

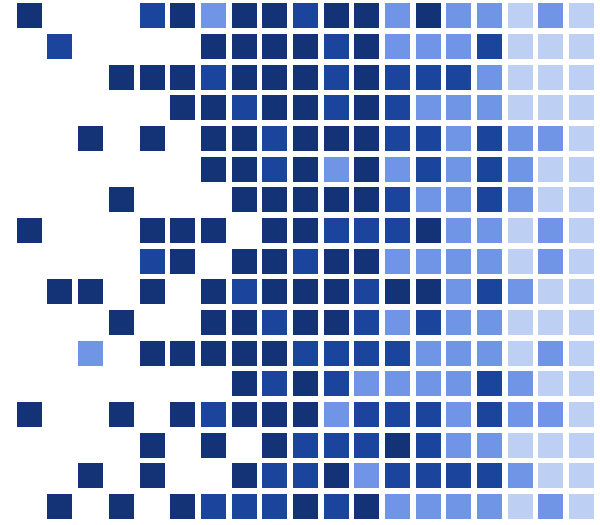
Modes of hydraulic failure in soil mechanics



SAINT LOUIS
UNIVERSITY™
— EST. 1818 —

Farhad Sakhaee: Ph.D. Candidate, farhad.sakhaee@slu.edu

Sahar Azimnezhad: Master of Science in Civil Engineering
August 29th 2020







1. Failure Due To Loadings

(Sliding)

(Overturning)

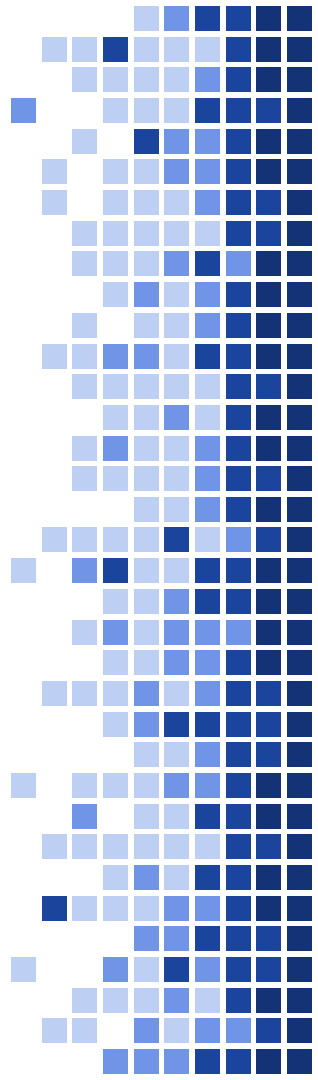
Excess Settlement

Sliding of the foundation
plate

Liquefaction

Hydrodynamic Scour

2. Geotechnical Failure



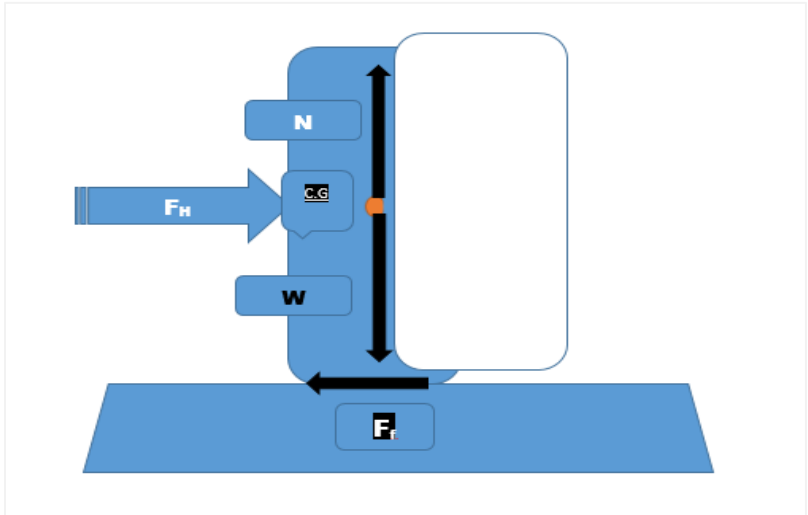


Figure 1. Sliding

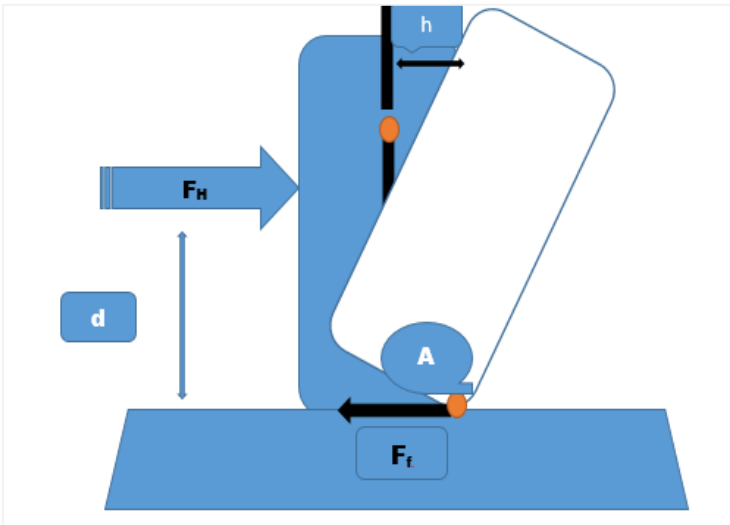


Figure 2. Overturning

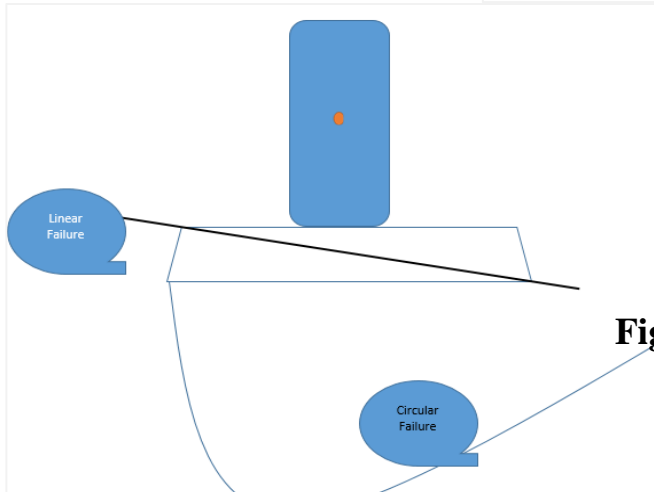


Figure 3. Linear and Circular failure due to foundation plate sliding





$$i \longrightarrow i_{cr} \longrightarrow \dot{\sigma}=0 \text{ E.q.8}$$

$$T=C+\sigma' \cdot \tan \phi$$

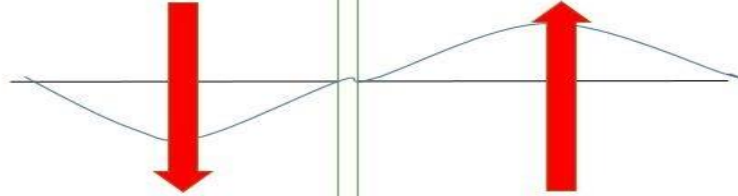
In Sandy Soils $\longrightarrow (C=0) \longrightarrow T=0$

In Clay Soil $\longrightarrow (C \neq 0) \longrightarrow T=C$



Downward Seepage

Upward Seepage



a)

$$\sigma' = \gamma'Z + iZ\gamma_w$$

b)

$$\sigma' = \gamma'Z - iZ\gamma_w$$



**In downward seepage
soil settles.**

c)



**In upward seepage
soil swell**

d)

