

Strengthening skills in NDT for regional industry

A project of the Regional Cooperative Agreement for Research, Development and Training in Nuclear Science and Technology in Asia and the Pacific (RCA)

If there's a flaw in your flange, a crack in your casting, or a weakness in your weld, non-destructive testing (NDT) will find it—without damaging or in any way compromising the usefulness of the structure or component being inspected. Over the last 40 years NDT techniques have become an essential part of quality assurance in the construction and manufacture of critical plant and equipment for key industries, and in many countries a mandatory requirement in ensuring the standard of industrial goods. NDT techniques are also widely used in regular maintenance procedures, to assess the reliability and safety of structures subjected to heavy loads, high pressure and corrosion. But for many years, reliable NDT services were not available in most RCA Member States, unless acquired from other parts of the world at great cost. Thanks to a series of RCA projects, local NDT capabilities and expertise are now firmly established in the region, thus providing an important technological tool for the advancement of the region's industrialisation.

NDT techniques use penetrating gamma-rays or X-rays (and other complementary techniques like Ultrasound, Eddy Current, Magnetic Particles etc.) to examine the internal features of a material or product, including any defects it may have. It's similar to the way an X-ray machine in hospital is used to 'see' if a patient has a

broken bone. But reliable results from NDT can only be obtained if the technology is handled by well-trained technicians. Prior to 1980, very few countries in Asia and the Pacific had personnel with the necessary training, qualification and expertise, and regional industries were faced with a choice between employing inadequately trained local NDT technicians or hiring NDT services from overseas at higher cost. Some chose neither option and instead exposed critical plant and equipment to the possible risk of failure by not having them inspected at all.

In response to this unsatisfactory situation, the RCA, with support from the International Atomic Energy Agency, initiated a long-running project in 1981 to build NDT capacity locally. Adopting a highly efficient 'pyramid' training strategy, the RCA first ran a series of regional training courses, using international experts to instruct select groups from participating Member States in various NDT methods and at various levels of expertise. A total of 300 personnel from 14 Member States were successfully trained. In turn, these individuals provided training within their respective countries, disseminating NDT knowledge and technology at the national level. Amongst those trained were engineers, technicians and scientists, some of whom went on to establish NDT facilities and inspection teams within their own organisations. As a result, industry has been quick to adopt the technology, and now almost all large-scale and many medium-scale industries are self-sufficient in NDT technology in most of the RCA Member States.

To date, more than 20,000 personnel across the region have been trained and certified in accordance with their respective national standards, which are based on the international standards ISO/IEC 9712 and ISO17024 (General Requirements for Bodies Operating Certification of Personnel). Linking training and certification to national and international standards is crucial for the viability of NDT services because industry needs to be assured of the

skills and competency base underpinning the NDT inspection results. If an NDT inspection fails to detect correctly any material or structural flaws or abnormalities, the financial, operational and safety ramifications can be very serious. Member States are also securing the accreditation of their NDT laboratories as per international standards.



Radiographic testing of a repaired wicket gate of the Samanala Hydro Power Station of Sri Lanka



Radiographic Testing of Newly Constructed Pipeline in the Philippine Geothermal Power Plant

Regional harmonisation of national NDT qualifications and certification schemes, is another important step in the process. It is expected that by the end of 2010 ninety percent of Member States will be parties to an agreement for mutual recognition of personnel who hold NDT certificates within the region. The ultimate aim is the harmonisation of all personnel certification schemes in the region by 2012. This will not only be a major step forward in terms of achieving international recognition, it will also mean that RCA Member States will play a positive role in the universal acceptance of ISO 9712/ISO 17024.

The growth of local NDT capabilities within the region has resulted in significant improvements in the safety, quality, reliability and productivity of industrial plants. This has not only benefitted construction and manufacturing processes; regular maintenance checks using NDT have extended the service life of many industrial components. Industries that have profited from this include oil and gas, power generation, chemical and petrochemical, automobile, aviation and construction, plus many of the manufacturing industries which rely on exports to developed countries. Considering the anticipated rapid growth of these industries in the region, the benefits of the RCA project could multiply in the future.

In addition to training, the RCA has also initiated research and development programmes for advanced NDT techniques such as digital radiography and computerised tomography. By the end of 2008 four countries are expected to be in a position to train the remaining Member States in these techniques. There are also plans to set up programmes in two- and three-dimensional tomographic imaging of industrial specimens and civil engineering components.

This RCA project has responded to the needs of industry at a time of significant regional industrial growth. It has helped establish and expand the local NDT service industry, and provided many new career and employment opportunities. Some of the trainees have established their own NDT service businesses, while others have been able to use their internationally-recognised skills overseas. In the early 1980s most industries in the region were barely aware of NDT technology. Now the tables have turned. Instead of needing to import NDT expertise, the Member States are now self-sufficient in most NDT techniques and even have the capability and capacity to export their skills both within the region and beyond.



A training session on Industrial Digital Radiography and Computed Tomography, conducted in Mumbai, India



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