

CISN Display – Synthesizes the Best Available Earthquake Data for Caltrans Responders

Over the past year the GeoResearch Group has been actively promoting the statewide adoption of the earthquake notification software, CISN Display, through a campaign of outreach and training at Caltrans' Traffic Management Centers (TMC) and Emergency Operation Centers (EOC). CISN Display is a web-based client application developed by the California Integrated Seismic Network (CISN) partners, designed for 24/7 emergency management operations centers. The application provides users with a map interface that integrates near real-time seismicity, ShakeMaps, and Caltrans specific map data such as highways, bridges, and district boundaries.

Why We Pursued This Effort

In the minutes following a major earthquake, managers, emergency responders, and other critical users need information about the occurrence of the event in order to evaluate the impact on the transportation infrastructure. Historically, Caltrans staff have relied on a handful of tools to determine when and where an earthquake recently occurred, including pager-based notification services and web-site products through the California Geological Survey (CGS) and the U.S. Geological Survey (USGS).



Figure 1 – Caltrans TMC

In the early 1990's the *Caltech-USGS Broadcast of Earthquakes/Rapid Earthquake Data Integration* (CUBE/REDI) system was launched. This system compiled seismic activity from a network of sensors throughout California and transmitted data over a paging network. Agencies subscribed to the system used a dedicated DOS-based computer to receive messages with information on earthquake epicenter, magnitude, location, date, and time.

That information was displayed within minutes after an earthquake on a map running within the client software. Several Caltrans TMCs adopted the CUBE/REDI system as part of their response protocol.

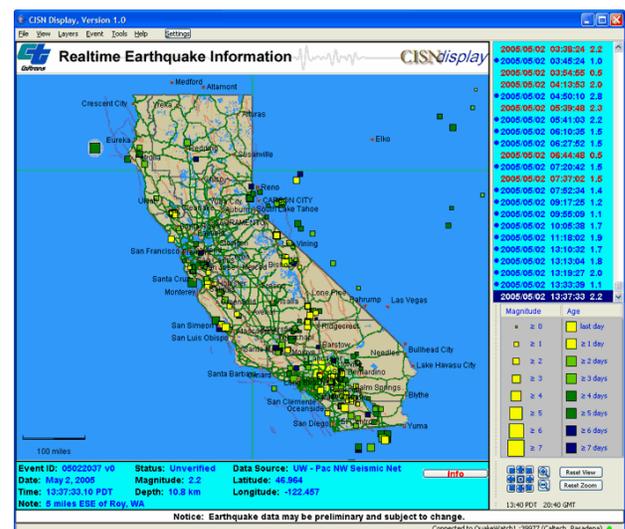


Figure 2 – CISN Display

Last year, the CISN officially released *CISN Display* (Figure 2), a Java client application that replaces all of the functionality of the original CUBE/REDI system, while adding substantial new functionality. With the availability of the new software, the GRG set out to facilitate the implementation of *CISN Display* at all state TMCs.

What We Did

CISN Display is a software package that rapidly receives earthquake information via the internet distributed by seismic networks operating in

California. As with the previous CUBE/REDI system, it provides basic map displays of earthquake locations, magnitudes, and time of occurrence. However, *CISN Display* expands it's capability by incorporating a number of key improvements:

- Notifies users of the occurrence of an earthquake via email.
- Displays ShakeMaps showing the extent and severity of ground motion in the affected region.
- Provides links to available earthquake products on the web, such as loss estimates from HAZUS, special reports on the earthquake prepared by seismologists, tsunami warnings, focal mechanisms, images of seismograms, maps of "felt" reports, and reports on damage and casualties from emergency services agencies.
- Allows users to customize the map display by importing GIS layers of highways, bridges, as well as private layers of organizational-specific infrastructure and other private facilities information.
- Uses a Java platform that runs on most operating systems.

The GRG created a Caltrans-specific installation package to meet the needs of statewide TMCs and EOCs. This map interface displays approximately 12,000 Caltrans bridges and highway facilities that can help EOCs in identifying potentially impacted bridges relative to ground shaking intensity from ShakeMaps.

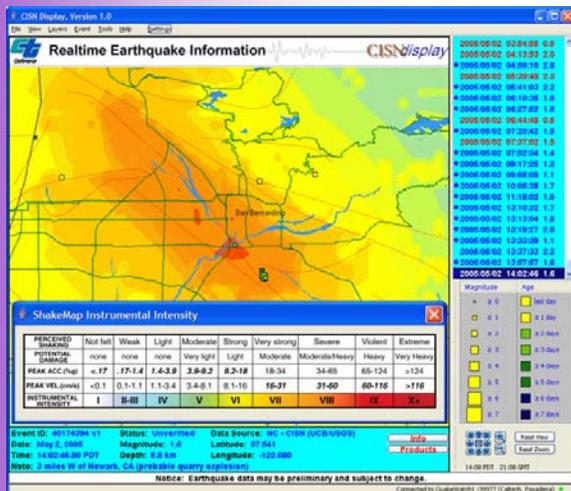


Figure 3 – ShakeMap within CISN Display

Take, for example, an earthquake in a major urban area. Within *CISN Display* the event is reported within minutes of it's occurrence, and the ShakeMap is automatically downloaded and displayed on the map within approximately 10 minutes. Zooming in to the region, one can quickly

see the "hotspots" in and around the impacted area (Figure 3). Zooming in further shows that a number of bridges fall within a region where "severe" to "violent" shaking had occurred (Figure 4). This information could potentially be used to direct field inspection crews as well as help in directing emergency vehicle routing.

The Researchers Recommend

Currently, eight District and three HQ units are now fully deployed with *CISN Display* in 24/7 operations. This includes the TMCs in Districts 1, 4, 6, 7, 8, 10, 11, and 12. The software is running at Research offices in Sacramento as well as in Structure Maintenance offices in Sacramento and Los Angeles. In Districts 4 and 12, the software is installed within their EOC rooms. In most of the TMCs, the software is running on a PC on the main floor with the capability to display the earthquake map data on the "big board" (Figure 1). Continued use of *CISN Display* will assure that Caltrans responders will have the best available information following an earthquake. Broader deployment of the tool to other potential Caltrans responders (e.g. District and Structure Construction Offices) should be considered.

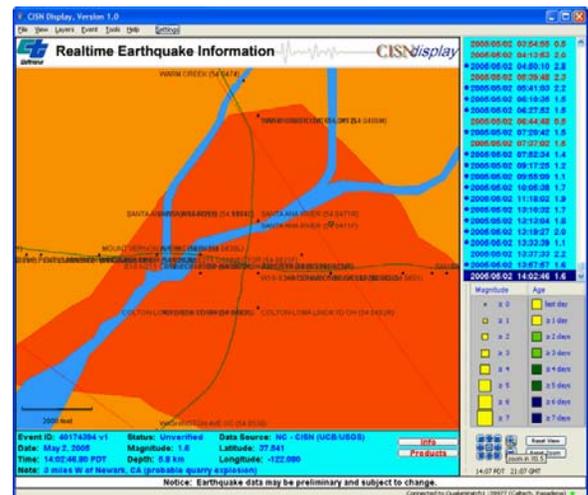


Figure 4 – Bridges and highways impacted by earthquake based upon ShakeMap

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