Opleidingsprogramma UT2 WDCD

Het opleidingsprogramma dient de kandidaat voor te bereiden voor het examen UT niveau 2 wanddiktemeting/corrosiedetectie.

Het programma is gebaseerd op de ISO/TR 25107, Non-destructive testing – Guidelines for NDT training syllabuses, UT niveau 2, in aanmerking nemend de toepassing wanddiktemeting/corrosiedetectie. Dit resulteert in onderstaande syllabus. De vermelde tijden zijn richtlijnen. De totale minimale cursus duur is vermeld in de Hobéon SKO Regelingen SKNDO (par. 6).

1. Introduction Terminology History of NDT

(Theory training time:1. hour)

- ❑ Task of NDT-personnel
- ❑ History of NDT in general and UT
- ❑ Terminology and definitions of UT (ref.: EN-1330-1, -2 and –3)

2. Physical principles of the method and associated knowledge

(Theory training time: 20 hours)

- ❑ Relevant standards
- ❑ EN 583-1 to – 6 and EN 14127
- ❑ Review of mathematical basics
- ❑ Physical definitions and typical parameters: sinusoidal movement, amplitude, period, frequency, wavelength, propagation velocity. acoustic impedance, factors of reflection and transmission (normal beam only) and beam propagation.

- ❑ Various types of wave modes
  Longitudinal waves;
  Transverse waves;
  Concepts of surface waves or Raleigh waves and of plate waves or Lamb waves;
  Reflection and refraction;
  Normal incidence;
  Transmission and reflection;
  Incidence oblique;
  Snell's law;
  Mode conversion;
  Acoustic pressure

- ❑ Transmission and reception of ultrasonic waves
  Piezo-electric effect;
  Ferro-electricity or electrostriction
- ❑ Transducer characteristics
  Material, dimensions, piezo-electric constants
- ❑ Characteristics of the beam of a circular transducer;
  Influence of transducer frequency and diameter
- ❑ Characteristics of the beam of a rectangular transducer;
  Near field (Fresnel zone);
  Far field (Fraunhofer zone);
  Beam profiling;
  Beam divergence;
  Beam divergence factor

3. Products knowledge and related capability of the method and derived techniques

(Theory training time: 5 hours)

- ❑ Various defects related to the manufacturing processes and service induced defects related to the defined sectors:
  Implementation of the testing techniques according to products and to expected discontinuities
- ❑ Influence of geometry and structure (spurious echoes, sound attenuation)
- ❑ Selection of transducers for required resolution and reduction of noise (type, frequency, size)
- ❑ Influence of the main parameters

4. **Equipment**
(Theory training time: 8 hours; Practical training time: 4 hours)

- ❑ Various probes (normal, angle, dual):
  instruments (analogical and digital);
  pulse generation;
  reception & amplification (percentage and dB);
  range setting;
  A-scan presentation;
  B- and C-scan presentation;
  Couplant;
- ❑ Detailed knowledge of the different functions of UT test equipment
- ❑ Calibration reference

5. **Information prior to test**
(Theory training time: 2 hours)

- ❑ Written instruction:
  Objectives;
  Contents;
  Requirements of instructions, procedures and standards;
- ❑ Preparation of written instruction

6. **Testing**
(Theory training time: 8 hours; Practical training time: 15 hours)

- ❑ Standardized calibration blocks (ref.: EN 12223; EN 27963)
- ❑ Contact technique (straight and angle beam);
  Reflection;
  Transmission;
- ❑ Setting of range and sensitivity
  Reference reflectors (laws of distance and size);
  DGS-method;
  sizing techniques, principles and limitation;
  scanning;
- ❑ Ultrasonic thickness measurement
  Equipment;
  Techniques;

7. **Evaluation & Reporting**
(Theory training time: 4 hours; Practical training time: 8 hours)

- ❑ Detecting, locating and sizing techniques:
- ❑ Recording and evaluation levels
  Acceptance levels
- ❑ Test reports
  System of co-ordinate Measurements (probe, reflector);
  Calculated values;
  Interpretation and evaluation of indications

8. **Assessment**
(Theory training time: 4 hours)

- ❑ Evaluation and confirmation of test reports
- ❑ Application of the acceptance
- ❑ Criteria according to standards, codes and procedures

9. **Quality aspects**
(Theory training time: 1 hour)

- ❑ Personnel qualification (ref: EN473; ISO 9712)
- ❑ Equipment verification
- ❑ Traceability of documents