随机地震荷载作用下黄土的液化特性

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LIQUEFACTION PROPERTY OF LOESS UNDER STOCHASTIC SEISMIC LOAD

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摘要 以场地未来50 a超越概率10%的地震波作为输入激振波，对取自宁夏南部西吉县夏家大路喜家湾滑坡后壁的黄土开展动三轴试验，研究随机地震荷载作用下黄土中孔隙水压力的增长基本特性、影响效应及孔隙水压力增长规律。由试验结果可知，在随机地震荷载作用下，孔隙水压力对输入动荷载的响应具有明显的滞后性，其增长主要集中在地震荷载的有效持时范围内。输入地震荷载的幅值、有效持时以及固结压力对黄土的液化特性有较大的影响，幅值较大、持时较长、固结压力较小时，更有利于孔隙水压力的发展。由于孔隙水压力的增长是源于孔隙的压缩引起的，因此，可以将孔隙水压力比表示为残余应变的函数，据此，可得地震荷载作用下，黄土不同变形情况时孔隙水压力的发展水平及液化程度。

关键词： 土力学　随机地震荷载　黄土液化　孔隙水压力比　孔隙水压力增长规律

Abstract： Certain earthquake waves with 10% exceeding probability in the following 50 years of the field are input as vibration wave to carry out the dynamic triaxial test to research the increasing characteristic，model and effect of pore water pressure of loess samples，which are adopted from the back of a loess landslide in village of Xiajiadalu Xijiawan，Xiji County of Ningxia Province. The results show that the response of pore water pressure in loess delays the vibration wave obviously，and increase in the range of effective time of vibration wave mainly. In addition，the amplitude，effective time of the seismic load and consolidation pressure influence the liquefaction character of loess significantly. The loess samples which suffer a seismic dynamic load with larger amplitude，longer effective time and lower consolidation pressure would induce increase of pore water pressure easily. In addition，for the increase of pore water pressure is induced by the reduction of pore，so the pore water pressure ratio could be expressed by a function of residual strain；and the level of pore water pressure and liquefaction degree of loess under different deformations could be gained under earthquake load.

Keywords： soil mechanics　stochastic seismic load　liquefaction of loess　pore water pressure ratio　increase rule of pore water pressure

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