Vicki Owen Britt

Gulf Stream Aerospace Corp., Savannah, GA 31402-2206, USA

Selected Publications of Vicki Owen Britt:

Starnes, J. H., Jr., Britt, V. O., and Rankin, C. C., "Nonlinear Response of Damaged Stiffened Shells Subjected to Combined Internal Pressure and Mechanical Loads," AIAA Paper 95-1462, April 1995.

Starnes, J. H., Jr., Britt, V. O., Rose, C. A., and Rankin, C. C., "Nonlinear Response and Residual strength of Damaged Stiffened panels subjected to Combined Loads," AIAA Paper No. 96-1555, April 1996.

A. Barut (1), E. Madenci (1), V. O. Britt (2) and J. H. Starnes, Jr (2)
(1) Department of Aerospace and Mechanical Engineering, The University of Arizona, Tucson, AZ 85721, U.S.A.
(2)Structural Mechanics Branch, NASA Langley Research Center, Hampton, VA 23681-0001, U.S.A.
"Buckling of a thin, tension-loaded, composite plate with an inclined crack", Engineering Fracture Mechanics, Vol. 58, No. 3, October 1997, pp. 233-248, doi:10.1016/S0013-7944(97)00064-7
ABSTRACT: A numerical study of the local buckling and fracture response of a thin composite plate with an inclined crack and subjected to tension is presented. Local buckling of the unsupported edges of the crack occurs due to compressive stresses caused by a Poisson effect in the neighborhood of the crack. The relationship between fracture of a plate with a crack and the local buckling and postbuckling responses of the plate is established through a geometrically nonlinear finite-element analysis in conjunction with concepts from fracture mechanics. The analysis is based on a co-rotational form of the updated Lagrangian formulation that is implemented with a triangular shell element that includes transverse shear deformation effects. The potential energy release rate results are computed for a predetermined radial crack propagation direction that coincides with the location of the maximum stationary strain energy density near the crack tip. The results indicate that the local buckling load increases and the potential energy release rate decreases as the crack orientation changes from a transverse crack to a longitudinal crack aligned with the direction of the applied tension load. The effect of stacking sequence on the local buckling load and on the energy release rate for specific crack orientations is also discussed.

Hilburger, M. W. (1 and 3), Britt, V. O. (2), and Nemeth, M. P. (3)
(1) National Research Council, Washington, DC 20418, USA
(2) Gulf Stream Aerospace Corp., Savannah, GA 31402-2206, USA
(3) NASA Langley Research Center, MS 190, Hampton, VA 23681-0001, USA,
"Buckling Behavior of Compression-Loaded Quasi-Isotropic Curved Panels With a Circular Cutout," International Journal of Solids and Structures, Vol. 38, 2001, pp. 1495-1522, doi:10.1016/S0020-7683(00)00114-1
ABSTRACT: Results from a numerical and experimental study of the response of compression-loaded quasi-isotropic curved panels with a centrally located circular cutout are presented. The numerical results were obtained by using a geometrically nonlinear finite element analysis code. The effects of cutout size, panel curvature and initial geometric imperfections on the overall response of compression-loaded panels are described. In addition, results are presented from a numerical parametric study that indicate the effects of elastic circumferential edge restraints on the prebuckling and buckling response of a selected panel and these

numerical results are compared to experimentally measured results. These restraints are used to identify the effects of circumferential edge restraints that are introduced by the test fixture that was used in the present study. It is shown that circumferential edge restraints can introduce substantial nonlinear prebuckling deformations into shallow compression-loaded curved panels that can result in a significant increase in buckling load.

Michael P. Nemeth, Vicki O. Britt, Timothy J. Collins, and James H. Starnes, Jr. (Langley Research Center Hampton, Virginia), “Nonlinear Analysis of the Space Shuttle Superlightweight External Fuel Tank”, NASA Technical Paper 3616, December, 1996. (Also see Journal of Spacecraft and Rockets, Vol. 36, No.6, November-December, 1999, pp. 788-803)
ABSTRACT: Results of buckling and nonlinear analyses of the Space Shuttle external tank superlightweight liquid-oxygen (LO2) tank are presented. Modeling details and results are presented for two prelaunch loading conditions and for two full-scale structural tests that were conducted on the original external tank. The results illustrate three distinctly different types of nonlinear response for thin-walled shells subjected to combined mechanical and thermal loads. The nonlinear response phenomena consist of bifurcation-type buckling, short-wavelength nonlinear bending, and nonlinear collapse associated with a limit point. For each case, the results show that accurate predictions of nonlinear behavior generally require a large-scale, high-fidelity finite-element model. Results are also presented that show that a fluid-filled launch-vehicle shell can be highly sensitive to initial geometric imperfections. In addition, results presented for two full-scale structural tests of the original standard-weight external tank suggest that the finite-element modeling approach used in the present study is sufficient for representing the nonlinear behavior of the superlight-weight LO2 tank.

Britt, Vicki Owen, “Assessment of preliminary design approaches for metallic stiffened cylindrical shell instability problems”, ProQuest Dissertations And Theses; Thesis (Ph.D.)--Old Dominion University, 2007.; Publication Number: AAI3272616; ISBN: 9780549122470; Source: Dissertation Abstracts International, Vol. 68-07, Section: B, page: 4619.; 231 p.
ABSTRACT: A preliminary design tool for metallic stiffened fuselage cylindrical panels subjected to longitudinal compression has been developed and validated by comparison to test results. Several methodologies for stiffened panel buckling and failure predictions were examined and evaluated. An appropriate level of analysis fidelity was determined for different failure modes and design details. Results from panel tests conducted to verify analytical methods used to design the Gulfstream V aircraft were presented. The panels were representative of four general skin/stringer configurations on the aircraft. Finite Element analyses and standard analytical methods were used to predict panel failure loads. The accuracy of the finite element analysis predictions was dependent upon the level of detail included in the model. The inclusion of such details as fasteners had a significant effect on the predicted failure load. The omission of such complexities from the finite element model led to unconservative failure predictions. Standard analytical methods were found to be more efficient than finite element methods and produced conservative panel failure loads. Improvements for a preliminary design tool were identified to reduce conservatism in failure predictions and thereby reduce structural weight.