

Abstract for SAPEM 2011

Keith Attenborough and Shahram Taherzadeh
Department of Design, Development, Environment and Materials,
The Open University,
Milton Keynes, MK7 6AA
UK
k.attenborough@open.ac.uk

Acoustic slow waves and their applications

A recent paper [1] has questioned the basis for the Biot Theory for the dynamics of poroelastic media and the resulting prediction of 'Type II' or 'slow' waves associated with out of phase motion of fluid and solid. Moreover a grain contact theory for sound propagation in underwater sediments does not include a slow wave. There continues to be considerable argument about the ability of Biot-type theories to explain the frequency-dependence of dilatational wave attenuation in underwater sediments. On the other hand for many years 'slow' waves have been shown to be the main contributors to the acoustical properties of air-filled solid materials. The important contributions of 'slow' waves and some of the applications of Biot-type theories in characterising materials ranging from the air-filled porous absorbing materials, unsaturated soils and bread to marrow-filled cancellous bone are reviewed. The extent to which modified Biot theories are able to explain the relative importance of the 'fast' and 'slow' waves in many of these contexts is discussed.

[1] Allan Pierce and William Carey 'Critique of Biot-related theories of acoustic waves in porous media' Proc. ICA Sydney 23 – 27 August 2010

Oral presentation preferred

Standard data projection