QUALIFICATION AND CERTIFICATION IN NDE AS PER EN STANDARDS

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ABSTRACT

Till now we in India were working mostly as per ASME standards and NDE personnel were certified as per IS 13805 (Indian Standards) and SNT-TC-1A (American guidelines). The demand for projects / jobs as per EN standards has steadily increased in the past one or two years, and is bound to rise exponentially in the near future. Consequently, requirement for Qualification and Certification of NDE personnel as per EN standards is increasing. This paper highlights the following points:

- Different National and International Certification schemes in NDE
- EN Qualification and Certification – Present scenario in India.
- Why go for EN certification.
- General comparison – SNT-TC-1A Vs EN 473
- Requirements for Qualification.
- Requirements for Certification.
- Training for Qualification and Certification.
- Certification examinations.
- The future of EN Certifications in India
- Road map for EN Qualification and Certification in NDE.

Keywords: European Standards-EN473, Certification Body, Examination Centre, SNT-TC-1A, NDE Methods

INTRODUCTION

While looking back in Training & Certification in NDT, in sixties, we see generic guideline made by ASNT by stating some basic requisites for qualification & certification. Along with the time, within last 50 years, these guidelines were developed further & refined to a recommended practice of SNT-TC-1A 2006 or CP-189-2006 standard. Many national & international standards were generated in last 50 years to address the subject. Few of them are ISO 9712, EN 473, IS-13805 & so on.

If we go to the basics of Qualification & Certification and ask a question to ourselves-

Why Qualification?

The obvious answer comes is ‘To judge the Competency.’ Now the competency is required for ensuring the correct testing & correct evaluation. To get this competency in testing, one has to have knowledge of testing techniques, knowledge of discontinuities expected, experience of finding out discontinuities and knowledge for evaluating these discontinuities. He shall also have the proper eyesight so that he will not miss the small discontinuities. He shall also have proper training & guidance to find out the discontinuities. This was the logic used for developing the first edition of SNT-TC-1A which was refined further in last 50 years.

THEORY

The basic quality of product is judged by three important parameters which are good design, right material and appropriate workmanship. A good design will work provided the designer assumptions are valid in actual product. This is verified by different type of testing techniques and NDE is playing a very important role in it.

The success of any NDE is dependent on right procedure, calibrated machine and qualified manpower. Even though we have sophisticated equipment and adequate procedures the success of NDE still rests on the competency of personnel carrying the NDE. The person carrying out NDE has to have...
knowledge and skill to apply the technique effectively. This knowledge and skill has to be verified, measured, documented and audited continuously for the success of NDE. The knowledge of person can be achieved by proper education and training and skill can be achieved by practice and experience. However the assessment of this knowledge and skill is only possible by proper qualification system. The different NDE operators’ certification and qualification are available worldwide.

The NDT Qualification & Certification, Standards are mainly grouped in two categories - Employer based & Independent of Employer. The American standards are employer based standards. SNT-TC-1A requires an employer to develop a written practice and train and qualify their personnel as per written practice. Whereas European Standards are independent of employer. They demand independent certification. While reviewing these two trends in Training & Certification, it is also seen that the American systems are now going towards Central Certification (ACCP is launched few years back). They are keen on removing the drawbacks of SNT-TC-1A and put more specific requirements on employee like the generation of CP-189 standard. The British Schemes are independent certification schemes and they demand sector wise certification.

Any type of scheme, we refer, a need for education, experience, eye test, training & examination is there. The requirements differ in their extent.

As on today the SNT-TC-1A 2006, ASNT’s ACCP Scheme, ASNT’s CP-189 standard or EN 473, ISO 9712 and IS 13805 are demanding different types of requirements. A comparison of requirements are listed in Annex 1. So far the certification schemes widely used in India are ISNT scheme IS 13805 and ASNT schemes. However in the recent past there is increasing demand for EN qualifications in different NDE methods. This is mainly because of an increase in outsourcing of engineering products and equipments to India by European community and other parts of the world. The base document for the qualifications and certification is EN 473.

Let us review some of the definitions in EN 473

Authorized qualifying body - Body, independent of the employer, authorized by the certification body to prepare and administer qualification examinations.

Certification body - Body that administers procedures for certification according to the requirements of this European Standard and which fulfils the requirements of EN ISO/IEC 17024.

Examination centre - Centre approved by the certification body where qualification examinations will be carried out.

Industrial experience - Experience, acceptable to the certification body, gained under qualified supervision, in the application of the NDT method in the sector concerned, needed to acquire the skill and knowledge to fulfil the provisions of qualification.

Job-specific training - Training, provided by the employer (or his agent) to the certificate holder in those aspects of non-destructive testing specific to the employer’s products, NDT equipment, NDT procedures, and applicable codes, standards, specifications and procedures, leading to the award of operating authorizations.

Main-method examination - Written examination, at level 3, which demonstrates the candidate’s general and specific knowledge, and the ability to write NDT procedures for the NDT method as applied in the industrial or product sector(s) for which certification is sought.

Qualification examination - Examination, administered by the certification body or the authorized qualifying body, which assesses the general, specific and practical knowledge and the skill of the candidate.

Sector - Particular section of industry or technology where specialized NDT practices are used, requiring specific product-related knowledge, skill, equipment or training.

NOTE A sector can be interpreted to mean a product (welded products, castings) or an industry (aerospace, in-service testing). See Annex A.

Specific examination - Written examination, at level 1 or 2, concerned with testing techniques applied in a particular sector(s), including knowledge of the product(s) tested and of codes, standards, specifications, procedures and acceptance criteria.

Supervision - Act of directing the application of NDT performed by other NDT personnel, which includes the control of actions involved in the preparation of the test, performance of the test and reporting of the results.

In EN 473 total 8 methods are listed which are as follows

- Acoustic emission testing - AT
- Eddy current testing - ET
- Leak testing - LT
- Magnetic particle testing- MT
- Penetrant testing - PT
- Radiographic testing- RT
- Ultrasonic testing -UT
- Visual testing- VT

Minimum training requirements

The minimum training requirements for level 1 ranges from 16 to 72 hours for different methods. For level 2, it is 24 to 80 hours, and for level 3 it is 24 to 80 hours.

Experience

The experience requirement prior to examination ranges from 1 to 3 months for level 1, 3 to 9 months for level 2, and 12 to 18 months for level 3 for various methods. This can be reduced by the certification body.
Number of questions

The required minimum number of questions for general examination for level 1 and 2 are 40 for AT, ET, RT and UT. Whereas for LT, MT, PT and VT these are 30.

Number of questions for level 3 are given in Table 1.

<table>
<thead>
<tr>
<th>Part</th>
<th>Subject</th>
<th>Number of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Technical knowledge in material science and process technology</td>
<td>25</td>
</tr>
<tr>
<td>B</td>
<td>Knowledge of certification body’s qualification and certification system based on this European standard. This may be an open book examination.</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>General knowledge of at least four methods as required for level 2 and chosen by candidate from the methods given in clause 1 which shall include at least one volumetric method. (UT OR RT)</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>Level three knowledge relating to the test method applied</td>
<td>30</td>
</tr>
<tr>
<td>E</td>
<td>Application of NDT method in the sector concerned, including the applicable codes. This may be an open book examination in relation to codes, standards and specifications.</td>
<td>20</td>
</tr>
<tr>
<td>F</td>
<td>Drafting of one or more NDT procedures in the relevant sector. The applicable codes, standards and specifications shall be available to the candidate. For a candidate who has already drafted an NDTJ procedure in a successfully passed level 5 examination, the certification body may replace the drafting of a procedure with a critical analysis of an existing NDT procedure covering the relevant method and sector, and containing errors and/or omissions.</td>
<td>—</td>
</tr>
</tbody>
</table>

Weighting factors

The uniqueness of the standard lies in weighting factors for grading the practical examination for level 1 and 2 which differ for knowledge of the apparatus, application of NDT to the test specimen, detection and reporting of discontinuities.

Renewal / Recertification

The certificate will be renewed after a period of 5 years, and will be recertified after a further period of 5 years. This cycle of renewal and recertification shall continue.

When creating a sector, it is recommended that the certification body takes into consideration the following reference list of sectors:

Product sectors

- castings (c)
- forgings (f)
- welded products (w)
- tubes and pipes, including flat products for the manufacturing of welded pipes (t)
- wrought products (wp)
- composite materials.

Industrial sectors

Sectors combining a number of product sectors including all or some products or defined materials (e.g. ferrous and non-ferrous materials, or non-metals such as ceramics, plastics and composites):

- metal manufacturing (combining c, f, t, w and wp);
- pre and in-service testing of equipment, plant and structure (combining c, f, w, t, wp and other product sectors);
- railway maintenance (combining f, wp and other product sectors);
- aerospace (combining c, f, w, t, wp and other product sectors).

Road map for employer to get EN certification for his personnel

- Check eligibility as per EN 473
- Verify experience as per EN 473
- Check training requirements (syllabus and training hours)
- Get the personnel trained through approved training center
- Eye test requirement and documentation
- Apply to certification body with fees (e.g. TUV Nord etc)
- Examination
- Certification
- Renewal and recertification

Our experience with EN Standards

EN standards are quite clear for interpretation, but one may find the language a little different from what he is used to. We have experimented with the certifications over a period of 2 years and have got certified 4 of our personnel (level 2 and level 3). This was not just for the reason of requirement, but also to understand the philosophy of EN certifications.
CONCLUSION

EN certifications are coming up in a big way in India, and more and more people are getting themselves certified to this standard, to cater to the requirement of the market. We see an exponential growth in these certifications. As this is just the beginning, there is a lot of scope for those getting certified in the near future.

REFERENCES

1) EN 473 -2008
2) SNT-TC-1A 2006
3) IS 13805 - 2004

Annexure 1

DIFFERENT NDT CERTIFICATION SCHEMES

General Comparison Chart

<table>
<thead>
<tr>
<th></th>
<th>SN 1-TC-1A</th>
<th>CP 189</th>
<th>ISO 9712</th>
<th>PCI/EN 473</th>
<th>BIS 13805</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certifying Agencies</td>
<td>Employer</td>
<td>Employer</td>
<td>Independent of Employer</td>
<td>Independent of Employer</td>
<td>Independent of Employer</td>
</tr>
<tr>
<td>Level III</td>
<td>Centralized + Employer based</td>
<td>Centralized (ASNT level III)</td>
<td>Centralized</td>
<td>Centralized</td>
<td>Centralized</td>
</tr>
<tr>
<td>Level I &amp; Level II</td>
<td>Non-Centralized</td>
<td>Non-Centralized</td>
<td>Centralized</td>
<td>Centralized</td>
<td>Centralized</td>
</tr>
<tr>
<td>Validity for Level III</td>
<td>Five years</td>
<td>Five years</td>
<td>Five years</td>
<td>Five years</td>
<td>Five years</td>
</tr>
<tr>
<td>Validity for Level I &amp; II</td>
<td>Five years</td>
<td>Five years</td>
<td>Five years</td>
<td>Five years</td>
<td>Five years</td>
</tr>
<tr>
<td>Specific</td>
<td>Employer Discretion</td>
<td>On Specification</td>
<td>Specific by Sectional Committee</td>
<td>Written + Pr for Level I &amp; Level II Procedure for I III</td>
<td>Written + Pr for Level I &amp; Level II Procedure for Level III</td>
</tr>
</tbody>
</table>