

# HANSER

Preface

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Plastics Failure Guide

Cause and Prevention

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# Preface to Second Edition

In the *Plastics Failure Guide—Cause and Prevention—Second Edition*, four factors of plastics technology provide an approach to solving predictable and unpredictable failures. They are Material, Design, Processing and Service Conditions. Prevention is treated as well. All chapters have “Lessons” at the end to emphasize the most important aspects of each chapter.

Beside fracture, which is the best known type of plastics failure, many other kinds of failure are covered, such as appearance change and warpage. Plastics failure may lead to time consuming and expensive product liability litigation that could end in bankruptcy. Chapters 1–6 cover various aspects of failure analysis along the lines of the four factors that are important in plastics failure indicated above, starting with Material. Testing, Quality Control and Legal are covered in Chapters 7, 8, and 9, respectively. Four product areas round out the first 13 chapters: Composites, Pipe, Medical, and Electrical/Electronics, respectively.

The first thirteen chapters have been expanded from the first edition. In addition, there are three new chapters which are Chapter 14, Adhesion Failure of Plastics; Chapter 15, Failure of Human Biopolymers; and Chapter 16, Environmental, Recycling, and Health Aspects of Plastics Failure.

Some adhesion failures were included in the first edition, but the new Chapter 14 brings a fuller treatment to the subject.

Failure of Human Biopolymers extends the treatment of synthetic polymer failure to human biopolymers, life’s natural polymers. There is a similarity in chemical composition and in susceptibility to failure by the same forces. For example, both polymer types are susceptible to failure by free radicals.

Chapter 16 brings a realization that some failures are due to recent changes in environmental, recycling, and health effects. Some of the new failures are for compositions that were considered desirable for as long as fifty years. An example is PVC phthalate plasticizers, such as DOP (dioctyl phthalate), which is banned in some products for children up to three years old. Much of the new failure types for plastics are due to recent environmental concerns, just as lead became unwelcome

and banned. Polycarbonate was the darling of unbreakable sterilized baby bottles for many years, but now is practically banned because of BPA (bisphenol A) monomer released with heat in sterilization.

There are big changes in what constitutes some failures. What used to be a great success technically and economically may be banned either officially or by popular demand for a concern that is no longer tolerated. Failure is failure, no matter how or why. “Read all about it.”

Longmeadow, Massachusetts

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