A Survey of Emergency Managers on the Seismic Mitigation Measures Proposed in H.R. 2806, H.R. 4792 and S.2533

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ABSTRACT

The National Coordinating Council on Emergency Management's (NCCEM) Earthquake Subcommittee conducted earthquake-safety surveys in 1991 and 1992. The 1991 results revealed broad support among governmental emergency managers for a federal earthquake mitigation and insurance program. In 1992, the Subcommittee surveyed NCCEM members and other emergency managers to assess their level of support for each mitigation measure proposed in H.R.2806, H.R.4792, and S.2533. The 1992 questionnaire was distributed: 1) in the *NCCEM Bulletin*; 2) on an electronic bulletin board; 3) in a letter to each state and territory, the largest cities in each state, and the 1991 survey's respondents; and 4) at both a southern California and a national emergency-services conference. Seven measures were given more support than the only two categorized in the bills as mandatory. In seismic-hazard areas, those seven measures would: control construction of all new buildings; retrofit seismically deficient buildings that house surgical, governmental EOC, fire-suppression, or police functions; and minimize earthquake damage to lifelines.

INTRODUCTION

In 1992, the National Coordinating Council on Emergency Management's (NCCEM) Earthquake Subcommittee surveyed the nation's emergency managers about the three bills being considered by the Congress of the United States of America that would establish a federal earthquake/volcanic-eruption mitigation and insurance program.

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The Subcommittee had surveyed the states, territories, federal district, and the counties in seven states in 1991 about their risk from earthquakes (Strand, 1992). Respondents in 1991 ranked their risk from earthquakes seventh--volcanic eruptions were ranked thirteenth--in comparing their risks from thirteen types of natural and technological disasters. They also showed they would support a federal catastrophic-earthquake insurance program if it had strong mitigation elements. The introduction of H.R.2806 in June 1991, and H.R.4792 and S.2533 in April 1992, provided an opportunity to discover which mitigation elements emergency managers would like to see as the strongest.

The Subcommittee decided it would consider its 1992 survey a success if a response equivalent to 20% or more of NCCEM's membership were received--the response was over 25%. The questionnaire was first distributed as an insert in the June 1992 issue of the *NCCEM Bulletin*, and reminders appeared in two issues. The State and Local Emergency Management Data Users Group (SALEMDUG) posted the questionnaire on its electronic bulletin board for six months. The author was assigned to obtain responses from the states, territories, federal district, and the five largest cities in each of five states; the other five Subcommittee members were each assigned the five largest cities in each of nine states. The Subcommittee also mailed the questionnaire to the 1991 survey's respondents, and distributed it at a Southern California Emergency Services Association (SCESA) seminar and NCCEM's 1992 Annual Conference.

The most responses were from California, which may be attributed to several factors: 1) large population; 2) increased seismicity; and 3) it is the only state where the questionnaire was distributed at a local emergency-services meeting. The Subcommittee recommends that to maximize the response to future questionnaires, NCCEM should arrange for their circulation at the seminars and conferences of each NCCEM Region, state emergency-services association, and NEMA; and perhaps also through disaster-preparedness associations for business and industry.

The Subcommittee rejected about ten responses because it could not be determined who they came from, plus a few that arrived after the deadline. Several respondents sent two questionnaires with different answers--in each case, they were called to find out which one should be used. In one case, the respondent completed a third version. The Subcommittee discovered that many cities rely on their counties for emergency management. The Subcommittee also found that Hurricanes Andrew and Iniki limited responses from Florida, Louisiana, and Hawaii, while other hurricanes prevented responses from several territories.

The bills' measures were identified, evaluated, and recommended in 1990 (Dames and Moore, 1990). Questionnaire measures #1--#2 are categorized in all three bills as mandatory, #3--#16 as discretionary, and #17--#27 as recommended. The measures are listed in the same order on the questionnaire as in the bills.

SURVEY RESPONSES

The Subcommittee divided the four compound measures under the bills' "Sec. 203(b)--"(2)(B)," "(2)(D)," "(3)(C)," and "(3)(F)"--into fifteen separate measures. Table 1 relates the questionnaire's measures to those in the bills, and compares the bills' categories with the survey's results. Tables 2, 3, and 4 summarize the survey's responses.

Respondents gave seven measures stronger support for mandatory inclusion than measures #1 and #2, which are the only two categorized in the bills as mandatory. Eleven measures were given over 50% support for mandatory inclusion. Of those eleven, only measure #27--to minimize earthquake damage to lifelines--which was ranked fifth by respondents, was not among the first eleven listed in the bills. Two other measures, #13 and #26, fell just short of 50% support for mandatory inclusion.

The most support was given to measures #4 and #9. In strongly supporting measure #4, emergency managers showed they favor preventing foreseeable catastrophes to new large structures capable of accommodating large numbers of people in areas susceptible to earthquake damage. Respondents gave only the twenty first level of support to measure #5--to retrofit existing large buildings in the same areas. In supporting measure #9, emergency managers showed they want to see retrofitting to the extent practicable, in earthquake-prone areas, of hospitals with surgical facilities that are made of construction known to be susceptible to structural collapse during earthquakes. Almost as much support was given to measure #11 as measures #4 and #9, showing emergency managers would like to retrofit governmental emergency-operations centers made of seismically deficient construction in earthquake-prone areas.

The fourth most supported measure was #6--to control all new construction in areas susceptible to earthquake damage. The fifth most supported measure was #27, reflecting the reliance of emergency managers on lifelines to optimize response and minimize the myriad of indirect problems that can occur when lifelines are damaged.

The sixth and seventh most supported measures were #7 and #8, showing respondents would like to see strengthening of seismically hazardous buildings housing fire-suppression and police facilities in earthquake-prone areas.

Measures #10 (to retrofit seismically deficient hospitals without surgical facilities), #3 (to require community-based building codes), #13 (to retrofit seismically deficient buildings containing significant amounts of hazardous materials), and #26 (staff to ensure compliance with community-based codes) received 47% to 51% support to be mandatory.

The survey's data is assembled into tables and maps. The tables group responses by: 1) states, territories, and D. C.; 2) cities, counties, and extras from states; 3) business, industry, and military; and 4) all respondents. The maps describe each state's total responses and most supported category. Copies of Tables 5--119 and Maps 1--27 may be obtained from: NCCEM, 7297 Lee Highway, Suite N, Falls Church, VA 22042.

CONCLUSION

The results of NCCEM's 1992 earthquake-safety survey suggest the emergency-management profession would increase its support of H.R.2806, H.R.4792, and S.2533, or their future variations, if they were strengthened by categorizing as mandatory the following measures under "Sec. 203.(b)": "(2)(A)" [questionnaire measure #3]; "(2)(B)"--new large buildings, only [questionnaire measure #4]; "(2)(C)" [questionnaire measure #6]; "(2)(D)"--essential buildings, except temporary shelters, but including buildings containing significant amounts of hazardous materials [questionnaire measures #7--#11 and #13]; "(3)(F)"--staff to ensure compliance with community-based building codes, only [questionnaire measure #26]; and "(3)(G)" [questionnaire measure #27].

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REFERENCES

Dames and Moore, 1990. "Loss-reduction provisions of a federal earthquake insurance program." Final Report, Prepared for the Federal Emergency Management Agency under Contract No. EMW-88-C-2872, FEMA-200, Washington, D. C., n. p.

Strand, C. L., 1992. "1991 issue backgrounder on earthquake-safety legislation." National Coordinating Council on Emergency Management, Falls Church, Virginia, 7 pp., 15 tables, 49 maps, and bibliography.

TABLE 1. Relation of questionnaire's measures to those in the bills, and comparison of the bills' categories to survey's results

#[a]	Measure in 1992 NCCEM earthquake-safety questionnaire	Measure in H.R.2806, H.R.4792, and S.2533 under "Sec. 203.(b)"	M, D, or R[b]	M, D, or R[c]
1	Require minimum seismic building standards for new residential property and other buildings.	"(1)(A)"	M	M
2	Require community-based building codes for new residential property that meet or exceed minimum seismic provisions of the National Building Code (NBC), Standard Building Code (SBC), or Uniform Building Code (UBC).	"(1)(B)"	M	M
3	Require community-based building codes for new residential property that contain minimum seismic provisions for new residential property located in a seismic-hazard area not covered by the NBC, SBC, or UBC.	"(2)(A)"	D	M
4	Apply geotechnical techniques (for example, base isolation) to minimize effects of ground failures for new large buildings in high-risk fault, landslide, site amplification, and liquefaction zones in earthquake-prone states.	"(2)(B)"--New large buildings	D	M
5	Apply the same geotechnical techniques, to the extent practicable and cost-effective, on existing large buildings in the same zones.	"(2)(B)"--Existing large buildings	D	D
6	Control construction of buildings in high-risk fault, landslide, site amplification, and liquefaction zones in earthquake-prone states.	"(2)(C)"	D	M

#[a]	Measure in 1992 NCCEM earthquake-safety questionnaire	Measure in H.R.2806, H.R.4792, and S.2533 under "Sec. 203.(b)"	M, D, or R[b]	M, D, or R[c]
7	Retrofit buildings, to the extent practicable, that: 1) have unreinforced-masonry bearing walls, tilt-up construction, or nonductile concrete-frame construction; 2) are in a seismic zone in an earthquake-prone state; and 3) house one or more of the following functions: Fire station;	"(2)(D)"--Fire station	D	M
8	Police station;	"(2)(D)"--Police station	D	M
9	Hospital with surgical facilities;	"(2)(D)"--Hospital with surgical facilities	D	M
10	Hospital without surgical facilities;	"(2)(D)"--Hospital without surgical facilities	D	M
11	Government emergency-operations center;	"(2)(D)"--Government EOC	D	M
12	Temporary shelter.	"(2)(D)"--Temporary shelter	D	D
13	Retrofit buildings, to the extent practicable, that contain significant amounts of hazardous materials.	"(2)(D)"--Buildings with significant amounts of hazardous materials	D	M
14	Secure building parapets and external ornamentations of existing buildings.	"(2)(E)"	D	M
15	Brace gas water heaters and apply other measures to reduce the risk of earthquake-induced fires in residential property.	"(2)(F)"	D	M

#[a]	Measure in 1992 NCCEM earthquake-safety questionnaire	Measure in H.R.2806, H.R.4792, and S.2533 under "Sec. 203.(b)"	M, D, or R[b]	M, D, or R[c]
16	Inspect residential property before transfer to determine whether the structure is adequately anchored to its foundation, any woodframe structure's cripple walls are braced, and all gas water heaters are braced to one or more walls.	"(2)(G)"	D	R
17	Expand research and development by the National Institute of Standards and Technology and other agencies of new cost-effective building technologies for new construction and retrofitting of existing buildings.	"(3)(A)"	R	R
18	Campaign and educate to promote additional voluntary mitigation.	"(3)(B)"	R	R
19	Grant reward-based fiscal incentives, such as: Lower property-tax assessments;	"(3)(C)"--Lower property-tax assessments	R	R
20	No reassessments for retrofitting that results in increased property values;	"(3)(C)"--No reassessments for retrofits that increase values	R	R
21	Other tax incentives to encourage use of state-of-the-art mitigation technology.	"(3)(C)"--Other tax incentives	R	R
22	Assist, at the state or community levels, low- and moderate-income households to purchase needed earthquake insurance and to adopt cost-effective loss-reduction measures.	"(3)(D)"	R	R
23	Improve long-term earthquake-construction practices, including the training and licensing of earthquake-design professionals as well as public and private building inspectors.	"(3)(E)"	R	M

#[a]	Measure in 1992 NCCEM earthquake-safety questionnaire	Measure in H.R.2806, H.R.4792, and S.2533 under "Sec. 203.(b)"	M, D, or R[b]	M, D, or R[c]
24	Support institutions specializing in earthquake-engineering technology and related disciplines.	"(3)(F)"--Institutional support	R	R
25	Provide training in earthquake-engineering technology and related disciplines.	"(3)(F)"--Training in earthquake-engineering technology	R	R
26	Staff to ensure compliance with the community-based building codes.	"(3)(F)"--Staff to ensure compliance with codes	R	M
27	Minimize damage to public utilities, including sewer, gas, electrical, and water systems, and other lifelines.	"(3)(G)"	R	M

[a] Number of measure in the 1992 NCCEM earthquake-safety questionnaire

[b] Category as written in the bills (definitions of M, D, and R are given in Tables 2 and 3)

[c] Category preferred in survey (definitions of M, D, and R are given in Tables 2 and 3; survey-response percentages for each category are given in Table 4)

TABLE 2. Responses to questionnaire measures #1--#13 from all respondents

Questionnaire measure number M--Mandatory; D--Discretionary; R--Recommended; or N--No												
1	2	3	4	5	6	7	8	9	10	11	12	13
158M 59D 67R	148M 65D 72R	142M 69D 68R 2N	188M 46D 47R 1N	85M 106D 90R 1N	171M 54D 56R	170M 54D 60R 1N	162M 58D 64R 2N	190M 45D 49R 1N	145M 77D 62R 2N	189M 45D 50R 2N	90M 103D 90R 2N	135M 74D 68R 1N

TABLE 3. Responses to questionnaire measures #14--#27 from all respondents

Questionnaire measure number M--Mandatory; D--Discretionary; R--Recommended; or N--No													
14	15	16	17	18	19	20	21	22	23	24	25	26	27
100M 84D 97R 2N	119M 77D 89R 1N	92M 89D 98R 3N	70M 78D 134R 2N	87M 76D 117R 2N	68M 100D 108R	98M 78D 100R 1N	78M 87D 104R	40M 110D 122R 6N	112M 71D 99R 2N	57M 111D 109R 3N	76M 96D 107R 1N	132M 65D 83R 1N	166M 42D 67R 1N

TABLE 4. Percentages from all respondents

Survey rank	Quest. measure #	Measure in H.R.2806, H.R.4792, and S.2533 under "Sec. 203.(b)"	Percentage M	D	R or N
1	4	"(2)(B)"--New large buildings	**66.7**	16.3	17.0
2	9	"(2)(D)"--Hospitals with surgery	**66.7**	15.8	17.5
3	11	"(2)(D)"--Governmental EOC	**66.1**	15.7	18.2
4	6	"(2)(C)"	**60.9**	19.2	19.9
5	27	"(3)(G)"	**60.1**	15.2	24.6
6	7	"(2)(D)"--Fire station	**59.7**	18.9	21.4
7	8	"(2)(D)"--Police station	**56.6**	20.3	23.1
8	1	"(1)(A)"	**55.6**	20.8	23.6
9	2	"(1)(B)"	**51.9**	22.8	25.3
10	10	"(2)(D)"--Hospitals without surgery	**50.7**	26.9	22.4
11	3	"(2)(A)"	**50.5**	24.6	24.9
12	13	"(2)(D)"--Buildings w/ signif. hazmat	**48.6**	26.6	24.8
13	26	"(3)(F)"--Staff to ensure compliance	**47.0**	23.1	29.9
14	15	"(2)(F)"	**41.6**	26.9	31.5
15	23	"(3)(E)"	**39.4**	25.0	35.6
16	20	"(3)(C)"--No reassessments	35.4	28.2	**36.5**
17	14	"(2)(E)"	**35.3**	29.7	35.0
18	16	"(2)(G)"	32.6	31.6	**35.8**
19	12	"(2)(D)"--Temporary shelter	31.6	**36.1**	32.3
20	18	"(3)(B)"	30.9	27.0	**42.2**
21	5	"(2)(B)"--Existing large buildings	30.1	**37.6**	32.3
22	21	"(3)(C)"--Other tax incentives	29.0	32.3	**38.7**
23	25	"(3)(F)"--Seismic-engineering training	27.1	34.3	**38.6**
24	17	"(3)(A)"	24.6	27.5	**47.9**
25	19	"(3)(C)"--Lower property taxes	24.6	36.2	**39.1**
26	24	"(3)(F)"--Institutional support	20.4	39.6	**40.0**
27	22	"(3)(D)"	14.4	39.6	**46.0**