

# Title: **Deformation approach for the calculation of bent wooden elements**

**Authors:** Dzmitry N. Lazovski; Arthur I. Hil; Dzmitry O. Gluhov

**Addresses:** Department of Structural Engineering, Euphrosyne Polotskaya State University of Polotsk, 211440, Novopolotsk, Belarus ' Department of Structural Engineering, Euphrosyne Polotskaya State University of Polotsk, 211440, Novopolotsk, Belarus ' SoftClub, 220000, Minsk, Belarus

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**Abstract:** The article presents the results of calculating the parameters of the stress-strain state of bent wooden elements at any stage of its work under the action of short-term static loading. The modelling took into account the complete diagrams of wood deformation under compression and tension, the dependences of their approximation were proposed, and verification was performed based on our own experimental data and data from other authors. The peculiarity of the destruction of wooden elements under the action of a bending moment has been experimentally established, which begins with the crumpling of wood fibres in a compressed zone and the formation of a 'plastic hinge'. This is followed by a sequential rupture of longitudinal fibres in a stretched zone along the height of the cross section, which corresponded to the simulation results. A criterion is proposed for calculating the bending resistance of wooden elements at the limiting stage in terms of strength in the form of the maximum force perceived by them, at which the conditions of equilibrium of forces in the cross section are fulfilled. The proposed criterion, in contrast to limiting the maximum deformations of wood during compression and stretching, allows us to more fully take into account the redistribution of forces between the longitudinal fibres in the cross-section of wood in the plastic stage of work before destruction.

**Keywords:** wooden elements; wood deformation diagram; flat section hypothesis; deformation calculation approach.

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