

# 7TH BIENNIAL INSPECTION SUMMIT 2017

JAN. 30-FEB. 02 | GALVESTON ISLAND, TEXAS, USA

ASSET INTEGRITY THROUGH CORROSION MANAGEMENT,  
INSPECTION AND ENGINEERING TECHNOLOGY

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## Training Courses

January 30, 2017 | Galveston Island Convention Center | Galveston, TX | [www.api.org](http://www.api.org)

*\*as of October 26, 2016 | Agenda subject to change*

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### Monday, January 30, 2017

#### 8 Hour Courses

8:00 am – 5:00 pm

#### **Storage Tank Fabrication and Inspection**

This course will provide a basic understanding of aboveground storage tank designs, construction/fabrication and inspection. The course will focus mainly on API 650 tanks; however, a general background of tanks built to other design standards, such as API 620 and the API 12 series, will also be covered. The course will also provide a basic understanding of the inspection and evaluation of existing storage tanks in accordance with API 653, including the determination of tank minimum thickness, prescriptive inspection intervals based on corrosion rate, the use of risk-based inspection to set inspection intervals, repair practices, hydrostatic test requirements, and settlement evaluation. An overview will be given of Level 1 fitness-for-service methods in API 579-1/ASME FFS-1 that are applicable to tanks. Relevant best practices and case studies of tank design, fabrication, inspection, evaluation and repair will be discussed.

**Instructor: Joel Andreani**

#### **Understanding Ultrasonic Phased Array Testing**

This 8-hour course will overview the fundamental physics and performance of ultrasonic phased array testing (PAUT) toward an increased understanding of this widely used NDT method. A comparison of PAUT to conventional ultrasonic testing will be explained and demonstrated for both corrosion and weld inspection applications for damage mechanisms outlined in API 571 as well as the applications used for API risk based inspection and fitness for service codes. The course will include advanced ultrasonic theory instruction followed by demonstrations on real world damage samples and optional hands on experience. A new emerging PAUT technology (Full Matrix Capture/Total Focusing Method) shall also be explained and demonstrated.

**Instructor: John Nyholt**

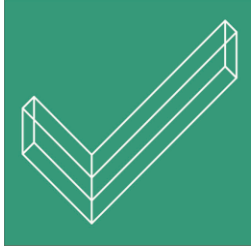
#### **Damage Mechanisms Affecting Equipment In the Refining and Petrochemical Industries**

This class will provide a general background on the material contained in API 571 (Damage Mechanisms Affecting Fixed Equipment in the Refining and Petrochemical Industries). As we all know, a key first step in safety and reliability of our mechanical equipment is the identification and understanding of the relevant damage mechanisms. Proper identification of damage mechanisms is important when:

1. implementing the API Inspection Codes (510, 570 & 653),
2. conducting risk based inspection per API 580, and
3. performing a fitness-for-service assessment using API 579.

Damage mechanisms need to be understood and considered to determine corrosion rate, location (general or local) and opportunities for mitigation.

**Instructor: Marc McConnell**



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## **Fitness-for-Service**

The one-day Fitness-For-Service (FFS) Short Course provides an overview of the Fitness-For-Service (FFS) Assessment Methods in API 579-1/ASME FFS-1, 2016 Edition. This course includes a review of the FFS assessment levels with a concentration in the Level 1 and Level 2 assessment methods and a discussion of what constitutes a “best-buy”, i.e. what assessment level to use and the inspection data required. In addition, this course also includes an overview of the assessment procedures for brittle fracture assessment, volumetric damage, HIC/SOHIC damage, crack-like flaws, creep damage and fire damage assessment, and how these FFS assessment procedures are incorporated into the Life Cycle Management of fixed equipment. Numerous example problems will be discussed. A review of the differences between 2016 Edition and the 2007 edition will also be provided.

**Instructor: David Osage**

## **Risk-Based Inspection**

The details of API’s recommended practices (API 580 Third Edition and API 581 Third Edition) will be presented by recognized industry experts and leaders in the development and use of RBI methodology. API RP 580 introduces the principles and presents minimum general guidelines for developing a RBI program for fixed equipment and piping. API 581 provides quantitative RBI methods to establish an inspection program. Together, these two documents comprise a widely-recognized standard for industry-accepted RBI practices. Both of these recommended practices were updated and new editions released in 2015. The course helps attendees understand and use RBI technology, develop a program, and learn which RBI procedures and working processes comply with industry standards. Additionally, changes between the Second and Third Editions will be highlighted and discussed

**Instructor: Lynne Kaley**

## **Using ASME Section IX and Reviewing Welding Procedures and Welder Qualification**

This eight hour presentation will provide an overview of the 2015 Edition of ASME Section IX – Welding Qualification. The discussion will include: Part QG – General Requirements; Part QW – Welding including: Article I - Welding General Requirements; Article II - Welding Procedure Qualifications; Article III – Welding Performance Qualifications; Article IV - Welding Data; Article V – Standard Welding Procedure Specifications (SWPSs). The presentation will include reviewing a Welding Procedure Specification (WPS) and its Procedure Qualification Record (PQR) answering four basic questions:

1. Is the Welding Procedure complete?
2. Is the Welding Procedure supported?
3. Is the Welding Procedure qualified?
4. Is the welding Procedure certified?

The workshop will also determine and document, on a Welders Performance Qualification (WPQ) form, the range of qualifications for the welder who welded the test coupon for the WPS qualification.

**Instructor: Robert Yagle**

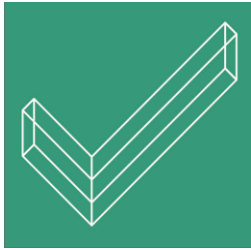
## **ASME PCC-2 – Repair of Pressure Equipment and Piping**

This course is an overview and discussion of the ASME PCC-2 repair methods. Subjects covered include welded repairs, mechanical repairs, and nonmetallic repairs. Failure scenarios will be presented and possible repair methods will be discussed.

**Instructor: Don Kurle, P.E.**

## **Mechanical Integrity for Refining – Crude Units**

This 8 hour course is designed to inform the Crude Unit Inspector / Corrosion Engineer on the basic operation of the Unit, potential damage mechanisms that can occur and how to inspect for the anticipated damage. This course differs from the typical API-571 course in that it adds a process overview for Crude Unit operation with specific emphasis on operating / process



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parameters that can impact corrosion. In addition, a more detailed look into inspection planning (scope, techniques, locations and frequency) will also be reviewed. To emphasize the learning, multiple Unit specific examples of corrosion damage and failures will also be reviewed.

**Instructors: Clay White, Jason Nigg, Brian Jack, Brian Batts**

## 4 Hour Courses

8:00 am – 12:00 pm

### **High Temperature Advanced NDE**

The ability to perform on-stream inspection of pressure vessels, reactors and other critical components in lieu of shutting down is invaluable to operating plants. During times of expected higher production rates or lowering costs by the refineries and process plants, coupled with the increasing dangers associated with entering confined spaces, creates enhanced awareness and appreciation for alternative inspection techniques. This workshop will focus on the power and evolution of Phased Array as the key tool for on-stream inspections. Over the course of the past 5 years, phased array has become the ultrasonic technique of choice. Once thought to be an ambient technique or limited to low to medium temperatures only, this course will go over in detail the advances in the technology which is now capable of performing critical inspections at temperatures up to 750F. During the past 3 years, we have developed, perfected and performed numerous fully automated High Temperature Phased Array (HTPA) examination throughout the world saving owner/users Millions of dollars in unnecessary down time and at the same time providing them with the very highest probability of flaw detection with exceptional flaw sizing which than allows for successful monitoring. This workshop will provide full details on the technology, advantages, cost savings, the onerous qualification processes that was used to qualify the technology and techniques and many examples of field results. Depending on the audience, I will also present details on the history of phased array, the basic physics and expectations for the future including some insight into Full Matrix Capture (FMC) and/or 4-D imaging.

**Instructor: David Bajula**

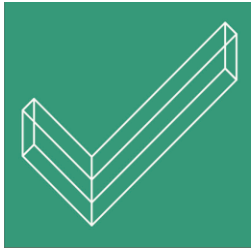
### **Creating and Implementing Corrosion Control Document (API 970) and Integrity Operating Windows (API 584) – A How To Guide**

This course will focus on the following: An overview of API 584 and API 970 contents; The value of CCD's and IOW's to your inspection program; Resources/team members needed in CCD/IOW creation; Sources of information and data collection; Process info validation – a vital quality step; Concise Inspection Highlights and use of existing CML data; Understanding the important parameters in degradation; Detailed outline of CCD deliverables and work process descriptions; Initial damage mechanism - assignment expected likelihoods; Team meeting (who, when, what), including defining process deadlegs, injection point and mix points; Defining IOW terms (standard, critical, and informational) and defining limits and actions/responsible parties; Finalizing CCD's/IOW's - validation of the results; Use of CCD's and detailed IOW implementation after parameters are defined; Handling and communicating of exceedances; Example of a hydrotreater unit and one other unit.

**Instructor: Gerrit Buchheim**

### **Bolting/Torquing/Gaskets - Bolted Joint Integrity**

This course is intended to provide an overview of the most important aspects for achieving leak free joint operation. The course emphasises the importance of the full life-cycle approach and each stage of the life-cycle is examined to demonstrate this concept. The most critical aspects for design, fabrication, assembly and maintenance are detailed in order for the attendee to be able to determine the status of their current joint integrity program and what will be required to bring it up to best practice. The course is suitable for engineers and managers wishing to improve joint integrity at their facility. It will be taught by Dr Warren Brown, vice chair of the ASME PCC-1 committee and author of over 50 publications on the subject of joint



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integrity.

**Instructor: Warren Brown**

12:00 pm – 1:00 pm

**Lunch**

*For participants of the 8-hour courses*

## 4 Hour Courses

1:00 pm – 5:00 pm

### **Joint Assembly Inspection for Inspectors**

Using the IJAQ TED Rig ([ijaq.org](http://ijaq.org)) the attendees will learn the aspects of joint integrity that rely on their skills and also have the chance to gain experience in inspection practices that may be required during the joint assembly process in a controlled environment. The TED Rig allows all required inspection practices for the assembly process to be taught and practiced by the participants. The course offered is from the IJAQ ASME PCC-1 Appendix A bolted joint assembler qualification course and, as such, addresses all inspection requirements that are listed in ASME PCC-1. This includes defect and flatness assessment per Appendix D, joint alignment per Appendix E and joint assembly alignment. The participants will also be shown site inspection practices for common gasket types. A sample of the available flange inspection tools will be used during the course, in addition to common rules-of-thumb. The course is suitable for both inexperienced inspectors and engineers and experienced inspectors and engineers wishing to further hone their skills. It will be taught by Dr Warren Brown, vice chair of the ASME PCC-1 committee, principal author of PCC-1 Appendix D and principal SME for IJAQ.

**Instructor: Warren Brown**

### **Welding and Welding Metallurgical Fundamentals for Inspectors**

This is a course designed for the entry to mid-level inspectors, maybe some senior level inspectors to help develop some basic and critical inspection / welding knowledge. We will discuss an array of things from welding procedures to some basic metallurgical items relating to welding. We plan on discussing other items such as Low Residual Element welding for HF Alky units, filler material choices and some heat treatment items. This course will be slightly modified from the course we taught at the 2015 Inspection Summit.

**Instructor: Terry McLane and Jeff Major**

### **Characteristics of the High Performing Inspector**

Most petrochemical inspectors are on jobs that present significant challenges. Technical situations, relationships with other plant departments, and high workloads are just some of the common challenges facing inspectors. Sometimes, technically qualified inspectors still underperform in their assignments. Why? Often it is because of limited abilities in important non-technical skills. These non-technical abilities are usually as important as technical skills, but unfortunately are often difficult to learn. This training session will help inspection personnel see a broad picture of the make-up of a High-Performing Inspector. We will look at the various job demands and match up important non-technical characteristics needed for those assignments. We will also briefly explore ways of developing these successful characteristics in the workforce.

**Instructor: Mark Smith**