CVEN 3698
Engineering Geology

Laboratory Assignment 2

Before proceeding with this assignment, you are asked to read pp. 195-198 in the *Laboratory Manual in Physical Geology* (7th Edition) and pp. 334-337 in *Engineering Geology* (Goodman, 1993).

1) For the geometry of the plane shown in Figs. 1(a) and 1(b) (adapted from Fig. 9.3 pp. 336 in *Engineering Geology* by R.E. Goodman) derive the following two equations:

$$\tan \psi_a = \tan \psi \cdot \cos \beta$$

$$\tan \psi_a = \tan \psi \cdot \sin \alpha$$

where ψ is the true dip of the plane and ψ_a is its apparent dip in a direction making a horizontal angle α with the strike direction (or β with the dip direction).

2) If the attitude of a plane is N 75° W 22° NE, what is its apparent dip in the direction N 50° E ?

3) Two lines define a plane. The following two apparent dips have been measured.

$\psi_{a1} = 10°$ in the N 72° W direction
$\psi_{a2} = 25°$ in the N 35° E direction
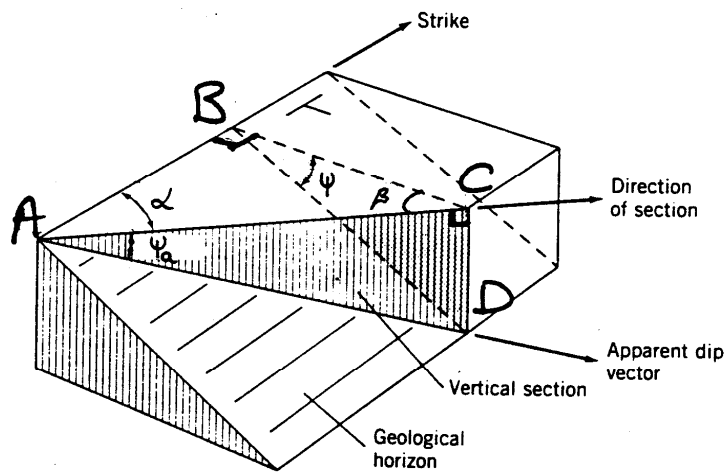
Determine the strike and true dip angles of the plane.

4) A certain bed dips 40° due North. In what direction(s) will its apparent dip be exactly half as great? There are two answers to that question.
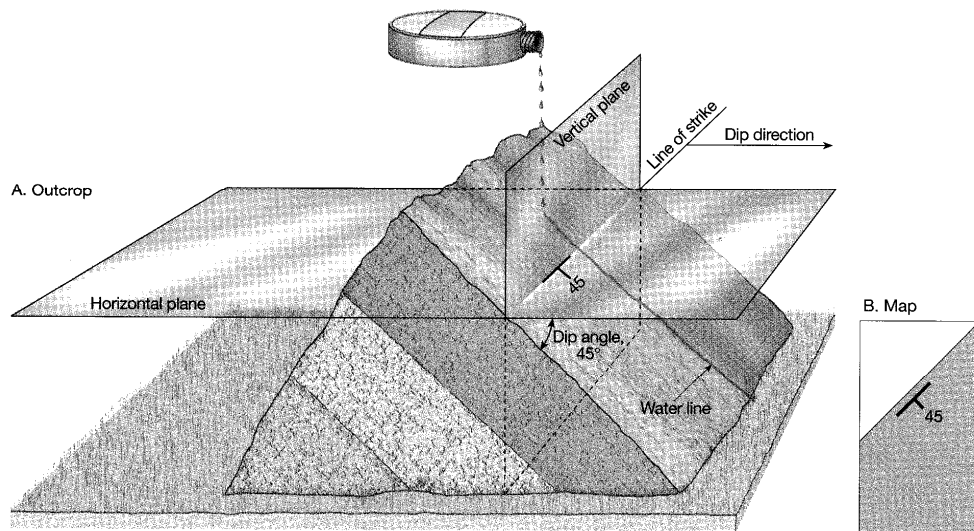
(a)

(b)

Figure 1. (a) Block diagram showing the strike, dip and dip direction angles of a geologic plane (after Bush, 2000) (b) Definition of the apparent dip ψ_a in a direction α with respect to the strike line (after Goodman, 1993).