OREGON'S SEISMIC REHABILITATION GRANT PROGRAM: AKA COURTNEY GRANTS

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ABSTRACT

In 2009, Oregon launched the nation's first state-funded seismic rehabilitation grant program, which provides state bond funds to help strengthen public school and emergency service buildings prone to severe building damage. This 10-year effort was championed by Senator Peter Courtney, Oregon Seismic Safety Policy Advisory Commission (OSSPAC), and by Oregon Department of Geology and Mineral Industries (DOGAMI). The Oregon seismic rehabilitation grant program was created to eliminate collapse-prone, high-occupancy school buildings to avoid mass casualties in future major earthquakes, as well as to promote community preparedness. Under the leadership of Senate President Peter Courtney, the 75th Oregon Legislature (2009-2011) authorized the first seismic bond sales of $15 million bond funds for public schools and $15 million bond funds for emergency facilities, provided funds for three staffers for the new seismic rehabilitation grant program, and appropriated $31 million for seismic mitigation for university buildings and $3 million for community college buildings. The grant program is administered by the Oregon Emergency Management (www.oregon.gov/OMD/OEM/). Seismic vulnerability scores for school and emergency service buildings across the state are publicly available on www.oregongeology.org/sub/projects/rvs/default.htm and www.ode.state.or.us/go/quakesafeschools.

Introduction

The Pacific Northwest's extreme disaster is a magnitude 9 earthquake on the Cascadia subduction zone, which will produce minutes of strong ground shaking, coastal subsidence, landslides, liquefaction, lateral spreads, and a near-field tsunami. Building damage is expected to be severe due to the relatively recent adoption of seismic building codes in 1994 and the high percentage of vulnerable buildings. Since 2001, state laws have required emergency service buildings and public schools to meet seismic life safety with a deadline of 2022 and 2032, respectively. Due to poor seismic resistance of many older emergency service and school buildings, over 1,000 buildings are at high risk of collapse. This paper describes the 10-year long effort to establish the nation's first state-funded seismic rehabilitation grant program.

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History of Seismic Safety Legislation

The Oregon Department of Geology and Mineral Industries (DOGAMI) completed the nation's first statewide seismic damage and loss study, and results were widely disseminated to public officials and the media (Wang and Clark, 1999). In 2000, DOGAMI met with the legislative members on the Oregon Seismic Safety Policy Advisory Commission (OSSPAC) and briefed them on the expected damage and losses from a future magnitude 8.5 Cascadia earthquake. Senator Peter Courtney and Representative Randy Leonard expressed concern about the community safety and the need for better preparedness. OSSPAC produced its first document, which addresses earthquake hazards, expected losses, and strategies for improved outcomes (Figure 1).

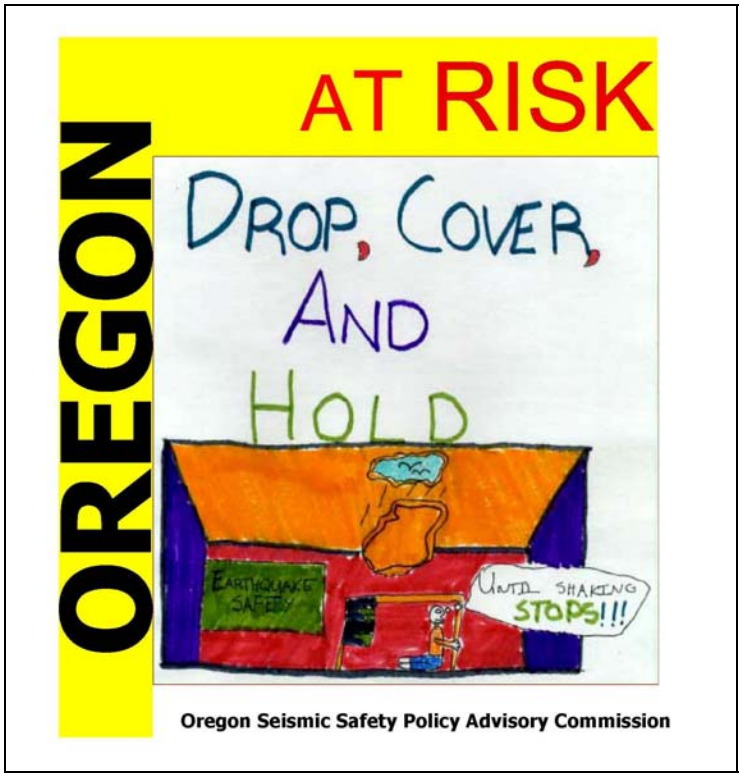

Figure 1. OSSPAC's first report "Oregon at Risk" addresses strategies on seismic preparedness (http://www.oregon.gov/OMD/OEM/osspac/docs/oratrisk.pdf).

2001 Legislation and 2002 Ballot Measures

In 2000, OSSPAC facilitated the crafting of earthquake safety legislative concepts to protect school children and improve community preparedness. In the 2001 Legislature, Senator Peter Courtney authored five successful earthquake safety bills -- 2001 Senate Bills 13, 14, and 15 and Senate Joint Resolutions 21 and 22. Passage of these bills required a bipartisan effort, which quickly defined Senator Courtney as a champion on earthquake preparedness (Figure 2). During that session, Senator Courtney earned several nicknames — "the earthquake kid" and "Number 9" (for magnitude 9). Later, in 2005, Senator Courtney was voted in as the Senate President, a position he continues to occupy.

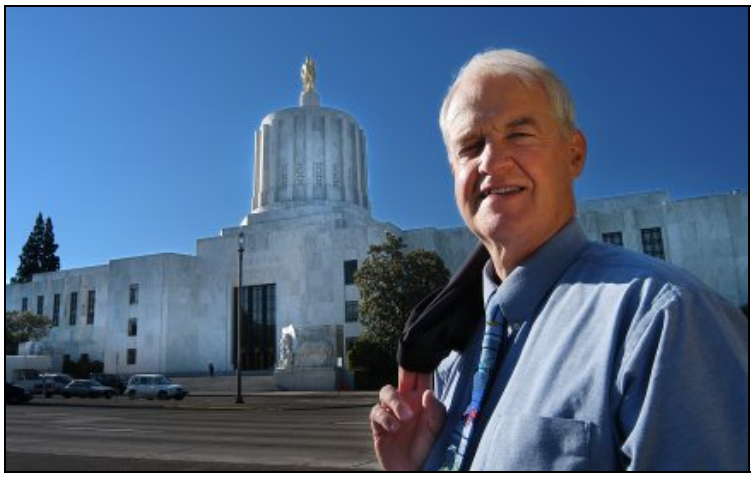

Figure 2. Senator Peter Courtney (http://www.leg.state.or.us/senate/senpres/home.htm).

Senator Courtney's Senate Bills 14 and 15 require high-occupancy public school buildings and emergency facilities to have life safety standards, which are set forth in the Oregon Revised Statute (ORS) 455.400, as detailed by Alesch et al. (2004). ORS 455.400 mandates public school buildings with greater than 250 occupants and fire stations, police stations and hospitals to achieve life safety standards in major earthquakes with 30- and 20-yr timelines, respectively. ORS 455.400 further requires evaluation of these public school buildings and emergency facilities using FEMA rapid visual screening methods for seismic vulnerability by January 1, 2007. High-risk buildings are to be mitigated (www.leg.state.or.us/ors/455.html).

Senate Bill 13 requires state and local agencies and employers with 250 or more full time employees to conduct earthquake drills. A new Oregon Administration Rule (OAR 104-020-000-040) went into effect April 1, 2002, and is overseen by Oregon Emergency Management (OEM).

The 2001 Senate Joint Resolutions 21 and 22 placed ballot measures 15 and 16 on the 2002 ballot, and both measures were passed by the voters. The resolutions changed the Oregon Constitution Articles XI-M and XI-N, which allow for state general obligation (GO) bonds to pay for over $1 billion of seismic evaluation and rehabilitation of existing schools and emergency service buildings Future bond sales would be paid back to the State Treasury through the Oregon State tax revenues (www.leg.state.or.us/orcons/orcons.html).

2005 and 2007 Legislation

In late 2004, bond funds had still not been made available to assist schools and emergency facilities. To promote action, DOGAMI used funding from FEMA (both NEHRP and Pre-Disaster Mitigation program) to facilitate a dialog on earthquake preparedness among a wide diversity of stakeholders. Three concepts were developed and shared with Senate President Peter Courtney, which he formulated into 2005 Senate Bills 2, 3, 4, and 5. OSSPAC developed a briefing sheet and supported the bills (Wang and Burns, 2006). In August 2005, Senate Bills 2, 3, 4, and 5 were passed into new laws.

The 2005 Senate Bill 2 directed DOGAMI to conduct statewide needs assessment for public schools and emergency facilities. As a result, DOGAMI and its partners evaluated over 3,500 buildings and published its findings in 2007 (Lewis, 2007). Seismic vulnerability scores for school and emergency service buildings across the state are publicly available at www.oregongeology.org/sub/projects/rvs/default.htm.

The 2005 Senate Bill 3 required OEM to form a temporary committee to establish a new state grant program to distribute earthquake rehabilitation grants using forthcoming state bond funds. OEM was not allocated funds and subsequently requested four new staff and staff funding, which was appropriated in the 2007-09 legislature via Senate Bill 1. In 2008, OEM hired a project manager to form a committee and develop a grant program. In 2009, two additional staff were hired.

The 2005 Senate Bills 4 and 5 allowed the issuance of state bond funds through a grant program to state and local communities for the rehabilitation of high risk fire stations, police stations, and hospitals and high-occupancy school buildings (Wang and Burns, 2006).

2009 Legislation

Governor Ted Kulongoski's recommended budget to the 2009-2011 Legislature included $30 million of bond sales for the seismic rehabilitation grant program. OSSPAC developed a briefing sheet for stakeholders to advocate for bond funds to the 2009-2011 Legislature (Figure 3). Under the leadership of Senate President Peter Courtney, the 75th Oregon Legislature (2009-2011) passed Senate Bill 5505, which provided $15 million bond funds for public schools, and $15 million bond funds for emergency facilities and became effective on July 1, 2009. The Legislature also funded three staffers for the new seismic rehabilitation grant program, as well as $31 million for seismic mitigation for university buildings and $3 million for community college buildings.

2009 Oregon Seismic Rehabilitation Grant Program

The Oregon Seismic Rehabilitation Grant Program is administered by Oregon Emergency Management (www.oregon.gov/OMD/OEM/). OEM announced the first grant application period in September 2009. The first grants are slated to be awarded in time for construction in summer of 2010. Due to Senator Courtney's dedication to seismic safety and perseverance of establishing an institutionalized funded grant program, these grants are also known as "Courtney grants." Figure 4 presents a timeline of seismic safety milestones from when the state first adopted seismic provisions in the building code in 1994 to 2032, which is when schools are to be seismically safe.

Seismic Rehabilitation Bond Funds
Public K-12 Schools, Community Colleges, Emergency Facilities

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Issue: Students should be in safe school buildings that will survive during earthquakes. Communities should have operable emergency facilities (EF) including fire, police and hospital services after earthquakes.

School and EF Laws: Since 2001, public school and community college buildings, with greater than 250 students, and EFs have been required by law to be mitigated to ensure safer, more secure educational environments and safer communities (http://www.leg.state.or.us/ors/455.html).

Schools and EFs at Risk: In the May 2007 earthquake in China, more than 19,000 school children died when schools collapsed. If a magnitude 9 Cascadia earthquake were to strike Oregon tomorrow, state studies indicate that the damage could be equally as tragic.

Over 1,000 high occupancy school buildings are at "Very High" or "High Risk" for collapse in major earthquakes. About 300,000 school children attend 614 schools with these 1,000 dangerous buildings that could collapse with school children inside them.

What's Needed? Request your Legislators to issue seismic rehabilitation bonds in 2009. In 2002, Oregonians voted and approved these bonds. In 2008, the Governor recommended to the Legislature to issue $30 million of bonds in 2009-2011. Currently, the Legislature is determining the state's budget. In order to provide grants for seismic upgrades through Oregon Emergency Management's Seismic Rehabilitation Grant Program, XI-M and XI-N bonds need to be issued by the State Treasury.

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Background

Oregon's school study results indicate the median age of Oregon school buildings is 46 years with almost 1,200 high occupancy school buildings over 50 years old. Because the first statewide building code was not adopted until 1974, and it was not until 1994 that seismic considerations were added to the building code, many schools are in desperate need of seismic strengthening and basic upgrades.

In 2007, the State of Oregon evaluated 1,101 schools in 170 districts representing 97% of the total enrollment. A comprehensive school building and EF database with these five key parameters that determine the relative seismic risk of each building: 1) Seismicity Zone (how hard the ground is expected to shake), 2) Building Structural Type, 3) Building Irregularities, 4) Original Construction Date, and 5) Soil Type (softer soils amplify the severity of ground motion) is available at www.oregongeology.com/sub/projects/rvs (search specific schools at http://www.ode.state.or.us/search/page/?id=2061).

Improving physical deficiencies of aging schools and emergency facilities is a sound, long-term investment of fundamental importance to communities. Investments towards safe school children and emergency facilities provide economic vibrancy. Portland Monthly writes on seismic school safety: http://www.portlandmonthlymag.com/issues/archives/articles/0309-quakes/

Timeline of Major Events

2001 Five bills introduced by Sen. Gary George (R) on behalf of Sen. Peter Courtney (D) as part of OSSPAC. SB 13, 14, 15 and SJR 21 and 22. All passed. Drills required of large employers (private and public). SJRs created ballot measures. Law (ORS 455.400) requires schools and emergency facilities to be seismically safe.
2002 Ballot Measures 21 and 22. Both passed. Create Articles XI-M and XI-N which allows state to issue bonds for seismic upgrades.
2005 SB 2, 3, 4 and 5 bills introduced by Sen. President Peter Courtney (D) on *Safe school children and Safer communities*. Directs Dept of Geology (Dogami) to conduct statewide risk study. The 2007 DOGAMI report indicates about 1,000 school buildings can collapse. Directs Oregon Emergency Management (OEM) to start grant program. Allows Dept of Administrative Service (DAS) and Treasury to issue XI-M and XI-N bonds.
2007 SB 1 provides Oregon Emergency Management (OEM) funds for 4 new staff to establish grant program.
2008 $30 million for general obligation bonds for seismic mitigation in the Governor's recommended budget. (http://www.oregon.gov/DAS/BAM/GRB0911intro.shtml, see public safety section, page D-3).
***2009** Legislature will determine bond amounts for XI-M bonds for schools and XI-N bonds for emergency facilities.*

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Oregon Seismic Safety Policy Advisory Commission (OSSPAC) http://www.oregon.gov/OMD/OEM/osspac/osspac.shtml March 10, 2009
For more information, contact OSSPAC Chair Gerald Williams, Ph.D., P.E. Gerry@cemresearch.com. Type "SEISMIC GRANTS" in subject line.

Figure 3. 2009 briefing sheet on issuing bonds for seismic rehabilitation grant program.

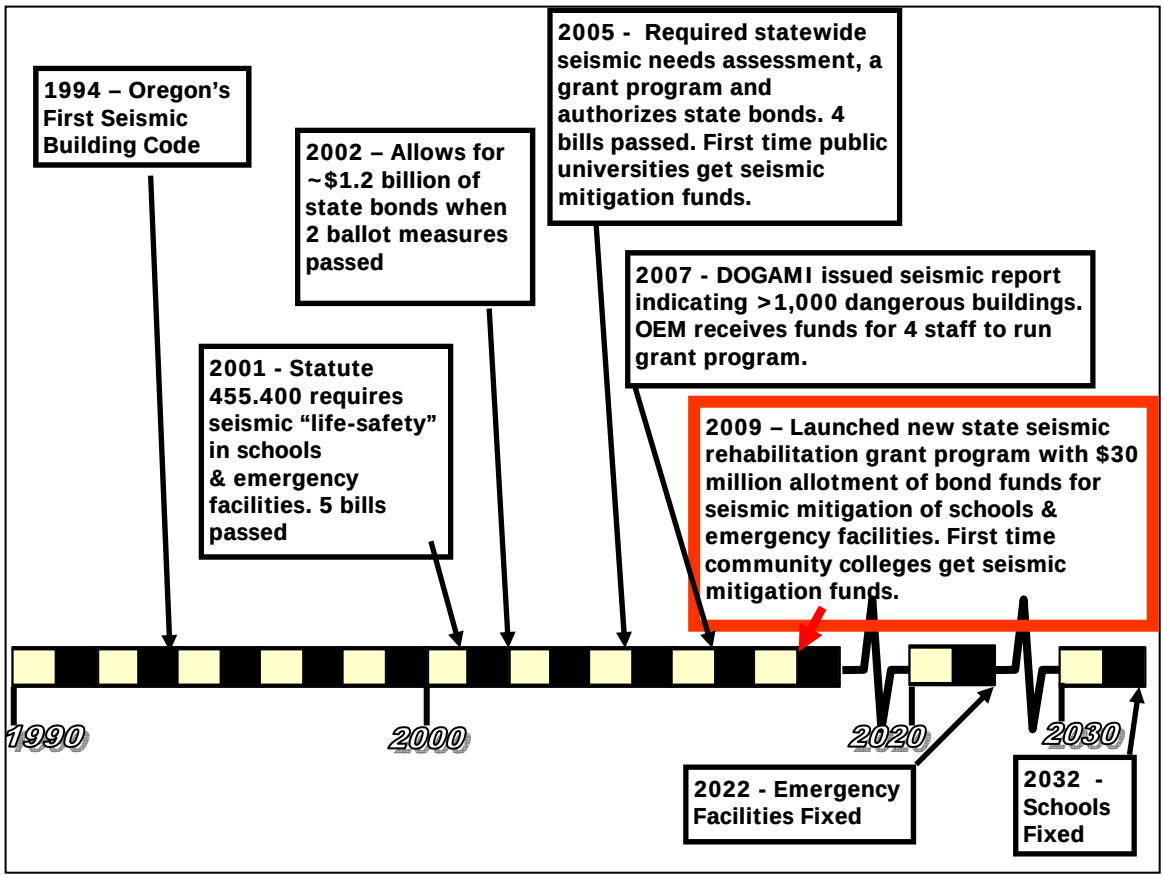

Figure 4. Timeline of earthquake safety milestones, including seismic safety laws and mitigation deadlines.

Creating Windows of Opportunity

Damaging earthquakes create an excellent window of opportunity to make advances in earthquake preparedness. The following earthquakes were used to promote seismic safety of schools in Oregon: 1993 Scotts Mills, Oregon; 2001 Nisqually, Washington; 2004 Sumatra, Indonesia; and 2008 Wenchuan, China. The Wenchuan, China earthquake is discussed below.

In addition to earthquakes, many additional opportunities exist. For example, in 2005, the damage and slow recovery inflicted by Hurricane Katrina were compared to future Cascadia earthquakes and tsunamis. In 2007, the damage in terms of dollar loss, geographic region impacted, and casualties from a winter storm in the Pacific Northwest were compared to future Cascadia events and deemed to be magnitudes less severe.

2005 Oregon Universities Seismic Mitigation Program

Due to 2001 laws, in 2002 the Oregon University System (OUS) began a partnership with DOGAMI to determine the seismic vulnerability of their seven universities. DOGAMI and OUS conducted preliminary screening evaluations of all major university buildings, strengthened several buildings using FEMA Predisaster

Mitigation (PDM) grant funds, and developed a long-term mitigation strategy that included funding (Wang, 2004; Wang and Heathman, 2007). The OUS mitigation strategy was shared with stakeholders in 2004 to illustrate that a comprehensive statewide mitigation effort could and should be pursued. This "window of opportunity" both helped OUS succeed with its strategy and furthered efforts toward crafting the 2005 Senate Bills 2, 3, 4 and 5.

In mid 2005 the Oregon University System obtained its first state funds from the Legislature for seismic mitigation of high risk buildings, which launched the OUS seismic mitigation program. OUS was appropriated $8 million, $26 million, and $31 million for seismic mitigation in the 2005-07, 2007-09, and 2009-2011 legislative sessions, respectively. Figure 5 shows pre- and post-mitigation of a classroom and office building at Western Oregon University, which was a FEMA PDM funded demonstration project.

Figure 5. Before (left) and after (right) mitigation of soft-story, collapse-prone building at Western Oregon University in Monmouth, Oregon.

Tragedy in China in May 2008

On May 12, 2008, a magnitude 7.9 earthquake destroyed many communities in Sichuan Province, China. Tragically, over 19,000 students died in damaged school buildings (Figure 6). Oregonians took this tragedy as an opportunity to make progress in seismic school safety. As an example, the Oregon Department of Education developed a webpage with earthquake safety information (www.ode.state.or.us/go/quakesafeschools) and distributed relevant information to school administrators. Also, Senator Peter Courtney, DOGAMI, and schools worked with media to highlight vulnerable schools in Oregon, such as interviewing with the *Newshour with Jim Lehrer* in "U.S. School Buildings Re-evaluated After China Earthquake Damage?" (http://vvi.onstreammedia.com:80/cgi-bin/visearch?squery=+ClipID:4++VideoAsset:pbsnh072508&query=earthquake&user=pbs-newshour&tid=email)

Shining the spotlight on seismically vulnerable schools influenced Governor Kulongoski's decision to include $30 million bond funds in his 2008 recommended budget to the Legislature.

Figure 6. Damage to a school in the 2008 earthquake in China. Floor boards are hanging down on the green chalkboard. Photo: Kit Miyamoto.

Steps Toward Resiliency

It is widely understood that Cascadia and other earthquakes are inevitable in the Pacific Northwest. Much of Oregon's current infrastructure is decades behind the latest advances in seismic design and performance, leaving schools and emergency facilities vulnerable to severe damage. In order for the new state seismic rehabilitation grant program to successfully help fix vulnerable schools and emergency facilities, it will require successful mitigation projects in the beginning years and decades of more bond funds. In addition, school and emergency districts may require special assistance ranging from guidance to floating local bond measures for supplemental funds to mitigation alternatives for structures in tsunami inundation zones.

To improve the state of Oregon's earthquake resiliency requires mitigation activity both within government and communities. Oregon should continue with an earthquake risk management approach involving stakeholders, hazards, risk, prioritization, and mitigation (Figure 7). Technical improvements are also needed. Mitigation options for schools need to be improved, such as significantly less expensive methods that can be streamlined to be implemented during summer breaks. Certain structural building types, such as concrete buildings, should be better evaluated and prioritized using preliminary, low-cost methods (Tesfamariam et al, 2010).

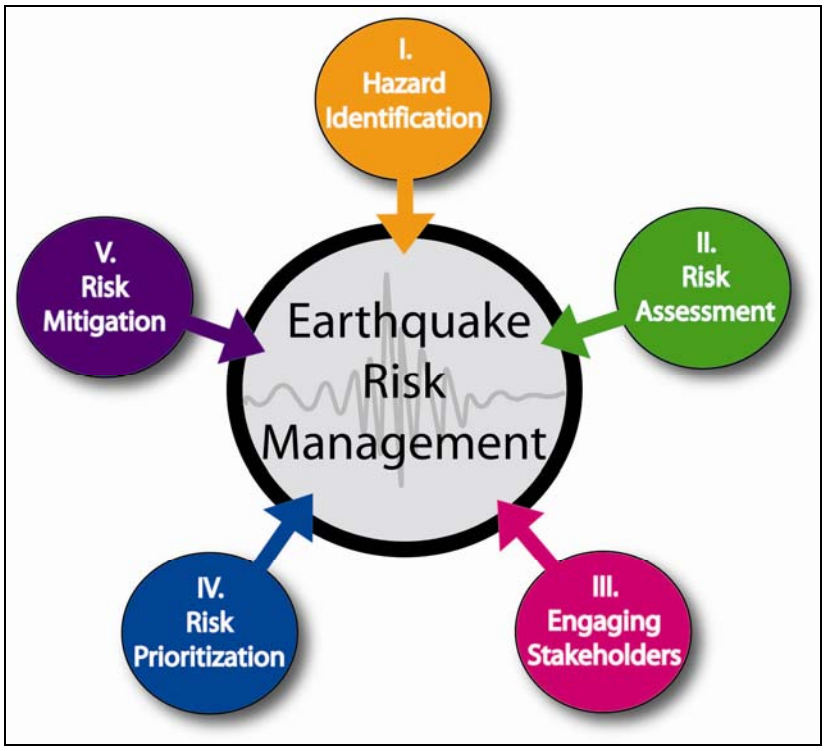

Figure 7. Earthquake risk management approach.

Looking beyond Oregon, a U.S. Government Accountability Office (GAO) study to identify high-risk schools in seismically active regions should be conducted and could include mitigation strategies. Federal assistance to other states, perhaps through the National Earthquake Hazards Reduction Program or FEMA PDM program, should be expanded to improve the nation's resiliency to natural disasters.

Acknowledgments

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