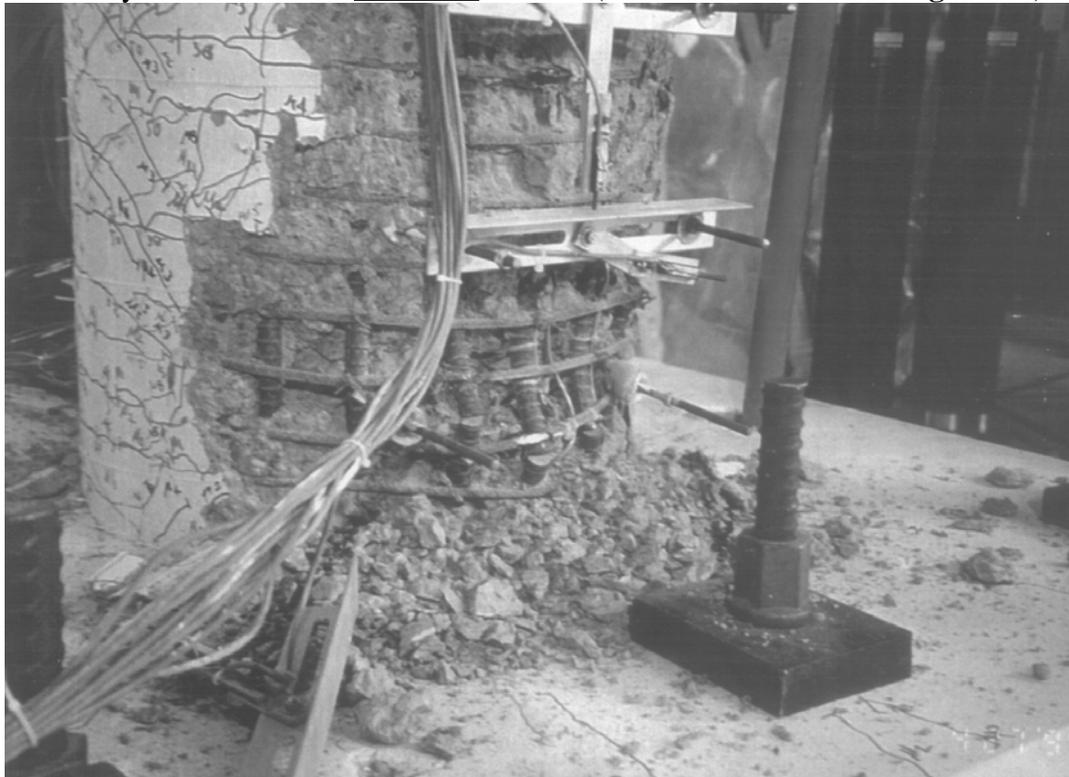
This specimen was designed conventionally to allow a column hinge to form at the footing. It is a 2 ft diameter, 12 ft tall concrete column with 20 #7 bars and a #3 spiral at a 3" pitch.



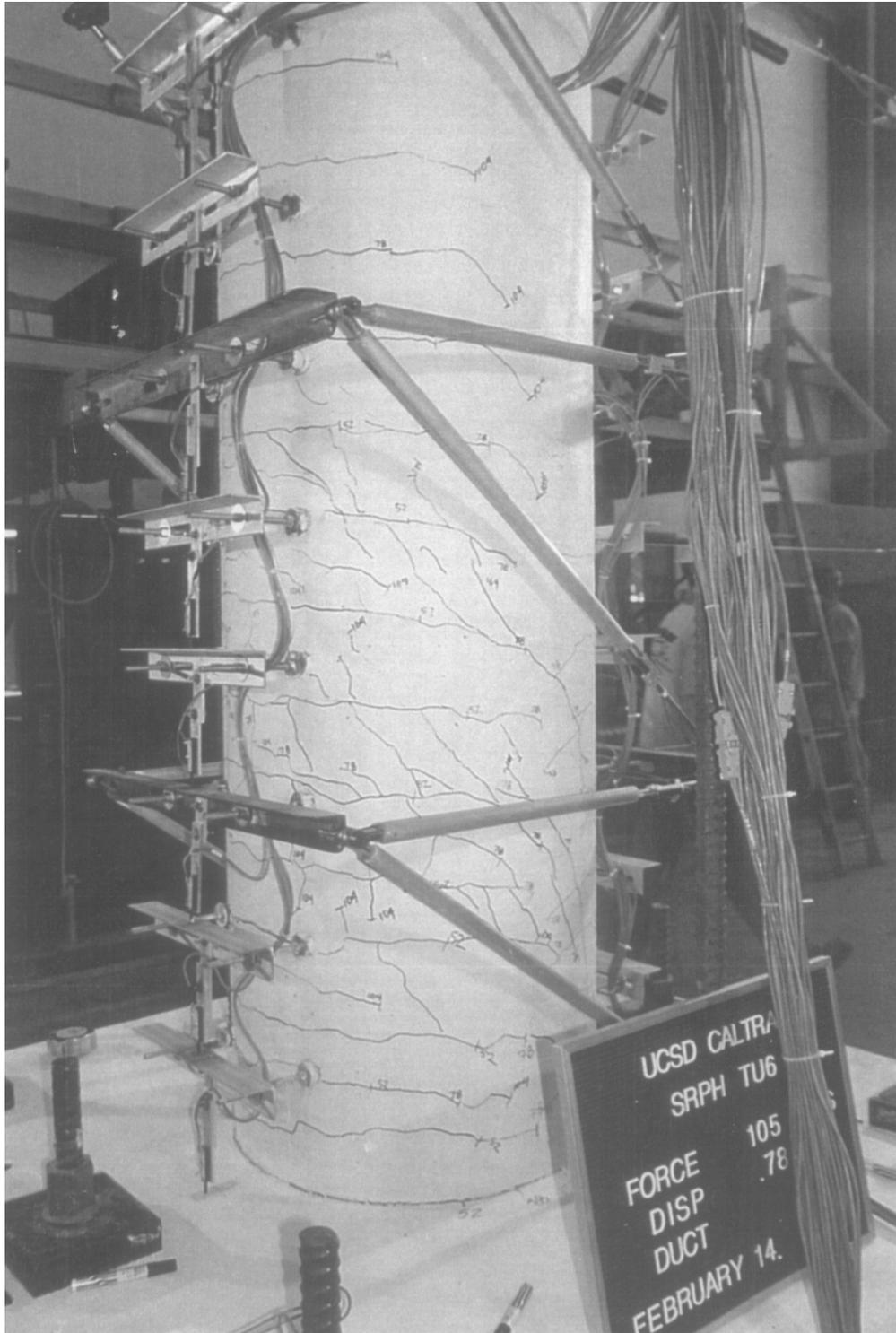
Third Cycle at Disp. = Ductility 2.0 at UCSD for Reference Column

(Relocation of Plastic Hinge Tests).

Ductility 8.0 at UCSD for Reference Column (**Relocation of Plastic Hinge Tests**).



Failure at UCSD for Reference Column (**Relocation of Plastic Hinge Tests**).

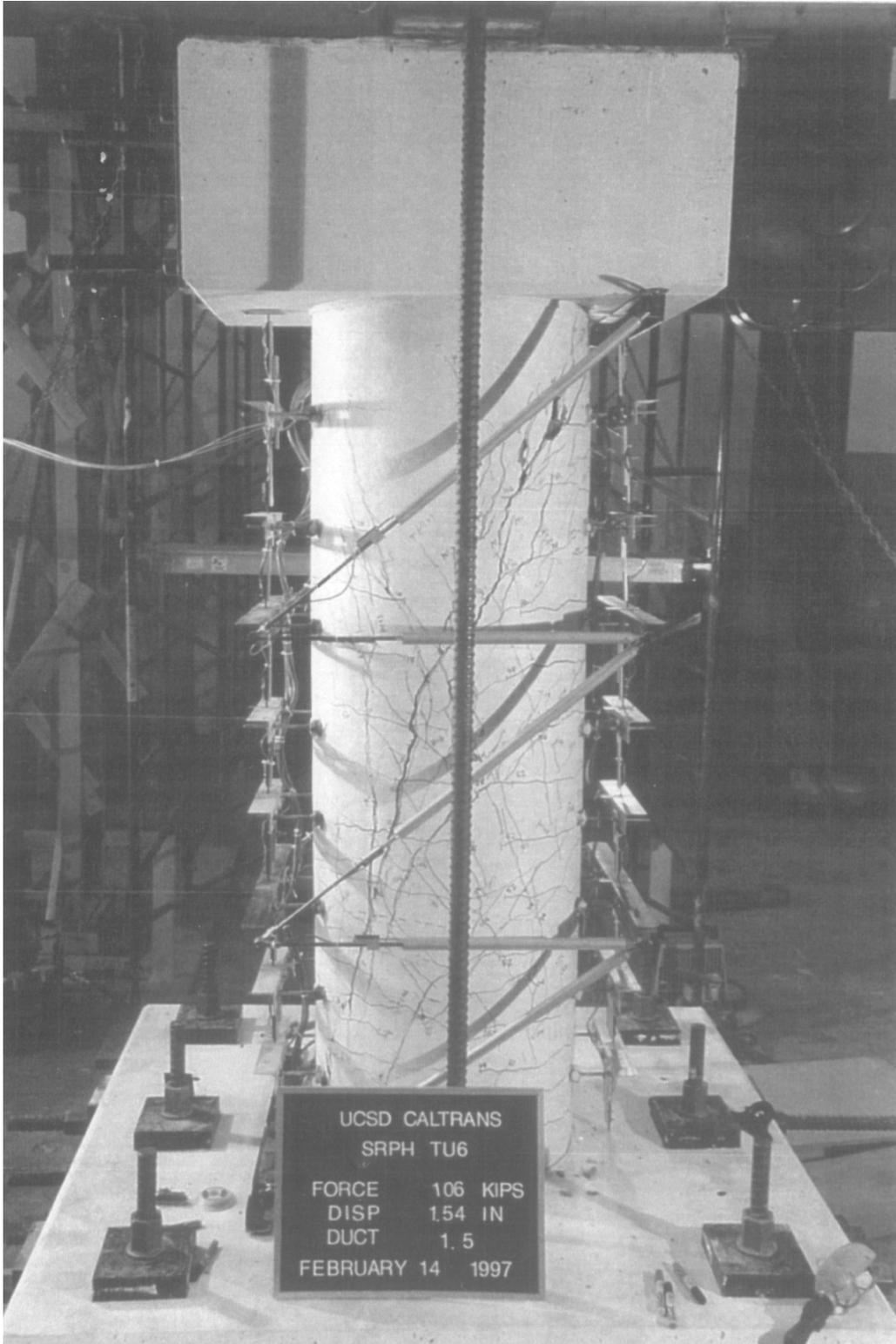


Yield for Shear Column at UCSD
(Relocation of Plastic Hinge Tests).

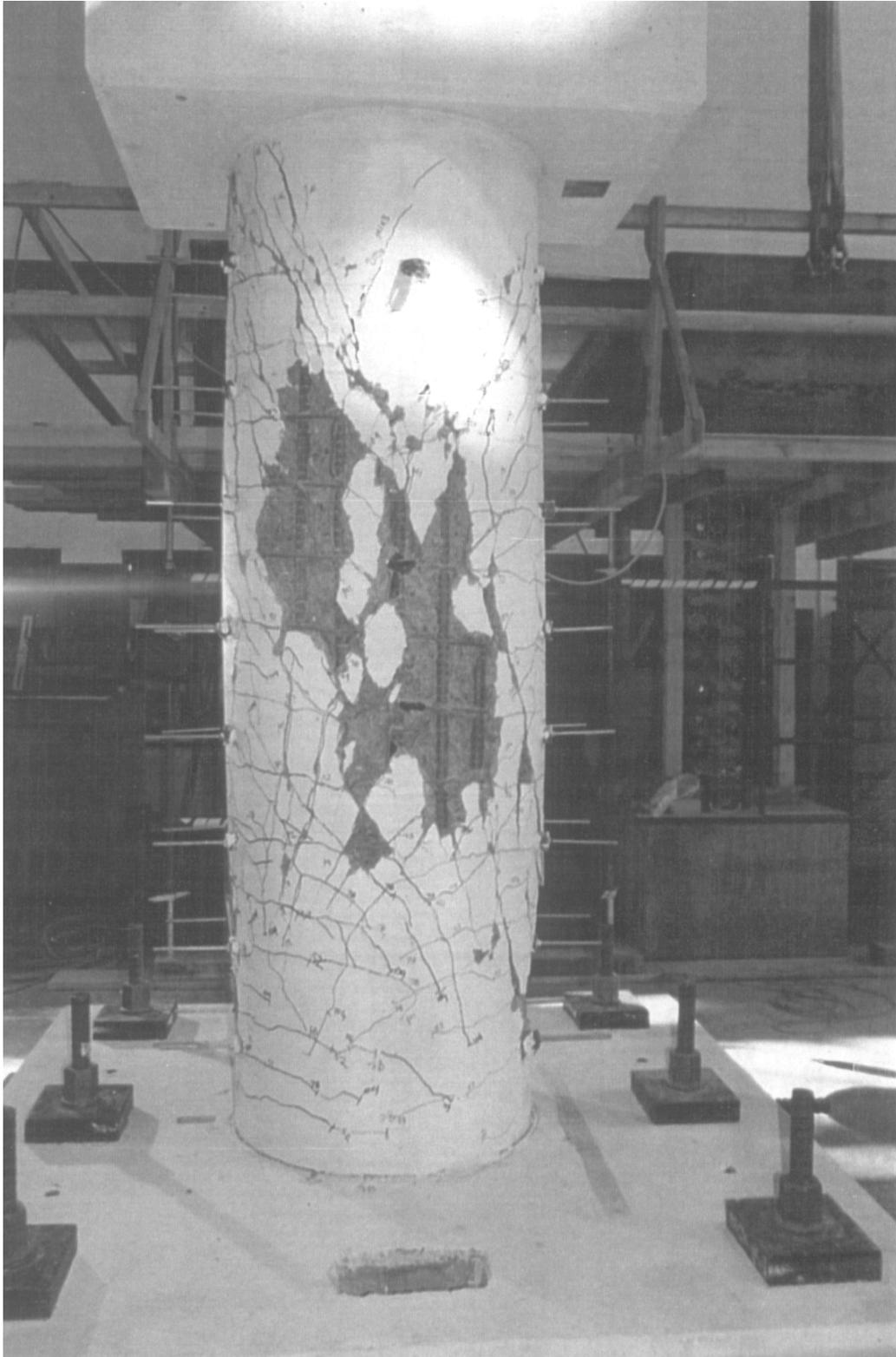
This specimen was designed with additional longitudinal reinforcement at the base of the column to force plastic hinging one column diameter above the footing. However, the transverse reinforcement was limited to cause a shear failure at a ductility of 2.0.



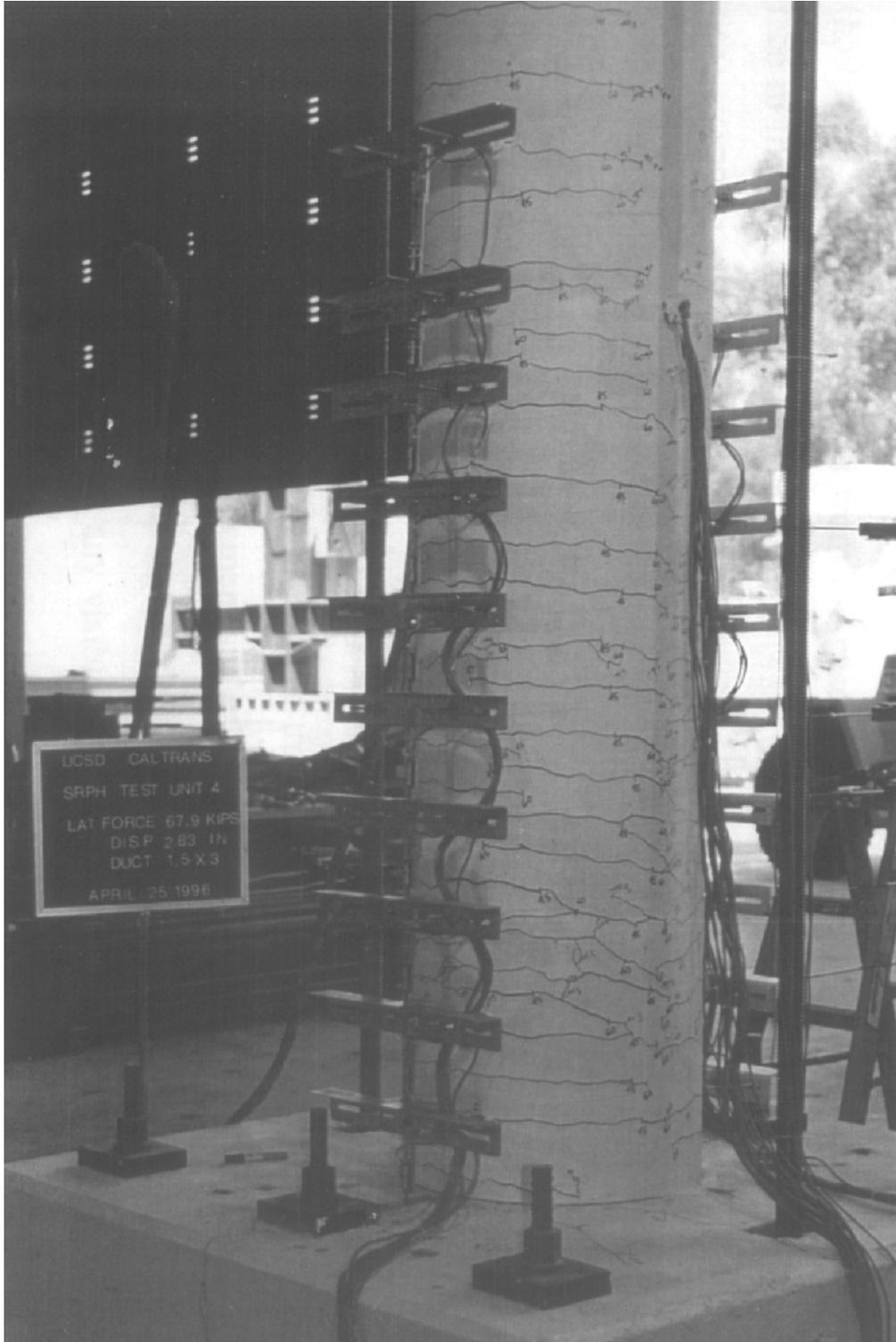
Ductility of 1.0 for Shear Column at UCSD
(Relocation of Plastic Hinge Tests).



Ductility 1.5 for Shear Column at UCSD
(Relocation of Plastic Hinge Tests).



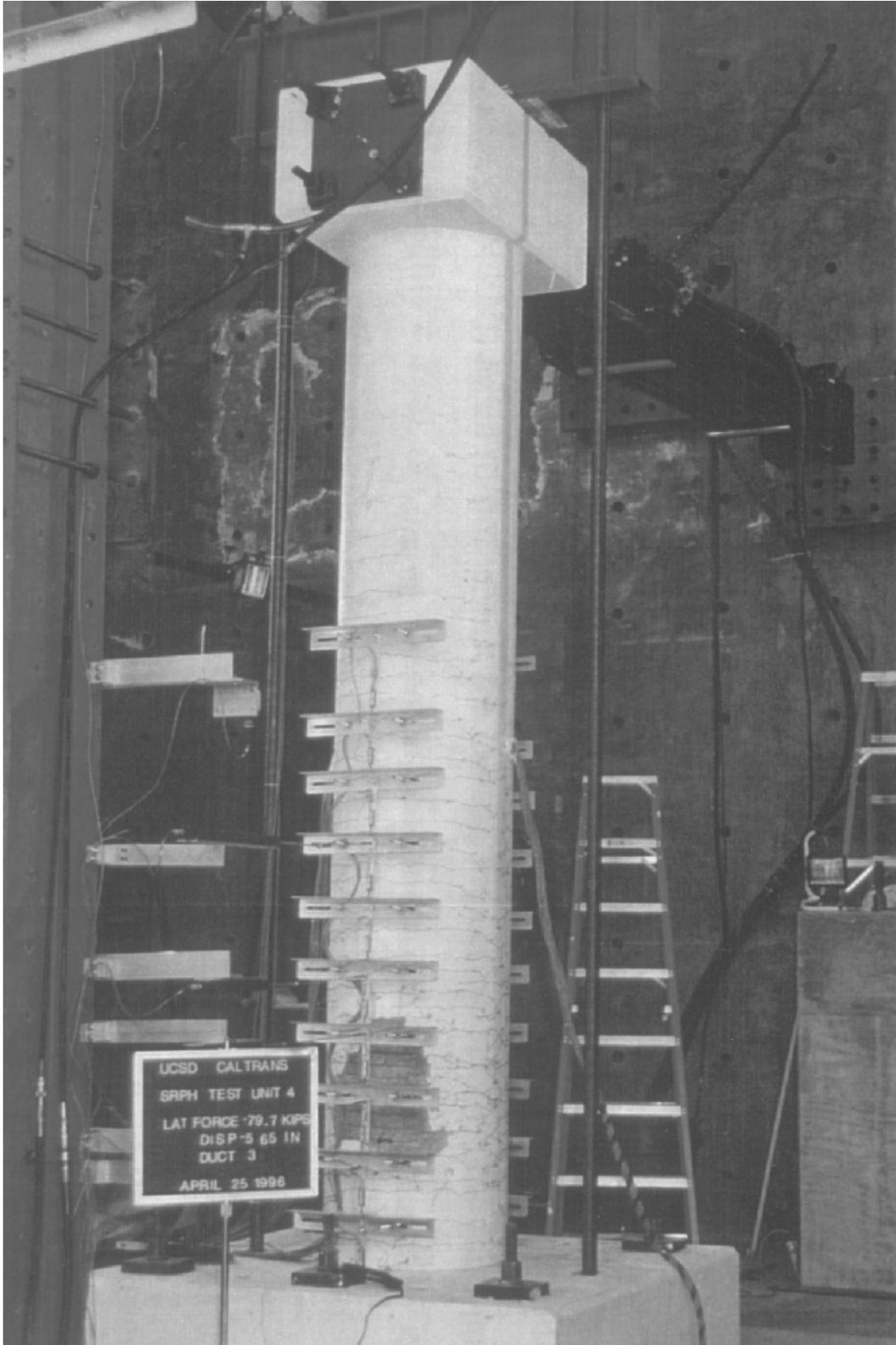
End of Test at UCSD for Shear Column (Ductility < 2.0)
(Relocation of Plastic Hinge Tests).



Ductility 1.5 at UCSD for Test Unit 4, Staggered Termination $\rho_s = 2.3\%$.

(Relocation of Plastic Hinge Tests).

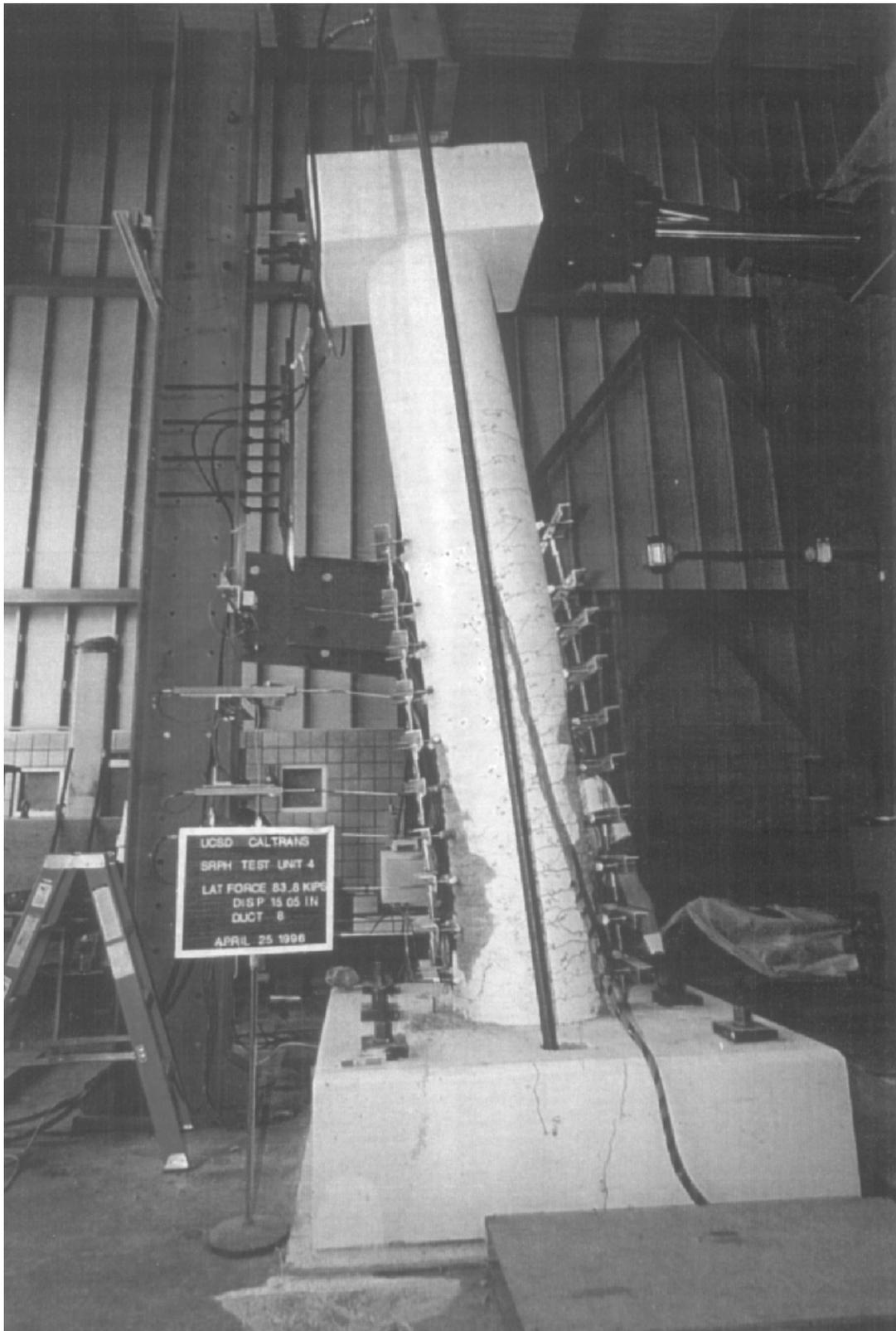
An extremely ductile column (#4 spiral w/ 1.5" pitch) with inner cage bars terminated to force the plastic hinge to occur 18" above the footing.



Ductility 3.0 at UCSD for Test Unit 4
(Relocation of Plastic Hinge Tests).



Ductility 4.0 at UCSD for Test Unit #4
(Relocation of Plastic Hinge Location Tests).



Ductility 8.0 at UCSD for Test Unit #4
(Relocation of Plastic Hinge Location Tests).

California Earthquake History 1769-Present

Studying previous California earthquakes will give the investigator a better perspective on the earthquake they are investigating. This list includes California, Baja California, and Nevada events. The **magnitude** listed here is the "summary magnitude". For most events prior to 1898 this is based on the adjusted intensity magnitude, and for events after 1898 it is the surface wave magnitude. The list includes known earthquakes with a magnitude of at least 6 and selected smaller events. The smaller events since 1898 all have at least one reported magnitude of at least 5.8, even if the summary magnitude is smaller. Some of these magnitudes may be different than what is reported in the Southern California or Northern California Earthquake Catalog. The **date and time** for each earthquake are given as "24 hour" time referenced to Greenwich Mean Time (now UTC). To convert a time to Pacific Standard Time (PST), subtract 8 hours. To convert a time to Pacific Daylight Time (PDT), where appropriate, subtract 7 hours. **Example:** The 1989 Loma Prieta earthquake occurred at 00:04 UTC on October 18, 1989 or 5:04pm PDT on October 17, 1989.

Ellsworth, W. L., "Earthquake History, 1769-1989" USGS Professional Paper 151 (modified to present)

DATE	TIME(GMT)	LATITUDE	LONGITUDE	MAG	LOCATION
1769	7 28 0 0	34	0.00 118 0.00	6.0	Los Angeles Basin
1800	11 22 2130	33	0. 117 18.00	6.5	San Diego region
1808	6 24 0 0	37	48.00 122 30.00	6.0	San Francisco region
1812	12 8 15 0	34	22.00 117 39.00	7.0	Wrightwood
1812	12 21 19 0	34	12.00 119 54.00	7.0	Santa Barbara Channel
1827	9 24 4 0	34	0. 119 0.	5.5	Los Angeles region
1836	6 10 1530	37	48.00 122 12.00	6.75	Hayward Valley
1838	6 0 0 0	37	36.00 122 24.00	7.0	San Francisco Peninsula
1852	11 29 20 0	32	30.00 115 0.	6.5	Volcano Lake, B.C.
1855	7 11 415	34	6.00 118 6.00	6.0	Los Angeles region
1856	2 15 1325	37	30.00 122 18.00	5.5	San Francisco Peninsula
1857	1 9 16 0	35	42.00 120 18.00	8.25	Great Fort Tejon quake
1857	9 3 3 5	39	18.00 120 0.	6.25	W. Nevada or E. Sierra
1858	11 26 835	37	30.00 121 54.00	6.25	San Jose region
1858	12 16 10 0	34	0. 117 30.00	6.0	San Bernardino region
1860	3 15 19 0	39	30.00 119 30.00	6.5	Carson City, Nevada
1861	7 4 011	37	48.00 122 0.	5.75	San Ramon Valley
1862	5 27 20 0	32	42.00 117 12.00	6.0	San Diego region
1864	2 26 1347	37	6.00 121 42.00	6.0	S. Santa Cruz Mountains
1864	3 5 1649	37	42.00 122 0.	5.75	E. of San Francisco Bay
1865	10 8 2046	37	0.00 122 00.00	6.5	S. Santa Cruz Mountains
1866	7 15 0630	37	30.00 121 18.00	6.0	W. San Joaquin Valley
1868	5 30 510	39	18.00 119 42.00	6.0	Virginia City, Nevada
1868	10 21 1553	37	42.00 122 6.00	7.0	Hayward fault
1869	12 27 155	39	24.00 119 42.00	6.25	Olinghouse fault, Nevada
1869	12 27 10 0	39	6.00 119 48.00	6.0	Carson City, Nevada
1870	2 17 2012	37	12.00 122 6.00	6.0	Los Gatos
1871	3 2 21 5	40	24.00 124 12.00	6.0	Cape Mendocino
1872	3 26 1030	36	42.00 118 6.00	7.6	Owens Valley
1872	3 26 14 6	36	54.00 118 12.00	6.75	Owens Valley
1872	4 3 1215	37	0. 118 12.00	6.25	Owens Valley
1872	4 11 19 0	37	30.00 118 30.00	6.75	Owens Valley
1872	5 3 1 0	33	0. 115 0.	5.75	Imperial Valley (?)
1872	11 12 0 0	39	0. 117 0.	6.0	Austin, Nevada region(?)
1873	11 23 5 0	42	0. 124 0.	6.75	Crescent City
1875	1 24 1200	40	42. 120 30.	6.0	Honey Lake
1875	11 15 2230	32	30.00 115 30.00	6.25	Imperial Valley to ColRv
1878	5 9 425	40	6.00 124 0.	6.0	Punta Gorda region
1881	2 2 011	36	0. 120 30.00	5.75	Parkfield
1881	4 10 10 0	37	24.00 121 24.00	6.0	W. San Joaquin Valley

1882	3	6	2145	36	54.	121	12.	5.75	Hollister
1883	9	5	1230	34	12.00	119	54.00	6.25	Santa Barbara Channel
1884	1	28	730	41	6.	123	36.	5.75	Klamath Mountains
1884	3	26	40	37	6.	122	12.	6.0	Santa Cruz Mountains
1885	1	31	545	40	24.	120	36.	5.75	Susanville
1885	4	12	4 5	36	24.00	121	0.	6.25	S. Diablo Range
1887	6	3	1048	39	12.00	119	48.00	6.5	Carson City, Nevada area
1888	4	29	448	39	42.00	120	42.00	6.0	Mohawk Valley
1889	5	19	1110	38	0.	121	54.00	6.25	Antioch
1889	6	20	6 0	40	30.00	120	42.00	6.0	Susanville
1889	9	30	520	37	12.	118	42.	5.75	Bishop region
1890	2	9	12 6	33	24.00	116	18.00	6.5	San Jacinto Fault region
1890	4	24	1136	36	54.00	121	36.00	6.25	Pajaro Gap
1890	7	26	940	40	30.00	124	12.00	6.25	Cape Mendocino
1891	7	30	1410	32	0.	115	0.	6.0	Colorado R. delta region
1892	2	24	720	32	33.00	115	38.00	7.0	Laguna Salada, B.C.
1892	4	19	1050	38	24.00	122	0.	6.5	Vacaville
1892	4	21	1743	38	30.00	121	54.00	6.25	Winters
1892	5	28	1115	33	12.00	116	12.00	6.5	San Jacinto fault region
1892	11	13	1245	36	48.00	121	30.00	5.75	Hollister
1893	5	19	035	34	6.00	119	24.00	5.75	Pico Canyon
1894	7	30	512	34	18.00	117	36.00	6.0	Lytle Creek region
1894	9	30	1736	40	18.	123	42.	6.0	Cape Mendocino region
1894	10	23	23 3	32	48.00	116	48.00	5.75	E. of San Diego
1896	8	17	1130	36	42.00	118	18.00	6.0	SE Sierra Nevada
1897	6	20	2014	37	0.	121	30.00	6.25	Gilroy
1898	3	31	743	38	12.00	122	24.00	6.5	Mare Island
1898	4	15	7 7	39	12.00	123	48.00	6.5	Mendocino
1899	4	16	1340	41	0.	126	0.	7.0	W. of Eureka
1899	7	6	2010	37	12.	121	30.	5.75	Morgan Hill
1899	7	22	2032	34	18.00	117	30.00	5.75	Lytle Creek region
1899	12	25	1225	33	48.00	117	0.	6.4	San Jacinto and Hemet
1901	3	3	745	36	0.	120	30.00	6.4	Parkfield
1903	1	24	527	31	30.00	115	0.00	6.6	Colorado R. delta region
1903	6	11	1312	37	24.00	121	54.00	5.5	San Jose
1903	8	3	649	37	18.00	121	48.00	5.5	San Jose
1906	4	18	1312	37	42.00	122	30.00	8.25	Great 1906 earthquake
1906	4	19	030	32	54.00	115	30.00	6.2	Imperial Valley
1906	4	23	910	41	0.	124	0.	6.4	Arcata
1907	9	20	154	34	12.00	117	6.00	5.3	San Bernardino region
1908	11	4	837	36	0.	117	0.	6.0	Death Valley region
1909	10	29	645	40	30.00	124	12.00	5.8	Cape Mendocino
1910	3	11	652	36	54.00	121	48.00	5.8	Watsonville
1910	3	19	011	40	0.	125	0.	6.0	W. of Cape Mendocino
1910	5	15	1547	33	42.00	117	24.00	5.5	Glen Ivy Hot Springs
1910	8	5	131	42	0.	127	0.	6.6	W. of Crescent City
1911	7	1	22 0	37	15.00	121	45.00	6.5	Calaveras fault
1914	2	18	1817	39	30.00	119	48.00	5.5	Truckee region
1914	4	24	834	39	30.00	119	48.00	6.0	Truckee region
1915	5	6	12 9	40	0.00	126	0.	6.2	W. of Cape Mendocino
1915	6	23	359	32	48.00	115	30.00	6.0	Imperial Valley
1915	6	23	456	32	48.00	115	30.00	5.9	Imperial Valley
1915	10	3	652	40	30.00	117	30.00	7.3	Pleasant Valley, Nevada
1915	11	21	013	32	0.	115	0.	7.1	Volcano Lake, B.C.
1915	12	31	1220	41	0.	126	0.	6.5	W. of Eureka
1916	2	3	5 3	41	0.	117	48.00	5.9	N. of Pleasant Valley, NV
1916	10	23	244	34	54.00	118	54.00	5.3	Tejon Pass region
1916	11	10	911	35	30.00	116	0.	6.1	S. of Death Valley
1918	4	21	2232	33	48.00	117	0.	6.9	San Jacinto
1918	7	15	023	41	0.	125	0.	6.5	W. of Eureka
1922	1	26	931	41	0.	126	0.	6.0	W. of Eureka
1922	1	31	1317	41	0.	125	30.00	7.3	W. of Eureka
1922	3	10	1121	36	0.	120	30.00	6.3	Parkfield
1923	1	22	9 4	40	30.00	124	30.00	7.2	Cape Mendocino

1923	7	23	730	34	0.	117	18.00	6.0	San Bernardino region
1925	6	4	12 2	41	30.00	125	0.	6.0	W. of Eureka
1925	6	29	1442	34	18.00	119	48.00	6.3	Santa Barbara
1926	10	22	1235	36	37.00	122	21.00	6.1	Monterey Bay
1926	10	22	1335	36	33.00	122	11.00	6.1	Monterey Bay
1926	12	10	838	40	45.00	126	0.	6.0	W. of Cape Mendocino
1927	9	18	2 7	37	30.00	118	45.00	6.0	Bishop region
1927	11	4	1350	34	42.00	120	48.00	7.3	SW of Lompoc
1932	6	6	844	40	45.00	124	30.00	6.4	Eureka
1932	12	21	610	38	45.00	118	0.	7.2	Cedar Mountain, Nevada
1933	1	5	651	38	46.00	117	44.00	5.9	Cedar Mountain, Nevada
1933	3	11	154	33	37.00	117	58.00	6.3	Long Beach
1933	6	25	2045	39	4.00	119	20.00	6.1	Yerington, Nevada
1934	1	30	2016	38	18.00	118	24.00	6.3	Excelsior Mountain,NV
1934	6	8	447	36	0.	120	30.00	6.0	Parkfield
1934	7	6	2248	41	15.00	125	45.00	6.5	W. of Eureka
1934	12	30	1352	32	15.00	115	30.00	6.5	Laguna Salada, B.C.
1934	12	31	1845	32	0.	114	45.00	7.0	Colorado R. delta
1935	2	24	145	31	59.00	115	12.00	5.3	Colorado R. delta
1936	6	3	915	40	0.	125	30.00	5.9	W. of Cape Mendocino
1937	3	25	1649	33	24.00	116	16.00	6.0	Buck Ridge
1940	2	8	8 5	39	45.00	121	15.00	6.0	Chico
1940	5	19	436	32	44.00	115	30.00	7.1	Imperial Valley
1940	12	7	2216	31	40.00	115	5.00	5.5	Colorado R. delta
1941	2	9	944	40	42.00	125	24.00	6.6	W. of Cape Mendocino
1941	4	9	1708	31	0.00	114	0.00	5.3	Gulf of California
1941	5	13	16 1	40	18.00	126	24.00	6.0	W. of Cape Mendocino
1941	7	1	750	34	22.00	119	35.00	5.9	Carpenteria
1941	9	14	1643	37	34.00	118	44.00	5.8	Tom's Place
1941	9	14	1839	37	34.00	118	44.00	6.0	Tom's Place
1941	10	3	1613	40	24.00	124	48.00	6.4	W. of Cape Mendocino
1942	10	21	1622	33	3.00	116	5.	6.5	Fish Creek Mountains
1942	12	3	944	39	42.00	119	18.00	5.9	N. of Wadsworth, Nevada
1945	5	19	15 7	40	24.00	126	54.00	6.2	W. of Cape Mendocino
1945	9	28	2224	41	54.00	126	42.00	6.0	W. of Crescent City
1946	3	15	1349	35	44.00	118	3.00	6.3	Walker Pass
1947	4	10	1558	34	59.00	116	33.00	6.4	Manix
1948	12	4	2343	33	56.00	116	23.00	6.5	Desert Hot Springs
1948	12	29	1253	39	33.00	120	5.00	6.0	Verdi, Nevada
1949	3	25	456	41	18.00	126	0.	6.2	W. of Eureka
1949	5	2	1125	34	1.	115	41.00	5.9	Pinto Mountain
1951	10	8	410	40	15.00	124	30.00	6.0	W. Of Cape Mendocino
1951	12	26	046	32	48.00	118	18.00	5.9	San Clemente Island
1952	7	21	1152	35	0.	119	1.00	7.7	Kern County earthquake
1952	7	21	12 5	35	0.	119	0.	6.4	Kern County
1952	7	23	038	35	22.00	118	35.00	6.1	Kern County
1952	7	29	7 3	35	23.00	118	51.00	6.1	Bakersfield
1952	11	22	746	35	44.00	121	12.00	6.0	Bryson
1954	1	12	2333	35	0.	119	1.00	5.9	W. of Wheeler Ridge
1954	3	19	954	33	17.00	116	11.00	6.2	Arroyo Salada
1954	7	6	1113	39	25.00	118	32.00	6.6	Rainbow Mountain, Nevada
1954	7	6	22 7	39	18.00	118	30.00	6.4	Rainbow Mountain, Nevada
1954	8	24	551	39	35.00	118	27.00	6.8	Stillwater, Nevada
1954	8	31	2220	39	30.00	118	30.00	6.3	Stillwater, Nevada
1954	10	24	944	31	30.00	116	0.	6.0	W. of Santo Tomas, B.C.
1954	11	12	1226	31	30.00	116	0.	6.3	W. of Santo Tomas, B.C.
1954	11	25	1116	40	16.00	125	38.00	6.5	W. of Cape Mendocino
1954	12	16	11 7	39	19.00	118	12.00	7.1	Fairview Peak, Nevada
1954	12	16	1111	39	30.00	118	0.	6.8	Dixie Valley, Nevada
1954	12	21	1956	40	56.00	123	47.00	6.6	E. of Arcata
1956	2	9	1432	31	45.00	115	55.00	6.8	San Miguel, B.C.
1956	2	9	1524	31	45.00	115	55.00	6.1	San Miguel, B.C.
1956	2	14	1833	31	30.00	115	30.00	6.3	San Miguel, B.C.
1956	2	15	120	31	30.00	115	30.00	6.4	San Miguel, B.C.

1956	10	11	1648	40	40.00	125	46.00	6.0	W. of Cape Mendocino
1956	12	13	1315	31	0.	115	0.	6.0	W. shore, Gulf of Calif.
1959	3	23	710	39	36.00	118	1.00	6.3	Dixie Valley, Nevada
1959	6	23	1435	39	5.00	118	49.00	6.1	Schurz, Nevada
1960	8	9	739	40	19.00	127	4.00	6.2	W. of Cape Mendocino
1966	6	28	426	36	0.	120	30.00	6.0	Parkfield
1966	8	7	1736	31	48.00	114	30.00	6.3	Gulf of California
1966	9	12	1641	39	25.00	120	9.00	6.0	Truckee
1968	4	9	228	33	11.00	116	8.00	6.5	Borrego Mountain
1968	6	26	142	40	14.00	124	16.00	5.4	Punta Gorda
1971	2	9	14 0	34	25.00	118	24.00	6.5	San Fernando
1973	2	21	1445	34	4.00	119	2.00	5.2	Point Mugu
1976	11	26	1119	41	18.00	125	42.00	6.3	W. of Orick
1979	8	6	17 5	37	7.00	121	31.00	5.7	Coyote Lake
1979	10	15	2316	32	36.00	115	18.00	6.5	Imperial Valley
1980	01	24	1900	37	50.00	121	47.00	5.8	Livermore
1980	5	25	1633	37	36.00	118	50.00	6.1	Mammoth Lakes
1980	5	25	1649	37	39.00	118	54.00	5.9	Mammoth Lakes
1980	5	25	1944	37	33.00	118	49.00	5.8	Mammoth Lakes
1980	5	27	1450	37	29.00	118	48.00	6.0	Mammoth Lakes
1980	6	9	328	32	12.00	115	5.00	6.4	Victoria, B.C.
1980	11	8	1027	41	7.00	124	40.00	7.2	W. of Eureka
1981	4	26	1209	33	8.00	115	39.00	6.0	Westmorland
1981	9	4	1550	33	40.00	119	7.00	5.9	N. of Santa Barbara Isl.
1981	9	30	1153	37	35.00	118	52.00	5.8	Mammoth Lakes
1983	5	2	2342	36	14.00	120	19.00	6.5	Coalinga
1983	7	22	239	36	14.00	120	25.00	5.7	Coalinga
1984	4	24	2115	37	19.00	121	39.00	6.1	Morgan Hill
1984	9	10	314	40	23.00	127	9.00	6.7	Mendocino Fracture Zone
1984	11	23	18 8	37	27.00	118	36.00	5.7	Round Valley
1985	8	4	12 1	36	8.00	120	10.00	5.9	North Kettleman Hills
1986	7	8	920	34	0.	116	36.00	6.0	North Palm Springs
1986	7	20	1429	37	34.00	118	26.00	5.6	Chalfant Valley
1986	7	21	1442	37	32.00	118	26.00	6.2	Chalfant Valley
1986	7	31	722	37	28.00	118	22.00	5.2	Chalfant Valley
1987	10	1	1442	34	3.00	118	5.00	5.8	Whittier Narrows
1987	11	24	153	33	4.00	115	47.00	6.2	Elmore Ranch fault
1987	11	24	1316	33	1.00	115	51.00	6.6	Superstition Hills
1989	10	18	0004	37	2.19	121	52.98	7.1	Loma Prieta
1991	8	16	2226	41	38.00	125	52.00	6.3	W. of Crescent City
1991	8	17	1929	40	17.00	124	14.00	6.2	Punta Gorda
1991	8	17	2217	41	41.00	126	3.00	7.1	W. of Crescent City
1992	4	23	450	33	58.00	116	19.00	6.1	Joshua Tree
1992	4	25	1806	40	20.00	124	14.00	7.2	Cape Mendocino
1992	4	26	741	40	26.00	124	36.00	6.5	Cape Mendocino
1992	4	26	1118	40	23.00	124	35.00	6.6	Cape Mendocino
1992	6	28	1157	34	12.00	116	26.00	7.3	Landers
1992	6	28	1505	34	12.00	116	50.00	6.2	Big Bear
1993	5	17	2320	37	9.00	117	50.00	6.1	Big Pine
1994	1	17	1230	34	13.00	118	32.00	6.7	Northridge
1994	9	01	1515	40	27.00	125	54.00	6.9	Mendocino Fracture Zone
1994	9	12	1223	38	49.00	119	37.00	6.0	Carter's Station, Nevada
1995	2	19	403	40	37.00	125	54.00	6.6	W. of Eureka
1995	9	20	2327	35	46.00	117	38.00	5.5	Ridgecrest
1996	7	24	2016	41	47.04	125	54.66	5.7	W. of Eureka
1997	1	22	717	40	16.32	124	23.64	5.7	Punta Gorda
1999	8	1	1606	37	23.40	117	4.80	5.7	Scotty's Junction, Nevada
1999	10	16	947	34	35.64	116	16.26	7.1	Hector Mine
2000	3	16	1520	40	23.16	125	16.74	5.9	Mendocino Fracture Zone
2003	12	22	1916	35	41.98	121	5.84	6.5	San Simeon
2004	9	28	1815	35	48.60	120	22.22	6.5	Parkfield

Sample Earthquake Evaluation Form

POST EARTHQUAKE BRIDGE EVALUATION FORM Sheet Number _____					
Inspector's Name _____		Affiliation _____		Date _____ Time _____	
Earthquake Name _____		Country _____		Region _____	
DESCRIPTION OF BRIDGE			DESCRIPTION OF DAMAGE		
Bridge Name _____ Br. # _____ Route # _____ Location _____ Bridge Bearing _____ Length _____ Number of Spans ___ Simple Spans Continuous Hinges yes <input type="checkbox"/> no <input type="checkbox"/> locations in spans _____ River Xing RR Xing Interchange Other _____			Overall Rating No Damage Minor Damage Moderate Damage Major Damage Collapse		
Suspension Cable Stay Steel Truss Steel Arch Steel Box Girder Steel I Girder Concrete Box Girder Concrete T Girder Concrete Slab Precast Girder Concrete Arch Timber Arch Timber Truss Timber Girder Bascule Lift Swing Other _____			Dropped Spans yes <input type="checkbox"/> no <input type="checkbox"/> spans _____ Span Movement _____ Girder Damage _____ Other Superstructure Damage _____ _____ Indications of soil movement _____		
BEARING TYPES _____			Damage	Location	Description
 Roller	 Plane Sliding		Restrainer Hinge Joint	_____	_____
 Rocker	 Curved Sliding		Bearings Shear Key Abutment	_____	_____
 Knuckle	 Disc		Bent Bent Cap	_____	_____
 Leaf	 Elastomeric		Column	_____	_____
 Link	Isolation/Damping		Footing	_____	_____
Abutments			Roll #	Frame #	Photo Log
Seat Type Diaphragm Other _____			_____	_____	_____
Piers			_____	_____	_____
Concrete Walls Single Col. Multicol.			_____	_____	_____
Steel Tower Single Col. Multicol.			_____	_____	_____
Other _____			_____	_____	_____
Foundations			_____	_____	_____
spread pile pileshaft caisson other _____			_____	_____	_____
Retrofit yes <input type="checkbox"/> no <input type="checkbox"/>			_____	_____	_____
Shear Keys <input type="checkbox"/> Catcher Blocks <input type="checkbox"/> Restrainers <input type="checkbox"/>			_____	_____	_____
Abutments _____			_____	_____	_____
Bents _____			_____	_____	_____
Other _____			_____	_____	_____
Additional Comments _____					

SKETCH DAMAGE