

NDT&E for Industry 4.0

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Background

Nondestructive material testing and evaluation technics and applications shaped and progressed always in line with industrial demands and technical requirements. The current state of NDT&E has evolved driven by design requirements for structural integrity and safety and pushed by innovations in computing, sensor physics, micro-electronics, and robotics. Highly developed inspection equipment with advanced features like real time imaging and data evaluation and front end multi-channel electronics supports industry to produce and maintain technical components on highest quality level according to applicable industrial standards denoted by industry 3.0.

In the course of globalization and in recognition of the progress made in information technologies and artificial intelligence, a software concept is under industrial implementation that restructures industrial manufacturing with impressive expectations and promises. Industry 4.0 is marking the future of cyber manufacturing.

Statement of Contribution

We assume a new quality of nondestructive testing and evaluation embedded into cyber manufacturing as an information source that supports profiling manufacturing features. Existing line or process integrated NDT is specified and designed to meet quality standards for a specific local task. Cyber NDT is specified and assembled as a profiler knot for a transparent and controllable flexible manufacturing present in the virtual production mapping.

Analysts recognized the idea of an integrated Cyber NDT [1]. They predict a change of NDT business that challenges for disruptive innovations. NDT research comes up by system engineering with experts from manufacturing planning and IT to understand embedded NDT as a smart element of the applied IoT and IoP. Beside traditional NDT objectives new tasks have to be identified and justified that require new methods and technologies.

Results/Discussion

We discuss first ideas on technical specifics required to meet the idea of an embedded NDT system. The concept is illustrated by case studies that focus on the control of mass produced parts. The experienced gained helps to become a qualified partner for the advancing industry 4.0.

References:

[1] Mariano Kimbara. *Future of Nondestructive Testing: Industry 4.0/Smart Manufacturing – Disrupting Established Products, Technologies and Business Models // Frost & Sullivan. 2015.*