



Focus

Creating an NDT Certification Program

by James W. Houf

One of the most frequently asked questions addressed to the ASNT Technical Services Department usually begins with "I'm an NDT technician and I want to start my own NDT company...", "Our company needs to create an NDT certification program..." or "Our company wants to quit out-sourcing our NDT work and bring it in-house...". The query typically ends with "What do I have to do to create an NDT program that complies with *Recommended Practice No. SNT-TC-1A*?"

Purpose of SNT-TC-1A

The first thing that is needed is an understanding of the purpose of the *SNT-TC-1A* guidelines. *SNT-TC-1A* was created because elements from industry indicated a need for standardized guidelines for NDT certification. In response to this request, ASNT (then called the *Society for Nondestructive Testing* or *SNT*) formed a *technical committee*, thus the letters *TC*, to develop those guidelines. Made up of industry volunteers, the first *SNT* technical committee formed was numbered *1A*, resulting in the combined term *SNT-TC-1A*. Because the document contains *guidelines* and not strict *requirements*, it was designated a *recommended practice*, leading to the document's final name, *Recommended Practice No. SNT-TC-1A*. Since its inception in 1966, there have been nine editions of *SNT-TC-1A*. A tenth edition is currently being finalized. Each edition is reviewed by a committee of ASNT volunteers from various industries and is revised as needed to reflect their perception of industry needs at that time.

Suppliers and Purchasers Must Agree. Section 1.0 of *SNT-TC-1A*, entitled "Scope," makes clear that the contents of *SNT-TC-1A* are guidelines for the development of an employer's qualification and certification program. It also states that the guidelines may not be appropriate for all employers' circumstances and that the employer

may modify them to meet their particular needs. However, when modifying the guidelines, the employer must remember that the *SNT-TC-1A* "Foreword" states that the purchaser of NDT services and the supplier of NDT services (the employer) must agree upon the acceptability of the employer's program. It is this fundamental premise that keeps a qualification and certification program within bounds; if the modifications are unreasonable, the purchaser of NDT services may refuse to accept the program.

The terms *qualification* and *certification* are commonly misused. *Qualification* is defined in *SNT-TC-1A* as the "demonstrated skill and knowledge, along with documented training and experience required for personnel to properly perform the duties of a specific job" (§ 2.1.11). *Certification* is defined as "written testimony of qualification" (§ 2.1.1).

Modifying the Guidelines. How, then, does an employer (and a self-employed person *is* his own employer) modify the guidelines to create an

NDT program? *Recommended Practice No. SNT-TC-1A* requires that the employer develop a *written practice* (§ 5.0 – 5.5), which is defined in *SNT-TC-1A* as "a written procedure developed by the employer that details the requirements for qualification and certification of their employees" (§ 2.1.14). It must describe the way the employer will control and administer personnel training, examination and certification; the responsibility of each level of certification; and the training, experience and examination requirements for each level of certification. The employer's NDT Level III must review and approve the written practice and the employer is required to maintain the written practice on file.

The employer's written practice, which is based on the *guidelines* of *Recommended Practice No. SNT-TC-1A*, becomes the qualification and certification *requirements* for the company. It is the employer's written practice that defines the company's NDT program, and this is what the purchaser of NDT services should review when determining the acceptability of an NDT supplier's certification program.

When a Written Practice Is and Isn't Needed. If technicians are going to work as contract NDT labor, that is to say, hire themselves out to a company as a temporary employee, they do not need to develop a written practice; they will

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Many of the questions directed to our Technical Services staff here at ASNT headquarters pertain to starting an NDT business. This month's "Focus" article, "Creating an NDT Certification Program," provides a little background on the origin of *Recommended Practice No. SNT-TC-1A*, discusses its purpose, and, most importantly, explains how *SNT-TC-1A* relates those that provide NDT services and those that purchase NDT services. It's informative reading for both perspectives.



Thanks to those of you that have called and e-mailed with your positive comments regarding the "Crossword Challenge." This month's crossword features liquid penetrant testing. The questions are adapted from the *Supplement to Recommended Practice No. SNT-TC-1A on Liquid Penetrant Testing* and the *ASNT Level II Study Guide - Liquid Penetrant Testing Method* and are a great way to test your NDT knowledge. Let us know the methods or applications you are most interested in and we'll try to oblige.

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either have to take the employer's examinations and become certified by that company or obtain central certification that is recognized by *SNT-TC-1A*, such as the ASNT Central Certification Program (ACCP). If ACCP certification is used, the employer's written practice must state that the company will accept third-party qualification examinations, but the employer is still required to authorize the person to perform NDT tasks for the company. If a technician decides to form an independent company, then a written practice will be needed.

Implementing *SNT-TC-1A*

As a means to simplify the process of developing a written practice, ASNT has prepared a publication package entitled *Implementing Recommended Practice No. SNT-TC-1A* (ASNT Publications Catalog item no. 2092). This package contains a copy of *Recommended Practice No. SNT-TC-1A*, the booklets *A Model Written Practice* and *Introduction to Nondestructive Testing* as well as *A Guide to Personnel Qualification and Certification*. The booklet, *A Model Written Practice*, provides most of the standard wording found in most written practices and, at points in text where the employer needs to insert specific requirements, there is guidance on what should be entered to make it applicable to the employer's needs. To further facilitate the process of creating a written practice, the package is also available with a floppy disk (ASNT Publications Catalog item no. 2092A) that contains the complete text of *A Model Written Practice* in ASCII format that can be copied and pasted into most word processing documents.

Typical Modifications

Another question that often comes up when discussing the process of developing a written practice is, "What are typical examples of modifications to a written practice?" The answer to this will depend on the scope of your work. For example, if you will only be doing digital ultrasonic thickness testing, you may want to reduce the required number of hours required by your written practice for ultrasonic training since digital thickness testing is more simple than angle beam testing. Similarly the experience time might also be reduced in this case. However, if limited certification such as this is to be used, the employer must be certain that the limitations are clearly described on the employee's certification documents. In all cases, the employer should keep in mind that any purchaser has the right to (and should) review the supplier's written practice, and modifications that are unacceptable to the purchaser may result in the potential loss of work. **Contracting a Level III.** When forming a new company or developing an in-house program for the first time, the question of what to do about an

Tech Toon



"Certified!? I'll say I'm certified."

NDT Level III comes up, since many companies may not have an NDT Level III on staff, or a newly self-employed person may not know how to handle the issue of *self-certification*. *SNT-TC-1A* addresses this by permitting the use of contracted (outside) Level III services if the company does not have an in-house Level III. In this manner, a company can have the contract Level III review and approve the written practice and develop and administer the company's qualification examinations. For self-employed personnel, contract Level IIIs can administer their own qualification examinations to the self-employed person, sign the certification documents, review the written practice and perform other Level III tasks while acting as the company Level III. This also eliminates the problem of how a person in a small company becomes certified and lends credibility to that person's certifications. If this is done, the written practice should be written to permit the use of a contracted Level III and the contract with the Level III should be documented for auditing purposes. The contract may be written on an *as-needed* basis if the company does not want to keep the Level III on retainer. However, when considering an *as-needed* Level III contract, the company should keep in mind that under such a contract the Level III may not be available at all times.

Training Requirements. NDT training requirements must also be documented in the written practice. *SNT-TC-1A* does not require any specific training facility or supplier. It does provide outlines for "Recommended Training Courses" for the NDT test methods listed in *SNT-TC-1A* which can be referenced when designing in-house training courses. These training outlines are being incorporated into a new American National Standard (ANSI/ASNT CP-105) and are scheduled for publication soon. The training should address the general principles and theory of the applicable test method and the specific NDT applications that the company's personnel will be using.

Qualification Examinations. Qualification examinations can be developed in-house or may be administered through a third party. If they are developed in-house, Level IIIs can write the exam questions themselves or they can modify questions that are available from commercial sources. The ASNT series of booklets, *Questions and Answers: Supplements to Recommended Practice SNT-TC-1A*, has sample questions for Levels I, II and III for many NDT test methods. If these sample questions are used, they should be modified to make the questions specific to the employer's applications. Or, as noted previously, the employer's written practice may permit acceptance of third-party examinations. As with

third-party training, the employer is responsible for ensuring that the third-party examinations or training courses also meet *SNT-TC-1A* guidelines.

Finally, employers should consider whether or not the company will be working on projects that require certification to other employer-based certification documents such as *NAS 410*, *ATA 105*, ANSI/ASNT Standard *CP-189* or *MIL-STD-410E* (cancelled by the US Department of Defense effective 31 December 1997 and superseded by *NAS 410*, but still called out in specifications for some equipment built when still in effect).

If the company will be working to any of these other specifications, the employer might consider incorporating the most stringent training, examination and experience requirements from all of those standards so that the company program will meet or exceed the requirements of any of those documents. In this way, your personnel can meet your written practice requirements and be certified to all of those specifications through the use of a single set of qualification examinations. **TNT**

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FYI

Practical Radiography — Digital Radiography and CMOS Flat Panel Detectors

by Raymond R. Shepard

Film radiography is the dominant volumetric nondestructive testing technique utilized throughout the world. Film is lightweight, flexible, and suitable for diverse applications with a proven track record of more than one hundred years. However, film does have disadvantages. It requires significant amounts of time (approximately 20 minutes) for processing that must be done in a darkroom using chemicals that have to be legally disposed of. In addition to a limited shelf life, processed film requires a storage area in which the temperature and humidity are controlled — a significant expense. In contrast, digital radiography requires none of the above. Radiographic images can be generated, optimized, analyzed, stored and distributed in digital format.

Computed Radiography

Computed radiography is a transitional technology between film and direct digital radiography. A reusable, flexible, *photo stimulable phosphor* (PSP) plate is loaded into a cassette and is exposed in a manner similar to traditional film radiography. The cassette is then placed in a laser reader where it is scanned and translated into a digital image. Depending on the resolution required and image size, the process of digitizing may take from one to five minutes. Once digitally captured, the image may be stored on a computer or other electronic media. Archiving is made easier and the images can be electronically distributed to others for viewing.

Direct Digital Radiography

A *direct digital* system is different from computed radiography in that it digitizes the photon radiation that passes through an object directly into an image that can be displayed on a computer monitor. Amorphous silicon, charge coupled device (CCD), and complementary metal oxide semiconductor (CMOS) are the three

principle technologies used in direct digital imaging. Direct digital system images are available for viewing and analysis in seconds as compared to the minutes required in computed radiography systems. The increased processing speed is a result of the unique construction of the pixels in a direct digital system; an arrangement that also allows an image resolution that is superior to computed radiography and most film applications.

How Do CMOS Pixels Work?

Making a direct digital image involves converting *X-* or *gamma* radiation into a digital signal, a multi-step process. A conversion screen is exposed to radiation and converts the radiation into light. The pixel, in direct contact with the screen, converts the light into electrons that are then stored in a capacitor. When the capacitor discharges, the current is sent to an amplifier. Each CMOS pixel is configured with its own amplifier, a significant improvement over CCD detectors in which only one amplifier is available for each row of pixels in the array. Timing and control circuitry for the CMOS detector is resident on the chip, making additional circuitry adjacent to the panel unnecessary. The last step of the process is to perform analog to digital conversion of the signal that is done right at the sensor. In this process, the analog signal is converted into binary code. The binary signal is then sent directly to the computer.

A CMOS imager can be used with either *X-* or *gamma* radiation. Compared to traditional film radiography, the exposure times are significantly shorter, thereby reducing the duration of radiation exposure to the radiographer. The object to be imaged may be placed directly on the panel, or the panel may be positioned on or adjacent to the object. The source is energized and the detector is started. The image is captured and displayed on the computer monitor ready for analysis.

Digital Image Processing and Analysis

A digital system with more than an eight-bit processor is capable of providing an image with better contrast than that achieved with film. Image sensitivity meets or exceeds film characteristics. The highest spatial resolution available in a CMOS detector at this time is 39 microns (0.0015 in.) and linear array detectors typically have a pixel size of 80 microns (0.0032 in.).

Analysis software for digital images offers a wide range of functions not available for film radiography. For example, images that are over or under-exposed are less problematic with digital systems because of the increased latitude of the collected data. In addition, the ability to enlarge or magnify portions of an image on the computer screen improves the technician's ability to interpret areas of interest. Automatic algorithms can also be programmed to detect specific discontinuity types. The inspection process can be fully automated and integrated with the manufacturing process allowing near real-time, zero defect manufacturing. Archiving an image is a simple save function from a computer pull-down menu.

Using Digital Imaging Systems In the Field

Flat panel digital imagers are fragile when compared with film. However, that does not limit their use to laboratory applications. Flat panel digital imaging systems have been used in field environments as diverse as those found on Alaska's North Slope and in Saudi Arabia. Often, sheet metal housings are fabricated to protect the imager. The flat panel imager may be housed in a case suspended through a system of springs. The springs act as shock absorbers that prevent the panel from contacting the casing as well as to prevent direct impact to the panel. Since panels are heavier than film, sufficient means are necessary to support the panel in the proper position during an exposure. Methods to achieve this can be as simple as a series of shock cords and nylon straps.

Corrosion under insulation (CUI) is a major concern on insulated piping systems in power plants, refineries, and transportation pipelines (Fig. 1). When water infiltrates the galvanized outer wrap, the contact zone between the insulation and pipe becomes a perfect location for corrosion. Hand-held C-arm systems that consist of a lightweight arm that can reach around pipe are frequently



Figure 1. Real-time radiography system set-up to look for corrosion under insulation using a tangential shot. Area of interest for viewing is at the six o'clock position of the pipe.

used for detection of CUI. One side supports the imager, and the other supports a pulsed X-ray tube (Fig. 2). These lightweight and portable systems are deployed using a tangential radiography technique (Fig. 3). When looking at an image of the intersection of exterior insulation and the pipe surface, the undamaged external surface of the pipe will appear as a straight black line. If corrosion is present, or if water is present in the insulation, the pipe surface appears rough or irregular and the water may appear as slight fogging in the insulation. Dark scale, a byproduct of the corrosion



Figure 2. Technician using a lightweight, portable C-arm digital imaging system to look for corrosion under insulation (CUI) on small diameter insulated pipe.

process, may also appear in the image.

Care in Daily Use. Here are some tips technicians should keep in mind when using any digital radiographic system.

1. Make a daily check of the panel and housing to ensure that the imager is clean and properly aligned and that all electrical connections are secure.
2. Carry the imager with both hands to avoid dropping or jarring it.
3. Be aware of your footing and surroundings.
4. Return the imager to a padded storage container for transportation purposes.

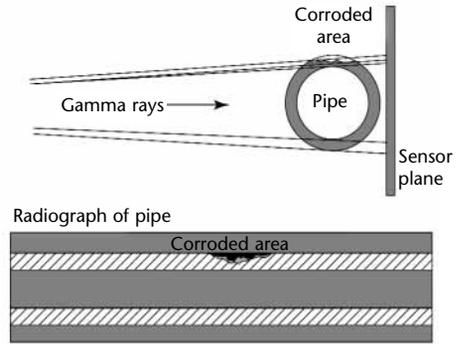


Figure 3. Schematic of the tangential radiographic technique.

5. Carry an extra set of communication and power cables. Digital imaging is the future of industrial radiography. Although film radiography is a well-established technology that will undoubtedly be used for years to come, digital imaging technology continues to improve and in time, can be expected to exceed film applications. **TNT**

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Spotlight on NDT Students: ASNT Poster Competition

Annual Student Competition. Each year, as a means to encourage students engaged in research in nondestructive testing, ASNT sponsors a Student Poster Contest in conjunction with the Society's annual Fall Conference. In addition to cash awards, the competition allows participating students an opportunity to present the results of their research to a select judging committee and to conference attendees as well. Student presentations are given during the conference welcome reception and awards to the first, second and third place winners are made during the Annual Awards Banquet. Members of the

selection committee for 2005 included Henry M. Stephens (ASNT National Chair for 2005-2006 and Awards Committee Chair), Claudia V. Kropas-Hughes (Professional Program Committee Chair), Ricky L. Morgan (Section Operations Council Chair) and Edward E. Hall (Student Interests Committee Chair).

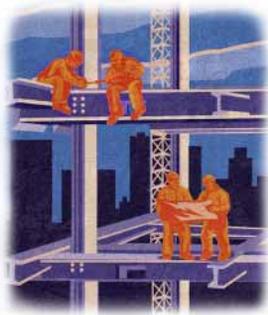
Diverse Topics Presented. The 2005 competition featured ten participants. A cash prize of \$500 for first place was awarded to Harsha Phukan of the University of Missouri-Rolla, Rolla, Missouri. The topic, "Defect Detection in Friction Stir Welds," described research concerning the two most commonly

observed subsurface defects in friction stir welds: *advancing side wormholes* and *lack of penetration*. Most other conventional NDT methods proving ineffective, Phukan's presentation demonstrated the results of eddy current testing of post-process friction stir weld samples.

Spotlight continued on page 10.



Harsha Phukan describes the results of his research in defect detection in friction stir welds using eddy current testing.



Feature

Unforeseen Events Shape NDT Career

by Robert V. Johnson

Not everyone reaches a career goal as the result of long-term planning. Sometimes, careers happen because the individual is challenged by unexpected opportunities. This is not to imply that success is merely the result of being in the right place at the right time, but is instead the result of an ability to recognize genuine opportunity and of exercising the focus and discipline to build the skills and accreditation needed to bring it to fruition.

Twenty-six years ago I wanted to be a diver — to hurl myself into the dark cold abyss and come face-to-face with my innermost fears. In pursuit of that, I attended a commercial diving school where inspection, welding, cutting and rigging were also part of the required curriculum. In my opinion, these classes were just an afterthought, the things I had to do to justify the privilege of bobbing across the ocean floor in full diving gear. Despite my grand plan, not everything went as anticipated. During a simulated dive in a hyperbaric chamber, my ears blew out. I was told I would have to forget diving. To this day I still have purple inner ears.

A Change In Perspective

Fortunately, diving school had provided me with basic training in NDT. With few other skills to fall back on, I took a job as an ultrasonic Level I with a small inspection firm that focused on testing steel structures and soon became certified as a Level II in MT and UT. During my second year, the owner of the business was contracted to move to Korea to inspect an offshore platform being constructed in dry-dock. He handed me his rotary card file of clients and his NDT equipment and informed me that the business was all mine — for a reasonable fee. I bought an answering machine and calls started coming in. Thrown into a sink or swim situation, I decided to swim. The blue abyss was off-limits, but climbing steel on a 45-story building offered equally exciting physical and mental challenges. The calls continued to come and at the end of the year, as I added up the receipts, it occurred to me that this was the start of a new career.

ASNT NDT Level III Is Challenging Stuff

When a *job* officially turns into a *career*, intimidating words like responsibility come to mind. I realized that a commitment to personal and business growth was required in order to make my career in NDT successful. I wanted to bring in additional technicians to help with the workload. I needed to conform to accepted standards for personnel training and procedures. And, written practices had to be developed. I decided to take the ASNT NDT Level III exam. The two-day test was challenging stuff, but miraculously I came through with Level III certifications in MT and UT.

Opportunity Knocks Again

Eventually, opportunity turned into routine and the structural marketplace began to show signs of a slowdown. I asked myself how I was going to stay motivated. I had NDT and AWS CWI certifications and was looking for a challenge. Just as I was considering my alternatives, there was an explosion in a local refinery and opportunity knocked again. Someone had heard that I could develop NDT procedures, manage NDT personnel and train and certify technicians. I was offered a challenging position and told I could work twenty-four hours a day, seven days a week. The work was dangerous but the pay was fantastic. It was right up my alley! Refinery management requested that I develop procedures, schedule radiographic crews, interpret radiographs, perform remote video borescope inspections, climb towers, oversee visual and NDT inspections, and inspect robotic welding of exotic metals — all work that I thoroughly enjoyed.

Pressed Shirt and Slacks

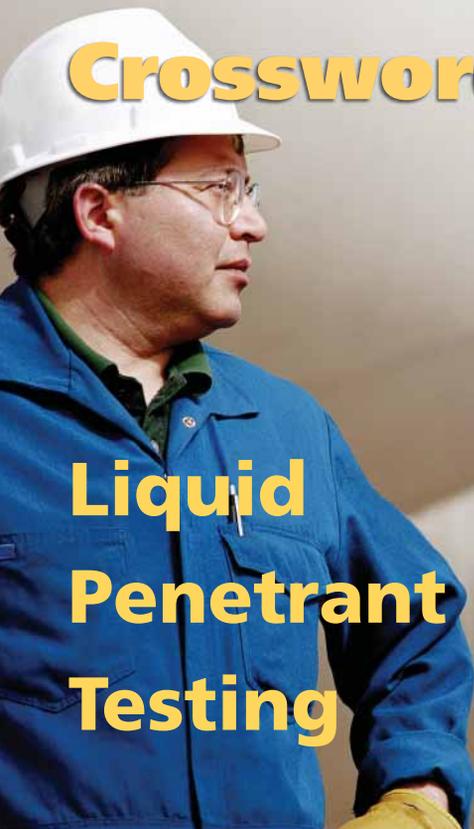
With three years of refinery work behind me, I decided to return to the structural workplace with my newly found knowledge of NDT. While on a hospital construction project, a guy in a pressed shirt and slacks walked into the trailer. I was impressed by his overall knowledge of the construction project and soon learned that he was one of California's many state certified inspectors for the OSHPD (Office of Statewide Health Planning and Development). These inspectors oversee all aspects of construction on hospital projects within the State of California. I also learned that the state was offering an exam for Class A OSHPD inspectors at the hospital where I was working and that I was eligible to sign up. Once again, opportunity was knocking. I took home a set of drawings and began poring over the electrical, plumbing and mechanical sections.

Diversity Is Key

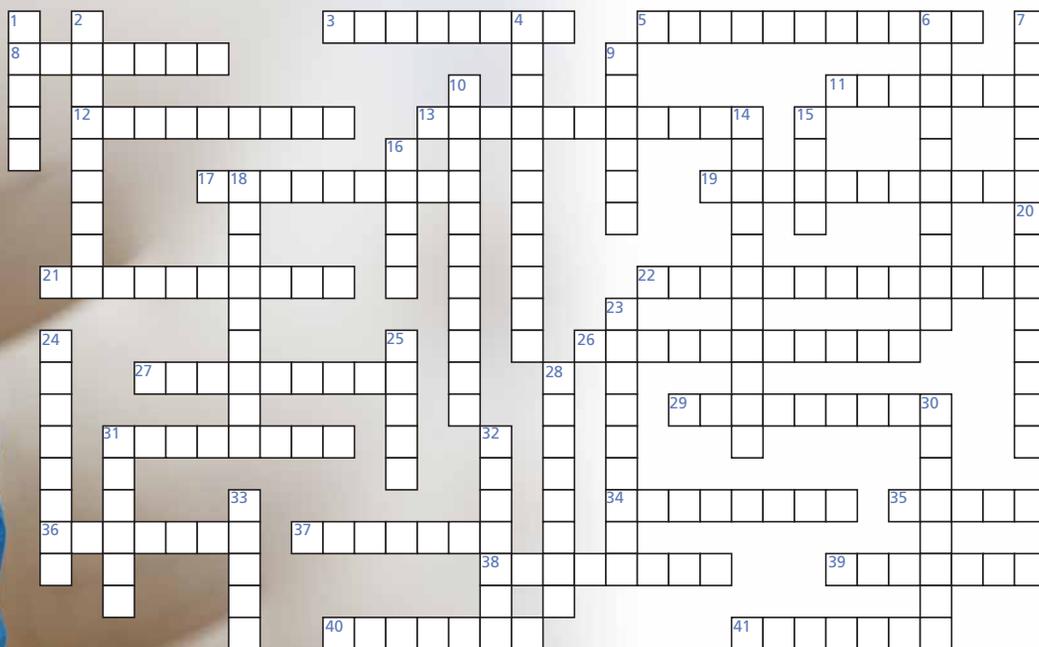
Knowledge has presented a diverse set of opportunities for me. Some find that specialization paves the way to success but for me, diversity has been the key. The principles that I applied to the inspection of welding twenty-six years ago can be applied to the inspection of anything, even dirt. Three earthquakes, two refinery explosions and a Los Angeles underground rail system later, I find I'm still being challenged. ASNT NDT Level III, AWS CWI, ICC Concrete and Steel, OSHPD Class A, DSA Class 1 and I'm convinced the ride is not over.

Robert V. Johnson, President of Structural Inspection Service, has been a frequent contributor to the *Materials Evaluation* "Back to Basics" column. 1617 Acacia Avenue, Torrance, CA 90501, (310) 415-1463, (323) 565-3721, <soundwerx@earthlink.net>

Crossword Challenge:



Liquid Penetrant Testing



Across

3. Process in which developer assists in detection of penetrants retained in discontinuities.
5. Solvents to be avoided in the penetrant system when testing titanium.
8. After application of a wet developer, the drying process aids in securing a _____ developer coating.
11. Water _____ is a standard classification for a type of developer.
12. Forces with tendencies that allow liquid penetrant to enter a discontinuity.
13. A typical indication due to part geometry or part design.
17. When conducting a water washable PT test, wet developer is applied after removal of the _____.
19. Material applied over the film of penetrant on surface of part to be washed off.
21. Used to measure specific gravity of wet developer.
22. Instrument used to check hydrophilic emulsifier concentration.
26. Performance characteristic describing ability to produce a visible indication from a small discontinuity after processing is referred to as _____.
27. Abrupt changes in casting thickness can reveal _____ cracks.
29. Elongated inclusions found in bar stock.
31. Using a weld standard for interpretation of indications provides reliable acceptance _____.
34. Cause of multiple round indications on a weld.
35. Most common type of contaminant in fluorescent penetrant fluid.
36. When attempting to detect minute _____ discontinuities, the penetrant test method is more reliable than radiographic testing.
37. Periodic checks performed to assure that the penetrant testing system is functioning are called _____ control tests.
38. A penetrant inspection cannot find an _____ cavity.
39. Dye penetrant inspection that can be performed under ordinary lighting conditions.
40. Good _____ ability is a characteristic of a good penetrant.
41. Removal of smeared metal by chemical process is called _____.

Down

1. Discontinuity associated with forgings.
2. A characteristic of good penetrant is that it has good _____.
4. When conducting a fluorescent PT test, a commonly used technique for assuring that the excess penetrant has been removed prior to the application of developer is to scan the surface with _____ light.
6. Water washable liquid penetrants differ from post-emulsification penetrants in that water washable penetrants do not need the application of an _____ before rinsing.

7. Term used to define period of time in which a part is covered with penetrant.
9. Dry developer is checked for fluorescent contamination by viewing under an ultraviolet light for fluorescent _____.
10. Developer assists in detection of visible dye penetrant test indications by providing a _____ background.
14. Part _____ is one variable that must be considered when determining adequate penetrant dwell time.
15. Dry developer is sometimes applied using a powder _____.
16. Contamination of dry or wet developer can result in this kind of indication.
18. _____ removal of penetrant may result in undetected discontinuities during evaluation.
20. Most effective method for applying nonaqueous developer.
23. Dry, aqueous wet and non-aqueous wet are terms used to describe three different types of _____.
24. Difference in visibility between an indication and the background.
25. Discontinuities that may be found in aluminum extrusions.
28. When conducting a penetrant test, spherical indications on the part surface could be indicative of _____.
30. Generally accepted method for applying wet developer when conducting a PT test using post-emulsifiable visible dye penetrant.
31. A hose and a nozzle with a _____ spray is the best way to remove excess water-washable penetrant.
32. Good surface _____ is characteristic of a good penetrant.
33. Sensitivity of wet developers can be seriously impaired if the applied coating is too _____.

Questions for "Crossword Challenge: Liquid Penetrant Testing" adapted from Supplement to Recommended Practice No. SNT-TC-1A (Q&A Book) - Liquid Penetrant Testing Method, revised edition and the ASNT Level II Study Guide - Liquid Penetrant Testing Method, second edition.

Answer Key

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|----------|--------------|-------------|----------------|----------------|------------|----------|------------|----------|----------------|-------------|---------------|-----------------|--------------|----------|-------------|---------------|---------------|--------------|----------------|----------------|-------------------|---------|--------------|-----------|-----------------|---------------|--------------|---------------|--------------|--------------|-------------|-----------|--------------|-----------|-------------|-------------|--------------|-------------|-------------|-------------|
| 1. burst | 2. viscosity | 3. bleedout | 4. ultraviolet | 5. halogenated | 6. uniform | 7. dwell | 8. uniform | 9. false | 10. background | 11. soluble | 12. capillary | 13. nonrelevant | 14. contrast | 15. bulb | 16. etching | 17. penetrant | 18. excessive | 19. internal | 20. nonaqueous | 21. hygrometer | 22. refractometer | 23. wet | 24. contrast | 25. seams | 26. sensitivity | 27. shrinkage | 28. porosity | 29. stringers | 30. spraying | 31. criteria | 32. surface | 33. heavy | 34. porosity | 35. water | 36. surface | 37. process | 38. internal | 39. visible | 40. wetting | 41. etching |
|----------|--------------|-------------|----------------|----------------|------------|----------|------------|----------|----------------|-------------|---------------|-----------------|--------------|----------|-------------|---------------|---------------|--------------|----------------|----------------|-------------------|---------|--------------|-----------|-----------------|---------------|--------------|---------------|--------------|--------------|-------------|-----------|--------------|-----------|-------------|-------------|--------------|-------------|-------------|-------------|



PRACTITIONER PROFILE

Jason M. Barrick

Jason Barrick grew up with an NDT school practically in his backyard and decided early that NDT was what he wanted to study. He now has a job that he loves — working for the Tennessee Valley Authority's Inspection Services Organization (ISO), an internal NDT group. Jason gives us the benefit of his insight regarding internships, mentors and growth areas in NDT.

Q: How did you begin a career in NDT?

A: I grew up about 2 blocks from the Hutchinson campus of Ridgewater College. I went there right out of high school. They have a self-paced, two-year degree program in NDT that also has internships for those that are interested. I have an Associate of Applied Science degree.



Q: How are the internships structured?

A: Companies looking for people to assist post the internships and students can sign up. It takes longer to finish your degree because you're out on the road doing the internships but it's a

good way to gain experience and get certified hours. I usually spent six months out of the year working. In between, I would go back to go to school. The internships varied from a week, two weeks, to a couple of months, depending on the one you chose.

Q: Were you able to obtain a broad base of experience through the internship program?

A: Yes, I started with an internship for a utility company located here in Chattanooga doing nuclear power inspections. And I did other internships in a paper mill, chemical plants, some lab work. I also worked for a company in Minneapolis.

Q: Tell us about the TVA Inspection Services Organization.

A: We are an internal inspection services group within TVA that is broken up into groups based on NDT method. Most of us are cross-certified or have multiple certifications. I'm certified as Level IIA in eddy current — with analysis. Eddy current is my main job function but I'm also certified Level II in UT, PT and MT so I help out in those methods. There are four of us in the ET group. Generally, the ISO is called in when the work is time-dependent or if it's something that's more involved. Our work is not just limited to TVA. We're a financially self-sustaining company within a large company. We bid against other contractors just like any other company.

Q: Do you have ASNT certification?

A: Yes, actually the UT cert that I have is ACCP.

Q: Can you describe a typical day for us?

A: Depending on the day, we would probably be out running the road. There's a lot of different work that we do. Most days, we know what the work will be in advance. We have six nuclear units within TVA that we assist and we have something like 48-50 fossil units we maintain and do a large portion of the inspections for; plus, we have hydros and gas turbines. Some days however, they will call us and say, "This is broken and we need it fixed now. How fast can you get someone here to do this inspection?"

Q: Are you part of a crew?

A: Yes, and no. We generally work together when we can maintain it. But, if there are scheduled outages, for example, where one of our nuclear units or one of our fossil units is shutting down, we'll bring in contractors to help sustain personnel. Then each one of us becomes a supervisor to oversee a contractor. Most components that we test are quite large or are fixtures at a particular site, so we travel to the location. Generally, we're not too far away from home but sometimes we're on the road for a month straight.

Q: What was the purpose of your recent trip to Changwon in South Korea?

A: Basically, that was the pre-service inspection of new steam generators that will replace the existing steam generators at Watts Bar [Nuclear Plant] this Fall. Westinghouse had the original contract and it was subcontracted to Doosan Heavy Industries.

Q: Can you describe the steam generator structure for us?

A: They are very, very large — 136 inches in diameter. The total length is 812 inches end-to-end. And the weight is in the hundreds of tons, 380 tons with more than 39,000 inches of welds. We were there primarily to inspect the welds.

Q: What methods were used for the inspections?

A: Ultrasonics. And, we did some visuals on the bolting for the manways and also some magnetic particle on some of the nozzles.

Q: What do you consider the growth areas of NDT?

A: Right now, it's the power industry. It's getting bigger and bigger, because of the shortfall of power we are having. Fossil plants built during the forties and fifties are aging and are under

constant repair to the point where some are being shut down. Nuclear plants were built in the fifties, sixties and seventies. Watts Bar, which is a TVA facility, was the last nuclear unit to go online in the US and that was 1995. In addition to an aging infrastructure, the workforce is aging. Just within TVA, it is predicted that we will lose almost half our workforce to retirement within five years. These are Level IIIs and Level IIs that have been in the field for thirty years. That's a lot of knowledge to lose in the nuclear power industry.

Q: Have you ever had a mentor in your work in NDT?

A: Several. When I first started in my internships, I worked directly with a gentleman that taught me a lot about UT. When I came to TVA, I was hired for UT but was moved into ET where I worked with a Level III that taught me a lot about that side of NDT.

Q: How did you find your mentors?

A: I really didn't find them. They happened to be there and they took me under their wing and taught me a lot. TVA generally hires you as a contractor first to make sure you are going to work out before they hire you full time.

Q: How helpful have mentoring relationships been to your career?

A: It's been a big part. Gaining as much knowledge as quickly as you can is obviously important. Understanding the plants, how

each of the systems work so that you know the type of defects to look for or how conditions can change. Mentors that have been in the field for a long time have knowledge and experience that can point you in the right direction but without holding your hand.

Q: What's the worst part of the work you do in NDT?

A: The paperwork. In the eddy current group that I am directly involved in, we write a full report of our findings for every inspection we do. For example, if you're on a typical outage and you have, say, 12 components that you are inspecting, that means you have twelve reports to write when you are done.

Q: What's the best part of your job?

A: All of it. I really love my job. It's constantly something new – we're finding new damage mechanisms and trying to pinpoint causes. New materials and new metals are being introduced all the time and then you have to develop new techniques to inspect them. It changes constantly — new equipment, digital equipment. In just the four years that I have been here, the inspection equipment we started with is completely different.

Q: What advice would you offer to someone considering a career in NDT?

A: Definitely get the degree. Big corporations like to see the degree. **TNT**



Inbox

Q. I see aluminum tube welds with lots of porosity both with X-ray and penetrant. Is this normal? What causes these indications to be so relevant? Is it possible to have a porosity free aluminum tube weld these days? Thanks for any advice you can return. R.M.

A. Porosity results when gas bubbles are trapped in the weld metal as it solidifies, resulting in a loss of wall thickness at that spot. A good weld, aluminum or otherwise, should not contain unacceptable amounts of porosity, and porosity-free aluminum welds are quite common provided proper welding techniques are used. These will include properly pre-cleaned base material, adequate shielding during the welding process, etc. On pipe and tube welds, back-purging may also be necessary to prevent porosity from forming at the root of the weld before the root gap is closed.

All of these measures should be described in the welding procedure and if you are finding large amounts of porosity in your welds, you may want to review and revise the welding procedure as necessary. You might also check for applicable welding standards (ASTM, AWS, ASME, etc.) to see if they can provide guidance on this problem. **TNT**

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Spotlight continued from page 5.

The second place cash award of \$300 was presented to Lisa Rouzee of Southeast Community College, Milford, Nebraska. "NDT Methods as Applied to the Art World" demonstrated NDT methods such as holography, scattered X-ray and spectrometry as applied in detecting art forgeries and in art preservation.

The \$200 third prize was awarded to Kellen Heideman, also of Southeast Community College, for his presentation "Eddy Current Tube Inspection" describing cutting-edge eddy current tubing inspection in the nuclear field.

Submittals for 2006 Competition. Students interested in participating in the Student Poster Contest at the 2006 ASNT Fall Conference in Houston, Texas are requested to submit a brief summary/abstract of their research to ASNT by September 1, 2006.

Guidelines. The 4' X 4' posters should include:

- a clear, concise representation of the NDT research effort
 - text sufficient to explain the NDT concepts at work in large legible format
 - graphics demonstrating the work.
- Projects submitted for the competition are judged on:
- originality of poster design
 - analysis and interpretation of work
 - quality and level of technical content



Kellen Heideman of Southeast community College receives congratulations and plaque from Henry M. Stephens for his presentation describing the application of new eddy current tubing inspection technology in the nuclear industry.

- factual and technical accuracy
 - use of examples.
- Inquiries for the Student Poster Contest should be directed to Jacquie Giunta <ggiunta@asnt.org>, (800) 222-2768 X213. **TNT**



Lisa Rouzee receives award for second place in Student Poster Contest from Henry M. Stephens, ASNT National Chairman. "NDT Methods as Applied in the Art World" describes the application of holography, spectrometry and scattered X-ray in the attribution and conservation of art.

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