

OSHDP Office of Statewide Health Planning and Development



Hospital Building Safety Board

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**HOSPITAL BUILDING SAFETY BOARD
Instrumentation Committee**

**Wednesday, October 29, 2014
10:00 a.m. - 4:00 p.m.**

Office of Statewide Health Planning and Development
400 R Street, Suite 452
Sacramento, CA 95811
(916) 440-8453

and

Metropolitan Water District Headquarters
700 N. Alameda Street, Suite 2-546
Los Angeles, CA 90012
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Committee Members Present

Lou Gilpin, Chair
John Egan, Vice-Chair
Rami Elhassan
Trailer Martin
Simin Naaseh
Moh Huang, Consulting Member
Tony Shakal, Consulting Member

OSHDP Staff

Paul Coleman, Deputy Director
Hussain Bhatia
Glenn Gall
Roy Lobo
Chris Tokas
Elizabeth Wied

HBSB Staff

Linda Janssen, Executive Director
Cathy Kane
Evet Torres

1. 1. Welcome and Introductions

2 Committee Chair Lou Gilpin opened the meeting and reviewed the agenda.



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2. Review the October 29, 2013 Meeting Report

There were no comments on the October 29, 2013 meeting report.

3. Reports and Briefings

- **OSHPD Briefing**
 - **C. Tokas and R. Lobo, OSHPD**

Mr. Lobo gave a presentation for the committee.

He reviewed the 2013-2016 OSHPD/California Geological Survey (CGS) contract. The three-year total contract is for just under \$800,000. For FY 2013-14 only \$189,600 has been spent; the balance, \$609,400, will be spent on UCSF Mission Bay.

The three completed hospital buildings for this FY are San Francisco General–New Trauma Center; Sharp Memorial Hospital–South Tower; and Community Hospital of Redlands–Radiology addition.

Mr. Lobo reviewed the instrumentation references in the 2013 California Building Code (CBC) as well as OSHPD’s instrumentation requirements and recommendations.

He displayed a map of the 58 hospitals in California that are currently instrumented.

He explained the common seismic resistant systems requiring design criteria for OSHPD approval, then other criteria for HBSB instrumentation selection.

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He listed the buildings with owner-paid instrumentation and possible candidates for instrumentation. The group discussed the Loma Linda University Medical Center – it has a quadruple pendulum bearing system, and there are three structures on the common base.

- **Annual Report – OSHPD/California Strong Motion Instrumentation Program (CSMIP) Hospital Instrumentation Project**
 - **M. Huang**

Mr. Shakal and Mr. Huang reviewed the Annual Report with the committee.

Mr. Shakal stated that last year they finished the San Francisco General Trauma Center, as well as two Voluntary Seismic Improvement (VSI) projects.

The OSHPD-funded instrumentation of the Santa Clara Valley Hospital’s Replacement Bed Building has been significantly affected by delays. In addition, the UCSF Hospital at Mission Bay instrumentation has recently been affected by union delays.

Thirteen owner-paid instrumentation projects were completed or are underway during FY 13-14: seven new buildings and six existing buildings. A five-step procedure is now in place which Mr. Shakal explained as follows.

1. Determination of effective sensor locations after study of structural plans.
2. Development of an instrumentation plan.

- 1 3. Development of a detailed technical design for the system called the Technical
- 2 Specification Letter.
- 3 4. An on-site field visit to mark sensor locations.
- 4 5. On-site testing and acceptance.

5
6 Mr. Tokas asked about San Francisco General; Mr. Huang stated that the inside of the
7 building is done. Displacement sensors are installed.

8
9 Mr. Shakal explained the three tables listing the instrumentation projects completed and
10 underway.

11
12 Mr. Huang described the progress of the Cathedral Hill project in Table 2. Currently
13 they are waiting for the instrumentation plan to come back so OSHPD can approve it.
14 Mr. Bhatia stated that the general location has been agreed upon. Mr. Huang noted
15 that the structure is steel moment frames with viscous wall dampers – the first of its kind
16 in the country.

17
18 Mr. Huang stated that the framing of the Lucile Packard Children’s Hospital is almost all
19 the way up. A meeting will be scheduled to determine the location of the sensors. Mr.
20 Shakal said that the hospital was almost topping out before they began to think about
21 instruments; what can be done differently next time? Mr. Tokas responded that the
22 minute OSHPD issues approval, there is a step that should come in; in this case
23 someone had not followed up on the design side and the process had to be jump-
24 started.

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2 Ms. Naaseh noted that this one was mandated because of the Alternate Means of
3 Compliance. We have the buckling-restrained braces (BRBs) at UCSF and Kaiser –
4 this is another BRB in at least one direction. What was the Alternate Means of
5 Compliance for? Mr. Tokas replied that there are many factors, including the 12 stories;
6 it is a challenging building.

7

8 Mr. Tokas stated that the VSI projects in Table 3 are winding down – VSIs will no longer
9 trigger the requirement (unless the VSI includes some kind of Alternate Method of
10 Compliance).

11

12 Mr. Huang described the progress of the San Francisco General Hospital and Sharp
13 Memorial Hospital projects.

14

15 Ms. Naaseh asked about developments in displacement measuring: is there a way to
16 measure actual drift as opposed to back-calculating from measured accelerations? Mr.
17 Shakal responded that at San Francisco General they are measuring actual small
18 displacement with the sensors, to a hundredth of an inch. The committee discussed
19 drift measurement.

20

21 Mr. Huang referred to the “Strong-Motion Records from Hospitals” for the last fiscal
22 year, in particular the M4.4 Encino Earthquake on March 17 and the M5.1 La Habra
23 Earthquake on March 28. The strong-motion records are available at the Center for
24 Engineering Strong Motion Data website.

1 Mr. Huang referred to an interactive map available at the same website, showing the
2 location of the epicenter and the strong-motion stations that recorded the Encino
3 earthquake. Mr. Shakal added that it is a cooperative data center between the Applied
4 Technology Council (ATC) and the United States Geological Survey (USGS). The map
5 is an increasingly useful tool.

6
7 Mr. Huang explained the Acceleration and Displacement Records for St. John's Hospital
8 in Santa Monica during the Encino earthquake.

9
10 Mr. Huang and Mr. Shakal explained the coordination between the map entitled
11 "Hospitals Instrumented by CSMIP/OSHPD" (Appendix D) and the list entitled "Hospital
12 Buildings Instrumented by CSMIP/OSHPD" (Appendix E).

13
14 Mr. Gilpin stated that last year, the committee had discussed updating the 1996 shake
15 hazard map for the hospital-plotting exercise. Tim McCrink of the CGS had
16 accomplished the update. He presented the map. The substantial changes he saw
17 were that some of the high probability zones – the red areas from the 1996 model, now
18 on the 2008 ground motion model – are more subdued. At the same time, some of the
19 medium probability areas have increased in size (for example, the Lake Tahoe area).

- 20
21 • **Review of any newly proposed candidate hospital buildings to add to the**
22 **current candidate list:**
23 ○ **D. Jephcott**

1 Mr. Gilpin directed the committee to the Candidate Hospital Buildings table. He stated
2 that the hospitals Mr. Jephcott had recommended for upgrades on the OSHPD-supplied
3 list were Miller Children’s Hospital in Long Beach and Whittier Presbyterian Hospital.
4 Mr. Huang stated that Oakland Kaiser was already in process; they could try to obtain
5 permission to move something into this year.

6
7 The committee decided to switch SW Healthcare System – Murrieta (#5 on the list) with
8 Whittier Presbyterian Hospital (#6).

9
10 Mr. Gilpin asked about a hospital in the Fairfield area, the location of the Green Valley
11 fault – was there any instrumentation there? Mr. Tokas stated that OSHPD has been
12 staying away from that area, but since the Napa earthquake the Bay Area probabilities
13 are going to be recalculated; maybe it should be revisited. Mr. Gilpin suggested adding
14 the hospital to the list. Tim McCrink said that the USGS is now looking at the pressure
15 transfer to the Green Valley fault.

16
17 Mr. Gilpin stated that Mr. Egan had looked up the Newport Inglewood fault, and it runs
18 within the Miller Children’s Hospital campus.

19
20 Mr. Gilpin also proposed adding the North Bay Medical Center (addressing Fairfield) as
21 #11 on the list. Mr. Huang observed that it was already #27 on the map of instrumented
22 hospitals.

23

1 Mr. Gilpin moved to the list of Owner-Supplied Instrumentation. Mr. Huang pointed out
2 that the list is in no particular order – it just depends on the phase of construction. Mr.
3 Tokas stated that the hospitals of high importance are the OSHPD-instrumented ones –
4 the priorities affect money allocation.

5

6 ○ **Review candidate hospital building documentation**

7 The committee established that this agenda item was a carryover from a couple of
8 years ago. Currently the committee has an MOU and a process in place.

9

10 **MOTION:** (M/S/C/) [Martin/Egan]

11 The committee voted unanimously to switch the positions of hospitals #5 and #6
12 on the list of OSHPD-Supplied Instrumentation.

13

14 At Ms. Gilpin's request, Mr. Shakal provided background information on the Early
15 Warning System.

- 16 ▪ It is in pilot mode.
- 17 ▪ Its origin of development is Berkeley and CalTech.
- 18 ▪ California earthquakes are “underfoot” – they occur where the cities are, and not
19 much warning time is possible.
- 20 ▪ The Napa earthquake provided the first real test of a 5-second warning at
21 Berkeley, 10 seconds in San Francisco, and longer in San Jose.
- 22 ▪ The network's focused areas are around the Bay Area and Pasadena. The next
23 step is to expand the number of stations outward – a station must be near where
24 the fault is rupturing.

- 1 ▪ The goal is to put the system in place and develop ways to use a very short
2 warning time effectively.
- 3 ▪ The federal government is stepping up: members of Congress have sent a letter
4 to the President, requesting that \$16.1 million be added to this year's budget. It
5 would be a five-year package.
- 6 ▪ The system imports several technologies including one from Japan.
- 7 ▪ Three systems are competing to see which operates best. The Napa earthquake
8 was a good test.

9

10 Mr. Gilpin asked if hospitals could be candidate sites. Mr. Shakal replied that the free
11 fields could conceivably be part of a sensing system that would feed into the system.

12

13 Mr. Tokas addressed the two different types of networks, public and private, that the
14 host can use in order to take advantage of the benefits of the Early Warning System.
15 The public network has all kinds of other problems, while the private network has high
16 reliability – but what instruments are going to be incorporated onto it? Mr. Shakal
17 replied that a company in Southern California says they can do it without any other
18 networks. They use sensors directly on fire stations. That methodology is different from
19 a system that recognizes an earthquake coming at a distance by measuring the
20 difference between the speeds of the p wave and the s wave.

21

22 Mr. Egan asked if there has been any examination of the amount of warning time that is
23 effective for people to be able to respond. Mr. Shakal replied that it is actively being

1 looked at; they are separating the response into those things that can be done
2 automatically and those that require human action.

3
4 Mr. Shakal mentioned that BART was an early adopter of the system – they have
5 tapped into the signal coming from Berkeley. The speed of the trains reduces
6 automatically, then humans intercede and decide whether to stop the trains.

7
8 Mr. Coleman and Mr. Tokas had recently attended a hearing on Early Warning
9 Systems. Mr. Coleman commented that the purpose of the hearing was actually to
10 determine sources of funding. The hearing had three different panels: Health Care,
11 BART/Public Transportation, and Utilities (electrical, water, and gas).

12
13 As a member of the Health Care panel, Mr. Coleman had covered the advantages of
14 Early Warning Systems for hospitals.

- 15 ▪ Postponement of elective surgical procedures.
- 16 ▪ Shutoff of MRIs and other highly sensitive medical equipment.
- 17 ▪ Time to brace patients and remove instruments, especially robotic and laser.
- 18 ▪ Elimination of the 10-second delay for the essential electrical system.
- 19 ▪ Maintaining pressure relationships and differentials for infection control.
- 20 ▪ Elevators could return to the first floor ahead of time.
- 21 ▪ Integration of mechanical and other electrical systems, for example, shutting off
22 the gas valves.

23
24 Disadvantages of the system:

- 1 ▪ Panic and overreaction.
- 2 ▪ False alarms may make the system untrustworthy.
- 3 ▪ The warning time may still not be adequate for many beneficial preventive steps.
- 4 ▪ Cost may be a problem for hospitals, particularly as they are trying to comply with
- 5 seismic deadlines and safety requirements.

6

7 Mr. Coleman continued that the Office of Emergency Services (OES) had stated that

8 the Early Warning System would have 100% reliability, by saturating the state with over

9 300 sensors. Mr. Coleman felt that the reliability of the system was going to be

10 important for it to be effective.

11

12 He had posed the questions, Can the free field stations at the hospitals be converted or

13 modified in such a way that they could actually become a part of the Earthquake Early

14 Warning System? If so, would OSHPD have to pick up the cost for those stations it has

15 paid for, installed, and currently maintains?

16

17 Mr. Egan commented on two aspects the hospitals would need: having the

18 instrumentation there, and then being linked in to the network so they can receive a

19 warning signal and respond.

20

21 Carl Scheuerman from Sutter Health commented that their operators do not understand

22 or see any results from the instruments. The operators need to understand what

23 happened to their buildings following the generation of the data.

24

1 Mr. Bhatia said that there are ways of actively monitoring the instruments at the hospital
2 – but that means extra cost for the hospitals.

3
4 Mr. Elhassan asked if the Early Warning System signal also carries the intensity of the
5 data coming in. Mr. Tokas responded that it does carry a prediction of the intensity,
6 although it may not be totally accurate. Mr. Bhatia added that the demonstrations they
7 had seen involved an app on a phone; the signal told the magnitude of the earthquake
8 and the predicted level of shaking at the site of the phone.

9
10 **4. Selection and Prioritization of New Hospital Buildings for Instrumentation,**
11 **2014-2015 Fiscal Year**

12 *(Covered in #3 above)*

13

14 **5. Set Next Meeting Date/Agenda**

15 The committee decided on October 29, 2015 for the next meeting.

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17 **6. Comments from the Public/Board Members on Issues not on this Agenda**

18 There were no further comments.

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20 **7. Adjournment**

21 Mr. Gilpin adjourned the meeting at 11:47 a.m.

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