

RUSSIAN AND INTERNATIONAL APPROACH TO CREATION OF INDUSTRIAL SECTORS FOR NDT PERSONNEL CERTIFICATION

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Nondestructive testing is widely used in different branches of industry: machine building, ship building, oil and gas industry, aviation, railway etc.

Independent certification standards ISO 9712 and EN473 pay much attention to clear definition of industrial sectors. Standards define that sector is particular section of industry or technology where specialized NDT practices are used, requiring specific product-related knowledge, skill, equipment or training. According to European approach sector is defined by type of product to be tested. EN 473/ISO 9712 recommends to use the following 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).

This approach is based also on technological standards for testing of products. For instance, there are following standards are used for UT:

- castings – EN 12680-1 “Founding – Ultrasonic examination – Part I: Steel castings for general purposes”
- forgings – EN 10228-3 “Non-destructive testing for steel forgings – Part 3: Ultrasonic testing of ferritic or martensitic steel forgings”
- welded products – EN 1714 “Non-destructive testing of welds – Ultrasonic testing of welded joints”
- tubes and pipes – EN 10246 -6 “Non-destructive testing of steel tubes – Part 6: Automatic full peripheral ultrasonic testing of seamless steel tubes for the detection of transverse imperfections”
- wrought products – EN 10160 “Ultrasonic testing of steel flat product of thickness equal to or greater than 6 mm (reflection method).

EN 473/ISO 9712 give possibility to combine product sectors or defined materials (e.g. ferrous and non-ferrous materials, or non-metals such as ceramics, plastics and composites) in industrial sector. Certification body shall precisely define in its published documentation the chosen combination of product sectors. For instance:

- 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).

An individual certificated in an industrial sector shall be regarded also as holding certification in the individual sectors from which the industrial sector is composed. It means that he can conduct testing of all objects related to particular industrial sector. And only one practical examination is needed.

EN 473/ISO 9712 clear defines number of specimens which shall be tested during examination. Where the practical examination requires the testing of more than one specimen, the second or any subsequent specimens shall be different in character, e.g. in product form, material specification, shape, size and discontinuity type, from those tested previously.

Another principle is applied in Russian norms. For instance, Rostekhnadzor’s document PB 03-440-02 defines test objects as kind of supervised facility: technical devices, buildings and

constructions which should be tested by NDT. List of test objects is in Attachment 1 to the document. There are 55 test objects in total. It means 55 sectors. Such approach to sector definition is stipulated by Russian technological standards.

As example:

1. Objects of boiler inspection:

- 1.1. Steam and hot water boilers.
- 1.2. Electric boilers.
- 1.3. Vessels under pressure more than 0,07 MPa.
- 1.4. Steam and hot water pipelines under steam pressure more than 0,07 MPa and with water temperature more than 115°C.
- 1.5. Pressure chambers.

3. Lifting equipment:

- 3.1. Cargo cranes.
- 3.2. Elevators.
- 3.3. Cable ways.
- 3.4. Funiculars.
- 3.5. Escalators.
- 3.6. Lifts.
- 3.7. Pipelayer crane.
- 3.8. Manipulators.

Such approach to sector definition makes practical examination extremely complicated. PB 03-440-02 (clause 5.5.2.) defines that candidate shall test at least 3 specimens regarding test object. Additionally Level 2 candidate shall draft an NDT instruction regarding test object. There are no problems if candidate seek certification for one test object. But if the number of test objects is increased some problems are appeared. PB 03-440-02 (clause 5.5.6.) defines that candidate seeking extension of certification scope for a new test object shall be required to take the new specific and practical examinations. Additionally knowledge of the rules of safety operation of particular technical device shall be checked. There are no requirements how many additional specimens shall be tested: "For certification in two or more test objects specimens should be chosen in random manner from the set of specimens corresponding to applied test objects".

Therefore candidate shall test at least 3 specimens for each test object. If candidate work with objects of boiler inspection he shall test at least 15 specimens and draft 5 NDT instructions. In practice NDT specialist can test different objects: objects of boiler inspection, lifting equipment, gas supply objects, process pipelines etc. In this case the number of specimens to be tested is considerably increased.

What shall certification body do? First of all it is needed to analyze Russian norms in this field. For instance, for ultrasonic testing the following standards and norms could be considered: GOST 14782-86 – general standard for ultrasonic testing, RD 34.17.302-97 (OP №501 TsD-97) – ultrasonic testing of welded joints of boiler inspection objects, VSN 012-88 – ultrasonic testing of pipelines, RD ROSEK-001-96 – ultrasonic testing of lifting equipment. Than certification body can decide that candidate has to test limited number of specimens regarding particular standard or norm. Thus practical exam become optimal.

Conclusion.

Such non-compliances in definition of sectors in Russian documents and EN473/ISO9712 are the main obstacle on the way of their harmonization. Great efforts from both certification body and candidate are required. In view of joining of Russian accreditation body with EA and development of single international standard on independent certification it is very important for Russia to harmonize standards with international ones. And, of course, accreditation procedures should be harmonized as well based on ISO/IEC 17024.