School Earthquake Safety Initiative

EARTHQUAKE ENGINEERING RESEARCH INSTITUTE

SCHOOL EARTHQUAKE SAFETY INITIATIVE

– promoting safe buildings for school children –
www.eeri.org/schools

MISSION, SCOPE, AND ORGANIZATIONAL STRUCTURE[1]

VERSION 1.0
FEBRUARY 23, 2016
APPROVED: APRIL 14, 2016

VISION:

Serving the world as a leader in the science, public policy, and advocacy of school earthquake safety.

MISSION:

We are a global and collaborative network of diverse, expert, and passionate professionals committed to creating and sharing knowledge and tools that enable progressive, informed decision making around school earthquake safety.

We serve everyone with a stake in school earthquake safety, from children and their parents, to teachers and administrators; from developers and architects, to engineers and builders; from financial institutions and building officials, to government agencies and emergency managers; from civil servants and commissioners, to local politicians and state and federal legislators.

We leverage our extensive expertise and reputation to conduct regionally appropriate actions that make a tangible and positive difference in communities around the world, by protecting the lives of all who inhabit school buildings.

BACKGROUND AND JUSTIFICATION:

"Schoolchildren have a right to learn in buildings that are safe from earthquakes"
(NEHRP ACEHR, 2012).

It is well-known by EERI members and other professionals that, in seismically active regions throughout the United States, thousands of students/staff unknowingly study and work in structurally vulnerable school and university buildings. Nonductile school buildings, which are under-reinforced concrete buildings prone to catastrophic collapse, are unfortunately common in many areas that are capable of generating damaging earthquakes. Unreinforced masonry (URM) and under-reinforced concrete were commonly used in school construction in many parts of the United States, especially during the early to mid twentieth century. These structural types have inherent serious vulnerabilities to ground shaking particularly in places where local building codes lagged behind current scientific understanding of the seismic environment.

[1] *This file draws from the 2015 SESI Strategic Action Plan, dated June 30, 2015 (https://www.eeri.org/wp-content/uploads/EERI-SESI-Strategic-Action-Plan-Final-v1.pdf)*

Public school buildings constructed prior to adequate seismic building codes share seismic deficiencies common to other buildings of the same structural types in the same setting, but several considerations set school buildings apart from their peers in terms of priority for seismic assessment and retrofit:

- Schools are the only high occupancy public buildings other than prisons and courthouses whose occupants are compelled by legal mandate to be inside them.
- Students are considered to be a vulnerable population due to their age and their developmental stage. Children are dependent on adults to provide safety, whereas adults are presumed capable of being consenting and accepting risks.
- School buildings in many communities tend to remain in use longer than comparable structures in private ownership, and tend to receive less frequent and less consistent capital renewal investment.
- Community members and public officials often hold a high (if unfounded) expectation that schools will provide community shelter or host public services in the wake of a natural disaster. (Wolf and Wang, 2014).
- School buildings often have large assembly rooms (e.g., gyms, auditoriums), which can increase their seismic vulnerability, making them more vulnerable than other buildings of similar construction types.
- The collapse of a school building is particularly devastating to communities because schools can hold an entire generation (i.e., all children of a certain age range in the community), a community's future.

Many factors complicate the issue of school earthquake safety. One factor is that building codes for schools have evolved over time and many school buildings nationwide were built decades ago before the development of modern seismic design provisions in building codes. Older schools almost always have significantly less capacity to resist earthquake forces than do newer schools. Thus, older schools often have a much higher probability of damage severe enough to result in deaths and injuries than do newer schools. Increased seismic design requirements in building codes is needed to improve the expected performance of school buildings in earthquakes over time.

Another factor is that understanding of earthquakes has improved over the decades and locations where earthquakes were thought to be rare events are now known to have significant earthquake threats, including parts of Oregon and Washington and many parts of the Central and Eastern United States. In some of these regions, adoption of the seismic provisions in building codes occurred long after the provisions were updated in national building codes. Also, some jurisdictions may have never adopted codes with seismic provisions.

Further complicating the issue is that there is no unifying organization for identifying and mitigating these structures due to the basic fact that these buildings are owned by countless numbers of local entities (public, parochial, charter, state, and private).

The earthquake risk for schools is not limited to only California or other areas with the most frequent earthquakes. In many cases, schools in moderate seismic hazard areas (or even low seismic hazard areas) may have seismic risk as high as or even higher than schools in high seismic hazard areas because:

- Many schools in moderate or low seismic hazard areas were built with minimal or even no consideration of earthquakes. Therefore, many schools in moderate or low seismic hazard areas are subject to major damage, up to and including partial or full collapse, from smaller earthquake having much lower levels of ground shaking than are many schools in high seismic hazard areas.
- Enforcement of seismic provisions in building codes and inspections during construction have often been less robust in moderate or low seismic hazard areas than in higher seismic hazard areas.

- The absence of recent earthquake activity in an area can lead to complacency about the risks to older buildings. If there are no "tests" of a building's lateral capacity from an earthquake, there is a tendency to minimize the need for seismic retrofits. Buildings in low and moderate regions may also see extended life spans which prolong the exposure of these deficient buildings to earthquakes

For these reasons, school earthquake safety practices must be regionally appropriate. In low to moderate seismic regions, this may mean that approaches to earthquake safety must be a part of a larger safety discussion for all natural hazards.

Earthquake risk to school buildings needs to be understood by a variety of groups. Making the case for action (mitigation) requires a clear understanding not only of the technical issues but also the economic, social, and political implications of misunderstanding or under appreciating the consequences of earthquakes. EERI is well positioned to be able to provide an authoritative and unified voice for earthquake safety for school buildings. EERI members derive personal and professional satisfaction from the process of multidisciplinary engagement and thus can contribute to the envisioned outcome of enhanced school safety and resilience.

In summary, earthquake safety for schools can and will mean different things to different groups. It is the intent of this initiative to help communities and school districts decide which risks are acceptable and which are not, then to provide the tools and resources needed to help properly evaluate and mitigate those risks.

SCOPE:

This focused and narrowed scope is needed to target activities and actions into achievable areas where change is most possible via an effort conducted primarily by volunteers. The initiative will continue to build upon and revise these principles in the future as this effort grows and matures.

The scope of EERI's School Earthquake Safety Initiative will be defined by the following principles.

1. Earthquake and earthquake related hazards (shaking, tsunami, liquefaction, landslides, etc.) will be the primary hazards addressed in this Initiative.
2. While all schools are important, efforts will be focused on schools in high and moderate seismic hazard regions and for events that have a higher probability of occurrence.
3. Schools will be broadly defined to include public, parochial, charter, state, and private schools from pre-kindergarten through university level, however the initial focus will be on K-12 public schools.
4. The stakeholders engaged will depend on the activities of each subcommittee, however the initial focus will be on knowledge transfer and outreach to: state agencies, school administrators, code development committees, legislators, teachers, students, and parents.
5. EERI's SESI advocates for mitigation of earthquake risk to children in existing schools via building retrofit, abandonment, or replacement, as well as nonstructural retrofit.

ORGANIZATIONAL STRUCTURE:

The organizational structure for this initiative will consist of the following.

1. Chair: The EERI SESI will be lead by a Chair who is appointed by the EERI Board for a term of 3 years.

2. Executive Committee: An invitational group of 10-15 members to guide and make decisions for the project. The EERI SESI Chair is the leader of the Executive committee. The chair of each sub-committee is automatically appointed to the Executive Committee. The Executive Committee will report to the EERI Board on behalf of the project and provide annual written report of the

initiative's progress and activities. An EERI Staff member will also be assigned to the executive committee to support its work.

3. Program Committee: This committee's membership is open to any EERI member and has no limit to its size. The committee will engage via regular update meetings or calls (i.e. quarterly). The program committee is designed in this fashion to allow any EERI member to learn more about the Initiative, its activities, and find ways to participate. EERI SESI Sub Committee Chairs are expected to report the progress of their subcommittee activities during these regular meetings.

4. Subcommittees: EERI SESI Subcommittees are open to any EERI member, and are tasked to achieve various actions and activities of the program. Each Subcommittee will be lead by a Subcommittee Chair. Proposals for the establishment of new activities and sub-committees can be developed by any EERI SESI member, and must be formally approved by the executive committee. There is no limit to the number of sub-committees that can be added.

ASSIGNMENT OF ACTIVITIES & RESPONSIBILITIES:

Subcommittees will implement the activities of this Initiative along with the SESI Executive Committee. The responsibilities of each group are indicated below. See the annual action plan for detailed actions for each group.

Executive Committee

Charge: *Set vision for SESI and provide oversight of SESI Program & Subcommittee activities*

a. Advise the EERI Executive Director and EERI Staff in the administration of the program.
b. Oversight of SESI Staff action items
c. Oversight of SESI Subcommittees and their activities
d. Reporting to the EERI Board
e. Ensure that the program is achieving its mission and goals
f. Consideration and development of new SESI activities when needed
g. Organize Annual Meeting sessions focused on SESI activities

EERI Staff

Charge: *Support Implementation of SESI Program & Subcommittee activities*

a. Support implementation of Executive Committees activities.
b. Support implementation of SESI Subcommittee activities.
c. Consider and recommend as needed new initiative protocols or operational improvements that would facilitate the progress towards the SESI mission and vision.
d. Ensure that the EERI membership is aware of SESI activities and how members can participate in the SESI program.
e. Maintain SESI web presence and communications mechanisms.
f. Prepare and submit both progress and final reports needed by funding agencies for grant-supported tasks.

Program Committee

Charge: *Provide support and feedback to SESI. Promote participation of members in SESI subcommittees and their activities.*

a. Hold regular meetings to provide committee members updates on SESI activities (i.e. quarterly or semi-annually).

Safety Screening, Inventory, and Evaluation Subcommittee

Charge: *Facilitate and encourage implementation of risk reduction measures by developing and helping to carry out stepwise screening methodologies to identify school buildings with the highest seismic risk efficiently while minimizing the effort and expense for school districts.*

a. Consider, develop, and implement activities and programs that advocate for and support creation of school earthquake safety, inventory, and/or evaluation efforts.

Classroom Education and Outreach Subcommittee

Charge: *Use education in the classroom to create on ongoing dialog with parents, teachers, and administrators and to develop advocates for earthquake school safety. Bring together EERI regional and student chapters to collaborate on delivering the activities and serving as expert resources for stakeholders.*

a. Develop and implement high-quality outreach activities at local schools focused on earthquake education and safety that can utilize EERI volunteers and chapters.

Tsunami Mitigation for Schools Subcommittee

Charge: *Support schools with tsunami hazard by provide them access to experts and sharing best practices for tsunami risk mitigation.*

a. Clearly document schools in US with tsunami risk.
b. Document and share successful programs, methods, and informational resources for reducing tsunami risk.
c. Advocate for establishment programs that reduce tsunami risk to schoolchildren.

Code Updating and Improvements Subcommittee

Charge: *Advocate for code improvements, refinement and/or implementation practices that will enhance school safety and use after major earthquakes.*

a. Consider, identify, and advocate for appropriate improvements to building codes that will enhance school earthquake safety.

Safety Advocacy and Messaging Subcommittee

Charge: *Bridge the communication gap between technical professionals and non-technical partners and stakeholders interested in earthquake risk reduction for schools.*

a. Support SESI Executive Committee and Subcommittees in their advocacy efforts.

ABOUT EERI:

The Earthquake Engineering Research Institute (EERI) is an international, nonprofit, technical society of engineers, geoscientists, architects, planners, public officials, and social scientists. EERI members include researchers, practicing professionals, educators, government officials, and policymakers. The objective of EERI is to reduce earthquake risk by (1) advancing the science and practice of earthquake engineering; (2) improving understanding of the impact of earthquakes on the physical, social, economic, political, and cultural environment; and (3) advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes. EERI is a leader in earthquake investigations and in the dissemination of earthquake risk reduction information both in the US and globally in cooperation with its international partners. More information can be found at www.eeri.org.