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PECULIARITIES OF REFINED SOLUTION OF A BEAM STRESS STATE WITH A LONGITUDINAL CRACK

O. Н. Нurtovyi1, D. V. Zhuk1, L. S. Uhryn2

*1National University of Water Management and Nature Resources Use,  
11, Soborna St., Rivne, 33028, Ukraine,  
2Ukrainian Academy of Printing,  
19, Pidholosko St., Lviv, 79020, Ukraine  
o\_g\_gurtovy@ukr.net*

**Research methodology.** A refined kinematic model has been used for horizontal and vertical displacements taking into account the cross shear deformation for solving the problem. The system of differential equations and the system of equations for boundary conditions have been obtained by the variational method of Lagrange. The solution of the system of differential equations has been obtained by the method of Euler. The system for boundary conditions has been solved numerically using the method of Cramer.

**Results.** The result satisfies conjugation conditions in the cross section at the edge of the crack integrally for normal stresses and accurately for displacement and shear stresses. There exist gaps in normal stresses for which the boundary conditions are satisfied integrally. The deviation of the stress-strain state from the physically substantiated character with a distance from the edge of the crack disappears.

**Novelty.** This result clearly reflects the stress-strain state of the beam, with the exception of the region near the edge of the crack, and agrees well with the known numerical solutions and experimental data.

**The practical significance.** The longitudinal interfacial cracks in beams and plates can significantly influence their strength, so you need a more complicated mathematical approach to the calculation of such structural elements compared with the defect-free. This study indicates that relatively simple approaches and methods which allow to get the general solution of the problem, well reflect the stress-strain state of such structures with the exception of a small area at the edge of the crack.