Stability Analyses in Geotechnical Engineering (by Dr J. Takemura)

Mid-term Exam: 22nd November 2004

If you cannot solve the following questions satisfactorily, submit the solutions as an assignment.
Due date: 27 November
(もし満足のいく回答ができなかった場合は、レポートとして回答を提出すること)
期限：11 月 27 日

1. Consider the bearing capacity of rigid strip footing on a ground surface.   As shown in the figure below, vertical very thin plates with smooth surface and zero strength are inserted into the ground from the both edges of the footing.
    1) Obtain the bearing capacity (Q_{ult}) of the footing, using i)upper bound analysis, ii) lower bound analyses), iii) slip line method and iv) limit equilibrium method for the two ground conditions: (I) undrained condition: $\tau_f=c_u$, (II) drained condition: $\tau_f=\tan\phi'$, $\phi'=\psi$, effective unit weight γ.
    2) Discuss the correctness of the obtained solutions.

   Note: If additional conditions are needed for the solution, assume by yourself and explain the assumption.

(I) undrained condition $\tau_f=c_u$
(II) drained condition $\tau_f=\tan\phi'$ ($\phi'=\psi$)
     effective unit weight γ

thin smooth surface plates
with zero strength
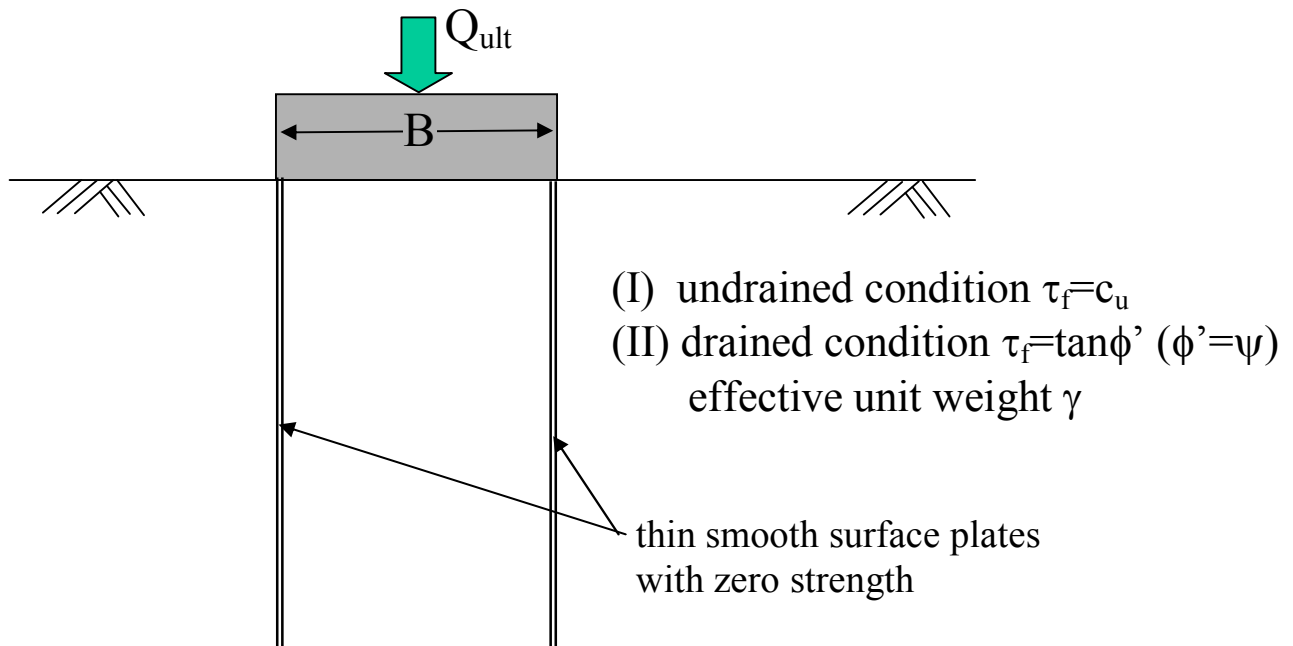
2. If the two thin plates are removed from the ground shown above, how does the bearing capacity change?