

Preface

The engineering point of view is a way of looking at complex problems that are characterized by any mixture of objectives (e.g. material performance, customer receptiveness, monetary, durability, delivery time, positioning strategy on the marketplace, etc.). Typically, by breaking down the problem into more manageable pieces, data and judgments can be rationally and carefully brought to bear on them, after which the pieces are then reassembled in order to present a coherent overall picture to decision makers.

This is also the case when a material selection strategy must be put into practice, for the simple reason that the choice of material can be relevant and have a great impact on the success of a product in the market.

Despite the fact that the literature background of material selection and the specific methods to be used are well-regulated, several objectives often require negotiation, in obedience to different performance targets and different business units and company departments, which may all conflict with each other, thus becoming at best ineffective or, in the worst cases, leading to unsuccessful choices being made.

The scope of this brief is to present a new method that is based on the author and his students' shared experience in applying a structured method that has, as its main goal, the creation of an overall organization in the options, using language and employing a platform that is not restricted to engineers.

The book has been structured into four chapters so that the reader can gradually build up an idea with the given information and it is designed to be used in traditional classrooms, in higher level professional education courses, for self-study, for professional training programs, as well as in many MBA programs focusing on manufacturing management. Thus, it is written for all those people, who aim for a better understanding of how to integrate and speedup the entire product development process from the initial product concept, engineering design phases to design specs, manufacturability and product marketing with optimal choice of materials.

I think a warning is necessary. Depending on your own background, some concepts might appear too specific, and some other topics too specialized, as they could require specific knowledge on materials; as well as that, some other topics might be too boring for you. Even if you have a technical background you might refuse some strange things that you may consider should be a concern for the manager and

the marketing department. Do not worry, jump them and go ahead, without anxiety, since that is how we have structured the reading of this book. As in a visiting tour, the first reading could be the first trip for you in a new landscape, so you climb a hill and get a general panoramic view over the valley just underneath you. Maybe you are curious to move toward the valley to enjoy its character and a few of those corners to the fullest, and then hopefully you will join in with some local tastes.

Ultimately, I wish to thank my numerous former students who have participated in this project and its main scope, allowing people with a variety of backgrounds to communicate, negotiate, and decide how to be successful. We hope we have not failed in our job.

Material Selections by a Hybrid Multi-Criteria Approach

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