

# Accepted Manuscript

Puncture mechanics of soft elastomeric membrane with large deformation by rigid cylindrical indenter

Junjie Liu , Zhe Chen , Xueya Liang , Xiaoqiang Huang ,  
Guoyong Mao , Wei Hong , Honghui Yu , Shaoxing Qu

PII: S0022-5096(17)31022-0  
DOI: [10.1016/j.jmps.2018.01.002](https://doi.org/10.1016/j.jmps.2018.01.002)  
Reference: MPS 3260



To appear in: *Journal of the Mechanics and Physics of Solids*

Received date: 12 November 2017  
Revised date: 24 December 2017  
Accepted date: 6 January 2018

Please cite this article as: Junjie Liu , Zhe Chen , Xueya Liang , Xiaoqiang Huang , Guoyong Mao , Wei Hong , Honghui Yu , Shaoxing Qu , Puncture mechanics of soft elastomeric membrane with large deformation by rigid cylindrical indenter, *Journal of the Mechanics and Physics of Solids* (2018), doi: [10.1016/j.jmps.2018.01.002](https://doi.org/10.1016/j.jmps.2018.01.002)

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.

Puncture mechanics of soft elastomeric membrane with large deformation  
by rigid cylindrical indenter

Junjie Liu<sup>a</sup>, Zhe Chen<sup>a</sup>, Xueya Liang<sup>a</sup>, Xiaoqiang Huang<sup>a</sup>, Guoyong Mao<sup>a</sup>,  
Wei Hong<sup>a, b</sup>, Honghui Yu<sup>c</sup>, Shaoxing Qu<sup>a, \*</sup>

<sup>a</sup> *State Key Laboratory of Fluid Power & Mechatronic System, Key Laboratory of Soft Machines and Smart Devices of Zhejiang Province, and Department of Engineering Mechanics, Zhejiang University, Hangzhou 310027, China*

<sup>b</sup> *Department of Aerospace Engineering, Iowa State University, Ames, IA 50010, USA and Global Station for Soft Matter, Global Institution for Collaborative Research and Education, Hokkaido University, Sapporo 060-0810, Japan*

<sup>c</sup> *Department of Mechanical Engineering, The City College of New York, New York, NY 10031, USA*

## Abstract

Soft elastomeric membrane structures are widely used and commonly found in engineering and biological applications. Puncture is one of the primary failure modes of soft elastomeric membrane at large deformation when indented by rigid objects. In order to investigate the puncture failure mechanism of soft elastomeric membrane with large deformation, we study the deformation and puncture failure of silicone rubber membrane that results from the continuous axisymmetric indentation by cylindrical steel indenters experimentally and analytically. In the experiment, effects of indenter size and the friction between the indenter and the membrane on the deformation and puncture failure of the membrane are investigated. In the analytical

Download English Version:

<https://daneshyari.com/en/article/7177526>

Download Persian Version:

<https://daneshyari.com/article/7177526>

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