ROLE OF OPERATOR TRAINING AND CERTIFICATION FOR THE RELIABILITY OF NDT

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Abstract
That the accuracy of a non-destructive test is mainly influenced by the testing equipment, the organizational context and written procedures, the interorganisational relations and last but not least by the operator. To improve the standing of the operator an training and certification according EN 473/ISO 9712 is common sense in many industrial sectors. This puts a high responsibility on the shoulders of training/certification bodies. Market is pushing the training/certification bodies to offer their service with the minimum training times of EN 473. To deal with heterogeneous groups of candidates pre-training, modern training tools and a systematic feedback during training is required.

Keywords: Training and Reliability

1. Introduction
A number of studies and projects have been founded to identify the basic factors of a non-destructive test. Shortl y summarized, they found that the accuracy of a non-destructive test is mainly influenced by:

- testing equipment
- operator performing the test
- organizational context and written procedures [1]
- interorganizational relations.

Here we focus on the operator: What influences the operator's performance during inspection?

Mainly experience, training, practical skills of the operator and individual capabilities like character, diligence, understanding numerical and mechanical principles. But also a careful briefing, a good organization of the inspection and a useful preparation of the tested area are important to motivate the operator. [2, 4, 5]
It can be summarized that the required accuracy of non-destructive tests depends highly on the operator and that his qualification, motivation and the test management have to be handled carefully.

2. The Operator

Fig. 1: In/ Output of the training process

There is no unified operator. He is a human being different in knowledge, skills and thinking. Some of his properties are of major importance for his performance as NDT-operator. The task of NDT-training is to transfer basic knowledge about NDT-methods and to develop skills for the operation. The examination and certification process should give a confidence in his ability to perform basic NDT-tasks.

3. Expectations

The employer of the NDT-operator spends a lot of money for NDT-training. He pays the fees, travel costs, accommodation but also the wage of the absent operator so training should be short. He is expecting also that the training is successful, that the examination is passed, that the operator gained knowledge and skills useful for the company. Some companies think that the operator is lifted from 0 to 100 during training, that he is ready to perform every kind of NDT immediately after the examination. Also important is the wish that a certificate is accepted by every customer and authority.

There are also expectations from the employee, the candidate for training. He likes to be treated fair: enough time for learning, good preparation for examination. This is connected to a modern learning environment. The candidates like also to pass the examination, as a certificate is lifting his job-opportunities.
4. The training company

This company has a difficult job. It seems clear that a heterogynous group of people has to be trained. Very small groups of people with the same level of knowledge are financially not optimal for the organisation. Huge groups are very heterogynous and difficult to train. We found the optimum between 12 and 18 candidates with two or three trainers.

But even in small groups it seems impossible to deliver a successful training for every kind of candidate because time is limited.

Our success rate is an average passing grade of 80% in examination. At the time of the examination we guarantee a minimum level of knowledge and skills. This can be certified.

(But from complex 12-month training sessions of unemployed people we learned that at the end they have forgotten the content of the first methods.)

5. Improvement potential

A basic fact seems to be that there is no way to get more time for the training of different persons. This leads to the use of a modern tool: E-learning.

Selection of candidates:

A simple assessment tool could help the employer to identify employees with a high probability to pass NDT-training and examination.

Pre training:

Better use of the training time. Outsource a part of the training into the company or as homework. The target is to form a homogenous group of participants with the same level of pre knowledge. Beginning with mathematical and physical contents an e-learning could also cover an introduction into the method and its basics. The training company could concentrate its work on the transfer of complex/difficult content and the development of practical skills.

During training:

Software could be a tool for the interactive visualisation of complex content. Even today there are simulation programs mainly in UT, RT and DR available to simulate complex tests on the screen and to evaluate the results. Actually we are working on an UT-hands-on simulator to improve UT-Testing on welds.

To control daily the knowledge transfer and to prepare the candidate for the written examination a test question program could be very useful.
After Training:
The training tools could help to refresh knowledge, to prepare for special jobs
or not at least for the recertification.

6. Summary
The qualification of NDT-personnel is under high financial pressure and
expectations. To improve this process e-learning could be a very useful tool
for every stage of training.

7. References
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