

Effective design and manufacturing, both necessary to produce high-quality products, are closely related. However, effective design is a prerequisite for effective manufacturing; quality cannot be manufactured or tested into a product, it must be designed in. The United States needs to sharpen its understanding of engineering design theory if it is to realize the competitive advantages of superior engineering design. Significant improvement of design practice requires increased knowledge of the fundamentals of design and increased readiness of firms to adopt new methods. Developing and teaching a coherent body of engineering design principles in this area could help accelerate the changes necessary to maintain the competitiveness of future U.S. manufacturing.

This report presents the findings and recommendations of the Committee on Engineering Design Theory and Methodology, formed by the Manufacturing Studies Board of the National Research Council at the request of the National Science Foundation. The scope of the committee's efforts

Determine the importance of engineering design to U.S. industry's competitiveness in world markets.

Articulate the means by which the practice of engineering design in the United States can be improved.

Propose actions to improve undergraduate and graduate education in engineering design.

Propose a national effort to improve the practice of engineering design through research and development.

Recommend to government, industry, and academe mechanisms for improving engineering design practice, education, and research.