Failure Analysis of Paints and Coatings

Revised Edition
To my son Andy, who can still make me smile.
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Preface to the Revised Edition

It has been over 8 years since the first edition of *Failure Analysis of Paints and Coatings* was published. During this period, many coating types have remained the same, and a few new ones have been introduced, or at least have been more heavily marketed. Advances have been made in surface preparation technology, and more opportunities for training and education have been made available than ever before. However, in spite of all of this, the coatings industry still experiences its fair share of failures.

A coating failure does not just involve the cost of some paint. Repair of an existing structure can be extremely expensive, perhaps even entailing lost production time if the facility has to be shut down for repairs. If a coating lining a process vessel or a railroad tank car fails, large amounts of product may become unmarketable and may have to be disposed of. Reputations can be damaged. The cost of a paint failure is seldom cheap.

The first edition of this book introduced some basic concepts in paint formulation and chemistry. This has been updated in the second edition to include some additional types of coatings, such as polyureas, polysiloxanes and powder coatings. Some additional discussion has been included concerning surface preparation, the mechanism of blistering and the chemistry of amine blush. Analytical techniques such as gas chromatography–mass spectroscopy and differential scanning calorimetry have been discussed in more detail. However, as with the first edition, the subjects of coatings chemistry and analytical chemistry are presented at the introductory level. Although essential to conducting a failure analysis, many thorough texts already exist on these subjects.

As pointed out in the preface to the first edition, the failure analysis of paints and coatings is all about problem solving. Problem solving is a difficult subject to teach, and probably relies on curiosity and experience more than anything else. Therefore, in addition to the basics of coatings science and analytical chemistry, which form the foundation upon which curiosity and experience can build, this book contains numerous practical examples of solving real-world coating failures. Indeed, the biggest difference between the first and second editions is