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

Mid-term Exam: 30th November 2006

If you cannot solve the following questions satisfactorily, submit the solutions as an assignment.
Due date: 4 December
(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)
：12 月 4 日

1. **Consider a vertical rough surface wall retains a soil under the following conditions. (Fig.1)**

   (a) The retained soil by the wall is clay for which undrained loading condition can be reasonably assumed.
   (b) The unit weight of the clay is γ and the cohesion c_u
   (c) The adhesion mobilized between the clay and the wall surface is the same as the cohesion of the clay, c_u.
   (d) The wall height is H.
   (e) The surcharge pressure p_s is applied to the surface of the retained soil.
   (f) There is no friction between the base of the wall and the stiff layer underneath.
   (g) Plane strain (two-dimensional) condition can be assumed.

   Answer the following questions:

   (1) Obtained the passive total earth pressure (P_p) on the vertical surface wall using upper bound analysis.

   (2) Obtained the active total earth pressure (P_a) on the vertical surface wall using upper bound analysis.

   (3) Obtained passive total earth pressure (P_p) on the vertical surface wall using slip line method.

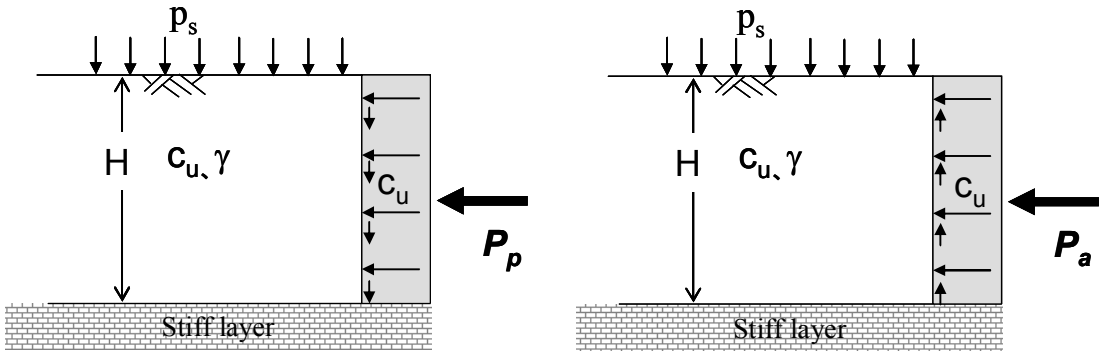

Fig.1

2. **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.**

3. **Suppose that you would be a geotechnical engineer involved in the project of countermeasures against further titling of Leaning Tower of Pisa. Propose the any counter measures using drawings.**