

عنوان مقاله:

Evaluation of Earthquake Liquefaction Hazard of Kutch Region

محل انتشار:

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خلاصه مقاله:

Soil liquefaction during earthquakes is a common phenomenon. Liquefaction occurs when waterlogged sediments are agitated by earthquake shaking. Liquefaction is the mixing of sandy soils and groundwater during the shaking of a moderate or strong earthquake. If liquefaction occurs under a building, it may start to lean, tip over, or sink several feet. Liquefaction earthquake hazard occurs in areas that have low groundwater level and consist of sandy soil strata. ۲۰۰۱ Bhuj Earthquake produced major liquefaction in Great & Little Rann of Kutch, Banni plains, Kandla, and Gulf of Kutch; and these areas contained low-lying salt flats, estuaries, intertidal zones, and young alluvial deposits typically known for high susceptibility zones of liquefaction due to earthquake. Severe damage of many bridges, ports, buildings, embankment dams was reported in Kutch region due to liquefaction of underneath soils. The present study aims to conduct an extensive experimental investigation of soils from Kutch region to access liquefaction susceptibility and liquefaction potential of the region. Basic geotechnical characterization of soils from the region was carried out to evaluate its vulnerability to liquefaction. In the current research, ۳۲ soil samples from ۱۰ locations, including ۵ major dams, at different depths were collected from the region to conduct a detailed geotechnical investigation. Most soils in the region were found to be cohesionless loose soil and classified as silty-sand. Results from geotechnical investigation were connected to liquefaction aspects of the region. Liquefaction vulnerability was related to grain size parameters and indices. Variation of grain size index (IGS) with fines content & d_{50} of Kutch soils exhibited high susceptibility to liquefaction. Shear strength parameters of soils in the region exhibited low friction angle (average ۳۱ deg). Low shear strength parameters combined with the large settlement during saturation & shearing indicated the contractive behaviour of Kutch soils leading to large pore pressure evolution during earthquake shaking resulting to liquefaction in the region. Most soil samples from various locations of Kutch region exhibited lower FOS values indicating soils prone to liquefaction. Results from the current experimental investigation showed high susceptibility of soils in the Kutch region to liquefaction. Soil behaviour and performance of structures during ۲۰۰۱ Bhuj earthquake .were in agreement with the conclusions made in the current study

کلمات کلیدی:

Liquefaction susceptibility, Grain size index, Shear strength, Kutch region

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