

## RED-ACT Report

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

### May. 02, Mw5.4 Tallaboa, Puerto Rico Earthquake

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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 07:13, May 02 2020 (Local Time, UTC -4), an Mw 5.4 earthquake occurred in Tallaboa, Puerto Rico. The epicenter was located at 17.94 -66.73, with a depth of 9.0 km.

#### 2. Recorded ground motions

8 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 310.3 cm/s/s. The waveform and corresponding response spectra in comparison with the design spectra specified in the Chinese Code for Seismic Design of Buildings are shown in Figure 1.

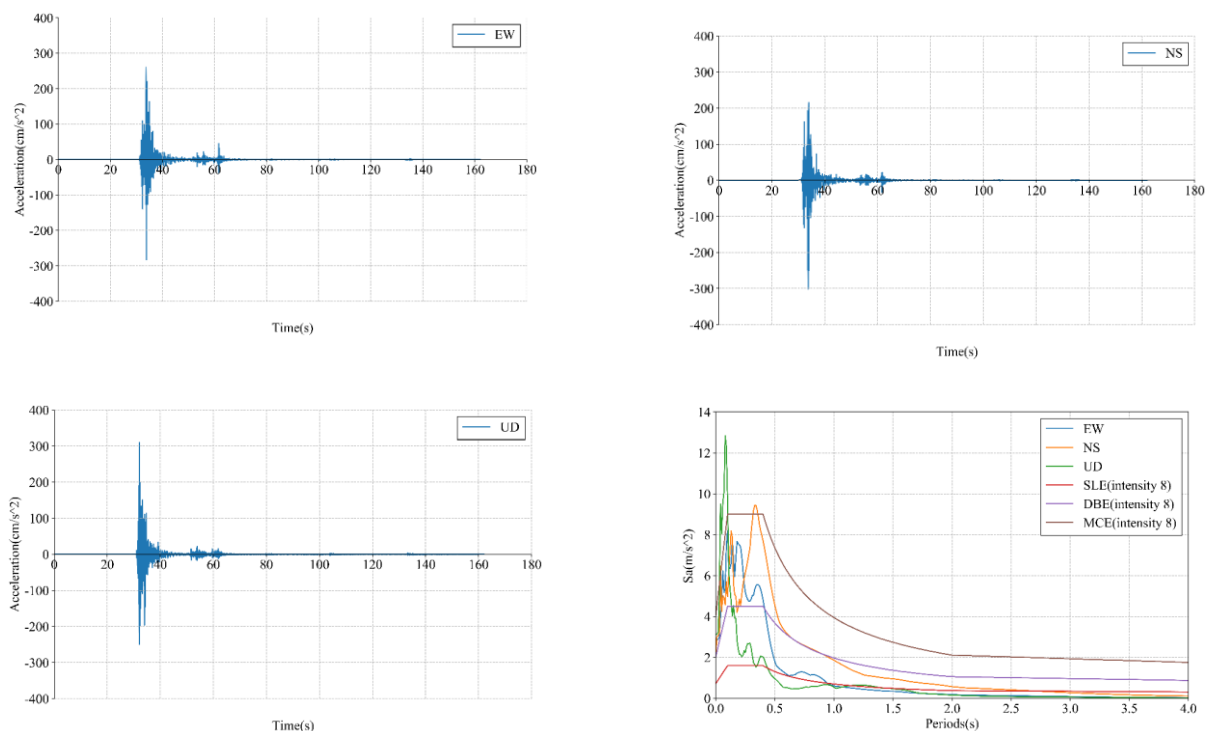


Figure 1 Waveform and response spectra of the recorded ground motions with maximal PGA

### 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**, the damage ratios of buildings located in different places can be obtained. The building damage distribution and the human feeling distribution near to different stations are shown in Figure 2 and Figure 3, respectively. These outcomes can provide a reference for post-earthquake rescue work

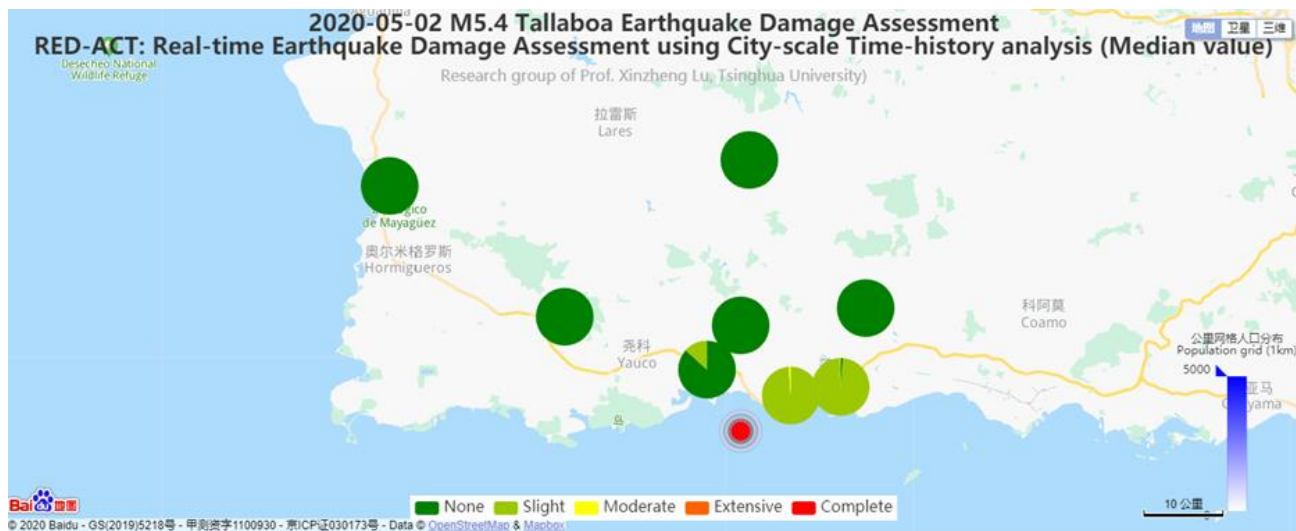


Figure 2 Damage ratio distribution of the buildings near to different stations

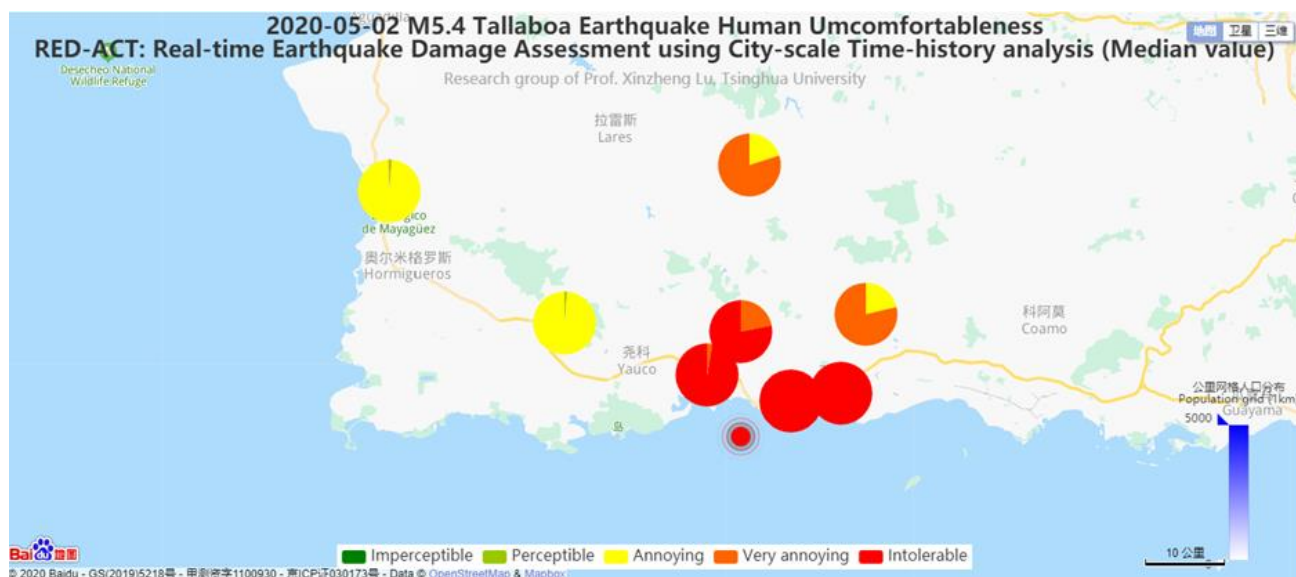


Figure 3 Human feeling distribution near to different stations

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Table 1 Names and locations of the strong motion stations

No.	Station Name	Longitude	Latitude
1	PR04	-66.67	17.98

2	PN13	-66.61	17.99
3	PR06	-66.73	18.06
4	PR02	-66.77	18.01
5	CELP	-66.58	18.08
6	UUPR	-66.72	18.25
7	PRSN	-67.15	18.22
8	PR03	-66.94	18.07