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Lessons Learned from Wenchuan Earthquake: Building Materials

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
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Keywords [Building Material](#), [MS8.0 Wenchuan Earthquake](#), [Seismic Disaster](#), [Strong Ground Motion](#)

Abstract It has always been concerned about seismic motion and building materials near faults, but it still remains as an uncertain problem due to insufficiency of case study and information. The paper presents the main cases of seismic disaster by field investigations of M8.0 Wenchuan earthquake, on the relationship among earthquake faults, ground motion and earthquake disasters near fault zone, i.e. the forms of structural damage are very complex in the fault areas, with main forms of shear failure and damage of tension and compression. The brittle materials such as reinforced concrete and masonry materials are prone to partial brittle fracture, and main forms are composed of up and down shake and surface ruptures. The brittle materials are prone to tension and compression damage. By using qualified materials, following building codes, the constructions in urban areas showed good seismic performance. Survey results showed that the framework and the structure of the steel and wood that use the flexible materials with flexible structures possess good seismic performance.

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Lessons Learned from Wenchuan Earthquake: Building Materials

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Keywords: MS8.0Wenchuan earthquake, seismic disaster, strong ground motion, building materials

Abstract. It has always been concerned about seismic motion and building materials near faults, but it still remains as an uncertain problem due to insufficiency of case study and information. The paper presents the main cases of seismic disaster by field investigations of M8.0 Wenchuan earthquake, on the relationship among earthquake faults, ground motion and earthquake disasters near fault zone, i.e. the forms of structural damage are very complex in the fault areas, with main forms of shear failure and damage of tension and compression. The brittle materials such as reinforced concrete and masonry materials are prone to partial brittle fracture, and main forms are composed of up and down shake and surface ruptures. The brittle materials are prone to tension and compression damage. By using qualified materials, following building codes, the constructions in urban areas showed good seismic performance. Survey results showed that the framework and the structure of the steel and wood that use the flexible materials with flexible structures possess good seismic performance.

Introduction

By China Earthquake Information Network, Wenchuan earthquake is of magnitude $M_s8.0$, and depth of focal 14 km, (USGS: magnitude $M_s8.0$, depth 19 km) occurring in the middle of nappe tectonic zone at Longmen mountain, Wenchuan, Beichuan, Qingchuan and other areas are suffered destructive blows. The emergency field study [1] shows that the earthquake causes Beichuan-Yinxu fracture and Guanxian -Jiangyou fracture to induce surface rupture simultaneously.

It is significant to interpret the relationship among the complex fault of the Wenchuan earthquake ground motion, building damage and the materials. First of all, investigated information as an example in this article, The paper introduces the case of the earthquake of fracture zone and near-fault region, at the same time, lists the case of other regions suffering from serious disasters, then analyzes and discusses the phenomenon, brings up the correlation and basic characteristics of earthquake disasters and materials, offering references for defeating earthquakes and disasters.

Damage investigation

Near-fault region: Near-fault region generally refers to the region of less than 15 km away from the fault. According to the previous survey, near-fault region where earthquake damage is very intensive is a major earthquake disaster area. Through reviewing the serious damage areas of the town of Yingxiu, the town of Leigu, the town of Hanwang and the town of red and white, as well as the town of Hongkou, the town of small fish cave; it's found that large-scale destruction of buildings took place in these areas. In the light of post-disaster assessment, the town of Yingxiu and the town of Leigu are identified as XI degrees, other parts of the areas are identified as X degrees. Photo 1 shows the places of the town of Hanwang where large scale areas are destroyed (on the right side) and a corner of the station. It can be seen that the residential buildings have serious damage and collapse, while the station of the frame construction has good seismic performance.