ADVANCED UT EXAMINATION PROGRAMMES

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Abstract
The introduction of new, innovative, advanced training and examination programmes requires a combined input from users, manufacturers, researchers, industrialists, trainers and examiners. This paper looks at two approaches to this process and considers how the development of future programmes might evolve.

Keywords: Certification, Time of Flight Diffraction (TOFD), Phased Array (PA)

1.1 EN 473 specifies the system used in this standard can also apply to other NDT methods …… or new technique provided a comprehensive scheme of certification exists.
1.2 ISO 9712 states the system used by this International Standard could also be applicable to other NDT methods, where independent certification programmes exist.

2. BINDT Approach (Central Certification)
2.1 Enquiry from industry for a potential programme
2.2 Certification Services Division receives the enquiry and issues a call for interested parties through the Institute Journal
2.3 Establishment of cross-board interest
   Industry
   End-Users
   Manufacturers
   Trainers
   Examiners
2.4 Creation of Working Group by the Certification Management Committee
Selection of Chair
Establish Terms of References for the Group
Remit to provide 3 main documents and an equipment and exam sample requirement
Must be cross-board committee representation

2.5 Main Document
Requirements of the programme
Syllabus
Specimen questions
Plus minimum requirement for equipment and samples for trainers and examiners

3. Example Programme Time of Flight Diffraction
3.1 Enquiry put to industry
3.2 Working Group meeting establishing feasibility
3.3 Use of BS 7706 [3] which included a framework training and qualification programme
3.4 Creation of initial draft documents
3.5 Discussion between Working Group Members/Experts then submission to CMC, return to Working Group for attention to comments, amendment to document, return to CMC, approval by CMC, forward to Council and issued as a BINDT/PCN product.
3.6 Initially the programme for Level 2 TOFD which emerged was as follows: TOFD for Linear Butt Welds in Ferritic Steel.
3.6.1 Must hold UT Level 2 Welds PCN
3.6.2 12 Months TOFD work experience
3.6.3 80 hours accredited TOFD training
3.6.4 Level 2 exam
   3.6.4.1 TOFD Specific Theory
   3.6.4.2 TOFD Practical
       Calibration and set up
       Collect and store data from 2 weld samples
       Interpret and report on 5 weld samples
       Prepare an NDT Instruction
Approximate time from enquiry to issue for this programme was around 2 years, issued in January 2004. Slight variations to the
4. Example Programme UT Phased Array

4.1 A similar programme was followed after an UT Phased Array enquiry. This was more challenging than the TOFD one as there was no existing standard to work on, and Phased Array could be applied to castings, wrought and weld products and so needed a different approach to the requirements document. However as a result of serious discussions a solid programme emerged in 2005, and as the TOFD one, this document has also been reviewed and amended by the Working Group in light of experiences gained from running the programme.

4.2 Essentially the programme for Level 2 Phased Array which emerged was as follows: UT for Phased Array Transducers:
4.2.1 Must hold UT Level 2 Castings/Wrought/or Welds PCN
4.2.2 3 months work experience in Phased Array
4.2.3 80 hours accredited Phased Array training
4.2.4 Level 2 exam
   4.2.4.1 Phased Array Specific Theory
   4.2.4.2 Phased Array Practical
       Calibration and set up
       Production of set up files and scans plus testing and collection and storage of data for 3 appropriate samples
       Interpret and report on 3 scan data files
       Prepare an NDT instruction

Again this programme took 2 years to emerge from the initial enquiry stage.

5. Other Programmes

Other programmes which have emerged using the similar process are

1) UT and Welds in Duplex Stainless Steel
2) Computed Radiography.

There are others at various committee stages including one for Guided UT Waves.

All the completed programmes are available for the PCN level on the BINDT website www.bindt.org.
6. Employer Based Programmes

Within employer based programmes such as SNT-TC-1A\(^4\), EN 4179\(^5\) and NAS 410\(^6\) the employer will create a programme within his Written Practice, this programme must be agreed between the purchaser and supplier to ensure the various components of training, and experience and examination for the Advanced UT programmes to meet the precise needs of the purchaser.

7. Limitations

There are limitations of these processes including the time it takes to bring a new programme into use at an AQB, my experience is that it can take as long as 2 years from start to finish. Other concerns are the cost of the advanced equipment being out of reach of a basic AQB as can the cost of training and examination samples to replicate these used in industry.

8. Conclusions

8.1 Programmes for new and emerging NDT methods for 3rd party programmes must follow a structured process which involves all parties, end users, manufacturers, trainers, examiners and industrialists.

8.2 The process is overseen by a variety of committees to ensure relevance to industry’s needs.

8.3 For employer based systems the new programmes must be agreeable to both supplier and purchaser and documented in the Employer Written Practice and approved by the Level 3.

8.4 In all cases the employer is responsible for issuing the operator with the authority to work and so it is important that the route to certification is solid and acceptable to industry.

9. References


[3] BS 7706 Guide to Calibration and setting-up of the Ultrasonic Time of Flight diffraction (TOFD) technique for defect detection, location and sizing of flaws

[4] Recommended Practice Nº SNT-TC-1A 2006 Personnel Qualification and Certification in Non destructive testing

[5] BS EN 4179: 2009 Aerospace series – Qualification and approval of personnel for non-destructive testing