KS-ASNT Newsletter

Issue : 1, 2013 Page : 1 of 4

From the Chairman's Desk :

Dear Members of KS-ASNT,

Welcome to the first edition of our NDT Newsletter.

The State of Kuwait is currently planning for capacity expansion requiring many new construction projects. Construction Quality and Equipment Reliability are very critical and NDT plays an essential role. ASNT is the largest NDT Society in the world promoting Standards and Practices for effective and reliable use of NDT in various applications. It is the most appropriate juncture we strengthen our NDT community to take up the challenges ahead.

Found in 2010, the Section has conducted numerous knowledge sharing programs with local and visiting experts in the field of NDT. For the first time in Kuwait KS-ASNT organized NDT Level-III examinations in Kuwait and has been continuously held every year for the benefit of the local NDT professionals.

On behalf of the Section, I wish to inform you that there are many more programs on the anvil to provide a place for NDT professionals to interact and exchange experiences and to explore the latest NDT technologies to address inspection challenges. I believe that younger members would benefit greatly from the programs as we have planned to organize Level-II Certification Programs in the near future.

We look forward for the support of all of you including NDT/ Inspection Organisations, Construction Companies and the Oil Companies for the growth and success of the Section.

Nayef Al Enezi
Chairman KS-ASNT

Editor's Note :

Dear Members of KS-ASNT,

With the support of all of you we are able to bring out this first edition of our NDT Newsletter. It is our intention to share the information and updates regarding NDT activities in Kuwait.

It is the dedication of the Office bearers of this Section, that we have grown to this extend and plan to organize many educational programs for the benefit of Kuwait NDT fraternity. This effort will be yielding more results due to your participation and the support of the local Industries.

On behalf of KS-ASNT and the Chairman, we request the readers and Organisations to contribute to this Newsletter by sharing your experience, latest techniques used in the field, so that the same will be useful for other readers when published. In this edition, we have included overview of couple of advanced NDT techniques. We feel the readers can understand the basics of these technique out in the market. Also included are clarification on ASNT SNT-TC-1A terms.
Readers are requested to visit KS-ASNT website for information on seminars, courses and examination to improve their knowledge and skill.

Renu Anbalagan

Inside this issue:

Time-of-Flight Diffraction (TOFD)

By : *Deenadayalu Selvaraj - QA Inspector (John Pickle Middle East) Kuwait*

Introduction to TOFD

The Time of Flight Diffraction Technique (TOFD), currently the most promising ultrasonic technique for examination of heavy wall thickness welds on Pressure Vessels. TOFD is a computerized ultrasonic system, able to scan, store, and evaluate indications in terms of height (through thickness weld), length, position,

Application of TOFD (Ultrasonic testing in lieu of radiographic testing)

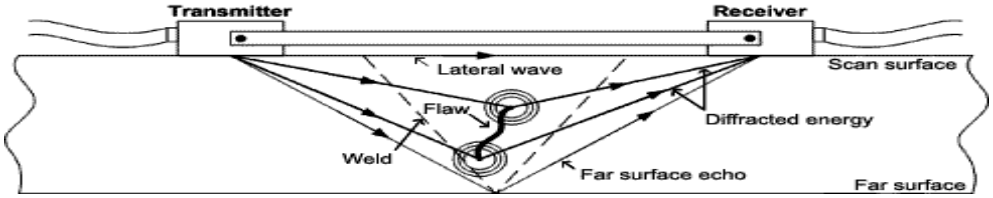
The ASME Code has accepted this method in lieu of radiography examination for thicknesses over 6 mm. If UT is used in lieu of RT, the examination requirements shall meet the code of construction of the vessel being constructed as well as ASME sec V article 4.

The TOFD technique is based on diffraction of ultrasonic waves on tips of discontinuities, instead of geometrical reflection on the interface of the discontinuities (See Fig. 1).

This principle makes TOFD ideal for identifying cracks, lack of fusion located along the vertical axis of the weld (in particular for narrow gap preparation) or with any other orientations, because detection is not affected by the negative consequence of ultrasonic beam deviation from the receiver due to un-favorable orientation of the discontinuity.

In this technique, one transducer (compression wave probe) acts as transmitter mode and the other as receiver, one probe on each side of the weld and maintains a fixed distance. The beam divergence is such that the majority of the thickness is inspected, although, for thicker components, more than one probe separation may be required.

In addition to energies diffracted by defects, the TOFD method will also detect a lateral wave propagating directly between the probes and also a back wall echoes from energies that reach the back of the test piece without interference from defects .The difference in the flight of the diffracted wave fronts carries the information on the spatial relationship of the tips of the defect and hence the extent of the defect.



Examination according to ASME codes

During examination the area shall include the volume of the weld, plus 50 mm (2 in) on each side of the weld for material thickness greater than 200 mm (8 in). For material thickness 200 mm (8 in) or less, the ultrasonic examination area shall include the volume of the weld, plus the lesser of 25 mm (1in) or *t* on each side of the weld. Alternatively, examination volume may be reduced to include the actual heat affected zone (HAZ) plus 6 mm (1/4 in) of base material beyond the heat affected zone on each side of the weld. A documented examination strategy or scan plan shall be provided.

Procedure Qualification

The procedure shall have been demonstrated to perform acceptably on a qualification block(s). The qualification block(s) shall have a thickness within 25% of the thickness to be examined, be prepared to meet the ASME codes.

The procedure shall have been demonstrated to perform acceptably on a qualification block with imbedded flaws representing for surface and sub-surface defects flaws which shall no larger than that specified by the referencing code section.

Instrument

The instrument shall provide a linear “A” scan presentation to allow for the viewing of the un-rectified A-scan so as to position the start and length of a gate that determines the extent of the A-scan time-base that is recorded.

Personal Qualification

Personnel performing and evaluating UT examinations shall be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A or CP-189 shall be used as a guideline.

Interpretation: Flaw sizing and acceptance shall be as per construction code.

SPECIAL RADIOGRAPHIC TECHNIQUE IN MODERN INDUSTRY "IN - MOTION RADIOGRAPHY"

By : *D.M. Tripathi, Manager QA/QC, AIGTCC-Oil & Gas, Kuwait*

In most industrial radiography, it is essential that there be no relative motion of radiation source, specimen and film.

There are certain cases, however, in which motion between components of the radiographic system – source, specimen, and film has positive benefits, either economic or in producing information that could not be otherwise obtained.

"In - Motion radiography" in which the X-ray beam is restricted to a narrow angle by means of a diaphragm at the tube. The tube is then traversed the length of the weld, each segment of weld being radio graphed only during the time that the beam is incident on it. If there are two or more longitudinal welds, all could be radio graphed only during the time that the beam is incident on it. radio graphed only during the time that the beam is incident on it. If there are two or more longitudinal welds, all could be radio graphed at once using a rod-anode tube giving a 360° radiation beam.

Advantages:

- Saving in setup time.
- High productivity
- Less exposure time

"TOMOGRAPHY"

Tomography often termed "Body Section Radiography". This technique provides a relatively distinct image of a selected plane in a specimen while the images of structures that lie above and below that plane are blurred. It is fairly common in medical radiography, and has a few specialized applications in industrial radiography.

"NEUTRON RADIOGRAPHY"

Neutron radiography makes use of the differential absorption of neutrons.

Two general classes of techniques are used in neutron radiography. Both involving known as '**Converter Foils'**.

The first technique is **'Direct exposures'** in which the film is exposed between two layers of foil of "material that becomes radioactive when exposed to neutrons. The exposure to the film is caused by the beta or gamma radiation emitted by the converter foils.

The second technique is **'Transfer Exposure'** in which the converter foil alone is exposed to the neutron radiation transmitted by the specimen, and is thus rendered radioactive.

Conventional industrial X-ray films are ideal for neutron radiography.

The most satisfactory neutron source for neutron radiography is a nuclear reactor.

"FLUOROSCOPY"

Fluoroscopy differs from radiography in that the X-ray image is observed virtually on a florescent screen rather than recorded on a film.

Fluoroscopy has the advantages of high speed and low cost. Fluoroscopy has been used in the inspection of packaged foods for foreign objects, molded plastic parts for the correct placement of metallic inserts image intensifier etc.

SNT-TC-1A TERMS CLARIFIED

SNT-TC-1A terms clarified

In 1968, the American Society for Nondestructive Testing (ASNT) published the first edition of the *Recommended Practice No. SNT-TC-1A*. The document was developed to provide guidelines for employers to use to set up their own NDT certification programs and listed three levels of qualification Level I, Level II and Level III. The document name based from the fact that ASNT was then "SNT", and the number of the Technical Committee (TC) that developed the document was "1A".

Since ASNT publishes SNT-TC-1A many employers mistakenly assume that personnel whom they have certified under SNT-TC-1A are "ASNT certified", when in fact they have been certified "in accordance with SNT-TC-1A". Only personnel who have sat for and passed the examinations developed and administrated by ASNT and have received ASNT certificates may call themselves "ASNT certified".

Employer based personnel are NDT Levels Is, IIs and IIIs and have often called "corporate" Level Is, IIs or IIIs. If the Level III did not examine to that Level, they are commonly called "appointed" Levels IIIs to distinguish that they have not gained certification through examination. However, this is not a derogatory term, as appointed was permitted prior to 1988. There are still personnel in Industry who were appointed to Level III without examination; under the guidelines of SNT-TC-1A editions prior to 1988, this was permitted. Today Employer certified Level IIIs may be called "Level IIIs" or "NDT Levels III".

(This information was taken from an article in Materials Evaluation 2005).

KSASNT Section News

- **ASNT NDT Level III examination in Kuwait is scheduled on 11th -12th April, 2014. Duly Filled and completed Application dead line is 17th January, 2014.**
- **Kuwait Technical Training and Consultancy Center shortly announcing the NDT Level II training courses.**

For more information, please visit KSASNT website (www.ksasnt.org)