Preface

The idea of this monograph is to present the latest results related to mechanical and materials engineering applied to the machining, joining, and modifying modern engineering materials. The contributions cover the classical fields of casting, forming, and injection molding as representatives of manufacturing methods. Additive manufacturing (rapid prototyping and laser sintering) is treated as a more innovative and recent technology which opens the possibility for the manufacturing of shapes and features which are not possible to achieve based on traditional methods. Water jet cutting is treated as an innovative cutting technology which avoids the heat increase as in the case of classical mechanical cutting. As a different technology for separation of materials, the laser cutting technology is introduced. Classical bonding and friction stir welding approaches are treated as joining technologies. In many cases, forming and machining technologies require a post-treatment to achieve a required surface quality or to equip the component with a protective layer. This area is covered based on laser treatment, shot peening, and the generation of protective layers.

The 9th International Conference on Advanced Computational Engineering and Experimenting, ACE-X 2015, was held in Munich, Germany, from June 29 to July 2, 2015, with a strong focus on computational based and supported engineering. This conference served as an excellent platform for the engineering community to meet with each other and to exchange the latest ideas. This volume contains 18 revised and extended research articles written by experienced researchers participating in the conference. Well-known experts present their research on casting, forming, injection molding, and laser-based methods.

The organizers and editors wish to thank all the authors for their participation and cooperation which made this volume possible. Finally, we would like to thank the team of Springer-Verlag, especially Dr. Christoph Baumann, for the excellent cooperation during the preparation of this volume.

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