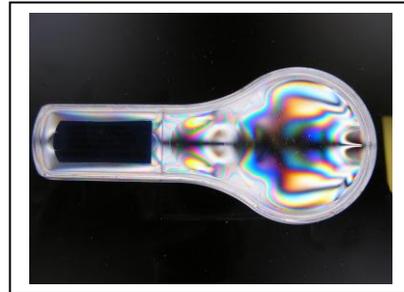




## **Plastic Parts Failure Analysis & Product liability Prevention Workshop**



### **Purpose of the Course:**

Two day long intensive workshop has been designed to highlight the principles of Failure Analysis, Failure Prevention and Product Liability as it relates to plastic parts. Understanding why plastic parts fail will help you correct and prevent premature failures and develop safe, successful, cost-effective products. The workshop will focus on the main reasons behind part failures and how to solve the most common and troublesome problems facing the designers, manufacturers and end-users of plastic products. Product Liability lawsuits can have devastating effect on businesses. Major objective of this workshop is to teach attendees how to take proactive approach to prevent such lawsuits by designing a well documented quality program.

The fundamental problem concerning the failures of parts made from Plastics materials is one of lack of understanding the difference between the nature of relatively new polymeric materials and traditional materials such as metal, wood, and ceramics. Designers, processors and end-users are all equally responsible in contributing to the problem. Merely copying a metal or wood product with some minor aesthetic changes can lead to premature and sometimes catastrophic failures. Designers are generally most familiar with metals and their behavior under load and varying conditions of temperature and environment. While designing metal parts, a designer can rely on instantaneous stress/strain properties and for most applications he can disregard the effect of temperature, environment and long-term effect of load (creep). Plastics materials are viscoelastic in nature and unlike other materials, properties can vary considerably under the influence of temperature, load, environment, and presence of chemicals. For example, a well-designed part may perform its intended function for a very long time at room temperature environment and under normal load. The same part may fall apart quickly when exposed to extreme cold or hot environment and the process can accelerate if it is subjected to mechanical loading or exposed to chemical environment. Most often overlooked is the synergistic effect of all the conditions such as temperature, creep, chemicals, UV and other environmental factors on plastics parts. During processing, plastics materials are subjected to severe physical conditions involving elevated temperatures, high pressures and high shear-rate flow, as well as chemical changes. Processor must follow the proper procedures and guidelines set forth by material suppliers and make sure that material is processed optimally in well maintained equipment. Lastly, the end-users must be educated by product manufacturers in the

proper use of the plastics products and make sure that it is used for intended purpose. Plastics parts often fail prematurely because of the intentional or unintentional abuse by the consumers.

### **What you will learn**

- Reasons behind plastic parts failures
- Material selection, Design, process, service condition
- Types of failures and typical failure modes
- Mechanical, Thermal, Chemical, Environmental
- Analyzing Failures – Steps and Tools
- Examples of failed parts and failure analysis steps
- Preventing Part failures – Addressing chronic failures
- Product liability prevention

Lecture will be supplemented with case studies and Identification Analysis Demonstration.

### **Who should attend?**

The intensive course is designed for plastics Engineers, Managers, Designers, Processors, End users and anyone who wishes to acquire knowledge concerning plastic parts failure analysis. Attendees are encouraged to bring questions and samples from their actual experience for discussion and review.

### **Instructor**

**Vishu H. Shah** is a graduate of University of Massachusetts Lowell where he received B.S. and M.S. degree in Plastics Engineering. He is also an author of ***Handbook of Plastics Testing and Failure Analysis***, SPE Sponsored book, Used as a text book in many universities.

An active member of SPE, his career spans more than 30 years in Plastics industry mostly having responsibility as Plastics Engineer in charge of material, product and process development, Technical Services, Compounding operation and Test facilities. As a President and cofounder of a custom Injection Molding business for eighteen years, he was responsible for entire manufacturing operation. As a Consultant and Expert Witness, he has worked extensively with companies throughout the world and with many Law firms in the area of failure analysis. He has conducted seminars and short courses on variety of subjects for supervisors, engineers, purchasing, sales and marketing personnel along with current Plastics Engineering Certificate program at Cal-Poly Pomona.