



## **ASHSC Policy Recommendation 2011-3**

### **IDENTIFICATION AND MITIGATION PRIORITIZATION OF SEISMICALLY VULNERABLE BUILDINGS**

*Perform FEMA Rapid Visual Screening of Existing Buildings to identify and prioritize all seismically vulnerable State of Alaska owned buildings. Establish a mitigation plan to reduce risk imposed by those buildings, including structural and nonstructural elements, equipment, and contents. The most essential buildings should be addressed as the highest priority.*

#### **Recommendation**

Schools frequently are the most heavily occupied and critical structures in a community. In addition to supporting students on a daily basis throughout the school year, most Alaskan schools also serve the public in various capacities with after school hour activities. Furthermore, many school facilities are designated as emergency shelters in the case of a natural disaster. Therefore, the Alaska Seismic Hazards Safety Commission (ASHSC) recommends that the State Legislature work with Alaska Department of Education and Early Development (ADEED) to establish an active program that begins the process of identifying schools that may be vulnerable to seismic hazards and pose a potential life safety threat to their occupants. The ASHSC further suggests that structural and non-structural elements be evaluated, since both can result in injuries or death in the event of a damaging earthquake. Evaluation for potential tsunami inundation, earthquake-induced ground failure below foundations, and local landslide effects also should be considered during the process.

Because of the expense of such an undertaking, the ASHSC suggests first ranking schools based on location in areas of potentially strongest earthquake ground shaking as identified on probabilistic seismic hazards maps produced by the United States Geological Survey (USGS) for Alaska (Wesson et al., 2007). A preliminary structural vulnerability screening process could be used to further rank and prioritize those schools. The at-risk schools would then be addressed in ranked order with the most vulnerable facilities being examined first.

## **Prioritization**

Screening and ranking schools based on age, structural and foundation types, and seismic/site hazards prior to conducting detailed structural analysis is common practice, and is discussed below. However, the cost to screen every school in the State could prove prohibitive if conducted as a single project. The ASHSC suggests prioritizing the screening of schools by regions of highest seismic hazard, first. This can be done using the most current version of the Risk-Targeted Maximum Considered Earthquake Ground Motion Response Accelerations maps for Alaska, as published by the International Building Code, the American Society of Civil Engineers, and the USGS.

To further assist decision-makers, the ASHSC has identified Alaska public school buildings located in the areas of highest expected ground motions, as depicted on the attached map. The ASHSC recommends that the map be used along with other building information to establish budget priorities and select schools for seismic-safety evaluation. By ranking schools by location in areas of highest expected ground accelerations, age, and construction type, a sound basis can be established for evaluation, along with a goal to further screen "X number" of buildings per year to determine whether seismic upgrades are necessary.

## **Implementation of Formal Screening Methodology**

Once schools are prioritized, other more detailed and professionally accepted screening methodologies for preliminary identification of at-risk structures could be utilized, such as FEMA's ***Rapid Visual Screening of Buildings***, ASCE/SEI's ***Seismic Evaluation of Existing Buildings- Tier I Screening***, and FEMA's ***Reducing the Risks of Nonstructural Earthquake Damage***. These methods can be used as the basis for identifying which facilities are most likely prone to major damage or collapse in the event of strong ground-shaking.

The screenings will require follow-up with detailed evaluations for schools found to be at risk, including the verification of existing site and structural conditions. Preliminary screening, however, helps prevent spending money to analyze structures that in all probability meet life-safety requirements. It also enables the ranking of the structures by the highest probability of significant structural and/or non-structural damage. Some districts may have already conducted seismic-safety screening of their facilities, in which case existing information could be used.

These methodologies have been successfully used in other states and countries with high-seismic risk. States with the greatest success thus far include Washington, Oregon, California and Utah. These states are unified through the Western States Seismic Policy Council, which firmly believes that children have the right to be safe in school buildings during earthquakes. Furthermore, communities will be heavily dependent on adequate shelter from Alaska's harsh climate following a severe seismic event. Schools are often designated as the best resource, and need to meet this requirement.