



## Plastics Failure Analysis and Prevention (Plastics Design Library)

*By John Moalli*

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**Plastics Failure Analysis and Prevention (Plastics Design Library)** By John Moalli

This book contains analysis of reasons that cause products to fail. General methods of product failure evaluation give powerful tools in product improvement. Such methods, discussed in the book, include practical risk analysis, failure mode and effect analysis, preliminary hazard analysis, progressive failure analysis, fault tree analysis, mean time between failures, Wohler curves, finite element analysis, cohesive zone model, crack propagation kinetics, time-temperature collectives, quantitative characterization of fatigue damage, and fracture maps.

Methods of failure analysis are critical to for material improvement and they are broadly discussed in this book. Fractography of plastics is relatively a new field which has many commonalities with fractography of metals. Here various aspects of fractography of plastics and metals are compared and contrasted. Fractography application in studies of static and cycling loading of ABS is also discussed. Other methods include SEM, SAXS, FTIR, DSC, DMA, GC/MS, optical microscopy, fatigue behavior, multiaxial stress, residual stress analysis, punch resistance, creep-rupture, impact, oxidative induction time, craze testing, defect analysis, fracture toughness, activation energy of degradation.

Many references are given in this book to real products and real cases of their failure. The products discussed include office equipment, automotive compressed fuel gas system, pipes, polymer blends, blow molded parts, layered, cross-ply and continuous fiber composites, printed circuits, electronic packages, hip implants, blown and multilayered films, construction materials, component housings, brake cups, composite pressure vessels, swamp coolers, electrical cables, plumbing fittings, medical devices, medical packaging, strapping tapes, balloons, marine coatings, thermal switches, pressure relief membranes, pharmaceutical products, window profiles, and bone cements.



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#### **About the Author**

Dr. John Moalli has received his Ph.D. in polymers from MIT. He is a recognized expert in product design and development, analysis of fracture surfaces, and experimental mechanical property analysis of fracture surfaces, and experimental mechanical property analysis, among other areas. His current research is in automotive, medical, construction, recreation, and other polymer applications.

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