

Materials Research Innovations >

Volume 19, 2015 - [Issue sup5: Global Conference on Materials Science and Engineering \(CMSE 2014\)](#).

101 Views | 4 CrossRef citations to date | 0 Altmetric

Research Papers

Research on burst pressure for thin-walled elbow and spherical shell made of strength differential materials

L. Yan , Z. Junhai, X. Ergang & C. Xueye

Pages S5-80-S5-87 | Received 20 Oct 2014, Accepted 12 Dec 2014, Published online: 30 May 2015

 Cite this article  <https://doi.org/10.1179/1432891715Z.0000000001340>

 Check for updates

Sample our
Physical Sciences
Journals

>> [Sign in here](#) to start your access
to the latest two volumes for 14 days



 Full Article  Figures & data  References  Citations  Metrics

 Reprints & Permissions

Read this article

 Share

Abstract

This paper derived the computational formulae of burst pressure for thin-walled elbows and thin-walled spherical shells with arbitrary curvatures, using the finite deformation theory and the unified strength theory, and considering the intermediate principal stress, the strength disparity effect of materials and the strain-hardening effect. The quantitative relationship between the burst pressure of thin-walled elbows and thin-walled spherical shells was obtained as well. Additionally, this study analysed how the strain-hardening index, the thickness/radius ratio, the curvatures of elbows, the strength disparity effect of materials and the intermediate principal stress affected the burst pressure of thin-walled elbows and thin-walled spherical shells and the burst pressure ratio. The deduced formulae provide the solution for burst pressure with

different yield criteria, which is of wide applications and guidance for security design and integrity assessment of thin-walled pressure vessels.

Keywords:

- Unified strength theory
- Thin-walled elbow
- Thin-walled spherical shell
- Burst pressure
- SD effect
- Intermediate principal stress

Related research

Recommended articles

Cited by
4

Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

Keep up to date

Register to receive personalised research and resources by email



Sign me up



Copyright © 2026 Informa UK Limited [Privacy policy](#)

[Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG



Taylor & Francis
by informa