

## Book Review

I. N. Sneddon and M. Lowengrub: **Crack Problems in the Classical Theory of Elasticity**, The SIAM-series in Applied Mathematics, John Wiley and Sons, Inc., New York, London, Sydney, Toronto, 1970. VIII + 221 pp., price 140/—.

In this up-to-date book two-dimensional crack problems in the theory of elasticity and their three-dimensional analogues are treated. It contains three chapters.

In the first chapter the basic equations which are employed, are discussed. In addition to the differential equations of equilibrium, a modification of the Papkovitch–Boussinesque–Neuber solution (a general solution of the equations of equilibrium in terms of potential functions) is given. Also the known complex expressions for the stresses and displacements in two-dimensional problems, due to Kolosov and Muskhelishvili are included. Further the Griffith criterion for failure is mentioned.

Chapter 2 deals with two-dimensional crack problems. Much attention is paid to a Griffith crack (i.e. a line-shaped crack of finite length in cross section) in an unbounded elastic solid, leading to mixed boundary value problems. Solutions are given for the three basic problems corresponding to three distinct modes of displacement. The first mode concerns a Griffith crack in a solid under a tension perpendicular to the line of the crack, in the second mode the solid is under an applied shear parallel to the crack and in the third mode the applied shear is perpendicular to the crack. Moreover rows of collinear and parallel Griffith cracks, cracks in a strip with stress-free edges, stresses in the vicinity of an external crack and some other problems are treated. A brief account is given of solutions of dynamic crack problems.

The first sections of chapter 3 are concerned with penny-shaped cracks in an infinite solid. Again solutions are indicated for the three modes of displacement mentioned above. In the remaining sections attention is paid to a lot of problems, such as thermal stresses around a penny-shaped crack, a crack in a thick plate, a crack in a long circular cylinder and a flat elliptical crack.

This book is based on a set of lectures given in the mathematics department at North Carolina State University by Sneddon during the spring of 1961. Many crack problems are extensively discussed in the present book. Moreover the recent developments in the field of crack problems and an extensive bibliography is included. Hence it is extremely valuable for all mathematicians interested in crack problem.

D. H. Keuning