



The role of an NDT Level 3 Inspector

Following a survey conducted amongst current Level 3 Inspection personnel that posed the question 'What is the role of an NDT Level 3 Inspector in industry?' SAIW's *Harold Jansen* presents his findings.



Harold Jansen, SAIW's NDT manager.

Every citizen's right to life and to a safe environment, whether at home or at the workplace, is enshrined within Chapter 2 of the Constitution of South Africa and thus protected by law. The Occupational Health and Safety Act, the Minerals Act and the Merchant Vessel Act are decreed to protect these basic human rights.

The safety of individuals, their environment and operating plant is ensured through inspections that are governed by statutory codes, stipulated by the Minister of Manpower and enforced by the Department of Labour through an advisory council chaired by the Chief Inspector. Non Destructive Testing (NDT), as an integral part of inspection, is a statutory requirement for any system, vessel or plant being manufactured or fabricated and the implementation of in-service inspection programmes are also required to ensure that systems continue to operate safely.

The need for competent inspection personnel is established via the statutory code while the rules for qualification, certification and relevant duties/responsibilities of personnel, are found in related standards.

Two qualification and certification schemes are utilised throughout the South African NDT industry. The first scheme, detailed within the international standard ISO 9712 (which supersedes EN 473) is a personnel certification scheme based on independent third party qualification process, thus neither the employer nor the customer is involved in training or examination. In-service training and assessments are, however, mandated through the authorisation process required).

The second scheme is a company based certification scheme which is based on either a first party (customer)

or second party (employer) qualification (training and examination) process mandated by a mutually agreed Written Practice, compiled based on the recommended practice SNT-TC-1A or CP 189.

Three levels of qualification are defined in either ISO 9712 or SNT-TC-1A and CP 189. The requirements for each level, relating to training, examination, industrial experience and physical attributes are described within these documents. More importantly, the duties for each level are also defined.

In a nutshell, Level 1 NDT personnel (SAQA professional designation: NDT operator) are responsible for inspecting a component based on a supplied written instruction and to interpret and report the results, while Level 2 NDT personnel (SAQA professional designation: NDT technician) as well as performing level 1 duties, are responsible for ensuring, through direct supervision, that the inspection is performed within a quality environment, ie, in accordance with the relevant procedures and written instructions. Furthermore, the Level 2 is responsible for evaluating the reported results based on the applicable acceptance criteria and compiling the NDT inspection report.

Apart from the responsibilities attributed to Level 1 or 2, the only unique duties of an NDT Level 3 (SAQA professional designation: NDT technologist) according to the mentioned documents are to:

- Assume full responsibility for a test facility or examination centre and staff (ISO 9712).
- Establish, review for editorial and technical correctness, and validate NDT instructions and procedures (ISO 9712).
- Develop, qualify, and approve procedures (CP 189 and SNT-TC-1A).

- Establish and approve techniques (CP 189 and SNT-TC-1A).

From the qualification and certification standards it is apparent that Level 3 duties and responsibilities are focused on developing, qualifying and approving procedures and techniques and to take responsibility for NDT operations and staff, thus mostly administrative in nature.

In industry, however, a Level 3 NDT inspector is not critical when the only deliverable that the end-user requires is a signed inspection report! Therefore, the question 'Why are NDT Level 3 inspectors required in industry?' is very relevant.

The importance of the NDT Level 3 can be summarised by stating that they create or facilitate the creation of the quality environment in which NDT can be performed and ensure that the requirements of the client and those of the governing codes are met. While these two statements underline the importance of the NDT Level 3, a closer look might reveal the true nature of Level 3 responsibilities.

The mentioned quality environment refers to the resources and infrastructure needed for NDT inspections and the processes by which NDT is managed, controlled, applied and evaluated.

Resources refer to both personnel and equipment utilised during non-destructive testing. One of the Level 3 inspector's main duties is to ensure that personnel, whether in-house or subcontracted, is qualified, ie, has sufficient knowledge, skill and the physical abilities to perform the inspection. To this end, the Level 3 is responsible for compiling, implementing and managing the quality manual (ISO 9712) or Written Practice (SNT-TC-1A) that mandates the qualification and certification of NDT personnel.



It is crucial that NDT personnel are thoroughly trained by approved training bodies (ATB), which provide general training according to international codes and standards, are examined by authorised qualification bodies (AQB) and are also mentored and assessed in-house by approved NDT Level 3 personnel, based on company procedures and processes. Company authorisation or certification is only possible after a Level 3 Inspector has assessed the knowledge and skill of each individual, based on industry and company norms.

The NDT Level 3 is also responsible for the equipment or consumables used during inspections. Although the acquisition is not the responsibility of the Level 3 inspector, ensuring that equipment and consumables function in compliance with code requirements most definitely is. Aspects such as equipment calibration and functionality checks fall within the realm of Level 3 responsibility. The NDT Level 3 should establish a process whereby these functions are controlled, managed and verified.

Managing the inspection process and the specific tasks being performed by Level 1 and Level 2 inspectors, is the responsibility of the Level 3 who, in turn, takes full responsibility on behalf of the company for all deliverables provided to the client.

The NDT Level 3 is also responsible for documentation processes and for establishing, reviewing and validating inspection techniques and related documents to ensure that the detection capability and probability of detection is within an acceptable range. Documents relating to personnel qualification and certification, equipment verification, reporting structure and archiving, should be controlled via a process established and managed by the NDT Level 3.

These aspects cannot be remotely managed, thus the presence of the NDT Level 3 during inspections and interacting with the client is of utmost importance. Furthermore, the Level 3 should establish an inspection 'chain of command' to enable status updates and executive summaries of results to be produced.

While the use of Level 3 inspectors for training and authorisation/certifying personnel is a standard requirement, the presence of an NDT Level 3 during inspections is not mandated by any code. While the advantages of using an NDT Level 3 are evident from the previous

paragraphs, the use of Level 3 inspectors during NDT inspections is elective, and their function depends on the manufacturer, plant owner or operator. What is of utmost importance, however, is to ensure compliance with code and client requirements.

Identification of critical components, inspection planning, scope selection and extension, method and technique allocation, detection limitation and validation, review of results, probability of detection evaluation and systems review are only some of the areas where the use of an NDT Level 3 can be beneficial to the customer. Inspection problem solving and dispute resolutions should also be part of the operational duties of the NDT Level 3.

Although the referenced standards require that a candidate be qualified and certified as an NDT Level 3 to perform the

administrative or managerial tasks, it is evident that Level 2 certification, which ensures operational, hands-on ability, as well as applicable tertiary qualifications, would be beneficial to the NDT Level 3.

In conclusion, while the involvement of an NDT Level 3 during testing is not mandated by statutory codes, the advantage of having a well-established and maintained 'quality environment' to manage the inspection process, makes the use of a dedicated NDT Level 3 inspector invaluable to the overall service delivery and inspection quality. ■

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NDT Level 3 Inspectors: A summary of duties

Administrative: Certified Level 3:

Quality system (relating to NDT only):

- Quality manual and / or Written Practice.
- Validate and Authorise NDT procedures.
- Written instructions or techniques sheets.
- Report sheets.
- Document and record control.

Resource management: personnel (permanent, temporary or subcontracted):

- Company based training and mentoring, quality systems, procedures, mastering skills, site experience and evaluation.
- Assessment and examination.
- Company authorisation and certification.
- End-user approvals and authorisations (if and when required).
- Personnel records.

Resource management, equipment:

- Calibration.
- Functionality and operational checks.

Infrastructure:

- Inspection and communication protocols.
- Inspection site management.
- Company offices: management of NDT related documents and records.

Operational: Certified Level 3 with applicable Level 2 certification:

- Inspection planning and scope selection.
- Manage quality systems and resources.
- Monitor inspection progress and communicate with client.
- Ensure compliance with code and client requirements.
- Inspection problem solving and dispute resolution.
- Executive summation of inspection results.

Technical review; system and deliverables: Certified Level 3 with relevant tertiary qualifications in engineering or applied sciences:

- Statistical analysis of inspection results and personnel performance.
- Review process effectiveness and modify if required.
- Probability of detection and evaluation of procedure validity.

Research, design, development, validation and implementation: Certified Level 3 with relevant tertiary qualifications in engineering or applied sciences:

- Develop new or improved methods or techniques.
- Engineering of NDT (ISO 9712 : 2012 Annex E).