RED-ACT Report

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

Mar. 27, M5.4 Japan Hyuga-nada Earthquake

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Acknowledgments and Disclaimer

The authors are grateful for the data provided by K-NET and KiK-net. 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/software/Real-Time_Report.pdf

1. Introduction to the earthquake event

At 09:11 Mar 27, 2019 (Local Time, UTC +9), an M 5.4 (JMA) earthquake occurred in Japan Hyuga-nada. The epicenter was located at 132.2 32.2, with a depth of very shallow.

2. Recorded ground motions

10 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 31 cm/s/s. The corresponding response spectra in comparison with the design spectra specified in the Chinese Code for Seismic Design of Buildings are shown in Figure 1.

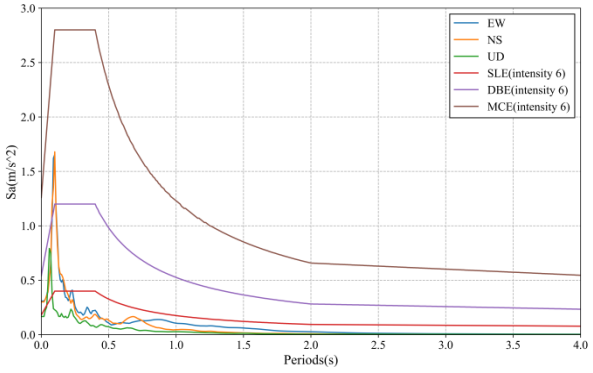

Figure 1 Response spectra of the recorded ground motions with maximal PGA

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 uncomfortableness 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.

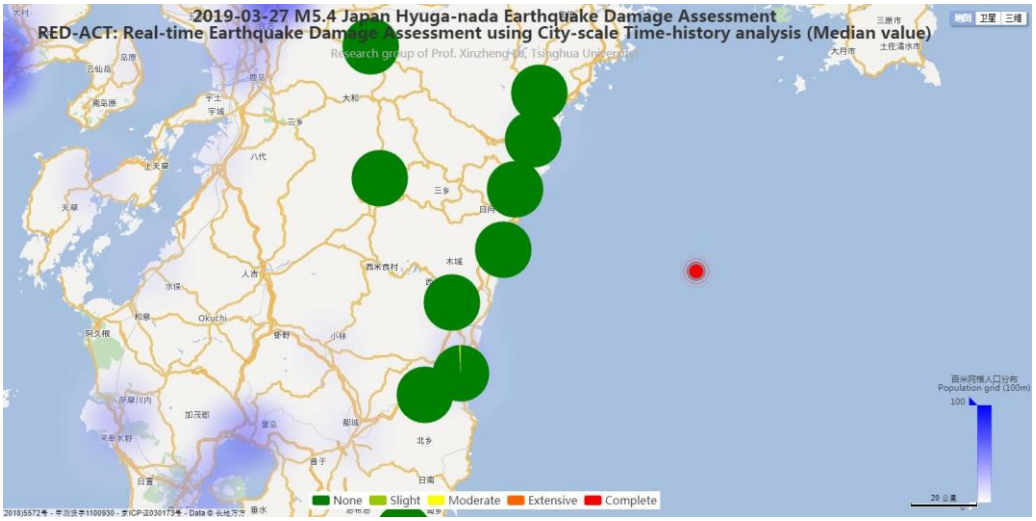

Figure 2 Damage ratio distribution of the buildings near to different stations

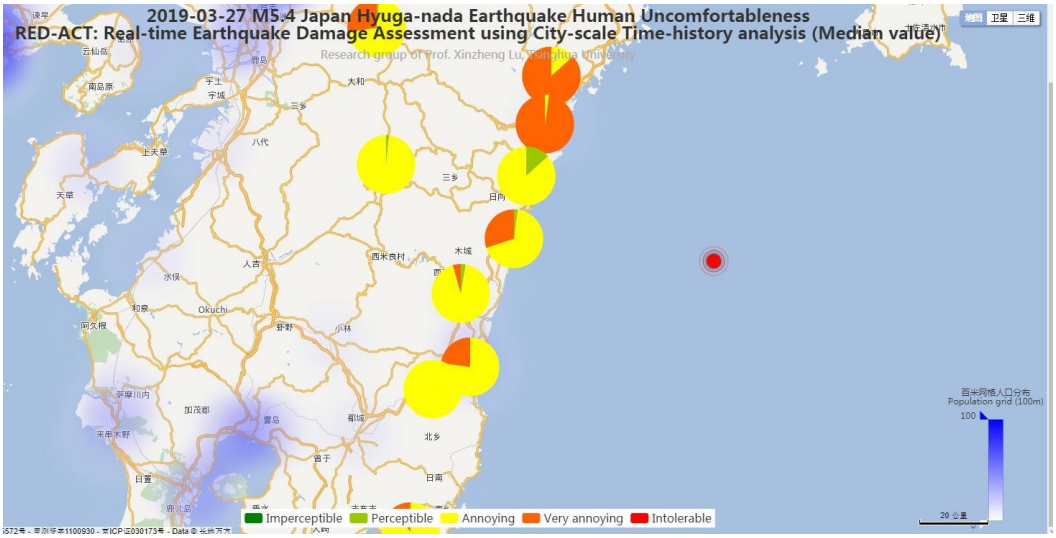

Figure 3 Human uncomfortableness distribution near to different stations

The details can be accessed at
http://www.luxinzheng.net/software/2019-03-27-Japan-5.4.html
http://www.luxinzheng.net/software/2019-03-27-Japan-5.4-Acc.html

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Table 1 Names and locations of the strong motion stations

No.	Station Name	Longitude	Latitude
1	KMM007	131.123	32.8267
2	MYZ002	131.683	32.6978
3	MYZ003	131.66	32.5659
4	MYZ005	131.601	32.4286
5	MYZ006	131.561	32.2565

6	MYZ008	131.393	32.106
7	MYZ013	131.419	31.9087
8	MYZ014	131.303	31.8454
9	MYZ017	131.228	31.4637
10	MYZ020	131.147	32.455