

Creative Approach Development towards Non – Destructive Testing Expert Profession in the Process of Certification at the “SertiNK” Examination Centre

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Abstract. In order to interpret adequately the results of nondestructive testing and to get the full picture of the sort and space location of the defect, it is not enough to know only the requirements of norms and instructions. The knowledge of the physics of the method, understanding of the existing physical process in the course of defect searching is an important constituent part of an NDT specialist qualification.

Much attention is paid to qualified teaching of physical bases of nondestructive methods at the Examination Center “CertiNK”. At this Educational Institution, the teachers, who for the most part are the employees of the Moscow State Technical University named after N. E. Bauman, deal with specialists’ preparation in the field of nondestructive testing.

Questions for the General Examination are prepared in such a way that a specialist should have an opportunity to simulate a non-standard situation in the course of the nondestructive testing; to explain the influence of possible forms and space locations of the defect on the results of the control; to get understanding of what will happen in case of changes of this or that parameter of the physical process.

In order to give the right answer to the question, the candidate being examined, should have not only specific knowledge in the field of the method of control, but he is to reveal the creative approach towards solving of the set task. All this causes additional interest to the profession and its deeper understanding.

At practical studies, in the course of examination preparation, the specialists are offered different samples having multi-variant defects. At initial stages experienced teachers help the beginners to reveal and describe the defects in a right way.

Creation of the unified system of preparation and attestation of the experts in the field of non – destructive testing started in Russia in 1980s – and MSTY named after N. E. Bauman actively participated in this process.

Experts from the University have been members of the Commission on elaboration of the “Status on Attestation of Experts in the field of Non – Destructive Testing”, approved in 1987; qualification characteristics; attestation programs and questionnaires for attestation of experts of different qualification levels.

In 1990, Mr. N. P. Aleshin, the Director of RTC “Svarka I Kontrol” (Welding & Control), was introduced as a member of NAC (National Attestation Committee on Non – Destructive Testing). Having been accredited by NAC NK Scientific and Testing Centre “Svarka I Kontrol” (Welding & Control), since 1991 conducted attestation of experts in the fields of Acoustic Testing, Radiographic Testing, Magnetic Particle Testing, Eddy Current Testing, Acoustic Emission Testing, Leak Testing and Liquid Penetrant (Capillar) Testing.

Since 1996 an independent body for Non – Destructive Personnel Certification has named “SertiNK”. Starting with 1997 “SertiNK” has been accredited by the German Society on Accreditation (TGA) and worked in the field of experts’ certification in accordance with European standards.

More than 60 Doctors of Science and PhDs from the leading technical universities of Russia have participated as consultants and examiners of “SertiNK” RTC “Svarka I Kontrol” (Welding & Control). This provides highly technical level of forming collections of examination questions and their permanent actualization.

Questions for the general exam are composed in such a way that an expert can simulate the non – standard situation in the course of testing; explain the influence of different forms and spacing of a defect on the results of tests; imagine what happens with changes of this or that parameter of a physical process.

In order to give the right answer to a question a person, being examined, should have not only concrete knowledge in the field of the test method but also to use creative approach to solve the given task. All this causes additional interest towards profession itself and its deeper understanding.

In Figure 1 there are several typical examination questions. Training Manuals on all methods of Non –Destructive testing are developed by the examiners of “SertiNK” that are used by candidates in the course of preparation for certification.

Cross wave falls perpendicular to the border of medium interface: steel – air; steel – water, steel – oil. In what case the reflected wave amplitude will be the largest?

1. steel - air
2. steel - water
3. steel - oil
4. the same for all cases

Cross wave is directed from the Earth surface to its centre. Some time later an echo – signal with a rather large amplitude has been received. A substance in what condition is located in the centre of the Earth?

1. solid
2. liquid
3. gaseous
4. liquid or gaseous

How it is possible to determine the point of reflection of the axis of the cross waves bunch from the cylinder surface of the sample V-1?

1. by way of palpating with a wet finger
2. by using the time of echo-signal movement on the screen
3. impossible to determine
4. using not big direct transducer through the layer of dense lubricant.

enterprises dealing with these methods thoroughly for a long time (see Figure 2).



Figure 2. Candidates to be certified in Ultrasonic Test method at their practical studies.

Examination samples raw for conducting practical examination at “SertiNK”, is formed in accordance with the declared types of industrial products for a candidate certification.

There are different artificial and natural defects presented in the samples. In order to reveal them it is necessary to demonstrate not only skills in working with the modern equipment, but also the ability to interpret the tests results in the right way and to understand the type and spacing of a defect.

The knowledge of the physical basis of a method, understanding of the going physical process in the course of the defect searching – is an important part of qualification of an expert in the field of Non – destructive testing. Modern equipment of different types enables to conduct the practical examination on a high quality level.

In Figure 3 there are defectograms of the most complex and interesting examination samples.

In order to learn information in a better way in the course of the pre – examination studies there are computer films / movies, some of them prepared at RTS “Svarka I Kontrol” (Welding & Control).

For example, a film for candidates to be certified in the field of ultrasonic method of testing, consists of 100 questions and tasks in graphic form. Each task includes a welding joint or a sample with a natural or artificial reflector, the flaw detector screen and piezo – electric transducer, which can be moved alongside the welding joint with the help of the PC key – board and manual manipulator of the “mouse” – type.

In the course of a reflector searching appropriate echo – signals, typical for this reflector, are being drawn on the screen of the flaw detector.

The tasks and questions have been prepared using the principle of determination of different characteristics of reflectors; place of their location inside the weld – joints; determination of the flaw detectors parameters; conducting of ultrasonic tests of different types of weld – joints; using of different schemes of sounding; understanding the essence of physical processes, using for determination of reflectors parameters.

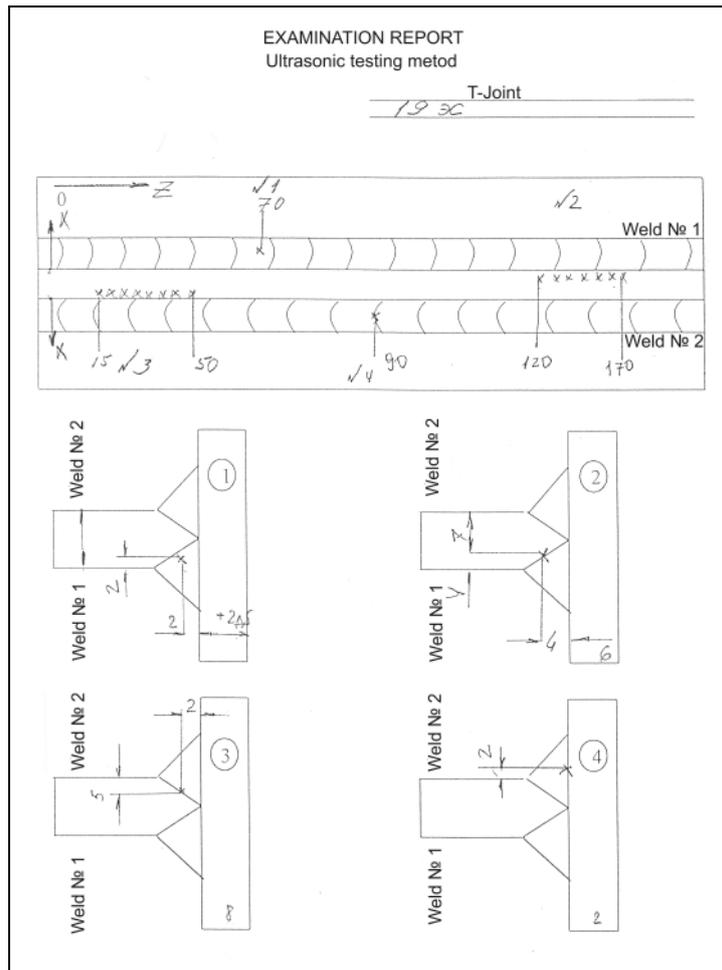


Figure 3. An example of a Defectogram of an examination sample in Ultrasonic Test method.

Some of the most typical pictures, taken from the computer films, that are used in the course of the exams preparation work for candidates for certification, are presented in Figure 4.

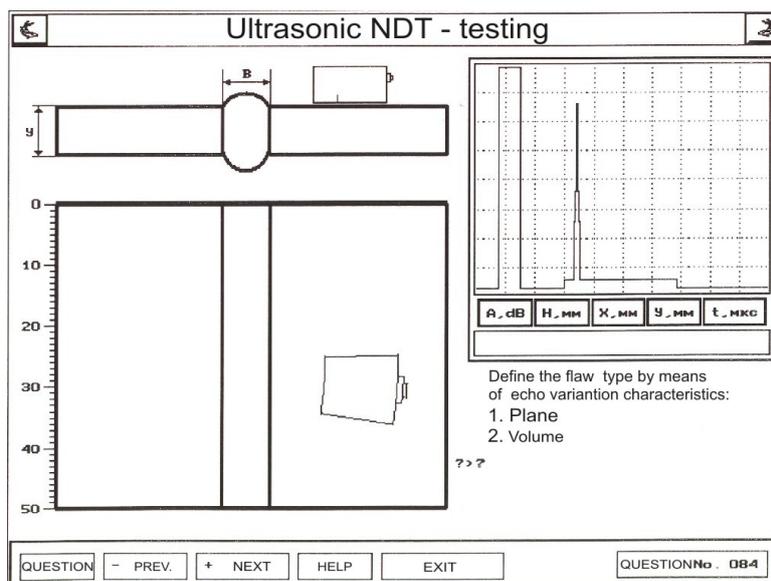


Figure 4. An example of tasks taken from a computer film, used in the course of preparations for an examination in Ultrasonic Test method.

Creative approach towards the process of tests, which can be traced all along complete stages of certification process, enables to use expert's possibilities as a thinking personality, that, in turn, may be considered as the base of the progress in Non-destructive testing.