HB

53

SFIN

FILE

REPORTED OUT
MAY 0 9 2002
SENATE FINANCE COMMITTEE

SENATE FINANCE COMMITTEE REPORT

DATE: 4/30/02

FURTHER:

DATE TURNED IN TO OFFICE: 9 May 2002

Finance Committee considered CS FOR HOUSE BILL NO. 53(STA)

HB 53 SEISMIC HAZARDS SAFETY COMMISSION

"An Act establishing the Alaska Seismic Hazards Safety Commission."

and recommends:

[ ] be **replaced** with____ **CS** _____ (_____)

[✓] adopt **previous** ____ **CS** HB 53 (STA)

[ ] attached amendment(s)

[ ] adopt Letter of Intent by _____ Committee

[ ] further referral to _____ Committee

Senate Bill:
[ ] same title
[ ] new title

House Bill:
[ ] same title
[ ] technical title
[ ] new: SCR #____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Zero	FN#

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Zero	FN#
Governor	4/19/02	33.5		#3

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	DO PASS	DO NOT PASS	NO REC	AMEND
			✓	
	✓			
			✓	
			✓	
			✓	
	✓			
COCHAIR:		✓		
COCHAIR:	✓			

FISCAL NOTE

STATE OF ALASKA
2002 LEGISLATIVE SESSION

Fiscal Note Number: 3
Bill Version: CSHB 53 (STA)
(S) Publish Date: 4/30/02

Revision Date/Time (Note if correction):
Dept. Affected: Office of the Governor
Title "An Act establishing the Alaska Seismic Hazards Safety Commission."
BRU Commission and Special Offices
Component Seismic Hazards Safety Commission
Sponsor Representatives Davies, Hudson, Kerl
Requester (H) STA
Component No.

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

OPERATING EXPENDITURES	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Personal Services	18.0	13.4	13.4	13.4	13.8	13.8
Travel	7.0	7.0	7.0	7.0	7.0	7.0
Contractual	8.0	8.0	8.0	8.0	8.0	8.0
Supplies	0.5	0.5	0.5	0.5	0.5	0.5
Equipment						
Land & Structures						
Grants & Claims						
Miscellaneous						
TOTAL OPERATING	33.5	28.9	28.9	28.9	29.3	29.3
CAPITAL EXPENDITURES						
CHANGE IN REVENUES ( )						

FUND SOURCE (Thousands of Dollars)

1002 Federal Receipts						
1003 GF Match						
1004 GF	33.5	28.9	28.9	28.9	29.3	29.3
1005 GF/Program Receipts						
1037 GF/Mental Health						
Other (Specify Type–Do not abbreviate)						
TOTAL	33.5	28.9	28.9	28.9	29.3	29.3

Estimate of any current year (FY2002) cost: 0.0
Check this box (X) if funding for this bill is included in the Governor's FY 2003 budget proposal:

POSITIONS

Full-time						
Part-time	1	1	1	1	1	1
Temporary						

ANALYSIS: *(Attach a separate page if necessary)*

Fiscal note assumes 1/4 time clerical staff to support the commission activity as technical support will be met by existing staff in Department of Natural Resources; quarterly commission meetings -- 2 face-to-face and 2 teleconferenced. Travel costs reflect estimated meeting costs for 9 total commission members and one staff. Contractual reflects estimated postage, communication, advertising and teleconference costs.

Fiscal note assumes existing departmental office space/equipment will be available for use by the part-time clerical staff position.

Prepared by: Michael A. Nizich, Administrative Director
Phone 465-3876
Division Administrative Services
Date/Time 4/19/02 2:58 PM
Approved by: David Ramseur, Chief of Staff
Date 4/19/2002
Agency Office of the Governor

(Revised 9/2001 OMB)

COMMITTEE COPY

Alaska State Legislature

Legislative Committees:
House Finance Committee

Legislative Budget Subcommittees:
University of Alaska
Department of Natural Resources
Department of Environmental Conservation

110 N. Cushman Street Suite 207
Fairbanks, Alaska 99701
(907) 456-8172
FAX (907) 451-9293

While in Session
State Capitol
Juneau, Alaska 99801-1182
(907) 465-4457
FAX (907) 465-3519

Representative John Davies
District 29

SPONSOR STATEMENT

House Bill 53
"An act establishing the Alaska Seismic Hazards Safety Commission"

A Seismic Hazards Safety commission needs to be established to address the pressing need to provide a consistent policy framework and a means for ongoing coordination of programs and public safety practices related to seismic hazards. Currently this need is not being addressed by any continuing state government organization. The seismic Hazard Safety Commission would encourage long-term progress toward mitigating the effects of earthquakes.

Alaska is on the edge of the Pacific Plate, which acts like a relentless conveyor belt, moving about six centimeters a year. It is inevitable that there will be large earthquakes, the only question is when will they occur, not if they will occur. Although the state has made great improvements in disaster preparedness there has been little corresponding improvement in measures to reduce the disaster potential of major earthquakes and, consequently, to reduce dependence on disaster relief. Creating a seismic commission patterned after those in California, Oregon, Washington and other states on major fault lines will help address the issues. If you prepare for a major earthquake ahead of time and prepare appropriately, when the earthquake does occur less damage will result, less lives will be lost and the cost of recovery will be less.

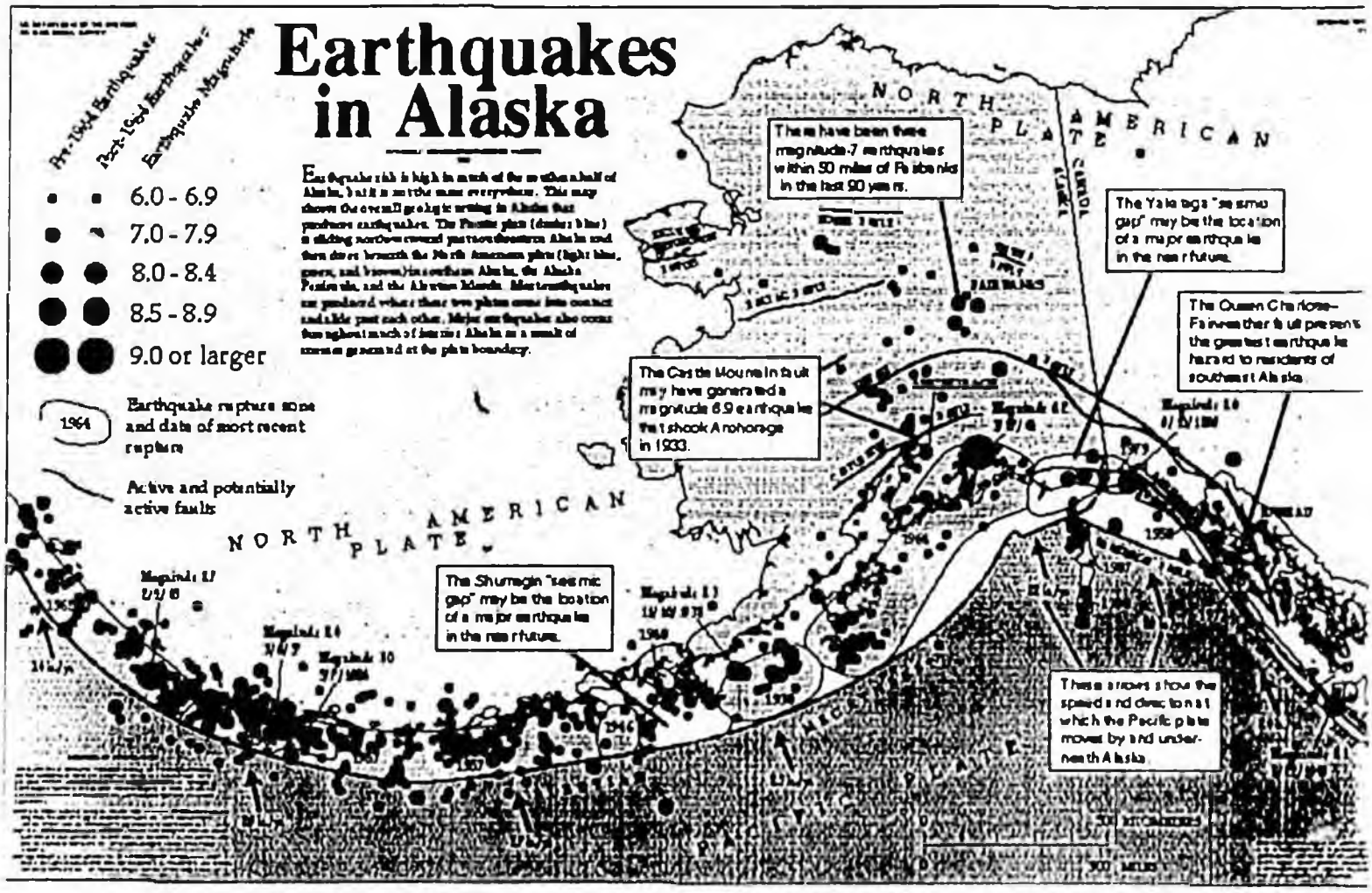
Through ten years of experience as state seismologist I have extensive knowledge in this subject area. I have first hand experience with the difficulty if coordinating earthquake information for the university and state, federal, and municipal governments. Anchorage does have an active geo-

tech advisory commission, but the state needs to strengthen that work while broadening efforts throughout the state. A Seismic Safety Hazards Commission can provide that strength.

The scientific community is working hard on earthquake prediction, but it is not yet a reality, except in the most general sense. We can predict in a probabilistic way where earthquakes are likely to occur so we can focus resources in those areas, but in terms of knowing the date and time of occurrence of earthquakes we will not have that information for some time, if ever.

The state can mitigate possible effects of earthquakes by encouraging appropriate land use and building design so it can reduce loss of life and property, as well as the costs of recovery when earthquakes occur. It costs a lot of money to rebuild after a large earthquake and, of course there is no way to replace lost lives; so it is clearly worth spending some time and money before earthquakes occur to prepare for them. If mitigation efforts are undertaken at the time a building or subdivision is in the planning stages, the costs are relatively minor compared to retrofit or rebuilding. This commission would help our state be better prepared.

Members of the commission would be appointed by the governor to represent the university and governmental agencies, as well as members of the public who are knowledgeable in earthquake hazard mitigation. The commission would recommend to the public and governmental sector goals and priorities for reducing earthquake effects. The commission may accept grant contributions and appropriations from public agencies, private foundations, and individuals. The authority and responsibilities of other state agencies, boards, councils, commissions or local governments are not intended to transfer to the Alaska Seismic Hazards Safety Commission.


Earthquakes in Alaska
Pre-1964 Earthquakes
Post-1964 Earthquakes
Earthquake Magnitude
6.0 - 6.9
7.0 - 7.9
8.0 - 8.4
8.5 - 8.9
9.0 or larger
1964
Earthquake rupture zone and date of most recent rupture
Active and potentially active faults
NORTH AMERICAN PLATE
There have been three magnitude-7 earthquakes within 50 miles of Fairbanks in the last 90 years.
The Yakutat "seismic gap" may be the location of a major earthquake in the near future.
The Queen Charlotte–Fairweather fault presents the greatest earthquake hazard to residents of southeast Alaska.
The Castle Mountain fault may have generated a magnitude 6.9 earthquake that shook Anchorage in 1933.
The Shumagin "seismic gap" may be the location of a major earthquake in the near future.
These arrows show the speed and direction at which the Pacific plate moves by and underneath Alaska.

AEIC Alaska Earthquake Information Center
Geophysical Institute, UAF

Recent Earthquakes in Alaska

Other Maps: Global View

Earthquakes Shown on This Page:		
Local Time	Magnitude	Region
03:15 PM AKDT Wednesday April 11th, 2001	1.88 ML	in the Prince William Sound region of Alaska
01:46 PM AKDT Wednesday April 11th, 2001	2.81 ML	in the Kenai Peninsula region of Alaska
11:04 AM AKDT Wednesday April 11th, 2001	2.23 ML	in the Kenai Peninsula region of Alaska

FEMA 1993

Appendix I

Existing Seismic Safety Advisory Boards

Arizona

Arizona Council for Earthquake Safety
Arizona Department of Emergency and Military Affairs
Division of Emergency Services
5636 E. McDowell Rd.
Phoenix, AZ 85008
Phone: (602) 231-6238
Fax: (602) 231-6231

Arkansas

Arkansas Earthquake Advisory Council
Arkansas Office of Emergency Services
P.O. Box 758
Conway, AR 72032-0758
(501) 329-5601
Fax: (501) 327-8047

California

Seismic Safety Commission
1900 K St., Ste. 100
Sacramento, CA 95814
(916) 322-4917
Fax: (916) 322-9476

Central United States Earthquake Consortium (CUSEC)

Central United States Earthquake Consortium
2630 E. Holmes Rd.
Memphis, TN 38118
(901) 345-0932
Fax: (901) 345-0998

Hawaii

Hawaii State Earthquake Advisory Board
Office of the Director of Civil Defense
3949 Diamond Head Road
Honolulu, HA 96816-4495
(808) 734-2161
Fax: (808) 737-4150

Illinois

Illinois Earthquake Advisory Board
Illinois Emergency Services & Disaster Agency
110 East Adams St.
Springfield, IL 62706
(217) 782-4448

Indiana

Indiana Seismic Safety Advisory Board
Indiana State Emergency Management Agency
IN GOVT CTR S/302 W. Washington St. E208
Indianapolis, IN 46204
(317) 232-3986
FAX (317) 232-3895

Kentucky

Governor's Earthquake Hazards & Safety Technical Advisory Panel
Kentucky Division of Div. of Disaster & Emergency Services
EOC Building, Boone Center
Frankfort, KE 40506
(502) 564-8611

Mississippi

Mississippi Seismic Advisory Panel
Mississippi Emergency Management Agency
P.O. Box 4501, Fondren Station
Jackson, MS 39216
(601) 352-9100

Missouri

Missouri Earthquake Hazard Mitigation Panel
Missouri Emergency Management Agency
P.O. Box 116
Jefferson City, MO 65102
(314) 751-9779
FAX (314) 634-7966

Nevada

Nevada Seismic Safety Council
Division of Emergency Management
Capitol Complex
2525 South Carson St.
Carson City, NV 89710
(702) 687-4240
Fax: (702) 687-6788

New England States Earthquake Consortium (NESEC)

New England States Earthquake Consortium
501 Islington St
Portsmouth, NH 03801
(603) 430-9876
Fax: (603) 430-9875

FEMA 1993 (cont'd)

Oregon

Oregon Seismic Safety Policy Advisory Committee
595 Cottage St. NE
Salem, OR 97310
(503) 378-2903
Fax: (503) 588-1378

Puerto Rico

Comision de Seguridad Contra Terremotos
Pda. 3 1/2 Ave. Munoz Rivera
Pta. de Tierra Apartado Correo 5887
San Juan, PR 00906
(809) 722-8784
Fax: (809) 725-0350

South Carolina

South Carolina Seismic Safety Consortium
Dept. of Civil Engineering
The Citadel
Charleston, SC 29401
(803) 797-4208

Southeastern United States Seismic Safety Consortium

Southeastern United States Seismic Safety Consortium
Dept. of Civil Engineering
The Citadel
Charleston, SC 29401
(803) 797-4208

Tennessee

Tennessee Seismic Safety Advisory Panel
Tennessee Emergency Management Agency
Tennessee EOC
3041 Sidco Dr.
Nashville, TN 37204-1502
(615) 252-3311

Utah

Utah Earthquake Advisory Board
University of Utah Seismograph Stations
705 W. C. Browning Bldg.
Salt Lake City, UT 84112
(801) 581-6274
Fax: (801) 581-7065

Washington

Washington State Seismic Safety Advisory Committee
Washington State Dept. of Natural Resources
Geology & Earth Resources Division
P.O. Box 47007
Olympia, WA 98504-7007
(206) 902-1000
Fax: (206) 902-1785

USGS
science for a changing world

USGS Reducing Earthquake Losses Throughout the United States

Seismic Maps Foster Landmark Legislation

When a powerful earthquake strikes an urban region, damage concentrates not only near the quake's source. Damage can also occur many miles from the source in areas of soft ground. In recent years, scientists have developed ways to identify and map these areas of high seismic hazard. This advance has spurred pioneering legislation to reduce earthquake losses in areas of greatest hazard.

Television cameras broadcasting the start of the 1989 World Series instead recorded the urban devastation from a major earthquake striking Northern California. Four hours after the earthquake struck, homes in San Francisco's prosperous Marina District still burned out of control from fires started by broken gas lines; the shock severely damaged or destroyed 70 residential buildings in the district. Across San Francisco Bay in Oakland, the collapse of the double-decker Cypress freeway structure trapped more than 160 people, 42 of whom died.

Both of these grim spectacles from the magnitude 7.1 Loma Prieta, California, earthquake occurred more than 50 miles from the temblor's source in areas underlain by soft soil (loose sediment, uncompacted fill, and mud). In contrast, structures built on rock and firm soil, which underlie most of San Francisco and Oakland, were largely unscathed. Near the earthquake's epicenter, however, shaking was violent enough to cause considerable damage even in areas underlain by rock and firm soil.

(Click on image for a full size version - 101K)
Buildings constructed on uncompacted fills and soft soils are especially vulnerable to earthquake shaking damage. In this photo, taken four hours after the 1989 Loma Prieta, California, earthquake had struck, homes in San Francisco's Marina District still burn out of control from fires started by broken gas lines. The district was built on artificial fill that included rubble from the great quake of 1906. Scientists can identify areas where such shaking damage is likely to be especially severe. (Photo by Martin Klimek, Marin Independent Journal.)

This localization of severe shaking and damage was no surprise. It had been noted in previous San Francisco-area earthquakes, as early as 1868. Only after the devastating 1964 magnitude 9.2 Alaska earthquake, however, did the nation direct much attention toward understanding and mapping earthquake hazards. In the late 1960's, the U.S. Geological Survey (USGS) launched a program to develop methods for identifying and mapping areas of potential earthquake hazard.

An early product of this program was a series of maps showing the locations of active segments of the San Andreas Fault in California. These maps demonstrated the feasibility of identifying faults that might rupture the ground surface in future earthquakes. This capability lead to new strategies to reduce losses from such ruptures. In 1972, the California Legislature passed a landmark law requiring the

identification of seismic-hazard zones along faults. In these zones, special geologic studies are required before structures can be built for human occupancy. This law has successfully prevented homes, schools, and offices from being built across active faults.

The major cause of earthquake damage, however, is strong ground shaking, not the rupture of the ground surface by faulting. Strong shaking damages or collapses weak structures over wide areas. It also triggers ground failures (fracturing, sliding, and slumping), which in turn damage or destroy structures and disrupt utility and transportation systems. In the mid-1970's, the USGS published an innovative map of the ground-shaking hazard for part of the San Francisco Bay region. This map was used by local and regional government bodies to develop seismic safety policies. The map predicted that shaking on soft ground would be several times as intense as that on nearby rock. Some engineers and scientists were skeptical of these predictions, but records of strong shaking and patterns of damage in the 1989 Loma Prieta earthquake verified the predictions. The map had correctly showed the Marina District and the area of the Cypress freeway structure as being subject to violent shaking during earthquakes.

(Click on image for a full size version - 83K)

Seismic hazard maps further legislation to reduce earthquake losses: *This map sequence illustrates the shaking hazard in San Francisco for a possible repeat of the great 1906 earthquake. Such maps provide information essential for developing effective seismic safety policies and laws.*

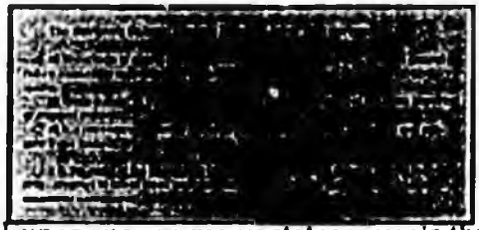
1-Effect of distance on shaking: *Expected ground shaking on bedrock decreases rapidly with increasing distance from the San Andreas Fault, from very violent (red) to moderate (green).*

2-Effect of ground type on shaking: *The capability of ground type to amplify shaking varies from very high for mud and uncompacted fill, to moderate for sandy soil, to low for soft rock, and to none for hard rock.*

3-Expected ground shaking: *This map combines information from Maps 1 and 2 to show expected shaking levels throughout San Francisco.*

4-Areas of most intense shaking: *This map, derived from Map 3, shows in red the areas of most intense shaking where efforts to reduce earthquake losses should be focused.*

Faced with the disastrous losses from the Loma Prieta shock, the California Legislature realized that stronger measures were needed to combat earthquake hazards. In 1990, the Legislature passed the California Seismic Hazards Mapping Act to assist cities and counties in protecting public health and safety against such hazards. This law requires the State Geologist to make maps of seismic hazard zones, identifying areas prone to violent shaking and ground failure. It also requires that evaluation of these potential hazards precede approval of construction projects within defined hazard zones and that buyers of real estate be notified when the property lies within such a zone. This act builds on the success of both the 1972 law and the early maps of predicted ground shaking.



(Click on image for a full size version - 72K)

Experience in many states reveals that seismic hazard maps serve diverse audiences. Users of these maps include buyers and owners of real estate, geotechnical consultants and engineers, financial institutions, utility and transportation companies, emergency managers, and government planners.

Mapping seismic hazards is especially important in urban areas of earthquake-prone regions of the United States. Such areas have large populations and huge investments in structures and lifelines that are at risk from earthquakes. Potential losses from future urban earthquakes are staggering. For example, a repeat of the 1886 Charleston, South Carolina, earthquake today would cause an estimated 2,000

fatalities and $5 billion of damage. In the central Mississippi Valley region, projected losses from a repeat of an 1811 earthquake are 6,000 lives and $50 billion of damage.

Crucial to reducing these potential losses is sound geologic knowledge leading to effective seismic safety policies and legislation.

Roger D. Borcherdt, Robert B. Brown, Robert A. Page, Carl M. Wentworth, and James W. Hendley II

COOPERATING AGENCIES, COMPANIES, AND INSTITUTIONS
Association of Bay Area Governments California Division of Mines and Geology City of San Francisco

For more information contact:
Earthquake Information Hotline (415) 329-4085
U.S. Geological Survey, MS 977
345 Middlefield Road, Menlo Park, CA 94025
USGS Menlo Park Earthquakes Home Page

U.S. Geological Survey Fact Sheet-097-95, March 1995

Web page by Will Prescott - 1996 April 9

DOWL ENGINEERS
A Division of DOWL LLC

March 14, 2001
W.O. D00001

The Honorable John Davies
House of Representatives
State Capitol Building
Room 422
Juneau, Alaska 99801-1182

Subject: House Bill 53
Alaska Seismic Hazards Safety Commission

Dear John:

As a practicing civil engineering in the State of Alaska, I wholeheartedly support HB 53 pertaining to the establishment of a state Seismic Hazards Safety Commission. I have been practicing my profession in Alaska for over 25 years. My technical specialties are geotechnical engineering and earthquake engineering, so I routinely deal with the problems associated with seismic hazards and their mitigation throughout the state. Moreover, I have been a member of the Municipality of Anchorage Geotechnical Advisory Commission (GAC) for over 20 years (currently Vice-Chairman). In that role, my fellow commissioners and I have routinely advised the Municipality regarding identification and mitigation of seismic hazards in Anchorage.

Although major earthquakes seemingly are "rare" events, their consequences literally can be disastrous, as was demonstrated by the 1964 great Alaska earthquake. Because of the damage and loss of life that occurred in Anchorage in 1964, and due to the concerns of local engineers and earth scientists, Anchorage established the Geotechnical Advisory Commission to advise our local government officials and citizens about earthquake hazards that can affect our community. The GAC generally has been the only real resource in those matters Anchorage has been able to rely upon consistently and effectively through the years. I believe the commission has had a positive effect on how our community has developed, and how it has taken appropriate steps to mitigate the seismic hazards with which we must live. Most of these efforts have been, and continue to be, through identification and mapping of the local hazards, and recommending mitigation measures to preserve life safety and to minimize economic impacts when the next major quake impacts our city.

Recent earthquakes in California and the February 28, 2001, earthquake near Seattle underscore the consequences even moderate earthquakes can have in urban areas. Moreover, the benefits to a community of understanding regional and local seismic issues and taking steps to mitigate the associated hazards were clearly demonstrated again during the Nisqually (Seattle) earthquake.

I believe it is imperative that the State Legislature of one of the most seismically active regions in the world establish a statewide Seismic Hazard Safety Commission to help its citizens and those responsible for their general well being understand the seismic environment in which they live, and how best to deal with the hazards that can affect them.

4040 B STREET • ANCHORAGE • ALASKA • 99503 • 907/562-2000 • FAX 907/563-3953

John, I applaud your sponsorship of this bill and give it my full support. If there is anything else I can do for you in this matter, please feel free to call me.

Sincerely,
DOWL Engineers

David A. Cole, P.E.
Project Manager

D00001.RepDavies.DAC 031401.mas

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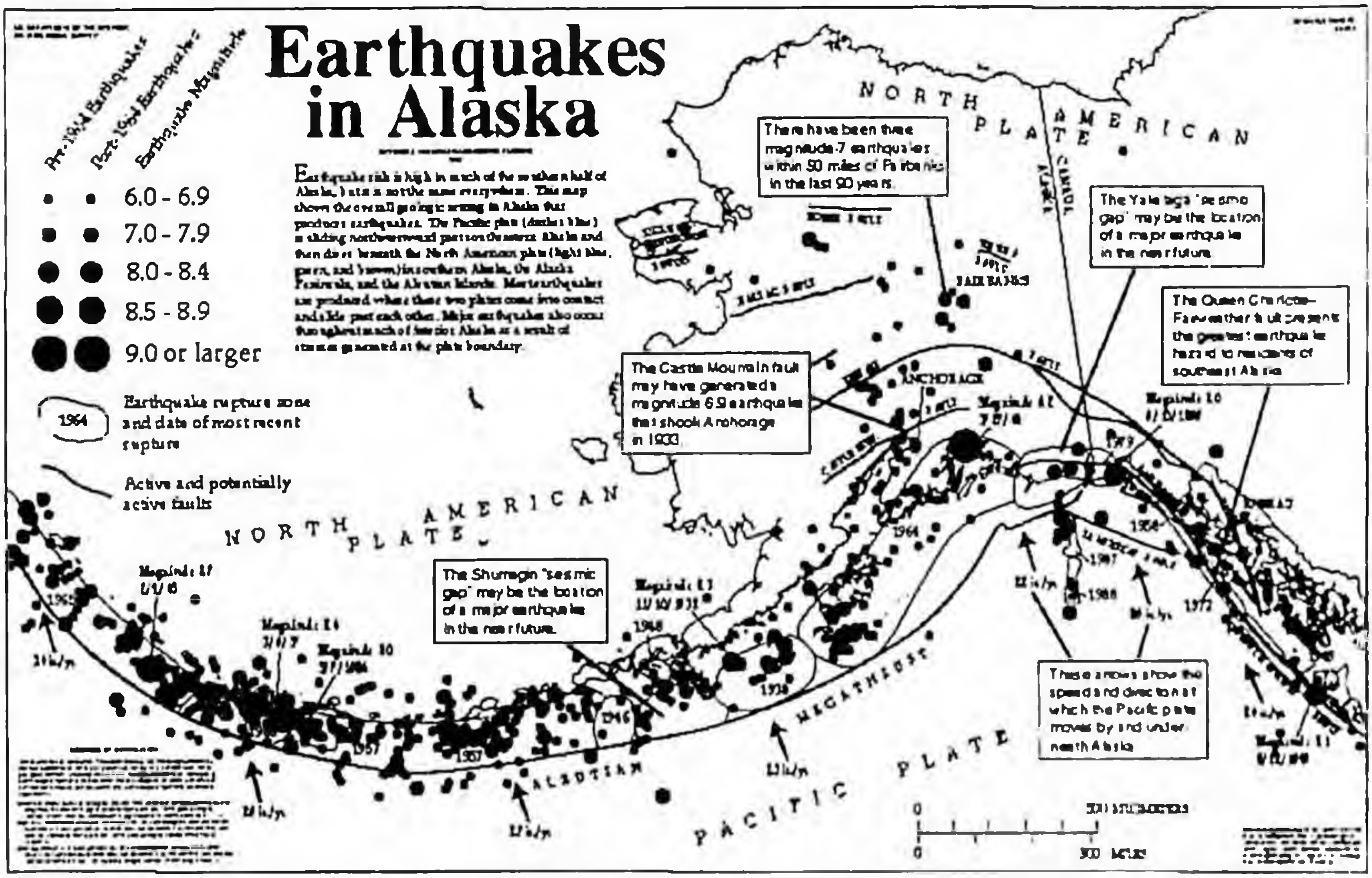
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The Castle Mountain fault may have generated a magnitude 6.9 earthquake that shook Anchorage in 1933.
ANCHORAGE
FAIRBANKS
The Shumagin "seismic gap" may be the location of a major earthquake in the near future.
These arrows show the speed and direction at which the Pacific plate moves by and under-neath Alaska.
1964
1965
1957
1946
1938
1958
1972
PACIFIC PLATE
ALEUTIAN MEGATHRUST
0
300 MILES

FEMA 1993

Appendix I

Existing Seismic Safety Advisory Boards

Arizona

Arizona Council for Earthquake Safety
Arizona Department of Emergency and Military Affairs
Division of Emergency Services
5636 E. McDowell Rd.
Phoenix, AZ 85008
Phone: (602) 231-6238
Fax: (602) 231-6231

Arkansas

Arkansas Earthquake Advisory Council
Arkansas Office of Emergency Services
P.O. Box 758
Conway, AR 72032-0758
(501) 329-5601
Fax: (501) 327-8047

California

Seismic Safety Commission
1900 K St., Ste. 100
Sacramento, CA 95814
(916) 322-4917
Fax: (916) 322-9476

Central United States Earthquake Consortium (CUSEC)

Central United States Earthquake Consortium
2630 E. Holmes Rd.
Memphis, TN 38118
(901) 345-0932
Fax: (901) 345-0998

Hawaii

Hawaii State Earthquake Advisory Board
Office of the Director of Civil Defense
3949 Diamond Head Road
Honolulu, HA 96816-4495
(808) 734-2161
Fax: (808) 737-4150

Illinois

Illinois Earthquake Advisory Board
Illinois Emergency Services & Disaster Agency
110 East Adams St.
Springfield, IL 62706
(217) 782-4448

Indiana

Indiana Seismic Safety Advisory Board
Indiana State Emergency Management Agency
IN GOVT CTR S/302 W. Washington St. E208
Indianapolis, IN 46204
(317) 232-3986
FAX (317) 232-3895

Kentucky

Governor's Earthquake Hazards & Safety Technical Advisory Panel
Kentucky Division of Div. of Disaster & Emergency Services
EOC Building, Boone Center
Frankfort, KE 40506
(502) 564-8611

Mississippi

Mississippi Seismic Advisory Panel
Mississippi Emergency Management Agency
P.O. Box 4501, Fondren Station
Jackson, MS 39216
(601) 352-9100

Missouri

Missouri Earthquake Hazard Mitigation Panel
Missouri Emergency Management Agency
P.O. Box 116
Jefferson City, MO 65102
(314) 751-9779
FAX (314) 634-7966

Nevada

Nevada Seismic Safety Council
Division of Emergency Management
Capitol Complex
2525 South Carson St.
Carson City, NV 89710
(702) 687-4240
Fax: (702) 687-6788

New England States Earthquake Consortium (NESEC)

New England States Earthquake Consortium
501 Islington St
Portsmouth, NH 03801
(603) 430-9876
Fax: (603) 430-9875

FEMA 1993 (cont'd)

Oregon

Oregon Seismic Safety Policy Advisory Committee
595 Cottage St., NE
Salem, OR 97310
(503) 378-2903
Fax: (503) 588-1378

Puerto Rico

Comision de Seguridad Contra Terremotos
Pda. 3 1/2 Ave. Munoz Rivera
Fta. de Tierra Apartado Correo 5887
San Juan, PR 00906
(809) 722-8784
Fax: (809) 725-0350

South Carolina

South Carolina Seismic Safety Consortium
Dept. of Civil Engineering
The Citadel
Charleston, SC 29401
(803) 797-4208

Southeastern United States Seismic Safety Consortium

Southeastern United States Seismic Safety Consortium
Dept. of Civil Engineering
The Citadel
Charleston, SC 29401
(803) 797-4208

Tennessee

Tennessee Seismic Safety Advisory Panel
Tennessee Emergency Management Agency
Tennessee EOC
3041 Sidco Dr.
Nashville, TN 37204-1502
(615) 252-3311

Utah

Utah Earthquake Advisory Board
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USGS
science for a changing world

USGS Reducing Earthquake Losses Throughout the United States

Seismic Maps Foster Landmark Legislation

When a powerful earthquake strikes an urban region, damage concentrates not only near the quake's source. Damage can also occur many miles from the source in areas of soft ground. In recent years, scientists have developed ways to identify and map these areas of high seismic hazard. This advance has spurred pioneering legislation to reduce earthquake losses in areas of greatest hazard.

Television cameras broadcasting the start of the 1989 World Series instead recorded the urban devastation from a major earthquake striking Northern California. Four hours after the earthquake struck, homes in San Francisco's prosperous Marina District still burned out of control from fires started by broken gas lines; the shock severely damaged or destroyed 70 residential buildings in the district. Across San Francisco Bay in Oakland, the collapse of the double-decker Cypress freeway structure trapped more than 160 people, 42 of whom died.

Both of these grim spectacles from the magnitude 7.1 Loma Prieta, California, earthquake occurred more than 50 miles from the temblor's source in areas underlain by soft soil (loose sediment, uncompacted fill, and mud). In contrast, structures built on rock and firm soil, which underlie most of San Francisco and Oakland, were largely unscathed. Near the earthquake's epicenter, however, shaking was violent enough to cause considerable damage even in areas underlain by rock and firm soil.

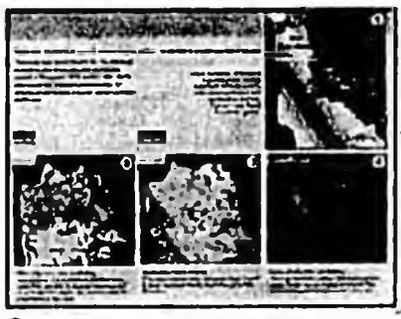
(Click on image for a full size version - 101K)
Buildings constructed on uncompacted fills and soft soils are especially vulnerable to earthquake shaking damage. In this photo, taken four hours after the 1989 Loma Prieta, California, earthquake had struck, homes in San Francisco's Marina District still burn out of control from fires started by broken gas lines. The district was built on artificial fill that included rubble from the great quake of 1906. Scientists can identify areas where such shaking damage is likely to be especially severe. (Photo by Martin Klimek, Marin Independent Journal.)

This localization of severe shaking and damage was no surprise. It had been noted in previous San Francisco-area earthquakes, as early as 1868. Only after the devastating 1964 magnitude 9.2 Alaska earthquake, however, did the nation direct much attention toward understanding and mapping earthquake hazards. In the late 1960's, the U.S. Geological Survey (USGS) launched a program to develop methods for identifying and mapping areas of potential earthquake hazard.

An early product of this program was a series of maps showing the locations of active segments of the San Andreas Fault in California. These maps demonstrated the feasibility of identifying faults that might rupture the ground surface in future earthquakes. This capability lead to new strategies to reduce losses from such ruptures. In 1972, the California Legislature passed a landmark law requiring the

identification of seismic-hazard zones along faults. In these zones, special geologic studies are required before structures can be built for human occupancy. This law has successfully prevented homes, schools, and offices from being built across active faults.

The major cause of earthquake damage, however, is strong ground shaking, not the rupture of the ground surface by faulting. Strong shaking damages or collapses weak structures over wide areas. It also triggers ground failures (fracturing, sliding, and slumping), which in turn damage or destroy structures and disrupt utility and transportation systems. In the mid-1970's, the USGS published an innovative map of the ground-shaking hazard for part of the San Francisco Bay region. This map was used by local and regional government bodies to develop seismic safety policies. The map predicted that shaking on soft ground would be several times as intense as that on nearby rock. Some engineers and scientists were skeptical of these predictions, but records of strong shaking and patterns of damage in the 1989 Loma Prieta earthquake verified the predictions. The map had correctly showed the Marina District and the area of the Cypress freeway structure as being subject to violent shaking during earthquakes.



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Seismic hazard maps further legislation to reduce earthquake losses: *This map sequence illustrates the shaking hazard in San Francisco for a possible repeat of the great 1906 earthquake. Such maps provide information essential for developing effective seismic safety policies and laws.*

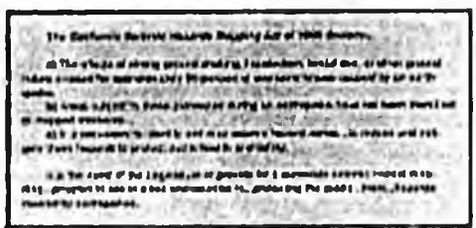
1-Effect of distance on shaking: *Expected ground shaking on bedrock decreases rapidly with increasing distance from the San Andreas Fault, from very violent (red) to moderate (green).*

2-Effect of ground type on shaking: *The capability of ground type to amplify shaking varies from very high for mud and uncompacted fill, to moderate for sandy soil, to low for soft rock, and to none for hard rock.*

3-Expected ground shaking: *This map combines information from Maps 1 and 2 to show expected shaking levels throughout San Francisco.*

4-Areas of most intense shaking: *This map, derived from Map 3, shows in red the areas of most intense shaking where efforts to reduce earthquake losses should be focused.*

Faced with the disastrous losses from the Loma Prieta shock, the California Legislature realized that stronger measures were needed to combat earthquake hazards. In 1990, the Legislature passed the California Seismic Hazards Mapping Act to assist cities and counties in protecting public health and safety against such hazards. This law requires the State Geologist to make maps of seismic hazard zones, identifying areas prone to violent shaking and ground failure. It also requires that evaluation of these potential hazards precede approval of construction projects within defined hazard zones and that buyers of real estate be notified when the property lies within such a zone. This act builds on the success of both the 1972 law and the early mans of predicted ground shaking.



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Experience in many states reveals that seismic hazard maps serve diverse audiences. Users of these maps include buyers and owners of real estate, geotechnical consultants and engineers, financial institutions, utility and transportation companies, emergency managers, and government planners.

Mapping seismic hazards is especially important in urban areas of earthquake-prone regions of the United States. Such areas have large populations and huge investments in structures and lifelines that are at risk from earthquakes. Potential losses from future urban earthquakes are staggering. For example, a repeat of the 1886 Charleston, South Carolina, earthquake today would cause an estimated 2,000

fatalities and $5 billion of damage. In the central Mississippi Valley region, projected losses from a repeat of an 1811 earthquake are 6,000 lives and $50 billion of damage.

Crucial to reducing these potential losses is sound geologic knowledge leading to effective seismic safety policies and legislation.

Roger D. Borcherdt, Robert B. Brown, Robert A. Page, Carl M. Wentworth, and James W. Hendley II

COOPERATING AGENCIES, COMPANIES, AND INSTITUTIONS
Association of Bay Area Governments California Division of Mines and Geology City of San Francisco

For more information contact:
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U.S. Geological Survey, MS 977
345 Middlefield Road, Menlo Park CA 94025
USGS Menlo Park Earthquakes Home Page

U.S. Geological Survey Fact Sheet-097-95, March 1995

Web page by Will Prescott - 1996 April 9

STATE OF ALASKA

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May 9, 2002

WRITTEN TESTIMONY
SENATE FINANCE COMMITTEE HEARING, MAY 9 2002.
HOUSE BILL 53, AN ACT TO ESTABLISH THE ALASKA SEISMIC HAZARDS SAFETY COMMISSION

To: Honorable members of the Alaska Senate Finance Committee

From: Rod Combellick, Chief Rod Combellick
Engineering Geology Section
Alaska Division of Geological & Geophysical Surveys
Phone 907-451-5007
Email rod@dnr.state.ak.us

As a geologist in Alaska for nearly 25 years, I have studied the effects of major earthquakes here and have seen the geologic evidence that they have occurred on a more or less regular basis for thousands of years. Although large earthquakes occur infrequently at any given location, there is high probability that a major destructive earthquake will occur in a populated area during our lifetimes. It has already been 38 years since a major damaging earthquake in Alaska, and there is tendency for complacency to set in until a destructive event occurs that vastly exceeds available resources for disaster relief and recovery. It is during this quiet time that we can take effective measures to not only prepare our disaster response capabilities but, even more importantly, to reduce our vulnerability to casualties and property damage. I support House Bill 53 because the state-level advisory group it establishes will help focus and coordinate efforts to mitigate seismic risks in Alaska. The efforts of similar state-level advisory committees in other states to promote earthquake-safe construction and retrofit unsafe structures have proven repeatedly to save lives and reduce by many millions of dollars the damage costs from these events.

A recent study by the Federal Emergency Management Agency ranked all the states in order of their projected annual economic losses from earthquakes. Given the status quo, Alaska ranks eighth in the nation for total annualized losses from earthquakes, and SECOND only to California for annualized earthquake-loss ratio, or the total losses as a percentage of the value of the state's infrastructure. This is clearly a serious threat to the economic well-being and public safety of our citizens. The Alaska Seismic Hazards Safety Commission will not only coordinate all efforts among state agencies for reducing vulnerability to earthquake risks, but will encourage local governments and the private sector as well to take measures to reduce their earthquake losses. I encourage you as members of the Senate Finance Committee to support House Bill 53 and send it to the full Senate for approval.

Thank you for your consideration of my comments on this bill.

WRITTEN TESTIMONY
SENATE FINANCE COMMITTEE
MAY 9, 2002 4:15-7:00 PM

I appreciate having the opportunity to express my support of House Bill 53 for establishing an Alaska Seismic Hazards Safety Commission. Dr. Davies should be commended for ongoing interest in seismic risk mitigation and his years of effort in attempting to get this Bill enacted. I currently serve as Chairman of the Municipality of Anchorage (MOA) Geotechnical Advisory Commission, the Advanced National Seismic System Alaska Region Advisory Committee, and the MOA Seismic Microzonation Advisory Panel. In these capacities I have witnessed the changes that come about when groups of individuals work together as champions of an effort such as seismic risk mitigation. To date, these efforts have been somewhat concentrated in the Anchorage area. A State Seismic Hazards Safety Commission would provide the vehicle for coordinating pre-earthquake risk mitigation efforts and post-earthquake recovery. By voting for passage of this Bill you will take the initial steps towards providing a coordinated effort in addressing future earthquake safety, risk mitigation, and post-earthquake recovery issues. I urge you to vote for this measure, it is one that will go a long way towards making Alaska a safer place in which to live.

Dr. John L. Ah
CH2M HILL.
Vice President and Principal Project Manager

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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May 9, 2002

To: Senate Finance Committee

Re: Written Testimony for HB53

I am writing in support of House Bill 53, "An Act establishing the Alaska Seismic Hazard Safety Commission." Alaska faces numerous complex policy, mitigation, and insurance issues with regard to seismic hazards. Dealing effectively with seismic hazards is an inherently complex problem that requires the active participation of many public and private sector organizations. Response to seismic events, no matter how well executed, is only part of an effective program. Equally important is the care given to mitigation measures that prepare communities to withstand seismic events with less damage and greater safety.

Alaska has a good record of preparing its larger communities to deal with the possible results of significant earthquakes. We have been less proactive in identifying and coordinating pre-event mitigation measures. It is especially in the area of pre-event mitigation that an Alaska Seismic Hazard Safety Commission could make a real contribution to the safety of Alaskans and the reduction in time and cost required to recover from a seismic event.

In other states seismic hazard safety commissions, or their analogs, have worked with insurers, engineers, and government agencies to improve insurance coverage, building design, construction codes, hazard response times, and community recovery efficiency. Post-event analysis of damage and costs associated with California earthquakes clearly demonstrates that mitigation measures initiated by the California Seismic Safety Commission reduced economic losses from the Northridge earthquake by about 60 percent.

Loss reduction from seismic events requires knowledge of the probable location, area extent and severity of seismically induced ground motion. Translating this knowledge into improved public safety and future cost reductions requires coordinating the goals and efforts of a large number of federal, state, local government, utility, and private sector entities. An Alaska Seismic Hazard Safety Commission, like that proposed in HB 53, would provide an effective forum to frame statewide seismic hazard policies and formulate a comprehensive approach to mitigating seismic hazards so that losses from future events are minimized.

Sincerely,

Milton A. Wiltse
State Geologist and Director
Alaska Division of Geological & Geophysical Surveys

cc: Pat Pourchot, Comm. DNR
Marty Rutherford, Deputy Comm. DNR
Carol Carroll, Director Support Services DNR

SENATE COMMITTEE REPORT

DATE: 4/19/02

FURTHER: Finance

DATE TURNED IN TO OFFICE: 4/29/02

Resources Committee considered CS FOR HOUSE BILL NO. 53(STA)

HB 53 SEISMIC HAZARDS SAFETY COMMISSION

"An Act establishing the Alaska Seismic Hazards Safety Commission."

and recommends:

[ ] be **replaced** with____ **CS** _____ (_____)

[ ] adopt **previous** ____ **CS** _____ (_____)

[ ] attached amendment(s)

[ ] adopt Letter of Intent by _____ Committee

[ ] further referral to _____ Committee

Senate Bill:
[ ] same title
[ ] new title

House Bill:
[ ] same title
[ ] technical title
[ ] new: SCR #____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Zero	FN#
Gov	4/9/02	39.5		3

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	DO PASS	DO NOT PASS	NO REC	AMEND
Lyda J Taylor	✓			
Ben Stevens			✓	
Gary Miller			✓	
CHAIR:	✓			

SENATE COMMITTEE REPORT

DATE: 5/1/01

FURTHER: Resources
Finance

DATE TURNED IN TO OFFICE: 4/19/02

State Affairs Committee considered CS FOR HOUSE BILL NO. 53(STA)

"An Act establishing the Alaska Seismic Hazards Safety Commission."

and recommends:

[ ] be **replaced** with____ **CS** _____ (_____)

[ ] adopt **previous** ____ **CS** _____ (_____)

[ ] attached amendment(s)

[ ] adopt Letter of Intent by _____ Committee

[ ] further referral to _____ Committee

Senate Bill:
[ ] same title
[ ] new title

House Bill:
[ ] same title
[ ] technical title
[ ] new: SCR #____

NEW FISCAL NOTE(S):

Department	Date	Fiscal	Zero	FN#
FNs Forthcoming				

PREVIOUS FISCAL NOTE(S):

Department	Date	Fiscal	Zero	FN#

[ ] **APPROPRIATION - no fiscal note**

SIGNATURES AND RECOMMENDATIONS:	DO PASS	DO NOT PASS	NO REC	AMEND
Kim Holland			✓	
Betty Davis	✓			
Ben Stevens			✓	
CHAIR: Lyda Green			X	

SITE: FAIRBANKS LIO *COMMITTEE:* (S) FINANCE *DATE:* 05/09/02	*SUBJECT OF MEETING:* HB 53 *UPDATE #:* 1

P R I N T *YOUR NAME*	*DO YOU WANT ADDRESS (MAILING & ZIP)*	*REPRESENTING*	*TO TESTIFY? Y or N*
Rod Combellick		AK DNR/DGGS	Y - HB 53
Email address:			
Milt Wiltse		AK DNR/DGGS	Y - HB 53
Email address:			
Email address:			
Email address:			
Email address:			
Email address:			
Email address:			

SITE: Kodiak LIO *COMMITTEE:* Senate Finance *DATE:* 05-09-02	*SUBJECT OF MEETING:* *HB 53 - Seismic Hazards Safety Commission* *UPDATE:* #!

PLEASE SIGN IN

P R I N T *YOUR NAME*	*ADDRESS (MAILING & ZIP)*	*REPRESENTING*	*DO YOU WANT TO TESTIFY? Y or N*
Gary Carver		**Self**	**Y (HB 53)**
Email address:			
Email address:			
Email address:			
Email address:			

Offnet Dan Bockhurst HB 296