

**CISN ADVISORY COMMITTEE MEETING
PASADENA, CA
JANUARY 21, 2003
SUMMARY OF MAJOR POINTS**

The CISN Advisory Committee met with the Steering Committee and several invited guests, at its regular semi-annual meeting on January 21, 2003 at Cal Tech and USGS offices in Pasadena. The agenda had four major topics for discussion:

- 1) What new applications of the existing products, and what new products, have been identified during the past six months?
- 2) Are we ready for the next M>7 earthquake to strike California, and if not, what areas need highest priority upgrades in the near future?
- 3) What would be the most effective way of organizing the upcoming building instrumentation program, in light of our previous experiences in instrumenting buildings in California?
- 4) What are the latest prognoses for continued funding, and at what levels, by the existing funding agencies, USGS and Cal OES?

NEW APPLICATIONS AND NEW PRODUCTS

Stephanie King (Hart-Weidinger Associates) presented the general results of the ATC-54 project, which asked users and potential users how they were planning to use the new ShakeMap products in their emergency response and planning efforts, and what improvements could they suggest for better application of the products. The report is nearly complete, but has been upgraded relatively frequently as new applications of the ShakeMap have surfaced from users. Users specifically noted that the ability to download ShakeMap in GIS formats allowed them to overlay their own databases of structures or facilities, and to apply HAZUS databases to run loss estimates quickly and conveniently.

Doug Givens (USGS) gave a brief report about progress with CISNDisplay, which allows information to be 'pushed' to user who need it in a number of different forms. The objective was to have a system that was quick, robust, secure, scalable, and flexible. CISNDisplay will act as a gateway to other data sets of interest, by allowing users to be checked for security, then guided to the data sets they need. There will be a beta test site for CISNDisplay opening in the Bay Area in the coming month or two.

Rich Eisner (OES) pointed out that OES is conducting a number of briefings and User Group meetings, including a briefing for Bay Area media to introduce ShakeMap on January 23. Of considerable interest is the ability to do initial damage estimates using HAZUS within about 10 minutes of the earthquake.

ARE WE READY FOR THE NEXT M>7 EARTHQUAKE IN CALIFORNIA?

David Oppenheimer (USGS) gave an update of the system and some of its new redundancies. The T-1 loop is now complete and each of the main centers now has a 2-way transmission capability in addition to Internet communications. If a segment of the T-1 line is severed, the center now has alternative paths for sending data and other key communications. In addition, 10 northern California field stations are sending data to southern California, and 10 southern California stations are sending data to northern California. In the event of a great earthquake, a skeleton ShakeMap could be constructed at a distant center, if the nearby center were off-line. David commented that there was still considerable discussion continuing as to what other disaster scenarios should be considered in improving robustness of the system.

Discussion centered around the balance of funding between adding robustness to the communication links and adding more free-field strong-motion stations to improve the quality of the resulting ShakeMaps. It was noted that some parts of the State with relatively high population densities still do not have enough stations to create a very useful ShakeMap, particularly San Diego, Santa Barbara, and parts of the western Central Valley. State money has been specifically directed at improving the robustness of the system, and considerable progress has been made. The general feeling was that a system that failed to produce any ShakeMap after a major earthquake would receive no further funding at all, so robustness had to have higher priority than more detail or higher accuracy in the map itself.

BUILDING INSTRUMENTATION

Woody Savage (USGS) gave a brief summary of the general thinking for the ANSS structural instrumentation program. The program must be aimed at providing data that meet the needs of the practicing and research structural engineering community. In addition, national as well as regional needs should be met. The general needs were well described by the recent COSMOS building instrumentation workshop, and ANSS is planning to rely on that list as the goals for the program. It is important to note that the COSMOS workshop identified that each building instrumentation project would require 20 to 50 channels of data to collect the information needed. Based on the original funding level expected for ANSS, this would mean instrumenting 200 to 400 buildings. Savage proposed a National Structural Instrumentation Review Committee, which would work under the National ANSS Steering Committee, to prioritize candidate instrumentation projects received from the regions and advise ANSS on general policies and practices. The regions would recommend instrumentation projects and identify special regional needs (building types, unusual foundation conditions, etc.). Developing the specific building instrumentation package, and procuring, installing, and maintaining the package would be the responsibility of regional groups and the USGS, acting in response

to the policies of the National Review Committee. The ANSS plan for carrying out structural monitoring, including the creation of the National Structural Instrumentation Review Committee, needs to be reviewed at the upcoming ANSS National Steering Committee.

Mehmet Celebi (USGS) talked about structural instrumentation subcommittees. Between 1983-1994, Structural Instrumentation Committees in 12 regions of the U.S. provided input and advice. Through this effort, approximately 20 buildings were instrumented nationwide with funds from USGS and other sources. He also summarized the efforts of two California (NC & SC) subcommittees that were convened in 2002 to advance CISN structural instrumentation programs with ANSS funding. Lists of buildings, in accordance with COSMOS criteria, have been developed. Committee members provided the input rather than staff. He recommended that this would be a successful way for the future also. He further recommended that a separate "Program Management Committee for Structural Instrumentation" be established to oversee and review the structural instrumentation efforts on behalf of the CISN Steering and Advisory Committees. Later, in response to a question, he explained that there is a federal instrumentation program at USGS (with non-USGS and non-ANSS funding) to instrument federal buildings belonging to federal agencies in seismic areas of the United States (California and other States). Through this effort, 10 buildings have been instrumented and others are in the pipeline. Both groups of buildings are being monitored currently by USGS staff.

Tony Shakal (CGS) talked about the structure of his CSMIP program, which currently has approximately 170 buildings and several dozen other structures (dams, bridges, etc.) instrumented and being maintained and operated by CGS. In general, the CGS program is focused on basic structural response characteristics of a wide variety of different kinds of buildings, rather than on the specific research objectives identified in the recent COSMOS meeting. There are an average of 15 sensors in each of their buildings. Strong-motion time histories are reported through dial-up phone lines to a central database and are available to researchers and practicing professionals in days to weeks after the earthquake. Blueprints for each building are available in Sacramento, and the basic soil and structural parameters for each site are available on the website.

The discussion reflected a general desire for the entire program to be well coordinated, so that researchers could be confident that the instrumented buildings would be maintained for decades and that the data would be available for use in a common format, processed consistently, and at an accessible location. There was some concern as to who would be doing the work to design the instrumentation plan and install the instruments. Within CGS, this work is done by CGS staff, and within the USGS, this work is done by USGS staff.

STATUS OF FUTURE FUNDING

John Filson (USGS) reported that chances were pretty good that there would be level funding at about the \$4M level for the remainder of FY03, but that the FY04 budget has a 'punitive' reduction to \$2M at this point. He was cautiously optimistic that funding would eventually be at the \$4M level for FY04 as well. This is in addition to a bas monitoring program funding level of about \$47M, which also appears to be level-funded in FY04 budgets so far. An ongoing problem is that there is no champion for the program in Congress.

Rich Eisner (OES) reported that state funding this year, FY 2003, remains at \$2.9M, down from last years \$3.9M level. This should not change for the remainder of the year. Next year, FY 2004, (starting July 1, 2003) is likely to see a 20% cut, in response to the 20% cut that OES is to receive from the State for FY 2004. The State budget situation is still very fluid, so the situation may change between now and the passage of the FY 2004 budget this summer.

CISN ADVISORY BOARD RECOMMENDATIONS

1) NEW APPLICATIONS AND PRODUCTS

CISN Steering Committee and PMG are to be congratulated for their efforts in identifying new products (CISN Display) and helping users solve applications problems. We support the direction that Display is moving in, and encourage CISN to get it out quickly. The back door for specific clients appears to be a smart move, because demand from casual users and the public right after a big earthquake could be substantial.

More formal efforts to interest managers and planners in the products through workshops, SEMS-type requirements to use the products for post-earthquake financial assistance, and incorporation into training programs like CSTI, would help improve the acceptance of the products by the community. This is a community that is driven by financial incentives, so working the products into financially driven training procedures would be very helpful. The outreach group should focus on how the Display applications will positively affect post-earthquake funding for local governments and agencies.

2) ARE WE READY FOR M>7?

There has been very good progress in this area as well. Keep the focus on standardization of methodologies, software, archiving, and output, because that standardization will make the system work better when the pressure is on. The Committee felt that this issue of good operations is still more important than broadening the field network, but the second priority is to improve field coverage in smaller populated areas away from the largest cities.

3) BUILDING INSTRUMENTATION

ANSS should be sure to remember who the customers (users) are. The major purpose of instrumenting buildings is to relate the actual performance of the building to the analytical predictions of how the building will perform. The information is critical to future code development, to the future of performance-based engineering methodologies, and to rapid damage assessment and loss estimation applications. Those objectives and those users need to be given highest priority in moving forward with the building instrumentation program.

The ANSS program needs to be under the guidance of a single high-level comprehensive review committee, so that the objectives and policies for selecting building targets, designing instrumentation layouts, collecting and processing data, and making the processed and archived data all consistent and convenient for users to access. If the federal and state programs are going to be separate, then the products that ANSS dollars are buying should be consistent and uniform. That means the federal and state efforts should be integrated closely at the operating level, in order to achieve the most impact from the few dollars available. The existing CISEN seismic program seems to have achieved that integration by making uniform decisions through a Program Management Group (PMG). A similar operating group could be very helpful for the building instrumentation effort as well.

The resulting strong-motion data need to be available to all researchers and practicing professionals in a uniform and convenient format, and the data need to be relevant to the critical questions about building performance. That means the designs of the instrument packages need to be appropriate for the questions being asked. Specifically, the CSMIP sites should be upgraded to be responsive to the critical engineering objectives identified in the COSMOS workshop. In some cases, it might make sense to increase the density of instruments in some of the CSMIP buildings that are already being monitored.

Maintenance and operation, data management, and archiving procedures all need to be standardized, well organized and used commonly by whatever facilities are doing ANSS building instrumentation work. If more than one facility is involved (e.g., CSMIP, USGS, and/or other institutions), procedures for handling data and making them available to users should be established and followed rigorously by every facility. Seismologists now have considerable experience with processing similar record databases, and should be consulted in how the data can be most effectively organized and preserved for future users.

4) FUTURE FUNDING

The committee does not have any silver bullet for solving this problem. Some possibilities are to pursue public/private partnerships in order to increase the density of field instrumentation and the number of buildings to be instrumented. Perhaps some connections with the insurance industry could be pursued. If incentives for instrumenting could be tied to insurance policies, there might be some way to increase the number of buildings being instrumented.

The practicing community could be doing a better job of lobbying for public funds. There is still not a groundswell of public support for ANSS or for CISN, despite the fact that the public benefits could be quite dramatic. It is time to make that case with the people responsible for funding, and to find champions among elected officials who could make expanded funding possible.

In a separate item, I am pleased to report that Ron Tognazini was elected Vice Chair, and will take up his post immediately.

Respectfully submitted,

CISN Advisory Committee

Bruce R. Clark, Chair