Over 350 Australian pipeline personnel trained to international level!

Welding Technology Institute of Australia
Research, Education, Technical Support & Information

2012

INTERNATIONAL PIPELINE COURSES

Novotel Hotel
Sydney Olympic Park, Australia

Who should attend?

Pipeline engineers, designers, operators and service professionals who are involved with the maintenance, design, inspection and repair of oil and gas pipelines.

OZWELD SWT

A WTIA OzWeld School of Welding Technology event proudly supported by the members of the SMART Gas Pipelines Industry Group and WTIA Technical Panel 7 Pipelines.

Defect Assessment in Pipelines
Professor Phil Hopkins
Penspen Integrity, UK
3 day course
26-28 March 2012

WORLD AUTHORITIES

Pipeline Repair Methods – In-Service Welding Course
William A Bruce
DNV Columbus, USA
2 day course
27-28 March 2012

Includes review and analysis of available thermal analysis models including the original Battelle model, the heat-sink capacity method, and the PRCI Thermal Analysis Model for Hot Tap Welding.

"Linking the Australian Pipeline Industry with the World"

The WTIA is the Australian Member Society of the 55 member-country International Institute of Welding (IIW). Participation by the Australian Delegate and other Experts in Commission XI *Pressure vessels, boilers & pipelines* ensures local industry is kept aware of the latest international developments in technology and pipeline management. Australian experts interested in attending Commission XI and IIW should contact WTIA.

PENSPEN

DNV

the australian PIPELINE industry association Ltd

iiw

INTERNATIONAL PIPELINE COURSES

2-DAY COURSE PROGRAMME

PIPELINE REPAIR/ IN-SERVICE WELDING

The objective of this course is to provide an in-depth overview of the various aspects of pipeline modification and repair (full-encirclement, sleeves, hot taps, etc.) as well as to address the concerns for welding onto in-service pipelines.

A thorough understanding of the factors that affect the concerns for welding onto in-service pipelines will allow repairs and modifications to be made with confidence. The proper use of in-service welding allows both economic and environmental benefits to be realised by avoiding pipeline shutdown and interruption of service.

The course includes a review and critical analysis of available thermal analysis models including the original Battelle model, the heat-sink capacity method, and the PRCI Thermal Analysis Model for Hot Tap Welding. The PRCI model was originally conceived by Bill Bruce and, under his direction, the software was developed and sponsored by Pipeline Research Council International (PRCI). Students will learn why these models, while useful as planning tools, should not be regarded as 'magic bullets' against hydrogen cracking in hot tap welding, and by utilising worked comparative examples. The comprehensive, up to date course will give an unbiased analysis of best strategies for avoiding burnthrough and the development of crack susceptible weld microstructures.

The course is intended for a wide range of personnel - from welders and inspectors to engineers and managers.

LECTURER

William A Bruce is Director of Welding & Materials Technology at Det Norske Veritas (U.S.A.), Inc. (DNV) in Dublin, Ohio, USA. Prior to joining DNV, he was a Technology Leader at Edison Welding Institute (EWI) and a Senior Engineer at Panhandle Eastern Pipeline Company. He has been involved in pipeline welding research and its practical application continuously since his graduation from The Ohio State University in 1981.

His areas of interest include repair welding, inspection techniques, and failure analysis. He has carried out numerous projects pertaining to safety and integrity aspects of repair and modification of in-service pipelines by welding.

He is an American Welding Society representative on the American Petroleum Institute API 1104 Committee and is the chairman of the Maintenance Welding Subcommittee. He has received numerous awards, including a Distinguished Researcher Award from Pipeline Research Council International. He holds a B.S. degree in Welding Engineering and is a Registered Professional Engineer, an IIW International Welding Engineer (IWE), and an AWS Certified Welding Engineer (CWEng).

DAY 1 Tuesday 27 March

Pipeline Repair Methods/InService Welding
- Introduction
- Incentives
- Primary concerns

Defect Assessment Prior to Repair
- Reason for assessment
- Types of pipeline defects
- Pressure reduction requirements
- Corrosion measurement methods
- Corrosion assessment methods

Welding Processes/Discontinuities and Defects
- Arc welding processes
- Consumable designations
- Discontinuities and defects
- Crack types

Burnthrough and Related Safety Concerns
- Factors affecting burnthrough
- Effect of wall thickness
- Effect of heat input
- Effect of flow rate/pressure
- Avoiding burnthrough

Hydrogen Cracking Concerns
- Recent significant incidents
- Common factor/recommendation
- Hydrogen cracking requirements
- Weld hydrogen levels
- Crack-susceptible weld microstructures
- Welding residual stresses
- Welding metallurgy for carbon steels
- Thermal cycles of welded joints
- Prevention of hydrogen cracking

Full-Encirclement Repair Sleeves
- Full-encirclement sleeve types
- Principal of operation
- Assuring effective reinforcement
- Sleeve design
- Sleeve fabrication

Hot Tap Branch Connections
- Branch connection design
- Reinforcement types
- Integrally-reinforced
- Line replacement/stopping
- Pressure testing

Pipeline Repair by Weld Deposition
- Physical concept
- History of weld deposition repair
- Burnthrough risk
- Integrity restoration
- Practical application
- External repair of internal wall loss

Non-Welded Repairs
- Repair by grinding
- Composite repairs
- Epoxy-filled shells

Selecting an Appropriate Repair Method
- Pipeline repair manual
- Detailed selection criteria

DAY 2 Wednesday 28 March

Code and Regulatory Requirements
- API 1104 Appendix B – In-Service Welding
- CSA Z662 requirements
- Code requirements for weld deposition repair

Procedure Selection for Hot Tap and Repair Sleeve Welding
- Burnthrough risk summary
- Prevention of hydrogen cracking
- Welding procedure options
- Predicting required heat input
- Welder/procedure qualification
- Selecting an appropriate procedure

Practical Aspects of Hot Tap and Repair Sleeve Welding
- Practical aspects of avoiding burn-through
- Practical aspects of avoiding hydrogen cracking
- Qualification of welding procedures (API 1104)
- Qualification of welders (API 1104)
- Welding procedure selection examples
- Chemical composition determination
- Electrode (filler metal) selection
- Proper electrode handling
- Proper fit-up
- Proper welding sequence
- Control of heat input levels
- Inspection and testing

Alternative Welding Processes for In-Service Welding
- Conventional processes
- Alternative processes
- Branch connection root pass welding
- Cellulosic-coated electrode limitations

Lessons to be Learned from Past Pipeline Repair Incidents
- Reported incidents
- Previously unreported incidents
- Ten commandments of in-service welding

INTERNATIONAL PIPELINE COURSES

3-DAY COURSE PROGRAMME

DEFECT ASSESSMENT IN PIPELINES

Many oil and gas pipelines are at, or are nearing, the end of their design life. Pipeline infrastructure, however, will need to perform for many more decades, as world demand for oil and gas is predicted to increase up to 2020. Many transmission pipelines are now over 20 years old. This is "middle aged" in pipeline terms, and even the best designed and maintained pipeline will become defective as it progresses through its design life.

Operators, therefore, need to be aware of the effect these defects will have on their pipeline, and – more importantly – be able to assess their significance in terms of the continuing integrity of the pipeline. The increasing use of high-technology maintenance (for example, intelligent pigs) is helping pipeline owners to assess the condition of their lines, and if these modern maintenance methods are combined with modern defect-assessment methods, they can provide a very powerful and cost-effective tool.

This course will present the latest defect-assessment methods to pipeline engineers and managers. These methods will range from simple, quick assessment methods, to the more detailed "fitness for purpose" analysis. The course is highly interactive and takes the form of lectures, workshops and case studies.

The course will cover methods available to assess the significance of defects detected in onshore pipelines. It will introduce simple analytical methods used to assess internal and external corrosion, dents and gouges, cracks (e.g. SCC), weld defects and fatigue. It will include worked examples where attendees will calculate the significance of defects in pipelines and set intelligent pig inspection levels. The course is unique as it is a holistic approach to defect assessment, and it ensures the student appreciates all aspects of the subject, including repair and risk management.

LECTURER

Professor Phil Hopkins has more than 30 years' experience in pipeline and marine engineering, working with most major oil and gas companies around the world providing consultancy on management, business, design, maintenance, inspection, risk analysis and safety, and failure investigations.

His previous work on transmission pipeline projects includes setting weld defect acceptance levels for pipelines, material selection, risk analysis and inspection and maintenance procedures. Phil has served on many national and international committees, including the British Standards Institution, DNV Pipeline Committee, and the European Pipeline Research group. He is currently a member of the ASME Pipeline Committee and the DNV Pipeline Committee. He has extensive experience in both lecturing and training, and is a Director of Penspen Ltd UK.

DAY 1 Monday 26 March

Introduction to Basic Pipeline Engineering Principles
- Basic pipeline design principles
- Stresses in pipelines
- Routing of pipelines
- Basic pipeline operating and maintenance parameters
- Maintenance and inspection methods

Introduction to Pipeline Defects – Why Pipelines Fail
- How safe are pipelines?
- How often do they fail?
- What causes pipelines to fail?
- Pipeline risks

Introduction to Fracture Mechanics
- Basic theory
- Brittle & ductile fracture
- K, J, and CTOD

Introduction to Fundamental Pipeline Defect Failure Relationships
- History of pipeline defect assessment
- Fundamental failure relationships
- Explanation of key parameters

How to Assess Corrosion Defects
- Introduction to basic theory
- Methods to assess corrosion
- ASME B31G and RSTRENG methods
- Interacting defects
- New methods
- Tutorial - Worked examples on Corrosion Defect Assessment

DAY 2 Tuesday 27 March

How to Assess Gouges and Dents
- Introduction to basic theory
- Methods to assess gouges
- Methods to assess dents
- Problems with fatigue loadings
- Tutorial - Worked example on damage assessment

How to Assess Cracks and Weld Defects
- Basic theory
- The problems with cracks in pipelines
- Stress corrosion cracking (low and high pH)
- Assessing defects in pipeline girth welds
- Assessing non planar defects in welds
- The EPRG girth weld defect guidelines

Setting Intelligent Pig Inspection Levels
- Basic theory
- What pigs can detect
- What operators want to detect
- Setting intelligent pig inspection levels

Workshop: Setting Intelligent Pig Inspection Levels

Fracture Propagation and Arrest
- Why fractures propagate
- Brittle and ductile propagation
- Fracture arrest
- Calculating toughness requirements

DAY 3 Wednesday 28 March

How to Assess Fatigue
- Why do pipelines fatigue?
- Basic fatigue theory
- Fatigue assessment - design
- Fatigue assessment - service

Pipeline Repair and Rehabilitation
- Response to discovering defects
- What are the cost implications?
- Types of repair and rehabilitation methods
  - ~ Grinding
  - ~ Weld deposition
  - ~ Shells (including epoxy-filled)
  - ~ Composite wraps
  - ~ Cut outs
  - ~ Mechanical clamps/connectors
- Repair and rehabilitation strategy

Limit State Design
- What is it? Is it accepted? Basis and applications

Risk and Integrity Management and Analysis
- Pipeline maintenance
- Pipeline and risk management systems
- Major accident prevention documents
- Risk analysis
- How to incorporate defect assessments and significance into quantitative and qualitative risk analyses
- How defect assessments assist with risk analyses
- Setting inspection and maintenance priorities
- Prioritisation schemes

Workshop: Setting Priorities

INTERNATIONAL PIPELINE COURSES

26 - 28 March 2012, Sydney NSW

REGISTRATION FORM

Please return form to:
WTIA National Office,
PO Box 6165,
SILVERWATER, NSW, 1811
Phone: +61 (0)2 9748 4443
Fax: +61 (0)2 9748 2858
Email: training@wtia.com.au

Please register me to attend:	WTIA/APIA Member	Non-Member	Total
☐ **Defect Assessment in Pipelines** Professor Phil Hopkins 3-day course. 26-28 March 2012	$3,190	$3,520	
☐ **Pipeline Repair Methods/In-Service Welding** William A Bruce 2-day course. 27-28 March 2012	$1,980	$2,200	
		Total	

COURSES & FEES

All fees are in Australian dollars and inclusive of GST. Courses include morning tea, afternoon tea, lunch each day, course notes, and attendance certificates for the courses.

CONTACT DETAILS

First Name:_____ Surname:_____

Position: _____ Company:_____

Address: _____

Suburb: _____ State: _____ Post Code: _____ Country: _____

Phone: _____ Fax: _____ Mobile: _____

WTIA/APIA Membership number: _____ Email: _____

METHOD OF PAYMENT

Payment of registration fees should be made payable to WTIA. Payment can be made by Cheque, Direct Deposit, Mastercard or Visa

☐ Cheque ☐ Mastercard ☐ Visa ☐ Direct Deposit

Cardholders Name: _____ Amount $: _____

Card No : _ _ _ _ / _ _ _ _ / _ _ _ _ / _ _ _ _ Expiry Date: _ _ / _ _

Signature: _____ Date: _____

Funds may be transferred to the following account details. Please return a remittance advice to fax +61 (0)2 9748 2858 or email training@wtia.com.au
Welding Technology Institute of Australia: Account No: 047162875, BSB No: 082 330, Bank: National Australia Bank, Branch: Parramatta NSW.

VENUE and HOTEL ACCOMMODATION

The Courses will be held at Novotel Hotel, corner of Olympic Boulevard and Herb Elliott Avenue, Sydney Olympic Park, NSW, 2127.

Accommodation is available at the Novotel and Ibis Hotels and at the adjacent Pullman Hotel. Undercover car parking is available at the hotels, however car space cannot be guaranteed and fees do apply.

For Novotel accommodation reservations visit www.novotelsydneyolympicpark.com.au or Tel: +61 (0)2 8762 1111.

Other hotels in the area include the Formule 1 Sydney Olympic Park and a range of hotels in Parramatta which is 10km by road.

Cancellation & Refunds

Please note, for cancellations received within 30 working days of the events, 100% of the fees will be charged. Replacement delegates may be sent, however, in lieu of those cancelled. WTIA reserves the right to cancel the Courses due to insufficient registrations or other reasons beyond its control, as well as altering the programme if it deems necessary. WTIA also reserve the right to refuse registrations. Confirmation of bookings will be sent to delegates upon registration. All prices are inclusive of 10% Goods and Services Tax.