Preface

Residual, internal stresses in materials can arise as the outcome of the synthesis and/or engineering of materials, and/or as a consequence of the application of materials in practice. Residual stresses can have beneficial or detrimental effects. Therefore, understanding and control of residual, internal stresses is a prerequisite to utilize them to our advantage in material systems in wide ranging application areas, such as, for example, microelectronic devices, sensors and actuators and machine parts, as in the automotive industry.

The series of International Conferences on Residual Stresses provides the ideal platform to present new developments on stress-measurement techniques, on modelling and prediction of residual stresses and on progress made in the fundamental understanding of the relation between the state of residual stress and the material properties.

The successful series of ICRS meetings was initiated in Garmisch-Partenkirchen (Germany, 1986). Following meetings took place in Nancy (France, 1988), Tokushima (Japan, 1991), Baltimore (USA, 1994), Linkoping (Sweden, 1997), Oxford (UK, 2000), Xi'an (China, 2004) and Denver (USA, 2008). With the 9th International Conference on Residual Stresses (ICRS 9), held from 7 – 9 October 2012, we returned to Garmisch-Partenkirchen, Germany.

ICRS 9 offered a key forum for scientists, students, and engineers interested in the prediction, evaluation, control, and application of residual stresses. Both the scientific and engineering aspects of these topics, such as material response to loading, simulation of stress profiles, stress development by surface treatments (e.g. peening, induction hardening, grinding, cladding) and by manufacturing (e.g. casting, welding, cold wire drawing, cutting, roller straightening), component performance, life and failure, were addressed. Special attention was paid to method development and burning issues of great current interest, as, for example, mechanical and diffraction stress analysis including synchrotron radiation, depth-resolved stress analysis, stresses in nanosized systems, etc.

A total of 154 contributions were presented at the meeting, orally or as a poster. After a rigorous and time consuming refereeing procedure, 98 contributions could be published in the conference proceedings now in front of you. Herewith we would like to thank all reviewers for their time spent on the manuscripts.

The ICRS 9 turned out to be a fascinating and inspiring conference. We hope the current proceedings reflect this.

S.J.B. Kurz
E.J. Mittemeijer
B. Scholtes

Stuttgart, Kassel,
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Organizer of the ICRS 9

Arbeitsgemeinschaft Wärmebehandlung und Werkstofftechnik e.V.
Paul-Feller-Str. 1
D-28199 Bremen

Local Organizing Committee

J. Gegner
S.J.B. Kurz
E.J. Mittemeijer
S. Müller
B. Scholtes
W. Zinn

Contact

Homepage: www.is.mpg.de/icrs9
Conference Secretariat: info@awt-online.org

International Scientific Committee

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