INTRODUCTION

Nowadays, when international competition among producers becomes more and more severe, continuous improvement of products is crucial for the company's survival. Engineering design is one of the most important factors contributing to the product excellence. There are numerous papers, books and conferences that stress the importance of the design for creating better and more competitive products in industry.

The question arises to what extent research in engineering design, which is now generally accepted scientific discipline, has left its mark on the product development process. There have been many reports that academics as well as companies are not fully satisfied from the current situation. Reasons are complex. Perhaps one drawback is that many methods are too sophisticated and have to be significantly changed to suit real-life problems. Or a problem has to be significantly modified to the method. Too many modifications may be troublesome and lead to false conclusions and solutions.

One of the most critical issues is enormous complexity of the design process, which must be overcome in course of the product development. Complexity in product design ensues from large numbers of diverse parts, functions, and disciplines that require an intricate network of synergistic relationships to link them together. We design products that are are more and more complex, we use complex methods and tools, and design process itself is very complex, not only because design problems are complex but also because designing systems are inhomogeneous.

It is extremely difficult for designers to explicitly assimilate and represent such complex relations in totality.

What features are essential in order to use the design methods seamless in extremely complex and multi-facet product development processes? How can we increase the usefulness and effectiveness of the methods for both the product and production process quality? It seems that no definite answer has been found by now.

Hopefully, this book will cast a light on questions of this kind. Distinguished experts in the field of engineering design have been invited to present their views and achievements and to share their experience with those involved into the product development process. On behalf of the Polish Committee of Mechanical Engineering at Polish Academy of Science I asked them for attempting to outline a framework for methods that have sound theoretical foundations as well as value for industrial use. The framework would help to provide a methodology that is acceptable for industrial practitioners.

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