

Learn more about Careers and Education for NDT!

Non Destructive Testing (NDT) Resource Center

This site was designed to be a comprehensive source of information and materials for NDT and NDE technical education. The site was created by NDT professionals and educators from around the world. Learn more at: http://www.ndt-ed.org/index_flash.htm

Federal Directory of Occupations (NDT)

The National Occupational Classification (NOC) is the nationally accepted reference on occupations in Canada. It organizes over 30,000 job titles into 520 occupational group descriptions. It is used daily by thousands of people to compile, analyze and communicate information about occupations, and to understand the jobs found throughout Canada's labor market. **NOC 2261** provides job descriptions for Non-destructive Testers and Inspectors. Learn more at: <http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/QuickSearch.aspx?val65=NDT>

Mohawk College Quality Engineering Technician – Non Destructive Evaluation

Students in this program will use state of the art equipment and facilities available through a partnership with the Canadian Institute for NDE (CINDE). Students in this program learn from CINDE instructors about the five main NDT techniques, and prepare for the Department of Natural Resources Canada (NRCan) third-party NDT certification testing according to national standard CAN/CGSB-48-9712. Successful students will also meet the Canadian Nuclear Safety Commission requirements for the exam for the Certified Exposure Device Operator (CEDO) license. Learn more at: <http://www.mohawkcollege.ca/Discover/Help/coop/progStaff/qualityEdTechNDE.html>

The Canadian Institute for NDE (CINDE)

The Canadian Institute for NDE (CINDE) is the national non-profit; membership based technical society for NDT technicians, educators and service suppliers across Canada. The CINDE supports the NDT community through a variety of member services, and delivers world-class NDT training and professional development courses through day courses or night school classes at training centers in Hamilton, Ontario and Leduc, Alberta. Some courses are also available through interactive on-line delivery over the Internet. It is an Approved Test Center for conducting written and practical examinations for the Natural Resources Canada Certification Agency. Learn more at: <http://www.cinde.ca/ndt.shtml>

Durham College Mechanical Engineering Technician – Non-Destructive Evaluation

The Mechanical Engineering Technician-Non-Destructive Evaluation program prepares students with the education, training and practical experience necessary to successfully begin their careers in the field of non destructive testing (NDT). Core subjects offered within the Mechanical Engineering Technician program are also included in this program. Learn more at: <https://myplace.durhamcollege.ca/durham/program.do?from=subject&programID=1361>

Southern Alberta Institute for Technology (SAIT)

SAIT's Non-Destructive Testing Center in Calgary, Alberta is committed to providing first class training to those wishing to pursue a career in the NDT field. Learn more at: <http://www.sait.ca/pages/about/organization/departmentlistings/ma/ndt.shtml>

NDT Testing Techniques

Nondestructive testing (NDT) allows us to examine structures, materials or components without damaging or destroying the object being tested. Defects cannot always be detected with visual inspection; they may be too small or located entirely within the material. NDT provides a means to detect such defects without having to cut, etch or otherwise damage the material. Since NDT can often be conducted *in situ*, it is economical both in terms of time and money. Billions of dollars are spent on NDT every year for maintenance in the nuclear, aircraft and petroleum industries alone. In the welding, metal forming and fabrication industries, NDT is a necessary part of the quality assurance process. There are nine NDT methods which can be employed. The CGSB training standard CAN/CGSB-48.9712.00 and certification are available for five of these methods at present. Following is a brief explanation of each of the nine NDT techniques.

Liquid Penetrant Testing (PT)	PT is known as a surface method, and is used for both ferrous and non-ferrous materials. A coloured, penetrating dye (often fluorescent) is applied to the part under test and seeps into cracks or other surface openings. The test part is washed and a blotting agent applied which draws the dye from the surface opening to produce a two dimensional, visible indicator of its location.
Magnetic Particle Testing (MT)	MT is known as a surface method, and is used to detecting surface and near-to-surface discontinuities in ferro-magnetic materials. The test material is magnetized and coloured iron filings (often fluorescent) are poured onto the surface. The north/south pole created by a crack or other defect will attract the iron filings and provide a visible indication of the defect's location.
Ultrasonic Testing (UT)	UT uses high frequency sound waves to inspect for both internal and surface defects in fine-grained castings, forgings, welds and extrusions as well as non-metallic materials. Sound waves are generated in the test material by a piezoelectric crystal and their travel through the material is measured. Interference of the sound beam path, caused by discontinuities in the material, is indicated on a cathode-ray-tube display.
Radiography (RT)	RT is a method for detecting internal discontinuities in castings, forgings and weldments. A special film is placed beneath the test material and x-rays or gamma rays used to penetrate through the material to the radiographic film. Areas of different material densities are recorded on the film, indicating any cracks, voids, porosity or inclusions.
Eddy Current Testing (ET)	ET is used to detect surface and near surface flaws in electrically conductive materials. Small circular currents (eddy currents) are generated in the surface of the test material by a test coil. The eddy current flow is disrupted by the presence of discontinuities which changes the electrical impedance of the test coil. Any changes are amplified and indicated on the eddy current instrument. Since eddy currents are affected by metallurgical properties as well as defects, this method can be used for material sorting and hardness and conductivity measurements. It is also widely used in the aircraft and nuclear industries.
Acoustic Emission (AE)	Sensitive listening devices (sensors) are used to detect high frequency acoustic waves emitted due to the sudden release of energy caused by crack growth, plastic deformation or phase transformation of metals. Sensors are mounted on the outside of the test object and stress in the form of pressure, compression, tension or torsion is applied. Acoustic emissions are amplified, filtered and processed for interpretation. Static defects cannot be detected by this method.
Leak Testing (LT)	Widely used in industries such as food, refrigeration and air conditioning, petro-chemical plants and power plants, Leak Testing is used to detect leakage within or outside of a closed system. Leaks may be detected visually or by ultrasonics or smell. Minute leaks may be detected by a soap bubble test, amplified sonic methods or chemicals which produce colour changes. Often, the system is pressurized during testing and a fluorescent dye is added to the fluid to improve chances of leak detection.
Infrared Thermography (IRT)	This technique uses a special camera with an Infrared sensor to evaluate the way a material conducts or radiates thermal energy as heat or cold. A thermal profile, called a Thermograph, is created that can detect leaks in roofing membranes and evaluate the insulation of builds and structures. The quality of bonding or contact between parts can be checked, and hidden objects can be located. Anything that is visible to the eye, such as mechanical equipment, electronics, electrical circuits, motors and power transmission lines etc. is a candidate for Infrared Thermography testing.
Vibration Analysis (VA)	This method is used to monitor vibration due to misalignment or unbalance, and to detect failures due to bearing wear or broken gears, mismatched fan blades and bent shafts. A wide variety of rotating machinery can be monitored and evaluated while in operation. Static or non-rotating systems can be excited by an external vibration source and the motion or sound produced by the test piece is analyzed. Data can be collected using portable, hand-held transducers and data collectors, or for continuous monitoring, by using permanently installed on-line systems.