



Professor Friedrich Gruttmann

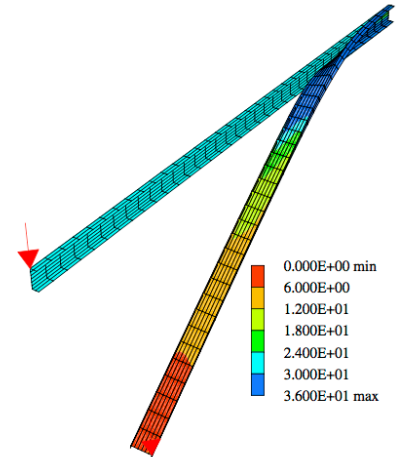
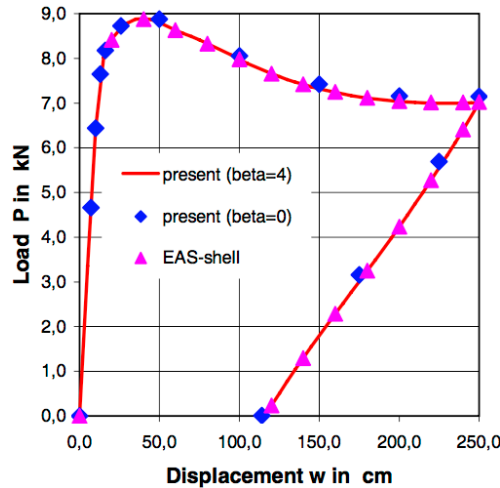


Figure 2: Load deflection curves and v.Mises stresses at the ultimate state

From: Friedrich Gruttmann and Werner Wagner, "Finite element formulations for geometrical and material nonlinear shells based on a Hu-Washizu functional", VIII International Conference on Computational Plasticity (COMPLAS VIII), E. Onate and D.R.J. Owen, Editors, CIMNE, Barcelona, 2005

See:

- http://www.solmech.tu-darmstadt.de/mitarbeiter_5/professoren_und_sekretariat/prof_gruttmann.de.jsp
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Department of Civil and Environmental Engineering
 Technical University Darmstadt

Education and Employment:

- 1973-1976 Studies of civil engineering at the Fachhochschule Bielefeld
- 1977-1979 Structural and design engineers at the company. Lübbert Holzleimbau in Bad Oeynhausen, interrupted by military service
- 1979-1984 Study of Civil Engineering at the University of Hannover
- 1984-1989 and Researcher at the Institute for Mechanics and Computational Mechanics, University of
 1990-1995 Hannover
- 1987 Promotion to Dr.-Ing at Hanover University
- 1989-1990 Post-doctoral student at the Department of Civil Engineering at the University of
 California at Berkeley
- 1995 Habilitation at the University of Hannover
- 1995 -1998 Lecturer at the Institute of Structural Analysis at the University of Karlsruhe

Since 1998

Professor in the Department of Civil and Environmental Engineering at the TU Darmstadt

Selected Publications:

F. Gruttmann, W. Wagner, L. Meyer and P. Wriggers, "A nonlinear composite shell element with continuous interlaminar shear stresses", *Computational Mechanics*, Vol. 13, No. 3, 1993, pp.175-188

F. Gruttmann and W. Wagner (Institut für Baumechanik und Numerische Mechanik, Universität Hannover, Appelstrasse 9A, 30167 Hannover, Germany), "On the numerical analysis of local effects in composite structures", *Composite Structures*, Vol. 29, No. 1, 1994, pp. 1-12

F. Gruttmann and W. Wagner (Institut für Baustatik, Universität Karlsruhe, Kaiserstraße, 76131, Karlsruhe, Germany), "Coupling of two- and three-dimensional composite shell elements in linear and non-linear applications", *Computer Methods in Applied Mechanics and Engineering*, Vol. 129, No. 3, 15 January 1996

P. Betsch, F. Gruttmann and E. Stein, "A 4-node finite shell element for the implementation of general hyperelastic 3D-elasticity at finite strains", *Computer Methods in Applied Mechanics and Engineering*, Vol. 130, Nos. 1-2, March 1996, pp. 57-79

Gruttmann, F., Sauer, R., Wagner, W., 1999. Shear stresses in prismatic beams with arbitrary cross-sections. *International Journal for Numerical Methods in Engineering*, 45(7):865-889

Klinkel S, Gruttmann F, Wagner W (1999) A continuum based three-dimensional shell element for laminated structures. *Comput Struct* 71(1):43–62

W. Sprenger, F. Gruttmann and W. Wagner, "Delamination Growth Analysis in Laminated Structures with Continuum-Based 3D-Shell Elements and a Viscoplastic Softening Model," *Computer Methods in Applied Mechanics and Engineering*, Vol. 185, No. 2-4, 2000, pp. 123-139

Gruttmann, F., Wagner, W., 2001. Shear correction factors in Timoshenko's beam theory for arbitrary shaped cross-sections. *Computational Mechanics*, 27(3):199-207

Wagner W, Gruttmann F and Sprenger W (2001). A finite element formulation for the simulation of propagating delaminations in layered composite structures. *Int J Num Meth Eng* 51: 1337–1359

Wagner, W., Gruttmann, F., 2002. A displacement method for the analysis of flexural shear stresses in thin walled isotropic composite beams. *Computers & Structures*, 80(24):1843-1851.

W. Wagner, S. Klinkel, and F. Gruttmann. Elastic and plastic analysis of thin-walled structures using improved hexahedral elements. *Computers and Structures*, 80:857–869, 2002.

Friedrich Gruttmann and Werner Wagner, "Finite element formulations for geometrical and material nonlinear shells based on a Hu-Washizu functional", VIII International Conference on Computational Plasticity (COMPLAS VIII), E. Onate and D.R.J. Owen, Editors, CIMNE, Barcelona, 2005

F. Gruttmann, W. Wagner, (2006), Structural analysis of composite laminates using a mixed hybrid shell element, *Computational Mechanics*, vol.37, pp. 479-497

S. Klinkel, F. Gruttmann and W. Wagner, A robust non-linear solid shell element based on a mixed variational formulation, *Comput. Methods Appl. Mech. Engrg.* 195 (2006) 179-201

Pham, V. and Gruttmann, F., “A few typical delamination patterns of compressed thin films”, *PAMM*, Vol. 7, 2007, pp. 4040023–4040024.

F. Gruttmann and V. D. Pham, “A finite element model for the analysis of buckling driven delaminations of thin films on rigid substrates”, *Computational Mechanics*, Vol. 41, No. 3, 2008, pp. 361-370

Friedrich Gruttmann, “Nonlinear finite element shell formulation accounting for large strain material models”, Chapter in *Recent Developments and Innovative Applications in Computational Mechanics*, pp 87-95, 2011