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Dwellings vulnerability to earthquake hazard at Sete Cidades Volcano (S. Miguel Island, Azores)

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Since the settlement of S. Miguel Island (Azores) in the XV century, several earthquakes were reported to have caused human losses and severe damages. In the Sete Cidades Volcano area, located in the westernmost part of the island, the maximum historical intensity was IX in the EMS-98 (Silveira, 2002). At least seven earthquakes reached intensity VI in the last 150 years.

Aiming to evaluate the impact of a future major earthquake in the area, a field survey was carried out in ten parishes of Ponta Delgada County, located in the flanks of Sete Cidades Volcano and inside its caldera. A total of 7019 buildings were identified, being 4351 recognized as dwellings. According to the 2001 census the resident population in the studied area reach 11429.

In this work, dwellings were classified according to their vulnerability to earthquakes (Classes A to F) using the structures types table of the EMS-98 adapted to the Azorean constructions. It was verified that 75% (3263) of the houses belong to Class A, and 17% (740) to Class B, the classes of higher vulnerability.

Taking into account the damage intervals considered in the EMS-98 for each value of intensity, it was concluded that if the area become affected by a seismic event with intensity IX (EMS-98), 65% (2828) to 80% (3480) of the dwellings will partially or totally collapse and 13% (565) to 19% (826) will need to be rehabilitated. In this scenario, considering the average of inhabitants in each house for each parish, 84% (9600) to 93% (10629) of the population will be dislodged.