Professor Jan Tessmer

See:
http://www.researchgate.net/profile/Jan_Tessmer
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Head of Structural Mechanics at DLR
Windenergy Research
German Aerospace Center (DLR), North Rhine-Westphalia, Germany

Biography:
Dr. / Coordinator wind energy research at DLR / Braunschweig, Germany / exchange, services, jobs, on the subject :, Engineering, Leadership, structural analysis, lightweight, technology management, work areas :, statics, dynamics, stress testing, project management, team management, consulting , Keywords :, strength, stability, Nachbeulen, damage tolerance, multi-physics, modeling, calculation methods, FEM, manual methods, stress Justification, Certification, Experimental Methods, phenomenology, characterization, validation, qualification, NDT, NDI, SHM, Repair, Virtual structures , Virtual testing, evaluation of the life cycle, from production to collapse, metals, steel structures, composites, carbon fiber, Sandwich, GLARE / Member of the IASB - Industry Committee structure calculations, TECCON Consulting & Engineering GmbH, DLR, Ostfalia, Hochule of Applied Sciences, Leibniz University Hanover

Education:
1995 – 2000 Leibniz Universität Hannover, Numerical methods in mechanics, Dr.-Ing.
1989 – 1994 Leibniz Universität Hannover, Civil Engineering, Dipl.-Ing. Structural Engineering, Mechanics
1986 – 1987 University of Shippensburg, PA, USA, General Studies

Selected Publications:
Benedikt Kriegesmann, Raimund Rolfes, Christian Hühne, Jan Teßmer, Johann Arbocz, "Probabilistic Design of Axially Compressed Composite Cylinders with Geometric and Loading Imperfections", International Journal of Structural Stability and Dynamics, 10/2010; 10(2010-10):623-645. DOI: 10.1142/S0219455410003658

ABSTRACT: The discrepancy between the analytically determined buckling load of perfect cylindrical shells and experimental test results is traced back to imperfections. The most frequently used guideline for design of cylindrical shells, NASA SP-8007, proposes a deterministic calculation of a knockdown factor with respect to the ratio of radius and wall thickness, which turned out to be very conservative in numerous cases and which is not intended for composite shells. In order to determine a lower bound for the buckling load of an arbitrary type of shell, probabilistic design methods have been developed. Measured imperfection patterns are described using double Fourier series, whereas the Fourier coefficients characterize the scattering of geometry. In this paper, probabilistic analyses of buckling loads are performed regarding Fourier coefficients as random variables. A nonlinear finite element model is used to determine buckling loads, and Monte Carlo simulations are executed. The probabilistic approach is used for a set of six similarly manufactured composite shells. The results indicate that not only geometric but also nontraditional imperfections like loading imperfections have to be considered for obtaining a reliable lower limit of the buckling load. Finally, further Monte Carlo simulations are executed including traditional as well as loading imperfections, and lower bounds of buckling loads are obtained, which are less conservative than NASA SP-8007.

Daniel Hartung, Martin Wiedemann, Jan Teßmer , "Experimental test and material model for three dimensional failure analysis of Non Crimp Fabrics", ETDCM9- 9th Seminar on Experimental Techniques and Design in Composite Materials

Richard Degenhardt, Jan Teßmer, "Advances in Computational Stability Analysis of Composite Aerospace Structures", DOI: 10.1063/1.3498128 Conference: 23rd CADFEM Users' Meeting
ABSTRACT: European aircraft industry demands for reduced development and operating costs, by 20% and 50% in the short and long term, respectively. Structural weight reduction by exploitation of structural reserves in composite aerospace structures contributes to this aim, however, it requires accurate and experimentally validated stability analysis of real structures under realistic loading conditions. This paper presents different advances from the area of computational stability analysis of composite aerospace structures which contribute to that field. For stringer stiffened panels main results of the finished EU project POSICOSS and the running follow-up EU project COCOMAT are given. Both projects deal with exploitation of reserves in primary fibre composite fuselage structures through an accurate and reliable simulation of postbuckling and collapse. Next, experimental validation of postbuckling analyses, development of two different fast tools for the postbuckling simulation and findings on the structural behaviour under dynamic loading is presented. Finally, for unstiffened cylindrical shells problems of a robust design method are given.

Richard Degenhardt and Jan Tessmer (DLR – Institute of Composite Structures and Adaptive Systems), "Improved design Scenario for Composite Airframe Structures", AIAA Paper 2007-2180, 48th AIAA Structures, Structural Dynamics and Materials Conference, April 2007, Honolulu, Hawaii
ABSTRACT: European aircraft industry demands for reduced development and operating costs by 20 and 50 per cent in the short and long term, respectively. Contributions to this aim are provided by the completed project POSICOSS and the running follow-up project COCOMAT, both supported by the European Commission. As an important contribution to cost reduction a decrease in structural weight can be reached by exploiting considerable reserves in primary fibre composite fuselage structures through an accurate and reliable simulation of postbuckling and collapse. The POSICOSS team developed fast procedures for postbuckling analysis of fibre composite stiffened panels, created comprehensive experimental data bases and derived design guidelines. COCOMAT builds up on the POSICOSS results and considers in addition the simulation of collapse by taking degradation into account. The main objective is a future design scenario for composite stiffened panels which allows the exploiting of considerable

reserves in primary fibre composite fuselage structures. The results comprise an extended experimental data base, degradation models, improved certification and design tools as well as design guidelines. The paper deals with the main objectives of the project COCOMAT, the general status of the progress as well as DLR's first results.

From http://www.zoominfo.com/p/Jan-Tessmer/410717747 :
COMPOSIT News – Review of Modeling Workshop, 18 September, 2003:
Dr. Jan Tessmer of DLR presented his work on "Virtual Testing of Aircraft Structures Considering Post-critical and Thermal Behaviour".
"Dr. Tessmer begins his talk with an interesting overview of DLR's strategic approach to simulation and modeling, a field in which the German research institute is very active. He clearly emphasizes the necessity to evaluate a model on two different, but equally important, levels - (i) the ability to solve the relevant equations correctly (e.g. by means of numerical methods), and (ii) the ability of those equations to accurately describe the physical phenomena to be simulated. This approach has been applied to the simulation of stiffened panels for aerospace applications in two types of situation - after the onset of buckling, and when operating under critical thermal conditions. With both situations, the objective was to assess the residual load bearing capacity of the structure in the post-critical regions. With respect to the post-buckling analysis, Dr. Tessmer describes a finite element model of a stiffened panel under axial compression. He presents a series of numerical results that investigate the sensitivity of the finite element analysis towards parameters such as the panel geometry, its initial imperfections, experimental boundary conditions, and the level of discretization. Validation of the model against experimental results shows excellent agreement on both a global and local level. In terms of the thermal analysis, if future aircraft fuselages are to be manufactured from composites, one major problem that will have to be addressed is the severe thermal cycles that these structures will have to withstand when transitioning from standing on the ground to taking-off and flying. Therefore, the second half of Dr. Tessmer's presentation describes the modeling of typical fuselage structures subject to severe thermal scenarios. A 3D model is firstly implemented for small fuselage panels, and verification and experimental validation procedures are presented. The implemented model is then applied to large fuselage structures. Finally, Dr. Tessmer focuses on some 2D finite element formulations that aim to describe 3D temperature distributions, whilst reducing the time and computational effort required for the thermal analyses of large and complex fuselage structures."