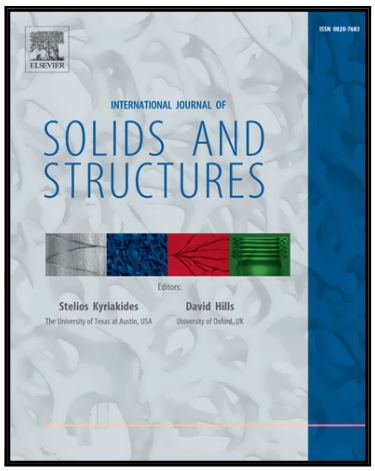

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Transversely isotropic half-spaces subject to surface pressures

Francesco Marmo[a,*], Ferdinando Toraldo[a], Luciano Rosati[a]

[a]*Department of Structures in Engineering and Architecture, University of Naples Federico II, Naples, Italy*

Abstract

We outline a general methodology for proving the equivalence between several solutions available in the literature for the elastic problem of transversely isotropic materials. The proposed methodology is mathematically supported by a novel solution strategy yet arriving at the same expression of the displacement field contributed by Ding et al. [Elasticity of Transversely Isotropic Materials, Springer, 2006].

We further show how to address the case of transversely isotropic half-spaces subject to linearly distributed vertical pressures applied over arbitrary regions of the half-space boundary. In the significant case of polygonal regions, displacements and stresses at arbitrary points of the half-space are evaluated analytically and the relevant singularities are properly accounted for.

The proposed approach has been numerically validated by first solving a basic indentation problem for which an analytical expression of the displacements on the half-space surface is available. Furthermore, the displacement and stress fields induced in a half-space by a polygonal indenter of arbitrary shape subject to a

*Corresponding author.
Email address: f.marmo@unina.it (Francesco Marmo)