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Selected Publications of Andrew E. Lovejoy:

Vinson, Jack R and Lovejoy, Andrew J, “Minimum weight foam core composite sandwich shells under axial compression”, Japan-U.S. Conference on Composite Materials, 6th, Orlando, FL; USA; 22-24 June 1992. pp. 634-644. 1993
ABSTRACT: Foam core sandwich cylindrical shells with specially orthotropic composite face materials are treated. Methods by which to analyze and design these shells are presented to prevent overstressing, overall buckling, core shear instability and face wrinkling. In addition, analytic methods to determine the configuration and materials to achieve absolute minimum weight are developed and presented herein. These procedures provide the means to select the face thickness, the core depth, and the optimum foam core shear modulus to attain minimum weight for a given face material. A factor of merit is developed for selecting the composite face material to attain a minimum weight sandwich. The methods clearly define the maximum loads the sandwich shell can withstand without buckling or overstressing of the faces.

Lovejoy, Andrew E., Hilburger, Mark W., and Chunchu, Prasad B. " Effects of Buckling-Knockdown Factor, Internal Pressure and Material on the Design of Stiffened Cylinders." AIAA-2010-2778, 51st AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Orlando, Florida, Apr. 12-15, 2010.

Lovejoy, Andrew E., Chunchu, Prasad B., and Hilburger, Mark W.. "Ares-I Upper Stage Design Study: The Effects of Buckling Knockdown Factors and Internal Pressure." NASA/TM-2010-216848, October, 2010.

Lovejoy, Andrew E., Chunchu, Prasad B., and Hilburger, Mark W.. "Ares-V Design Study: The Effects of Buckling Knockdown Factors, Internal Pressure, and Materials." NASA/TM-2011-217061, February, 2011.

Andrew E. Lovejoy and Marc R. Schultz (NASA Langley Research Center, Hampton, CA 23681), “Evaluation of analysis techniques for fluted-core sandwich cylinders”, AIAA Paper 2012-1868, 53rd AIAA Structures, Structural Dynamcs and Materials Conference, Honolulu, Hawaii, April 2012
ABSTRACT: Buckling-critical launch-vehicle structures require structural concepts that have high bending stiffness and low mass. Fluted-core, also known as truss-core, sandwich construction is one such concept. In an effort to identify an analysis method appropriate for the preliminary design of fluted-core cylinders, the current paper presents and compares results from several analysis techniques applied to a specific composite fluted-core test article. The analysis techniques are evaluated in terms of their ease of use and for their appropriateness at certain stages throughout a design analysis cycle (DAC). Current analysis techniques that provide accurate determination of the global buckling load are not readily applicable early in the DAC, such as during preliminary design, because they are too costly to run. An analytical approach that neglects transverse-shear deformation is easily applied during preliminary design, but the lack of transverse-shear deformation results in global buckling load predictions that are significantly higher than those from more detailed analysis methods. The current state of the art is either too complex to be applied for preliminary design, or is incapable of the accuracy required to determine global buckling loads for fluted-core cylinders. Therefore, it is necessary to

develop an analytical method for calculating global buckling loads of fluted-core cylinders that includes transverse-shear deformations, and that can be easily incorporated in preliminary design.

Dawn C. Jegley; Andrew E. Lovejoy, "The Use Of The Stags Finite Element Code In Stitched Structures Development", AIAA Paper AIAA 2014-0845, 55th AIAA Structures Meeting, January 13-17, 2014