Qualification and Certification of NDT Personnel – Concepts and Misconceptions

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Introduction

Qualification and Certification of NDT personnel is an important requirement in the field of Non-destructive Testing. We know that good testing calls for approved procedure, qualified personnel and calibrated equipment. No NDT person can do testing or examination without certain qualification, in spite of good experience.

The need for qualification arose out of requirement of competency. Competency to perform the test correctly, and competency to evaluate the results correctly. A lot of factors contribute towards this; knowledge of testing techniques, knowledge of expected discontinuities, experience of identifying the discontinuities, knowledge of evaluating these discontinuities with respect to different national and international codes and standards and the knowledge of advantages and limitations of the testing methods. The obvious requirement that followed was that of proper eyesight. This was to ensure reliable detection and identification of all discontinuities which have bearing on the satisfactory performance of the item or product under test.

The whole purpose of qualification is to ensure that faulty product does not go to the process / customer. The training, both theoretical and practical, is an inseparable part of the process.

Various Schemes – A Review

There are various schemes available for Qualification and Certification all over the world. Qualification can in general be defined as upgrading to a particular level (can be given by an outside agency) and certification as authorizing to work (must be given by the employer). These schemes basically are similar. The schemes can be classified as employer based schemes and centralized schemes. The basic things covered by all the national and international schemes are education, experience, physical tests, theory tests (general and specific) and practical tests.

A few schemes to mention, which are widely used are: SNT-TC-1A, CP 189, EN 473, IS 13805 and ISO 9712.

With respect to certifying agencies, SNT-TC-1A and CP 189 are employer based. The other three are independent of the employer.

The American schemes/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. European Standards are generally independent of employer, and demand sector-wise
certification. They demand independent certification. While reviewing these two trends, it is also seen that the American systems are now going towards Central Certification (like ACCP). They are keen on removing the limitations due to flexibility of SNT-TC-1A and put more specific requirements on employee like the generation of CP-189 standard.

In any type of scheme, a need for education, experience, eye test, training and examination is specified. The requirements differ in their extent.

As on today the SNT-TC-1A, ASNT’s ACCP Scheme, ASNT’s CP-189 standard or EN 473, ISO 9712 and IS 13805 are demanding different types of requirements, though similar in nature. So far the certification schemes widely used in India are 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. ISO 9712 is gaining popularity as a uniform standard for the world.

While employer based schemes do have the advantage of flexibility to a certain extent, they limit the qualified persons in their work area. Centralized schemes, on the other hand, are not flexible, but a qualified person is free to choose his work area. Employer based scheme at times loses its appeal when a lot of liberty is taken during defining the system and implementing. Whereas centralized schemes maintain their standard due to being rigid.
A general table showing some similarities and dissimilarities between various schemes is shown below.

**General Comparison Chart**

<table>
<thead>
<tr>
<th></th>
<th>SNT-TC-1A</th>
<th>CP 189</th>
<th>ISO 9712</th>
<th>PCN/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>Independent / Employer based</td>
<td>Independent (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 L III</td>
<td>Written + Pr for Level I &amp; Level II Procedure for Level III</td>
</tr>
</tbody>
</table>
Pain Areas

Education
Education has something to do with the level of understanding the candidate may have before attending the training. Though there may not always be a direct relation between the grasping ability of a candidate and the formal education he has or has not undergone, it is observed that a higher level of formal education helps in better understanding the course content during training. Different countries will have different levels or primary schools or secondary schools. Hence, one needs to go through the syllabus and understand the basic level of education required. In some of the schemes, it is having relation to the number of training hours required to be completed. Another thing is, there is no mention of the gap between completion the required level of education and the time when the training is being imparted. A large gap, like say twenty years, is a deterrent to both the candidate and the tutor as far as learning and teaching is concerned.

Experience
Understanding the requirement of experience is a big problem industry is facing. Systems are used and abused worldwide in this area. What is experience? Experience is defined as working with qualified supervision. It needs to be certified by some authority. This is not done in proper way in most of the places. A statement saying that a person is working in PT for twelve months may be satisfying the standard’s requirement of experience, but does not make any sense in actual practice. In many places, job opportunities exist for a candidate once he passes NDE Level II in a method; he is generally authorized to sign reports. Hence, completing Level I, working as Level I for a period and obtaining further experience is becoming a past. Going directly for Level II is reaping a big crop of non-performing Level IIs who are only signing the reports. The basic testing is carried out by persons who are not qualified and who are working under Level II. Take an example of penetrate test conducted by a person not qualified at all, and interpreted by a Level II person for acceptance. This will not give the output that the standard wants, but this seems to be a common practice.

Vision Test
Unless the operator is having proper eyesight no NDE can give results. There are near vision tests and colour vision tests specified by all schemes. Ignorance about conducting the test properly is a problem. The light intensity and distance from the chart being read are important for J1 / J2 tests, and are generally ignored. On many occasions, far vision certificates are produced instead of near vision. In colour vision tests, the deficiency of specific colours and how it will affect the operator’s use on specific test needs to be known. Shades of gray and its use are generally forgotten. The periodicity of the test (generally one year) is also a problematic area. One may find personnel working with eye test overdue. These tests need to be conducted by competent persons. The competent persons (including eye specialist) should know the purpose of the test and acceptance criteria. Copying the Jaeger charts or colour vision charts shall be avoided.

Training
This is another pain area. Who can train? There is a misconception that any qualified level III can train. Out of ten level IIIIs passing the exams, only one may have the required training skill. Training needs commitment, good communication, and systematic approach in addition to the sound subject knowledge.
Training syllabus with specified time in hours for specific topics, methodology for delivering the subject, methodology for judging the penetration of the subject, developing and maintaining training material updated are the key areas to be addressed for good training.
The other part of training is practical training. Practicals must be properly designed for developing skills in the operators and also to simulate actual working conditions. Developing good question banks and maintaining known characterized defective samples are the key parameters for success of any NDE training. Proper training of the trainers is a MUST. Maintaining adequate Training record is another area which needs improvement.

**Examination**

This is another key area. Examinations are meant to segregate the candidates in two groups; those who are meeting the requirements and those who are not. A properly designed examination shall meet the above requirement. Well designed and properly covered topic-wise questions and adequate degree of difficulty are essential. In practical examination, predefined and pretested defective samples are necessary. Border-case defects is an essential requirement. The candidate’s skill of performing the test and interpretation and evaluation of test must be judged during practical exams. Maintaining the seriousness of exams, monitoring the exams and confidentiality are the key areas. Proper training and qualification of examiners is a very important aspect which is not seen covered in the present schemes.

After the exam is over the candidate is qualified and certified….what next? His competency shall be judged periodically to ensure that he is maintaining requisite skills. Not performing the tests for a long time will deteriorate his skill levels. Ageing process (cataract etc) can also deteriorate his skills.

A periodical technical performance evaluation by a written test and practical exams carried out by a competent person is an essential feature of many certification schemes. Identification of adequate Examination records and its maintenance is very important.

**Evaluation of NDE Subcontractors**

The industry wants right NDE to be carried out. NDE is either done by own operators or subcontracted. If there is in-company NDE, the scheme of training and certification must exist and its implementation shall be done by competent authority.

If the NDE is subcontracted, the evaluation of subcontractor is a very important parameter. This is often an ignored area. The two ASTM Standards, ASTM 1212-92 – Standard Practice for Establishment and Maintenance of Quality Control Systems for Nondestructive Testing Agencies, and ASTM 1359-92 – Standard Guide for Surveying Nondestructive Testing Agencies, give quality system and the methodology of auditing NDE service agencies. The manufacturer / employer must take pains to evaluate / audit the NDE service agencies to ensure that the work done by them is up to the mark. Maintaining a library of defective samples to control the NDE service agencies is an essential requirement to have adequate control on NDE operators.

**Conclusion**

Qualification and certification is essential, irrespective of whether the standards and schemes demand it or not. Good qualification and Certification schemes exist world over. Success of a scheme depends on its implementation. A defect-free job reaching the customer is the ultimate aim. Pain areas discussed here are limiting the objectives of the schemes.

We all agree that things have to be done in a systematic and effective way. And we all want good results. Then why not follow the employed scheme or standard seriously? We bend the rules for our own sake, we ignore others’ laxity, we encourage short-cuts by tolerating them, we believe in inadequate reports. So the right thing to do seems to be – be sincere and strict in implementation of such schemes, respect the standards. And we have to, as usual, start with ourselves in case we want to make a change.