

Buckling of composite panels with initial imperfections

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ABSTRACT

In the paper, the buckling behaviour of laminated plates, with a pre-existing initial deformation and a central circular delamination, subjected to in-plane loading is treating. The plate is modelled as an orthotropic Mindlin plate. The analysis is carried out by using so layered shell elements, gap and coupling elements. By applying the finite element method, the plates with initial deformation (first modal shape of buckling) are studied. Numerical and experimental results for the critical buckling load are presented for several examples.

KEY WORDS: Imperfect Composite Plates, Buckling, FEM Analysis

References

1. **CHIRICA, I., BEZNEA, E.F., CHIRICA, R.**, *Orthotropic Plates*, The University Dunarea de Jos Publishing House, Galati (2006)
2. **CHIRICA, I., BEZNEA, E.F., CHIRICA, R., BOAZU, D., CHIRICA, A.**, *Buckling Behavior of the Delaminated Ship Hull Panels*, Proceedings of The 12-th International Maritime Association of the Mediterranean Congress – IMAM, 2-6 sept. 2007, Varna, Bulgaria, pp. 161-166, vol. 1-Maritime Transportation, Ed. Taylor&Francis, ISBN 978-0-415-43725-7 (2007)
3. **HAYMAN, B.**, *Defect and damage assessment for ships built in FRP sandwich*, RINA Conference on High Speed Craft, Royal Institution of Naval Architects, London, UK, November (2004)
4. **KIM, H., & KEDWARD, K.T.**, *A Method for Modeling the Local and Global Buckling of Delaminated Composite Plates*, Composite Structures 44, p. 43-53 (1999)
5. **LINDE, P., SCHULZ, A. & RUST, W.**, *Influence of modelling and solution methods on the FE-simulation of the post-buckling behaviour of stiffened aircraft fuselage panels*, Composite Structures 73, pp.229–236 (2006).