

Earthquake Research Project Concept Summary

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Title:	Enhancements to the California Emergency Management Agency's (CalEMA's) Building Safety Assessment Program Emerging from Recent Earthquakes in New Zealand and Japan
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Previous Efforts and Relationship to this Project:	<p>CalEMA's Safety Assessment Program was established shortly before the 1989 Loma Prieta Earthquake after its predecessor organization, the Governor's Office of Emergency Services, the Office of Statewide Health Planning and Development, and the Federal Emergency Management Agency funded the Applied Technology Council's development of a standardized approach for rapid safety assessments of damaged buildings titled "Post-Earthquake Safety Evaluation of Buildings," ATC 20. It was last updated in 1995 based on its use in the Northridge Earthquake.</p> <p>The Safety Assessment Program (SAP) utilizes volunteers and mutual aid resources to provide professional engineers and architects and certified building inspectors to assist local governments in safety evaluation of their built environment in an aftermath of a disaster. The program is managed by Cal EMA with cooperation from professional organizations. SAP produces two resources, SAP Evaluators, described above, and SAP Coordinators, which are local government representatives that coordinate the program when implemented in their community. Training courses exist for both the Evaluators and the Coordinators. Cal EMA issues registration ID cards to all SAP Evaluators that have successfully completed the program requirements. This training program has been approved by the Department of Homeland Security and is now eligible for Homeland Security Grant Program funding.</p> <p>Since 1989, CalEMA and its affiliated non-profit organizations has offered training and certification courses for engineers, architects, and building inspectors under the state's Safety Assessment Program (SAP). To date, over 6,300 have been credentialed through seven organizations in collaboration with CalEMA. Hundreds of credentialed SAP volunteers have been deployed after recent California earthquakes to conduct assessments and post red (unsafe), yellow (restricted use) or green (inspected) placards</p>

	<p>on buildings to help ensure safety following earthquakes and speed recovery.</p> <p>In 2009, an international workshop was held by the European Union at L’Aquila Italy to compare safety assessment practices in use throughout the world. This workshop resulted in CSSC staff generating the attached comparison chart. Strengths and weaknesses of the existing programs in each participating country were identified. Japan’s approach of accelerating post-earthquake demolitions and repairs in a coordinated fashion was then identified as a key missing aspect of California’s program.</p> <p>Recent earthquakes and aftershocks in New Zealand resulted in the rapid development of enhancements to its safety assessment program that could easily be considered and adapted on an interim basis here in California with low or no cost to local governments. Numerous buildings in Christchurch were barricaded and stabilized following its M7.1 September 4, 2010, Darfield Earthquake. Many of the damaged, barricaded and stabilized buildings experienced far more severe shaking in the February 22, 2011 M6.1 aftershock that killed 170.</p> <p>Japan’s Niigata and Tohoku earthquakes in 2007 and 2011 provide major opportunities to learn from their experiences with safety assessments, as well as barricading, stabilization, demolition and reconstruction policies.</p> <p>A CSSC staffmember, Fred Turner, participated in Reconnaissance Teams organized by the Earthquake Engineering Research Institute to observe damage after both the September 2010 and February 2011 earthquakes in New Zealand. After the latter event, members of the reconnaissance team spent up to three days helping New Zealand conduct safety assessments, experiencing firsthand the refinements adopted there.</p> <p>Mr. Turner and Mr. Barnes are also instructors for the state’s Safety Assessment Program. They have monitored the effectiveness of SAP activities after recent earthquakes in California and are aware of the strengths and weaknesses of the state’s current program.</p> <p>The scope of work for this project was developed based on these previous efforts.</p>
<p>Estimated Budget/Duration:</p>	<p>This project will be six months long with a budget of approximately \$50,000.</p> <p>CalEMA staff has identified the following budget to meet its needs: \$31,380</p> <p>Additional funds from CSSC that are likely much less than \$18,000 may be warranted to help CalEMA offset the direct expenses of the Applied Technology Council and the California Building Officials (CALBO), a key local government coordinating and training non-profit organization. These additional funds would be subject to further negotiations with CalEMA, ATC, and CALBO if CSSC were to direct its staff to pursue the further development of this project.</p>

Other Potential Project Partners and Funds Requested or Committed to Date

The Applied Technology Council (ATC) identified the need in 2008 to update ATC 20 "Post-Earthquake Safety Evaluation of Buildings." However, since the council controls the copyright on this publication despite its creation using government funds, ATC has made plans to conduct the update using its own funds. ATC indicates that it collects substantial revenue from the publication and dissemination of ATC 20 and its companion Field Manual and seminars offered by ATC.

ATC's perspective is now worldwide whereas CalEMA's perspective is limited to meeting California's needs, so there are considerable differences in their approaches.

ATC representatives report that it is considering funding a small team to visit New Zealand in coming months to obtain information first-hand about enhancements New Zealand made to its safety assessment program that had previously been largely based on ATC 20.

A dialogue is also underway between CSSC staff, CalEMA staff, and ATC representatives on how to best coordinate efforts and avoid duplication. This dialogue will influence negotiations between CSSC staff and CalEMA if the CSSC directs staff to pursue a formal interagency agreement. A small portion of CSSC funds may be directed to assist the Applied Technology Council since CalEMA relies heavily on ATC 20 as a training resource. A small portion of CSSC funds may be directed to assist CALBO in offering training and particularly travel assistance to local government building officials and inspector trainees.

SEAOC's Disaster Emergency Services Committee may be involved with this project by providing advice on the technical safety-related changes to SAP that may arise.

In-kind volunteer services from CalEMA, ATC, CALBO, and SEAOC have not yet been determined, but will likely be worth well in excess of the cash proposed to be provided by the CSSC.

Contacts for Others Potentially Involved with this Project:

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Brief Description of the Research Project: Enhancements to the California Emergency Management Agency's (CalEMA's) Building Safety Assessment Program Emerging from Recent Earthquakes in New Zealand and Japan

Description: This proposal is to examine lessons learned from sister programs in New Zealand and Japan, to incorporate improvements into the California program, and to provide training in various locations in California with the improved material.

The following is a tentative list of refinements to Safety Assessment Programs in New Zealand and Japan identified to date that may be potentially relevant to California practice:

- 1) Use of Indicator Buildings to assess need for reevaluations following aftershocks:
<http://www.stuff.co.nz/the-press/news/christchurch-earthquake-2011/4792155/Buildings-hold-up-in-shock>
- 2) Christchurch's enhanced intelligence from Level 2 assessments that expand on minimal SAP Tagging intelligence: Green 1, Green2, Yellow 1, Yellow 2, Red 1, Red 2, Red 3.
- 3) Demolition/repair intelligence on a blue form for red-tagged buildings only
- 4) A very different approach for moderately damaged residences than compared to SAP – Reds only, No Yellows or Greens, informational pamphlets instead
- 5) Rapid response practices versus zone-wide safety assessments and relative priorities
- 6) Light Urban Search And Rescue escort team protocols to ensure safety of SAP teams
- 7) Demolition advice to owners, perhaps modeled after the Japanese Stage 3 system
- 8) Aftershock Policy: Entering Damaged Buildings
- 9) Barricading, cordoning practices and their performance in aftershocks
- 10) Stabilization Practices and their performance in aftershocks
- 11) Road Clearing of Debris – Expediting contracts
- 12) Water-resistant Ink Pens and non-fadeable placards.

This project will:

- 1) Help CalEMA, the California Building Officials (a primary local government coordination organization), ATC and others to evaluate need to enhance California's Safety Assessment Program administration
- 2) If warranted, help expedite short-term, stopgap administrative changes to California's Safety Assessment Program
- 3) Help develop a dialogue between CalEMA, ATC, and CALBO resulting in an interim consensus, where possible
- 4) Help develop revised forms, procedures, protocols, policies, and training resources to reflect necessary changes to SAP
- 5) Help CalEMA train Safety Assessment Coordinators in new administrative changes

Homeland Security Goals and Objectives:

Objective 1.5 Enhance Coordination and Response Activities through a System of Resource Typing, Inventoried Resources, and Credentialing

Objective 1.6 Enhance Securing Identification Cards and Documents

INVESTMENT #9: Implement the National Incident Management System (NIMS) and National Response Plan (NRP) and enhance catastrophic incident planning, response and recovery operations

Proposed Product I Deliverables –

How CalEMA proposed to accomplish this project (a list of major activities and completion dates):

1. Analyze lessons learned, propose changes to materials to partner organizations, revise manuals and training materials (3 months)
2. Solicit training co-sponsors, identify sites and schedules, advertise training availability. (concurrent with above)
3. Conduct training (3 months)
4. Issue new SAP Identification cards to trainees (concurrent with above changes to SAP).