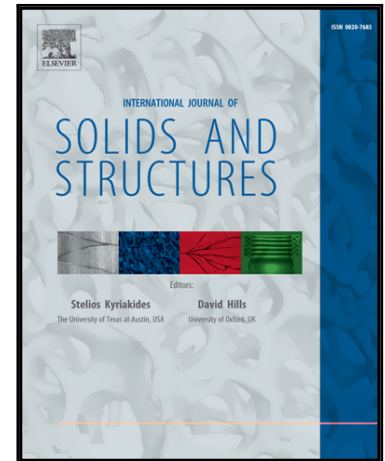


Accepted Manuscript

A Gurson-type layer model for ductile porous solids with isotropic and kinematic hardening

Léo Morin, Jean-Claude Michel, Jean-Baptiste Leblond

PII: S0020-7683(17)30138-5
DOI: [10.1016/j.ijsolstr.2017.03.028](https://doi.org/10.1016/j.ijsolstr.2017.03.028)
Reference: SAS 9517



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

Received date: 14 December 2016
Revised date: 20 March 2017
Accepted date: 27 March 2017

Please cite this article as: Léo Morin, Jean-Claude Michel, Jean-Baptiste Leblond, A Gurson-type layer model for ductile porous solids with isotropic and kinematic hardening, *International Journal of Solids and Structures* (2017), doi: [10.1016/j.ijsolstr.2017.03.028](https://doi.org/10.1016/j.ijsolstr.2017.03.028)

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.

A Gurson-type layer model for ductile porous solids with isotropic and kinematic hardening

Léo Morin ^{a,b,*} Jean-Claude Michel ^a, Jean-Baptiste Leblond ^c

^a*Laboratoire de Mécanique et d'Acoustique, CNRS, UPR 7051, Aix-Marseille Univ, Centrale Marseille, 4 impasse Nikola Tesla, CS 40006, 13453 Marseille Cedex 13, France*

^b*PIMM, Arts et Métiers-ParisTech, CNAM, CNRS, UMR 8006, 151 bd de l'Hôpital, 75013 Paris, France*

^c*Sorbonne Universités, Université Pierre et Marie Curie (UPMC), CNRS, UMR 7190, Institut Jean Le Rond d'Alembert, F-75005 Paris, France*

Abstract

The aim of this work is to propose a Gurson-type model for ductile porous solids exhibiting isotropic and kinematic hardening. The derivation is based on a “sequential limit-analysis” of a hollow sphere made of a rigid-hardenable material. The heterogeneity of hardening is accounted for by discretizing the cell into a finite number of spherical layers in each of which the quantities characterizing hardening are considered as homogeneous. A simplified version of the model is also proposed, which permits to extend the previous works of Leblond et al. (1995) and Lacroix et al. (2016) for isotropic hardening to mixed isotropic/kinematic hardening. The model is finally assessed through comparison of its predictions with the results of some micromechanical finite element simulations of the same cell. First, the numerical and theoretical overall yield loci are compared for given distributions of isotropic and kinematic pre-hardening. Then the predictions of the model are investigated in evolution problems in which both isotropic and kinematic hardening parameters vary in time. A very good agreement between model predictions and numerical results is found in both cases.

Keywords: Porous ductile solids; Isotropic hardening; Kinematic hardening; Sequential limit-analysis

* Corresponding Author: Léo Morin; Email, leo.morin@ensam.eu; Phone, +33 1 44 24 61 92

Download English Version:

<https://daneshyari.com/en/article/4922456>

Download Persian Version:

<https://daneshyari.com/article/4922456>

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