Geophysical Research Abstracts
Vol. 21, EGU2019-11785, 2019
EGU General Assembly 2019

Impact of Oblique-Slip Faulting on layout of Embedded Shallow Foundation by Analogue Model Integrated with Numerical Model

ChunYuan Liu, Chien-Hung Li, Chien-Hui Hung, and Ming-Lang Lin
National Taiwan university, Department of Civil Engineering, Taiwan (mlbgary1994@gmail.com)

Ground deformation and surface rupture induced by faulting severely damaged many infrastructures in several earthquakes. Features include ground deformation, particle rotation, strain localization and foundation translation during faulting were elucidated through DEM simulation and sandbox experiments. The oblique-slip faulting has not been studied comprehensively and is worthy of in-depth researching to reveal the three-dimensional rupture propagation.
The thickness of overburden soil (H) is 10 cm and the dip of fault plane is 60 degrees in sandbox. Different rake angles are applied in sandbox experiments and validated by DEM simulation. Experiments indicate that the width of ground deformation zone (W) range from 1.1H to 1.5H with different rake angle. The dip-slip offset dominates the propagation of shear zone and surface deformation in oblique-slip faulting. The strike-slip offset results in Riedel shear and flower structure. An Embedded shallow foundation located within ground deformation zone would tilt toward foot wall and rotate along strike direction. Besides, rotation of foundation causes local soil failing passively in compression side. The deeper the foundation embedded, the fewer the foundation rotate.
The key factors of interaction among oblique-slip faulting, overburden soil and embedded shallow foundation include 1) shallow foundations position related to fault tip, 2) the rake angle of faulting, 3) the embedded depth and 4) the layout of foundation. If there are unavoidable infrastructures in active fault zone, construction at foot wall is better than at hanging wall. Engineers should take potential translation and rotation into consideration to mitigate the impact from ground deformation.