NUGENIA
NUclear GENeration II & III Association

COMRAD

Comprehensive investigation of the performance of computed and digital radiography

OBJECTIVES

COMRAD is a comprehensive study on the performance of computed and digital radiography (CR/DR). CR and DR are two contenders as replacement technologies for traditional film based industrial radiography. In CR the film is replaced by an imaging plate containing photostimulable storage phosphors, which store the radiation level received at each point in local electron energies. A scanner employs a laser beam to read out the imaging plate via photostimulated luminescence, where the emitted light in the visible spectrum is detected by a photomultiplier and converted to an electronic digitised signal (see Figure 1). In DR a digital detector array the image is directly captured in the detector (see Figure 2). Both techniques share a number of potential advantages over film, such as their linear detection characteristics over a wide dose range, allowing the examination of a wider range of thicknesses in one exposure and making CR and to a lesser extent DR less vulnerable to under- or overexposure, unlike conventional film. Another potential advantage is the increased sensitivity at lower energies and the consequential ability to reduce the radiation exposure (which in turn reduces inspection times and the potential radiological hazard). However, the transition from traditional silver film to CR/DR requires an in-depth understanding of the relative performances of CR/DR and film based radiography. As detection, processing and interpretation of the two methods are significantly different there are many technical aspects that need to be explored. It is the aim of COMRAD to identify the essential parameters that affect the performance of CR and DR and thereby providing a consistent approach to inspection design and the production of technical justifications.

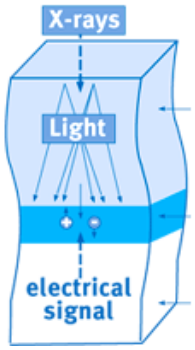

Fig.1: Principle of DR

DESCRIPTION OF WORK

The technical work of the project is carried out by two working groups (WGs), one in Sweden around Chalmers University (with support from Vattenfall, SQC and SSM) and one in France, lead by CEA with support from EDF and Intercontrole. The work is divided in 5 work packages (WPs) and each of them involve a literature review where needed, computational modeling and experiments :

- WP1: Identification of suitable filters to reduce scattered radiation;
- WP2: Assessment of the effective spatial resolution;
- WP3: Detector calibration;
- WP4: Selection of suitable source energy;
- WP5: Definition of interpretation conditions for CR and DR

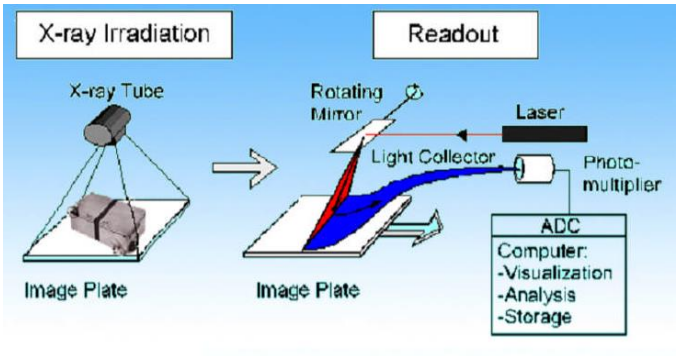

Fig.2: Principle of CR

MAIN RESULTS / HIGHLIGHTS

Results of the Swedish and French WGs will be published in a final report with summarised findings. Both reports will serve as a basis for an ENIQ Recommended Practice on CR and DR (main out put of the project) and other ENIQ publications.

DURATION

1 July 2014 – 31 December 2016
2.5 years

PARTNERS

CEA / CEA / EDF / Intercontrole (Areva NDE Solutions) / Chalmers Univ. / SQC / Vattenfall / SSM
EDF / Intercontrole (Areva NDE Solutions) / Chalmers Univ. / SQC / Vattenfall / SSM

CONTACTS

Technical Project Leader & Contacts:
France: David Tisseur (CEA, david.tisseur@cea.fr)
Sweden: Tommy Zettervall (SQC, tommy.zettervall@sqc.se)