Material Selection

Design is an iterative process in which the starting point may be a new idea or market need, and end point is generally a product designed to meet that need. Development of new materials can offer a unique combination of properties, which suggest the new design, and, conversely, the need for a new product can demand the development of a new material.

This module outlines the material selection process, and various factors and criteria that play a role in material selection. Given these criteria several key points are presented on methods that can be implemented to make a sound decision when making the final material selection.

Six classes of materials are presented along with their respective design-limiting properties along with Material Selection charts. Performance-optimization techniques are implemented in the selection process to design an application-specific product.

The concepts of failure, manufacturability, cost-effectiveness, value analysis, and recycle-ability are discussed, as well as their respective roles in material selection. Formal decision making methods involving weighting and rating factors are used in the final selection of a material for an application-specific design.