

Paper Number: 4677

Seismic Vulnerability Investigation of RDP homes in the city of Matlosana, North west Province, South Africa

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Following the 5th August 2014 Orkney earthquake, the assessment of seismic vulnerability of RDP homes in the city of Matlosana, North West Province in South Africa was done. A survey was done in the town of Khuma, Kanana and Jouberton. 34 homes were surveyed in Khuma, 17 in Kanana and 8 in Jouberton. The highest EMS earthquake intensity and damage was recorded in the town of Khuma. Three homes were totally damaged in Khuma and were rebuilt. The earthquake effect was felt by all 33 householders interviewed in Khuma. They all said that they were extremely scared. 16 houses in Kanana were damaged out of the 17 houses surveyed. Jouberton was the less affected town in terms of damage and intensity. The EMS intensity and damage grade ranges respectively were Khuma (VI-VIII, 1-5), Kanana (VI-VII, 2-3) and Jouberton (VI-VII, 1-3).



It should be noted that most (if not all) of the outer wall of the RDP homes were made of a single brick layer instead of double brick layers. There was a repetition in the kind of damages noted. There were mostly corner cracks, damage above windows and above door openings, falling plaster and hairline cracks.

Fig 1: RDP homes in Kanana, South

Africa

There were instances where the damage could be attributed to shoddy workmanship. In many cases there was an absence of supporting beams, brickforce and often not even enough cement/mortar between the bricks.

In addition a lesser degree of damage was observed in the older units for the same observed intensity.

Another interesting observation was that the older housing units performed better during the earthquake shaking than many of the newer units. A lesser damage grade was observed in the older units for the same intensity.

The results are expressed in terms of damage probability matrices. Most data points for damage were for intensity VI. It is recommended that a second survey be conducted to obtain more data points and to look at the effects of building age and building material on the intensity damage grade results.

