

RED-ACT Report

Real-time Earthquake Damage Assessment using City-scale Time-history analysis

July 04, M6.4 California Searles Valley Earthquake (V2)

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Acknowledgments and Disclaimer

The authors are grateful for the data provided by **CESMD**. This analysis is for research only. The actual damage resulting from the earthquake should be determined according to the site investigation.

Scientific background of this report can be found at:

<http://www.luxinzheng.net/rr.htm>

1. Introduction to the earthquake event

At 10:33:49 04 July 2019 (Local Time, UTC -8), an **M 6.4 (USGS)** earthquake occurred in **California Searles Valley, USA**. The epicenter was located at **35.7052N 117.506W**, with a depth of **10.7 km**.

2. Recorded ground motions

15 ground motions near to epicenter of this earthquake were analyzed. The names and locations of the stations can be found Table 1. The maximal recorded peak ground acceleration (PGA) is **369 cm/s/s**. The corresponding response spectra in comparison with the 8-degree design spectra specified in the Chinese Code for Seismic Design of Buildings are shown in Figure 1.

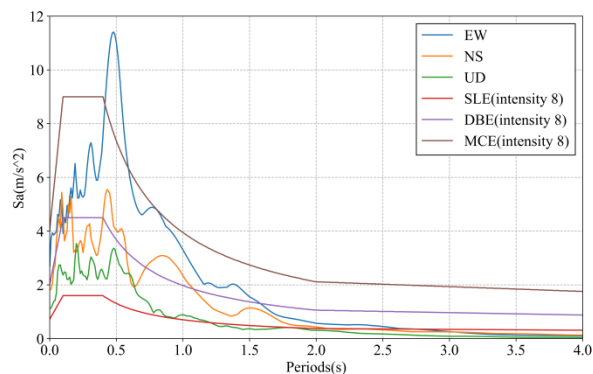


Figure 1 Response spectra of the recorded ground motions with maximal PGA

3. Damage analysis of the target region subjected to the recorded ground motions

Using the real-time ground motions obtained from the strong motion networks and the **city-scale nonlinear time-history analysis (see the Appendix of this report)**, the damage ratios of buildings located in different places can be obtained. The building damage distribution and the human uncomfotableness distribution near to different stations is shown in Figure 2 and Figure 3, respectively. These outcomes can provide a reference for post-earthquake rescue work.

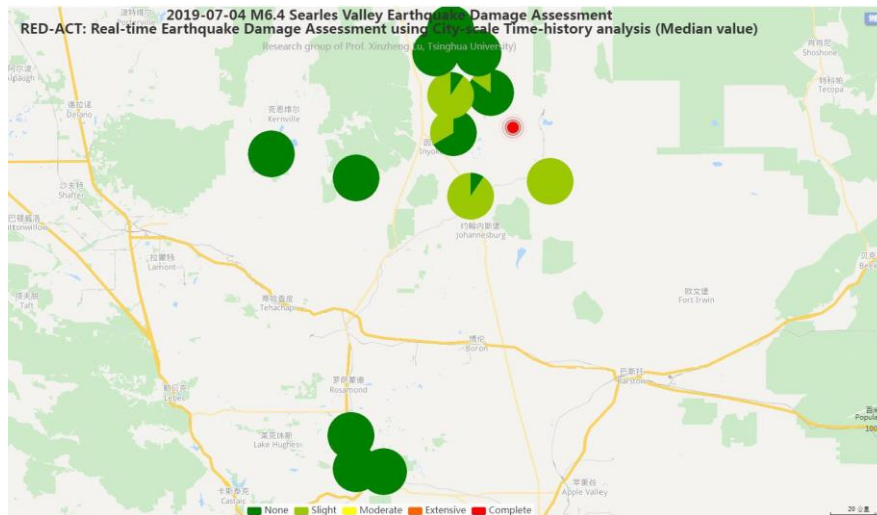


Figure 2 Damage ratio distribution of the buildings near to different stations

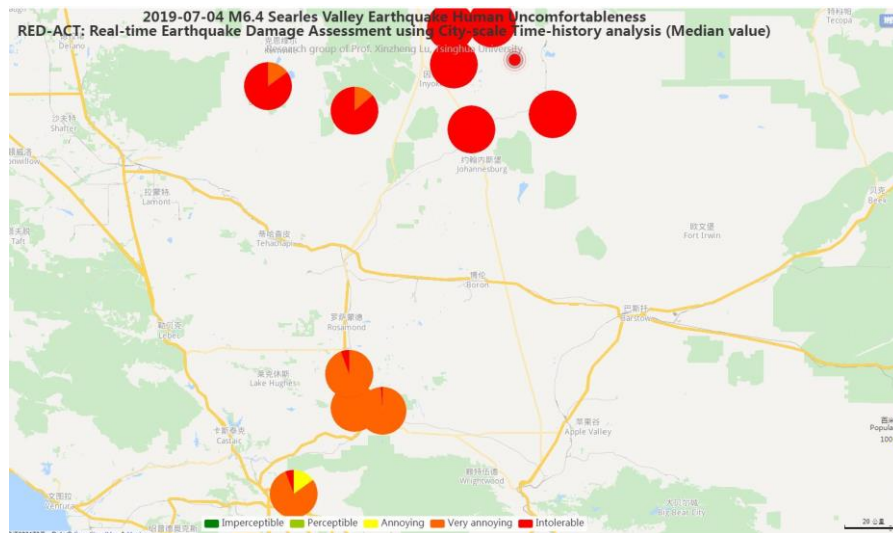


Figure 3 Human uncomfortableness distribution near to different stations

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Table 1 Names and locations of the strong motion stations

No.	Station Name	Longitude	Latitude
1	CE24088	-118.376	34.296
2	CE24457	-118.145	34.583
3	CE24517	-118.158	34.687
4	CE24661	-118.16	34.687
5	CE24965	-118.03	34.57
6	CE34349	-118.478	35.616
7	CICCC	-117.365	35.525
8	CICLC	-117.598	35.816
9	CILRL	-117.682	35.48
10	CISRT	-117.751	35.692

11	CITOW	-117.765	35.809
12	CIWBS	-118.14	35.537
13	CIWCS	-117.765	36.025
14	CIWRC	-117.65	35.948
15	CIWVP	-117.818	35.949