2/20/09 PRESENTATION: SEISMIC HAZARDS SAFETY COMMISSION

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ALASKA SEISMIC HAZARDS SAFETY COMMISSION

A LOOK AT CURRENT ACTIVITIES WITH AN EMPHASIS ON SCHOOLS

Presented at a joint Meeting of
the Senate Education and
Finance Committees

Dr. JOHN L. AHO, Ph.D., Sc.D.

February 20, 2009

ASHSC Alaska Seismic Hazards Safety Commission

Presentation Summary

- A Brief History of the Alaska Seismic Hazards Safety Commission (ASHSC)
- ASHSC Standing Committees (with an emphasis on schools)
- An Historic Perspective of School Failures and a Look at Resultant Mitigation Legislation
- An Alaskan Communities' Experience
- Presentation Closure and Next Steps Forward
  - » http:www.dggs.dnr.state.ak.us/seismic_hazards_safety_commission.htm

ASHSC Alaska Seismic Hazards Safety Commission

History of ASHSC

- HB 53 established ASHSC in 2002
- 11 Members
- Policy Recommendations
- ASHSC Goals
- Standing Committees
- Administered by DNR

ASHSC Alaska Seismic Hazards Safety Commission

ASHSC Standing Committees

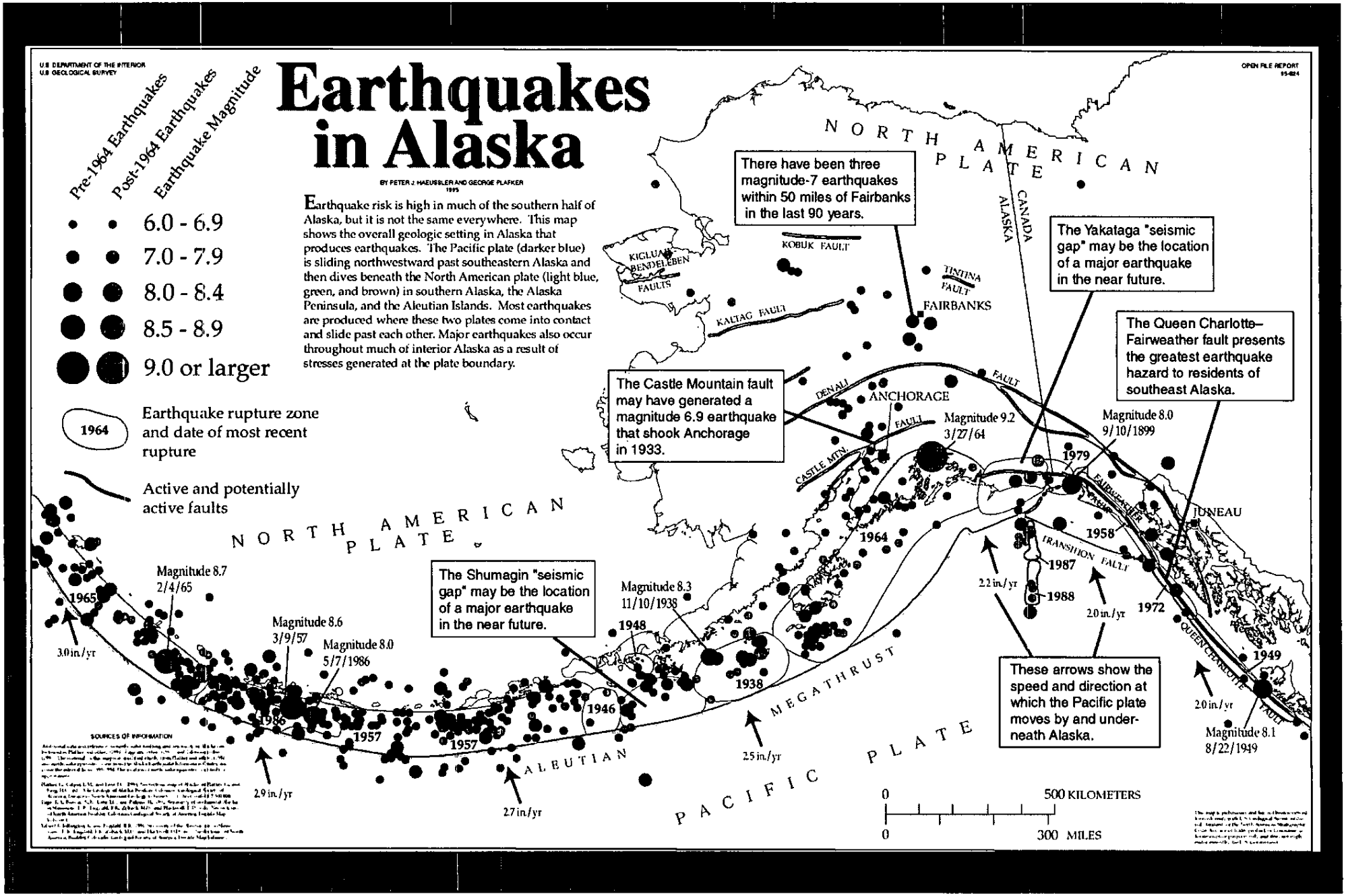
- Insurance
- Schools
- Earthquake Scenarios
- Education & Outreach
- Hazards Identification
- Response, Recovery, & Loss Estimation
- Post-Earthquake Planning
- Partnership

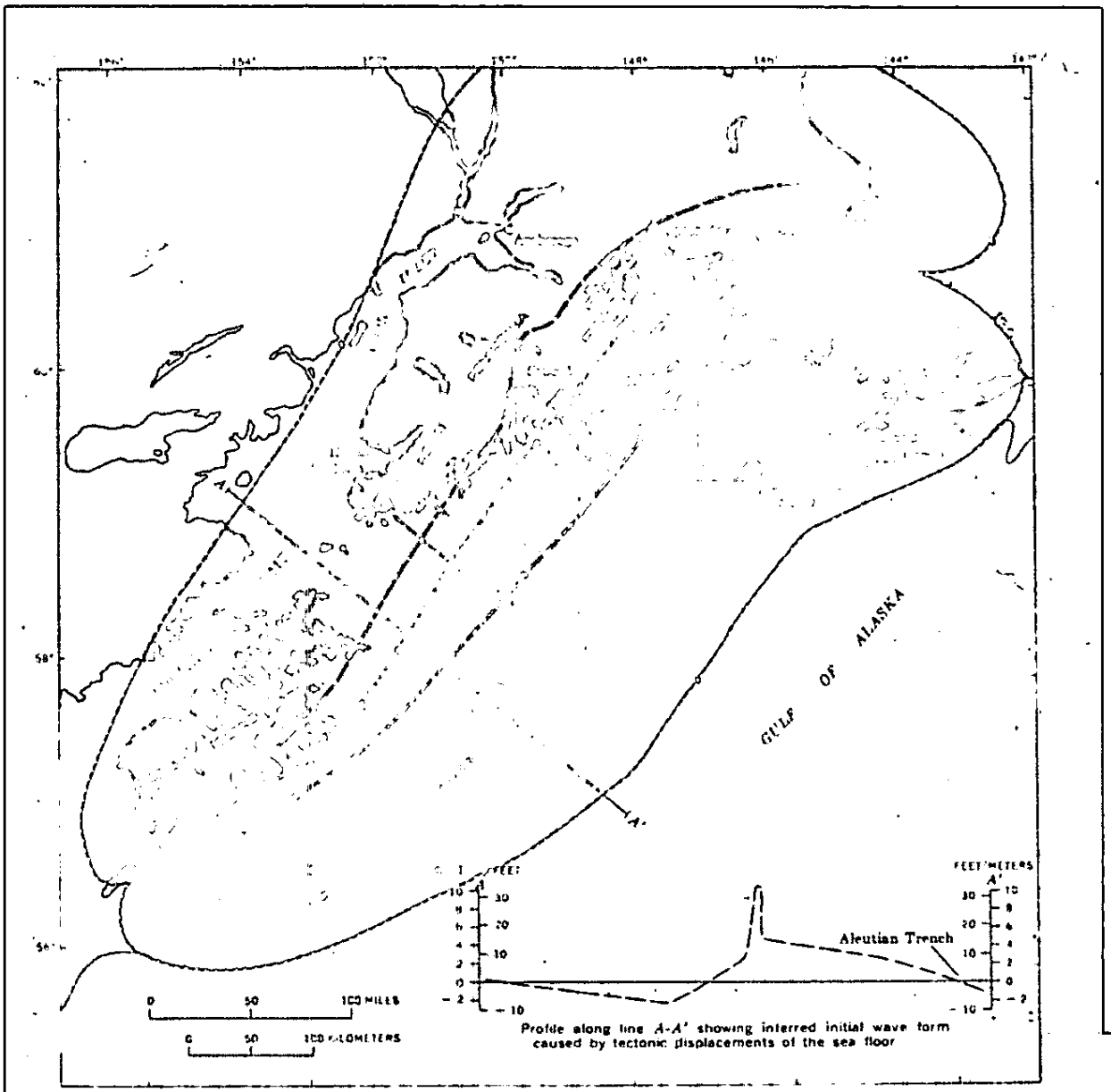
ASHSC Alaska Seismic Hazards Safety Commission

Schools Committee Tasks

- Identify previously accomplished work
- Identify legislation affecting design & construction
- Examine current plan review/inspection procedures
- Examine Code provisions relating to schools
- Identify seismically at-risk facilities
- Identify and interview stakeholders
- Develop conclusions/recommendations and way forward

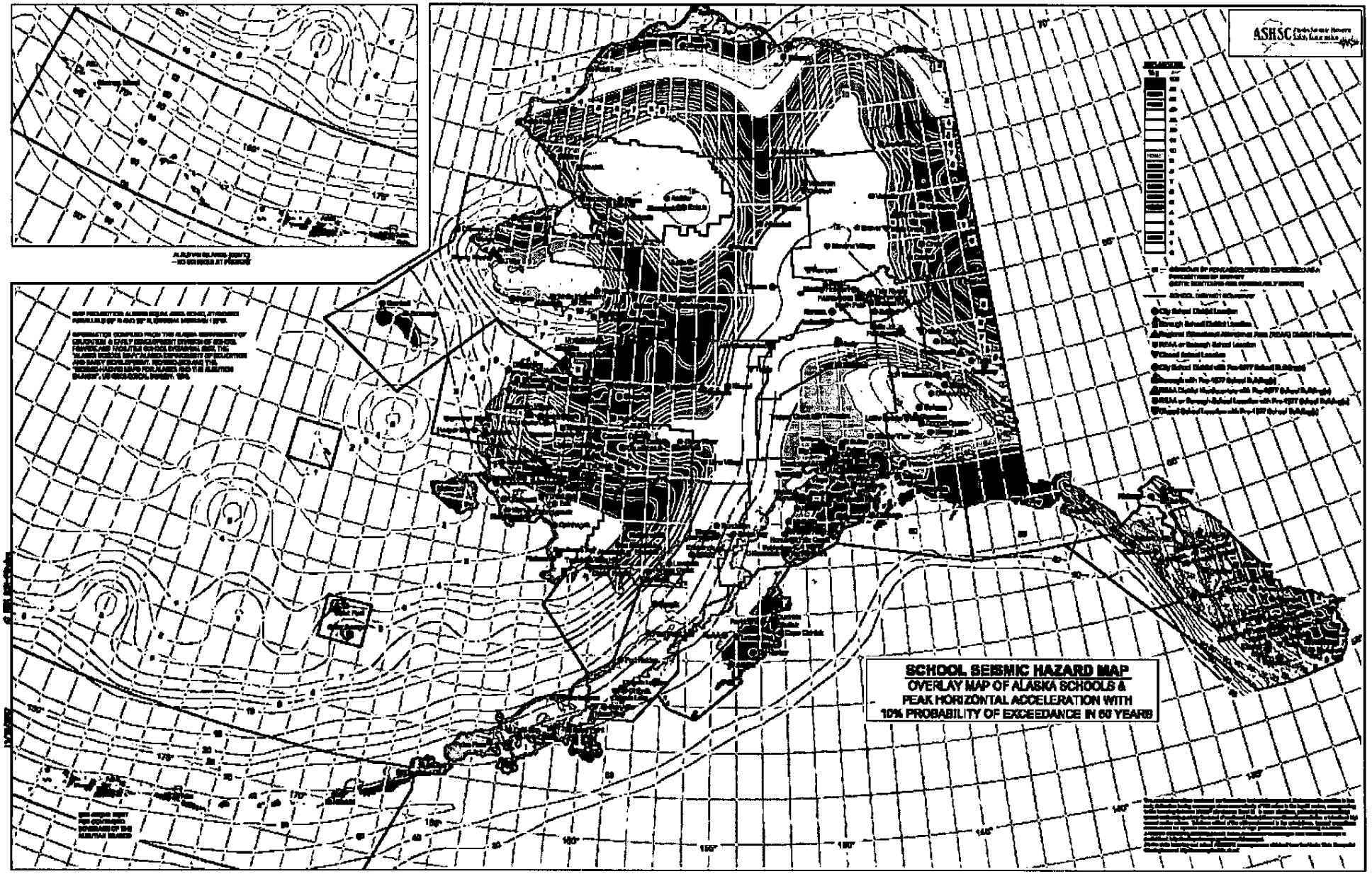
ASHSC Alaska Seismic Hazards Safety Commission

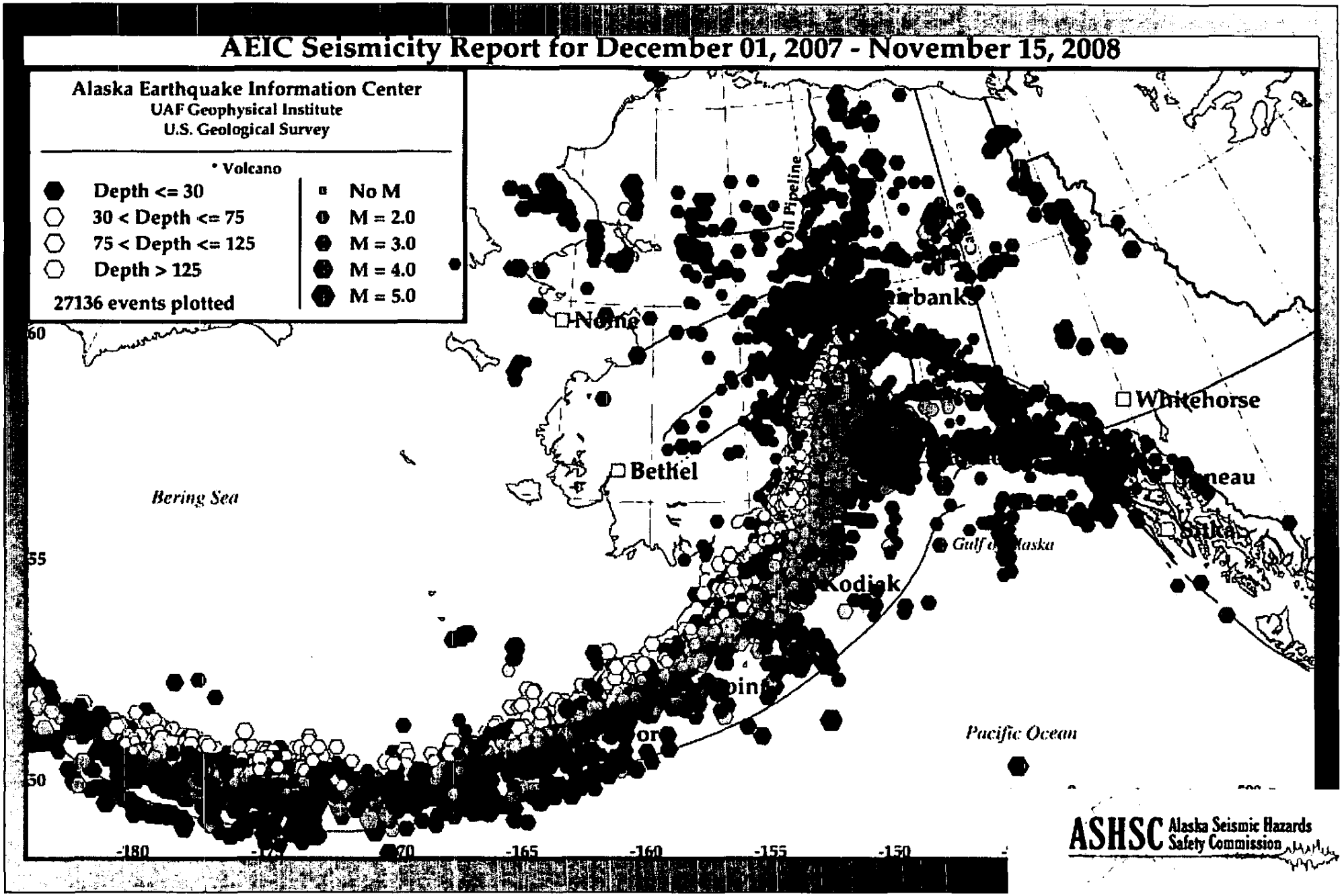

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
OPEN FILE REPORT
95-624
Earthquakes in Alaska
BY PETER J. HAEUSSLER AND GEORGE PLAFKER
1995
Earthquake risk is high in much of the southern half of Alaska, but it is not the same everywhere. This map shows the overall geologic setting in Alaska that produces earthquakes. The Pacific plate (darker blue) is sliding northwestward past southeastern Alaska and then dives beneath the North American plate (light blue, green, and brown) in southern Alaska, the Alaska Peninsula, and the Aleutian Islands. Most earthquakes are produced where these two plates come into contact and slide past each other. Major earthquakes also occur throughout much of interior Alaska as a result of stresses generated at the plate boundary.
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
There have been three magnitude-7 earthquakes within 50 miles of Fairbanks in the last 90 years.
The Yakataga "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.
NORTH AMERICAN PLATE
PACIFIC PLATE
ALEUTIAN MEGATHRUST
CANADA
ALASKA
KOBUK FAULT
KIGLUAIK
BENDELEBEN
FAULTS
KALTAG FAULT
TINTINA FAULT
FAIRBANKS
DENALI FAULT
ANCHORAGE
CASTLE MTN. FAULT
Magnitude 9.2
3/27/64
Magnitude 8.0
9/10/1899
1979
FAIRWEATHER FAULT
JUNEAU
1958
TRANSITION FAULT
1987
1988
1972
QUEEN CHARLOTTE FAULT
1949
Magnitude 8.1
8/22/1949
1964
Magnitude 8.7
2/4/65
1965
Magnitude 8.6
3/9/57
Magnitude 8.0
5/7/1986
1986
1957
1957
1946
Magnitude 8.3
11/10/1938
1948
1938
3.0 in./yr
2.9 in./yr
2.7 in./yr
2.5 in./yr
2.2 in./yr
2.0 in./yr
2.0 in./yr
SOURCES OF INFORMATION
0
500 KILOMETERS
0
300 MILES

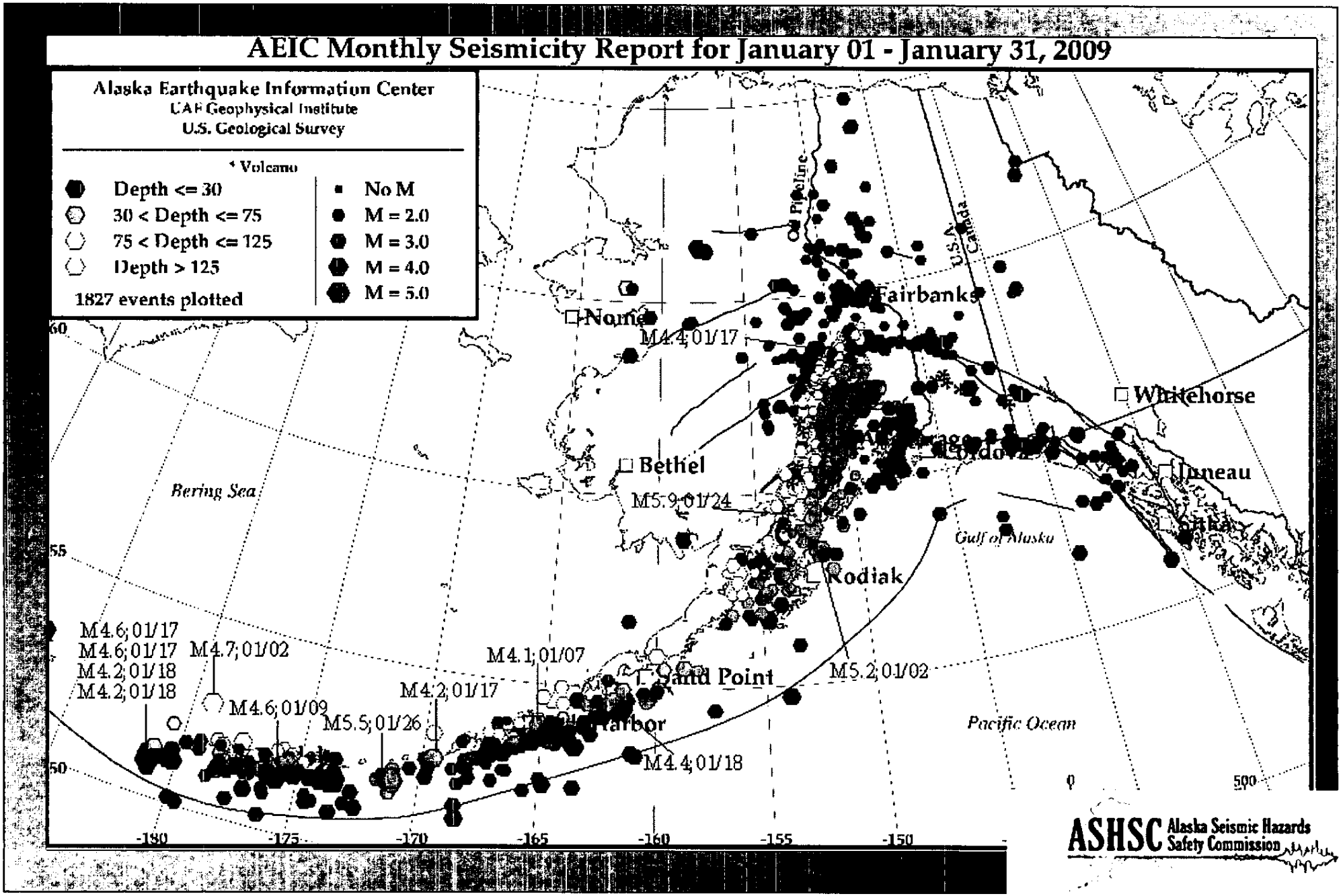


Profile along line A-A' showing inferred initial wave form caused by tectonic displacements of the sea floor

ASHSC Alaska Seismic Hazards Safety Commission


ASHSC
SCHOOL SEISMIC HAZARD MAP
OVERLAY MAP OF ALASKA SCHOOLS &
PEAK HORIZONTAL ACCELERATION WITH
10% PROBABILITY OF EXCEEDANCE IN 50 YEARS


AEIC Seismicity Report for December 01, 2007 - November 15, 2008
Alaska Earthquake Information Center
UAF Geophysical Institute
U.S. Geological Survey
* Volcano
Depth <= 30
30 < Depth <= 75
75 < Depth <= 125
Depth > 125
27136 events plotted
No M
M = 2.0
M = 3.0
M = 4.0
M = 5.0
Nome
Bethel
Whitehorse
Kodiak
Bering Sea
Pacific Ocean
Gulf of Alaska
Oil Pipeline
-180
-165
-160
-155
-150
ASHSC Alaska Seismic Hazards Safety Commission

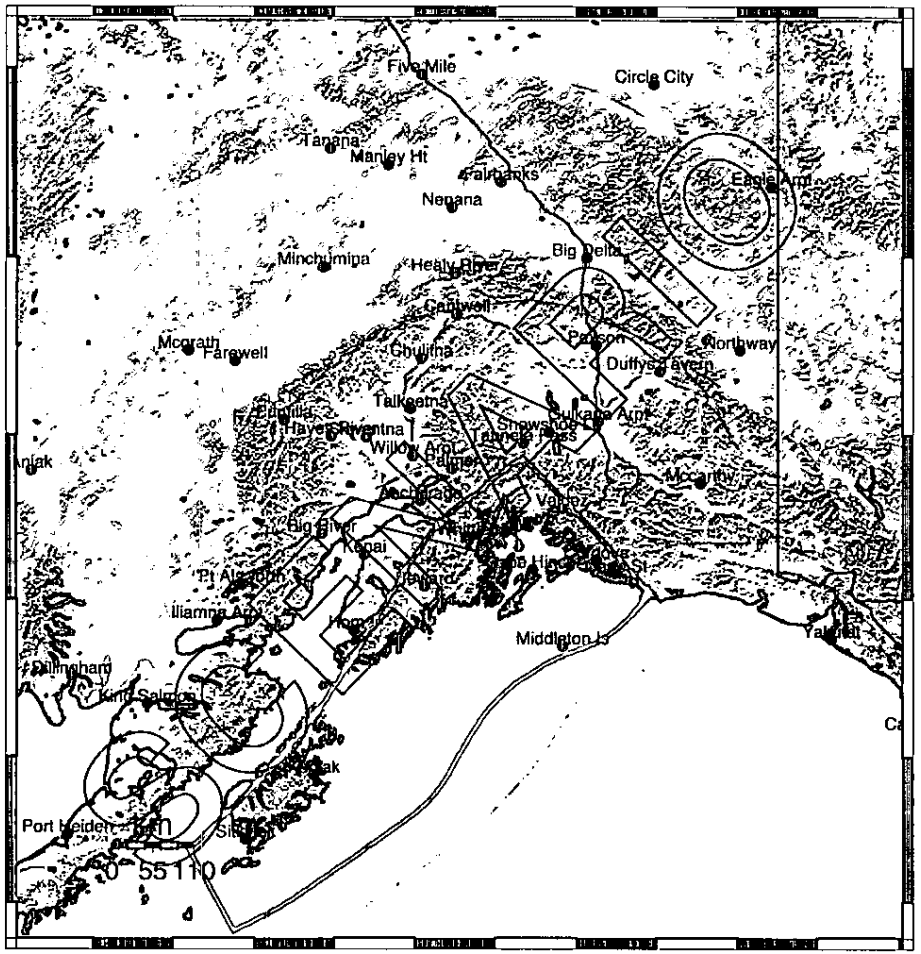

AEIC Monthly Seismicity Report for January 01 - January 31, 2009
Alaska Earthquake Information Center
UAF Geophysical Institute
U.S. Geological Survey
Volcano
Depth <= 30
30 < Depth <= 75
75 < Depth <= 125
Depth > 125
1827 events plotted
No M
M = 2.0
M = 3.0
M = 4.0
M = 5.0
Oil Pipeline
U.S.A.
Canada
Fairbanks
Nome
M4.4;01/17
Whitehorse
Bethel
M5.9;01/24
Juneau
Sitka
Bering Sea
Gulf of Alaska
Kodiak
M4.6;01/17
M4.6;01/17
M4.2;01/18
M4.2;01/18
M4.7;01/02
M4.6;01/09
M5.5;01/26
M4.2;01/17
M4.1;01/07
Sand Point
M5.2;01/02
Harbor
M4.4;01/18
Pacific Ocean
60
55
50
-180
-175
-170
-165
-160
-155
-150
0
500
ASHSC Alaska Seismic Hazards Safety Commission

999

-- Earthquake Planning Scenario --

Rapid Instrumental Intensity Map for 1964 Anchorage Scenario

Scenario Date: Wed Mar 27, 1964 05:36:14 PM GST M 9.2 N61.00 W147.80 Depth: 25.0km



PLANNING SCENARIO ONLY -- PROCESSED: Tue Feb 18, 2003 10:52:15 PM GST

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1. 4	1.4-3. 9	3.9-9. 2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

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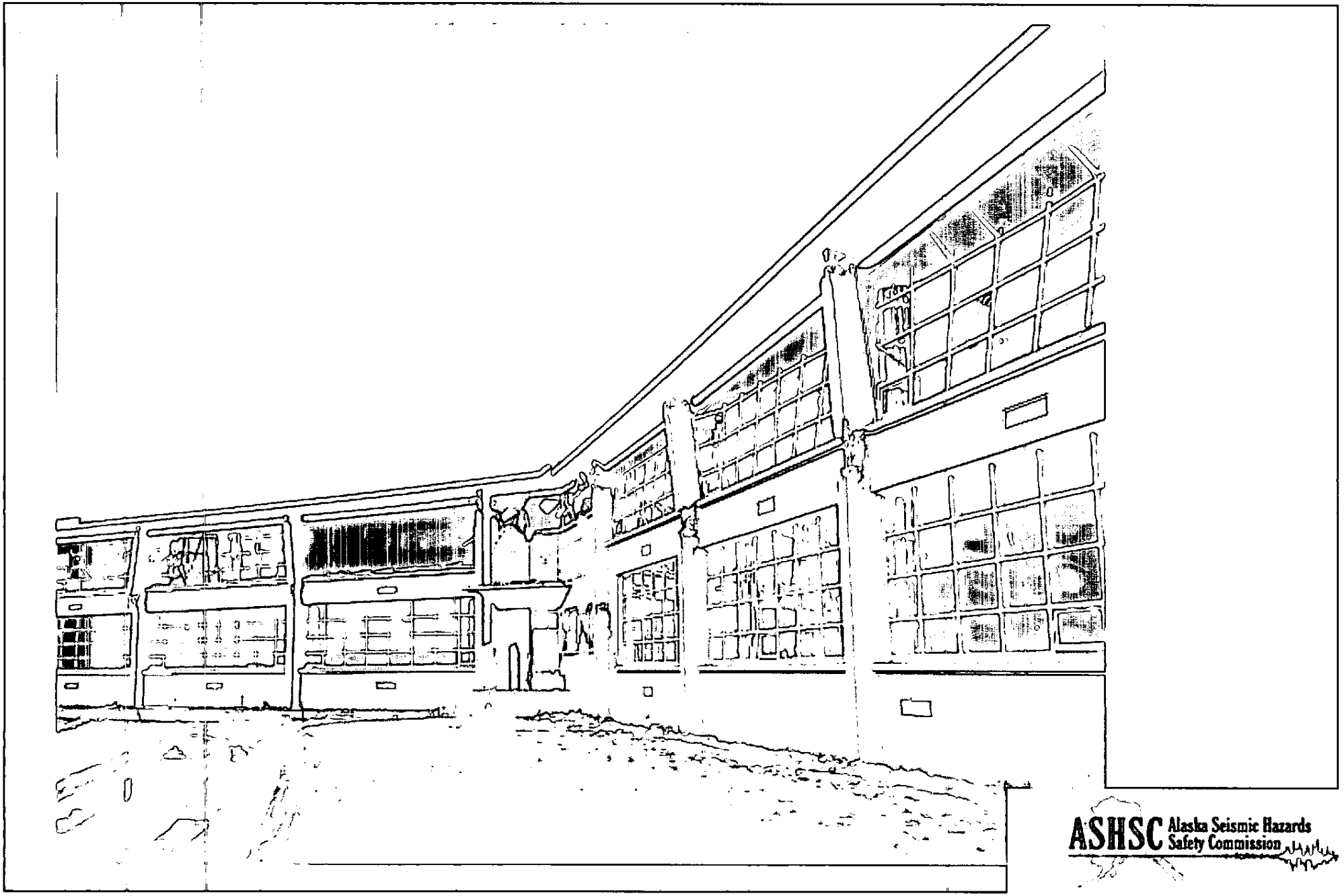

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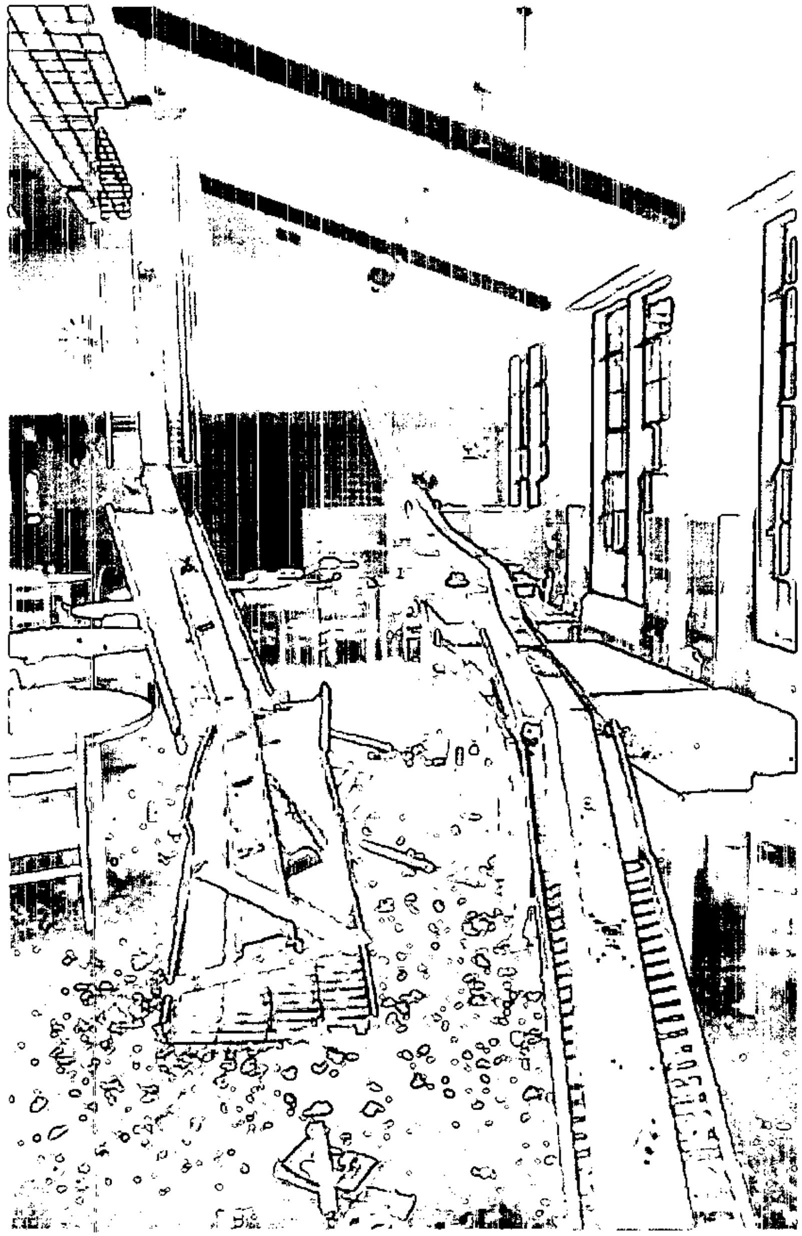

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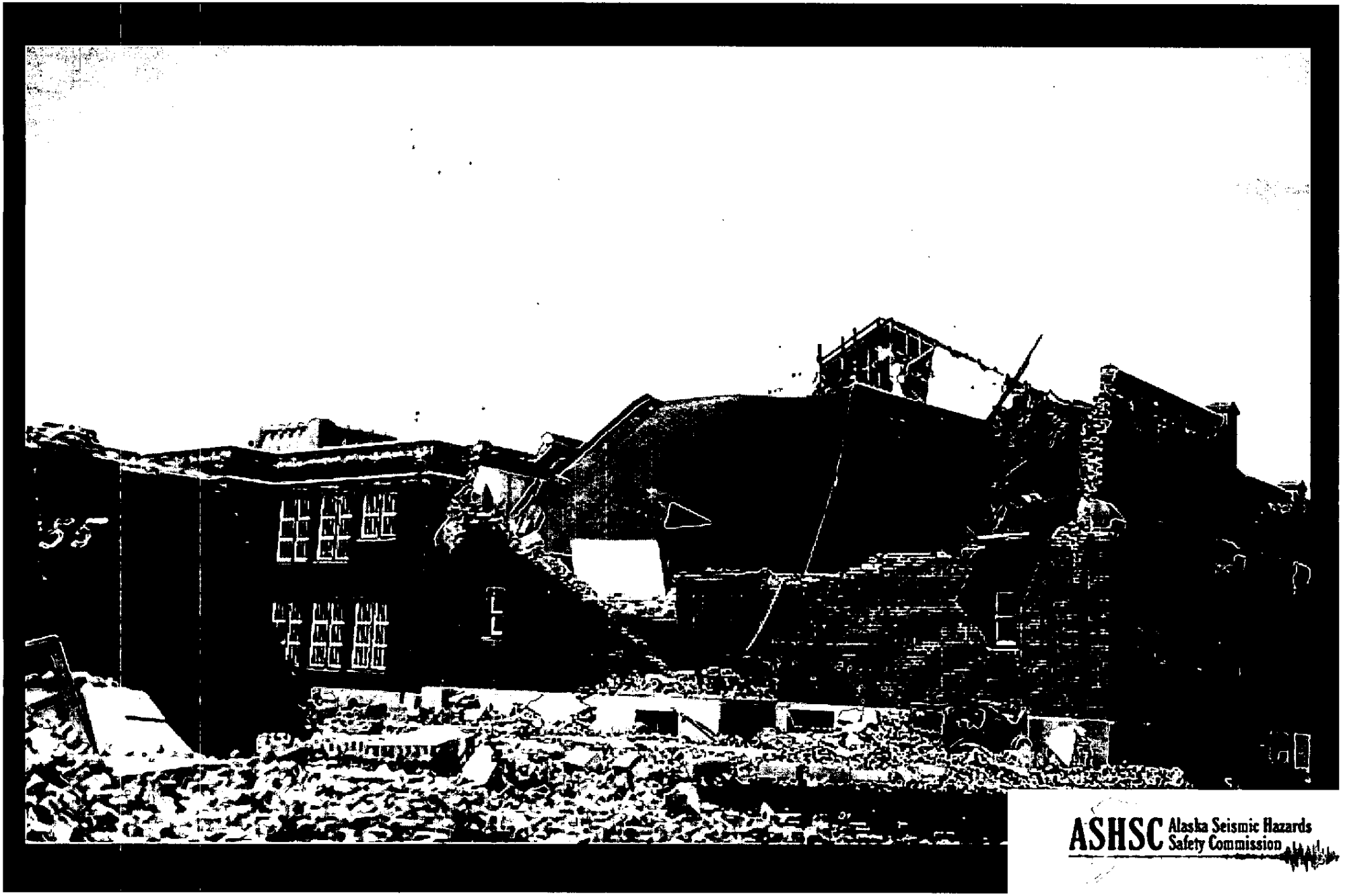

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Pertinent Legislation

- FEMA's Hazard Mitigation Grant Program (HMGP)
- FEMA's Pre-Disaster Mitigation Grant Program (PDM)
- National Earthquake Hazards Reduction Program (NEHRP)
- California (Field Act)
- Oregon, Washington, Nevada, Utah

ASHSC Alaska Seismic Hazards Safety Commission

The Kodiak Island Borough Experience

- Seismic Vulnerability Assessment for 13 Schools
- Evaluated 6 Seismic Hazards
- Recommended Structural Seismic Upgrades
- Recommended Higher Standard for New Construction
- Considered Non-Structural Hazards
- Performed Benefit cost Analysis

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Lessons Learned

- Recognition of the Problem
- Identification of Structures at Risk
- Prioritization of Mitigation
- Final Determination of Mitigation Projects

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Closure and Next Steps

- ASHSC to Refine Tasks & Continue Its Efforts Identifying Existing At-Risk Schools
- Currently Working on a School's Brochure
- Studying Seismic Requirements that Would Be Particular to Schools
- For New Schools & Major Renovations
  - » Require independent peer review of lateral force resisting element design
  - » Require resident observation of construction.

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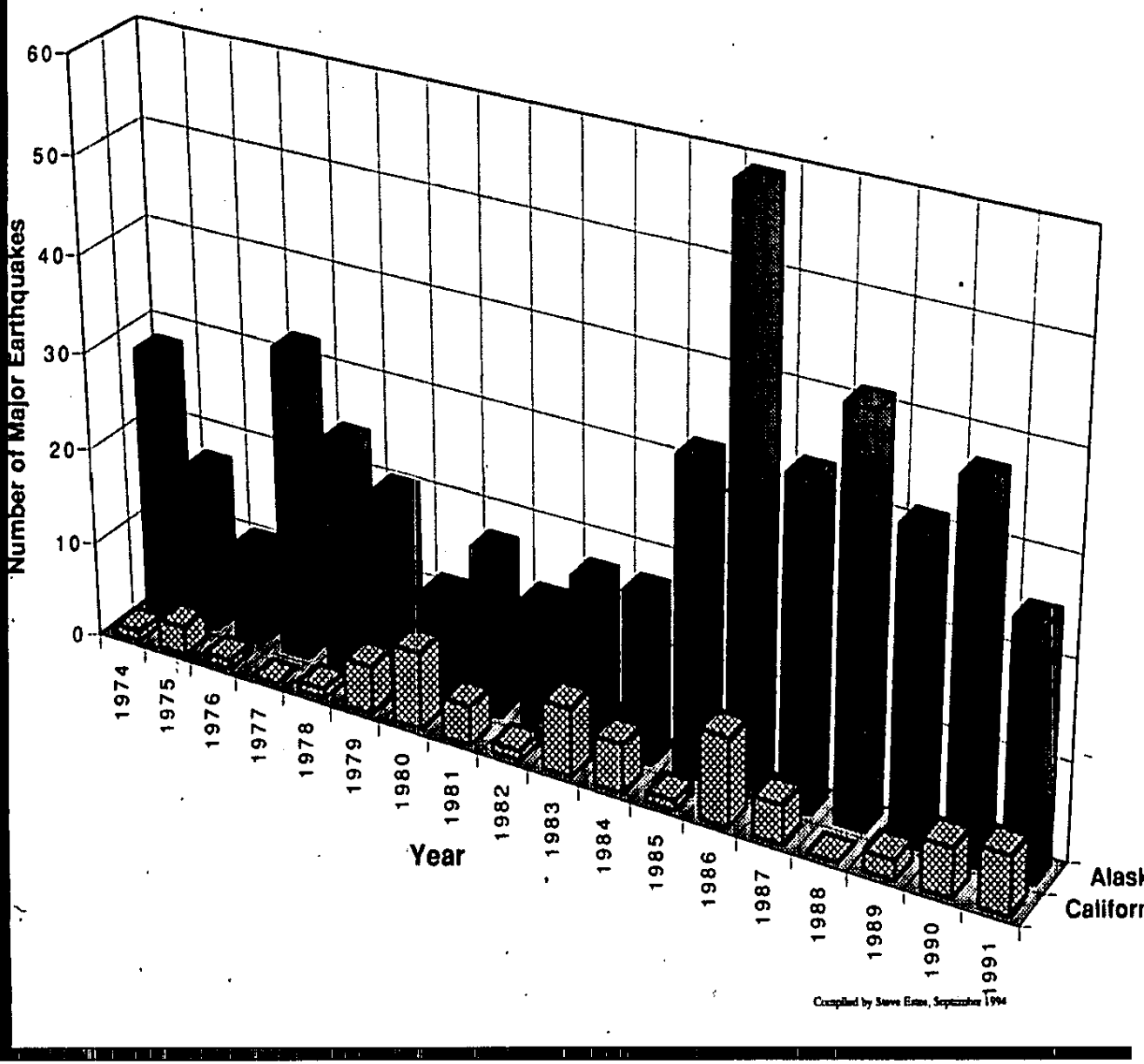

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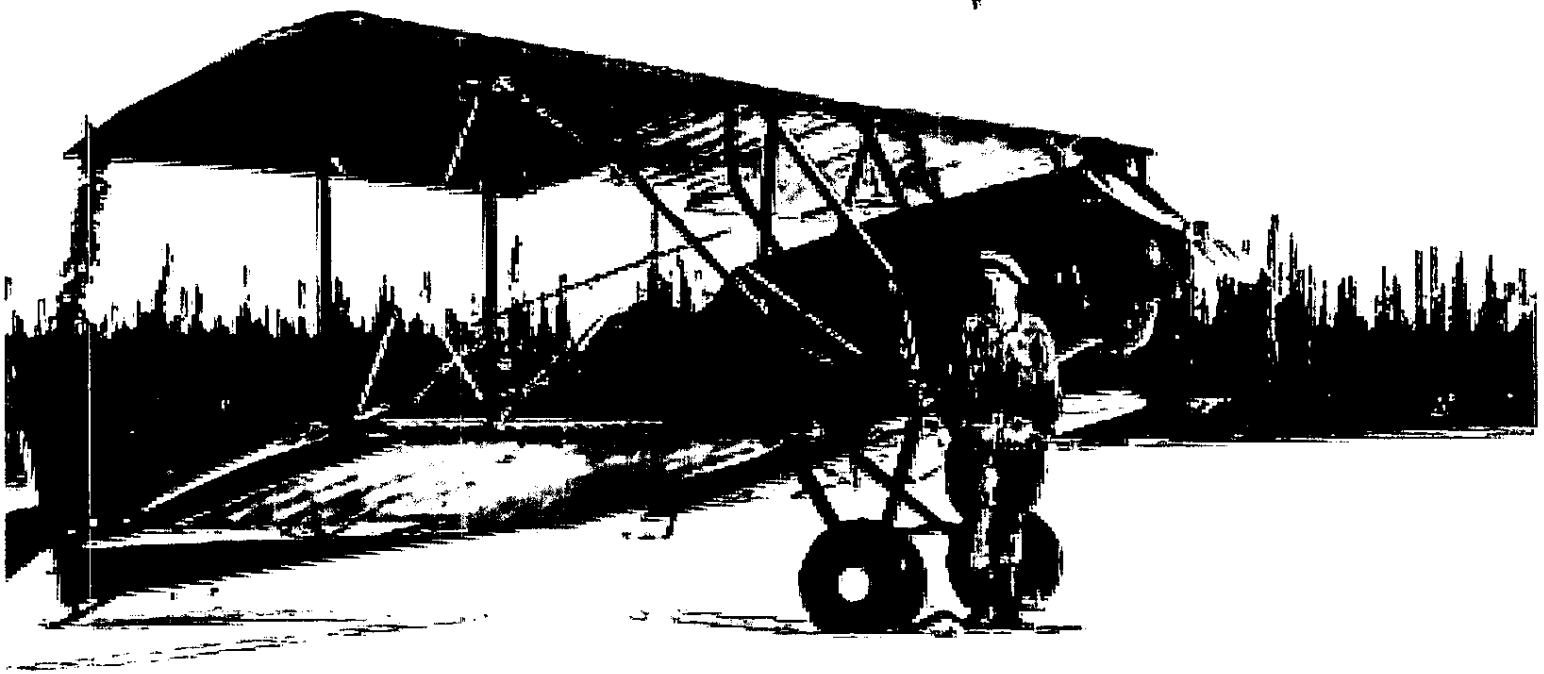
QUESTIONS?

9/11 ends now in Alaska

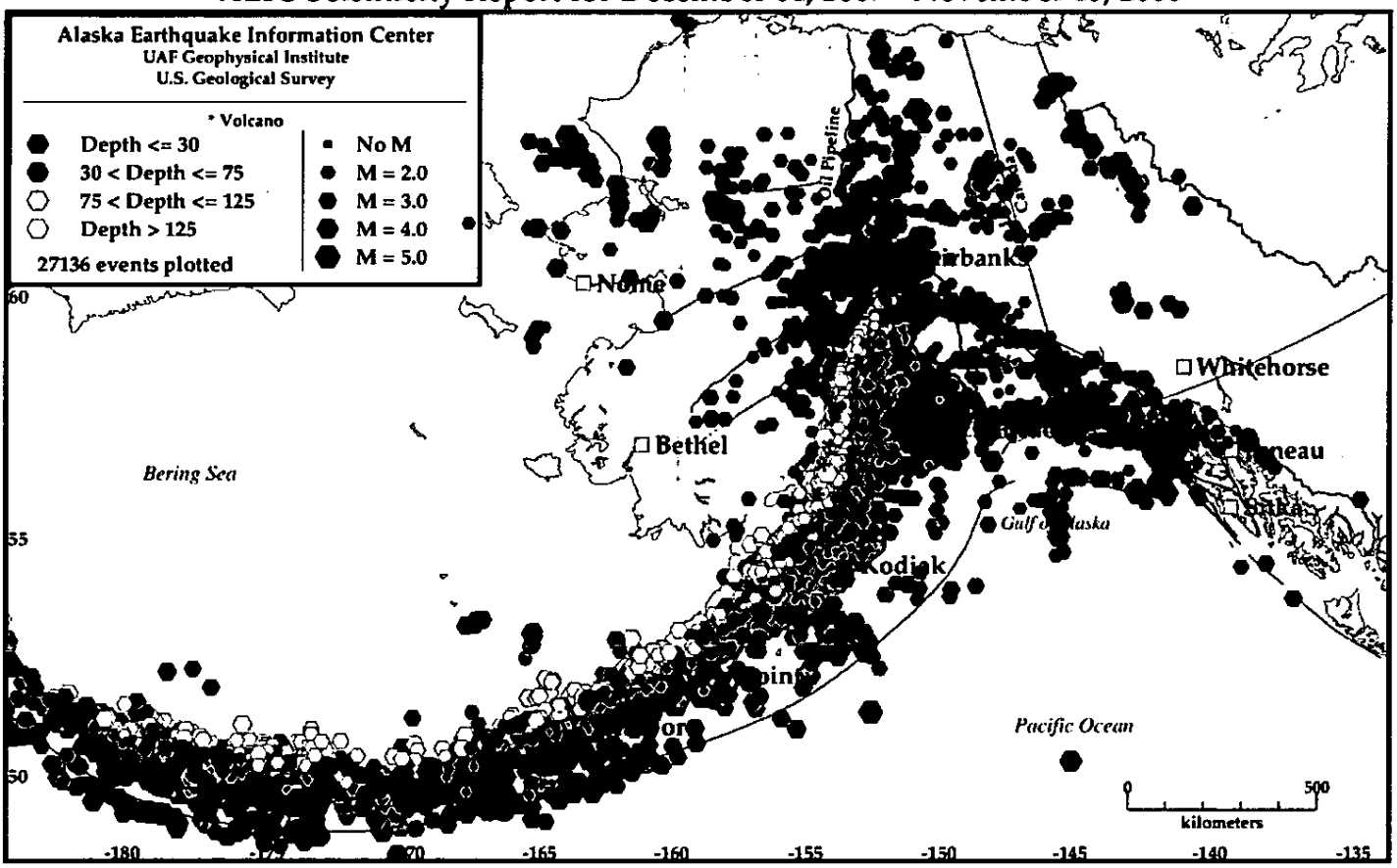


ASHSC Alaska Seismic Hazards Safety Commission

Alaska Seismic Hazards Safety Commission

Report to the Governor and State Legislature
FEBRUARY 2009

AEIC Seismicity Report for December 01, 2007 - November 15, 2008



ASHSC Alaska Seismic Hazards Safety Commission

ALASKA SEISMIC HAZARDS SAFETY COMMISSION

Report to the Governor and State Legislature

FEBRUARY 2009

EXECUTIVE SUMMARY

This annual report to the Governor and Legislature from the Alaska Seismic Hazards Safety Commission (ASHSC) reiterates the priority issues and goals of the Commission and identifies its 2008 accomplishments. The report updates the history and status of the Commission, identifies the current membership, lists the accomplishments to date, describes various committee functions, and presents the Commission's recommendations to improve seismic safety in Alaska.

The Commission operates under the powers and duties prescribed by its enacting legislation (Appendix A) and is guided by its Charter (Appendix B) which provides a clear understanding of the Commission's roles and expectations, empowers Commission members, and provides operating guidelines agreed to by all members.

During the past year the Commission has invited numerous governmental and private organizations to give presentations describing their approaches to seismic risk mitigation. These briefings have provided the members of the Commission with opportunities to gain an understanding of current programs and various approaches to seismic risk mitigation, identify areas of concern, and to focus initial mitigation efforts in these areas. These briefings are available for viewing on the Commission web site.

The Commission's efforts in 2008 have reinforced its belief that seismic risk mitigation issues can be addressed in an economical way that will result in improving the quality of life and public safety in Alaska. The Commission continues to address the following policy recommendations:

- Structural stability of critical facilities
- Earthquake insurance necessity and availability
- Approaches to seismic risk mitigation in future construction
- Response and recovery practices to mitigate future seismic risk
- Hazard identification and public education

These policy recommendations are currently being addressed through the following standing committees:

- Insurance
- Schools
- Earthquake Scenarios
- Education and Outreach
- Hazards Identification
- Response, Recovery, and Loss Estimation
- Post-earthquake Planning
- Partnership

The 2008 activities of these committees are described in more detail in subsequent paragraphs.

Our basic public-policy goal areas remain unchanged from the 2007 Commission report:

- Education
- Guidance
- Assistance
- Implementation

INTRODUCTION

The Alaska Seismic Hazards Safety Commission ("the Commission") is charged by statute (AS 44.37.067; Appendix A) to recommend goals and priorities for seismic hazard mitigation to the public and private sectors; recommend policies to the governor and the legislature, including needed research, mapping, and monitoring programs; review the practices for recovery and reconstruction after a major earthquake; recommend improvements to mitigate losses from similar future events; and to gather, analyze, and disseminate information of general interest on seismic hazard mitigation, among other duties to reduce the state's vulnerability to earthquakes. The Commission consists of eleven members appointed by the Governor from the public and private sectors for three-year terms. It is administered by the Department of Natural Resources, Division of Geological & Geophysical Surveys (DGGS).

Commission members include: A representative from the University of Alaska, three representatives from local government; a representative from the Department of Natural Resources; a representative of the Department of Military and Veterans' Affairs; a representative from an appropriate federal agency; a representative of the insurance industry; and three members of the public who are experts in the fields of geology, seismology, hydrology, geotechnical engineering, structural engineering, emergency services, or planning. Six members constitute a quorum. The Commission membership elects its own chair and vice-chair. There is no executive director, although DGGS provides administrative, travel, and publication support.

History and status of the Commission

In 2002, the 22nd Alaska Legislature passed, and the Governor signed into law, House Bill 53 establishing the Alaska Seismic Hazards Safety Commission with nine members. The legislation originally placed the Commission in the Office of the Governor, but in January 2003, Governor Frank Murkowski issued Executive Order Number 105 transferring the Commission to the Department of Natural Resources. Governor Murkowski appointed nine members to the Commission in 2005.

In 2005, the House of Representatives passed House Bill 83 (HB 83) to extend the Commission to June 30, 2008, add tsunami risks to its purview, and provide two additional Commission positions representing local government. In 2006, the Senate passed a substitute version of HB 83 including the two additional local government positions but omitting specific mention of tsunamis in the Commission's powers and duties. The Senate bill extended the Commission through June 30, 2012. The House concurred with the Senate version and Governor Murkowski signed the bill into law at a Commission meeting on June 16, 2006. Although the revised statute does not specifically include tsunami hazards in the Commission's powers and duties, the definitions in AS 44.37.069 include tsunami inundation as a seismic hazard. Consequently the Commission addresses tsunamis in its discussions and recommendations. As a result of passage of HB 83, the Commission currently has 11 members.

The Commission first met on October 28, 2005, at which time it elected a Chair and Vice Chair, listened to briefings from the California Seismic Safety Commission and various state and local agencies in Alaska with responsibilities in earthquake-risk mitigation, and began developing goals and priorities for its activities. There were twelve meetings of the Commission through December 2006, six of which were via teleconference. In both 2007 and 2008, the Commission held nine meetings, seven of which were via teleconference. The Commission published its first annual report to the governor and legislature on April 18, 2006. A Commission Web site posts basic information about its mission, earthquake risk in Alaska, meeting agendas, minutes, presentations, and appropriate links. The Web site address is:

http://www.dggs.dnr.state.ak.us/seismic_hazards_safety_commission.htm.

Membership

Name	Representation	Contact information
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David A. Cole	Public member	DOWL Engineers 4041 B Street Anchorage, AK 99503 Phone: (907) 562-2000 Email: dcole@dowl.com
Rodney A. Combellick	Alaska Department of Natural Resources	Div. of Geological & Geophysical Surveys 3354 College Rd. Fairbanks, AK 99709 Phone: (907) 451-5007 Email: rod.combellick@alaska.gov
Gay Dunham	Local government	City of Valdez P.O. Box 2975 Valdez, AK 99686 Phone: (907) 835-2339 Email: runninghorse@cvinternet.net

Roger A. Hansen	University of Alaska	UAF, Geophysical Institute P.O. Box 757320 Fairbanks, AK 99775-7320 Phone: (907) 474-5533 Email: roger@giseis.alaska.edu
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Kathy Hosford	Local government	Chilkoot Trail Outpost P.O. Box 286 Skagway, AK 99840 Phone: 907-209-4399 Email: khosford@aptalaska.net
Laura W. Kelly	Vice-chair, Federal agency	U.S. Coast Guard P.O. Box 195025 Kodiak, AK 99619-5025 Phone: (907) 487-5320 Email: laura.w.kelly@uscg.mil
Dean Maxwell	Insurance industry	State Farm Insurance 2351 North Love Drive Palmer, AK 99645 Phone: 907-261-3793 Email: Dean.Maxwell.A4TF@statefarm.com
Mark Roberts	Alaska Department of Military & Veterans Affairs	Division of Homeland Security & Emergency Management P.O. Box 5750 Fort Richardson, AK 99505 Phone: (907) 428-7016 Email: mark.roberts@alaska.gov

EARTHQUAKE RISK IN ALASKA

Alaska has more earthquakes than any other region of the United States and is, in fact, one of the most seismically active areas of the world. The second largest earthquake ever recorded occurred on the Prince William Sound portion of the Alaska-Aleutian megathrust in southern Alaska on March 27th, 1964, with a moment magnitude of 9.2. The largest on-land earthquake in North America in almost 150 years occurred on the Denali fault in central Alaska on November 3rd, 2002, with a magnitude of 7.9. In 2008 alone, the Alaska Earthquake Information Center recorded about 27,000 earthquakes (see Cover photograph), including over 400 events with magnitude 4.0 or greater, 73 events of magnitude 5.0 or greater and nine events of magnitude 6.0 or greater. It is not possible to predict the time and location of the next big earthquake, but the active geology of Alaska guarantees that major, potentially damaging earthquakes will continue to occur.

Alaska has changed significantly since the great 1964 earthquake. The population has more than doubled, but many new buildings are designed to prevent collapse during intense shaking. Some older buildings have been reinforced, and development has been discouraged in some particularly hazardous areas. However, despite these improvements, and because practices to reduce vulnerability to earthquakes and tsunamis are not applied uniformly in regions of high risk, future earthquakes may still cause life-threatening damage to buildings, cause items within buildings to be dangerously tossed about, and disrupt the basic utilities and critical facilities that we take for granted.

With the occurrence of the 1964 Prince William Sound and 2002 Denali fault events in recent decades, damaging earthquakes in the near future may be more likely to occur on other geologic sources. These include the Castle Mountain fault in lower Matanuska-Susitna valley, the Wadati-Benioff zone beneath Anchorage, the active belt of faulting and folding in northern Cook Inlet, the Fairbanks seismic zone, and Yakataga seismic gap near Yakutat, among others. While the seismic provisions of current Alaska building codes are largely geared toward preventing collapse from the types of shaking that occurred in 1964, earthquakes on these other sources may affect structures differently, in ways that may or may not be ameliorated by the current codes.

As discussed below, earthquakes of magnitudes that could cause major structural damage and injury to residents continue to occur in Alaska.

Earthquake activity in 2008

On April 15, 2008, at 2:59 pm ADT, a strong earthquake, magnitude 6.4, occurred in the Andreanof Islands region. It was followed by a larger earthquake of magnitude 6.6 on April 15 at 9:54 pm ADT (red stars on fig. 1). The events were about 124 km (77 miles) ENE of Amchitka and 179 km (112 miles) W of Adak. The Alaska Earthquake Information Center (AEIC) located over 550 aftershocks through the end of April (crosses). The largest aftershock of magnitude 5.0 occurred on April 18 at 12:51 pm ADT. These earthquakes are the largest to occur in this region since the magnitude 7.2 event on December 19, 2007 (large white star on the map).

The April, 2008 earthquakes occurred in the area separating rupture zones of the 1965 M8.7 Rat Islands earthquake to the west and the 1957 M8.6 Andreanof Islands earthquake to the east (approximate extent of the rupture zones is shown in red). In the last five years, sixteen M6-7 and three M7+ earthquake occurred within the area shown on the above map. Most of these events occurred on the plate interface between the subducting Pacific and overriding North American plates.

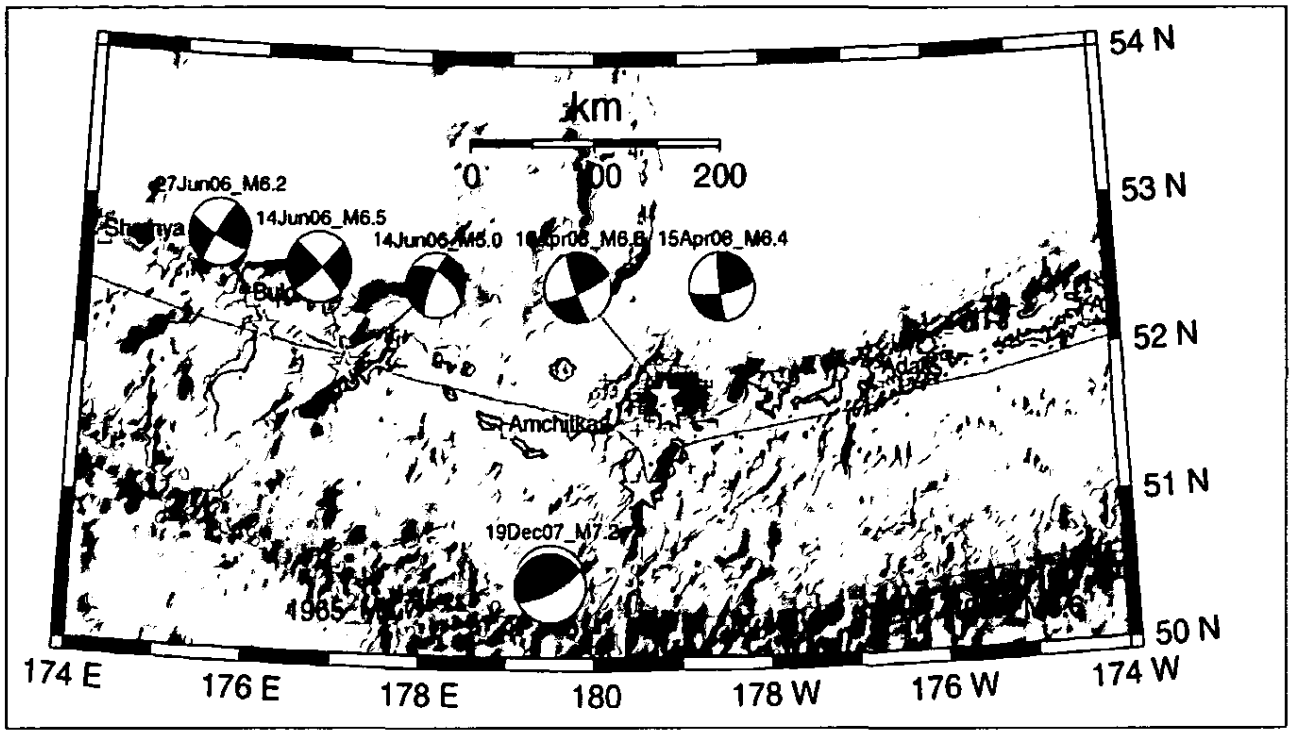

Figure 1. April 15 and 16, 2008 M6.4 and 6.6 Andreanof Islands earthquakes.

On May 2, 2008, at 5:33 pm ADT, a strong earthquake, magnitude 6.6, occurred in the Andreanof Islands region of the Aleutian Islands (see fig. 2). The event was about 64 km (40 miles) W of Adak and 238 km (149 miles) E of Amchitka. It was felt strongly on Adak. No reports of damage have been received. The AEIC recorded nearly 1500 aftershocks through the end of May. The largest aftershock was magnitude 5.0 and occurred on May 8 at 6:12 am ADT. On April 15 and 16, magnitude 6.4 and 6.6 earthquakes, respectively, occurred about 110 km (69 miles) west of the May 2 event (red stars).

The strongest known earthquakes in this region are the 1965 M8.7 Rat Islands earthquake to the west and the 1957 M8.6 Andreanof Islands earthquake to the east (approximate extent of the rupture zones is shown in red). In the last five years, eighteen M6-7 and three M7+ earthquake occurred within the area shown on the above map. Most of these events occurred on the plate interface between the subducting Pacific and overriding North American plates.

On August 6, 2008, a vigorous seismic swarm occurred in the vicinity of Kasatochi volcano in Andreanof Islands (see fig. 3). Starting at 7:00 am ADT on August 6, the intensity and frequency of the earthquakes rapidly increased resulting in ~1,100 events located over the course of 48 hours during the most energetic part of the swarm. The largest earthquake, magnitude 5.8, occurred about 27 hours into the sequence and about 3.5 hours before the first aerial ash discharge from Kasatochi was detected by the Alaska Volcano Observatory through satellite data. This discharge was followed by two more explosions, also detected via satellite monitoring. The 3rd explosion consisted of nearly continuous ash emissions and declined in frequency and intensity through about 2:00 pm ADT on August 8. The seismic swarm intensity started to decline at about 10:00 am ADT on August 8, and continued to decline through the end of August. Overall, there is a strong causative relation between behavior of the seismic swarm and the eruption episodes. Due to seismic network limitations in the region (all stations

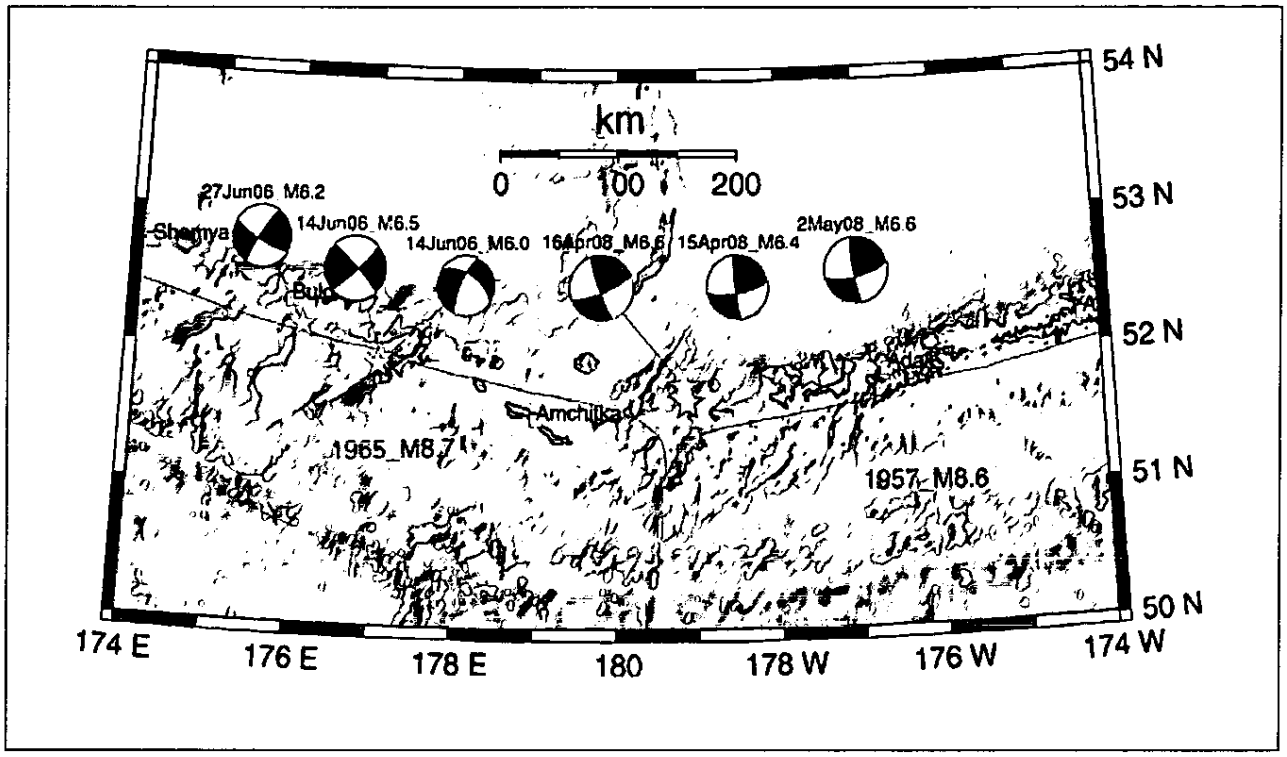

Figure 2. May 2, 2008 M6.6 Andreanof Islands earthquake.

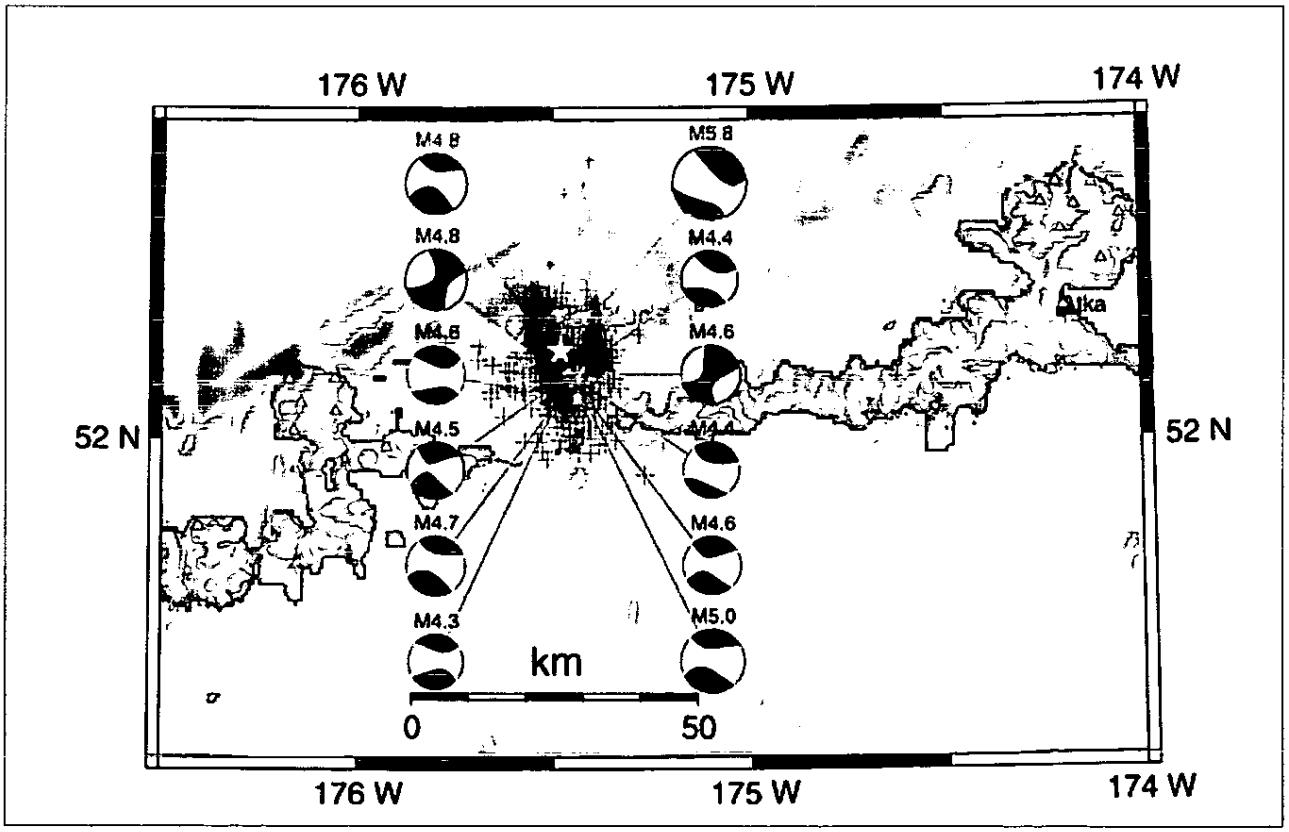

Figure 3. Earthquake swarm associated with the August 2008 Kasatochi volcano eruption.

are in a linear array along the island arc), determining accurate locations of the Kasatochi seismicity became a challenge. The locations have much larger uncertainties in the N-S direction than in the E-W direction, and overall are poorly constrained.

Some additional earthquake statistics for Alaska

- Eleven percent of the world's recorded earthquakes have occurred in Alaska.
- Alaska has more frequent earthquakes than the entire rest of the United States.
- Three of the eight largest earthquakes in the world were in Alaska (see fig. 4).
- Seven of the ten largest earthquakes in the United States were in Alaska.

Since 1900, Alaska has had an average of:

- One "great" earthquake (magnitude 8) or larger earthquake every 13 years
- One magnitude 7 to 8 earthquake every year.
- Six magnitude 6 to 7 earthquakes per year.
- Forty five magnitude 5 to 6 earthquakes per year.
- Three hundred twenty magnitude 4 to 5 earthquakes per year.
- About 1,000 earthquakes recorded in the state each month.

It is not possible to predict the time and location of the next big earthquake, but the active geology of Alaska guarantees that major potentially damaging earthquakes will continue to occur. Scientists have estimated where large earthquakes are most likely to occur, and the probable levels of ground shaking to be expected throughout the state. With this information, as well as information on soil properties and landslide potential, it is possible to estimate earthquake risks in any given area. It is also possible to estimate the potential for earthquakes to generate tsunamis, and to model the extent to which tsunamis will inundate coastal areas.

The Federal Emergency Management Agency[1] estimates that with the present infrastructure and policies, Alaska will have the second highest average annualized earthquake-loss ratio (ratio of average annual losses to infrastructure) in the country. Reducing those losses requires public commitment to earthquake-conscious siting, design, and construction. The Seismic Hazards Safety Commission is committed to addressing these issues. Earthquake-risk mitigation measures developed by similar boards in other states have prevented hundreds of millions of dollars in losses and significant reductions in casualties when compared to other seismically active areas of the world that do not implement effective mitigation measures.

COMMISSION ACCOMPLISHMENTS IN 2008

General

- Held seven telephonic and two face-to-face meetings of the Commission.
- Four Commission members were invited, and attended, a national workshop on development of Earthquake Planning and Response Scenarios, sponsored and funded by the Earthquake Engineering Research Institute with a grant from the National Earthquake Hazards Reduction Program.

[1]HAZUS 99 Estimated Annualized Earthquake Losses for the United States, Federal Emergency Management Agency Report 366, September 2000.

- The Commission sponsored the Kodiak Island Borough School District's nomination to the Western States Seismic Policy Council (WSSPC) for recognition of their seismic safety efforts. The School District won the national overall Award for Excellence in Seismic Mitigation for these activities.
- ASHSC Commission Chairman John Aho gave a presentation to DNR Commissioner Tom Irwin concerning Commission activities.
- Heard briefings on seismic risk reduction and current research from seven individuals representing external organizations.
- Developed and published its third annual report to the governor and legislature in March 2008.
- The Commission cosponsored, with the University of Alaska Anchorage and the Earthquake Engineering Research Institute (EERI), the Joyner Lecture given by Chris Poland of Degenkolb Engineers, titled '*Building a Resilient Community: Preparing for the Next Earthquake*".
- Commissioner Laura Kelly was named 2009 Engineer of the Year by the United States Coast Guard (USCG). This award recognizes the outstanding engineer throughout the entire USCG. She is also nominated as a candidate for Federal Engineer of the Year.
- Delivered Commission correspondence to Department of Geological and Geophysical Services (DGGS) Director Robert Swenson that encouraged the mapping of existing earthquake faults. Director Swenson responded favorably indicating that fault tectonics is on the short-term planning list.
- Continued work associated with the existing six standing committees: Insurance, Schools, Earthquake Scenario, Education and Outreach, Hazards Identification, and Response, Recovery and Loss Estimation.
- ASHSC Commission Chairman John Aho gave presentations concerning Commission activities specifically related to seismic risk mitigation for schools to the State of Alaska Board of Education and Early Development and to the Council of Educational Facility Planners International.
- Toured the Alaska Division of Homeland Security and Emergency Management (ADHS&EM) Emergency Operations Center.
- The Commission heard a short presentation by Department of Natural Resources (DNR) Commissioner Tom Irwin in support of their activities.

Policy Recommendations

- Assess the structural stability of critical facilities
- Address the importance of earthquake insurance
- Address approaches to seismic risk mitigation in future building construction
- Address response and recovery practices to mitigate future seismic risk
- Address hazard identification and public education

The following Standing Committees are now functional with chairpersons named and members assigned

- Insurance
- Schools
- Earthquake Scenario
- Education and Outreach
- Hazards Identification
- Response, Recovery, and Loss Estimation
- Post Earthquake Planning
- Partnership

ONGOING COMMISSION ACTIVITIES

The Alaska Seismic Hazards Safety Commission (ASHSC) continues to operate within its budget of $10,000 per year. The eleven (11) Commission members, representing over 250 years of combined experience in seismic risk identification and mitigation activities, continue to donate their time and effort to addressing the seismic safety issues so important to Alaska's residents.

The activities of the various Commission standing committees are discussed in the following paragraphs.

Insurance Committee

A 1985 Federal Emergency Management Agency (FEMA) document titled "Earthquake Insurance: A Public policy Dilemma" examined the issues and problems associated with the availability and procurement of earthquake insurance. This dilemma has touched residents of Alaska with the announcement that the number two carrier, with slightly more than 21 percent of the Alaska earthquake insurance market, recently announced that it is withdrawing its optional earthquake coverage nationwide. Many previously insured Alaska residents are now without property earthquake insurance.

The committee is currently addressing the following issues and concerns:

- Expertise required by Division of Insurance regarding the use of modeling for earthquake insurance premiums.
- Public understanding of the consequences of inaction concerning obtaining insurance protection.
- Public expectations of post-event assistance from the government.
- The current public perception of earthquake insurance rates and availability.
- The potential of providing incentives for earthquake risk mitigation efforts such as cost savings for individual efforts.
- Consider approaches to addressing public apathy toward obtaining earthquake insurance.
- How can earthquake insurance be offered that is equitable, fair, and affordable?
- How can the public be motivated to consider earthquake insurance?

The following deliverable items are being considered to address the issues and concerns;

- Work with the Alaska Department of Insurance (ADOI) to assist in establishing and developing standards for rate modeling for earthquake insurance premiums.
- Partner with ADOI to develop public information and awareness.
- Develop a topic paper to disseminate to the public regarding earthquake insurance issues focusing on insurance availability and coverage and what assistance is, or is not, available.
- Develop instructions to the public on how to make informed decisions regarding the need for earthquake insurance.

Schools Committee

The Commission considers the safety of children in Alaska's schools during a major seismic event of paramount importance. Schools are also considered critical public facilties because they are often

used as temporary shelter following earthquakes and other disasters. The committee is considering existing, renovated, and new school facilities. While seismic safety of existing facilities will continue to be addressed there will be an increased concentration on addressing the appropriate design and construction oversight of new and renovated facilities. The committee will develop recommendations to be presented to the Alaska Board of Education and Early Development and, if required, the Legislature requesting:

- That all new school design projects be required to have an independent review of the seismic design calculations and details.
- That major renovations to existing facilities be required to have a review, and modification if necessary, of their existing lateral force resisting system.
- That qualified resident observation be required of construction of the facility's lateral force resisting system.

The committee's goals include mitigating the potential for damage as shown in figures 4 & 5.

The Anchorage High School failure (fig. 4) was a result of strong ground shaking during the 1964 Great Alaska Earthquake and the inadequate lateral force resistance of the non-ductile concrete material design. Although most are probably safe, many structures designed prior to 1973 have the potential for similar damage in major seismic event. All schools in areas of high seismic risk should be evaluated.

Figure 5 shows an entire gymnasium roof collapse initiated by a heavy snowfall and inadequate structural design and improper construction. Research relating to the roof failure also uncovered the fact that the entire building was inadequately designed and constructed for lateral force (wind and seismic) resistance. The redesigned facility was constructed at a cost that exceeded the original cost of the facility.

Figure 4. Anchorage High School, 1964 Alaska earthquake (photo credit Anchorage Museum).

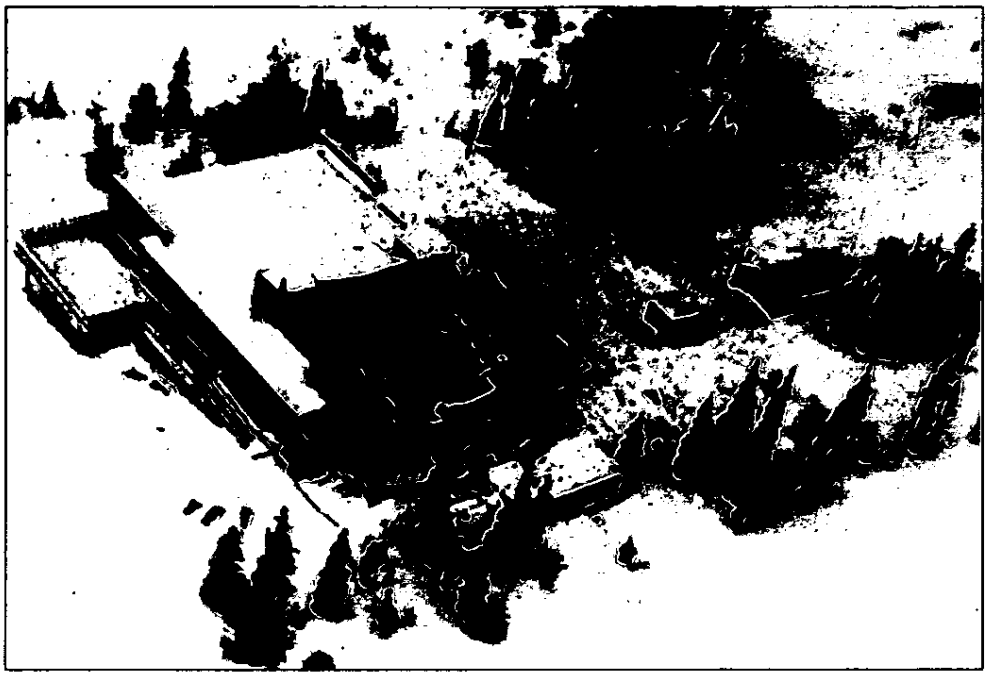

Figure 5. Aleknagik gym roof failure, snow load 1983 (photo credit John Aho).

The Anchorage High School failure reinforces the need for independent peer review of designs. The Aleknagik School failure reinforces the need for not only independent peer reviews of school designs but also qualified resident observation of construction.

Earthquake Scenario Committee

Earthquake planning scenarios have been used successfully in other areas of the U.S. to identify weaknesses in the built environment as well as vulnerable interdependencies among utility systems that could result in multiple or cascading failures if even only one system fails. These planning scenarios describe a hypothetical but geologically realistic earthquake; define the types and severity of shaking and ground breakage likely to occur; describe the likely impacts to facilities, including disruptions to utilities and transportation systems; describe secondary effect such as fire and toxic materials release; estimate the numbers of deaths, injuries, and dollar value of losses by building type; and estimate the long-term business losses and socioeconomic consequences. The resulting information provides the basis for planning earthquake response exercises, prioritizing and pre-locating response resources, and developing mitigating measures for reducing vulnerability to future earthquake damage.

Developing an earthquake planning scenario requires assembling pertinent geologic and seismologic data for a realistic event, compiling building and utility system inventory information for the affected region, assigning seismic fragilities to the building stock, assembling current data on population demographics, using loss-estimation technology such as HAZUS software to model the event using all the compiled data, and documenting the results in one or more reports and presentations. The Earthquake Engineering Research Institute (EERI) has noted in a document titled "An Overview of Scenario Planning" that: "A well crafted scenario provides a powerful tool for members of private industry, government officials, and the general public to begin to draft mitigation policies and programs."

Committee members attended a national workshop on developing earthquake scenarios sponsored by the Earthquake Engineering Research Institute and are now considering the requirements and funding necessary to develop planning earthquake scenarios for Alaskan urban and rural communities.

Education and Outreach Committee

Initial ASHSC Education and Outreach Committee efforts will be to focus on legislators, the governor's office, administrative agencies, local governments, local emergency planning committees, and industry groups. The Committee strives to avoid duplicating efforts by other groups with responsibility for addressing earthquake education and outreach.

The Committee is currently working on the following future deliverables:

- Periodic press releases addressing Commission activities or interesting facts relating to seismic risk mitigation
- Periodic newsletter to the governor's office and legislators
- Develop a directory of speakers with an expertise in seismic risk mitigation issues
- Develop a media education package with materials to explain basic seismic risk information to students and the public (see for example fig. 6)
- Develop potential model legislation

Figure 6. Mentasta children iImmediately after 2002 Denali Fault earthquake (photo credit John Aho).

The reaction of residents of rural communities following the 2002 Denali Fault Earthquake underscores the need to begin considering methods of educating residents of Alaska's smaller isolated communities of the potential consequences of a major earthquake and what they can do to mitigate potential effects of such an event.

Hazards Identification Committee

Earthquake-risk mitigation authors have noted that any earthquake loss reduction program entails three basic elements: (1) understanding the nature and extent of the earthquake risk, (2) taking actions to reduce that risk, and (3) establishing policy to guide the development of effective earthquake risk reduction programs. The purpose of the ASHSC Hazards Identification Committee is to address item 1 above.

Goals of the Committee continue to be to promote:

- Identification and characterization of the seismic hazards
- Definition and description of the seismic risks
- Seismic risk and hazard research
- Dissemination of seismic hazard and risk information to state and local governments, the public, business and industry, and the scientific and professional communities

The committee continues to address approaches to identifying and mapping previously unknown earthquake faults through its own activities and requests to the State of Alaska for mapping existing known fault systems. The ultimate result will be to prevent situations such as shown in figure 7 where construction occurred over an active earthquake fault. In addition we hope to make residents aware of massive landslides and other ground failures that can occur during a major seismic event (see fig. 8).

Figure 7. Denali Fault 2002 (photo credit John Aho).

Figure 8. Massive land sliding, Black Rapids Glacier, Denali earthquake 2002 (photo credit USGS).

The Commission also heard a presentation on the Sechuan Earthquake by UAA professor Dr. Joey Yang concerning the relatively common phenomenon called "quake lakes". These are large bodies of water that form when earthquake-initiated landslides dam rivers. These can have detrimental effects on land and infrastructure downstream from the dams and bordering the rivers, particularly when the water overtops the dam, breaches the loosely deposited material, and drains catastrophically.

Response, Recovery, and Loss Estimation Committee

Among the powers and duties assigned to the commission by enacting legislation are to "offer advice on coordinating disaster preparedness and seismic mitigation activities of government at all levels, review the practices for recovery and reconstruction after a major earthquake, and recommend improvements to mitigate losses from future similar events.

The ASHSC Response, Recovery, and Loss Estimation Committee, chaired by the Commission member from the Division of Homeland Security and Emergency Management will address such tasks as:

- The need for an integrated approach to building design, land use, and emergency planning
- Creation of standard protocols for the various functions necessary in managing an earthquake disaster
- Address warning systems and the appropriate distribution of warnings
- Develop an understanding of the recovery process
- Address the provision of shelter and relief supplies

Important issues to be addressed prior to a damaging earthquake include the approaches to be used for victim extraction and debris removal. These are often areas that are neglected in earthquake risk reduction planning.

For example, development of a local guidance plan for debris removal is important. This would include pre-disaster agreements with public and private equipment and service providers and identification of disposal sites.

The committee will address approaches to situations as shown in figure 9 should they occur.

The Committee will develop work tasks for their efforts in 2009.

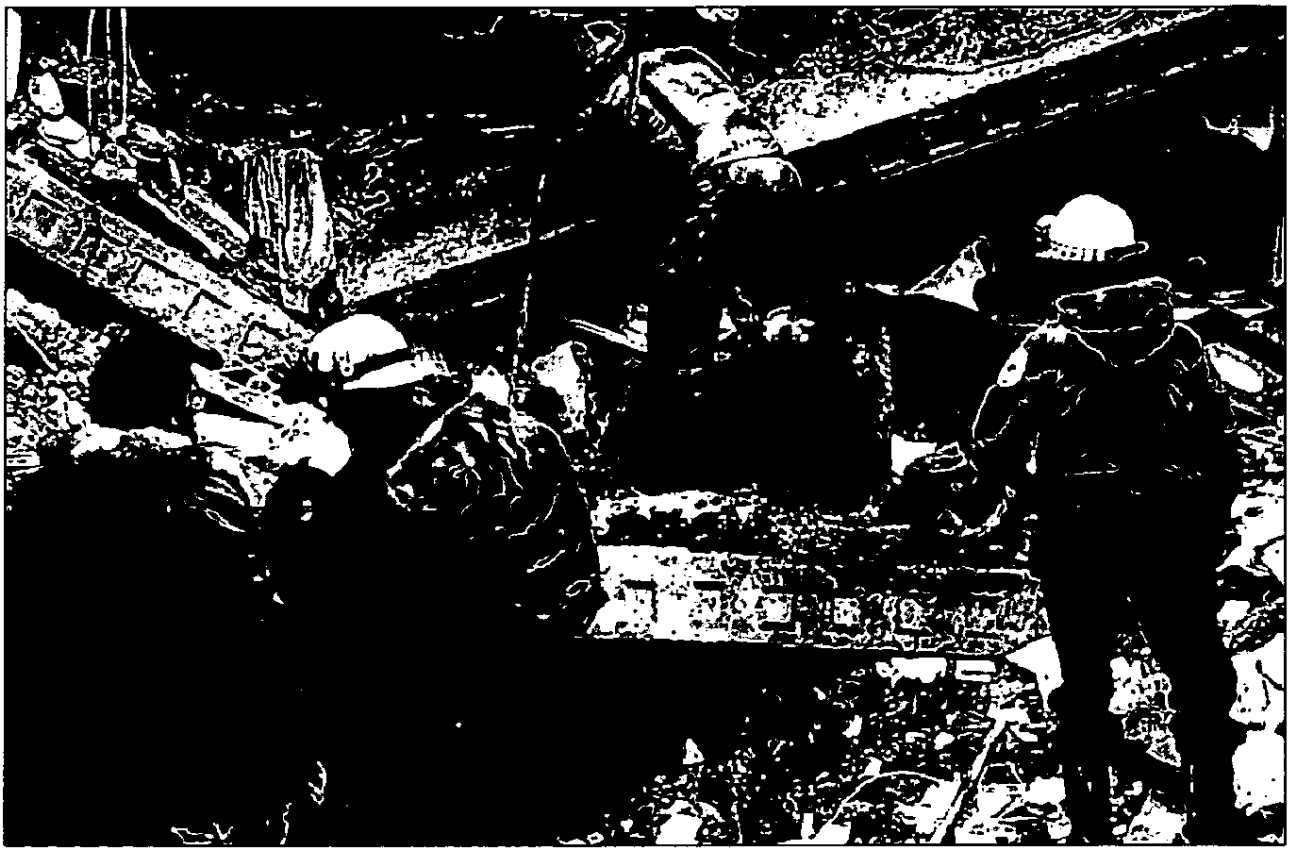

Figure 9. Rescue efforts in Mexico City, 1985 (photo credit EERI).

Post-Earthquake Planning Committee

This committee will be combined with the Response, Recovery, and Loss Estimation Committee and the new committee will be renamed to reflect its new tasks.

The tasks associated with the current ASHSC Post-Earthquake Planning Committee are currently being developed. The purpose of the Committee is to recommend future recommendations and draft policies that will be developed in advance and made available during the window of opportunity after a major seismic event when public and legislative interest is high. The deliverables might address specific response approaches based on the size of the event and resultant damages, as well as proposed new policies to prevent similar damage from future earthquakes.

Partnership Committee

Commission enacting legislation charges them to "establish and maintain necessary working relationships with other public and private agencies". The purpose of the ASHSC Partnership Committee is to investigate potential relationships.

The committee partnered with the Earthquake Engineering Research Institute and the University of Alaska Anchorage to present the "Joyner Lecture" given by Chris Poland, an internationally known structural engineer. Poland's lecture focused on the responsibility of earthquake professionals to deliver expertise on earthquake resilience in an understandable fashion that can be interwoven into public policy. "No one else has the technical knowledge to bring that perspective to the policy table." Poland observed that progress on implementing an action plan for reducing losses to acceptable levels in future earthquakes appears to be stalled due to a lack of funding and political will caused by complacency, misunderstanding, and an absence of persistent lobbying by the earthquake experts. He believes that the way to help policy makers understand how much damage the built environment will experience is to craft a message in broad-based, usable terms that name the hazard, define performance, and establish a set of performance goals that make clear the resiliency needed to enhance a community's natural ability to rebound.

Future committee activities will include beginning initial planning for the 2014 International Earthquake Engineering Conference to be held in Anchorage, Alaska. This conference will draw 1000-1500 earthquake risk mitigation specialists from all over the world in commemoration of the fiftieth anniversary of the Great Alaska Earthquake of 1964.

SEISMIC-RISK ISSUES BEING ADDRESSED BY THE ALASKA SEISMIC HAZARDS SAFETY COMMISSION

The following issues relating to seismic risk mitigation continue to serve as a guide to developing the path forward for the Commission and for the formation of standing committees.

1. Assess the Structural Stability of Critical Facilities

Description of the Issue: Some existing critical buildings in the state may not be constructed in a manner to withstand future earthquake and tsunami events. A specific concern is school buildings. Hospitals, clinics, and fire, rescue and police stations across the state may also be vulnerable to

failure. Also at possible risk are large Federal, State and private complexes such as military bases, Coast Guard stations, airports, college campuses, harbors, power-generating stations, communication centers, water and waste-water treatment facilities, jails and detention facilities, pipelines, and highways and bridges.

Importance of the Issue: If attention is not brought to bear on this issue before a damaging earthquake or tsunami, communities in the State could see massive structural failure of important community facilities, resulting in human casualties, economic loss, and environmental damage. Furthermore, Alaska's remote nature and extreme weather conditions can cause delays in response efforts and put displaced building occupants at severe risk from exposure. Adequate preparedness is imperative for timely rapid response and recovery from a significant seismic event.

Benefits of Addressing the Issue: Some private and public entities have taken important steps to improve the seismic resistance of key facilities and infrastructure. For example, prior to constructing the Trans-Alaska Pipeline System, Alyeska hired geologists and engineers to specifically address seismic hazards. The resulting design and earthquake-resistant construction prevented the spillage of any oil during the M7.9 Denali fault earthquake of November 3, 2002. The Alaska Department of Transportation and Public Facilities is undertaking a seismic retrofit program for State-owned bridges, and is focusing on upgrading bridges that provide critical access to communities. Some boroughs and cities across the State have taken the initiative to identify and begin retrofitting seismically vulnerable school buildings and other essential facilities.

Despite the recency of most construction in Alaska and implementation of modern building codes, many buildings and key infrastructure remain vulnerable due to proximity to seismic hazards, some of which are known and others of which are poorly understood. Building codes continue to change and have been significantly upgraded in the period between 1976 and 1997. The Federal Emergency Management Agency (FEMA) and earthquake consortia such as the Cascadia Regional Earthquake Workgroup (CREW) in the Pacific Northwest have long recognized that addressing the problems prior to a catastrophic event can have long-standing benefits in the future. However, building codes are often inadequately implemented and recommendations of advisory bodies are often ignored.

How the Commission Can/Will Address the Issue: The Commission will encourage mitigation efforts by presenting information about earthquake hazards and risk and suggesting approaches to addressing the strengthening of at-risk critical facilities. Public education must include the correct mix of information on potential damage and suggestions of effective actions to be taken.

2. Address the Importance of Earthquake Insurance

Description of the Issue: Catastrophic natural perils, particularly earthquakes, are unpredictable, relatively infrequent, and can be financially disastrous. Earthquake risk is especially difficult to insure against because insurers are unable to accumulate adequate reserves for such high severity, low frequency losses.

Importance of the Issue: Insurers are unwilling to provide insurance in a market where premium rates are inadequate to create the reserves necessary to pay for damages in the event of a major

earthquake. This can create a severe deficiency in availability of insurance as existing insurers withdraw from the market and new insurers are unwilling to enter.

Benefits of Addressing the Issue: Improved pre-loss mitigation efforts, such as retrofitting existing structures; emergency planning to speed post-loss recovery; and actuarially sound earthquake insurance rates encourage additional insurers to enter the market. This in turn improves availability of insurance products and results in more competitive premiums.

How the Commission Can/Will Address the Issue: The Commission can encourage development of public-private partnerships that provide education and mitigate the potential impact of future events. We will examine the seismic-hazard information needs of the insurance industry and provide recommendations for improvement.

3. Approaches to Seismic Risk Mitigation in Future Building Construction

Description of the Issue: Sustainable development entails maintaining environmental quality, improving a community's quality of life, and fostering social equity while maintaining a healthy economy. Therefore, sustainable development includes incorporating disaster resilience and mitigation into a community's decisions and actions. Building codes normally have a performance goal of life safety, which is considered a minimum safety level, but typically become the maximum level to which buildings are designed. Codes do not appropriately address the effects of ground failure, ground-shaking amplification, or provide guidance to designers and construction contractors.

Importance of the Issue: Communities need to know the potential earthquake risk and impacts at a structure site and should implement appropriate standards to mitigate the identified risk so new buildings are not subjected to the effects of massive ground failure and strong ground shaking.

Benefits of Addressing the Issue: The results of addressing the issue are more effective mitigation and an assurance that countermeasures are not only adequate but the cost of implementation is not prohibitive.

How the Commission Can/Will Address the Issue: The Commission will encourage continued Federal, State, and private partnerships in updating ground failure susceptibility mapping of Anchorage, ground shaking characterization in high-risk Alaskan communities, and determination of structural response of buildings and bridges. We will work with the technical community and the construction industry to inform, educate and work with communities to provide guidance to improve building and land-use codes.

4. Response and Recovery Practices to Mitigate Future Seismic Risk

Description of the Issue: Communities don't have a good understanding of the costs and resources needed for response and recovery. First responders to a damaging earthquake in one of Alaska's major cities will be overwhelmed in the initial hours following the event. Damage to transportation systems will make movement of people and goods difficult. Demand for emergency shelter, food, and water will strain a communities' resources. Disruptions to lifeline systems will complicate recovery.

Importance of the Issue: An understanding of response and recovery issues is critical to assessing the impacts to State and local resources.

Benefits of Addressing the Issue: Implementing effective response and recovery practices will reduce economic and social costs of recovery and will help mitigate risks from future events.

How the Commission Can/Will Address the Issue: The Commission will promote and assist in the development and use of "earthquake planning scenarios" to define the impact of future damaging earthquakes and will communicate lessons learned from past events to provide guidance to communities on recovery planning and preparation.

5. Hazard Identification and Public Education

Description of the Issue: A damaging earthquake has not affected a major population region in Alaska since 1964. The majority of the population is unaware of the consequences of a major seismic event. The 2002 Denali fault earthquake resulted in relatively minor damage to smaller rural communities but had little effect in larger communities such as Anchorage and Fairbanks. It was evident, during damage assessment evaluations after the Denali fault event, that the residents of the smaller at-risk communities had little understanding of the earthquake hazard, had not implemented measures to mitigate damage, and were unprepared to respond to the consequences of damage. It is important that the population of Alaska be aware of the earthquake hazard and be informed of the measures that can be taken to mitigate risk.

Importance of the Issue: There is a high probability that Alaskans will experience the results of a damaging earthquake in the future. All Alaskans will be better prepared to take measures ahead of time to reduce losses and casualties and to respond to the event if they are informed of, and truly understand, the hazard and the resultant risk.

Benefits of Addressing the Issue: An educated public has a greater potential of responding appropriately before, during, and after a damaging earthquake. Improved knowledge and public awareness of hazard and risk can change behavior and lead to more cost-effective mitigation.

How the Commission Can/Will Address the Issue: The Commission will examine the need for greater public investment in identification and assessment of earthquake hazards, and the most effective ways of communicating this information to the public. The Commission will examine and promote the concept of seismic resilience of communities, addressing reduced failure probabilities, reduced consequences of failure, and reduced time to recovery..

6. Recommended Public-policy Goals of the Commission

a. Education
   - Develop an effective public education and outreach program.
   - Convey scientific and technical information from credible authorities.
   - Communicate information in a manner that is understandable by the public.

b. Guidance
   - Provide advice on seismic risk mitigation and recommend policies to improve preparedness.

- Recommend goals and priorities for risk mitigation to public and private sectors.
- Recommend needed research, mapping, and monitoring programs.
- Offer advice on coordinating disaster preparedness and seismic risk mitigation.

c. Assistance
- Review seismic and tsunami hazard notifications and recommend appropriate response.
- Review predictions and warnings and suggest appropriate responses.

d. Implementation
- Establish and maintain working relationships with other private and public agencies.
- Gather, analyze, and disseminate information.
- Conduct public hearings.
- Appoint committees from Commission membership and/or external advisory committees to address risk mitigation issues.
- Accept grants, contributions, and appropriations.

APPENDIX A

Alaska Seismic Hazards Safety Commission statute

Sec. 44.37.065. Commission established; membership.

(a) The Alaska Seismic Hazards Safety Commission is established in the Department of Natural Resources. The Department of Natural Resources shall provide staff support to the commission.

(b) The commission is composed of 11 members appointed by the governor for terms of three years. A vacancy is filled for the unexpired term.

(c) The governor shall appoint to the commission

(1) a representative from the University of Alaska;

(2) three representatives, each from a local government in a separate seismically active region of the state;

(3) a representative from the Department of Natural Resources;

(4) a representative from the Department of Military and Veterans' Affairs;

(5) a representative from an appropriate federal agency;

(6) a representative of the insurance industry; and

(7) three members from members of the public who are expert in the fields of geology, seismology, hydrology, geotechnical engineering, structural engineering, emergency services, or planning.

(d) The commission shall elect annually from its members a chair and vice-chair. A majority of the commission may vote to replace an officer of the commission.

(e) Six members constitute a quorum.

(f) Members of the Alaska Seismic Hazards Safety Commission serve without compensation but are entitled to per diem and travel expenses authorized for boards and commissions under AS 39.20.180.

Sec. 44.37.067. Powers and duties.

(a) The commission shall

(1) recommend goals and priorities for seismic hazard mitigation to the public and private sectors;

(2) recommend policies to the governor and the legislature, including needed research, mapping, and monitoring programs;

(3) offer advice on coordinating disaster preparedness and seismic hazard mitigation activities of government at all levels, review the practices for recovery and reconstruction after a major earthquake, and recommend improvements to mitigate losses from similar future events;

(4) gather, analyze, and disseminate information of general interest on seismic hazard mitigation;

(5) establish and maintain necessary working relationships with other public and private agencies;

(6) review predictions and warnings issued by the federal government, research institutions, and other organizations and persons and suggest appropriate responses at the state and local levels; and

(7) review proposed seismic hazard notifications and supporting information from state agencies, evaluate possible socioeconomic consequences, recommend that the governor issue formal seismic hazard notifications when appropriate, and advise state and local agencies of appropriate responses.

(b) The commission may
(1) advise the governor and the legislature on disaster preparedness and seismic hazard mitigation and on budgets for those activities and may recommend legislation or policies to improve disaster preparedness or seismic hazard mitigation;
(2) conduct public hearings;
(3) appoint committees from its membership and appoint external advisory committees of ex-officio members; and
(4) accept grants, contributions, and appropriations from public agencies, private foundations, and individuals.

Sec. 44.37.069. Definitions.
In AS 44.37.065 - 44.37.069,
(1) "commission" means the Alaska Seismic Hazards Safety Commission;
(2) "disaster preparedness" means establishing plans and programs for responding to and distributing funds to alleviate losses from a disaster as defined in AS 26.23.900 ;
(3) "seismic hazard" means an earthquake-induced geologic condition that is a potential danger to life and property; in this paragraph, "geologic condition" includes strong ground shaking, landslide, avalanche, liquefaction, tsunami inundation, fault displacement, and subsidence;
(4) "seismic hazard mitigation" or "mitigation" mean activities that prevent or alleviate the harmful effects of seismic hazards to persons and property, including identification and evaluation of the seismic hazards, assessment of the risks, and implementation of measures to reduce potential losses before a damaging event occurs;
(5) "tsunami" means a large ocean wave produced by an earthquake, landslide, or volcanic eruption.

JANUARY 2007

ASHSC Alaska Seismic Hazards Safety Commission

Charter

Vision

Eliminate losses from future earthquakes and tsunamis. Gain public recognition for enhancing Alaska's approach to seismic risk mitigation issues.

Mission

Advise the public and private sectors on approaches for mitigating earthquake and tsunami risk. Make recommendations to the governor and legislature for reducing the State's vulnerability to these seismic hazards.

Act in an Advisory Capacity

Advise the Governor, the Legislature, and the public and private entities on seismic risk mitigation issues.

Provide Information and Technical Guidance

Recommend studies and programs that will mitigate the risks associated with seismic hazards.

Recommend Educational Programs

Recommend and participate in programs that will disseminate information to government agencies and the public.

Support Seismic Hazards Risk Mitigation Efforts

Support efforts to address the issues related to seismic hazards risk mitigation

By achieving this mission, we create an opportunity to be an effective body in mitigating the potential damaging effects of major seismic events.

Core Values

- Honesty
- Integrity
- Trust
- Diligence

- Service to the State
- Responsibility for One's Own Work
- Support for Other Commission Members
- Commitment to Complete Accepted Assignments
- Provide Value to Stakeholders
- Be Objective and Reasonable
- Advocate for Seismic Risk Mitigation Efforts
- Recognize exemplary seismic risk mitigation efforts

Key Success Factors and Measures of Success

Success Factor	Measure
• Stakeholder Satisfaction	• Facilitate Governor & Legislature understanding of seismic risk mitigation issues • Meet or exceed SOA expectations • Advice is sought • Advice is accepted • SOA endorsement • Positive feedback from staff
• Advocate Seismic Risk Mitigation	• Provide advocacy for seismic risk mitigation programs • Create opportunities for seismic risk mitigation advocacy • Become familiar with current programs • Develop stakeholder support
• Advocate Public Outreach Programs	• Encourage social environment where seismic risk mitigation is accepted • Examine existing programs within the State • Be available for public educational presentations
• Critical Facilities Earthquake Risk Mitigation	• Identify at-risk facilities • Develop work plan(s) • Initiate cost/benefit analysis • Identify current legislation/programs • Identify pertinent code requirements • Recommend improvements
• Earthquake Insurance in Alaska	• Review and advise on issues • Develop "White Paper" on issues • Recommend improvements
• Promote Seismic Hazard Identification	• Promote improved seismic monitoring • Promote identification, mapping, and characterization of seismic sources and seismically induced hazards (e.g., tsunamis, liquefaction, landslides)
• Facilitate Partnerships for Seismic Risk Reduction	• Identify potential partners to address Commission goals • Involvement with Federal, State, Municipal, and Priva sector organizations to address Commission goals

ENDORSEMENT

We, the members of the State of Alaska Seismic Hazards Safety Commission, enthusiastically and fully endorse this Commission Charter for guiding and enhancing efforts in seismic risk mitigation.

John Aho/Chairman_____

Gary Carver/Vice Chairman_____

Rod Combellick_____

Linda Freed_____

Robert Hicks_____

Kathy Hosford_____

Laura Kelly_____

Dennis Nottingham_____

Scott Simmons_____

Dean Maxwell_____

Roger Hansen_____

This publication was released by the Department of Natural Resources. Its purpose is to report the findings and recommendations of the Alaska Seismic Hazards Safety Commission to the Governor and to the Legislature of Alaska. It was printed at the Division of Geological & Geophysical Surveys office in Fairbanks, Alaska. This publication is required by AS 44.37.067.

State of Alaska

Office of Boards and Commissions Roster

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John L. Aho, Ph.D., D.Sc., Ph.D. Public/Restricted -- Chair CH2M Hill 2015 Shepherdia Drive Anchorage, AK 99508	5/26/2005	6/16/2006	6/30/2009
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Rod Combellick DNR Representative Department of Natural Resources P.O. Box 82422 Fairbanks, AK 99708	5/26/2005	9/21/2007	6/30/2010
Gay O. Dunham Local Governments Representative P.O. Box 2975 Valdez, AK 99686	12/3/2008		6/30/2011
Roger A. Hansen, Ph.D. University of Alaska Representative UAF, Geophysical Institute P.O. Box 757320 Fairbanks, AK 99709	10/13/2005	6/16/2006	6/30/2009
Robert E. Hicks, J.D. Local Government Representative/Seismically Active Regions Alaska SeaLife Center P.O. Box 1329 P. O. Box 1329 Seward, AK 99664	9/8/2006		6/30/2009

Kathy Hosford Local Government Representative/Seismically Active Regions Chilkoot Trail Outpost P.O. Box 286 Skagway, AK 99840	9/8/2006		6/30/2009
Laura W. Kelly, P.E. Federal Agency Representative United States Coast Guard Facilities Engineering Division P.O. Box 195025 Kodiak, AK 99619-5025	5/26/2005	12/3/2008	6/30/2011
Dean Maxwell Insurance Industry Representative State Farm Insurance 2351 North Love Drive Palmer, AK 99645	6/16/2006		6/30/2009
Mark Roberts DMVA Representative P.O. Box 5750 Fort Richardson, AK 99505	12/10/2007		6/30/2011

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