

Overview of the East Sichuan, China earthquake presented at OSSPAC on May, 20, 2008

The May 12, 2008 East Sichuan, China earthquake had a magnitude of 7.9. Human casualties are estimated at over 71,000 fatalities and about 220,000 injured. About 3 million houses collapsed, and over 12 million houses were partially destroyed. This quake had a tremendous societal impact--human casualties were high, damage to buildings and lifeline infrastructure were severe, response efforts are still underway and recovery will extend over years. The economic damage will be in the billions of dollars.

Earthquake ground shaking resulted in damage to lifeline infrastructure, specifically bridges, highways, tunnels, railways, dams, and systems involving water, waste-water, gas, electrical, and telecommunications, as well as buildings, including schools, hospitals, and industrial plants. Severe damage has been incurred to hundreds of schools, dozens of hospitals, fire and police, and several chemical plants, including one with uncontrolled ammonia release. One 6-story high school collapsed to a 6 ft high rubble pile killing almost all 900 occupants. About 400 dams were damaged. These dams as well as large earthquake-triggered landslide dams may fail and inundate downstream communities.

While large aftershocks continue to occur, large scale relief efforts are underway by national and international governments and organizations. Several hundred relief workers died due to landslides that occurred days after the main shock. Mass evacuation is underway to avoid additional casualties from possible overtopping of landslide dams.

Perhaps the most important lesson from this earthquake is that critical facilities such as large chemical plants and dams require safeguards that will ensure public safety in the case of earthquake-triggered failures. Critical facilities built long before modern understanding of seismic hazards should be reevaluated for public safety. By applying lessons learned from recent earthquakes, such as the East Sichuan earthquake, we can increase the effectiveness of risk reduction measures. Three recommendations, which were developed from research findings, lessons learned from the E. Sichuan earthquake as well as from other earthquakes, should be adopted to help manage Oregon's significant earthquake risks.

- Important facilities including schools, fire stations, police stations, and hospitals, especially those on poor soils prone to liquefaction, landslides, or amplification or in tsunami zones, should meet modern building codes and should be able to withstand strong earthquakes. Any existing important facilities at high risk should be mitigated. Inexpensive mitigation solutions that can be applied to hundreds of schools in Oregon should be considered.
- Critical facilities with large occupancies, that contain significant hazardous materials, that serve important functions to society (e.g., energy facilities), or that have other sensitive parameters should meet modern building codes and should be able to withstand strong earthquakes. Any existing critical facilities at high risk should be mitigated against severe socioeconomic and environmental impacts.
- Major lifelines that are co-located and/or are interdependent with other lifelines should require special performance consideration to avoid multiple and/or cascading failures. Any existing lifelines at high risk should be mitigated to meet acceptable performance standards.