



## **Professor Nikolai P. Semenyuk**

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### **Biography:**

N.P. Semenyuk was born on 25 February 1939. After graduating from the school of mechanics-mathematics of the T.G.Shevchenko Kiev national university in 1962, he has been working at the Institute of Mechanics of the National Academy of Sciences of Ukraine as an engineer, senior engineer, junior and senior scientific officer, head of laboratory and major scientific officer.

N.P. Semenyuk's scientific activity is concerned with the issues of stability and postbuckling behavior of layered shell structures, including composite shells. He has developed methods of solving stability problems involving layered anisotropic cylindrical shells under axisymmetric and asymmetric external pressure, taking into account pre-buckling deformations of reinforced cylindrical shells under variable axisymmetric pressure, of corrugated cylindrical shells under axial compression and of shells of revolution under external pressure.

In N.P. Semenyuk's research physically nonlinear deformation of fibrous composites caused from cracking of the binder or from plasticity of the components have been included in solving stability problems of shells of revolution. He has also solved many problems of stability, initial post-buckling behavior and imperfection sensitivity of composite cylindrical shells based of special and general buckling theories.

In his works with use of Hamilton formalism a procedure for obtaining the canonical system of equations corresponding to the theory of shells is worked out. This system can be used for solving the problem by the orthogonalization method. In particular, the author used such an approach for the solution of non-linear problems involving shells that consist of layers of composite material with a general anisotropy.

He developed a variant of the Timoshenko-Mindlin nonlinear theory of shells that is valid for large deflections and small elastic-plastic deformations. This theory is the basis of the method of calculation of nonlinear deformation of composite shells in the limit and bifurcation points on the loading trajectory.

In his works N.P. Semenyuk provides a generalization of the theory by Koiter and Hutchinson as applied to the calculation of nonlinear pre-buckling and postbuckling behavior of shells with small initial geometric imperfections of arbitrary shape.

N.P. Semenyuk has published more than 200 scientific works, including 4 monographs. He is a member of National Committee of Ukraine on Theoretical and Applied Mechanics.

#### **Selected publications:**

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13. Колебания и устойчивость волнообразных цилиндрических оболочек из композитов. – Проблемы механики / Сборник статей к 90-летию со дня рождения А.Ю. Ишлинского. – М.: Физматгиз, 2003. – С.105-119.
14. Semenyuk N.P., Trach V.M. Allowing for Rotations about the Normal in Nonlinear Theories of Shells //Int. Appl. Mech. – 2004. – Vol.40, № 6. – P.694-701.
15. Semenyuk N.P., Babich I.Yu., Zhukova N.B. Natural Vibrations of Corrugated Cylindrical Shells //Int. Appl. Mech. – 2005. – Vol. 41, № 5. – P. 512- 519.
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