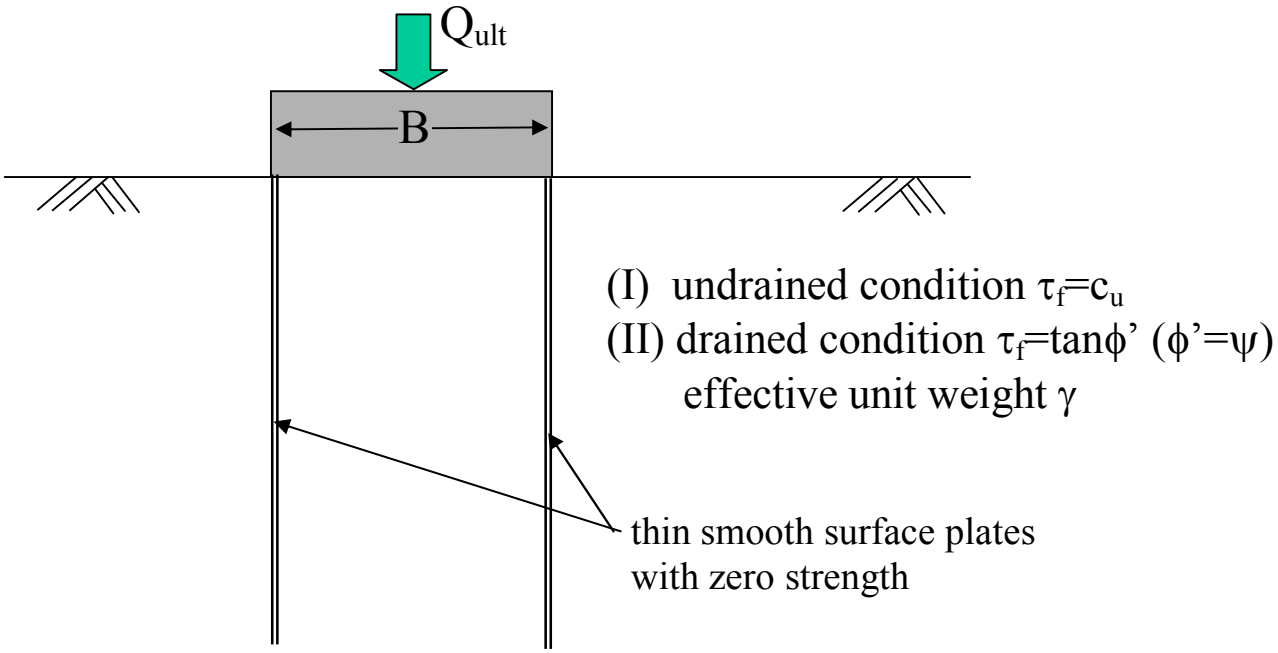
Stability Analyses in Geotechnical Engineering (by Dr J. Takemura)

Mid-term Exam: 21st November 2005

If you cannot solve the following questions satisfactorily, submit the solutions as an assignment.
Due date: 28 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 28 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.



2. **If the two thin plates are removed from the ground shown above, how does the bearing capacity change?**

3. **Explain the reasons why limit analysis can be reasonably applied for stability analysis on clay in short term problems and cannot be directly applied for that on loose sand.**