AEROSPACE QUALITY RADIOGRAPHIC DIGITAL IMAGERY
THE USE OF COMPUTED RADIOGRAPHY AS A DIRECT FILM REPLACEMENT

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Abstract: This presentation encompasses the solution to an Inspection Task describing the actions taken by Smith's Aerospace Corporation when faced with the challenge of inspecting a new product for the Aerospace Industry.
The product was a Titanium Welded Assembly, circular in design, with several welds requiring fifty exposures before and after Heat Treatment at a production rate of 25 assemblies per week. Radiographic quality level was required to be true 2-2T using Pratt and Whitney Plaque Type Penetrameters. Utilizing standard Wet Film Radiography, it was determined that the cost and facility burden would render that method of inspection as cost prohibitive. Several Filmless RT Technologies were explored, with the primary consideration being Image Quality, followed by ease of use, and the utilization of existing facilities and personnel, while still maintaining productivity regarding other products being manufactured and inspected Radiographically. After performing feasibility analysis with various available filmless technologies, it was decided to employ the use of flexible Imaging Phosphors (Imaging Plates) coupled to a Computed Radiography System (Reader and Workstation}.

Introduction: This presentation describes the use of Computed radiography as a direct replacement for Industrial Radiographic Film, the improved productivity of the NDT RT facility at Smith's Aerospace Corporation, and the substantial savings in Film, Chemistry and Effluent Treatment, Image Storage, and Image Sharing, and most importantly, Image Quality and customer approval regarding the use of Computed Radiography.

Results: Imaging Plates were substituted for typical film cassette packages and exposed in the same manner as film. However exposures were significantly reduced, 30 to 40 percent. Exposed Imaging Plates were then processed in a Reading Unit, used to extract latent images. This device not only extracted the latent images by exciting the phosphors, causing them to luminess, but applied pre prescribed algorithms to the Image File being generated in the form of pre selected grey scale values, contrast values, and various edge treatments. The selection of the algorithms was via a menu selection process, located at the Reader Unit, part of the Reader Unit System Controller. The menus selected were custom generated by the NDT level 3. The entire process was automated. After Image extraction, the Imaging Plate was erased and re-inserted in its respective cassette for re-use. The entire process takes less than One Minute. Image Pixel matrix was over 15 Megapixels. Image file size is approximately 33 Mbytes.
The image file, pre- treated with the selected Algorithms, was then exported to the system Workstation. Utilizing a High Performance flat panel display, the images were interpreted, dispositioned, and filed using optical storage media. To assist inspection personnel, various software "Tools" were used, including different types and degrees of image magnification, measurement tools, annotation, pointing, and window/leveling.
An additional sub-system was employed enabling Images to be burned to CD or DVD with viewing software also burned to every disk, enabling other personnel to view images on their own computers without having to have a System Workstation available to them. This is especially advantageous when providing a courtesy copy to customers and Government Agencies.

Results: Film Quality Images were obtained at lower costs, in less time, with the use of existing Radiographic Facilities. It is estimated that film savings alone were over $ 50,000 per year. All records of inspection are on disk, and other product was expedited through RT at Smith's Aerospace without delays caused by having to inspect the new product.