Project Management Institute.
Kingdom of Saudi Arabia

Digital Insights:

Transforming Oil & Gas Inspections with Computed Radiography

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COMPUTED RADIOLOGY

Non-destructive Testing (NDT) is essential for ensuring the integrity, safety, and quality of critical components and structures. In the oil and gas industry, Computed Radiography (CR) is used to inspect pipelines, pressure vessels, and welds in offshore structures to identify corrosion and defects.

As part of optimization, CR enables the transition of conventional radiography to digital radiography by using existing X-Ray equipment for conventional radiography.

Computed radiography (CR) is the use of a Phosphor Imaging Plate to create a digital image, these sensitive plates capture data during object examination.

Typical inspection comprises of radiographing the component to be inspected, evaluating the image with the relevant software and using the necessary software tools to show and calculate any defects.

The computed radiography plate has a thin layer of phosphor grains, known as a photostimulable phosphor. The plate is exposed to x-ray radiation exciting the phosphor, exciting the electrons to be trapped in the lattice until inevitably they are stimulated by the second round of illumination

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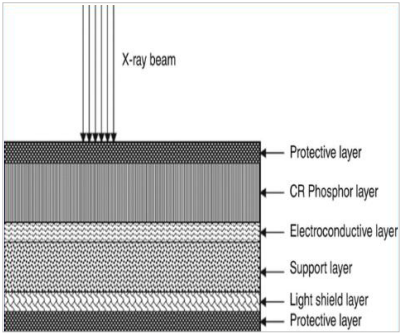
ADVANTAGES OF COMPUTED RADIOGRAPHY OVER CONVENTIONAL METHOD

HPX-PRO Portable CR System - Designed for high digital imaging in rugged environments. It's a lightweight, portable solution that can be set-up in less than 5 minutes and process a weld in up to a minute. Computed Radiography (CR) represents a transformative leap in the world of radiographic imaging, serving as the digital replacement for conventional gamma ray film. This innovative technology brings with it a host of advantages that not only enhance the efficiency of inspections but also contribute to a more sustainable and environmentally responsible approach.

One of the standout benefits of CR technology lies in its remarkable reduction in consumables. Unlike traditional gamma ray film, which necessitates the use of single-use film sheets and chemical processing, CR relies on reusable Imaging Plates (IPs). These IPs can be utilized for a substantial number of scans, typically ranging from 200 to 250 scans depending on their handling and maintenance. This reuse not only reduces costs but also minimizes the environmental impact by eliminating the need for chemicals and disposable film sheets.



Furthermore, CR technology obviates the need for a dedicated darkroom or chemical development processes, making the image production process significantly faster and more straightforward. The conventional darkroom.

The advantages of CR extend beyond the practicalities of the imaging process. It also simplifies data exchange, facilitating seamless digital communication and archiving. Unlike conventional film, CR images are not physical artifacts that need to be stored in dedicated areas. Instead, they can be stored in a digital platform for an extended period and accessed or archived at any point in time with ease.

In essence, Computed Radiography offers a comprehensive array of benefits that span cost savings, environmental responsibility, operational efficiency, and data management. By embracing this technology, industries that rely on radiographic imaging are not only modernizing their practices but also making a positive impact on their bottom line and the global planet.

REDUCED LABOR

Project achieved Manhours Savings of around 40 % due to elimination of Washing, drying, dwell time for conventional Films. Since IP Plates are directly brought to CR Equipment for Scanning; optimized labor utilization is achieved.

DATA MANAGEMENT

CR facilitates robust data management. The digital nature of the technology allows for the seamless storage and organization of radiographic images, reducing the risk of data loss and simplifying record-keeping.

COST SAVINGS IN CONSUMABLES:

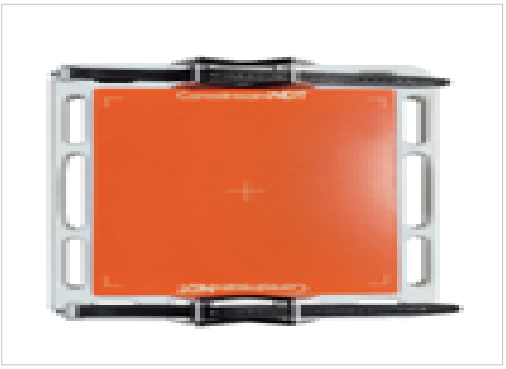
The shift to CR translates into cost savings in consumables. Reusable Imaging Plates (IPs) drastically reduce the need for single-use film sheets and chemicals, leading to cost-effective and sustainable inspection practices. highlight potential issues, reducing the risk of undetected flaws.

ONE-TIME SOFTWARE INVESTMENT:

The implementation of CR involves a one-time investment in software for Computed Radiography (CR), Digital Radiography (DR), and Digitizer. This initial investment paves the way for long-term efficiency gains and cost reductions.

REUSABLE IMAGE PLATES:

As mentioned, IPs are not only cost-effective but also environmentally friendly. Each plate can be reused for more than 200 to 250 exposures, depending on proper handling and maintenance, reducing waste and contributing to sustainability.



IMPROVED DETECTION OF DEFECTS:

CR provides high-resolution images that enhance the detection of defects such as cracks, porosity, and inclusions in welds, ensuring structural integrity.

ENHANCED CONTRAST:

Digital systems offer better contrast and can be adjusted post-capture to highlight potential issues, reducing the risk of undetected flaws.

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FOSSIL FUEL/ TREES SAVINGS AND CHEMICAL FREE PROCESSING

OPTIMIZED CO2 EMISSION:

CR systems generally consume less energy compared to the equipment required for processing film radiography, including chemical processing units and hence supports optimizing CO2 emission

TREE CONSERVATION

Zuluf WI Project achieved approximately 340 Tree Savings (considering Paper Conservation Analogy of 100,000 films equate to about 10 ton of cellulose film base approximately and Tree Equivalent: Roughly 17 trees per ton of cellulose.)

CHEMICAL FREE PROCESSING:

CR systems do not require the chemical developers and fixers used in traditional film processing. This reduces the use of potentially hazardous chemicals that can harm the environment if not disposed of properly.

Conventional Methods use Silver Halide Crystals, which can be avoided using CR System. It is to be noted that mining and processing of silver have significant environmental impacts, including habitat destruction and water pollution.

Conventional Methods use Developer and Fixer Chemicals, which can be avoided using CR System. These can be hazardous if not disposed of properly, potentially contaminating water sources