SM6S_12575

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Truncated Elastic Wedge under Torsional Load

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This talk deals with an analytical solution of the boundary-value problem of plane elasticity for a truncated infinite wedge of an arbitrary opening angle. The flanks of the wedge are free of traction. Its circular boundary is subjected to torsional load due to the given tangential displacements or the moment-replacement loading prescribed. The main goal of the paper is to verify whether the Carothers paradox is actual when the statement of the Carothers problem is modified and more rigorous. Two powerful methods, viz. the method of superposition and the method of homogeneous solutions, are introduced and compared. By means of them the boundary-value problem amounts to solving an infinite integro-algebraic system of equations and an infinite system of algebraic equations, respectively. Our numerical simulations with these systems provide graphical results. The distributions of stresses in some principal cases are presented. Numerical results turn out to be in a complete agreement with results by Neuber.

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