

Effect of a 'Static' Resonance in Elastic Thin-Walled Cylinders

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The results of experimental investigation (using qualitative small-sized steel samples) of influence of periodic non-homogeneity in a circumference direction onto deformation and buckling of longitudinally compressed elastic circle cylindrical shells are discussed. This non-homogeneity was caused by three different factors: by loading scheme (1), by initial imperfections of the mode of smooth cylinders (2) and by variability of the sign of an eccentricity of ribs of stringer modules (3). Analysis of experimental data showed, that the periodic non-homogeneity results in the beginning and development of periodic bending nonlinear deformations in the loaded shell. The most intensive deformations are developed at the non-homogeneities, the variability of which is close to the variability of the mode of the first tone of eigen lateral oscillations of a shell. The phenomena of increase of static lateral deformations of a shell, at the variability of non-homogeneity close to the variability to the first mode of eigen oscillations, can be called a "static" resonance.

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