

OSHDP Office of Statewide Health Planning and Development



Hospital Building Safety Board
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HOSPITAL BUILDING SAFETY BOARD
Structural and Non-Structural Regulations Committee

Wednesday, May 25, 2016
10:00 a.m. - 4:00 p.m.

Office of Statewide Health Planning and Development
400 R Street, Suite 452
Sacramento, CA 95811

and

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

Committee Members

Mike Hooper, Chair
Trailer Martin, Vice-Chair
Marshal Lew
Simin Naaseh
Michael O'Connor
Jennifer Thornburg
Scott Karpinen, Board Chair

OSHDP Staff

Paul Coleman, FDD Deputy Director
Hussain Bhatia
Glenn Gall
Tom Hale
Roy Lobo
Diana Scaturro
Chris Tokas
Beth Wied

HBSB Staff

Kathi Zamora
Krista Harrington
Evet Torres

1. 1. Welcome and Introductions

- 2 Mr. Mike Hooper, Committee Chair, called the meeting to order. Committee
- 3 members, OSHPD staff, and other attendees introduced themselves.

1 **2. Discuss and begin to identify structural and non-structural issues that may**
2 **arise during the process of repurposing hospital buildings, in order to provide**
3 **guidance for the resolution of those issues**

4 Mr. Chris Tokas, OSHPD, gave a presentation for the group.

5 Code Application Notice (CAN) 1.625 for Removal of Acute Care Services was
6 extensive. Several SPC-1 buildings have complied with the requirements of the law and
7 have removed the Acute Care Services. However, they have not gone through the
8 whole process to be removed from the system or repurposed. An internal committee is
9 examining the program overall.

10 Mr. Tokas read the Building Code, Section 3408 Chapter 4. The building itself makes
11 the issue complex: it may be comprised of one structure or multiple structures. Mr.
12 Tokas clarified this with the definitions in the Health and Safety Code regarding seismic
13 separation and firewalls – both have to be present for the structure to be considered a
14 separate building. He noted that if someone wants to separate an SPC-1 structure and
15 make it a separate building, 706.2 of the Building Code has to be satisfied.

16 Mr. Paul Coleman, OSHPD, noted that firewalls have been a subject of confusion in the
17 past. The firewall required for a Group I occupancy is a 3-hour wall. Mr. Coleman
18 stressed that if the purpose of the separation is to make the other building eligible to go
19 to the local jurisdiction, OSHPD will require a 3-hour wall on the hospital side.

20 Mr. Scott Karpinen, HBSB Chair, asked if most hospitals are doing this to keep the
21 separation between OSHPD and the local jurisdiction. Mr. Coleman stated that today,
22 most hospitals are choosing to stay in OSHPD's jurisdiction.

23 Ms. Simin Naaseh, Committee Member, asked about the intent of 702 allowing collapse
24 of construction on either side without collapse of the wall. Mr. Coleman replied that
25 hospitals must be designed now for continuing operation. There must be a compliant
26 seismic separation, which is based on a number of factors such as the seismicity of the
27 location; the buildings must be able to move in an earthquake without harming the
28 adjacent side. There are examples in the International Code Council (ICC) Guidelines
29 showing various assemblies that meet the requirement of structural stability when the
30 other side collapses.

1 Mr. Coleman continued the presentation. According to code, a conforming building was
2 built after the Seismic Safety Act went into effect; a nonconforming building was built
3 prior to that. Mr. Coleman explained that for adjacent buildings, floor-to-floor
4 separations between buildings come into play – a compliance separation is involved as
5 well as a Seismic Performance Ratings (SPC) separation.

6 Mr. Coleman pointed out that in order to remove Acute Care Services from a building, it
7 requires an OSHPD permit – OSHPD needs to have that record. This area is also
8 problematic with Licensing, and OSHPD is trying to work with Licensing on keeping
9 them apprised of seismic compliance. Site plans are available on the Internet, and
10 OSHPD is putting a more simplified version on the website where users can obtain a
11 site map, number of stories, SPC and Nonstructural Performance Category (NPC)
12 ratings, current projects in the facility, etc.

13 Mr. Michael O'Connor, Committee Member, asked about when Acute Care Services are
14 removed and the building stays under OSHPD jurisdiction – does the building still hold
15 the SPC and NPC ratings at the time? Mr. Coleman replied that it depends on what's in
16 the building. If Acute Care Services are removed from an SPC-1 building, it is no longer
17 required to meet SB 1953 which has to do with SPC and NPC ratings. Mr. Hussain
18 Bhatia, OSHPD, added that once the formal removal of Acute Care Services is
19 complete, OSHPD does not publish SPC and NPC ratings anymore.

20 Mr. Coleman stated that egress through a complying building cannot go through a
21 nonconforming building. Smoke compartmentation must be considered for the building.

22 Mr. Coleman pointed out that in a mixed occupancy building, up to 10% of a different
23 occupancy is allowed without having to change the occupancy. This is considered on a
24 floor-to-floor basis.

25 He said that as part of the Acute Care System in California Building Standards Code
26 (CBC) 1224, patients cannot pass through an SPC-1 building to get to another building.

27 Mr. Coleman continued explaining structural elements. He made the point that it is not
28 a simple process to remove Acute Care Services from a building. Basically all the
29 disciplines – Architectural, Mechanical, Electrical – must look at the building. If the
30 space is going to be left vacant, this must be addressed in the plans given to OSHPD.

1 When removing Acute Care Services from a freestanding building, there are number of
2 services listed in statute that can be left under OSHPD jurisdiction or taken to local
3 jurisdiction. For example, Outpatient Services can be in an outpatient building rather
4 than a conforming building. Some services will need a program flag from OSHPD and
5 Licensing to be in a non-hospital building.

6 Mr. Coleman explained freestanding buildings: they are separated by a complying yard
7 or a complying firewall and seismic separation. If the hospital has made a building
8 freestanding, there are still some cases where it cannot come under local jurisdiction.
9 He provided some examples to illustrate the options for jurisdiction.

10 Mr. Coleman described a situation where an SPC-1 building has had Acute Care
11 Services removed. The services going in are not required to be in a hospital building.
12 He asked the group what structural codes would apply. When the statute was written, it
13 did not envision the SPC concept (although it defined freestanding buildings). The code
14 defines a hospital building by what it is not. OSHPD must define what it is by applying
15 SB 1953. He said that if the services of the building are going to be non-Acute Care,
16 and if they are not supplemental services to the hospital, the Model Code could possibly
17 be used there.

18 Mr. Coleman explained a scenario in which a building under local jurisdiction is
19 sandwiched between two OSHPD buildings, and they want to make modifications to
20 that building that will impact the hospital building. Ms. Naaseh asked the mechanism
21 that would allow OSHPD to do a review of the proposed changes, to make sure the
22 changes will not adversely impact the OSHPD buildings. Mr. Bhatia responded that
23 there are various ways. A project can be opened under OSHPD to monitor the existing
24 building; there can be examination projects where work is done with a local jurisdiction
25 including a component that affects OSHPD so that field staff does monitoring. Mr.
26 Coleman stated that OSHPD relies on the fact that local jurisdictions are competent in
27 their jobs. He related an example from Cedars-Sinai Medical Center.

28 Mr. Hooper asked about how OSHPD handles transferring an SPC-1 building outside of
29 its jurisdiction – would OSHPD want to see the documents that provide the information
30 ensuring that the building is freestanding? Mr. Coleman said that OSHPD would have
31 to verify that the building is freestanding and would need to see a complete set of

1 documents. Mr. Tokas said that the applicable regulation is CAN 1-6-1.4.5.1 – it shows
2 all the steps and provides a flowchart. Mr. Coleman said that if the building’s new
3 function can remain under OSHPD jurisdiction, OSHPD can retain the building.
4 However if the function cannot remain under OSHPD jurisdiction, the local jurisdiction
5 must accept it.

6 Mr. Hooper asked if the CAN should be made more comprehensive to cover all the
7 possibilities that Mr. Coleman had laid out. Mr. Coleman answered that OSHPD has a
8 task force called Repurposing Hospital Buildings that is looking at the CAN and is also
9 coming up with a Policy Intent Notice. Chapter 34A of the Building Code discusses
10 change of use or occupancy of a building: if it is less fire and life risk than the previous
11 use, the building official does not have to require bringing the entire building up to
12 current code. OSHPD intends to draft a policy for which items need to be brought to
13 code when someone takes an occupancy; OSHPD will bring the draft to the HBSB for
14 input and guidance. The goal is to have it wrapped up by the end of this year.

15 Mr. O’Connor pointed out that general conformance to Model Code (energy and so on)
16 needs to be factored in. Mr. Coleman responded that after January 1, 2020, there will
17 be more than 700 SPC-2 buildings that hospitals must address by 2030. That will
18 include removing Acute Care Services from some of the buildings; by Building
19 Standards and Regulations they are supposed to have a project. OSHPD has put the
20 regulation into 2016 code that for any SPC-1 building that does not have an approved
21 extension, OSHPD will not issue any permits until there is a Removal from Acute Care
22 Services project for that building.

23 Mr. Coleman cautioned to remember that just because you make a space a B
24 Occupancy, and it is a mixed occupancy building, that does not necessarily trigger
25 compliance with energy standards.

26 Mr. Karpinen commented that hospitals will be better off upgrading their energy
27 capabilities because it gets triggered, versus spending the energy on Table 4A and
28 other requirements.

29 Mr. Glenn Gall, OSHPD, asked Mr. Karpinen about Table 4A – for administrative space,
30 it is Model Code. Mr. Karpinen replied that there are still ventilation requirements and
31 so on that are decreased in certain places.

1 Ms. Diana Scaturro, OSHPD, asked about changing the occupancy type for the space
2 overall – are they required to upgrade all of the amenities to code standards OSHPD is
3 setting? Mr. Coleman replied that it is the purpose of the task force to determine that.
4 In converting an I Occupancy to a B Occupancy – patient rooms into offices – certain
5 things must be brought up to current code such as accessibility, while others do not
6 such as ventilation. OSHPD is trying to focus on the structural impacts such as
7 anchorage and bracing of pipes and systems within the SPC building.

8 Mr. Gall made the point that for admin space associated with a hospital license in a B
9 Occupancy building, it is OSHPD 3 space – the same as if you are sitting in a hospital.

10 Mr. Hooper commented that the key activity would be the coordination between the two
11 agencies: the city taking it over as another occupancy and OSHPD relinquishing its
12 responsibility.

13 Ms. Naaseh commented on the need for FAQs. Mr. Coleman requested the committee
14 members to send questions to himself, Mr. Tokas, or Mr. Gall.

15 Mr. Coleman said that when jurisdiction is transferred, OSHPD makes its building
16 records available to the local agency.

17 **3. Discuss load combinations for load stability in seismically isolated structures**
18 **and provide feedback to OSHPD**

19 Mr. Roy Lobo, OSHPD, gave a short presentation. He sought to put the subject before
20 the committee to ensure that everyone had the same understanding.

- 21 • To have a seismically isolated building, a time-history analysis must have been
22 done.
- 23 • Mr. Lobo showed the requirement in Chapter 16 of the code for the loads on the
24 building in order to do a time-history analysis.
- 25 • He showed amendments to that chapter.
- 26 • He showed the definition in American Society of Civil engineers (ASCE) 710 for
27 *dead load* – basically all the load on the building.
- 28 • The required light load is the uniformly distributed light load typically applied to
29 the building. Mr. Lobo showed the definition.
- 30 • Table 4-1 tells the uniformly distributed light load for hospital buildings.

- 1 • Mr. Lobo showed the permissible reduction in light load.
- 2 • Mr. Tokas noted that the full reduction applies only on the basic quantity of light
3 load (the one given in the table).
- 4 • Mr. Lobo addressed the issue of vertical load stability on the isolators; the design
5 is found in Section 17.2.4.6. He explained load factors 5 (maximum load –
6 compressive forces) and 7 (counteractive forces). Load factor E is the
7 earthquake component – horizontal component plus vertical component. Load
8 combinations ensure the reliability of the design.
- 9 • For friction pendulum bearings, Mr. Lobo explained the application on the
10 sequence in how the load is applied on the structure – how the maximum
11 displacement is computed.
- 12 • Mr. Lobo posed the question: with the non-linear model, how do we do the
13 design not including the load factors in the analysis and then superimpose that in
14 a non-linear analysis? Chapter 16 tells what loads to apply, but if you apply the
15 load combinations and then do the analysis, you could have some resulting
16 effects. If you don't do that for a non-linear analysis but only use superstructure,
17 how would you accommodate that?
- 18 • Mr. Tokas explained how the load combinations were first generated and put into
19 code. The current code does not permit you to pick and choose how to apply
20 load combinations and what load factors to apply. The code defines load
21 combinations, and they apply for the design of the components of the structure –
22 regardless of the seismic resisting system.
- 23 • Mr. Bhatia noted that each of the load combinations has a target reliability index
24 to produce a certain factor of safety. It is derived from a fairly rigorous statistical
25 analysis.
- 26 • Mr. Lobo addressed the question of how to analyze a building and then put on
27 load combinations after the fact, when you have already gone inelastic.
- 28 • Mr. Lobo noted that ground motion has three components: two horizontal plus
29 one vertical. In order to include the vertical effects, you put the indicated load
30 combination in the Chapter 16 analysis, and add on the .2 sds. Alternatively, you
31 can put your vertical time-history analysis into the time-history analysis and run it
32 simultaneously to see what results you get.

1 A committee member from L.A. asked about the consequences of doing it this way –
2 how much increase is there going to be? Mr. Lobo replied that there will be a significant
3 amount of steel added to the structure – added weight and added cost.

4 The committee member asked about the increase in force. Mr. Tom Hale, OSHPD,
5 replied that based on some small models, it could increase the base shear by as much
6 as 15%.

7 **4. Presentation on SPC-4D: Material Testing and Conditions Assessment**

8 Mr. Bhatia gave the presentation, summarized below.

- 9 • The reason for including material testing and condition assessment for SPC-4D
10 buildings is that the buildings are old, mostly built before 1973 with local permits.
11 The QA and QC on the construction is questionable in many cases. The life of
12 the buildings is being extended indefinitely, so we are trying to provide the
13 equivalence to SPC-4 buildings.
- 14 • Material properties is one aspect; the other is condition assessment. Were they
15 built according to the existing drawings? When OSHPD did the SPC-2 upgrades
16 they were looking at the usual level of exposure and testing; now they are looking
17 at a comprehensive level.
- 18 • For condition assessment, there are cases involving some destructive work.
- 19 • Another issue is that we have had problems in the past with reinforcing bars. We
20 want the full section of the bars to be tested, not a machine sample.
- 21 • The 2016 California Building Code points to ASCE 41 for the specific
22 requirements for material testing and for condition assessment; it contains
23 programs and results for both.
- 24 • The emphasis is on lateral elements.
- 25 • The Seismic Compliance Unit has prepared a standard comment list currently
26 being piloted and soon to go onto the website. It includes every provision that we
27 could see in ASCE 41. Mr. Bhatia reviewed the document with the group.
- 28 • The Seismic Compliance Unit wants the engineers to look at the existing
29 conditions in detail, to see what influences the behavior of the buildings. It may
30 be invasive, involving exposing some elements (fiberscopes may be used).

- 1 • Where provisions of ASCE 41 seem to conflict with each other, the unit has tried
2 to provide guidance (for example, where the coefficient of variation cannot be
3 reduced to less than 20%, they will accept mean less one standard deviation).
- 4 • In certain cases, ASCE wants to remove cover concrete from concrete elements.
5 Mr. Bhatia displayed an example of local minimized removal of cover concrete.
- 6 • Mr. Bhatia was pleased with some of the programs the unit has received so far.
7 He displayed some examples.
- 8 • Once the unit approves the programs, a permit must still be obtained.
- 9 • Some details are needed to show how to remove samples and their locations. In
10 material testing, details are needed to show repairs.
- 11 • The unit realized that for certain large or tall buildings, the number of samples to
12 extract can become extensive. They arranged that a portion of the material
13 testing can be done to get a representative statistical sample, and if it meets the
14 coefficient of variation requirements in ASCE 41, it is sufficient. The unit is
15 determining the threshold for “excessive” so that they can apply it uniformly.

16 Ms. Naaseh asked about the other disciplines involved. Mr. Bhatia said that they come
17 in (such as Infection Control and Fire/Life Safety) when the permit is issued.

18 Mr. Dave Ring, OSHPD, asked if the submittal that comes to the unit is a formal
19 application; Mr. Bhatia answered that it is.

20 **5. Overview of the topics discussed at the 2016 National Earthquake Conference:**

- 21 a. Induced Seismicity
- 22 b. Earthquake Early Warning Program
- 23 c. Project 17: Next Generation Ground Motion Maps for Building Codes
- 24 d. Resilience Through Design

25 Mr. Tokas stated that some of these items are going to come up with code changes. He
26 began with a presentation on Induced Seismicity and Project 17 combined.

- 27 • Lately there is a new definition of *risk*: *resilience* is now the denominator for both
28 structural and non-structural components of the system.
- 29 • In California, buildings designed to meet code requirements after 1976 should
30 not collapse in earthquakes. As structures remain in place, we see the response

1 in performance of non-structural components of the systems; that is where the
2 losses emerge.

- 3 • Mr. Tokas discussed the presentation given by Tom Jordan, the key speaker at
4 the conference. The subject was resilience at the community level.
 - 5 ○ Mr. Jordan praised the programs in Los Angeles and San Francisco.
 - 6 ○ The lower part of the San Andreas is locked up, loaded, and ready to go.
7 The media ran with that statement; Mr. Jordan is a good advocate for the
8 field of earthquake engineering.
 - 9 ○ Mr. Lobo supplied numbers for the Northridge 6.8 earthquake: in today's
10 dollars it was about \$68 billion, of which only about \$7 billion were insured
11 dollars.
- 12 • Mr. Tokas showed a portion of Dr. Lucy Jones' presentation showing the path of
13 the San Andreas.
- 14 • Mr. Tokas discussed the 2014 National Seismic Hazard Model.
- 15 • *Induced seismicity* is the micro-earthquakes induced by fracking and wastewater
16 pushed down into the ground, lubricating the plates and making them release
17 their energy. This generates earthquakes in places where we thought we didn't
18 have them. Ground motion maps must now be changed.
- 19 • In the 2014 version of the Seismic Hazard Model, the seismicity in Southern
20 California went down by 20% from 2007 with a ratio of about .8. In San Diego
21 and Santa Barbara, seismicity went up with a ratio of about 1.25.
- 22 • The product is utilized by planners, insurance companies, HAZUS, etc. in order
23 to assess risk.
- 24 • One of the byproducts being utilized by the Midwest regions is the 2016 one-year
25 model.
- 26 • The risk in terms of annual probability across the nation is less than .02%, except
27 in California. Along the San Andreas the collapse risk goes up to between .1%
28 and .2%. If you include the new seismicity models, the part of the nation that
29 historically did not have earthquakes has the collapse risk go up. In one
30 Oklahoma city, they changed their code mid-cycle.

- 1 • A question to address is who should incur the increased cost for design against
2 induced seismicity – the owner or the entity that is the cause of the induced
3 seismicity (that is, the oil producers).
- 4 • A fundamental question to address is whether we will have the time and
5 resources to incorporate these issues in the 2017 update.
- 6 • Ms. Jennifer Thornburg, OSHPD, felt that it will be very problematic to include
7 induced seismicity in the update. Leaving California out and considering the
8 eastern U.S., Oklahoma is passing laws about injection rates. The landscape is
9 changing much faster than the building code system can accommodate.
- 10 • Mr. Tokas continued that Project 17 has been initiated. It will address the yo-yo
11 effect that we are facing daily. He posed the question of whether Project 17 will
12 yield the results so that we can have a 2020 National Seismic Hazard Model.
13 There is also the question of how to validate the theory.
- 14 • Project 17 will propose new ground motion maps.
- 15 • Mr. Tokas discussed a presentation given by Ron Hammer, beginning with the
16 Uniform Building Code (UBC) Seismic Hazard Zone Map. At present, the map is
17 now an app. Project 17 is going to bring the following factors forward with
18 additional analysis.
- 19 ○ Precision versus uncertainty.
 - 20 ○ Collapse rates.
 - 21 ○ Base seismicity which gives the acceptable probability of collapse at 1%.
 - 22 ○ Maximum direction.
 - 23 ○ Mr. Marshal Lew, Committee Member, discussed the multi-period spectra
24 versus response spectra and code spectra. The multi-period spectra
25 defines at many more periods than we have now.
 - 26 ○ Duration is going to be explicitly taken into account.
 - 27 ○ The vertical component. Mr. Bhatia noted that we still do not know how it
28 amplified when the component is near a column or in the middle of a floor.
 - 29 ○ Basin effects.
- 30 • Mr. Lew explained that some of the emphasis for Project 17 is to remove some of
31 the quirkiness in design patterns.

- 1 • Ms. Thornhill commented on the yo-yo-effect. We have asked the United States
2 Geological Survey (USGS) to provide the National Seismic Hazard Map based
3 on the latest and best science. By definition, it is changing under our feet and
4 will continue to change every couple of years; that is basically the uncertainty
5 range. For the S_{1} and S_{2} values, you are changing the definition of
6 S_{1} and S_{s} , adding risk coefficients one year and maximum rotated
7 component another year. The factor's meaning is actually changing.
- 8 • Mr. Tokas showed a slide displaying the speed of the P waves which travel at a
9 much faster speed than the S waves. Electronic transmission should allow
10 warnings to be sent.
- 11 • Mr. Tokas said that in 2016 we will have a production prototype in California. Mr.
12 Coleman asked about the instrumentation. Mr. Lobo explained that the system is
13 based on free-field instruments; Ms. Thornhill added that they are different
14 instruments than the strong motion instruments.
- 15 • Ms. Thornhill noted that south Napa was a prime example of the blind zone: in
16 an earthquake that size, the blind zone size is almost exactly the size of the
17 strong shaking.
- 18 • Mr. Tokas showed an example of what the displacement will look like with P
19 waves and S waves.
- 20 • He said that we have not yet canvassed the entire state with stations.
- 21 • Ms. Thornhill commented that in Japan, their system has a lot of false alerts
22 which is a big problem.

23 Mr. Lobo addressed the resilience through design subject. There was the question of
24 how L.A. managed to get this large ordinance in place in such a short time. Dr. Jones
25 had answered that they had not focused on deaths, but on living: how to keep the city
26 resilient after an earthquake.

27 Mr. Lobo continued that in the Florida model, some of the building codes are not being
28 enforced. If the codes had been enforced, the cost of Hurricane Andrew could have
29 been reduced by 30-40%. Factory Mutual has done a study concluding that if codes are
30 enforced, the loss in a catastrophic event can be reduced by 50%.

1 Mr. Tokas said that the other message imparted was that if our buildings were designed
2 as hospitals, we would have resilient communities.

3 **6. Comments from the Public/Board Members on issues not on this agenda**

4 There were no additional comments.

5 **7. Adjournment**

6 Mr. Hooper adjourned the meeting at approximately 1:00 p.m.

7