

Preface

The term “hot cracking” is generally used to describe cracking that occurs at elevated temperature and, in the context of materials joining, generally constitutes weld solidification cracking, and weld metal and heat-affected zone (HAZ) liquation cracking. Ductility-dip cracking can also be considered a “hot cracking” phenomenon, even though DDC occurs in the solid-state but only slightly below the solidus temperature of the material. Hot cracking is a major weldability issue with many structural materials including aluminum alloys, steels, stainless steels and nickel-base alloys.

This conference was the third in a series of workshops that started in 2004. The first workshop was organized by Prof. Horst Herold and Prof. Thomas Böllinghaus and held in Berlin in March 2004. The proceedings from that workshop, entitled *Hot Cracking Phenomena in Welds* (ISBN 3-540-22332-0) were published in January 2005. The second workshop in March 2007 was organized by Prof. Böllinghaus, Prof. Herold, Prof. Carl Cross, and Prof. John Lippold and also held in Berlin. The proceedings from that workshop, *Hot Cracking Phenomena in Welds II* (ISBN 978-3-540-78627-6), were published in May 2008. These first two proceedings constitute 42 papers with contributions from over 10 countries.

The third workshop was held in Columbus, Ohio in March 2010 and hosted by The Ohio State University and Edison Welding Institute. There were over 80 participants and 22 presentations from 8 countries (USA, Germany, France, United Kingdom, Finland, Japan, Sweden, and Brazil). Paper topics included weld solidification cracking, liquation cracking, ductility dip cracking, weldability testing, and modeling. The conference was organized into three major sessions based on material type: aluminum and magnesium alloys, steels and stainless steels, and nickel-base alloys. Each of these sessions was started with a keynote presentation. Keynote speakers at this workshop were Prof. Sindo Kou (Univ. of Wisconsin – USA), Prof. Thomas Böllinghaus (BAM – Germany), and Prof. John DuPont (Lehigh University – USA).

The papers collected here together with the 42 papers from the previous workshops represent the best compilation of information on the topic of hot cracking of welds that has ever been collected. Among these papers, readers can find information on hot cracking mechanisms, characterization, weldability testing approaches,

and modeling techniques. The authors are among the leading experts in the field and have been provided the opportunity (without page limitations) to present their results and express their opinions.

The editors wish to thanks all the authors for their excellent contributions and for keeping to a schedule that allowed publication of these proceedings in a timely manner. We would also like to thank the Edison Welding Institute for providing the venue for this workshop and, in particular, to Mr. Nate Ames and Mr. Brad Hudson for assisting with the organization and advertising of the workshop.

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Berlin, Germany
Berlin, Germany
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John Lippold
Thomas Böllinghaus
Carl E. Cross

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Lippold, J.C.; Boellinghaus, Th.; Cross, C.E. (Eds.)

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