# Global Challenges and **Opportunities in NDT**

Mike Farley **Director Technology Policy Liaison, Doosan Power Systems** Past President, BINDT Chairman, ICNDT









# **Contents of Lecture**

- Three parts:
  - Company (Doosan Power Systems), BINDT, ICNDT
- Three threads
  - Past, Present, Future
  - 50 years history, where we are now, future opportunities
- Three recurring themes
  - Importance of NDT, globalisation of the NDT world, achieving reliability of NDT







#### **Doosan Power Systems**





#### **Doosan Power Systems**

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#### Doosan Power Systems – Locations





#### History: Major NDT milestones over 50 years



DOOSAN



#### History: Major NDT milestones in the company





#### History: Major NDT milestones in the company





#### Present: NDT in Doosan Power Systems

- major user of NDT in our own business, in our supply chain
- a supplier of high-tech NDT and condition monitoring services
- accredited NDT Laboratory and Inspection Body





Pecem / Itaqui, Brazil 4 x 360 MW coal power plant



**EDF Sizewell B** 



UK submarine PSI

Atucha 1+ 2 PSI and ISI



DOOSAN

#### Present : NDT in Doosan Power Systems

- PSI and ISI of Nuclear RPV, Piping & Primary Circuit Components
- Vessel entry inspections of AGRs
- Noise, Vibration & Plant Monitoring
- Risk Based Assessment of Integrity of Pipework
- Component Testing
- Metallurgy & Welding
- Boiler Condition Assessment

**Customers:** EDF Energy (UK), Rolls-Royce, EDF, FKA & OKG (Sweden), Mühleberg (Switzerland) & NASA (Argentina), Drax, numerous offshore O+G









#### **Global challenges and opportunities in NDT for DPS**

- NDT for new products and services as the energy market and our business change
- Maintain recognition of the importance of NDT in the company
- Responding to the globalisation of our business and supply chain, ensuring quality and reliability of NDT services



#### **Opportunities: NDT for the new world of clean energy**





New build nuclear

Offshore wind turbines



Wider use of gas





#### **Globalisation of projects – example – coal fired boiler**

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#### Challenge:

How to ensure quality of NDT throughout the whole global supply chain?

IN UK, INDIA AND CHINA TO ASIVIE CODES

- Materials sourced globally, including Korea, Europe and China
- Boiler manufacture in Korea and Vietnam by Doosan Heavy
- Other equipment procured globally
- Construction by USA team with local NDT contractors





#### **British Institute of NDT**







#### History: some milestones in BINDT over 50years



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#### **BINDT: some major changes over 50 years**

Shift from UK focus to Europe then to global

- Equipment suppliers, users, universities, certified personnel, service providers
- NDT technology has become more complex and much more application focussed
- Shift from large knowledgeable major users of NDT to much outsourcing and subcontractoring
- Growth of a technically sophisticated service sector
- In-Service inspection now as important as manufacturing inspection



#### **BINDT – present - a view from outside**

- BINDT has successfully established itself as *the* focal point for NDT in the UK
- PCN, Insight, the video and BINDT's international engagement are world class
- University involvement much stronger than in the past, and the education link to University of Northampton is an exciting development, also the Apprenticeship scheme
- Horizontal development and links into Condition Monitoring, Air Tightness Testing and Corrosion are encouraging
- Involvement of NDT industrial users is not as great as in some countries, eg Germany, and our Branches are struggling
- Membership as traditionally defined is static but the number of stakeholders continues to grow massively through PCN



#### **BINDT – the future ?**

- Mission should be: "to promote total quality in NDT and allied disciplines in Britain, Europe and internationally for the benefit of all stakeholders and wider society, globally"
- Vital to remember that BINDT is vertically integrated with stakeholders of equal importance at all levels
  - Student to Professor
  - NDT Level 1 to Level 3
  - Operator to Managing Director
- Need to make BINDT more relevant to the NDT practitioner workforce
  - Meet the challenge of Wikipedia, NDT Cabin, NDT Net, Facebook and other internet communities
- NDT may come to mean <u>Non-destructive testing and Diagnostic</u> <u>Technologies</u>



#### **BINDT-** some more challenges and opportunities

- How to improve interactions with user groups in industry?
- How to be the point of contact for independent technical advice?
- How to utilise IT/ social media to keep in touch with Stakeholders?
- How to improve/speed up information services for Stakeholders?
- How to look and feel much more modern?
- How to engage with our disenfranchised stakeholders PCN certificate holders – and provide them with the services they need?
- How to work more closely with other international NDT Societies to deliver the full extent of our wider objectives?



# The World Organisation for NDT

 First meeting of the International Committee for NDT in 1960
Meetings and activities originally linked to World Conferences, every four years

ICNDE

Policy and General Purposes Committee was created in 1992 to advise on strategy and provide link to Regional Groups (EFNDT, APCNDT, PanAmNDT and AFNDT)

New constitution approved in 2000 and legalisation of ICNDT as a not-for-profit organisation, registered in Vienna, in 2008

# The World Organisation for NDT

Members are the national NDT Societies – more than 50

ICNDT

Meetings of the General Assembly are held every two years in conjunction with the WCNDT and a Regional Conference

Members elect a Chairman, Executive Committee and Secretariat to manage its affairs

ICNDT carries out activities in accordance with a Strategic Plan developed with its members

ICNDT chooses the NDT Society/country to run the World Conference every four years

Executive Committee (IEC) 2008 -2012			Elections of the next
ICN	DT Chairman	Mike Farley, UK	Executive take place in April 2012
ICN	CNDT General Secretary David Barnett, Australia		stralia
World Conference President		Manfred Johannes, South Africa	
Chairman of PGP		Douglas Marshall, Canada	
Treasurer		Gerhard Aufricht, Austria	
ICNDT Membership Chair		Joao Conte, Brazil	
Elected Member		Wayne Holliday, USA	
Elected Member		Matthias Purschke, Germany	





#### Membership

#### All major countries (more than 60 in total)

#### Approved at the Shanghai meeting

Lithuania, Serbia, Turkey, Sudan, Philippines, Lebanon

#### Members approved at Moscow meeting

- Hungary Marovicsz as Full \Member
- Singapore NDT Society as a Full Member
- Singapore Welding Society as an Associate Member
- Uzbekistan NDT Society as a Full Member

## Members recently approved

- Portugal, Vietnam, Thailand, Indonesia, Kazakhstan, Sri Lanka,

## Membership applications currently being processed

- Iran Institute of Welding and NDT (Associate), Iranian Society of NDT (Associate)





#### **Finances**

# Most costs are met by in- kind support of Member Societies

- Secretariat BINDT
- Website DGZfP
- Journal CINDE/BINDT
- Monographs ISNT

## ICNDT funding is largely by donation from organisers of World Conferences

- Substantial donations (25% of surplus) from Italy, Canada, China

# Fees introduced from Jan 2011

- 250 euros/ year
- 40+ have paid to date





#### Formal Annual Report, 2009 and 2010

- on the website
- ICNDT Journal every 4 months
- Website www.icndt.org











- Executive uses the the plan to manage its activities
- Plan divided into four sections
  - -1. Promotion of the importance of NDT
  - 2. Support to ICNDT Member Societies
  - -3. Certification
  - -4. Education and Research

Work has started to extend the plan to 2014 and Members are being asked to let us know their needs/wishes for ICNDT







# **1. Promotion of the importance of NDT**

- NDT is an overhead activity, often with no perceived added value
- Value comes from the avoidance of cost, risk and potential accidents
  - •NDT helps us avoid economic and human catastrophe
- More clearly perceived value when NDT or condition monitoring is used to permit life extension, or reduce statutory outages, or to permit planes to fly
  - •Forth Road Bridge
  - Nuclear power plants
  - Fossil Power plants
  - •Volcanic ash cloud over W Europe

Essential role for ICNDT and NDT Societies to promote the importance of NDT

Congratulations to everyone responsible for the BINDT video - The Unseen World of NDT !!



From 2008 -12 Strategic Plan :

- Workshops for new NDT societies at PanAm NDT Conference in Mexico and 18<sup>th</sup> WCNDT in Durban
- Workshop for Regulators on managing NDT at 18<sup>th</sup> WCNDT?
- Closer cooperation with IAEA Vienna
- Website scheme for new NDT societies
- Website links to BINDT, ASNT and JSNDI videos



# **3. ICNDT activities relating to Personnel Certification**



The World Organisation for NDT

## 3. ICNDT activities relating to Personnel Certification

- ICNDT view is that we need
  - -NDT Certification that we can rely on all around the world
  - Certificates gained in one country need to be valid/ recognised world-wide
  - Correct implementation of both Third Party certification and In-company certification (SNT-TC - 1A)
  - Harmonisation and mutual recognition of similar Certification schemes
- ICNDT supportive of third party certification, but not exclusively so and recognises that both third party and company certification can be applied well or badly

## Look further at the background.....





#### **Elements of Personnel Certification – good practice**

Education Training Experience General theory exam General practical exam Specific theory exam Specific practical exam

Central certification or in company

Central (Third Party) Certification based on ISO9712 or EN473 and ISO17024 Accredited

The employer retains responsibility



Company specific training In company experience Company specific theory exam Company specific practical exam Company certification

Company/ Employer Authorisation to work

Overall process described in company's NDT Quality System (Written practice) checked/audited by external inspection authority (eg ASME, or Notified Body)



#### **ICNDT Guide**

Published 1 March 2009

www.icndt.org

Will be updated for the 18<sup>th</sup> WCNDT in Durban

The World Organisation for NDT

ICNDT The World Organisation for NDT

# ICNDT Guide and Recommendations

for Qualification and Certification of NDT Personnel according to ISO 9712 and Aligned Standards

1 March 2009

#### 7. ICNDT Recommendations

#### 7.1 Recommendations to users of central, third party certification

- When central, third party certification is appropriate, regulators and industry are recommended to specify the use of NDT personnel who are certified in accordance with ISO 9712 or an aligned standard, where appropriate by a Certification Body accredited to ISO 17024.
- Regulators and users should recognise the importance of employers of NDT personnel properly fulfilling their responsibilities to authorise personnel to work (see Section 6) – after first confirming that their employees are adequately trained, experienced and qualified.

#### 7.2 Recommendations to Certification Bodies

 Certification Bodies are urged to provide certification to both ISO 9712 and relevant aligned standards in order to maximise the value of their certification. In anticipation of future harmonisation, their training syllabuses should encompass the requirements of the documents ISO/TR 25107 and/or CP 105 which define the body of knowledge.

#### 7.3 Recommendations to Standards Bodies

 Standards Bodies ISO, CEN and ANSI/ANST are urged to harmonise their standards for third party certification, whilst allowing within the Standard(s) some flexibility for national conditions.

#### 7.4 Recommendations for future ICNDT activities

 ICNDT members should share experience on development and operation of multilateral recognition agreements, with a view towards a possible ICNDT initiative to achieve mutual recognition between the EFNDT and APCNDT agreements and extension to other regions.





#### **ICNDT WG1 Qualification and Certification**

- Chairman: John Thompson
- Members: Australia, Germany, Austria, France, USA, Singapore, Japan, Russia, Brazil, Canada, South Africa, China, Spain
- ICNDT Multilateral Recognition Agreement (ICNDT MRA)
  - Replace regional MRAs
  - Open to all PCBs
- ICNDT Approval of Personnel Certification Bodies
  - Alternative or supplement to Accreditation
- Wide support from the ICNDT Membership;
  - reinforced at recent EFNDT Certification Conference in Valencia
- Decisions at PGP in Cancun



- Global survey of NDT Education at University level
- Promotion of international partnerships between Universities to facilitate NDT education at University level, starting with a survey of existing international partnerships, for publication on the ICNDT website
- Training guidelines for novel techniques
- International Workshop on Imaging NDE
- Produce ICNDT Monographs
  - Limited progress on all of the above
- Workshop for Researchers with representatives of key Research Centres at WCNDT





- Recognition of the importance of NDT
- Responding to the globalisation of business
- Ensuring quality and reliability of NDT services

New emerging challenge is

How to help create sustainable NDT societies (and Certification Bodies ) in the many small developing countries in the world



If NDT is important and will be carried out all around the world we need to be sure it is reliable wherever it is carried out

Key challenge is how to ensure quality all along the supply chain Remember we depend critically on the motivation of the individual NDT personnel, Avoid multiple duplicate personnel certification which must demotivate











# Future: Challenges and opportunities for ICNDT

- How to help create sustainable NDT societies (and Certification Bodies ) in the many small developing countries in the world
- We need
  - more and stronger regional groups (like EFNDT) to bring together common interests
  - new models for the cooperation of small societies with larger societies
  - -new uses of IT and social media
  - international technical seminars/workshops using web conferencing
- Will bring opportunities for both large Societies (like BINDT) and small societies



Bring together ICNDT WG3, NDT Academia, WFNDE centres, IIW, IAEA to share

- Objectives
- Scope
- Needs
- Actions
- Plans

My view is that Research communities and industrial communities need to be more closely linked

Research and development Standards Procedures Equipment Personnel Training Personnel Certification

Human Factors Audits and Surveillance





- WCNDT is organised every four years by a Member Society selected by the ICNDT membership from those who bid
  - 2000 Rome, 2004 Montreal, 2008 Shanghai
  - 2012 Durban, 2016 Munich
- We need your support to make the conference in Africa a great success
- Deadline for Abstracts is 15 October 2011
- Once in a working lifetime opportunity for most of us
- See you in Durban!

ICNDT The World Organisation for NDT

# Summary

- Three parts:
  - Company. BINDT, ICNDT
- Three threads
  - 50 years history, where we are now, future opportunities
- Three recurring themes
  - Importance of NDT,
  - globalisation of NDT,
  - achieving reliability of NDT

Have I demonstrated the Value and benefit of the work of BINDT, other NDT Societies, EFNDT to the industry and wider public and the added value of working together – in partnership with ICNDT







Support of Doosan Power Systems

Support of BINDT colleagues

Support of colleagues in ICNDT

Thank you for your time and attention





EDF Sizewell B



Atucha 1+ 2 PSI and ISI



