Quality and innovation in education and certification of the personnel with the responsibility for welding coordination and non-destructive testing

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Abstract

The article presents the activities of Instytut Spawalnictwa (Institute of Welding) which include essential supervision of training of welding and non-destructive testing personnel conducted at Instytut Spawalnictwa and outside the Institute. The activity comprise approval and attestation of centres for welding and NDT personnel training as well as verification of lecturers and examiners for the welders training centres located outside the Institute, supervision of run courses in all levels of training, participation in examination and verification of welders’ and specialists’ qualifications. On the basis of acquired accreditations, authorisations and current regulations Instytut Spawalnictwa initiates drafting of guidelines for training and examining in all levels of training in the field of welding technology and allied technologies as well as NDT. Training is conducted in accordance with Instytut’s own programmes as well as programmes of International Welding Institute (IIW) and European Federation for Welding, Joining and Cutting (EWF). Training is the base for welding and NDT personnel to obtain European and International diplomas and certificates.

Keywords: education, training, certification; examination, personnel with responsibility for welding coordination, non-destructive welding personnel

1. Introduction

Instytut Spawalnictwa (Institute of Welding) has been established in 1945. Main task of newly organised State Institute primarily was to train welders, and then welding engineers, designers, inspectors and technologists. The first welding courses started already in April 1945, and in June year the first certificates were issued by the State Institute for 41 graduates. In 1950-51 training was excluded from the scope of activities of the Institute. Instytut Spawalnictwa however supervised it and separated Training Centre extended its offer with education of engineers and technicians in courses for welding inspectors, designers and technologists. Since the very beginning Instytut has supervised welding courses organised by other training centres. Training activity was suspended at Instytut in 1975 and until then 21865 persons graduated at Instytut. Training Centre has restarted its activities after reorganisation of the Institute in 1990 [1, 2].
2. Scope of activity and organisation of the Centre for Education and Welding Supervision

The activity of the Centre for Education and Welding Supervision is based on:
1. Statute of Instytut Spawalnictwa,
2. The rules of Instytut Spawalnictwa,

The Centre has its seat at Instytut Spawalnictwa in Gliwice, ul. Bl. Czesława 6-18. The Centre is run by the Instytut as its integral section, and is directly subordinate to the Institute’s Director. The activity of the Centre is under the care of the Scientific Council of Instytut Spawalnictwa.

The Centre contains:
1. Laboratory for Practical Training,
2. Mechanical Working Unit,
3. Non-Destructive Testing Laboratory.

Main objective of the Centre includes:
- supervision of training in the field of welding technology conducted outside the Institute (approval of welders training centres and examiners for those training organisations, supervision of the welding courses organised on all levels of training, participation in examination of welders, verification of welders and practitioners,
- qualification of industrial enterprises producing welded structures for adequate categories on the basis of current standards or regulations as well as supervision of manufacturing of liable welded structures,
- initiation of drafting standards and regulations in the area of training of welders and personnel with the responsibility for welding coordination,
- drawing up guidelines in the field of training and examination,
- qualification of welding technologies,
- offering training courses;
- in the higher and medium level in the field of welding technology for welding engineers and technician basing on the acquired accreditation and authorisation of certification organisations,
- in all levels of training within the scope of all welding processes, allied joining processes and thermal cutting techniques,
- or non-destructive testing personnel for level I and II in accordance with adequate standard,
- for welding practitioners.

Continuing education of personnel in welding technology is organised in the following scope:
- organising and offering of specialist training for welding personnel in all levels in accordance with the programmes of Instytut Spawalnictwa, European Federation for Joining, Welding and Cutting (EWF) and International Institute of Welding (IIW). The completion of course makes possible to acquire European and international diplomas and certificates,
- organising and offering of non-destructive testing training which is the base for acquiring certificates in accordance with obligatory standards,
- organising and offering of training of welders, pressure welders as well as operators of welding and pressure welding of metals and thermoplastics,
- organising of the supervision over basic and specialist training of welders and welding personnel in Poland, which is performed as ordered duties.

- The scope of the Centres’ activities include as well:
  - initiation of training activities – trough organisation of other courses in welding technology,
  - supervision of training trough approval of welders training centres in Poland basing on Institute’s Guidelines,
  - qualification of industrial enterprises by the Welding Commission for Qualification of Industrial Enterprises [3-5],
  - supervision of licensed examiners of Instytut Spawalnictwa by the Commission for Examiners Verification of Instytut Spawalnictwa.

In order to fulfil its goals and tasks The Centre is authorised to enter into agreements with Polish and foreign institutions, organisations or legal persons and in particular with European Federation for Welding, Joining and Cutting (EWF) and International Welding Institute (IIW).

3. Essential supervision and training activity in welding area

3.1. Welders training in accordance with the programmes of Instytut Spawalnictwa

Instytut Spawalnictwa exercises the essential supervision over training activity in the welding technology [1, 2]. In the range of supervision and training activities in welding technology the Centre for Education and Welding Supervision conducts:
- approval of training centres being under the essential supervision of Instytut Spawalnictwa,
- verification of examiners who conduct examination on behalf of Instytut Spawalnictwa,
- issuance of certificates for welders (Certificate of Welder’s Examination and Welder’s Books) basing on the examination protocols forwarded to Instytut Spawalnictwa.

The supervision system over the training centres is currently improved and consists in the issuance of one or two years valid certificates basing on the audit in the range of training level, welding methods and material groups. The guidelines developed at Instytut Spawalnictwa include training programmes which are obligatory for training centres. They also give the requirements on the qualification of practitioners and lecturers as well as the requirements according the training base.

In 2007 new training programmes were introduced which adjust training system to that being in force in European Union. The two-stage system (basic and secondary stage) has been replaced with the three-stage system (qualification in the scope of
fillet welding of plates and tubes, butt welding of plates as well as butt welding of tubes). Nowadays, because of various suggestions coming from examiners on unification of the rules for examination in welding theory issues at centres approved by Instytut Spawalnictwa, new guidelines with testing questions (three possible answers, one correct) are being developed. A computer program enabling examination protocols to be sent is under construction.

There is also an idea of preparing and publishing simple, clear and inexpensive course books for welders – in separate welding processes. It is a response to the demand of welders training centres.

Supervision system over licensed examiners consists in the issuance of one-year licenses. In 2005 – 2007 the requirements for those examiners were increased. In 2006 for all examiners a verification examination was conducted. The exam included following issues:

- knowledge of current standards on examination of welders as well as guidelines for training (test – 60 questions),
- skills in correct fulfilling protocols in accordance with PN – EN 287 – 1 standard (two practical tasks),
- skill in correct assessment of fractures in welded joints after breaking test (each examiner assessed 3 samples).

Moreover since 2008 each examiner has to complete a course and acquire the competence certificate in accordance with the requirements of PN – EN 473 standard in the range of visual testing (VT – 2).

The initial conditions for the examiners has also been established. At the moment the examiner can be the person who completed a course and has IWE/EWE or IWT/EWT diploma, completed a course and has VT – 2 certificate as well as passed verification examination (in above mentioned range) before the Commission for Verification of Examiners at Instytut Spawalnictwa.

Within supervision activity of the Centre for Education and Welding Supervision numerous training centres have been approved for training of welders under the essential supervision of Instytut Spawalnictwa. It is confirmed by granting them appropriate certification in accordance with W-07/IS-41 Guidelines of Instytut Spawalnictwa.

In 2007 the Centre for Education and Welding Supervision has gained the Confirmation of the evaluation of Office of Technical Inspection – UDT – CERT for training and examining of welders within the scope of act on technical inspection.

3.2. Qualification and certification of non-destructive testing personnel in accordance with the PN – EN 473 standard

Since 2002 Instytut Spawalnictwa has been accredited by the Polish Centre for Accreditation in the scope of personnel certification in accordance with PN-EN ISO/IEC 17024 standard. The Institute is accredited for approving and supervising training and examination centres as well as conducting examination, qualification and certification of non-destructive personnel according to PN-EN 473 standard in the scope of:

a) • penetrant testing PT,
   • magnetic particle testing MT,
   • ultrasonic testing UT,
   • radiographic testing RT

For qualification levels 1 and 2 of non-destructive personnel in the industry sectors of „Metal manufacturing and processing” and „Pre and in-service testing of equipment, plants and structures”, in the range of: welded products, wrought products, castings and forgings.

b) • radiographic testing RT2 (ORS) – radiographic assessment of welds.

For qualification level 2 of non-destructive testing personnel in the industry sector of „Metal manufacturing and processing” and in the range of: welded products and wrought products.

c) • visual testing VT.

For qualification levels 1 and 2 of non-destructive personnel in the industry sectors of „Metal manufacturing and processing” and in the range of: welded products and wrought products.

A candidate can apply for the certificate of competence after completing the course organised at training centres approved by the Certification Centre, and which meet the requirements of document CEN ISO/TR 25108:2006 Non-destructive testing – Guidelines for NDT personnel training organisations. Furthermore training programme has to fulfil the requirements of document CEN ISO/TR 25107:2006 Non-destructive testing – Guidelines for NDT training syllabus.

Candidates for training course conducted in accordance with PN-EN 473 standard should meet minimum initial requirements. Training courses are conducted by highly qualified lecturers.

Table 1.
Lecturers with appropriate competence level in accordance with PN – EN 473 standard

<table>
<thead>
<tr>
<th>NDT method</th>
<th>Number of people with appropriate level of competence in accordance with PN – EN 473</th>
<th>Education in accordance with IWI, EWF guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>PT</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>MT</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>RT</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>UT</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>ET</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Main group of students in courses organised by Instytut Spawalnictwa are NDT personnel applying for certificate of competence in accordance with PN-EN 473 standard. Training courses are conducted both at w Instytut Spawalnictwa and outside the Institute. As Instytut Spawalnictwa has the status of notified body, the scope of notified body, the scope of competence certificate have been
extended. Since 1st May 2004 the certificates of competence of NDT personnel may enable them to conduct testing of pressure vessels subjected to EU Directives 97/23/EC.

During the process of qualification and certification of NDT personnel following documents are issued:
- a certificate of completion of a course with positive result (document of a training centre),
- a certificate of passing of the qualification examination,
- a certificate of competence of NDT personnel,
- a NDT identity card,
- an agreement between the certificate holder and a Centre.

3.3. Training, qualification and certification of welding personnel in accordance with the programmes of International Welding Institute and European Federation for Welding, Joining and Cutting

International Welding Institute (IIW) and European Federation for Welding, Joining and Cutting (EWF) deal with training and qualification of international welding personnel. Those organisations associate Authorised National Bodies – ANB which represent welding technology issues in individual countries. Authorised National Bodies’ assignment is to supervise the efficient implementation of IIW and EWF guidelines on training of welding personnel.

Training of welding personnel can be conducted in Training Centres (ATB - Approved Training Body), which are approved by national ANB, i.e. in case of Poland by the Certification Centre of Instytut Spawalnictwa. At present in Poland there are 6 centres training International/European welding personnel, which include:

1) Centre for Education and Welding Supervision of Instytut Spawalnictwa in Gliwice,
2) Department of Machines Materials, Welding Technology Unit, Faculty of Mechanical Engineering at Gdańsk Technical University,
3) Welding Technology Unit ITMA, Faculty of Mechanical Engineering at Wrocław Technical University,
4) West Pomeranian University of Technology in Szczecin, Faculty of Mechanical Engineering and Mechatronics,
5) Training Centre „PROFESJA” in Opole,
6) Centre for Vocational Training in Olsztyn.

At its Education Centre Instytut Spawalnictwa runs following courses for welding personnel:
- International/European Welding Engineer – IWE/EWE,
- International/European Welding Technologist – IWT/EWT,
- International/European Welding Specialist – IWS/EWS,
- International/European Welding Practitioner – IWP/EWP,
- International Welding Inspector – IWP,
- International Welder – IW,
- European Plastic Welder – CEPW,
- Personnel with the responsibility for macroscopic and microscopic metallographic examination of structural materials and their joints – special course of EWF.

The interest in International Welding Engineer training is constantly very high. There is also growing interest in the courses for International Welding Technologist and International Welding Specialist. At present a set of course books and unified computer presentations for the courses of International Welding Engineer, International Welding Technologist and International Welding Specialist are being prepared. The course book set is expected to include 8 volumes of 250 pages each.

International system of training, examination and qualification of welding personnel has been extended with the possibility of certification. Certificates of personnel competence are the documents confirming current level of welding qualification, experience and practical skills, which is of great importance while cooperating between companies.

Person who receives the diploma of International Welding Institute or European Federation for Welding, Joining and Cutting demonstrate sufficient knowledge and qualification for performing appropriate professional duties. The diplomas are issued during the process of personnel qualification for an indefinite period, what results in the fact that the certificates owners can retain their title even if they are not connected with the profession for many years.

The certification system however requires persons who have received diplomas confirming their competences to fulfill additional requirements, which include current industrial practice and improvement of their knowledge in order to prove their professional competence and experience. The certificate is a document with the expiry date as well as is subjected to supervision process and must be renewed.

Certification process defines the dependence between an employee and employer as well as a third party confirming the competence of the employee.

Literatura


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