



# Inspection Trends

THE MAGAZINE FOR MATERIALS INSPECTION AND TESTING PERSONNEL

April 2013 / Vol. 16 / No. 2



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## **Tips for Working Overseas**

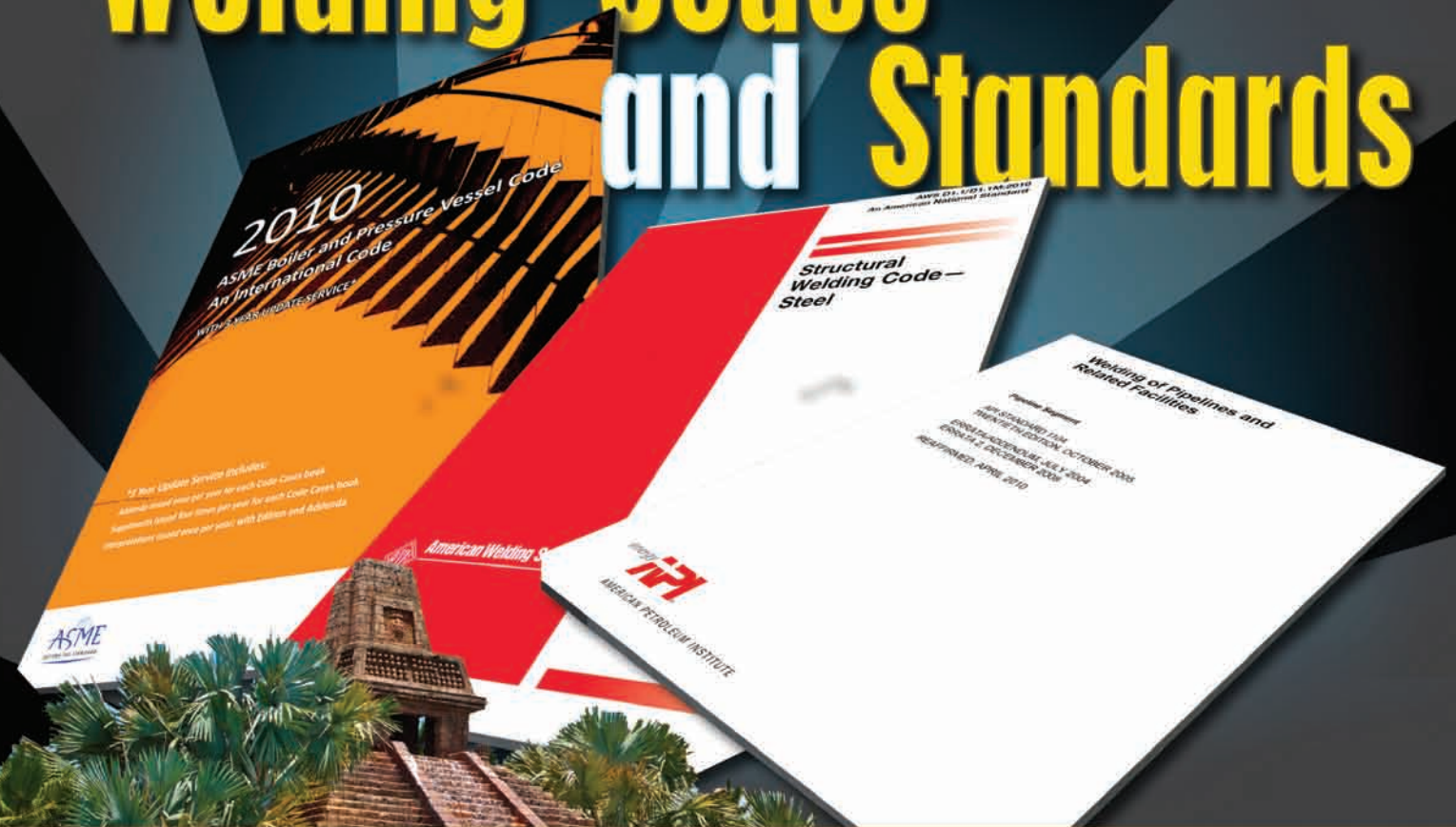
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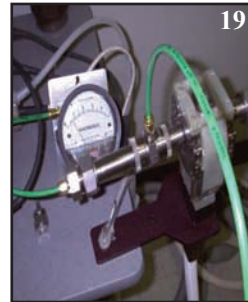
# HA Inspection Trends

THE MAGAZINE FOR MATERIALS INSPECTION AND TESTING PERSONNEL

Vol. 16 / No. 2



## HA Features



### Tips for Working Overseas

by Mary Ruth Johnsen / Four inspectors with plenty of experience working outside the United States offer their insight on what it takes to successfully handle an overseas assignment/ **15**

### Good Practices for Inspecting Austenitic Stainless Steel Tube and Pipe Systems in Hygienic Applications

by Michael Lang / When performing inspections on these critical welds, inspectors need to understand and adhere to the criteria presented in the AWS D18.1 Specification / **19**

### How to Handle 'Routine' Inspections

by Chris T. Brown / While inspection experience is certainly valuable, don't rely on it too much; you still need to thoroughly prepare for each inspection job / **21**

### Being in Business as a CWI

by Brent E. Boling / An established CWI and fabrication/erection contractor discusses some of the issues that must be addressed if you want to start your own weld inspection business / **24**

**INSPECTION TRENDS** (ISSN 1523-7168) is published quarterly by the American Welding Society. Editorial and advertising offices are located at 8669 Doral Blvd., Suite 130, Miami, FL 33166; telephone (305) 443-9353. Printed by R. R. Donnelley & Sons Co., Senatobia, Miss. Subscriptions \$30.00 per year for noncertified, nonmembers in the United States and its possessions; \$50.00 per year in foreign countries; \$20.00 per year for noncertified members and students; \$10.00 single issue for nonmembers and \$7.00 single issue for members. American Welding Society is located at 8669 Doral Blvd., Suite 130, Miami, FL 33166; telephone (305) 443-9353. Periodicals postage paid in Miami, Fla., and additional mailing offices.

POSTMASTER: Send address changes to Inspection Trends c/o American Welding Society, 8669 Doral Blvd., Suite 130, Miami, FL 33166.

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#### AWS MISSION STATEMENT

*The mission of the American Welding Society is to advance the science, technology, and application of welding and allied processes, including joining, brazing, soldering, cutting, and thermal spray.*

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By Mary Ruth Johnsen



Dear Readers,

Some issues of this magazine take on a life of their own, taking a departure from what I originally planned. This is one of those. I had thought it would be filled mostly with “how to inspect” type articles, but as feature articles started coming in, I soon realized it was reshaping itself into an issue mostly covering the “business” of being a CWI.

I met Brent Boling at FABTECH 2011 in Chicago. We talked about the magazine, and I suggested he write an article for it. He declined because, like many of you, he thinks others are the experts in this field and he’s just an everyday working guy. We met again at FABTECH 2012 in Las Vegas, and I extended the invitation once more. This time he thought seriously about it and submitted the article titled Being in Business as a CWI that appears on page 24 of this issue and then a short while later another article that will appear later this year. I think he offers some insights you’ll benefit from. He discusses the various types of insurance you may need for your business, tax liabilities, safety-related qualifications, equipment requirements, and the need to set aside funds for the many codes and standards you’ll need to work to, all from the point of view of someone who has been there and done that.

Chris Brown reminds us that CWIs can’t be complacent about their jobs. They shouldn’t think that because one inspection job seems similar to many they’ve done before that it truly is the same, or assume they don’t need to review the code requirements, but can rely on their memories. It’s a lesson he learned through his own experience. His discussion on “routine” inspections begins on page 21.

Although my work for the American Welding Society has provided opportunities to travel, I’m away from home only a short time. I’ve never had to even think about what it would take to work in another country with a language and culture different from what I’m familiar and comfortable with. But I got the opportunity to experience it vicariously through the four inspectors who offered Tips for Working Overseas (page 15). If you are considering taking a job that will place you in a foreign environment, be sure to read what they have to say. They offer guidance on how to adapt to different working and living situations. And even if you’ll never leave your hometown, read it anyway; I found their experiences fascinating, and I believe you will too. While these four men were in contact only with me, not with one another, interestingly, they all came to the same basic conclusion: During an overseas assignment, live by the Golden Rule and immerse yourself in the language and culture of the host country; if you do so, you’ll do fine.

And because we never want to neglect the “how to” part of the business of being a CWI, the fourth article by Michael Lang (page 19) discusses inspecting austenitic stainless steel tube and pipe systems in hygienic applications.

I think this issue covers some valuable topics. I hope you agree. 

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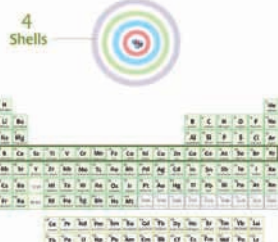


Metallurgy is the science that deals with the internal structure of metals, the relationship between metals, and the properties of metals. In welding, a basic understanding of metallurgy provides insight into the positive and negative changes that occur in metals when joined by welding.

Periodicity

All of the elements in the same row have the same number of electron shells.

4 Shells



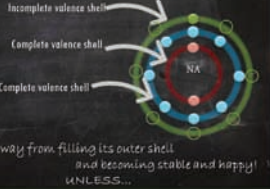
From the properties of an atom to the behaviors of metals during the welding process, you are introduced to the properties of metals and will gain an understanding of why metals behave the way they do.

Concepts covered include the anatomy of atoms, the periodic table, chemical bonding, including ionic bonding, covalent bonding, and metallic bonding, as well as the properties of metals. This seminar contains interactive exercises to reinforce key points and includes summaries and quizzes to help prepare you for the completion exam.

Incomplete valence shell

Complete valence shell

Complete valence shell



7 electrons away from filling its outer shell and becoming stable and happy! UNLESS...

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### NDE Methods to Enable Electron Beam Direct Manufacturing in F-35 Aircraft Production



Navy test pilot Lt. Christopher Tabert flies F-35B Joint Strike Fighter aircraft BF-3 with inert AIM-9X Sidewinder missiles over the Atlantic Test Range. (U.S. Navy photo courtesy and copyright of Lockheed Martin by photographer Michael D. Jackson.)

The Navy Metalworking Center, Johnstown, Pa., is managing a project funded by the Industrial Base Innovation Fund and Navy ManTech to advance electron beam direct manufacturing (EBDM) that will be used in F-35 Joint Strike Fighter production.

The project will assess the capability of traditional and advanced nondestructive examination (NDE) processes for detecting defect types and sizes likely present in these parts. Also, it will quantify the effects of surface finish and heat-treatment conditions on detection capability.

The integrated project team will investigate methods such as traditional radiography, standard and phased array ultrasonic inspection, and computed tomography. Developing NDE test methods and acceptance standards are required for EBDM technology to be approved for fabricating F-35 airframe components.

In addition, utilizing the technology for manufacturing F-35 titanium components will lower overall manufacturing costs considering EBDM facilitates fabricating components to a near-net shape, requiring less raw material and machining.

Upon approval, the recommended NDE practices will be implemented by Sciaky, Inc., and Lockheed Martin Aeronautics – Advanced Development Program on all designated EBDM components for the F-35 program beginning in 2015.

### GE Oil & Gas Establishes Technology Center in Iraq with Testing and Inspection Services

To help rebuild Iraq’s energy infrastructure, GE Oil & Gas recently established a new technology and service center near

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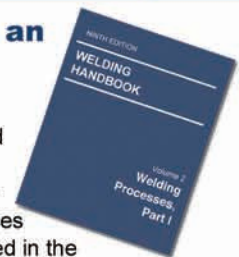
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The center GE Oil & Gas launched near Basra City, Iraq, will help boost production in the Rumaila oil field. Shown is the inside of the new facility.

Basra City. The facility not only brings up-to-date technology and services, but it will also help boost production in the Rumaila oil field, which is one of the largest in the world, with more than 200 production wells producing about 40% of Iraq's total oil output.

In addition to being a base for supplying pressure control equipment to Iraq's drilling and production sector, the center provides installation services along with maintenance, testing, inspections, repair, and storage. Future services will

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## Lee College to Incorporate Welding Inspection



Lee College, Baytown, Tex., is set to provide ultrasonic welding inspection and evaluation this fall. (Screen shot from 'Lee College: Welding Inspection' video on YouTube.)

New and incumbent welders and inspectors will soon be able to gain real-world experience with the Introduction to Ultrasonics course at Lee College, Baytown, Tex.

"This fall, the college will add a new credit-bearing class on ultrasonic testing to the welding inspection curriculum," said welding faculty member John Elliott. "The new course will help students fulfill additional requirements for welding inspection certification at Lee College, and will also be open to industry professionals looking to advance their careers."

He added this is important to local petrochemical facilities, where any workflow interruption can create a significant financial impact.

Students will learn to use the Olympus Epoch 600 ultrasonic flaw detector and StessTel UT thickness testing equipment as well as interpret and evaluate testing results using industry-accepted codes and standards.

Classes will be held from 4 to 6 p.m. Monday-Friday. For additional information, contact Elliott at [jelliott@lee.edu](mailto:jelliott@lee.edu).

## SGS Construction Services Rendered for State Oil Co. of the Azerbaijan Republic

Tekfen Construction and Installation Co., Inc., Istanbul, Turkey, has chosen SGS SA – Industrial Services to provide independent third-party inspection, nondestructive examination (NDE), and quality control services for a construction project in Azerbaijan. Services include building a new management office for the State Oil Co. of the Azerbaijan Republic and are scheduled to run until January 2014.

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magnetic particle, and visual inspection testing methods. Welds are monitored by specialists certified under CSWIP 3.2, *Senior Welding Inspector – Level 3*.

In related news, the SGS Non-Destructive Testing Training and Examination Center in Shanghai, China, is offering courses in Personnel Certification and SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing*, in accordance with EN ISO 9712:2012, *Non-destructive testing – Qualification and certification of NDT personnel*.

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## New Quality Manager Joins Laboratory Testing



Ed Deeny

The Quality Department at Laboratory Testing Inc., Hatfield, Pa., a materials testing, nondestructive examination, and calibration lab, has hired Ed Deeny as the new quality manager.

Deeny is responsible for customer agency, vendor and internal audits, and assisting with promoting quality performance throughout the company. He brings more than 25 years of experience in the quality field to his role. He succeeds Frank

Peszka who was promoted to director of quality, a position recently added.

## Desert NDT Expands Service Territory through Transaction with T&K Inspection

Desert NDT, LLC, Odessa, Tex., has acquired T&K Inspection Inc., Williston, N.Dak., a provider of industrial X-ray services to customers in North Dakota and Montana for more than 25 years.

Jerry Thompson and Ken Kain, co-owners of T&K Inspection since founding the company in 1988, will continue to oversee operations in the local office. The expanded location will provide nondestructive examination and integrity management services.

Financial terms of the purchase were not disclosed.

## Welder Training & Testing Institute Achieves ISO 17025 Accreditation

The Welder Training & Testing Institute, Allentown, Pa., received its initial accreditation to ISO/IEC 17025 in the field of mechanical testing through the American Association for Laboratory Accreditation. This allows accepting test and calibration data internationally. In addition, it will enable conducting PED testing that meets the European standard and to meet upcoming requirements of ASME and other industry-related code requirements. **1/4**

## Opportunity Knocks.

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## Print and Product Showcase

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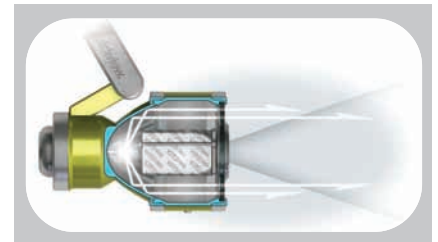
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— continued on page 30

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## Technology Notes

### Amendment #1 A5.8M/A5.8:2011

#### *Specification for Filler Metals for Brazing and Braze Welding*

The following Amendment has been identified and will be incorporated into the next reprinting of this document.

**Subject:** In Table 5 — Chemical Composition Requirements for Nickel and Cobalt Brazing Filler Metals; The boron (B) weight percent ranges for AWS classifications BNi-5a and BNi-5b

#### Replace:

AWS Classification	B
BNi-5a	1.3–1.6
BNi-5b	1.3–1.6

#### With data from AWS A5.8/A5.8M:2004:

AWS Classification	B
BNi-5a	1.0–1.5
BNi-5b	1.1–1.6

### Errata AWS B2.1-8-013:2002

*Standard Welding Procedure Specification (SWPS) for Shielded Metal Arc Welding of Austenitic Stainless Steel (M-8/P-8/S-8, Group 1) 10 through 18 Gauge, in the As-Welded Condition, with or without Backing*  
**Page 6, Metric Conversions**  
Correct “12350°F” to “120°F”.

### Erratum A5.36/A5.36M:2012

*Specification for Carbon and Low-Alloy Steel Flux Cored Electrodes for Flux Cored Arc Welding and Metal Cored Electrodes or Gas Metal Arc Welding*

The following erratum has been identified and will be incorporated into the next reprinting of this document.

Page 18, Figure 2, Test Assembly for Mechanical Properties and Soundness of Weld Metal for Welds Made with Multiple-Pass Electrodes  
Note 3: Change “Table 10” to “Table 11”.

### Interpretation

#### A5.36/A5.36M:2012

*Specification for Carbon and Low-Alloy Steel Flux Cored Electrodes for Flux Cored Arc Welding and Metal Cored Electrodes for Gas Metal Arc Welding*

**Inquiry No.:** A5.36-12-INT1

**Inquiry:** Does Table 5 of AWS A5.36/ A5.36M:2012 allow the use of gas blends different from the listed “nominal” composition within a listed shielding gas composition range when conducting classification tests for gas shielded electrodes to AWS A5.36/ A5.36M?

**Response:** Yes.

### Errata D9.1M/D9.1:2012

*Sheet Metal Welding Code*

The following erratum has been identified and will be incorporated into the next reprinting of this document.

Page 54, Question 6 of the SMAW Sample Test. The letter “D.” is missing from the alphabetical list — Correct “Direct Current Electrode Positive” to read “D. Direct Current Electrode Positive”.

## Looking for a Welding Job?

The American Welding Society has enhanced its Jobs In Welding Web site at [www.jobsinwelding.com](http://www.jobsinwelding.com).

The redesigned career portal includes additional capabilities for companies seeking workers and individuals looking for jobs.

Through relationships with many job boards and distributors, it offers direct access to more than 88% of the welding-related jobs posted on the Internet.

Users may search various openings for welders, Certified Welding Inspectors, engineers, technicians, and managers/supervisors.

In addition, the Web site contains the following highlights:

- The home page displays featured welding jobs along with the companies looking to fill them and city/state locations.
- The job seeker section connects individuals to new career opportunities by allowing them to post an anonymous résumé, view jobs, and make personal job alerts. This area has résumé tips, certification information, and a school locator.
- The employer area enables association with qualified applicants. Résumés, job postings, and products/pricing options may be viewed here.

Visit the Web site to create or access job seeker and employer accounts.



By Mary Ruth Johnsen

# Tips for Working Overseas

*This advice may help you cope when working in countries with different cultures and languages*

Some CWIs spend their careers working for one company in one place or at least in a limited geographic area; others are vagabonds who practice their profession all over the world. *Inspection Trends* sought advice from some inspectors with extensive experience working outside the United States on how to make the best of an overseas assignment. Following is an introduction to each of these men and a quick rundown of where they have worked overseas.

**Ken Erickson** is an AWS SCWI. You know him as one of the authors of The Answer Is... department of *Inspection Trends*. He is manager of quality for National Inspection & Consultants, Inc., Ft. Myers, Fla. From 1990 to the present, Erickson has worked in the following countries: Spain, Brazil, Italy, Sweden, Korea, Laos, Cambodia, Thailand, Singapore, China, Hong Kong, Bangladesh, Japan, Venezuela, Turkey, Canada, Mexico, Holland, Scotland, and Poland. Most of this work was involved with offshore structures, electric power generation, and aircraft. He mostly performed quality control, nondestructive examination, and project management overseeing local contractors.

**Jim Merrill**, a CWI based in California and a member of the AWS D1 Structural Welding Committee, has worked in many countries throughout Asia, Europe, and South America, as well as in Canada.

“The first project I had would have been around 1990 or so in Lima, Peru, and that was a boiler deaerator for Goodyear Tire & Rubber Co.,” Merrill noted. “Since then I have been involved in a number of bridge and electrical transmission projects that have taken me overseas.”

**Jon Lambert**, a former AWS SCWI and advisor to a number of committees related to the International



*Steve Snyder and coworker Saravana performing ultrasonic testing on butt-joint welds of the low- and high-pressure housing to pipe welds in Fakfak, Indonesia. The temperature was about 110°F that day. The low-pressure housing (typically 30 or 36 in.) provides a location point for the drilling guide base, and provides an interface for the 18¾-in. high-pressure housing. It is important for this first string to be jetted or cemented in place correctly because it is the foundation for the rest of the well.*



*Snyder is shown at the “laydown” yard in Fakfak inspecting subsea wellhead drilling equipment prior to it being shipped offshore to an exploratory well site.*



*Jon Lambert and his wife, Karen. Lambert's overseas working experience includes nearly five years in Kazakhstan.*

Institute of Welding, currently works as a freelance welding consultant reviewing welding procedures for the Ichthys LNG Project in Darwin, Australia. He also presents API 570 and 510 seminars throughout Australia. In 2011/2012, he held a short-term contract position in New Zealand as a quality assurance/quality control manager. Beginning in 1998, he served as a welding engineer/quality control engineer in Mexico, then as a welding supervisor and CWI in South Korea. From January 2007 through November 2011, he was a welding engineer in Kazakhstan, serving as the owner's representative for all welding aspects of the Kashagan Project.

Among other tasks, Lambert monitored "the contractor's technical design team to ensure all welding design was in accordance with the technical requirements of the relevant project specifications, codes, and standards, and provided guidance to the execution contract package managers in the evaluation of technical queries, project changes, and concession requests with respect to welding and nondestructive testing matters raised by the execution contractors."

The majority of **Steve Snyder's** work during the past five years has been in Southeast Asia. Snyder is an AWS SCWI currently with Transocean

Deepwater Drilling, Houston, Tex. "Although I have traveled to some extent domestically and internationally pretty much over my entire career, including about 14 different countries outside of the U.S.A., I did not start actually living overseas until 2008." He started with a job in Shenzhen, China, doing consulting and training groups of Chinese workers about codes and standards, then spent six months in both Ho Chi Minh City (formerly Saigon) and Vung Tau, Vietnam, working with local welding schools to assist them in complying with AWS Accredited Test Facility programs. He then traveled to Singapore and Indonesia beginning in early 2011. He spent a year in Singapore as the technical manager for a subsea well control overhaul and repair equipment facility. "My primary role there while supervising a team of inspectors, a welding engineer, and QC engineers was to improve the welding and fabrication operations and implement phased array ultrasonic testing to replace conventional radiography."

### **Language Barriers**

When asked how they dealt with language issues (did the people they worked with speak English, did the respondents speak the local language,



*Ken Erickson performing ultrasonic testing on an offshore tension leg platform anchor chain on a project in Sweden in the 1990s.*

did they utilize the services of an interpreter or simply use gestures), the general consensus from all four respondents was "all of the above."

"I have had the people I am working with speak English, I have made an effort to learn enough of the language that I can survive when I am deployed for long periods of time, and yes, an interpreter, particularly in the technical language is almost always a must," Merrill said. "And, of course, on the shop floor a lot of both gestures and picture drawing. I am of the opinion that if you are going to be on a long deployment, say a year or more, the best thing to do is dive into both the culture and the language. It is the only way that you will understand why they do things the way they do them."

Of all the countries in which Snyder has worked, he found it hardest to communicate in Vietnam. "Many tones of the Vietnamese language are difficult to master and have an ear for," he said. "The Vietnamese did have interpreters at times, and there were those in high-ranking positions who spoke English as well, but you had to listen closely and talk slowly. I did manage to pick up some Vietnamese; however, just enough to look like I was trying to learn the language." Snyder found his ability to weld and to set up and adjust inspection equipment helped



him because he could demonstrate to workers what needed to be done. He also found that while he did not speak the language, he often could understand what was being said at least to a limited extent because he heard similar conversations day after day.

“In Kasakhtan, I had interpreters, but I also speak and read the Russian language, which is what most people in Kazakhstan speak,” Lambert said. Kazakh is the area’s other language and has some similarities to Russian. “Most people in Kazakhstan speak at least a little bit of English,” he recalled. “In Korea, a combination of gestures was used although many Koreans at least understand a bit of the English language. In Mexico, I had an interpreter but I also learned the language, and, of course, in New Zealand and Australia, English is the native language.”

Erickson said he has never found language differences to be an issue. “English is spoken at many locations and, when not, you have to rely on other means such as pictures, drawings, and slower explanation. Remember to be patient and take the extra time in the beginning to ensure that all is being understood correctly,” he suggested. “Interpreters are always helpful but do not rely on them as this is only a plus.”

Erickson added that today’s technology, including smart phone applications and computer language translation programs, offer great help. “The stumbling blocks of language difficulties are only minor considerations,” he said.

“One of the biggest mistakes I see new expats make is to go to a foreign country and expect to find language and customs the same as in the United States,” Merrill noted. “A lot of people expect everyone to speak English, eat American food, drive like Americans, etc. When going overseas people need to embrace the culture they are in. If they don’t, they will only become frustrated and unhappy. I have had to send many technicians and engineers home because they could not do this.”

## Learning the Work Customs

All four respondents said they researched work and other customs in the places where they would be working themselves, which helped increase their comfort levels, even though some companies did provide

orientation programs. All found the Internet to be a great source of information but, as Erickson noted, “The in-country locals and expats can provide you with the best information for which the Internet does not provide.”

“Depending on the country you are in, simple things can create a very embarrassing moment,” Merrill said. He offered some examples: “In Korea, you never fill your own glass; the other members of the dinner party will fill your glass, and you are expected to fill theirs. In the Middle East, if you cross your legs and point the bottom of your shoes toward someone you have done the equivalent of flipping someone the bird in the United States. In China, you can never say that ‘someone’ has done something wrong. There may be ‘something’ that is wrong but you can never attach that to a person or you will cause them to lose face, and you will forever have an enemy no matter how hard you try to fix the situation. So the lesson to the reader is to understand the little things that may be very different in the U.S. culture and be sure you understand them well enough that you can integrate them into your daily actions.”

Snyder stressed the importance of being patient and willing to adapt to different situations.

Lambert found work customs to be mostly the same all over. “One thing I’ve found regardless of where I’ve worked, is in general terms, people are people, and if we try — just a little bit — we can get along with everyone.”

## Dealing with the Unexpected

The four men were asked to describe a situation that made it clear they were no longer in the United States. All four have interesting tales to tell.

### Being Handed a Baby

In Bangladesh, Erickson said, westerners were called “round eyes” and all were considered to be very wealthy. “On one occasion, a woman offered me her baby to hold,” he recalled. “I refused and found out later from the hotel front desk that the woman would have then left without the baby.” Her hope would have been that Erickson would take the child to raise, providing a better life for it than she could. “This also happened while I was riding a taxi one day.”

## Culinary Adventures

Merrill said there were so many unusual situations it was hard to select just one. “But here is one that is not too hard to understand. I was in Jiang Yin, China, with one of my technicians, Robert Mertz, and we were being taken out to dinner by one of the local fabricators. They took us to one of the nicer restaurants in town for some local foods.

“When they brought out one of the dishes and Robert looked at it, he leaned over to me and said, ‘Man, are those maggots?’ I took a look and said, ‘No, they have feet.’ By the way, we went on to enjoy the meal, but there was *nothing* on the table that looked like anything we were accustomed to.”

## A Trip to Nowhere

During his time in Kazakhstan, Lambert needed to visit a vendor in Taraz, a town located near the Chinese and Kyrgyzstan border. “Not the end of the earth, but you could see it from there,” he recalled. “Part of the Kazakh policy for migrant workers was to register their passports with Kazakh police if they would be in country for more than one week. As my travel was over the Christmas and New Year holidays, I asked my Human Resources (person) if I could just have my hotel manage getting my passport registered with the police. (The hotel had offered). I was given approval to do so and my passport was returned a few days later with a signature on my visa stamp. I took that as ‘okay.’”

Lambert stayed in Taraz for ten days then boarded a train for an 8-h ride. In the middle of the night, the train stopped and the police came on board.

“Naturally they came to my cabin and asked to see my passport. I handed it over to them, and they had some chatter between themselves. Then back to me one of the officers made a ‘pay me’ gesture with his hands and smiled saying ‘George Bush.’ I smiled back and pled ignorance. After about 15 minutes they left.”

The next day, Lambert delivered his passport to Human Resources “who literally freaked out and said I didn’t have a stamp in my passport — the signature meant nothing. I explained about the police on the train on the previous night and was told I could have

been removed from the train and would have likely never been heard from again. Human Resources had to send my passport off to the Capitol with a very hefty fine. I never knew how close I'd become to being another statistic until talking to some local friends. Whew!"

## Polar Opposites

What made an impression on Snyder was how often he was in situations diametrically opposed to what he was used to in the United States or what could even occur from one place to another in a very short time.

He worked for a while in Fakfak City, Papua, Indonesia, a remote city that has the highest malaria rate in the country and that has "a heat index that makes south Louisiana look like the polar bear club on some days." His hotel room included "your very own mosquito net with cold water shower." As he rode to the job site, children ran after him yelling "bule man," which means "white man or expat." He would bring them candy, which they treated as if it were gold. Goats roamed the streets, and he heard the calls for Muslim prayer ringing out five times a day.

"The area is still somewhat controlled by the tribes," Snyder recalled. "The established law of the government seems to not totally work in Fakfak due to the 'hak ulayat,' which is the tribal law and still dominant in regard to land control and leadership. There were cases of improvised explosive devices planted and found in the warehouse while I was working there as retaliations from the local tribes over land they felt was being taken that was still theirs or because of decisions made by the local law with oil exploration companies."

At an airport in Kaimana, Indonesia, they had to request the children get off the runway so Snyder's plane could land. He recalled playing "marbles" with the children using dead beetles.

"Fakfak was a far different world than that of the five-star lifestyle of Singapore, which offers the best of the best for living, dining, shopping, and world art. No one could have trouble adjusting there," he said. One day he flew from Fakfak to Singapore, "where I went from a bed with mosquito netting and cold water to fluffy pillows, warm water, and fresh linens."

## Additional Advice

You need to understand the requirements of the country you plan to work in so you aren't surprised by the cost and time it takes to get your equipment to the job site, Merrill advised.

Merrill's work usually requires a number of engineering technicians to travel with him. "These technicians have always had multiple certifications

## Understand the requirements of the country you plan to work in so you aren't surprised by the cost and time it takes to get your equipment to the job site

including CWI and ASNT Level II/III in UT, MT, PT, and RT, so we have always had the logistical issues of getting equipment in and out of various countries and the issue of dealing with 220 voltage vs. the U.S. 110 voltage most of our equipment is wired for. We have had to purchase a number of pieces of equipment that can only be used overseas in countries with 220 V.

"In addition to voltage considerations are the issues of getting equipment through customs. Sometimes there is a required tariff, other times it will sit in customs awaiting inspection, and other times you can get it in the country without any question or problem. I would also add that there are many countries that require a second tariff on the same equipment when you are leaving the country."

He added that people new to working overseas need to understand what medical resources are available and how to get to them if they need medical attention. Snyder also mentioned the need for an international medical plan.

"Assuring you understand and realize the tax consequences that may be part of your contract is essential,"

Snyder advised. It is best to be 'tax equalized' for any long-term assignments to avoid more tax liability than you would encounter if you would stay working in the U.S.A. and making the same salary. The consideration of having to pay local taxes must be worked out in your contract agreement as well, and you should contact your tax advisor accordingly."

"If you like a routine, (working overseas) is not for you," Snyder said. "The sights and sounds of arriving in a place like Ho Chi Minh City with about 8 million people, of whom likely 5 million are on scooters, is daunting at first. Don't look nervous. Blend in. Don't be flashy or stand out."

All four respondents echoed one another in saying that U.S. citizens working abroad must remember their place in the host country.

"Be respectful and mindful that you are a guest in their country," Lambert advised. "All too often I see my fellow Americans carrying an arrogant attitude that won't win us any friends. Be yourself but also be aware that you are a guest. Try on the local flavors, i.e., eat what the locals eat, not in McDonalds or the local five-star hotel. Keep your wits about you. Many of us who work in construction or heavy industry enjoy alcoholic beverages. Be careful. Although travel overseas is generally safe, one must still be conscious and alert for unexpected situations."

Erickson added, "First and foremost, realize and understand you are not in the U.S. and do not expect things as they are in the U.S. Each country, although different, has a wealth of history, sights, culture, etc., that should be respected and enjoyed. Try to learn some basic words and phrases, smile, and do not let the differences discourage you. Each day incorporate a new sentence or a basic greeting. If you live outside your comfort circle in a positive frame, your days will become much more interesting and enjoyable in a foreign environment."<sup>14</sup>

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## Good Practices for Inspecting Austenitic Stainless Steel Tube and Pipe Systems in Hygienic Applications

*The AWS D18.1/D18.1M Specification is indispensable for establishing weld inspection criteria*

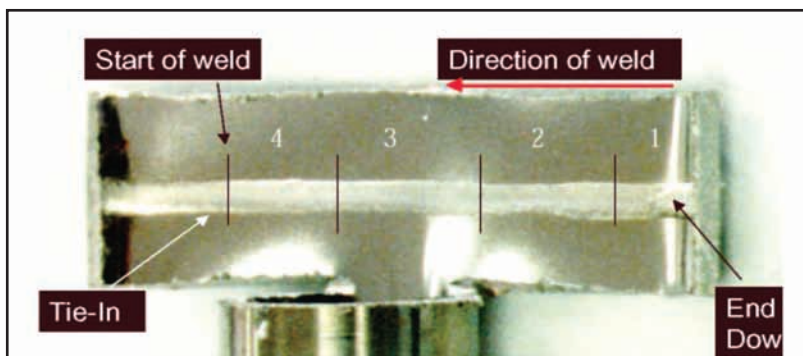


Fig. 1 — Example of preconstruction weld sampling.

For clarity, this presentation is broken down into four parts: expectations, preconstruction weld sampling, surveillance of construction activities, and visual exam.

### Expectations

Communication of expectations from owner, to contractor, to inspector, and finally to the welder is critical to successful welding. Unfortunately, all too often, AWS D18.1/D18.1M, *Specification for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications*, is not known or specified during the project planning phase. Yet this document holds the criteria needed for the installation of safe, quality systems. In cases like this, the inspector should make the parties aware of the document and its criteria.

It is the inspector's job to inspect. It is not to engineer for the contractor, train the welder, or help end users figure out the quality their product requires. Inspectors are there to apply the relevant code and project specifications. The

inspector must have clear criteria, and AWS D18.1/D18.1M is the definitive specification recognized by the industry. If the owner chooses not to follow industry codes and specifications, there should be a robust engineering argument to support such judgment. Inspectors should note any areas that are not AWS D18.1/D18.1M compliant on the appropriate inspection report.

The critical aspect of this scope is that these systems carry commodities for human consumption, and the inspector is safeguarding the public health.

### Preconstruction Weld Sampling

Preconstruction weld sampling (PWS) is an activity to prove the combination of welder/operator, machine, WPS, and materials are conducive to making repeatable quality welds. The inspector needs to verify PWS (Fig. 1) as acceptable per AWS D18.1/D18.1M Sec. 6, then use it as a standard during the production day. It needs to be understood that every



Fig. 2 — Typical dial indicator used to check mismatch, convexity, concavity, and other conditions.

change in size and/or thickness requires a different set of PWSs. AWS D18.1/D18.1M Sec. 5.2 is an excellent source of information on sampling procedures.

I have seen the PWS process missed with the proposed solution being to do samples after the fact. This might sound good at first, but look deeper. Will you have the same gas, tungsten, quality of input power, and conditions? Obviously not. At this point, you have a system of indeterminate quality. There is a reason it is called preconstruction weld sampling.

**“It Used To Take Us 8–10 Hours To Prepare A Typical Pressure Vessel Shell. It Now Takes About An Hour.”**

**Kurt Schaerer  
Enerflex General Manager**



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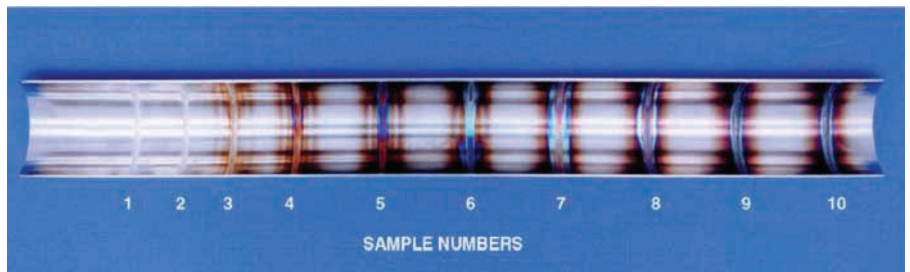


Fig. 3 — Levels of discoloration.

### Surveillance of Construction Activities

Surveillance is another area that requires good communication to be successful. The owner needs to set the criteria on surveillance, such as type of inspections and frequency. This is where the owner and inspector need to establish the extent of examination. This extent can then be communicated to the contractor.

A key point to consider is that inside diameter inspection opportunities are limited. Develop a surveillance plan to maximize visual inspection of these areas.

### Final Visual Exam

This needs to happen in two stages, before and after postweld finishing or conditioning. This gets to be an issue when an inspector is called to look at a weld and finishing has already been performed. This makes it impossible to properly visually examine the weld. At this point, visual verification of bead width, meandering, convexity, concavity, etc., are no longer available. These are issues that may require a cut-out and replacement of the entire weld.

The AWS D18.1/D18.1M Sec. 6 has easy-to-understand inspection criteria accompanied with illustrations — Fig. 2.

The other area of concern for the inspector is color or discoloration of the inside diameter. Contained in AWS D18.1/D18.1M, Fig. 3 shows different levels of discoloration. This illustrated example needs to be reviewed by all parties to determine the desired maximum discoloration that will be allowed on the project. The inspector should not be determining the quality in this case; however, advising the owner that more oxidation typically leads to reduced corrosion-resistant properties is appropriate. But again, the inspector should not determine quality levels.


Systems as these can carry varied levels of corrosive media that need to be addressed by the owner's responsible engineer.

Just from personal experience, I typically see discoloration quality of 3 and less acceptable and easily attainable with simple industrial grade argon purge and shielding gas.

Some contributing factors that lead to discoloration are moisture in the gas or on the materials to be joined; particulates from cleaning, and of gassing of cleaning solvent residue on surfaces to be joined; grade of material's surface finish; poor purge sealing; and leaks in hoses and loose connections.

### Keep This Standard Handy

This information presented is an overview of some areas to watch for and good practice recommendations. I recommend any inspector engaging in this scope should possess and understand the contents of AWS D18.1/D18.1M.

Just think. What you inspect might be the very same equipment that puts food on your family's dinner table. 

*MICHAEL LANG is chairman of the AWS D10 Committee on Piping and Tubing and a member of the AWS D18 Committee on Welding in Sanitary Applications.*





# How to Handle ‘Routine’ Inspections

*Inspectors should not fall into the trap of thinking they’ve seen it all before*

Each day, inspectors perform thousands of weld and component inspections utilizing various inspection methods including visual, liquid penetrant, magnetic particle, radiography, and ultrasonic techniques. As inspectors we go through rigorous training, experience requirements, and qualification to become certified in our inspection disciplines.

When I have the opportunity to work with trainees, it seems their focus and attention to detail is concentrated and often intense. Their willingness to seek advice, ask questions, and observe experienced inspectors at work is commendable. Typically, without question, their desire to perform work correctly, safely, and with confidence is important to them. They recognize the importance of what they are doing and feel their work plays a key role in the success of the final product.

A great deal of time, effort, and expense is put into the initial qualification and certification of these new inspectors. Hours of book study and research regarding the various codes and standards are required to pass the knowledge-based tests. Hundreds of hours of on-the-job training are required to pass the demonstration tests. Once all of the requirements for certification are completed satisfactorily, the inspector is certified to perform the work. When a person enters the field as a certified inspector for the first time everything is new and can be somewhat overwhelming. He or she is no longer a casual observer or trainee collecting experience hours without accountability. Instead, the new



*Fig. 1 — Ultrasonic examination being performed on heat exchanger supports. Even if you’ve performed similar inspections in the past, you need to properly and thoroughly prepare for each inspection job.*

inspector now has the responsibility to sign on the dotted line, to determine pass or fail.

At this point in a young inspector’s career very little is routine. In fact, what once appeared to be very simple as a noncertified individual who was an observer may seem surprisingly difficult now that he or she has the responsibility for acceptance or rejection. Over a time period that stretches from weeks to years, an inspector becomes more experienced and more confident about the inspections being performed. Familiarity with procedures, codes and standards, and equipment begins to set

in. At some point all of the formal training, book learning, and absolute reliance on the codes, standards, and procedures may become secondary or even minimized by the experience the person has obtained. Eventually, the inspections being performed may appear to become routine due to the fact the inspector has performed similar inspections multiple times, using the same procedures, equipment, and acceptance criteria time and time again.

At some point, the inspector may have his or her routine pretty much set in stone with little room for enhancement or change. Sometimes



*Fig. 2 — Typical ultrasonic examination equipment for applications to the requirements of AWS D1.1, Structural Welding Code — Steel. Don't rely solely on your memory, check the code requirements.*

inspectors may even attempt to make the requirements fit the inspection technique they have become so accustomed to in lieu of making the inspection technique fit the requirements. This is often done when the pressures of schedule and cost influence the work. When that happens, it is time to step back and really consider what you are trying to accomplish.

At some point the inspector may incorrectly assume that reference to the codes, standards, and procedures is not required or becomes less critical because “I have performed this inspection a thousand times” or “I already know what the code says.” I have even heard phrases such as “this is a better method than what the code requires.” Now, don't get me wrong, I firmly believe there is no substitute for field experience when it comes to inspection. I also know that many individuals are capable of keeping the code requirements committed to memory. However, over the years I have found the best policy is to challenge my memory by actually taking the time to study the code book and associated documents and validate whether my memory is correct. Sometimes my memory serves me well; sometimes I discover my memory

is not quite right. Yes, I admit that I have fallen into the trap of thinking “I know what the code says.” It usually takes a strong self check to bring me back to the mentality I had as a new inspector; that is, to prepare by studying, asking questions, and observing the process.

I was fortunate to have been mentored and to work beside someone whom I consider to be one of the most respected and competent inspectors in the nuclear industry. This individual has many years of both welding and inspection experience, and holds multiple Level III certifications as well as a welding engineering degree. He is patient and takes his time to make sure the job is performed correctly, efficiently, and safely. He has a tremendous capability for putting things in their proper perspective when it comes to cost, schedule, and safety, something we all know is difficult to do when we are up against the wall.

### The Need for Preparation

It is hoped each inspector is thoroughly prepared regarding the component he or she is called upon to inspect. The time it takes for proper and thorough preparation typically saves both time and money in the long

run — Fig. 1. I have always believed my preparation practices were above average for performing inspections. However, I recently had an experience with a trainee that opened my eyes and taught me a valuable career lesson with regard to this topic. I was called upon to perform multiple ultrasonic inspections that I felt were going to be just another set of “routine” inspections that would fall within my comfort zone toolbox of inspections. I had performed what I thought were similar ultrasonic inspections in the not-so-distant past. Within minutes, I had in my mind the path forward for completion of these inspections. I immediately envisioned the required flaw detector, transducers, calibration standards, acceptance criteria, qualified procedure(s), etc. I believed we were ready to move forward with very little effort.

As with many ultrasonic inspection jobs, it is great to have a second set of hands to help out. These inspections were going to be performed in a radiation/contaminated area as well as a confined space. I felt this would be a great job in which to utilize the assistance of one of our trainees, and which would also allow him to receive some valuable ultrasonic experience hours. Whenever I work with trainees, I try to emulate the methods my mentor uses. While it would take extra time, I felt it would be valuable for me to go through the specification and associated requirements in detail with the trainee even though I felt I already knew the scope and requirements of the work.

However, within minutes of reading through the specification, I realized my first assumptions about the inspections were off base and I would need to adjust my path forward. As we moved into the code requirements, I again realized that what I thought I knew was not totally correct. To my surprise, multiple items including personnel qualification, and calibration and equipment requirements were different from what I remembered — Fig. 2. While the code requirements were not a great deal different than my recollection, had I moved forward without



checking them, I would not have met the specified code requirements.

At this point, I realized I was in a serious self-check moment and I needed to set aside all that I thought I knew and treat this job as if I was performing an exam for the first time. In other words, we verified every inspection requirement through the specification, and applicable code and procedure. Throughout the verification process multiple questions arose. After several conversations with the designer, project engineer, and other experienced inspectors, we obtained the required equipment and updated personnel certifications through additional testing. In addition, we made time available to gather specific information about the welds, including actual weld prep contours of the unique joints. Through this process, we were able to model the ultrasonic sound paths for coverage determination and understand the geometric reflectors expected.

When the time came to do the actual inspections, we felt well prepared and ready to perform the work. While the inspections did not go off without some hitches, we were not shocked or surprised by what was identified throughout the inspection process.

## Lessons Learned

What did I learn through this and similar experiences?

1. Challenge assumptions and respect others who challenge your assumptions even if they appear less experienced or qualified.


2. Don't be afraid to ask a question, even if you are the one expected to know the answer.

3. Just because it is "the way we have always done it" does not make it right or mean the method cannot be improved upon.

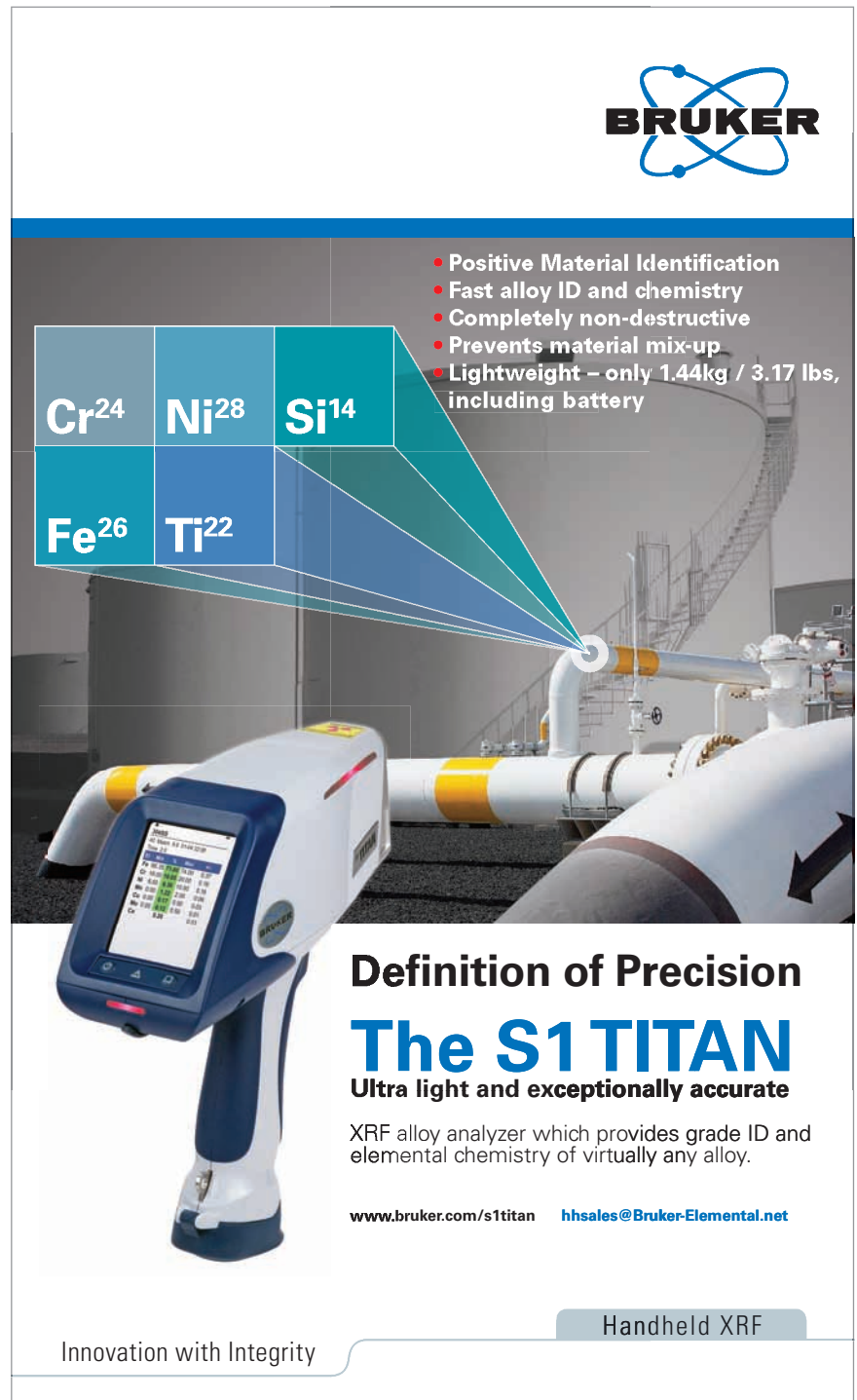
4. Be patient; approach issues from different angles. You'll find things do not always look the same when you observe it from a different viewpoint.

5. Thorough preparation is the best path toward speedy inspection.

The bottom line is there is no such

thing as a routine inspection in our business. Procedures are revised, codes and standards are updated, and equipment capability evolves. Inspection capabilities are improving every day. Ask yourself the question, "Am I keeping up or am I living in the past?" 

*CHRIS T. BROWN*  
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# Being in Business as a CWI

*Passing the CWI exam is only the first step to establishing yourself as a self-employed welding inspector*

After careful deliberation, you have made your choice: You are going to become an AWS Certified Welding Inspector (CWI). So you research this new opportunity to see what it takes to become an AWS CWI. You go online and buy study books and immerse yourself in them. You take the final plunge and travel to an AWS-sponsored seminar, then sit for the exam. Finally, the much awaited e-mail from AWS arrives: “Congratulations, you passed the CWI exam. The documents and stamp will follow in a few weeks.”

Truly, congratulations are in order. But you soon find yourself facing the next question: Now what? How do I use it? Where do I find work?

As an exam proctor, Section chairman, fabricator, and a CWI, I hear it all the time: What do I do now?

A few questions are in order as you consider the options available to you at this point:

1. Did you or an employer pay for the certification to aid you in becoming an in-house inspector/quality control? If your employer paid, are you planning on staying with that company?

2. Are you planning to go to work for an inspection facility at whatever capacity for which they require the assistance of a CWI for welder qualification, procedure qualification testing, etc.?

3. Did you plan on traveling the world doing welding inspections on structural erections, pipelines, or one of a great variety of opportunities working for whomever needs another CWI?

4. Do you plan on just going it alone and starting your own business doing weld inspections?

It is this last question that interests us for this article: how to go about being in business as a CWI.

As a fabrication/erection

contractor in the state of Arizona, I have come across many issues pertaining to this question. It needs to be stated that there will be many differences regarding exactly how this information applies to you and your circumstances. State laws vary on how one conducts business in a particular state, and then, of course, there are all the different Internal Revenue Service rules, OSHA rules, customer/company policies, AWS codes, local building jurisdiction rules, insurance requirements, etc. With those differences in mind, where do you begin?

I have to admit that in some ways this article may create more questions than answers, but I hope they will be questions that will lead you to discovering the answers that apply specifically to you, your location, and your application.

As a CWI, I have worked mainly as a third-party inspector representing the customer/engineer in the shop and/or field as its quality assurance person. While I run across many other inspectors doing the same thing, how we all got to that position varies widely. Many people believe all they have to do is show up as a CWI, inspect the welds, get a paycheck for the work, receive a 1099 tax form at the end of the year, and all is good. However, starting a business requires much more thought and attention to detail than that. Following are some scenarios and questions to consider as you plan your business strategy.

**Scenario 1.** Most job site requirements and insurance responsibilities require the general contractor to make sure all employees and/or subcontractors representing them have the proper insurance coverage. The necessary insurance may include liability, workers' compensation, worksite auto, and other

types of coverage. At the company's annual insurance audit, it will have to show proof of the subcontractor's own coverage or pay a percentage based upon payments made to the subcontractor to have been covered under the general contractor's policy. This trickles down to the working agreement between the inspection agency and the subcontracted inspector; is he or she properly insured? If the answer is no, everyone is in a hazardous position legally and financially if someone gets hurt, whether it be the inspector or someone he or she drops a tool on, runs over, knocks off the roof, or whatever.

**Are you properly covered by either your own insurance or the agency you are working for?**

One cost of being your own company — the all-important, self-employed inspector — is insurance. And if you don't have your own insurance, how do you get onto a job site if there is no agency umbrella that was preapproved by the customer and/or general contractor as to their insurance? Keep in mind the customer/general contractor's insurance most likely wouldn't cover you anyway, but no one asks for your proof of insurance because they think you work for the inspection agency. Don't take a chance and leave yourself open to problems; make certain you are covered either by your own insurance or the agency you are working for.

**Scenario 2.** Do you know the IRS rules regarding the requirements for being self-employed? What happens when you don't have an employer deducting the taxes out of each check? Sure, that bigger check looks nice all year long, and you feel like you are getting paid what you are worth. Right? Maybe not. You start doing your own taxes and find out that even with many great deductions for certain



expenses, you owe quite a bit of money that you didn't plan for. Then you find out you are responsible for the employer's portion of Social Security, your own unemployment taxes, and several others because you are now "self-employed." Speaking of being self-employed, you could even receive a letter from the IRS stating it doesn't consider you self-employed because for the past two years all your checks have come from only one company. According to the IRS, you are an employee.

**Are you prepared for the payment of taxes and all the appropriate paperwork that is required for being self-employed? Do you plan on working for more than one customer?**

You need to either learn the tax rules and consequences yourself or find a good accountant who can give you expert advice.

**Scenario 3.** You get to the job and they tell you to use the manlift and go on up and look at the welds. As you are moving the manlift, you get off the edge of the concrete and tip it over. Having dealt with the question of insurance previously, you know you have insurance and so you feel relieved. That is, until they ask for your qualification card as a manlift operator. Not to mention that the job specs state that the "special inspector will not operate the contractor's equipment but will be assigned an operator" to take him around. Now, your insurance won't cover you because you were using someone else's rented lift and you weren't qualified in its operation.

**Have you successfully completed the 30-h OSHA training course on Construction Safety and Health (usually referred to as OSHA 30) and are qualified/certified for manlift, fall protection, and other applicable safety programs? Did you read the job site responsibilities for subcontractors?**

You need to know your legal limitations and responsibilities on the job site. You may be the best lift operator in the state, but if you didn't rent it and don't have the proper qualifications then you better not operate it. More and more jobs are stipulating OSHA 30 and other safety qualifications in order to be granted access to the work site. And no matter how much information the inspection agency that hired you sent the general

contractor/customer, if you are a subcontractor and don't have all your own qualifications, you are in a difficult position if something goes wrong.

**Scenario 4.** The situations I presented previously dealt with being on the job site, but there are considerations that need to be examined at the very beginning of your business venture.

Do you incorporate, become a limited liability company (LLC), or simply work as a DBA (doing business as), meaning that you've set up a fictitious name?

There are many issues to consider regarding this decision. It will really depend upon laws and applications of those laws between your state, corporation commission, and registrar of contractors, as well as how you want to establish your business with regard to taxes, payroll, insurance, customer/contractor requirements, and many other options.

For my own business, I decided to become an S corporation. If you are not familiar with the term S corporation or S corp., it is, according to the U.S. Small Business Administration, "A special type of corporation created through an IRS tax election. An eligible domestic corporation can avoid double taxation (once to the corporation and again to the shareholders) by electing to be treated as an S corporation. An S corp. is a corporation with the Subchapter S designation from the IRS. To be considered an S corp., you must first charter a business as a corporation in the state where it is headquartered."

I have a fabrication shop as well as the inspections business, and being an S corp. works for me. My company has all the needed papers, licenses (city business, registrar of contractors); insurances (general liability, professional services, workers' compensation, worksite auto, etc.); bonding; employer identification number (EIN); and so much more that is needed when contracting for work. In addition, I, personally, have all the other qualifications that will be requested to work at the customer's site.

An S corp. will possibly be the most expensive type of business to set up, but will give your personal assets the best protection in the event of an accident or any other situation that

causes financial repercussions. How to set up your business is another one of those decisions that anyone planning to be self-employed needs to consider.

**Scenario 5.** To do your work properly, you need a safety harness, inspection tools, safety shoes, safety glasses, hard hat, safety vest, ear plugs, volt/amp meter, temperature-indicating sticks or gun, computer, phone, etc.

**Whose tools are you using in the performance of your job to inspect the welds?**

Especially if you are using these items from the agency you are subcontracted to, you may have again placed yourself in the position of being recognized by the IRS as an employee and not as self-employed. You need to learn what equipment you must supply for yourself and consider those costs if you wish to be self-employed.

**Scenario 6.** After having paid for several reference books and at least one code book from AWS, you get on the job and start working, inspecting welds. The customer wants you to verify the material being used and you discover you need a copy of the ASTM standards to accomplish this. Then a question comes up and you discover the answer will be found in the *AISC Construction Manual*. Someone challenges whether an item is within the scope of your job and you now need a copy of the *International Building Codes*. The code book you got for your CWI exam just got replaced by a new edition plus you need the seismic supplement.

**Who is providing for your constant need to add to and/or replace code books and other reference materials?**

If you are truly working for yourself, you need to have a fund set aside to buy these code books and standards, key components of your profession.

**Summary**

Many general contractors are becoming painfully aware of the failure of many subcontractors to have the proper documentation to show they have fulfilled all the requirements necessary to be on their job site without compromising the general contractor's and/or customer's liability. They are getting very explicit about who is qualified to be on their job site in any capacity. Inspectors are not

exempt from safety rules, insurance requirements, and other responsibilities that are required of the rest of the contractors on the job. However, many inspectors have gotten away with being negligent in this area, at least until they get caught or someone gets hurt.

As you can see, there is much to be considered regarding going into business for yourself, and there are many more items that are not discussed here. Every aspect of setting up your business is just as important as your decision to become a CWI.

These concerns should not be ignored until the IRS is standing at your door, or until you receive a letter from someone else's attorney. If you truly want to be self-employed as a Certified Welding Inspector then you need to prove you have the habits and attitude that truly represent the profession you are entering from the very beginning and get your business set up properly.

You will need to do a lot of research regarding your location and application, and there are always

multiple possibilities as to how to accomplish the task. The question is: Are you willing to be a businessman as well as a CWI? If not, you should probably consider being an employee in some capacity that requires the services of an AWS CWI rather than going it on your own. **TT**

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**Q: What are the primary test result differences in WPS qualification of reduced-section tension tests between AWS D1.1, Structural Welding Code — Steel, and ASME Boiler and Pressure Vessel Code (BPVC), Section IX?**

**A:** (from K. Erickson) Both AWS D1.1 and ASME BPVC, Section IX, provide specific information relative to the dimensioning of the weld samples prior to testing, but there are some minor differences when evaluating the test results.

AWS D1.1 simply states that the tensile strength of the base metal cannot be less than the minimum specified tensile range of the base metal used for testing. The base metal tensile strengths are listed in AWS D1.1, Table 2.1.

The ASME criteria are more detailed regarding both the material type(s) and the temperature, also the material P-Number type, and thickness have to be considered.

One key difference is that ASME does permit accepting tensile values less than the specified tensile strength of up to 5%, provided the specimen breaks either in the base metal outside the weld or in the weld interface location.

Before qualifying any weld procedure, it is imperative that the correct base materials are confirmed coupled with the proper filler metal to be used.

A questionable situation would be to weld standard A106 Grade C pipe using a minimum tensile strength of 70 ksi with E6010 (60 ksi) filler metal. Although it is possible that the filler metal strength, if welded properly, could exceed 70 ksi in tensile value, it is only classified for 60 ksi, which is less than the tensile strength of the base material used.

**Q: I have three questions regarding working with the ASME Boiler and Pressure Vessel Code (BPVC). We are constructing a large project that requires us to meet ASME B31.3.**

**The fluid service is classified as High Pressure by the owner. The project involves several contractors, each is responsible for different parts of the project. The prime contractor is doing the welding on site. The prime contractor has subcontracted a portion of the work to a sub-tier contractor who is also welding onsite. The sub-tier contractor has subcontracted some of the off-site work to a different contractor who is responsible for the fabrication of skids that are packaged units consisting of filters, piping, electric motors and pumps, and the connecting piping and valves. My questions are:**

**1. Can the on-site contractors utilize the same qualified welding procedures submitted by the sub-tier contractor who is assembling the skids in a shop?**

**2. If the contractors onsite are not permitted to use the WPSs submitted by the skid manufacturer, can they pool their resources to have a third party qualify the WPSs so they can both use the same WPSs on site?**

**3. Can the on-site contractors, i.e., both the prime contractor and the subcontractor, send their welders to a third-party testing company to qualify and certify their welders?**

**A:** (from A. Moore) You have an interesting situation that is not unique. As a general principle, the ASME requires each contractor to qualify and certify both the WPSs and the welders. The ASME BPVC is comprised of several sections, each addresses different aspects of design, materials selection, fabrication, and inspection. The sections are interrelated, that is to say, no one section is self-sustaining. The construction codes, that is Section I for Power Boilers, Section III for Nuclear Construction, Section VIII for Unfired Pressure Vessels, etc., refer to other sections of the code to provide specific details on the subjects of materials of construction (Section II), nondestructive testing (Section V), and the qualification

and certification of welding and brazing procedures and welders and brazers (Section IX). The interesting thing about working to ASME requirements is one must never forget that the construction code can and often does modify or take exceptions to Section V and Section IX.

Back to my earlier statement: each contractor is “always” required to qualify and certify his or her own welding procedure specifications (WPS) by testing. That statement is true. The WPS is qualified by welding a typical groove detail. The welding variables used to weld the test coupon and the test results are recorded in a document called the PQR. So far, so good. The conditions and requirements of how to qualify the WPS are delineated in ASME BPVC, Section IX.

Article V of Section IX includes an “exception” to the statement I just made. Article V lists several Standard Welding Procedure Specifications (SWPS) that can be purchased from AWS. The SWPS are exempt from the tests required in Article I and Article II of Section IX. There is a condition attached to using a SWP; basically, the contractor qualifies a welder who follows the SWPS to demonstrate they can implement the SWPS.

Now, going back to the project you are working on. You state the project specification specifies ASME B31.3 and the fluid service is High Pressure. High Pressure Fluid Service invokes specific requirements on the contractor regarding the design, materials of construction, fabrication, and inspection. Where B31.3 allows the use of certain SWPSs that are listed in Section IX, Article V: B31.3 for High Pressure Fluid Service does not allow them to be used. The chapter specifically states that each contractor must “always” qualify the WPSs used for construction. The only part of the qualification effort the contractor can subcontract is the nondestructive testing and mechanical testing.

— continued on page 30



## Mark Your Calendar

Note: A diamond (◆) denotes an AWS-sponsored event.

**World Conference on Quality and Improvement.** May 6–8. Indiana Convention Center, Indianapolis, Ind. Contact American Society for Quality (ASQ), (800) 248-1946 or <http://wcqi.asq.org/>.

◆ **AWS Pipeline Conference.** June 4, 5. Houston, Tex. Contact American Welding Society, (800) 443-9353, ext. 223, e-mail Alina Blanco at [ablanco@aws.org](mailto:ablanco@aws.org), or visit [www.aws.org/conferences](http://www.aws.org/conferences).

◆ **AWS Codes and Standards Conference.** July 16, 17. Orlando, Fla. Contact American Welding Society, (800) 443-9353, ext. 223, e-mail Alina Blanco at [ablanco@aws.org](mailto:ablanco@aws.org), or visit [www.aws.org/conferences](http://www.aws.org/conferences).

**QNDE Conference (Review of Progress in Quantitative Nondestructive Evaluation).** July 21–26. Hilton Baltimore, Baltimore, Md. Contact QNDE, Sarah Kallsen, [kallsen@iastate.edu](mailto:kallsen@iastate.edu), (515) 294-9749; FAX (515) 294-7771; or [www.qndeprograms.org/QNDE.html](http://www.qndeprograms.org/QNDE.html).

◆ **AWS 16th Annual Aluminum Conference.** Sept. 17, 18. Chicago, Ill. Contact American Welding Society, (800) 443-9353, ext. 223, e-mail Alina Blanco at [ablanco@aws.org](mailto:ablanco@aws.org), or visit [www.aws.org/conferences](http://www.aws.org/conferences).

**ASNT Annual Conference and Quality Testing Show.** Nov. 4–7. Rio Hotel, Las Vegas, Nev. Contact American Society for Nondestructive Testing, (800) 222-2768 or [www.asnt.org](http://www.asnt.org).

◆ **FABTECH 2013.** Nov. 18–21. McCormick Place, Chicago, Ill. Contact American Welding Society, (800) 443-9353, or [www.fabtechexpo.com](http://www.fabtechexpo.com).

### Educational Opportunities

**NDE Classes.** Moraine Valley Community College, Palos Hills, Ill., offers NDE classes in PT, MT, UT, RT, Radiation Safety, and Eddy Current, as well as API 510 exam prep and weld inspection. For more information, contact (708) 974-5735; [wdfs@morainevalley.edu](mailto:wdfs@morainevalley.edu); [morainevalley.edu/NDE](http://morainevalley.edu/NDE).

**EPRI NDE Training Seminars.** EPRI offers NDE technical

skills training in visual examination, ultrasonic examination, ASME Section XI, UT operator training, etc. Contact Sherry Stogner, (704) 547-6174, e-mail: [sstogner@epri.com](mailto:ssogner@epri.com).

**Nondestructive Examination Courses.** A course schedule is available from Hellier, 277 W. Main St., Ste. 2, Niantic, CT 06357, (860) 739-8950, FAX (860) 739-6732.


**NDE Training Courses.** GE Inspection Technologies offers training on topics such as eddy current, digital radiography, and remote visual inspection. For the complete schedule, contact (866) 243-2638; [www.geit-info@ge.com](http://www.geit-info@ge.com); [www.ge.com/inspectiontechnologies](http://www.ge.com/inspectiontechnologies).

**Preparatory and Visual Weld Inspection Courses.** One- and two-week courses presented in Pascagoula, Miss., Houston, Tex., and Houma and Sulphur, La. Contact Real Educational Services, Inc., (800) 489-2890; [info@realeducational.com](mailto:info@realeducational.com).

**CW/CWE Course and Exam.** A ten-day program presented in Troy, Ohio. Contact Hobart Institute of Welding Technology (800) 332-9448; [www.welding.org](http://www.welding.org); [hiwt@welding.org](mailto:hiwt@welding.org).

**T.E.S.T. NDT, Inc., Courses.** CWI preparation, NDE courses, including ultrasonic thickness testing and advanced phased array. On-site training available. T.E.S.T. NDT, Inc., 193 Viking Ave., Brea, CA 92821; (714) 255-1500; FAX (714) 255-1580; [ndtguru@aol.com](mailto:ndtguru@aol.com); [www.testndt.com](http://www.testndt.com).

**NDE Training.** NDE training at the company's St. Louis-area facility or on-site. Level III services available. For a schedule of upcoming courses, contact Quality Testing Services, Inc., 2305 Millpark Dr., Maryland Heights, MO 63043; (888) 770-0103; [training@qualitytesting.net](mailto:training@qualitytesting.net); [www.qualitytesting.net](http://www.qualitytesting.net).

**CW/CWE Prep Course and Exam and NDT Inspector Training Courses.** An AWS Accredited Testing Facility. Courses held year-round in Allentown, Pa., and at customers' facilities. Contact: Welder Training & Testing Institute (WTTI). Call (800) 223-9884, [info@wtti.edu](mailto:info@wtti.edu), or visit [www.wtti.edu](http://www.wtti.edu). 

## An Important Event on Its Way?

Send information on upcoming events to *Inspection Trends*, 550 NW LeJeune Rd., Miami, FL 33126. Items can also be sent via FAX to (305) 443-7404 or by e-mail to [mjohnsen@aws.org](mailto:mjohnsen@aws.org).





# Certification Schedule

## Certified Welding Inspector (CWI)

LOCATION	SEMINAR DATES	EXAM DATE
Fresno, CA	May 5-10	May 11
Miami, FL	May 5-10	May 11
Albuquerque, NM	May 5-10	May 11
Oklahoma City, OK	May 5-10	May 11
Corpus Christi, TX	May 5-10	May 11
Knoxville, TN	Exam only	May 18
Birmingham, AL	June 2-7	June 8
Hutchinson, KS	June 2-7	June 8
Spokane, WA	June 2-7	June 8
Miami, FL	Exam only	June 13
Bakersfield, CA	June 9-14	June 15
Pittsburgh, PA	June 9-14	June 15
Beaumont, TX	June 9-14	June 15
Corpus Christi, TX	Exam only	June 29
Hartford, CT	June 23-28	June 29
Orlando, FL	June 23-28	June 29
Memphis, TN	June 23-28	June 29
Jacksonville, FL	July 7-12	July 13
Omaha, NE	July 7-12	July 13
Cleveland, OH	July 7-12	July 13
Miami, FL	Exam only	July 18
Phoenix, AZ	July 14-19	July 20
Los Angeles, CA	July 14-19	July 20
Louisville, KY	July 14-19	July 20
Waco, TX	July 14-19	July 20
Milwaukee, WI	July 14-19	July 20
Corpus Christi, TX	Exam only	July 27
Sacramento, CA	July 21-26	July 27
Kansas City, MO	July 21-26	July 27
Denver, CO	July 28-Aug. 2	Aug. 3
Miami, FL	July 28-Aug. 2	Aug. 3
Philadelphia, PA	July 28-Aug. 2	Aug. 3
Chicago, IL	Aug. 4-9	Aug. 10
Baton Rouge, LA	Aug. 4-9	Aug. 10
Portland, ME	Aug. 4-9	Aug. 10
Las Vegas, NV	Aug. 4-9	Aug. 10
Mobile, AL	Aug. 11-16	Aug. 17
Charlotte, NC	Aug. 11-16	Aug. 17
Rochester, NY	Exam only	Aug. 17
San Antonio, TX	Aug. 11-16	Aug. 17
Seattle, WA	Aug. 11-16	Aug. 17
San Diego, CA	Aug. 18-23	Aug. 24
Minneapolis, MN	Aug. 18-23	Aug. 24
Salt Lake City, UT	Aug. 18-23	Aug. 24
Anchorage, AK	Exam only	Sept. 21
Miami, FL	Sept. 15-20	Sept. 21
Idaho Falls, ID	Sept. 15-20	Sept. 21
St. Louis, MO	Sept. 15-20	Sept. 21
Houston, TX	Sept. 15-20	Sept. 21
New Orleans, LA	Sept. 22-27	Sept. 28
Fargo, ND	Sept. 22-27	Sept. 28
Pittsburgh, PA	Sept. 22-27	Sept. 28

## Certified Welding Supervisor (CWS)

LOCATION	SEMINAR DATES	EXAM DATE
Minneapolis, MN	July 15-19	July 20
Miami, FL	Sept. 23-27	Sept. 28
Norfolk, VA	Oct. 14-18	Oct. 19

CWS exams are also given at all CWI exam sites.

## 9-Year Recertification Seminar for CWI/SCWI

(No exams given.) For current CWIs and SCWIs needing to meet education requirements without taking the exam. The exam can be taken at any site listed under Certified Welding Inspector.

LOCATION	SEMINAR DATES
Sacramento, CA	April 28-May 3
Charlotte, NC	May 5-10
Pittsburgh, PA	June 2-7
San Diego, CA	July 7-12
Miami, FL	July 21-26
Orlando, FL	Aug. 18-23
Denver, CO	Sept. 15-20
Dallas, TX	Oct. 6-11
New Orleans, LA	Oct. 27-Nov. 1
Seattle, WA	Nov. 3-8

## Certified Radiographic Interpreter (CRI)

LOCATION	SEMINAR DATES	EXAM DATE
Las Vegas, NV	May 6-10	May 11
Miami, FL	June 3-7	June 8
Dallas, TX	Aug. 19-23	Aug. 24
Chicago, IL	Sept. 23-27	Sept. 28
Pittsburgh, PA	Oct. 14-18	Oct. 19

The CRI certification can be a stand-alone credential or can exempt you from your next 9-Year Recertification.

## Certified Welding Sales Representative (CWSR)

CWSR exams will be given at CWI exam sites.

## Certified Welding Educator (CWE)

Seminar and exam are given at all sites listed under Certified Welding Inspector. Seminar attendees will not attend the Code Clinic portion of the seminar (usually the first two days).

## Certified Robotic Arc Welding (CRAW)

The course dates are followed by the location and phone number.

June 17-21, Dec. 9-13 at

**ABB, Inc., Auburn Hills, MI; (248) 391-8421**

May 20-24, Aug. 19-23, Dec. 2-6 at

**Genesis-Systems Group, Davenport, IA; (563) 445-5688**

Oct. 14 at

**Lincoln Electric Co., Cleveland, OH; (216) 383-8542**

April 22-26, July 15-19, Oct. 21-25 at

**OTC Daihen, Inc., Tipp City, OH; (937) 667-0800**

May 20, July 22, Sept. 23, Nov. 18 at

**Wolf Robotics, Fort Collins, CO; (970) 225-7736**

On request at

**MATC, Milwaukee, WI; (414) 297-6996**

## Certified Welding Engineer; Senior Certified Welding Inspector

Exams can be taken at any site listed under Certified Welding Inspector. No preparatory seminar is offered.

## International CWI Courses and Exams Schedules

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## The Answer Is

—continued from page 27

The welders must be qualified by the contractor as well. ASME Section XI has a provision that allows the contractors who are members of an association to qualify welders as a joint effort. The welders so qualified can go from one participating contractor to another without having to be requalified each time. However, there is a condition attached; each participating contractor must have a representative present when the welder is being tested and each contractor must “accept” the test sample and the test results.

It is my understanding of the requirement that the contractor's representative must be an employee who is authorized to act in that capacity. In other words, it is not acceptable for the contractor to send the welder to a third-party testing agency to be qualified and certified unless the contractor has an employee present to supervise, examine, and accept the welder's test coupon.

Once again, the requirements of Section IX are modified when the owner invokes B31.3 and specifies High Pressure Fluid Service. Once again, the construction code says the contractor

must qualify and certify the welder. The welder who participated in the qualification program previously described is not acceptable for High Pressure Fluid Service.

In summary, ASME always requires the use of qualified welding procedures and welders.


ASME sometimes permits the use of SWPSs purchased from AWS.

ASME may permit the welders to be qualified by others, as in the case described where all the participating contractors are present when the welders are tested.

ASME B31.3 for High Pressure Fluid Service takes an exception to the use of SWPSs.

My answers to your three questions are as follows:

1. No, the contractors cannot share the WPS submitted by one of the contractors. Quoting from B31.3; K328.2.2 Procedures Qualification by Others, “Qualification of welding procedures by others is not permitted.”
2. No, for the same reason as above.
3. No, each contractor must qualify and certify the welders they employ.

Quoting from B31.3; K328.2.3 Performance Qualification by Others, “Welding performance qualification by others is not permitted.” 

*Inspection Trends encourages question and answer submissions. Please mail to the editor at [mjohnsen@aws.org](mailto:mjohnsen@aws.org).*

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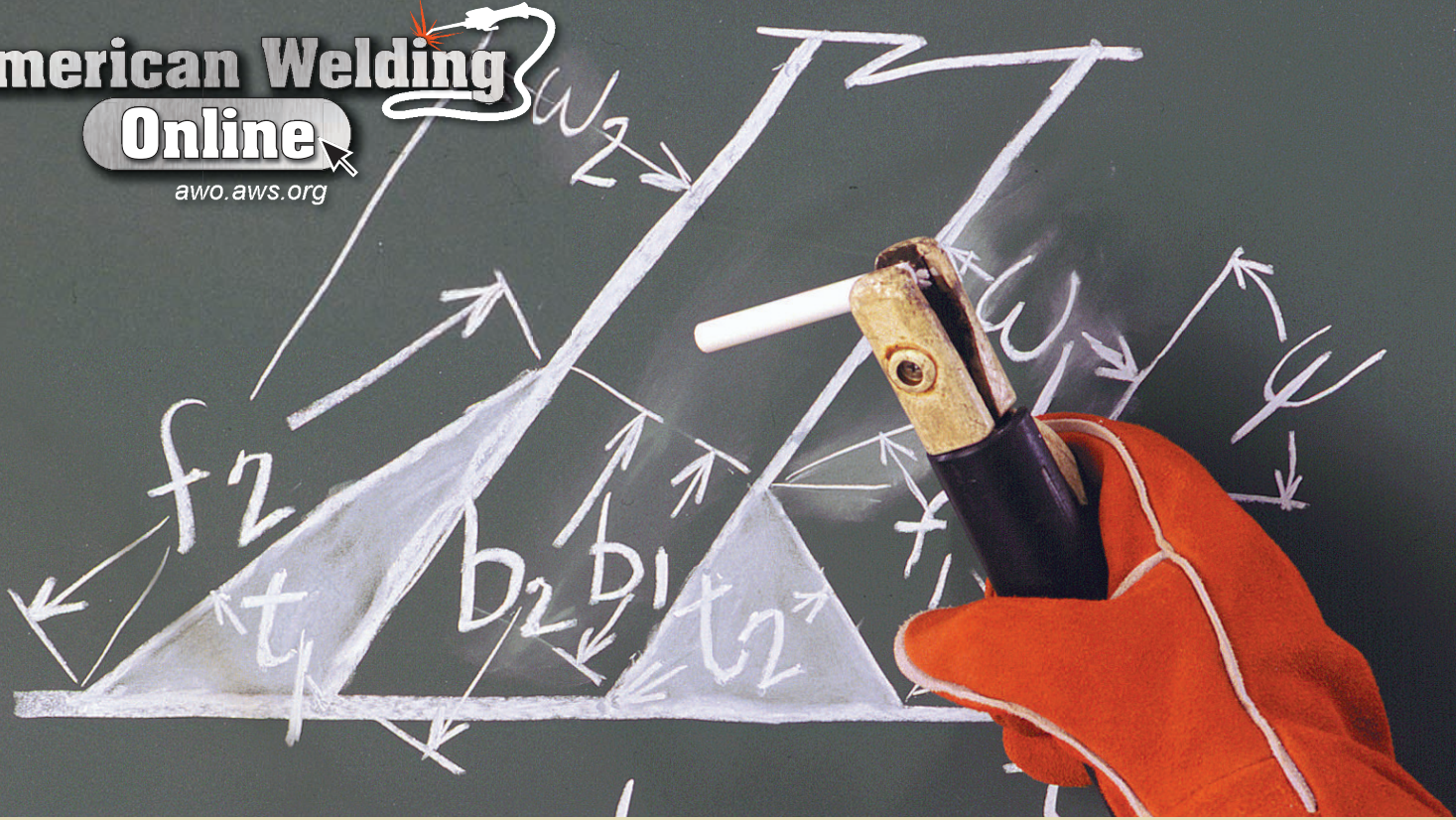
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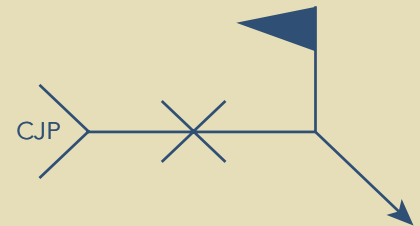
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# Understanding Welding Symbols



Knowledge of weld joint terminology is essential for all levels of the welding design and production process. Use of proper terms makes it much easier for welding personnel to communicate about various fit-up and welding problems encountered during the fabrication process. A welding inspector's ability to read and interpret welding plans correctly is essential to properly inspecting a piece or part.

This in-depth course walks the user through AWS 2.4:2012, starting with a module on orthographic views, joint types, and weld types. Then the course dives into the various types of welds and clarifies the rules and usage of welding symbols.

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The seminar is approximately 12 hours long and concludes with a final test.

**Fillet Welds: Skewed Joints**

The lengths of the weld on both sides of the skewed joint have also been provided. Instead of using weld symbols, a note is placed in the tail that can refer to a detail written at the bottom of the plans or to a separate drawing.

**Seam Weld Strength**

The strength of a seam weld is determined by shear strength.

**Dimensions - Length**

There is a fillet weld on both sides of this T-joint. Both fillet welds have a leg size of 1/2 of an inch and a length of 6 inches. In this case, a fillet weld symbol is placed on either side of the reference line.



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