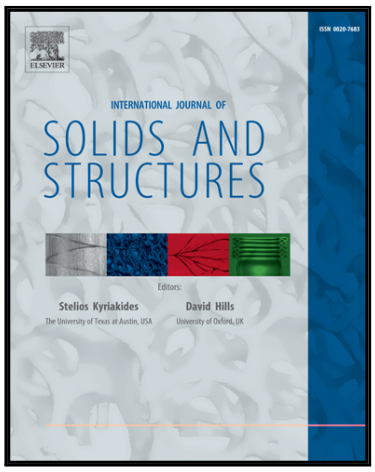
Accepted Manuscript



Numerical modeling of shape memory alloy plates considering tension/compression asymmetry and its verification under pure bending

Young-Jin Kim , Chang-Ho Lee , Joung-Hun Kim , Jae Hyuk Lim

PII: S0020-7683(17)30539-5
DOI: 10.1016/j.ijsolstr.2017.12.004
Reference: SAS 9822

To appear in: *International Journal of Solids and Structures*

Received date: 1 July 2017
Revised date: 12 November 2017
Accepted date: 4 December 2017

Please cite this article as: Young-Jin Kim , Chang-Ho Lee , Joung-Hun Kim , Jae Hyuk Lim , Numerical modeling of shape memory alloy plates considering tension/compression asymmetry and its verification under pure bending, *International Journal of Solids and Structures* (2017), doi: 10.1016/j.ijsolstr.2017.12.004

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.

ACCEPTED MANUSCRIPT

Numerical modeling of shape memory alloy plates considering tension/compression asymmetry and its verification under pure bending

Young-Jin Kim[1], Chang-Ho Lee[2], Joung-Hun Kim[1], Jae Hyuk Lim[3,*]

[1]*Aeronautical Systems Center, Defense Agency for Technology and Quality, Dongjin-ro 420, Jinju-si, Gyeongsangnam-Do, 52851, Republic of Korea*

[2] *Korea Aerospace Research Institute, Daejeon 34133, Republic of Korea*

[3] *Department of Mechanical Engineering, Chonbuk National University, Jeonju-si, Jeollabuk-Do, 54896, Republic of Korea*

Abstract. In this work, a numerical model of a SMA plate reflecting the tension/compression asymmetry of axial stress under pure bending was developed and verified experimentally. To achieve the goal, ABAQUS user-material (UMAT) based on the Brinson model with modified martensite transformation kinetics was proposed with the Drucker-Prager yield criterion to realize the tension/compression symmetry of SMA. To demonstrate the performance of the proposed model, we conducted several predictions on the recovery bending moment with temperature variation with diverse thicknesses under various strain conditions. These results were compared with pure bending test results obtained by a test device that can simulate a pure bending state for maximum 4% axial strain with uniform deformation curvature.

Keyword: shape memory alloy plate, ABAQUS UMAT, shape memory effect, recovery force, pure bending, tension-compression asymmetry

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/6748384

Download Persian Version:

https://daneshyari.com/article/6748384

Daneshyari.com