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Test Specimen for Interlaboratory Tests in X-Ray Control of Metals and Alloys

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Abstract

Proficiency testing program RT was announced for the purpose of comparing the performance of registered testing laboratories in the field in the NDT method RT. The aim is to ensure continuous improvement in the quality of testing laboratories' services.

Keywords: Radiography; Test; Welding; Laboratories; Radiographs; Non-destructive testing; NDT; Metals; Alloys

Introduction

The RT X-ray Testing Staff Skill Testing Program was announced with the aim of comparing the performance of registered RT testing laboratories in the field of NDT.

Test Specimen

Welded steel sample sent by the Certification Laboratory, without specified brand - Figure 1.

Figure 1: Sample sent for verification.

Results of the Study

Table 1 specifies the criteria for evaluating the template.

Figure 2 shows the artificially created defects that we had to register.

Table 2 shows the result of our study - out of 20 we have 18.8 points.

In Table 3 a partial assessment of the defects registered by us is given - a rating of 26.4 out of 30.

Table 4-7 presents the results of the defect assessment.

Figure 3 shows some of the radiographs obtained in compliance with standards [1-3] which we sent to the examiners. The overall score we received - Table 7 is 91 out of a possible 100.

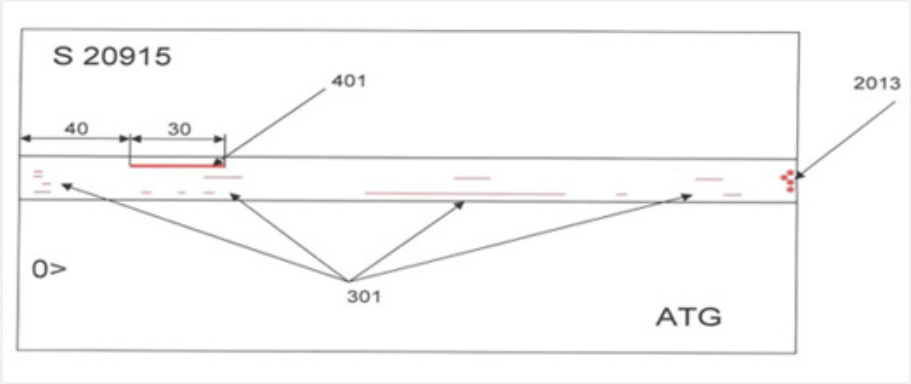

Figure 2: Artificially created defects.

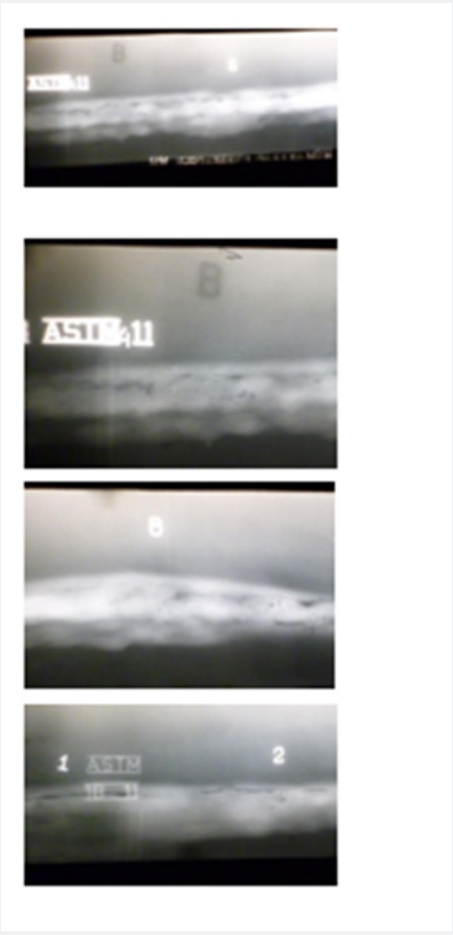

Figure 3: X-rays of sectors 1-3, 6-7, 4-5, 4-6.

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The evaluation System of Reference Values

Description of the activities	Max. number of points
1. Application of the NDT method / Task fulfilment	**20**
○ Application / Choice of the correct test technique	10
○ Determination of the test conditions	8
○ Activities after testing (cleaning of the sample)	2
2. Capability checks of the test means *(equipment, films, densitometer, negatoscope, gauges...)*	**5**
3. Finding defects	**30**
○ Relevant defects	5
○ Non-relevant not-registered defects	5
○ Position characterization and sizes	10
4. Evaluation of defects	**30**
○ Criteria application	5
○ Defect classification	5
○ Evaluation of the acceptable defect as inacceptable	5
○ Evaluation of the inacceptable defect as acceptable	15
5. Compliance with requirements for records	**10**
○ Explicitness and completeness	7
○ Marking of all unacceptable defects	3
6. Adherence to the specified deadline	**5**
TOTAL	**100**

Table 1: specifies the criteria for evaluating the template.

5.1 Statistical data for partial evaluation the success rate of the proficiency testing program RT-02/2012/10 for item No. 1 – Application of the NDT method/Task fulfilment:

Number of participants:	14
Maximum achievable number of points:	20 pts.
Average result achieved – median:	**18,8 pts.**

Graphical representation of results of individual participants:

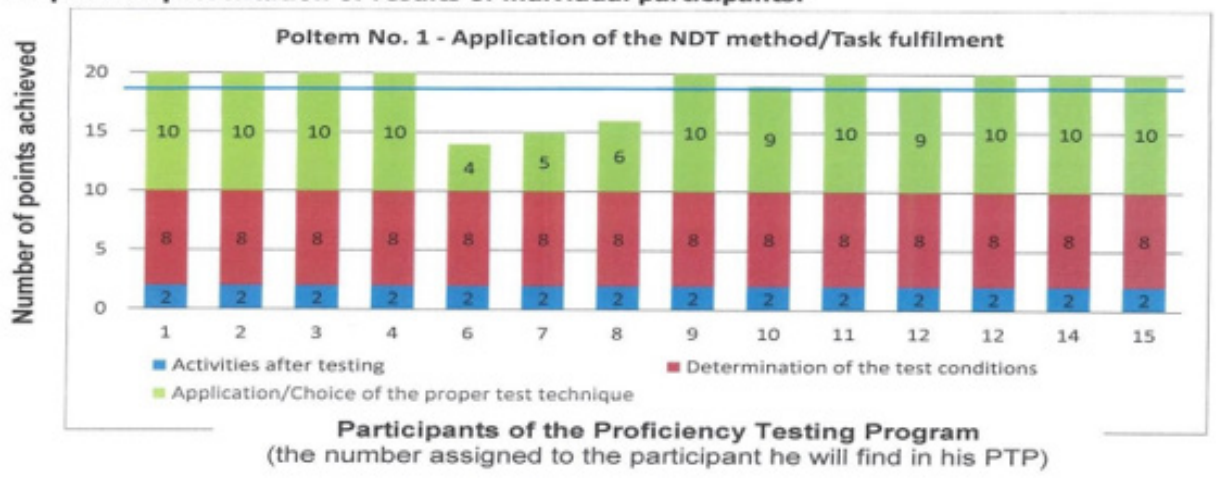

Table 2: Statistical data for partial evaluation.

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5.2 Statistical data for partial evaluation the success rate of the proficiency testing program RT-02/2016/12 for item No. 3 – Finding defects:

Number of participants:	14
Maximum achievable number of points:	30 pts.
Average result achieved – median:	**26,4 pts.**

Graphical representation of results of individual participants:

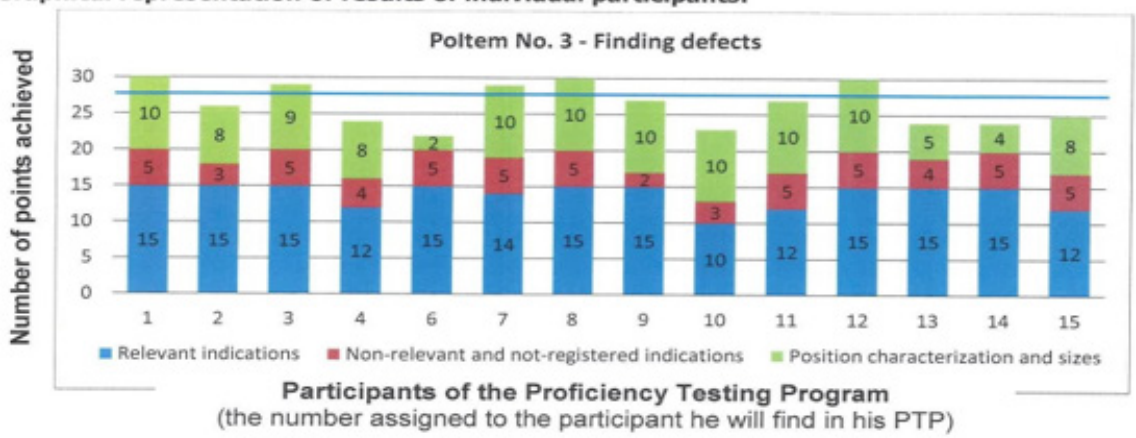

Table 3: Statistical data for partial evaluation-finding defects.

5.3 Statistical data for partial evaluation the success rate of the proficiency testing program RT-02/2012/10 for item No. 4 – Evaluation of defects:

Number of participants:	14
Maximum achievable number of points:	30 pts.
Average result achieved – median:	**26,1 pts.**

Graphical representation of results of individual participants:

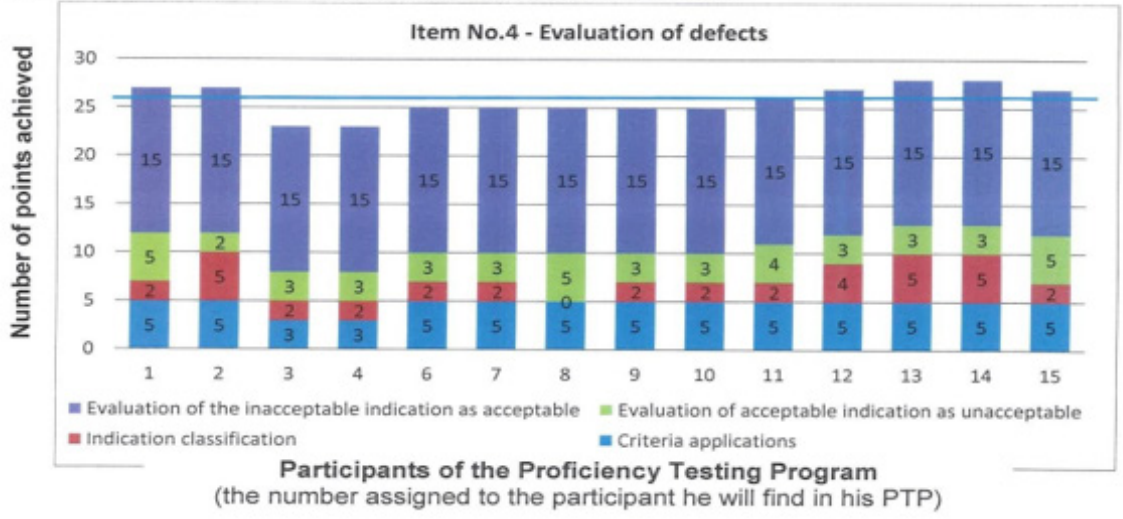

Table 4: Statistical data for partial evaluation of defects.

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5.4 Statistical data for partial evaluation the success rate of the proficiency testing program RT-02/2016/12 for item No. 5 – Compliance with requirements for records:

Number of participants:	14
Maximum achievable number of points:	10 pts.
Average result achieved – median:	**8,9 pts.**

Graphical representation of results of individual participants:

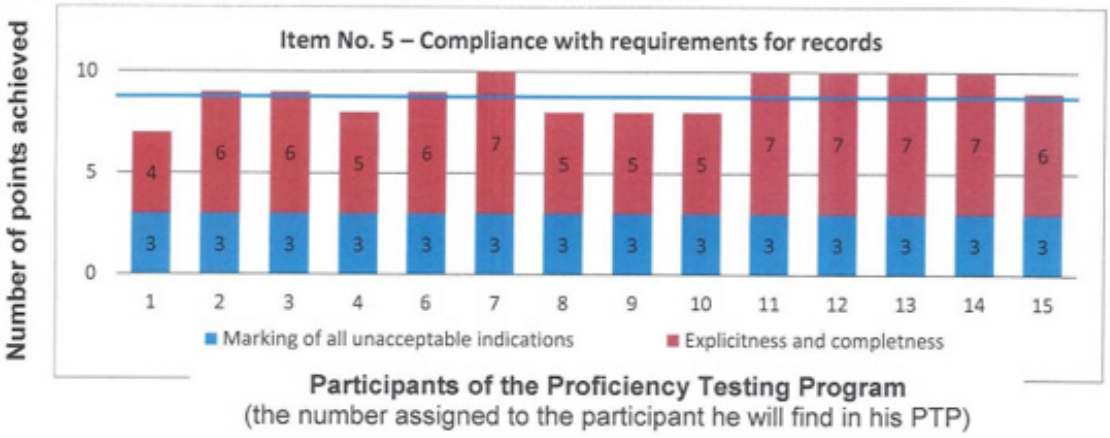

Table 5: Statistical data for partial evaluation.

5.5 Statistical data for overall evaluation the success rate of the proficiency testing program RT-02/2016/12:

Number of participants:	14
Maximum achievable number of points:	100 pts.
Criterion for satisfactory result:	minimum 70 pts.
Average result achieved – median:	**90,2 pts.**

Graphical representation of results of individual participants:

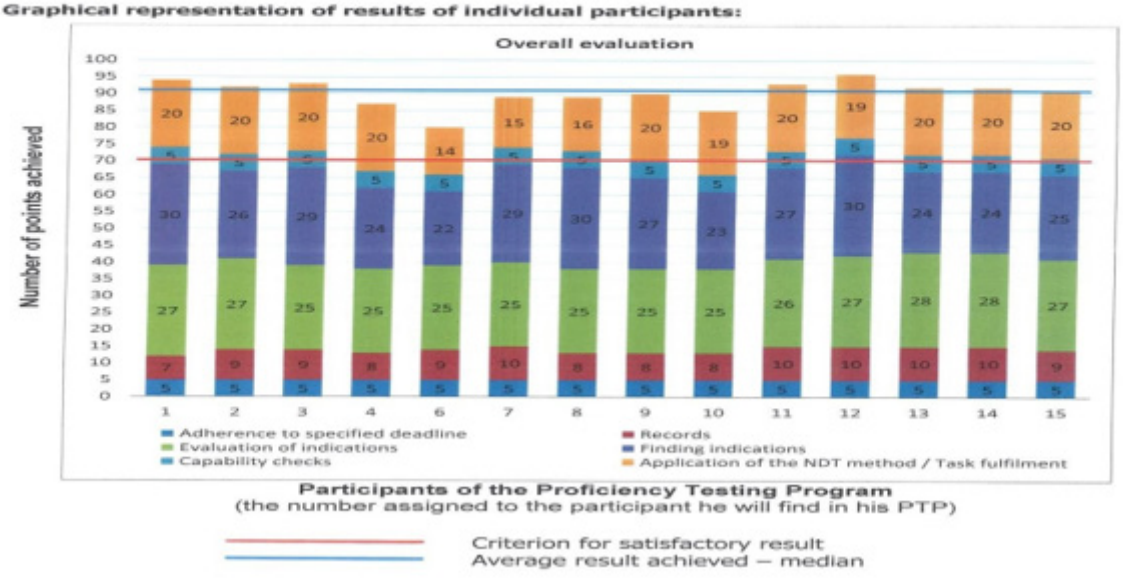

Table 6: Statistical date for overall evaluation.

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Detailed results of individual participants:

Description of activity	Max. number of points	Average number of points	Number of points achieved by individual participants – Participant code 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Application of the NDT method / Task fulfilment	20	18,8	20	20	20	20	0	14	15	16	20	19	20	19	20	20	20
• Application / Choice of the correct test technique	10	8,8	10	10	10	10	0	4	5	6	10	9	10	9	10	10	10
• Determination of the test conditions	8	8,0	8	8	8	8	0	8	8	8	8	8	8	8	8	8	8
• Activities after testing (cleaning of the sample)	2	2,0	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2
2. Capability checks of the test means (gauges, sprays, lamp, UV meter...)	5	5,0	5	5	5	5	0	5	5	5	5	5	5	5	5	5	5
3. Finding defects	30	26,4	30	26	29	24	0	22	29	30	27	23	27	30	24	24	25
• Relevant defects	15	13,9	15	15	15	12	0	15	14	15	15	10	12	15	15	15	12
• Non-relevant not registered defects	5	4,4	5	3	5	4	0	5	5	5	2	3	5	5	4	5	5
Position characterization and sizes	10	8,1	10	8	9	8	0	2	10	10	10	10	10	10	5	4	8
4. Evaluation of defects	30	26,1	27	27	25	25	0	25	25	25	25	25	26	27	28	28	27
• Criteria application	5	5,0	5	5	5	5	0	5	5	5	5	5	5	5	5	5	5
• Defect classification	5	2,6	2	5	2	2	0	2	2	0	2	2	2	4	5	5	2
• Evaluation of the acceptable defect as inacceptable	5	3,4	5	2	3	3	0	3	3	5	3	3	4	3	3	3	5
• Evaluation of the inacceptable defect as acceptable	15	15,0	15	15	15	15	0	15	15	15	15	15	15	15	15	15	15
5. Compliance with requirements for records	10	8,9	7	9	9	8	0	9	10	8	8	8	10	10	10	10	9
• Explicitness and completeness	7	5,9	4	6	6	5	0	6	7	5	5	5	7	7	7	7	6
• Marking of all unacceptable defects	3	3,0	3	3	3	3	0	3	3	3	3	3	3	3	3	3	3
6. Adherence to the specified deadline	5	5,0	5	5	5	5	0	5	5	5	5	5	5	5	5	5	5
TOTAL	100	90,2	94	92	93	87	0	80	89	89	90	85	93	96	92	92	91

* Participant no. 5 resigned from participation during the program

Verbal ratings		
95,5 – 100 points	Excellent	SATISFACTORY
90,5 – 95,0 points	Very good	
80,5 – 90,0 points	Good	
70,5 – 80,0 points	Sufficient	
70,0 points and less	UNSATISFACTORY	

Overall evaluation			
Number of participants:	Passed:	Failed:	Success rate:
14	14	0	100 %

Table 7: Assessment received.

Conclusion

The Certificate was obtained for competence for RT testing of the Laboratory "Non- Destructive Testing" of Imstca Balevski A.

References

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2. BDS EN ISO 5579:2013 Non-destructive testing (control). Radiographic testing of metallic materials using film by X-ray and gamma radiation. Basic rules. Non-destructive testing - General principles for radiographic examination of metallic materials by X- and gamma-rays. Basic rules (ISO 5579:2013).
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