

## EXAMPLE 3-005

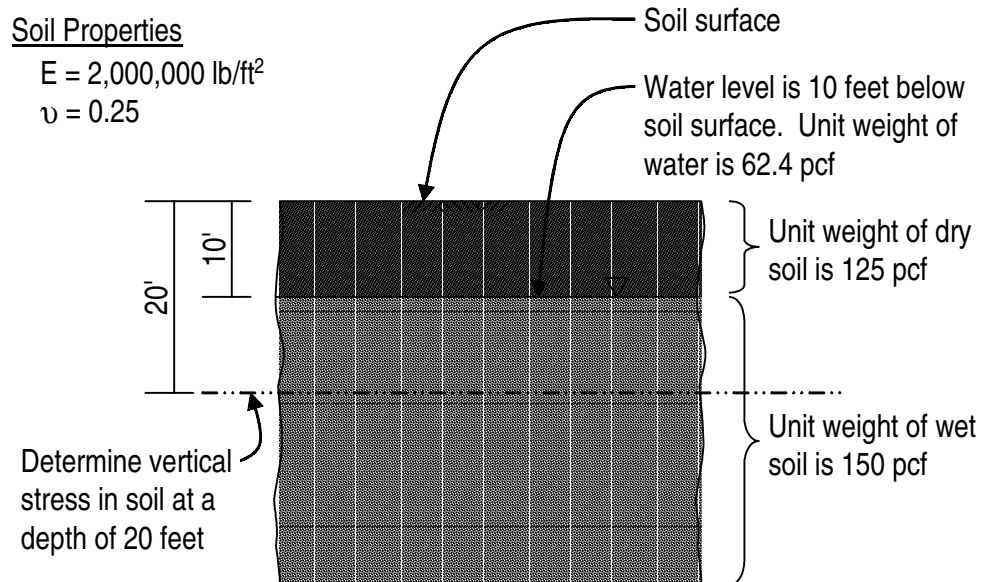
### PLANE – PORE PRESSURE

#### EXAMPLE DESCRIPTION

In this example, the water table level is 10 feet below the soil surface. The unit weight of soil is 125 pcf (pounds per cubic foot) dry and 150 pcf wet. The unit weight of water is 62.4 pcf. The vertical stress in the soil 20 feet below the soil surface is compared with a hand-calculated result.

A 40-foot cube of soil is modeled for this example using a plane stress element with an 8x8 mesh. It is restrained vertically at the bottom, and along the sides it is restrained horizontally in a direction normal to the side. The plane element is modeled to be 40 feet thick.

The pore pressure loading representing the water is applied using a joint pattern.



#### TECHNICAL FEATURES OF SAP2000 TESTED

- Pore pressure loading for planes
- Joint pattern

PROGRAM NAME: SAP2000  
REVISION NO.: 2

## RESULTS COMPARISON

### With Incompatible Modes

Output Parameter	SAP2000	Independent	Percent Difference
$\sigma_z$ psf At z = -20 feet Average for joint 43 in planes 29, 30, 37, and 38	-2126	-2126	0%

COMPUTER FILE: Example 3-005

## CONCLUSION

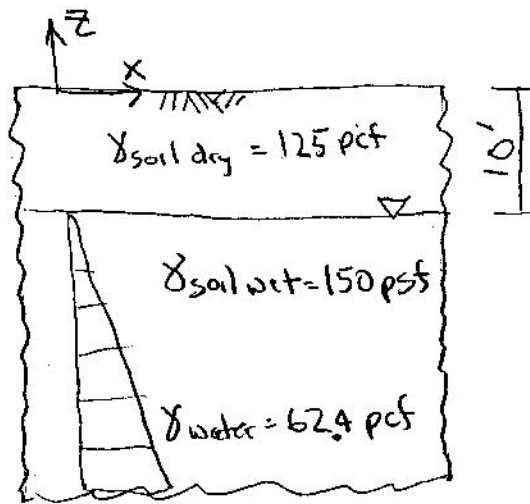
The SAP2000 results show an exact match with the independent results.

## HAND CALCULATION

$$\gamma_{dry} = 125 \text{ pcf}$$

$$\gamma_{wet} = 150 \text{ pcf}$$

$$\gamma_{water} = 62.4 \text{ pcf}$$



$$\sigma_{vert} = -10 \times 125 - 10(150 - 62.4) = \underline{\underline{-2126 \text{ psf}}}$$

@ 20' depth