DIPARTIMENTO di INGEGNERIA

LA RICERCA DENTRO UNIME

ULTIMATE BEARING CAPACITY OF ADJACENT FOOTINGS

UNIVERSITY OF MESSINA

Department of Engineering

PhD Program – 39th Cycle

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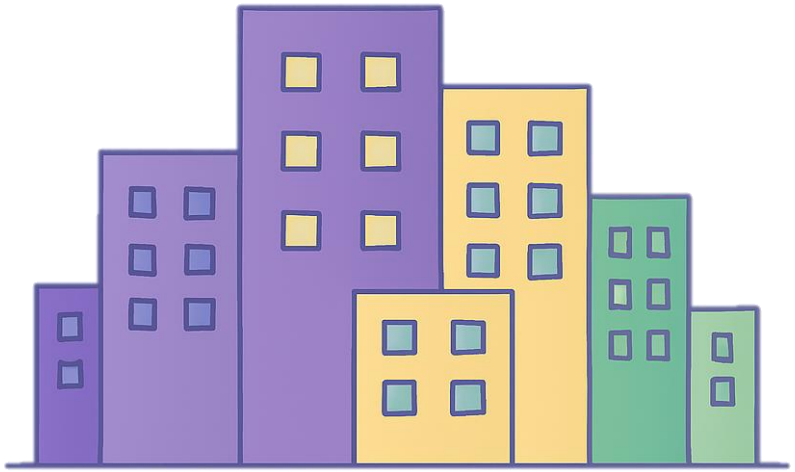
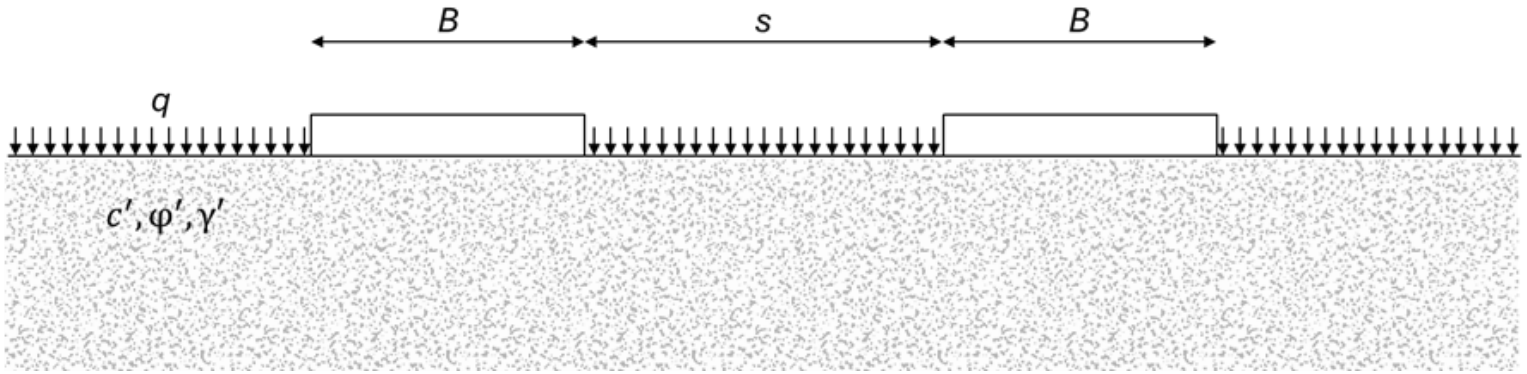
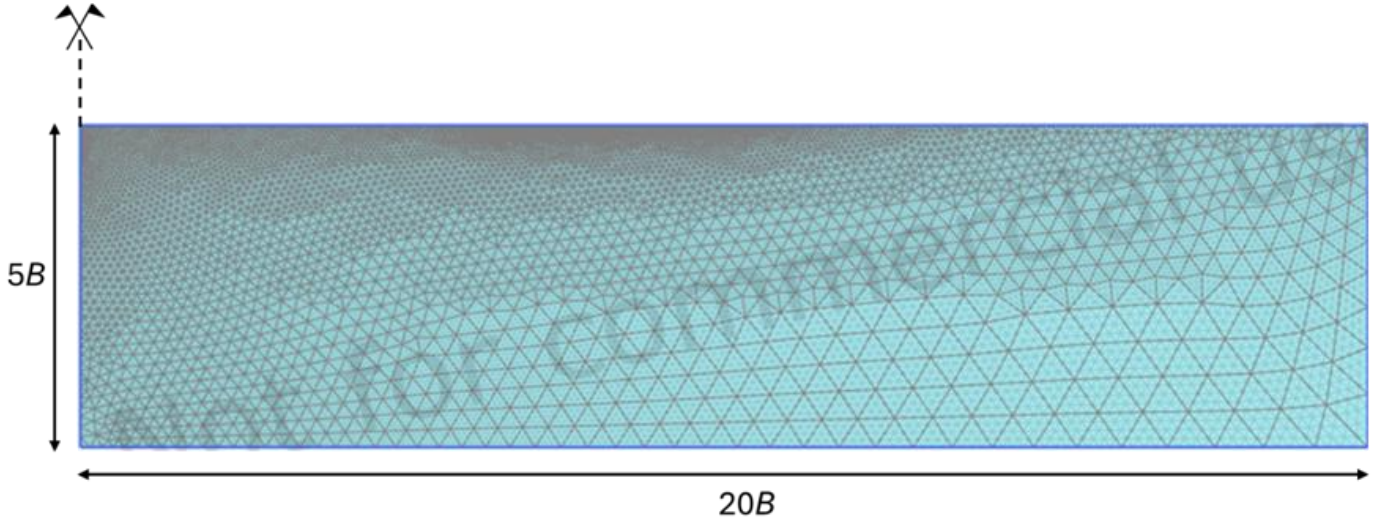
12 gennaio 2026



Failure Mechanism Geometry

Variation of bearing capacity with footing spacing





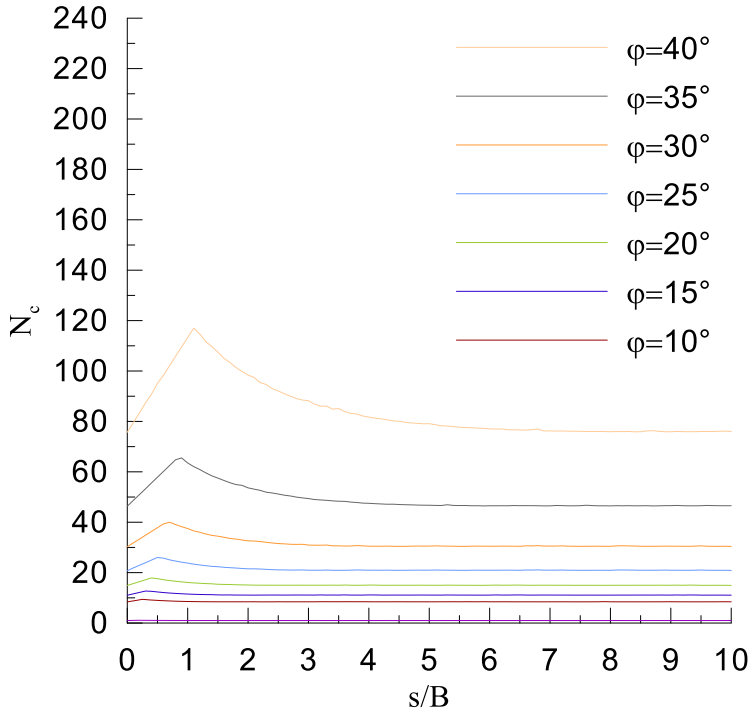
Mohr-Coulomb Model

$\overline{N_c}$ $c \neq 0 \quad q = 0 \quad \gamma = 0$

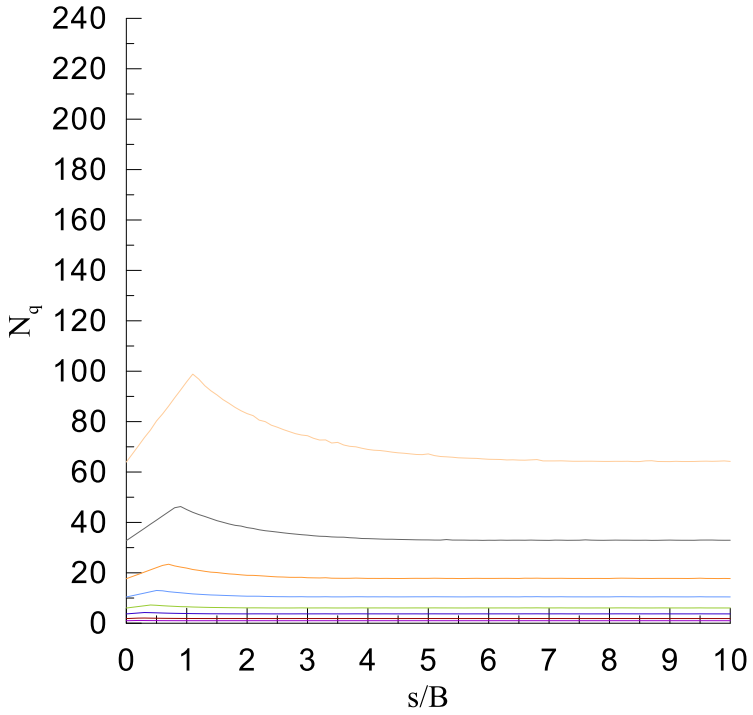
$\overline{N_q}$ $c = 0 \quad q \neq 0 \quad \gamma = 0$

$\overline{N_\gamma}$ $c = 0 \quad q = 0 \quad \gamma \neq 0$

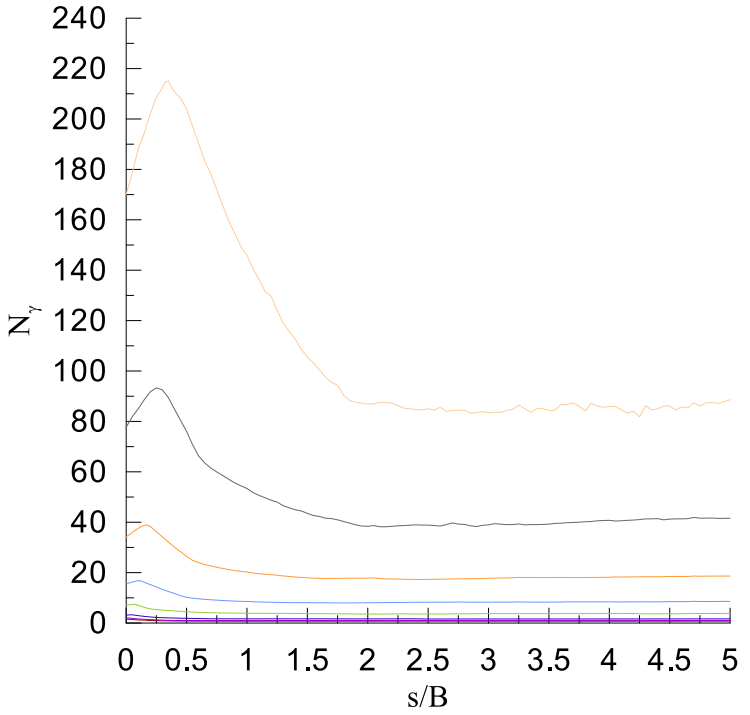
$\overline{N_c}$



$\overline{N_q}$



$\overline{N_\gamma}$



$$q_{\text{ult,coppia}} = c'\bar{N}_{\text{c}} + q\bar{N}_{\text{q}} + \frac{1}{2}\gamma B\bar{N}_{\gamma}$$

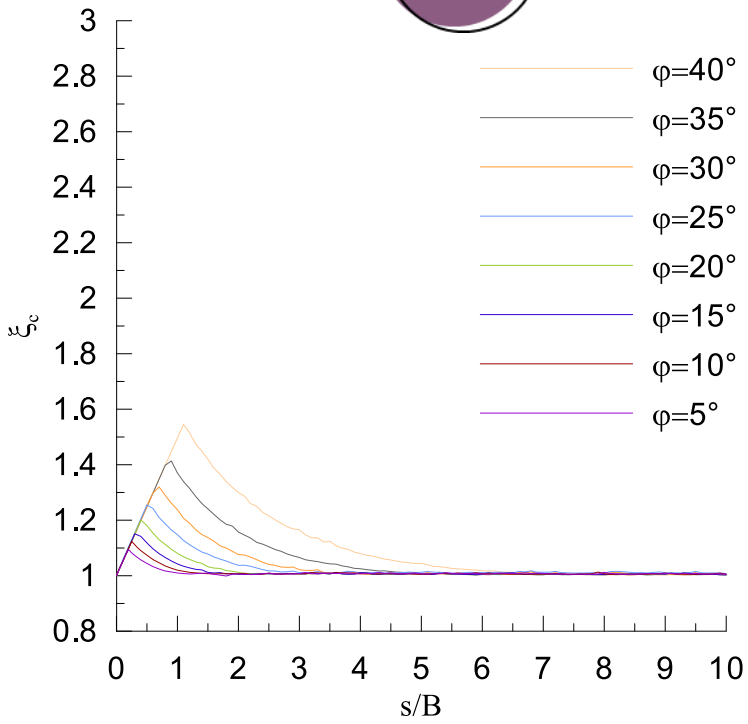
$$\xi_{\text{c}} = \frac{q_{\text{ult,c,coppia}}}{q_{\text{ult,c}}} = \frac{\bar{N}_{\text{c}}}{N_{\text{c}}}$$

$$\xi_{\text{q}} = \frac{q_{\text{ult,q,coppia}}}{q_{\text{ult,q}}} = \frac{\bar{N}_{\text{q}}}{N_{\text{q}}}$$

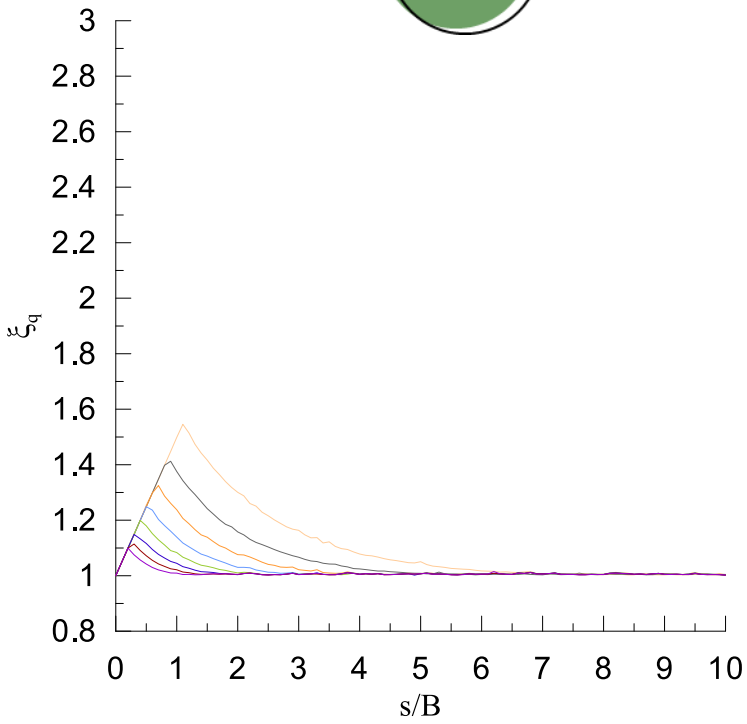
$$\xi_{\gamma} = \frac{q_{\text{ult,}\gamma\text{,coppia}}}{q_{\text{ult,}\gamma}} = \frac{\bar{N}_{\text{q}}}{N_{\text{q}}}$$

$$q_{\text{ult,coppia}} = c'\xi_{\text{c}}\text{N}_{\text{c}} + q\xi_{\text{q}}\text{N}_{\text{q}} + \frac{1}{2}\gamma B\xi_{\gamma}\text{N}_{\gamma}$$

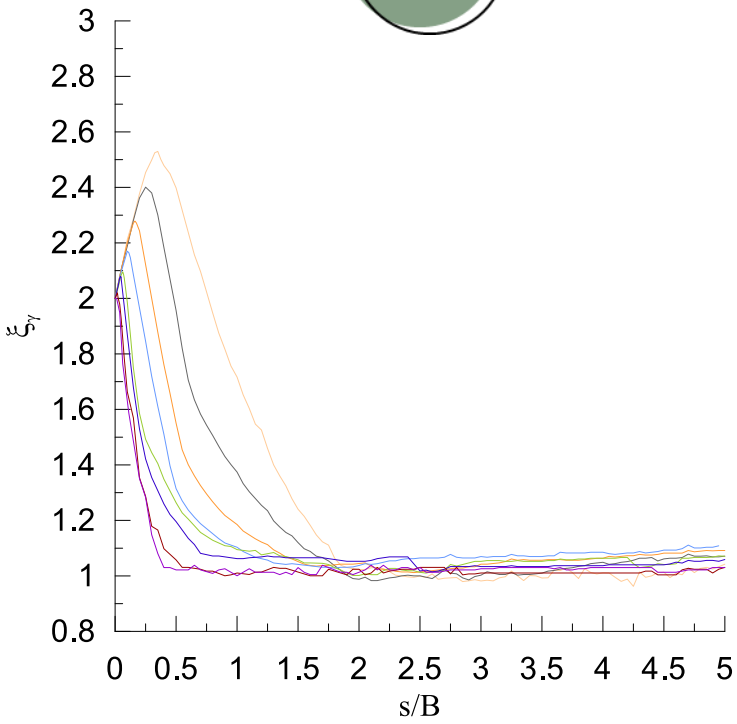
ξ_c



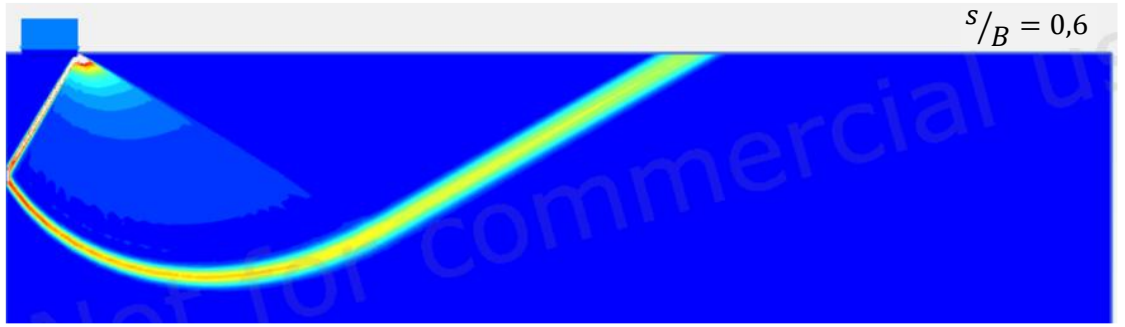
ξ_q

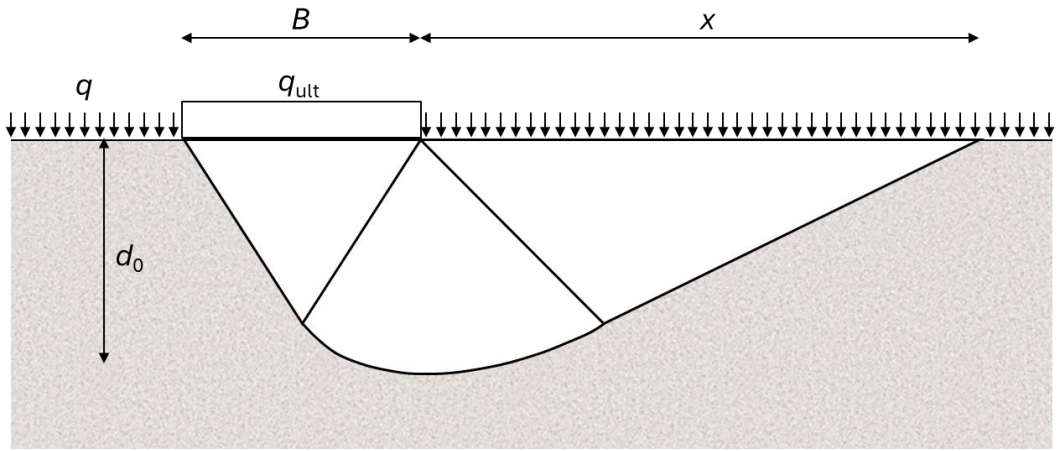


ξ_γ

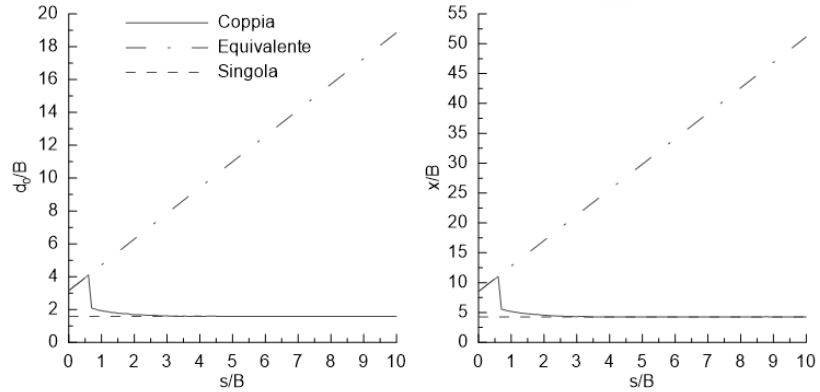


$\overline{N_c}$

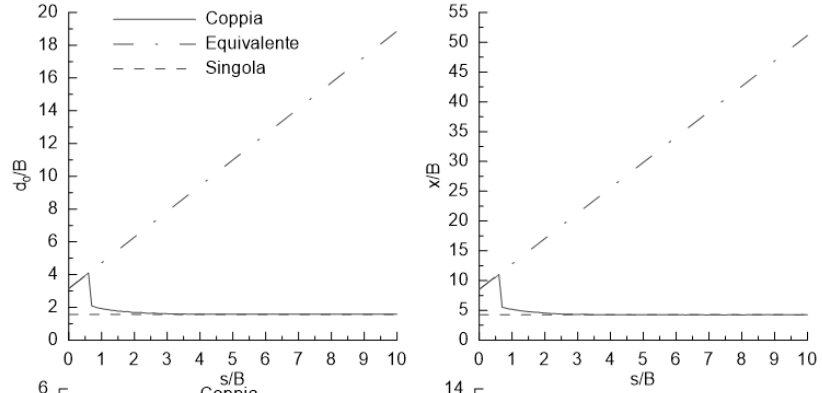




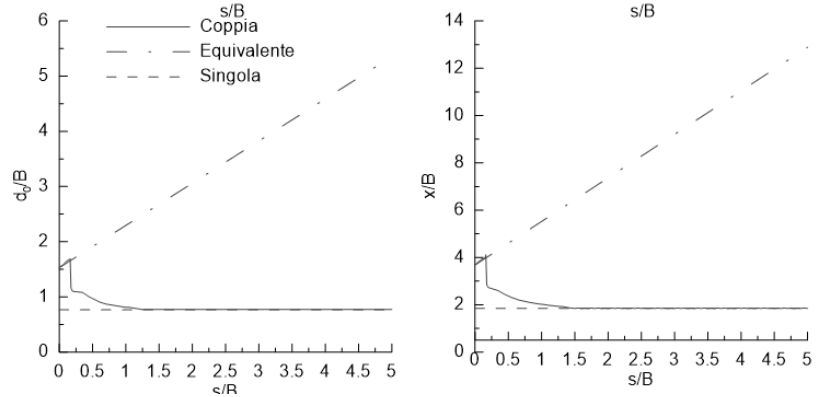
$\overline{N_c}$



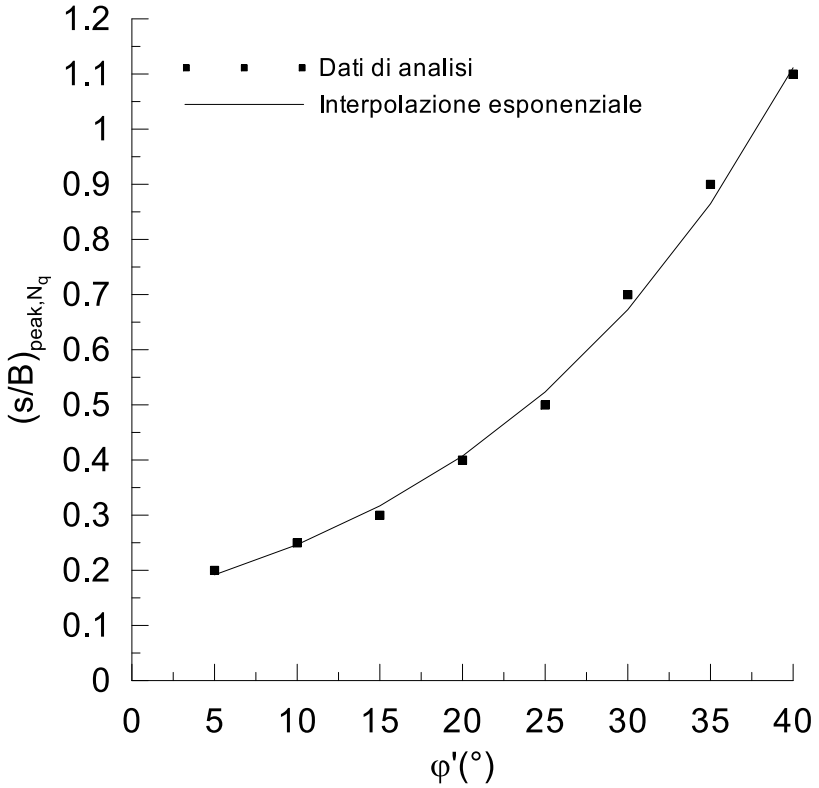
$\overline{N_q}$

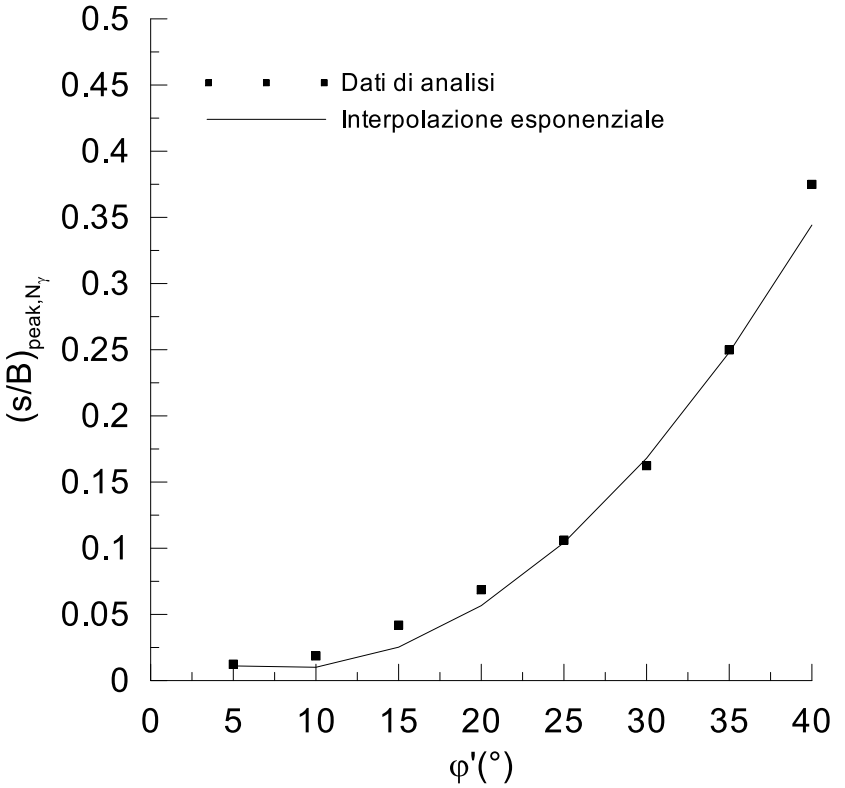


$\overline{N_\gamma}$



INTERPOLATION s/B_{max}





$$(s/B)_{peak,N_{c,q}} = 0.1492 \cdot e^{0.0504 \cdot \varphi'}$$

$$(s/B)_{peak,N_{\gamma}} = 0.0083 \cdot e^{0.0982 \cdot \varphi'}$$

Conclusions