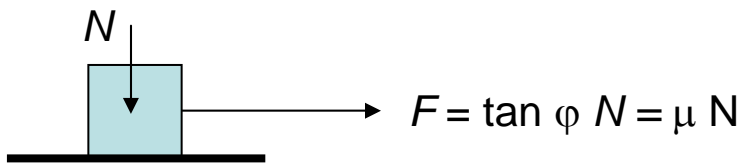


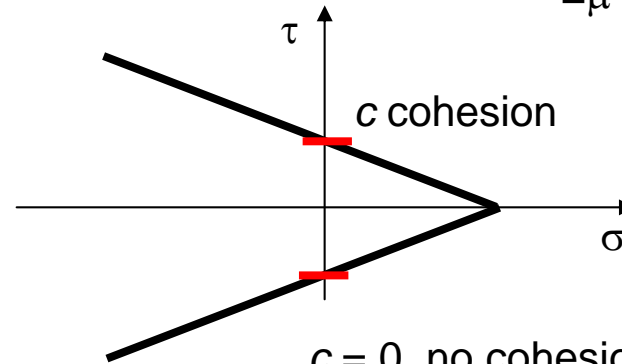
# Lecture 12- summary

## Mohr-Coulomb strength criterion

Physical meaning: Strength increased due to compression



$$\text{Mohr-Coulomb: } \forall \vec{n}; f(\vec{T}) = |\tau| + \sigma \tan \varphi - c \leq 0$$



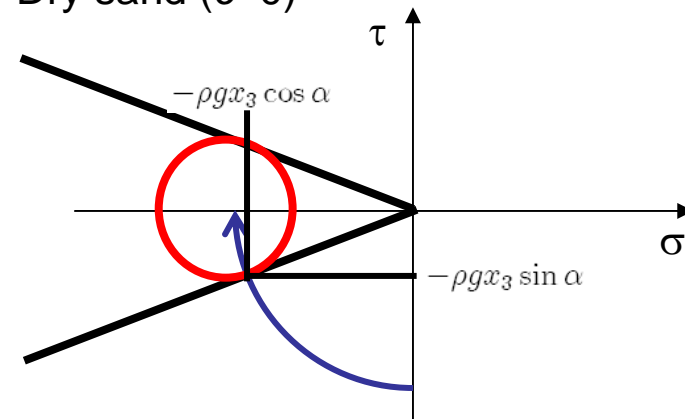
Applicable to: Concrete, soil, sand, ...

## Application: Sand pile

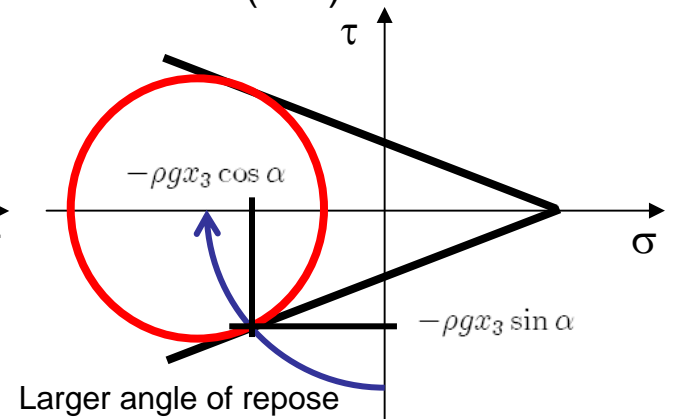
Solution:  $\vec{T}(\vec{n}) = \sigma \vec{n} + \tau \vec{t}; \begin{cases} \sigma = \sigma_{33} = -\rho g x_3 \cos \alpha & (\vec{n} = \vec{e}_3) \\ \tau = \sigma_{13} = -\rho g x_3 \sin \alpha & (\vec{t} = \vec{e}_1) \end{cases}$

S.C.

Dry sand (c=0)



Wet sand (c>0)



E.Q.

$$\text{div } \sigma + \rho \vec{g} = 0: \begin{cases} \frac{\partial \sigma_{13}}{\partial x_3} + \rho g \sin \alpha = 0 & (\vec{e}_1) \\ \frac{\partial \sigma_{23}}{\partial x_3} = 0 & (\vec{e}_2) \\ \frac{\partial \sigma_{33}}{\partial x_3} + \rho g \cos \alpha = 0 & (\vec{e}_3) \end{cases}$$