

# CR EXAMINER

▶ A newsletter for experts in non-destructive testing

## Ohio Aluminum: Small Company, Big Savings.

From 6 ounces to 60 pounds, Ohio Aluminum is bringing cost savings to its customers and its own bottom line. Specializing in castings for the aerospace and automotive industries, the company implemented Fuji CR about three years ago and hasn't looked back.

Stacey Brandfass, who has been with Ohio Aluminum as a sales engineer for seven years, coincidentally had been certified to perform NDT testing prior to joining the firm, which enabled him to work with his colleagues in Ohio Aluminum's x-ray department to bring the system on-line.

**"They have the most experience and it showed."**

"We're a small company and folks wear lots of hats, so this was a happy coincidence," he said.

Ohio Aluminum had been aware of digital radiography for non-destructive testing for a while. But when the president of the company, Jim Hubman, returned from an industry meeting where he had seen the technology demonstrated, he discussed it with Brandfass. "That's when we decided to call in someone who knew much more about it than we did. We called Clarence Wyland at Fuji," Brandfass recalls.

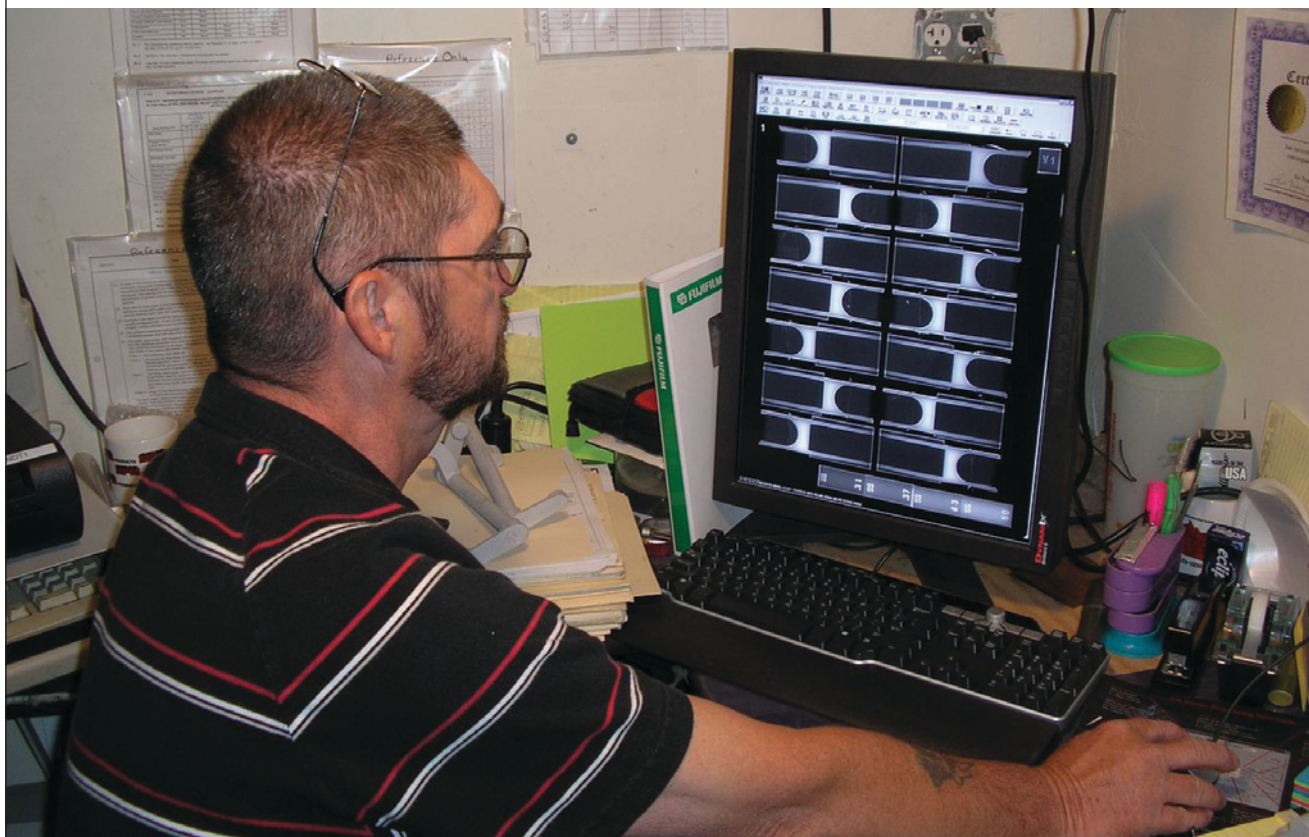
Ohio Aluminum never considered calling anyone but Fuji to make the transition. "They have the

*In this issue of CR Examiner, we are pleased to showcase the Casting Industry and how CR is being applied. Join us as we highlight real-world applications of CR for Casting Inspection. Proven to be an effective film replacement, CR improves productivity and reduces costs, to help ensure these facilities remain world-class companies with vision.*

most experience and it showed," said Brandfass. "They set up the equipment in just a couple of hours."

The firm evaluated the technology for about three months before moving forward with the purchase of a DynamIX® series 4 Multi-tasking system with ImageShare®. They imaged known defects digitally and on film, compared them side-by-side, and moved forward with digital implementation.

The workload at Ohio Aluminum is split 50/50 between automotive and aerospace, but it is the aerospace side that uses digital technology the most. With the extremely tight standards used by the aerospace industry and the need to detect even minute flaws, Fuji's digital technology is an important part of the quality control process. "All of the castings are x-rayed to some extent. Some lots require 100% inspection while others may require a smaller percent," he reports. Aerospace castings can be quite large. For example, a fuel control for a Boeing 737 aircraft weighs 40 pounds. *(continued on back)*



*Interpretation of Radiographic Images are now performed in a soft copy modality by Michael Scalf at AATC.*

## Material Versatility—the Niche for AATC

When Michael Scalf joined what is now American Aerospace Technical Castings, Inc. (AATC), in Phoenix Arizona, the firm was known as Tierney Castings. That was 25 years ago. Today, Scalf is the company's certified AS9100 lead auditor and its Quality Manager. He is also a self-taught NDT Level III certified inspector who has done NDT inspecting for 21 of those 25 years.

"I first started looking into digital technology about six or seven years ago," says Scalf, "but financially, we weren't ready to make the investment." But in December 2005, AATC began implementing Fuji CR for its NDT needs.

"I went to my film supplier who hooked me up with Fuji, but I looked at Kodak and GE, too. By far, Fuji's system was hands-down, the best. I liked its maneuverability, the software was user-friendly and uncomplicated, and the images were better."

Scalf and three others in the x-ray department were trained by Fuji on site and were certified within a week. AATC's actual products were used to set-up the

x-ray and digital techniques, inspections and how to use the system. Occasionally they found that they could reduce the kVs and mAs, depending on the noise level and the material thickness. "The training was great," recalls Scalf. "Fuji—they're the experts."

AATC is experiencing an extremely high throughput with their new Computed Radiography System, examining approximately 6 jobs for every one they did previously.

"We have significantly reduced our shot time. Typically we shot in the range of one to five minutes, depending on the material thickness," he says. "Now, regardless of material, we are shooting everything within 15 to 20 seconds." Also gone is the 12-minute processing time. Images appear on the monitor for reading in about 40 seconds.

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## The Howitzer and the F-22

XRI Testing Services' success in using digital radiography for final inspections began when, working with Precision Cast Components, they approached BAE with an inspection process for a new alloy in a new application: a titanium frame for the 105mm Howitzer military cannon. The original steel-framed, "portable," weapon-on-wheels had a little problem—it was so heavy it could only be moved by truck or tracked vehicle and the Army wanted to move them by helicopter. BAE wanted to reduce the weight by using a titanium frame.

"Progress in our field is largely driven by a customer's willingness to consider a new technology," says Kirk Thams, Vice-President of X-Ray Industries (XRI), who also heads up XRI's Testing Division. "So with BAE's agreement we were able to develop control processes that would allow us to perform final inspections on their new titanium frame using Fuji's CR technology." The result: a much lighter-weight piece of artillery that was more easily moved, with an extended life expectancy.

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Fuji NDT Systems  
A division of Fujifilm Medical Systems USA, Inc  
1055 Stevenson Court, Bldg.105  
Roselle, Illinois 60172-2300

## Ohio Aluminum: Small Company, Big Savings. *(continued from front)*

On the automotive side, suspension parts as well as cylinder heads are examined for “The Big Three,” as well as for the aftermarket. Some of the most challenging are cylinder heads because of their large size. Ohio Aluminum offers three types of casting: green sand; dry sand for more complex parts such as fuel controls that have numerous channels and cavities; and permanent molding where the mold is cut from steel or iron.

According to Brandfass, Ohio Aluminum was looking to digital radiography with Fuji CR to provide both cost and time savings. “A large casting that requires 100% x-ray coverage needs nine sheets of film per casting, so we were looking to increase our throughput in the x-ray department through the faster image acquisition and visualization afforded by CR. We also wanted to decrease our film costs,” Brandfass explained. “We are really saving time because standard film processing used to take us 12 to 15 minutes a sheet, but with digital technology it takes less than one minute for the image to be transferred to the monitor,” he said.

CR images are quickly displayed and read on the monitor and archived digitally. In the case of aerospace customers, these images must be saved for 25 years—the life of an aircraft. With digital storage, images are easily and economically archived and quickly retrieved. They can be provided to clients on disk or transmitted.

Unfortunately, not all of Ohio Aluminum’s customers are taking advantage of digital technology, but with the recent issuance of the new standards by ASMT, Brandfass has noticed an increased level of inquiries from those customers still using film. “It’s a shame,” he says, “that all of them aren’t taking advantage of the cost savings, but I know the savings are there because we’re buying a lot less film and a lot fewer chemicals, and we’re not paying to store all that bulky film. Aerospace is the biggest beneficiary.” ■

## Material Versatility—the Niche for AATC *(continued from front)*

“I am certain that the resolution and the image on the monitor is as good or better than anything we ever got on film,” Scalf says. “And what makes it even better is that I am able to manipulate the image and control the contrast and density, without taking multiple shots.”

AATC inspects a broad menu of materials including two types of aluminum, 20-25 different stainless steels, beryllium copper, and cobalt and nickel bases. “This is our niche, our area of expertise,” says Scalf. “Clients bring us new materials and we’re not afraid of any of them. But, if we can’t image it, we tell them that.”

Because AATC is in the process of getting certified, they still use film for certification. “Right now we’re using digital for information only, but I can’t believe the amount of film we’re saving. Typically we would run through about \$10,000 worth of film a month. Last month we were down to \$5,000, and this month

to date, with half of the month gone, we’ve only spent \$800 for film. Our Level II technician says she won’t be needing more.”

Scalf’s goal is to be filmless and he is already backing up all digital imaging on DVD/CDs. He’s also looking forward to a software program called ImageShare which will enable him to send images to clients on a CDR. “They’ll be able to do the same thing with their systems as I do with mine. I can also cut and paste and send images vial e-mail. It’s a sweet system.”

Scalf believes that the company has accomplished a great deal over the last 10 to 12 years and they are looking for a new facility, having outgrown the one they’re in. “This (DR) is a good thing that has happened to this company. I don’t think I could be much happier.” ■

*AATC has the following certifications:  
Nadcap AS7114 Nondestructive Testing  
Nadcap welding AS7110  
ISS09001:2000/AS9100 REV. B*

## The Howitzer and the F-22 *(continued from front)*

But the BAE project resulted in even more for XRI Testing: the eventual use of CR on certain aircraft parts. “We were able to share our experience with the titanium frame with Boeing,” says Thams, “which demonstrated our ability to inspect castings made from the same casting process using the same alloy. We showed them the control processes that we had developed internally, the sensitivity of the images we were able to achieve, and our ability to share the images with them. They approved CR for the in-process F-22 components that were non-fracture-critical.”

Another first for the F-22 project was an assessment of the use of titanium on cast structures. “This was the first time a cast structure was used in a fracture-critical application,” he recalls. In the past, this component would have been machined, but the short lead time on the project led to casting a near net shape and then final machining. “Basically, the challenge of casting is that there can be some variability that requires an intensive inspection process to make sure you don’t have any casting indications. These were new structures, using new technology in new applications. We had to develop a very tight tolerance inspection process to ensure there weren’t any casting flaws or indications.”

X-Ray Industries was founded in 1941 as part of the war effort. At that time in Detroit, many of the automotive companies were converted to manufacture war supplies. Packard was building Rolls Royce engines, General Motors was building aircraft engines, and Ford was building airplanes. All were building jeeps and tanks. “There was not a lot of imposed control,” explains Thams, “so three gentlemen from Pratt & Whitney started X-Ray Industries to perform inspection services, primarily of new aircraft engines and components.” As the aircraft and their engines became more complex, there arose a need for more controlled inspecting. Also, the casting process was becoming more popular for cylinders and engine blocks since it was able to mass produce parts better than forging. The net result was that X-Ray Industries had quality systems in place before there were formalized quality systems.

The company, which has been involved with digital testing for about 15 years, grew from the single location in Detroit in 1941 to 12 locations today. All facilities are implementing digital inspections. “While the company has had “film-less technologies” for 30 years, we have only recently had some successes in obtaining final inspection approval from our clients because of the advancements of CR,” says Thams.

XRI Testing purchased their first Fuji System for their Portland, Oregon facility around 5 years ago, where they had used film only, and has recently purchased another for inspecting welded fuel distribution components for jet engines. Two additional systems will be implemented this summer for inspecting hip and joint replacements for the orthopedic industry.

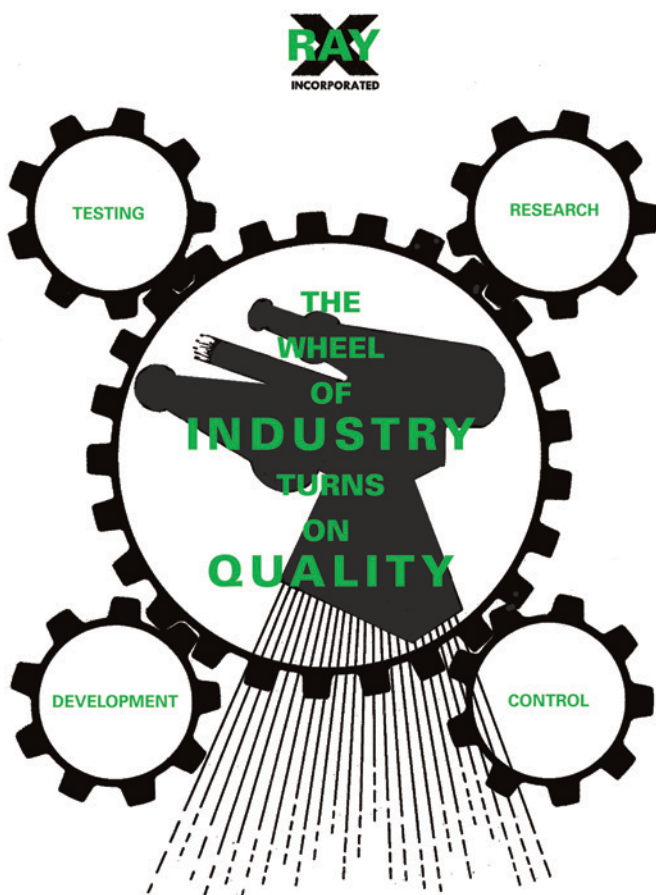
“We purchased the system because we felt that it had better resolution, better ease of use for the operator, better sensitivity, and it had image-sharing capability,” says Thams. “Where Fuji made a great step was with the development of ImageShare software, which not only burns the images to CD, but also burns the software, so our customers can view the images.”

Thams feels one of the biggest challenges the industry faces today is the lack of training for the interpretation of digital images, which he believes only comes with experience. “There’s not a good experiential base of people accustomed to reading digital images,” he says. To this end XRI has set up a training center at its corporate offices to train employees on digital image interpretation. “We are implementing digital in all of our facilities, so this only makes sense,” he says. “And our next step will be to train our customers to read the images as well, since we will be sharing the images with them.”

Thams is a firm believer that the best way to advance the science of CR is improving skills in image interpretation. “While manufacturers can help us as a technical resource, real-world users need to work together with them on how to best improve the process while they also become skilled at interpretation. This responsibility falls to the users of digital technology rather than the manufacturers of the equipment.”

Thams believes that the majority of the industry will eventually go digital, but that film will still have a role to play particularly in cases where a product requires custom-shaped film. “Digital is going to have to bring more than simply cost savings through material replacement,” he says. “It has to bring value, like a better inspection process or the ability to remove a little bit of the human variable. It’s both an economic and quality issue.”

Thams sees new or difficult programs involving castings as a core competency at XRI Testing. They continue work side-by-side with manufacturers, such as Boeing and Lockheed, as they have been doing so for 65 years. ■



*An early, original promotion from the 1940's for X-Ray Incorporated, now X-Ray Industries, shows the cover of their original brochure.*