Abstract

The paper is regarding to the current situation of NDT personnel qualification and certification in China with abundant historical data, and it mainly analyses and introduces the development of the NDT personnel certification of the Chinese Society for Non-destructive Testing. In addition, it introduces the characteristics and the effect of NDT certification system in other industrial fields. This paper also looks into the future development trend.

Keywords: NDT, personnel certification.

1. Foreword

China is a big country with NDT technology and undoubtedly, the number of NDT personnel in China ranks the first in the world. But the training and certification for the NDT personnel in China developed quite late. The Chinese Society for Non-destructive Testing (ChSNDT) was founded in 1978 and at the same time the first “technical accreditation committee” in China was founded. After 3 years, in May 1981, the first RT Level 2 training and examination course for NDT personnel in China was held in Nanchang Aviation Industry Institute. Almost at the same time or later, other industries such as aerospace, nuclear, metallurgy, railway departments began to conduct training and certifying the NDT personnel.

In 1986, National Economic Council issued a document No. [1986] 455, that is ChSNDT entrusted to organize the Chinese NDT personnel qualification committee and unify the examination procedures. In fact it was extremely difficult for ChSNDT to carry out this work. In 1988, ChSNDT was led to draft the standard GB/T9445-88 “General Rules of the Technical Qualification for NDT Personnel”. It was formally formulated by the National Standard Bureau and was adopted on March 10, 1989. The standard GB9445-88 was the first national standard of qualification of NDT personnel that based on the standard ISO 9712, and it is the first time for the ChSNDT to adopt ISO standard 9712. After that, other industries in China began to conduct training and certification work. At present, China has no less than 11 industrial departments or NDT certification bodies conduct their certification work relatively.
2. Qualification and Certification for NDT Personnel of ChSNDT

2.1 Organizational Structure of the Certification System

The Chinese Society for NDT was founded in 1978, and at the same time, education and training committee and technical qualification committee were set up. This was the first full-time qualification and certification body for NDT personnel in China. This committee was composed of 35 experienced NDT experts from various industrial departments and areas in China.

During the 6th annual meeting in 1995, education and training committee and technical qualification committee were renamed education and training working committee and qualification working committee.

During the 7th annual meeting in 1999, qualification working committee was renamed certification working committee.

During the 9th annual meeting in 2010, certification working committee was renamed certification scheme committee for NDT personnel.

From the year 2007 to 2009, in order to be assessed by EFNDT, ChSNDT continuously improved its certification body and related documents according to the standard ISO9712-2005 and ISO17024-2004 through several internal audits. Till April 2009, the organizational structure is as follows:

2.2 The Development of the ChSNDT Certification Work

The certification work of NDT personnel of ChSNDT has been developed for more than 30 years and it has been 20 years for ChSNDT to reference to the standard ISO
From 1989, ChSNDT began to conduct the certification work according to the standard GB9445-88, which was the fist national standard based on the standard ISO9712. At present, the certification body for NDT personnel of ChSNDT is the only organization using the standard ISO9712 to conduct the NDT certification work in China.

ChSNDT signed mutual recognition agreements with German Society for NDT (DGZfP) of UT and RT in 1990 and MT and PT in 1991. The certificate was equivalent to a certificate of ChSNDT and DGZfP on identical qualification.

As China has joined in WTO, the NDT certificates in China become more and more international. With the growing trade with EU and other countries, the ChSNDT standing committee made a decision during the meeting in March 2003 that they hope to seek mutual recognition with the European Federation for Non-destructive Testing (EFNDT) on the NDT certificates. During the 13th EFNDT board of directors meeting held in February 2004 in Moscow, ChSNDT became the association member of EFNDT.

The first working group meeting of EFNDT was held from Nov. 1 to Nov. 3, 2004 in Manchester, Britain. ChSNDT dispatched two delegates to attend this certification meeting. One is Mr. Xu Yongchang, chairman of the certification body; the other is Ms. Zhu Yaqing, vice chairman of the certification body. During the meeting, ChSNDT applied for joining in EFNDT certification system of NDT personnel. It was recognized that ChSNDT, as the representative of China, was the only NDT personnel certification system to join in EFNDT certification system.

In May, 2005, ChSNDT received a notification from the chairman of EFNDT first working group which formally accepted ChSNDT to be the member of EFNDT first working group. And ChSNDT’s application to join in EFNDT certification system was finally approved.

In September 2005, ChSNDT began to adopt the national standard GB9445-2005 which was identified with the standard ISO 9712-1999.

From Jan. 2007, ChSNDT began to adopt the standard ISO 9712-2005 Non-destructive test—Qualification and certification of personnel (also with reference to the standard EN473) to certify the NDT personnel in China.

In May 2008, the national standard bureau officially approved the standard ISO 9712-2005 to be the national standard GB9445-2008. This national standard was carried out in Nov. 2008. Since then, ChSNDT began to conduct certification work according to the standard GB9445-2008, identified with the standard ISO9712-2005.
On Apr. 24 and Apr. 25, 2009, EFNDT dispatched a primary assessor Mr. John Thompson and an assessor assistant Mr. He Furong coming to audit the certification system of ChSNDT in Shanghai. After the assessment, altogether 17 corrective actions were put forward. By the end of July 2009, ChSNDT submitted all the corrective actions to Mr. Thompson via email which were all approved by him. On Sep. 1, 2009, EFNDT WG1 meeting was held and the primary assessor Mr. John Thompson submitted a detailed report about the assessment. EFNDT WG1 approved that the NDT personnel certification scheme operated by ChSNDT has satisfied all of the qualification criteria of the EFNDT Multilateral Agreement for Recognition of NDT personnel certification schemes, and has been accepted for recognition and registration within the terms of the Multilateral Recognition Agreement (MRA). Holders of its certificates are certificated by a scheme which is recognized by the EFNDT as meeting the requirements of European Standards and technical documents referenced in the schedule of accredited scope.

From Oct. 2009 till now, ChSNDT conduct the certification work for NDT personnel according to the standard GB9445-2008 identified with the standard ISO9712-2005.

2.3 The Certification Status of ChSNDT
Certification body: It has complete quality system and procedures according to EFNDT requirements to do the certification work.
Examination Center: It is set up in the secretariat in Shanghai Research Institute of
Materials which have complete question bank, written examination room, practical examination room, archives room, etc.

Training syllabus: ISO/TR25107
Training materials: UT, MT, PT, RT

Methods and product sectors:
4 sectors for UT: welds, castings, forgings, pipes and tubes
3 sectors for MT and PT: welds, castings, forgings
2 sectors for RT: welds, castings

The written exams and practical exam are done according to the ISO 9712-2005 strictly. All questions for written examination are multiple choices. There are 50 questions for specific basic exams and 25 questions for industrial sectors. For practical examination the scores ratio is operation exam: 85%, NDT instructions: 15%.

ChSNDT website: [www.chsndt.com](http://www.chsndt.com)

According to statistics, ChSNDT has issued about 20,000 NDT certificates to the Chinese NDT personnel since 2007. Since ChSNDT got the certificate of EFNDT MRA in 2009, thousands of NDT certificates have been issued as UT 3669, MT 2004, PT 782, RT 593. ChSNDT has gained great influence in the Chinese NDT fields.

2.4 ChSNDT Has Cooperated With American Society for Non-destructive Testing (ASNT) in ASNT level III Examinations.

Usually ASNT does not make mutual recognition of the certificates with other countries. In May 1998, the President of ASNT Mr. Sadick organized a delegation to visit ChSNDT and signed 2 agreements: (1) Agreement for cooperation between ChSNDT and ASNT; and (2) Entrusted ChSNDT as the only authorized examination center for ASNT Level III examinations in China. ASNT prepares all the examination papers and makes evaluation to the candidates, and dispatches 1 or 2 monitors to supervise the examinations in Shanghai, China. The Level III certificates are issued by ASNT to the certified personnel who pass the examinations. The first ASNT III examinations were taken from April 23 to 25, 2002. As the economic crisis, the ASNT III examination interrupted for several times. In 2007, ChSNDT sent a delegation to attend ASNT Fall Conference in Las Vegas. In the conference, 2 important resolutions were made: (1) Resume the ASNT III examinations from Dec. 2007 and the examinations would be held once every year. (2) ASNT authorized ChSNDT to hold ASNT SNT-TC-1A Level II training and examination cooperated with certified ASNT Level III persons connected with employers in Shanghai. Till the year 2010, more than 200 ASNT III certificates have been issued and more than 100 SNTTC-1A Level II certificates have been issued in China.

3. NDT Certification System in Other Industrial Fields in China

3.1 Qualification and Certification for NDT Personnel of National Defense Industry

In 2002, qualification and certification work for NDT personnel of national defense industry started. In Nov. 2002, national military standard GJB9712-2002 qualification
and certification for NDT personnel was published. On Sept. 11, 2003, Commission on Science, Technology, and Industry for National Defense (COSTIND) set up a Qualification and Certification Committee for NDT Personnel of Defense Industry. They conduct the certification work according to the national standard GJB9712.

3.2 Qualification and certification for NDT personnel of aviation industry
Qualification and certification committee for NDT personnel of aviation industry was set up in 1981, which was one of the first organizations to conduct the NDT certification. Under the leadership of former Ministry of Aviation, the committee carries out aviation standard HB5357 and implements NDT training and certification within its industry with reference to US military standard MIL-STD-410 (replaced by NAS410 after 1996).

3.3 Qualification and Certification for NDT Personnel of China Classification Society
Qualification and certification committee for NDT personnel of China Classification Society was founded in 1999, which is the specialized management department to ensure the manufacture and repair quality of ships, offshore installations and metal structures, etc.

3.4 Qualification and Certification for NDT Personnel of Nuclear Industry
The first qualification and certification committee was founded in May 1983. Management training and examination is the main work. To ensure the safety and reliability of nuclear plants and nuclear facilities, training becomes very important. The NDT training materials about nuclear edited by nuclear industry were published in 1998 (internal distribution).

3.5 Qualification and Certification for NDT Personnel of Special Equipment
In relation to the relevant regulations and related standards of special equipment safety supervision, there are specific requirements for the NDT application and the qualification of the NDT personnel. Currently, this organization is under the direct leadership of state administration of quality supervision and inspection and special equipment safety supervision bureau, which is the non-profit organization conducting qualification and certification work for special equipment NDT personnel.

3.6 Qualification and Certification for NDT Personnel of Civil Aviation of China
Qualification and certification of personnel for civil aviation NDT board (CANDTB) was set up according to the civil aviation industry standards MH/T3001 “aircraft NDT personnel qualification and certification”. This certification organization is under the leadership of civil aviation administration standard division and is responsible for qualification and certification for NDT personnel in the field of civil aviation aircraft.

3.7 Water Conservancy and Hydropower
During the year 2002 to 2011, the certification committee of national water conservancy and hydropower industry for NDT personnel conducts the training and
certification for 54 times.

3.8 Air Force
Qualification and certification committee for NDT personnel of Chinese air force maintenance system was set up in May 1988. In August 1988, the first training course about aviation maintenance was held.

3.9 The Certification for NDT Personnel in Hong Kong, Macao and Taiwan
The certification is in various industries according to the requirements but mainly in NDT societies.

4. Questions and Future Development Trend
There shall be more comprehensive training materials of NDT level 1, level 2 and level 3. Standards shall be made to pick up more qualified teachers in order to improve the training quality.

It is always a development trend that there will be mutual recognition about the training and certification in various industries in China as so many NDT personal go to different industries to take NDT training and exams. They spend a lot time and efforts to get the NDT certificates. Usually one personnel holds many NDT certificates from different industries. But it is very difficult to have the mutual recognition because of the special national conditions in China.

The hope still exists that different industries may use the same international standard ISO9712 to do the certification work. The communications and exchanges shall be enhanced among the industries and maybe after several decades, mutual recognition about the NDT certification may one day become true!

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References: The NDT Year Book of China (1949~2005)
            The NDT Year Book of China (2006~2009)