ACOUSTICS2008/2735
The Biot Type II wave in the fluid and matrix of soils

James Sabatier and Chris McNeill
University of Mississippi, NCPA, 1 Coliseum Drive, University, MS 38677, USA

When an acoustic wave is incident on the surface of the porous ground energy is coupled into the soil matrix and fluid. To investigate the depth dependence of the Type I and II waves from the ground surface, the ground is modeled as a semi-infinite air-filled poro-elastic medium. Using a modified form of Biot-Stoll theory the magnitude and phase of the matrix velocity and fluid pressure caused by the two possible dilatational waves are determined. Traditionally speaking the type I (fast) wave is the non-dispersive wave traveling in the solid, and the type II (slow) wave is dispersive and travels primarily in the fluid (air). Previous experiments have shown the possibility that the type II wave travels in the solid near the surface and influences the measured matrix velocity and fluid pressure. Calculations have been done showing that near the surface of the ground the type II wave actually does have a large effect on the particle velocity of the matrix. After the first few centimeters the type II wave is completely attenuated and the type I wave is responsible for the displacement and pressure in the medium