Probabilistic safety concept in OHL construction

SC B2 – Overhead Lines

PS 2: Latest Techniques in Asset Management, Capacity Enhancement, Refurbishment

Question 2.13: In which other areas of the energy grid can be applied the probabilistic safety concept?
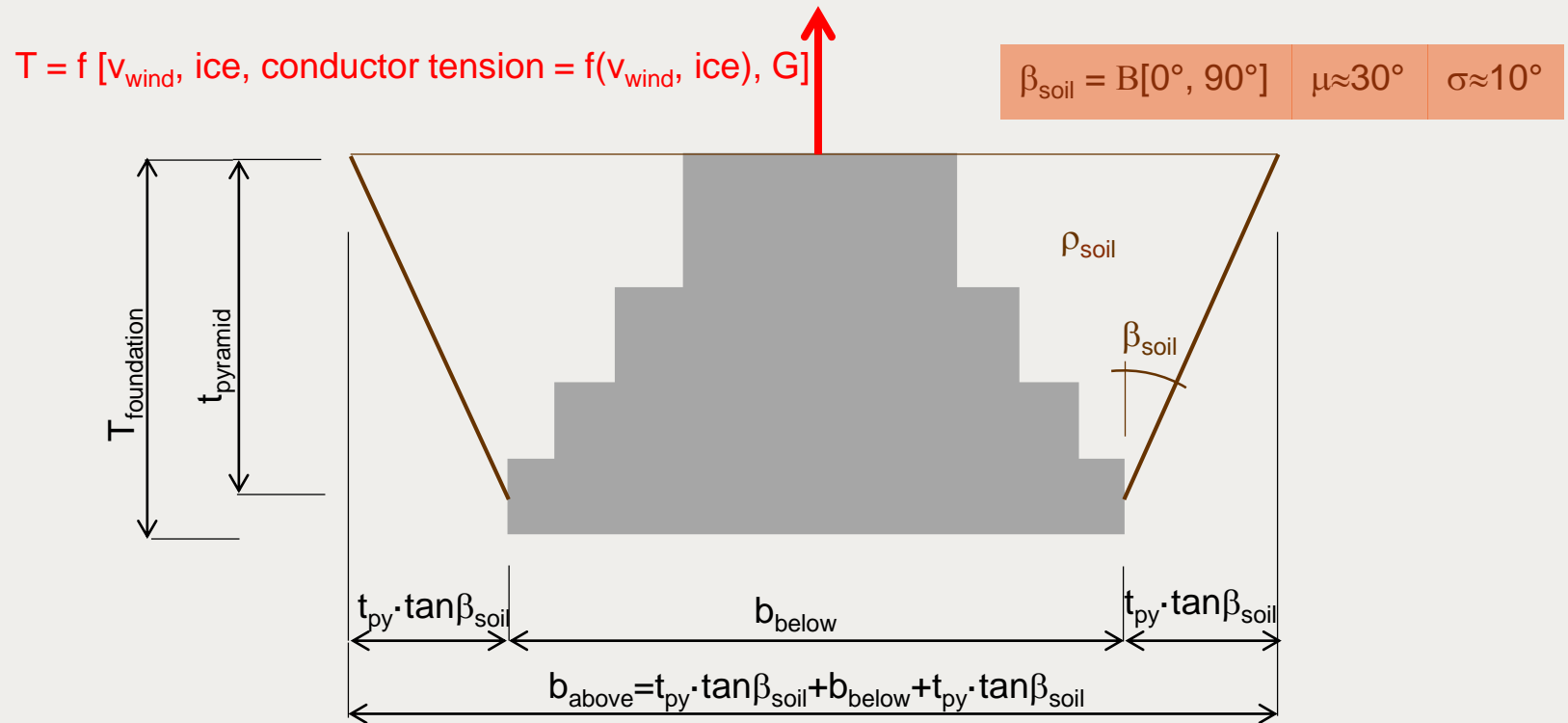
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Probabilistic analysis of single step foundations of towers

- *Limit state functions depend on the same stress variables like LSF of steel beams*
- *The important resistance variables are the angle β of the soil pyramid and the density ρ of soil*

$T = f\ [v_{wind},\ ice,\ conductor\ tension = f(v_{wind},\ ice),\ G]$

$\beta_{soil} = B[0°,\ 90°]$	$\mu \approx 30°$	$\sigma \approx 10°$

ρ_{soil}

β_{soil}

$T_{foundation}$

$t_{pyramid}$

$t_{py} \cdot \tan\beta_{soil}$ b_{below} $t_{py} \cdot \tan\beta_{soil}$

$b_{above} = t_{py} \cdot \tan\beta_{soil} + b_{below} + t_{py} \cdot \tan\beta_{soil}$

Probabilistic analysis of bending beams in substaions

- *Limit state functions also depend on conductor tension caused by short circuit*
- *External forces cause axial forces and partially bending moments in the steel beams*
- *Requires static analysis using the 2nd order theory*

$$e_0 = N[0, +\infty] \qquad \mu \approx 0,8 \cdot l/1000 \qquad \sigma \approx 0,75 \cdot \mu$$