MECHANISM OF OIL-WATER EMPLACEMENT IN SOILS

1ZHENG XILAI, 2WANG BINGCHEN 1Institute of Geosciences, Ocean University of Qingdao, Qingdao, China; 2Institute of Geotechnical Survey, Beijing, China

Daqing is the biggest petroleum industry base in China producing about 55 million tons crude oil and 2 million tons oil products per year. At the same time, a great amount of petroleum often spills and leaks on or under the surface in the process of its exploitation, refinement, transportation and utilization, and it has, to some degree, contaminated the soils.

On the basis of site investigation, soils from the area are sampled, air-dried, sieved and analyzed mechanically. And then, a two-dimensional oil-water emplacement device filled with one of the soils is installed, in which 10 negative pressure meters and 5 conductometer probes are applied to measure the micro-effects of pressure and water-bearing content in soil during the diesel and crude oil infiltration. At the same time, the propagation of oil front is observed with the help of the colored oils continuously. By means of the measured curves of oil front, water-bearing content and negative pressure in soils, the mechanism of oil-water emplacement is discussed in detail. Finally, a mathematical model for oil-water emplacement is set up to determine the distribution of oil front in soils according to Darcy's law and mass balance, and to evaluate the petroleum contamination potential to the soil-water system.