Preface

Special issue on the 6th conference on industrial computed tomography 2016 (iCT2016)

Industrial X-ray computed tomography (XCT) is a method whose relevance has increased more and more because of its huge advantages. XCT is a non-touching, non-destructive method which reveals the complete 3D-geometry of a specimen including inner surfaces. In the case of research XCT is an excellent tool to support the development of new materials, new processes and new parts, but it is also used for quality control and failure analysis. Some rough estimates of the worldwide industrial XCT-market in 2016 are:

- 2000–3000 XCT-systems for non-medical applications worldwide
- > 30 XCT-suppliers including small companies and big international enterprises
- > 10 XCT-Software companies (e.g. Volume Graphics VGStudioMax, FEI Visualization Sciences Group Avizo, …)
- Several XCT-standards are available: VDI/VDE 2630 for metrology and DIN EN 16016-1-4: 2011 for non-destructive testing, ASTM E 1695 (Standard test method for measurement of XCT system performance) and ASTM E 1441 and ASTM E 1570 (Standard practice for XCT), ISO 15708-1 and 2 for non-destructive testing. In addition the ISO TC 213 WG 10 is working on future ISO 10360-standards for XCT applied to metrology

The application areas of XCT are diverse and extensive, since any material or component can be examined with XCT. The major application areas of XCT in science and industry are non-destructive testing, 3D materials characterization and dimensional measurements (metrology). Some of the key uses for XCT scanning are flaw detection, failure analysis, 3D analysis and material composition, extraction of material properties for finite-element simulation, fiber extraction, assembly analysis, actual/nominal comparison and reverse engineering applications. In recent years various quantitative XCT-methods were developed to use XCT for the correct and reproducible determination of quantitative data from materials and components like porosity, pore size and form distribution, fiber length and orientation distribution, phase percentage and distribution, geometrical data, … Industrial XCT is used in various different industry sectors, but particularly in the automotive-, aerospace- and materials industry. Due to the increasing dispersion of industrial XCT, the method development and application areas are being spurred on a fast pace. Currently there are more than 30 XCT-device manufactures all over the world. Most of them can be found in the scientific program or at the industrial fair of this conference. XCT-devices with prices ranging from EUR 60,000 to more than one million EUR can be delivered for a broad variety of applications. www.3dct.at offers an overview of XCT-instrumentation companies.

The 6th international conference on industrial computed tomography 2016 (iCT2016) took place in Wels, Austria, from February 9th–12th, 2016. The organizers of the iCT2016 invited authors to submit the full papers of their contributions. The contributions accepted by the scientific program committee were published as on-line proceedings on www.ndt.net (The web's largest open access database of nondestructive testing ISSN 1435-4934) and some high quality papers were selected for this special issue of Case Studies in NDT&E International. As a result, this special issue includes 14 outstanding papers that have been accepted after a peer review process. This issue owes a great deal to a number of people (especially members of the program committee of iCT2016, www.3dct.at/iict2016) who devoted their time and expertise to handle the submitted papers. Words of thanks are addressed to the anonymous reviewers who carefully read the papers and provided detailed comments and suggestions to improve the quality of the submitted papers. This special issue would not have been without their effort.

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The 14 selected contributions give insight in the newest developments in the field of Industrial X-ray computed tomography. We hope that you will enjoy reading this issue and that the papers in this issue will provide opportunities to identify future developments and applications of industrial XCT.

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