

Quick report of building damages in 2007 Peru Earthquake

August 24th, 2007

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Summary of earthquake

Time: 6:40PM (EST) Date: August 15th 2007

Magnitude: 8.0

Earthquake location: 40km Northeast of Chincha

Earthquake focal depth: 39km

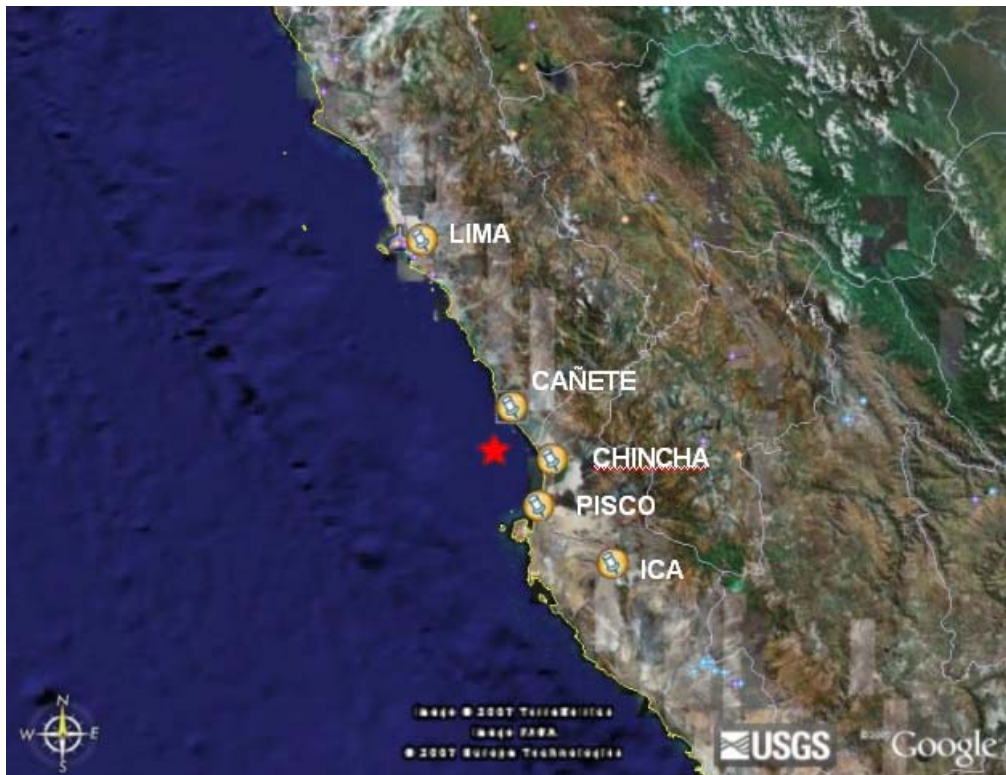


Figure 1: Location of epicenter and cities

Strong motion seismogram

4 Strong motion seismograms were recorded in Lima. The earthquake seismograms in the city, Ica, close to the earthquake center also recorded by the seismometer installed by CISMID.

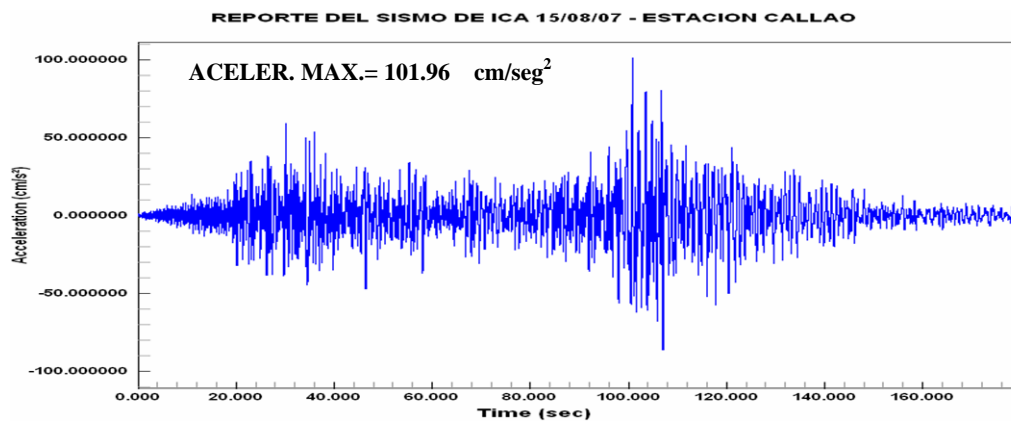


Figure 2: Strong earthquake motion observed in the city Lima (It shows double shocks)

Reconnaissance members and purpose

Date: 2007 August 19th

Reconnaissance members: six researchers and one security service

CISMID (Peru): Dr. Carlos Zavala, Dr Miguel Estrada

University of Texas (USA): Dr. Richard E. Klingner

University of San Juan (Argentina): Dr. Juan J. Carmona

Yokohama National University (Japan): Dr. Yutaka Yamazaki

Building Research Institute (Japan): Dr. Taiki Saito

The purpose of the mission was to investigate damages of buildings along the Pan-American Highway from Lima to Pisco and in the city area of Pisco. Most of the following pictures were offered by staff of CISMID and the reconnaissance members with consent of Dr. Zavala (CISMID).

Summary of damage

1) Roads and bridges

The damages of highway were found in many places caused by liquefaction after passing through Canete area. There were big waterholes along the coast made by the tsunami.



Photo 1: A part of high way was pushed up due to upheaval of east side of highway



Photo 2: Cracks and subsidences of roads where traffics were restricted



Photo 3: Waterholes on swampland along ocean-side by the Tsunami

2) Canete, Chincha

The damages in Canete were lower compared with those in Chincha and Pisco, even though Canete is located the closest to the epicenter of earthquake. Dr. Akio Abe (Tokyo Soil Research Co. LTD) explained that the reason why Canete had less damages is the ground condition in Canete is better than that in Chincha and Pisco. Buildings of adobe structure had serious damages in Chincha. Damages of confined masonry structure buildings are not so much in

general.





Photo 4: Damages due to liquefaction in Torre Tambo De Mora Licuaction. Many people crowded along the highway for water and food

3) Pisco

A bridge collapse blocked to go to Pisco right after the earthquake. Afterwards, a detour was made by dammed up the river. The bridge was used for a one way passage. There were swales around and the ground was not good.





Photo 5: Damaged bridge near Pisco. It was used for a one way passage

Dr. Zavala said the population of Pisco is tens of thousands. The population of Pisco is larger than that of Chincha. Buildings in the town were built mainly by adobe structure or confined masonry structure. According to a ground zoning map by CISMID, extensive damages were concentrated in the bad ground “zone 3”.

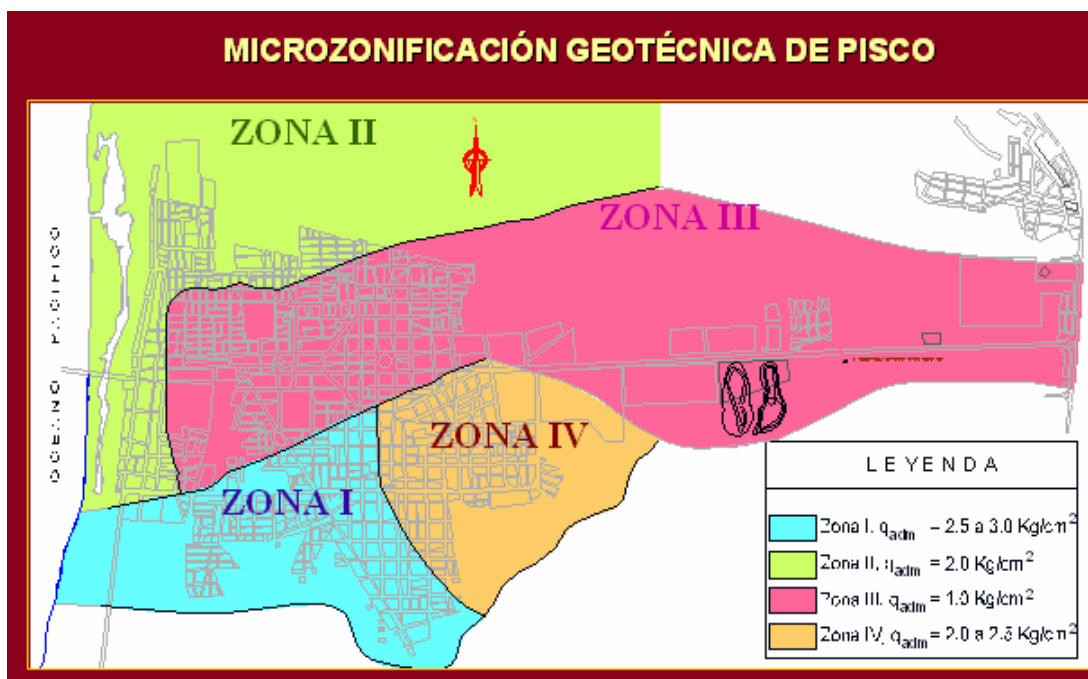


Figure 3: Ground zoning map of Pisco by CISMID

The central church in the town (CATEDRAL SAN CLEMENTE) was completely collapsed and 148 were found dead and two survived. It was built by adobe structure. Two towers, which were remained safe, had signs of repair works with flames of reinforced concrete. The rescue team of the government said, more than 10 people were left buried under rubbles in Hotel Embassy which was almost collapsed.



Photo 6: Damage of Church



Photo 7: Damage of Hotel

Most of low-rise buildings are adobe structures and mid-rise ones are confined masonry structures. Most buildings in a street were completely collapsed, but some adobe structure buildings were remained. Most of damage in confined masonry buildings was the collapse at parts of concrete casting joints in the upper part of columns and joints between columns and girders. Hospitals built by confined masonry structure were heavily damaged. There was no damage to buildings which were designed by the new building standards.







Hospital A



Hospital B



Hospital C (new building with no damage)