(a) SOME PROBLEMS OF PLANE STREES
(b) ON THE PERMANENT CORRUGATION OF SURFACES BY THE ACTION OF MOVING LOADS
(c) ON THE FORCED TRANSVERSE OSCILLATIONS OF CONSTRAINED BEAMS AND PLATES

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Abstract

In this dissertation the following questions are discussed:

(a) *Some Problems of Plane Stress*

Use of the Airy Stress Function for problems of plane stress. Stress and displacement systems in a two-dimensional semi-infinite solid due to uniform distributions of normal and shear load on part of the boundary. The corresponding systems for triangular and parabolic distributions of the load. Also integral formulae when the distribution is arbitrary, and an integral equation to determine the contact pressures when a given rigid profile is pressed into the surface. Theorem relating stress-systems due to any normal pressure or shear loads distributed in the same manner. Application of results to a finite rectangular plate loaded in its plane on a small length on an edge and rigidly supported by the opposite edge. Tabulated arithmetical results and curves for a square plate. References to papers on two-dimensional problems.

(b) *On the Permanent Corrugation of Surfaces by the Action of Moving Loads*

Occurrence of the phenomenon of corrugation. Panton's theory of rail corrugation. Conflicting observations. Description of apparatus constructed to provide uniform one-way or two-way rolling with normal pressure and braking load. Study of causes, characteristics of the phenomenon. Conjectural account of process of formation and suggested further experiments.

(c) *On the Forced Transverse Oscillation of Constrained Beams and Plates*

Limitations of the method of Normal Functions applied to beam problems. Solution of differential equation of vibration for vibrating forces and couples applied at the ends of the beam. Forced vibration due to pulsating couples at the ends, derived both as a finite expression and as a Fourier Series. Demonstration how a sine series may represent a finite bending moment at the end of the beam, although the individual harmonics all vanish. Use of principle of superposition to construct composite solutions for beams with constrained ends, or end damping, with concentrated or distributed disturbing forces. Note on a way of rearranging the Fourier Series to obtain better convergence.

The parallel theory for plates, with formulae developed for forced vibrations of the built-in, partially built-in, or simply supported circular plate with a uniform distribution of disturbing force. Effects of damping at the circumference.