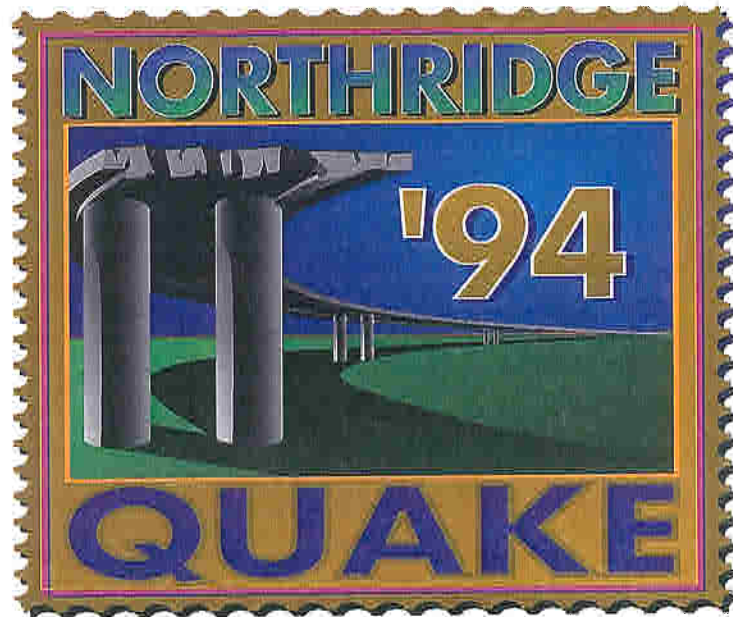


AN ANALYSIS OF CALTRANS' RESPONSE TO THE NORTHRIDGE EARTHQUAKE



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INTRODUCTION

On January 17, 1994, at 4:31 A.M., the 6.8 Northridge Earthquake rocked the L.A. area. Damaged State facilities included the collapse of bridges on the I-10, I-5, I-14, I-118, and I-5/14 interchanges. The Governor declared a State of Emergency. The Director of Transportation empowered and delegated authority to District 7 and encouraged other Caltrans units to provide necessary support. Under the leadership of the District Director, a multi-discipline and multi-agency team came together to work and acquire the funds to reconstruct the damaged facilities. The District and Structures construction and maintenance branches were able to gather expertise and additional personnel from other districts and Sacramento for the rebuilding effort.

The planning, design, construction, maintenance, and operation teams worked as partners with local agencies and emergency response teams to mitigate the impact to the community and maximize the use of the transportation systems. The support and commitment by all agencies (Federal, State, County, City) to expedite and facilitate the rebuilding was outstanding. Temporary detour routes and reconstruction were made a priority on routes I-5 and I-10, since they were critical north/south and east/west links in the Los Angeles area freeway system.

By the time of this report, over 90% of all the restoration work, on the 120 earthquake contracts (\$250 million), has been completed. Routes 10 and 5 were completed in record time, exceeding everyone's expectations. Many of the contractors worked 24 hours a day and 7 days a week. There were also many Caltrans heroes.

The planners, designers and Office of Office Engineering personnel worked diligently to prepare the contract plans and documents for the rebuild. They experimented with design and build contracts, incentive/disincentive contracts, informal bidding and same day service for bid opening, awarding and approval. The Federal Highway Administration demonstrated their partnership and commitment by not adding a single day to the process. The Office of Operations was creative in the use of detours, HOV lanes and mass transit to move goods and people. The Administration and Right of Way branches provided necessary support and resources. The many assigned and voluntary personnel in maintenance and construction branches responded to the call of duty and performed their tasks superbly.

This report is a result of a series of interviews with various key Structures and District personnel in construction and maintenance. A list of the interviewees is attached. This report is designed to capture and document the

unique experience of responding to the Northridge earthquake, and to analyze, in hindsight, what can be done to improve our readiness for the "next time" and summarize lessons learned from this crisis. This report contains lists of recommendations and suggestions for responsible parties assigned to specific tasks.

The implementation of these recommendations shall supplement all existing emergency response plans and enhance Caltrans state of readiness to responding to a major emergency.

I. EMERGENCY RESPONSE PLAN/OPERATION

A. WHAT DID NOT WORK WELL?

EXISTING PRACTICE:

- The District building did not have a fully equipped Emergency Response Center. Neither the Traffic Management Center (TMC) nor the Executive Conference Room have sufficient tables, space, or dedicated fax and telephone lines to conduct an effective emergency operation.
- Power to the TMC was out for the first six hours after the earthquake, until a backup unit was activated.

B. WHAT WORKED WELL

EXISTING PRACTICE:

- Pagers, portable radios and cellular phones were extremely useful for communication with and among field personnel.
- Damage assessment of existing roadways and bridges was done efficiently by District maintenance and Structures Maintenance Branches.
- Alternate routes were identified and made available immediately following the earthquake.

NEW METHODS:

- Authorizing the district director to approve Director's orders for requests up to \$4 million facilitated the District's response to the emergency.

C. DISCUSSION

Some District and Structures Construction, in support of Maintenance, personnel took the initiative to inspect the damaged site in their area and assess damages. Some of them reported to the District office, requested an emergency contract, administered the demolishing and shoring contracts and conducted interviews with the media. This voluntary support by Construction supplemented the effort by both Structures and District

Maintenance and was the key in overcoming the initial shock of the earthquake.

There needs to be a formal procedure to effectively utilize the construction personnel, in times of emergency, by Maintenance Branches. This was even more critical to Structures Maintenance which is not staffed to handle an emergency of this magnitude.

With the exception of Maintenance Branch, most employees who came out to help did it voluntarily. There was some confusion and initial lack of direction for Special Crews who were ready to assist and were waiting for instructions.

D. RECOMMENDATIONS

- 1a) The District should consider consolidating the Communication Center (CC) and TMC under one supervisor. TMC/CC staff should receive more training to respond to emergency calls.
Lead person: Chief of Division of Maintenance - District
- 1b) The District office TMC needs to be better equipped with dedicated fax machines, telephone lines, meeting and working furniture, etc. to be used for major emergencies.
Lead person: Chief of Division of Operations - District
- 1c) TMC should have a totally automatic transfer from mainline power to emergency generator.
Lead person: Chief of Division of Resource Management - District
- 1d) Emergency telephone numbers (office, cellular, home, fax no.) for key Structures, District, Construction (i.e. Branch Chiefs, Seniors, RE's) and Maintenance (Regional Managers, Supervisors, etc.) should be maintained at the EOC and updated monthly. Telephone lists should be one-sided only for easy fax.
Lead person: Chief of Division of Maintenance - District
- 2) The Emergency Response Plan should include the effective utilization of Construction Personnel by Structures and District Maintenance Branches. District should maintain a master list of key people with unique expertise and experience that would be needed during a major disaster or emergency.
Lead persons: Chief of Division of Maintenance - District, Chief of Division of Structures - HQ

- 3) A periodical earthquake drill should be conducted for earthquake of 6.0 at different parts of the District. The drill should include the dispatching of emergency response teams and activating the EOC.
Lead person: Chief of Division of Maintenance - District
- 4) Streamline the decision making process for Structures. A definite plan should be developed by Structures Maintenance to make timely decision on all damaged facilities.
Lead person: Chief of Division of Structures - HQ
- 5) Prepare a checklist for Earthquake damage inspection of bridges, drainage facilities, utility, etc.
Lead person: Chief of Division of Maintenance - HQ
Team member: Chief of Division of Structures - HQ
- 6) Develop an integrated Project Management System adaptable to Emergencies. The system should include a computerized identification and reporting of damaged facilities from the time of emergency to being availability of funds and completion of repair work. The PMS should coordinate emergency work with planned work already in the pipeline to avoid duplication.
Lead person: Chief of Division of Program Management - HQ

II. COMMUNICATION/COORDINATION & COMMUNITY OUTREACH

A. WHAT DID NOT WORK WELL

EXISTING PRACTICE:

- Maintenance Region Managers did not have car to car cellular phone communication capability even though they all had cellular phones in their cars.
- Maintenance Special Crews were receiving verbal requests from Traffic, Construction, TMC and Maintenance. Some of the requests were conflicting due to lack of coordination.
- The media demand for information and interviews in the field exceeded the District's resources. Instructions about communicating with the media were unclear and sometimes conflicting.

NEW METHODS

- Offering \$75/day for residents adjacent to demolition activities invited the entire community to be considered for eligibility.

B. WHAT WORKED WELL

EXISTING PRACTICE:

- Radios, pagers and cellular phones were extremely useful for field personnel in construction and maintenance in communication among themselves, and with EOC.
- There was a great deal of coordination between Maintenance and Construction Branches. This commitment to teamwork was the single most important factor in the District's ability to respond to the initial shock.
- The District Director conducted daily status meetings with all the Emergency Response Team members. This one step process to gather and disseminate consolidated Spread Sheet and other pertinent information was effective and time saving.

- Consolidating a temporary pool of Cellular phones and Radios in Construction branch assigning them to personnel who were working on earthquake projects enhanced field communication.

NEW METHODS:

- Borrowing 25 cellular phones from LA Cellular and 20 telephones from Pac-Bell enhanced the communication capability for Structure and District Maintenance.
- Local CHP, Maintenance Personnel, Fire Department, Construction Personnel, City Personnel established a disaster network team of the local region which was effective.
- Offering overnight and short term accommodations for residents impacted by reconstruction activity was a viable solution.
- Hiring Community Outreach service firm was effective in dealing with community concerns, demands by public officials and allowed construction personnel to concentrate on Contract Administration.
- Weekly Status reports on EQ projects allowed management to be apprised of the reconstruction activities and community concerns.

C. DISCUSSION

During the first few days different Branches were conducting their own meetings and preparing Spread Sheets independently. This lack of coordination required many employees to attend too many meetings and having to respond to repeated inquiries for the same information. The need to gather and disseminate information was time consuming.

Once the task to prepare master Spread Sheets was delegated to the HOV Branch, Structures Maintenance, and District Maintenance, the process became efficient. Anyone who need to provide input or needed to use the information was added to the distribution list.

Due to the unavailability of sufficient Media Relation Officers in the District, field personnel were bombarded with requests for interview on specific projects and general information. Many construction employees became regulars and overnight celebrities on local and national television programs. However, it was a burden to many who were administering quite a few contracts.

Coordination between maintenance and construction as well as with local agencies and emergency response teams was superb. Everyone worked as partners and supported each others objectives.

The community impact due to heavy demolition work was significant. The hiring of a private Community Outreach firm was instrumental in bringing attention and concern to local residents and mitigating the negative impacts. Late night noisy operations and vibrations were intolerable to many residents who lived within a block of a freeway demolition project.

D. RECOMMENDATIONS

- 1) Supervisor level personnel could be authorized to accommodate demands by media during a major emergency when few District Media Officers could not possibly make themselves available everywhere.
Lead person: Executive Assistant - District
- 2) Media Relations unit should set up locations for information and updates rather than being scattered throughout the district.
Lead person: Executive Assistant - District
- 3) A brief media statement and briefing can be made available for field personnel to talk to the media knowledgeably about the status of the emergency and immediate recovery plans. Training on media relations and emergency information should be offered to employees.
Lead person: Executive Assistant - District
- 4) The responsibility to gather data, prepare certain spread Sheets and to update the information should be delegated to individuals and Specific Branches to minimize duplication and to make updated information readily available and accessible. This process should be centralized as much as possible.
Lead person: Chief of Division of Maintenance - District
Team Members: Chief of Division of Operations, Chief of Structures Maintenance, Chief of Division of Design
- 5) The radio system needs improvement.
Lead person: Chief of Division of Maintenance - District

- 6) In case of emergency each district should have a plan to implement a community Outreach Program and a dedicated telephone line should be made available for impacted Residents and community members to call during a major demolition and/or reconstruction period.

Lead person: Executive Assistant - District

Team members: Chief of Division of Right of Way, Chief of Division of Construction, Executive Assistant, Chief of Office of Environmental Planning - District

- 7) Requests for Maintenance Special Crews should be submitted in writing (fax, etc.) and be centralized through one officer.

Lead person: Chief of Division of Maintenance - District

- 8) Having a conference call feature for field office telephones will enhance their ability to communicate and coordinate.

Lead person: Chief of Office of Business Management - District

III. RESOURCES (PERSONNEL/EQUIPMENT)

A. WHAT DID NOT WORK WELL

EXISTING PRACTICE:

- District Construction Branch was not able to get needed help from other districts in a timely manner. Rte I-10 Reconstruction was completed by the time arrangements were made to transfer people from other districts.
- Some cellular long distance phone lines were disconnected because the bills were not paid on time.

B. WHAT WORKED WELL

EXISTING PRACTICE:

- Structure Maintenance and District Maintenance, and Structures Construction were able to obtain additional personnel from other districts within a day.
- R/W Branch was able to provide field offices, trailers within three to ten days.

C. DISCUSSION

Due to lack of determination on per diem rates, voluntary help from other districts to district Construction Branch was delayed by over 70 days.

Employees had to work longer hours and excessive amount of overtime to provide an acceptable level of inspection.

The Maintenance Branches (Structures & District) had a plan to quickly transfer employees from other districts to needed areas. Key employees were quickly identified and assigned to locations within a few days of the disaster. Maintenance and District field offices lacked the additional fax and copy machines that would have facilitated the exchanging of information. Sacramento's Structures Maintenance Branch was able to rent addition copy machines as needed.

D. RECOMMENDATIONS

- 1) HQ Construction should develop a plan to transfer Construction employees from one district to another during emergency construction period.
Lead person: Chief of Division of Construction - HQ
- 2) Districts and Structures Maintenance should have the authority to rent or lease additional fax machines, copy machines and telephones during an emergency.
Lead person: Chief of Division of Resource Management - District
- 3) Cellular phones with Long Distance Capability should be identified. A one day approval process should be in place to add temporary long distance lines to other cellular phones as the need arises.
Lead person: Chief of Division of Resource Management - District
- 4) Field Offices and State vehicles should have emergency kits to sustain employees that would be required to work continuously.
Lead person: Chief of Division of Resource Management - District
- 5) Develop a standard form to be used to transfer and track personnel and equipment that are being relocated (sample forms attached).
Lead person: Chief of Division of Resource Management - District

IV. CONTRACT ADMINISTRATION

A. WHAT DIDN'T WORK WELL

EXISTING PRACTICE:

- Initially, the emergency contracts were not written in a timely manner which made it difficult for field personnel to administer the contracts.
- Rental rates were not applicable for the emergency contracts. In many cases the work was completed prior to establishing an agreed upon rental rate.

B. WHAT WORKED WELL

EXISTING PRACTICE:

- The use of tentative agreement forms for tracking force account work costs on CCO's and emergency force account contracts eliminated the usual disputes over quantities.

NEW METHODS:

- Availability of bid packages the same day the contract was awarded/approved allowed the Resident Engineers to initiate the contract and CCO's.
- Premium time and acceleration costs were included on CCO's for contracts with high incentive value. This eliminated disputes over contract time extension by addressing the impact of the CCO on controlling operations and contract time.
- Delegation of Contract Change Order (CCO) approval to HQ construction by the Federal Highway Administration streamlined the process. HQ construction CCO personnel were available at all times by pagers.
- Use of A & B contracts placed emphasis on construction time by making time a bid item. Most contractors completed their projects earlier than anticipated.
- Informal bid process saved at least two to three months of bid opening and award time.

- Use of incentive/disincentive money was a significant motivator to the contractor in accelerating the work by working 24 hours a day and seven days a week.
- Opening the bids in the district and having all the approving authorities in the District facilitated the award and approval process. In many cases the bid opening, awarding and approval were completed on the same day.
- Processing bi-monthly progress estimates lessened the financial burden for many contractors and subcontractors who were working 3 months worth of work in one month due to the accelerated schedules.
- Use of tentative agreement forms for tracking delays allowed both parties to agree on the facts that will be used for time extension analysis.
- A contract administration team from Bids and Contracts was mobilized by Field Maintenance to expedite the writing and awarding of emergency contracts.
- Partnering was used effectively. Unresolved issues were escalated immediately.

C. DISCUSSION

We have experienced that administering an emergency contract was in many ways different from the regular highway contracts. Equipment is used differently on Force Account emergency contracts where 100% of the work is done at Force Account. The Standard Specifications and Standard rates need to be examined for proper application on emergency contracts.

It was assumed that the Governor's Executive Emergency Order of January 23, 1994 authorized the Department to modify the contract requirements in the Standard Specifications and other provisions. However, the contracts awarded subsequent to the Governor's Emergency Order include the same Standard Provisions and did not address the contractual requirements and exceptions to be made for the emergency contracts. Substitution of DBE subcontracts and the substitution process which normally could take as many as fifteen days were sensitive issues on contracts that have a incentive/disincentive of \$200,000/day. They were being interpreted differently by the contract administrator.

What constitutes a day (or working day) also requires clarification's when large sums of incentive/disincentive money is being offered.

The use of tentative agreement forms for tracking force account work costs, potential delay impact on controlling operations and costs for disputed items or potential delay impact on controlling operations and costs for disputed items or potential claims were useful.

D. RECOMMENDATIONS

- 1) Mobilize a contract administration team in the field for emergency contracts. This team will be responsible for securing directors order, selection of contractors, assigning contract administration personnel and processing and executing all emergency contracts expeditiously and systematically. The team should consist of Construction, Bid & Contracts and Maintenance representatives. (The team should also develop a list of instructions and procedures on how to administer emergency contracts.)

Lead person: Chief of Division of Resource Management - District
Team members: Chiefs of Offices of Business Management, Construction Engineering Management and Maintenance Branches.

- 2) Establish an equipment rental rate for emergency contracts that can be activated by the Department.

Lead person: Chief of Division of Construction--HQ.

- 3) Bids & Contracts should maintain a data base of Contractors. Construction Branch should prepare and update the data base.

Lead person: Chief of Division of Resource Management - District

- 4) When receiving proposals for emergency force account work, a comparison of the equipment rental rate should be made for selection of a qualified contractor.

Lead person: Chief of Division of Resource Management - District
Team members: Same as #1

- 5a) Develop Standards and boiler plates for emergency contracts.

Lead person: Chief of Division of Construction - HQ

- 5b) Address time issues in the Standard Specification as it relates to emergency contracts. (i.e. time extensions, sub-contractor substitution, pre-stressing time, etc.)

Lead person: Chief of Division of Construction - HQ

- 6) Consider utilizing tentative agreement forms for tracking and keeping agreed pertinent facts and information for future dispute resolution (sample attached).

Lead person: Chief of Division of Construction - HQ

VI. ARE YOU READY?

The following questions are designed to test a district's state of readiness to responding to a major emergency.

- 1) Do you have an Emergency Operation Center that is fully equipped?
- 2) Are all the employees in your district well informed about the district's Emergency Response Plan?
- 3) Do you have periodical drills for emergencies that includes the testing of equipment and updating of emergency telephone numbers?
- 4) Are you ready to provide sufficient information to the public and the media during a major emergency?
- 5) Do you have a plan to deal with the public's inconvenience caused by the impact of your recovery activities?
- 6) Do you have an approved policy to transfer personnel and equipment from other districts within one day of a major emergency?
- 7) Do you have the authority to lease/rent essential equipment when absolutely needed?
- 8) Do you maintain and update a data base for qualified contractors (including DBE contractors) in your district?
- 9) Who in your district is responsible for the selection of contractors, the execution and administration of contracts, and the monitoring of DBE participation for emergency contracts?
- 10) Are you prepared to respond to a major earthquake (6+) with significant damage to transportation facilities in your district?

LIST OF INTERVIEWEES

- 1) Paul R. Askelson
Bridge Maintenance Engineer
- 2) Richard H. Kermode
Chief, Maintenance Field Branch
- 3) Larry Omay
Maintenance Regional Manager
- 4) Bill Varley
Maintenance Area Superintendent
- 5) Chuck Webster
Region Manager
- 6) John Janton
Maintenance Area Superintendent
- 7) Ron Thrash
Maintenance Area Superintendent
- 8) John Hogan
Maintenance Area Superintendent
- 9) Dan Goble
Chief of Office of Construction Engineering Management
- 10) Mike Hollis
Chief of Office of Construction Field North
- 11) Marco Ruano
Construction Engineer
- 12) Jay Steele
Construction Engineer
- 13) Scott Kennedy
Senior Bridge Engineer
- 14) Scott McKenzie
Construction Engineer

- 15) Andrew Ponzi
Senior Bridge Engineer
- 16) Tyrone Taylor
Resident Engineer
- 17) Bob Powell
Structure representative
- 18) Amer Bata
Senior Bridge Engineer
- 19) Aaron Karasik
Senior Transportation Engineer

TENTATIVE TIME AGREEMENT

REPORT NO. _____

PROJECT _____

DATE : _____

	DATE	TIME
BEGINNING DATE & TIME		
ENDING DATE & TIME		
TOTAL TIME (HOURS)		

ITEMS of WORK :

CAUSE OF DELAY :

OWNER CAUSED DELAY		CAUSE OF DELAY UNDETERMINED	
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PROJECT MANAGER
CONTRACTOR

RESIDENT/STRUCTURES ENGINEER
STATE