

MECHANICAL FASTENING OF PLASTICS

AN ENGINEERING HANDBOOK

**BRAYTON LINCOLN
KENNETH J. GOMES
JAMES F. BRADEN**

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An Engineering Handbook

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OTHER VOLUMES IN PREPARATION

PREFACE

Robotics, automation, electronics, communication, plastics—these are some of the buzzwords of the world's current industrial directions. At the 1982 National Design Engineering Show approximately 30 percent of respondents to a questionnaire advised that they expected their current or new designs to encompass robotic assembly in one way or another. It is estimated that by the mid-1990s automation, made possible through electronic developments, will have displaced from industry all but 10 percent of our productive workforce, down from approximately 22 percent in the early 1980s.

For those of us engaged in manufacturing and/or marketing of such fundamental products as fasteners and tools, or in designing and assembling new components, the substitution of an electronic and communications base for traditional leading markets such as steel, automotive, building construction, and related industries is having profound consequences.

At the same time that the new industrial direction has been developing, it has been accompanied by a revolution in the manufacturing materials being used—and at about the same pace. This accompanying revolution is of course the switch from the use of metals to the use of plastics. It is very evident in many fields. The use of plastics has been expanding rapidly; over the past 20 years, there has been a tremendous expansion in the development of new ones—harder, more structural polymers and blends. Many plastics are hitting hard at specific uses of metals. More than 40 "families" of plastics are in current use. Each can have dozens of variable subgroups, all with different fastening characteristics.

The designer of plastic parts, already faced with a bewildering series of possible polymer and filler combinations, may face even more difficulties in the future because of possible material property overlaps.

In the field of metals there is a wealth of knowledge covering mechanical fastening, and yet, in spite of all the research that has been done over the past 100 years, not everything about fastening in metals has been researched or covered. In the field of plastics, because of the tremendous surge in material development, the research surface has hardly been scratched. Not much has been published about fastening plastics.

It seems quite evident, therefore, that for those of us now engaged or about to be engaged with the assembly and fastening of products, such as product designers, manufacturing engineers, buyers, fastener marketing personnel, and students, there is a pressing need to understand the new materials and how fasteners work in them and an accompanying requirement to understand how fastening methods will be affected by switches to automatic assembly. This book endeavors to be a modest beginning to the creation of such an understanding.

Brayton Lincoln
Kenneth J. Gomes
James F. Braden

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