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Selected publications:

Gábor M. Vörös (Dept. of Applied Mechanics, Budapest University of Technology and Economics, Budapest, Hungary), "A special purpose element for shell-beam systems", Computers & Structures, Vol. 29, No. 2, pp. 301-308, 1988
ABSTRACT: This paper presents an isoparametric finite element for reinforced shells and plates. The formulation is based on general beam theory and takes into account both transverse shear deformation and torsional warping. The element exhibits complete two-line compatibility. Numerical examples are presented in order to demonstrate the validity of the formulation and the possibilities of application.

Gábor M. Vörös (Dept. of Applied Mechanics, Budapest University of Technology and Economics, Budapest, Hungary), "Free vibration of thin walled beams", Periodica Polytechnica, Ser. Mech. Eng. Vol. 48, pp. 99-110, 2004
ABSTRACT: Consistent and simple lumped mass matrices are formulated for the dynamic analysis of beams with arbitrary cross section. The development is based on a general beam theory which includes the effect of flexural-torsion coupling, the constrained torsion warping and the shear center location. Numerical tests are presented to demonstrate the importance of torsion warping constraints and the acceptable accuracy of the lumped mass matrix formulation.

Gábor M. Vörös (Dept. of Applied Mechanics, Budapest University of Technology and Economics, Budapest, Hungary), "Finite element analysis of stiffened plates", Periodica Polytechnica, Mechanical Engineering, Vol. 51, No. 2, pp. 105-112, 2007, DOI: 10.3311/pp.me.2007-2.10
ABSTRACT: The paper presents the development of a new plate/shell stiffener element and the subsequent application in determine frequencies, mode shapes and buckling loads of different stiffened panels. In structural modelling, the plate and the stiffener are treated as separate finite elements where the displacement compatibility transformation takes into account the torsion - flexural coupling in the stiffener and the eccentricity of internal (contact) forces between the beam - plate/shell parts. The model becomes considerably more flexible due to this coupling technique. The development of the stiffener is based on a general beam

theory, which includes the constraint torsional warping effect and the second order terms of finite rotations. Numerical tests are presented to demonstrate the importance of torsion warping constraints. As part of the validation of the results, complete shell finite element analyses were made for stiffened plates.

Gábor M. Vörös (Dept. of Applied Mechanics, Budapest University of Technology and Economics, Budapest, Hungary), "An improved formulation of space stiffeners", Computers and Structures, Vol. 85, No. 7-8, April, 2007, pp. 350-359, DOI: 10.1016/j.compstruc.2006.11.028

ABSTRACT: This paper presents a displacement based finite element model for predicting the constraint torsion effect of stiffeners. In structural modelling, the plate/shell and the stiffeners are treated as separate elements where the displacement compatibility transformation between these two types of elements takes into account the constraint torsional warping effect in the stiffeners. The development is based on a general beam theory which includes flexural-torsion coupling, constrained torsion warping, and shear-centre location. The virtual work principle includes the second order terms of finite beam rotations. For finite element analysis, cubic Hermitian polynomials are used as shape functions of the straight space frame element with two nodes. Elastic stiffness and geometric stiffness matrices for an arbitrary cross-section are evaluated in a closed form, and load correction stiffness for eccentric stiffener loads are considered. To demonstrate the importance of torsion warping constraints and to illustrate the accuracy of this formulation, finite element solutions are presented and compared with available solutions.

Gábor M. Vörös (Dept. of Applied Mechanics, Budapest University of Technology and Economics, Budapest, Hungary), "Mechanical analysis of reinforced plate structures", Gepeszet 2008, Budapest, 29-30 May, 2008, pp. 1-6

ABSTRACT: The paper presents the development of a new plate/shell stiffener element and the subsequent application in determine buckling loads and modes of different stiffened panels. The formulation of the stiffener is based on a general beam theory, which includes the constraint torsional warping effect and the second order terms of finite rotations. As part of the validation of the method, complete shell finite element analyses were made for stiffened plates.

Gábor M. Vörös (Dept. of Applied Mechanics, Budapest University of Technology and Economics, Budapest, Hungary, voros@mm.bme.hu), "Buckling and free vibration analysis of stiffened panels", Thin-Walled Structures, Vol. 47, No. 4, pp. 382-390, April 2009, DOI: 10.1016/j.tws.2008.09.002

ABSTRACT: The paper presents the application of the new stiffener element with seven degrees of freedom per node and the subsequent application in determining frequencies, mode shapes and buckling loads of different stiffened panels. In structural modelling, the stiffener and the plate/shell are treated as separate elements where the displacement compatibility transformation between the seven and six degrees of freedom nodes of these two types of elements takes into account the torsion–flexural coupling in the stiffener and the eccentricity of internal (contact) forces between the beam–plate/shell parts. The model becomes considerably more flexible due to this coupling technique. The development of the stiffener is based on a general beam theory, which includes the constraint torsional warping effect and the second-order terms of finite rotations. Numerical tests are presented to demonstrate the importance of torsion warping. As part of the validation of the results, complete shell and the usual six degrees of freedom per node shell–beam finite element analyses were made for stiffened panels.