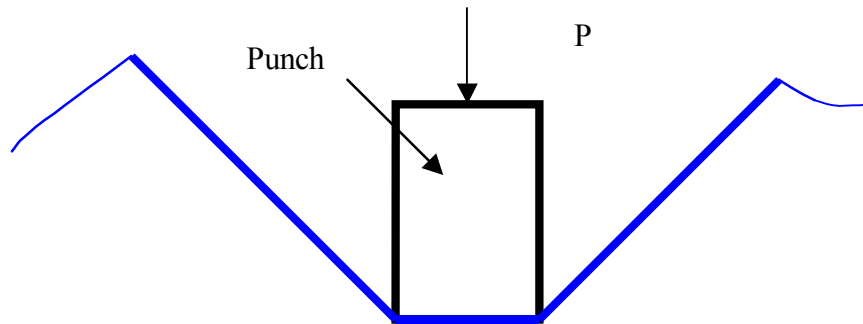


**2.800 Tribology**  
**Department of Mechanical Engineering**  
**Massachusetts Institute of Technology**  
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**Homework Exercise** (for discussion in class in about two weeks)

1. Read the paper by Oktay and Suh and comment.
2. A flat punch is used to indent a solid as shown below. Determine the upper and lower bound solutions for the indentation load. Using the slip-line field, determine the exact indentation load.



Rigid-perfectly plastic solid with yield strength  $2k$

3. A conical asperity is plowing the surface. Determine the coefficient of friction.
4. At the beginning of sliding, there are 10,000 particles of 1 micron in diameter between two flat Armco iron surfaces. The hardness of Armco iron is 1000MPa. After one day of sliding, the particles have agglomerated into 100 equal sized spheres. What would be the change in friction coefficient? Plowing is primarily responsible for friction. State your assumptions clearly.