

Damage Evaluation of Adobe Houses after Van Earthquakes (23 October 2011 and 9 November 2011)



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ABSTRACT

Kerpic material is one of the oldest and most widely used building construction material as earth-made construction. Around 30% of the world's populations live in earth-made construction. The use of kerpic is very common in some of the world's most hazard-prone regions, such as Latin America, Africa, the Indian subcontinent and other parts of Asia, the Middle East, and southern Europe. These type of houses are still very common especially countryside of south east of Turkey. Seismic response and performance of kerpic houses have been studying for a long time. After destructive earthquakes happened in Van city, damage levels of these type buildings were investigated. Van located at South east of Turkey was hit by two earthquakes; with $M = 7.2$ on 23 October 2011 at 13:41 (local time), where epicenter was about 16 km north of Van (Tabanlı village) and with $M = 5.6$ on 9 November 2011 where epicenter was about 6 km south of Van (near Edremit town) that caused the loss of life and property. During these earthquakes 644 people were killed 644 people and 2608 people were injured. Approximately 4000 buildings were collapsed or seriously damaged. In this region, there are many houses and public buildings constructed with stone, brick, kerpic and concrete blocks. Some of them were heavily affected where some had slight damages. In this paper the parameters affecting the seismic performance of adobe buildings of this area will be studied according to the damage level of the buildings. The construction year, production method of the adobe blocks, construction method, the geometry of the adobe walls, workmanship quality, foundation type, existence of wooden beams, type of roof, mortar between adobe block will be studied in understanding damage reason and evaluation of the parameters.

Keywords: Adobe, masonry, building, damage, earthquake.