

STRUCTURAL PERFORMANCE OF SCHOOL BUILDINGS IN NATURAL DISASTERS

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ABSTRACT

The Sichuan Earthquake that devastated China on May 12th, 2008 refocused the world's attention to the utter devastation generated by natural disasters. This earthquake particularly highlighted the inadequacy of school buildings in China by claiming the lives of thousands of children as their classrooms were turned to rubble. Although it is every parent's expectation that when their children go to school, they will be protected, the school buildings in China proved to be woefully inadequate in that regard. Unfortunately, this was not an isolated instance: schools around the world have been significantly damaged in a variety of natural disasters. This is doubly troublesome, as not only do these facilities house a large number of children on a daily basis, but also serve as shelters following disasters.

As such, this research will focus on improving the performance of schools in earthquakes, hurricanes/typhoons, and tsunamis. Literature reviews and direct correspondence with reconnaissance teams and government officials are utilized in this research to first collect data on school performance and design guidelines in both the United States and around the world. This information is then used to diagnose common failure modes and other inadequacies. Design guidelines and load provisions are then reviewed, including ASCE 7/IBC, US state guidelines, and international codes/standards, contrasting the design loads for wind, waves, and earthquakes on schools and non-essential structures. The study then concludes with recommendations for reconstruction and rehabilitation of school buildings and the adaptation of these guidelines to the developing world, where additional economic, construction technology, and cultural constraints must be considered.

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