Fundamentals of Engineering Plasticity

In this book, Hosford makes the subjects simple by avoiding notations used by specialists in mechanics. R. Hill's authoritative book, *Mathematical Theory of Plasticity* (1950), presented a comprehensive treatment of continuum plasticity theory up to that time; although much of the treatment in this book covers the same ground, it focuses on more recent developments. Hosford has also included recent developments in continuum theory, including a treatment of anisotropy that has resulted from calculations of yielding based on crystallography, analysis of the role of defects, and forming limit diagrams. This text also puts a much greater emphasis on deformation mechanisms and includes chapters on slip and dislocation theory and twinning. This book is useful for those involved in designing sheet metal forming processes. Knowledge of plasticity is essential for the computer simulation of metal forming processes, and understanding the advances in plasticity theory is key to formulating sound analyses.

William F. Hosford is a Professor Emeritus of Materials Science at the University of Michigan. He is the author of numerous research publications and the following textbooks: *Mechanical Behavior of Materials, 2nd Ed.*; *Metal Forming, 4th Ed.* (with Robert M. Caddell); *Materials Science: An Intermediate Text; Reporting Results* (with David C. Van Aken); *Materials for Engineers*; *Solid Mechanics*; *Mechanics of Crystals and Textured Polycrystals*; *Physical Metallurgy, 2nd Ed.*; and *Iron and Steel*. He is also the author of *Wilderness Canoe Tripping*.

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PREFACE

In 1950, R. Hill wrote an authoritative book, *Mathematical Theory of Plasticity*, that presented a comprehensive treatment of continuum plasticity theory as known at that time. Much of the treatment in this book covers some of the same ground but there is no attempt to treat all the same topics treated by Hill. This book, however, includes more recent developments in continuum theory, including a newer treatment of anisotropy that has resulted from calculations of yielding based on crystallography, analysis of the role of defects, and forming limit diagrams. There is a much greater emphasis on deformation mechanisms, including chapters on slip and dislocation theory and twinning.

This book should provide a useful resource to those involved with designing processes for sheet metal forming. Knowledge of plasticity is essential to those involved in computer simulation of metal forming processes. Knowledge of the advances in plasticity theory are essential in formulating sound analyses.

In writing this book, I have tried to make the subjects simple by avoiding some of the modern notations used by specialists in mechanics.

This book can form the basis for a graduate course in the field of mechanical engineering.