

Accepted Manuscript

Advanced models for smart multilayered plates based on Reissner Mixed Variational Theorem

I. Benedetti, A. Milazzo



PII: S1359-8368(16)32934-1

DOI: [10.1016/j.compositesb.2017.03.007](https://doi.org/10.1016/j.compositesb.2017.03.007)

Reference: JCOMB 4941

To appear in: *Composites Part B*

Received Date: 1 December 2016

Revised Date: 27 February 2017

Accepted Date: 7 March 2017

Please cite this article as: Benedetti I, Milazzo A, Advanced models for smart multilayered plates based on Reissner Mixed Variational Theorem, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.03.007.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Advanced models for smart multilayered plates based on Reissner Mixed Variational Theorem

I. Benedetti, A. Milazzo*

*Dipartimento di Ingegneria Civile, Ambientale, Aerospaziale, dei Materiali - DICAM
Università degli Studi di Palermo, Viale delle Scienze, 90128, Palermo, Italy*

Abstract

In the present work, families of equivalent single layer and layer-wise models for the static and free vibrations analysis of magneto-electro-elastic multilayered plates are developed. The models are defined in the framework of a unified formulation, which offers a systematic approach for generating refined plate theories through suitable expansions of the through-the-thickness components of the relevant fields, considering the expansion order as a free parameter. The key features of the developed formulation are: *a*) the condensation of the electric and magnetic description into the mechanical representation, based on the quasi-static electric-magnetic approximation, which allows to reduce the computation of the analysis for both layer-wise and equivalent single layer models; *b*) the employment of the Reissner Mixed Variational Theorem, in which the displacements and transverse stress components are used as primary variables, thus allowing the explicit fulfilment of the transverse stress interface equilibrium. The proposed methodology is assessed by generating different layer-wise and equivalent single layer models for the analysis of thick magneto-electro-elastic layer and comparing their solution against available three-dimensional analytic results.

Keywords: smart plates, magneto-electro-elastic materials, advanced plate theories

*Corresponding author

Email addresses: ivano.benedetti@unipa.it (I. Benedetti), alberto.milazzo@unipa.it (A. Milazzo)

Download English Version:

<https://daneshyari.com/en/article/5021615>

Download Persian Version:

<https://daneshyari.com/article/5021615>

[Daneshyari.com](https://daneshyari.com)