World Academy of Science, Engineering and Technology
International Journal of Geological and Environmental Engineering
Vol:11, No:06, 2017

Strong Ground Motion Characteristics Revealed by Accelerograms in Ms8.0 Wenchuan Earthquake

Authors : Jie Su, Zhenghua Zhou, Yushi Wang, Yongyi Li

Abstract : The ground motion characteristics, which are given by the analysis of acceleration records, underlie the formulation and revision of the seismic design code of structural engineering. China Digital Strong Motion Network had recorded a lot of accelerograms of main shock from 478 permanent seismic stations, during the Ms8.0 Wenchuan earthquake on 12th May, 2008. These accelerograms provided a large number of essential data for the analysis of ground motion characteristics of the event. The spatial distribution characteristics, rupture directivity effect, hanging-wall and footwall effect had been studied based on these acceleration records. The results showed that the contours of horizontal peak ground acceleration and peak velocity were approximately parallel to the seismogenic fault which demonstrated that the distribution of the ground motion intensity was obviously controlled by the spatial extension direction of the seismogenic fault. Compared with the peak ground acceleration (PGA) recorded on the sites away from which the front of the fault rupture propagates, the PGA recorded on the sites toward which the front of the fault rupture propagates had larger amplitude and shorter duration, which indicated a significant rupture directivity effect. With the similar fault distance, the PGA of the hanging-wall is apparently greater than that of the foot-wall, while the peak velocity fails to observe this rule. Taking account of the seismic intensity distribution of Wenchuan Ms8.0 earthquake, the shape of strong ground motion contours was significantly affected by the directional effect in the regions with Chinese seismic intensity level VI ~ VIII. However, in the regions whose Chinese seismic intensity level are equal or greater than VIII, the mutual positional relationship between the strong ground motion contours and the surface outcrop trace of the fault was evidently influenced by the hanging-wall and foot-wall effect.

Keywords : hanging-wall and foot-wall effect, peak ground acceleration, rupture directivity effect, strong ground motion
Conference Title : ICGDT 2017 : International Conference on Geophysics and Earthquake
Conference Location : Amsterdam, Netherlands
Conference Dates : June 18-19, 2017