MODFIELD NDT

RESOURCES & INSPECTION SERVICES

WE BELIEVE THAT QUALITY HAS NO DESTINATION

An Modfield NDT Organization engaged in manifold quality verification activities in the field of Nondestructive services since 2015.The Laboratory was set up at Oman & India.

www.modfield.in

INDEX

About Us	04
All Services	05
Non-Destructive Testing	06
Engineering Services	20
Consultancy Of Services	25
Contact Us	28

ABOUT US

Modfield NDT., popularly known as ‚Modfield inspection services' was established in the year2015 under the Companies Act, 2011 by a team of a dedicated and highly motivated team of professionals. Over the period, the Company has grown from a small outfit pertaining to the services of Inspection and Testing to domestic manufacturers & overseas buyers to one of the well-recognized laboratories in the country imparting the most comprehensive range of **QUALITY ASSURANCE SERVICES.**

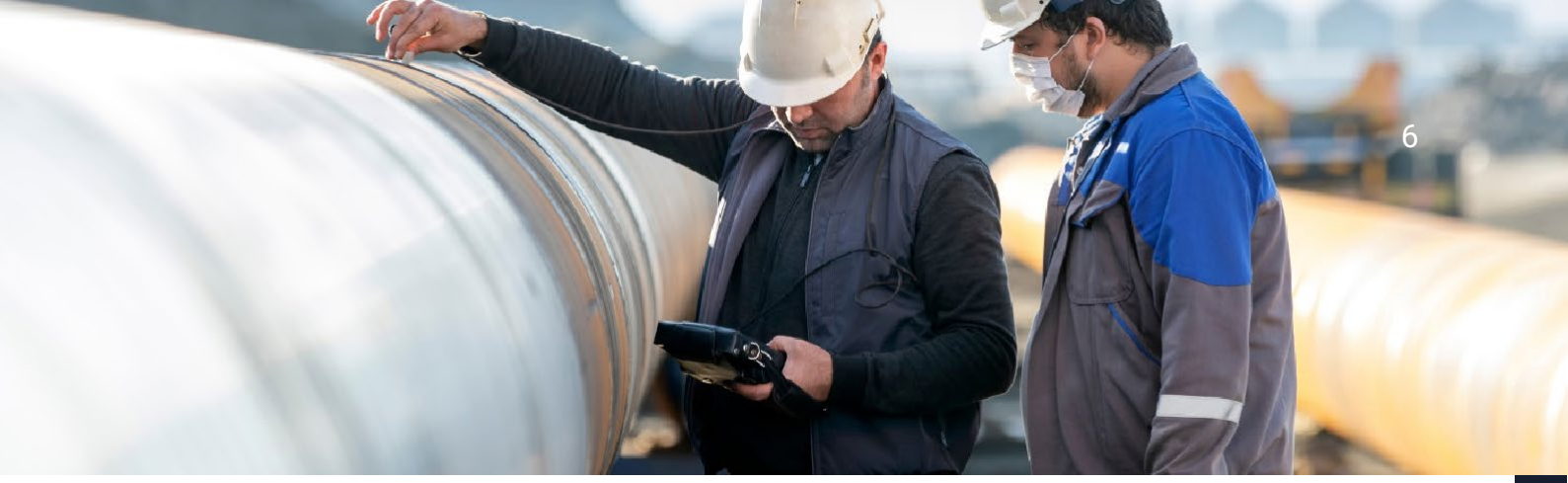
The spectrum of Modfield clientele encompasses the whole gamut of Indian Industry like giant National and Multinational Corporate Houses, Government Organizations, and Public Sector Undertakings under different Ministries of Railways, Steel, Power, Refinery and Petrochemical, Infrastructural Construction, etc and major part of a Medium and Small-Scale Sectors. Modfield has built up over the year 200 names in their Customer list whom they have served in various aspects of Quality by professionals of different fields of Science and Technology who are specialized in their respective fields.

In the development process, particular emphasis has always been given to the procurement of the latest instruments and equipment, both indigenous and imported. Special attention has been given to the recruitment of suitable human resources and the training/orientation program was conducted at all levels to update technical knowledge and management skills. Modfield is having a workforce of around 120 comprising of Doctorates, PCN /ASNT Level III (both conventional and advanced) more than 20 plant engineers, and various NDT Level II holders.

Modfield is now one of the most preferred organizations by a large number of Internationally Repute Project Management Consultants and Public Sector Undertakings of the Company to associate as their Quality Assessor for Non-Destructive Testing Services

OUR SERVICES

1. Non-Destructive Testing
2. Engineering Services
3. Consultancy Of Services



SERVICES I NON DESTRUCTIVE TESTING

1. Conventional NDT Services
    - A. Ultrasonic Testing
    - B. Radiographic Testing(X-ray & Gamma Ray)
    - C. X-ray Pipeline Crawler
    - D. Magnetic Particle Inspection(MPI)
    - E. Liquid Penetrant Testing(LPT-Fluorescent & Visible)
    - F. Boroscope Testing(Rigid/CCD-Real Time Recording)
    - G. Vacuum Box Testing
2. Advanced NDT Services
    - A. Phased Array Ultrasonic Testing(PAUT)
    - B. Long Rang Ultrasonic Testing(LRUT)
    - C. Automated Ultrasonic Testing for Corrosion Monitoring and Weld Scan (P Scan, C Scan & B Scan)
    - D. Time of Flight Diffraction (TOFD)
    - E. Acoustic Eye (Tubular Inspection)
    - F. Magnetic Flux Leakage (MFL) (Tank Floor mapping/ Pipe Scanning)
    - G. Surface Eddy Current Testing
    - H. Eddy Current Testing (PULSED & RFET)
    - I. Internal Rotary Inspection System (IRIS)
    - J. Thermography Testing
    - K. Alternate Current Field Measurement (ACFM)
    - L. Alternate Current Field Measurement (ACFM)
    - M. Electromagnetic Acoustic Transducers (EMAT)
    - N. Aerial Inspection
3. Training on NDT & API Plant Inspection

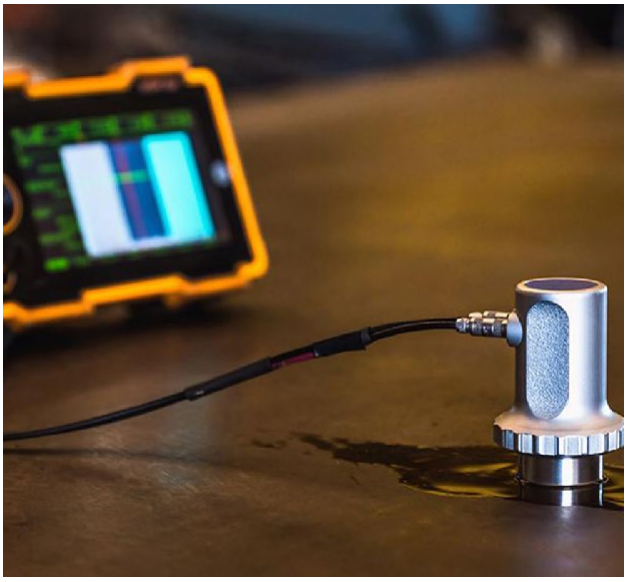
SERVICES I NON-DESTRUCTIVE TESTING

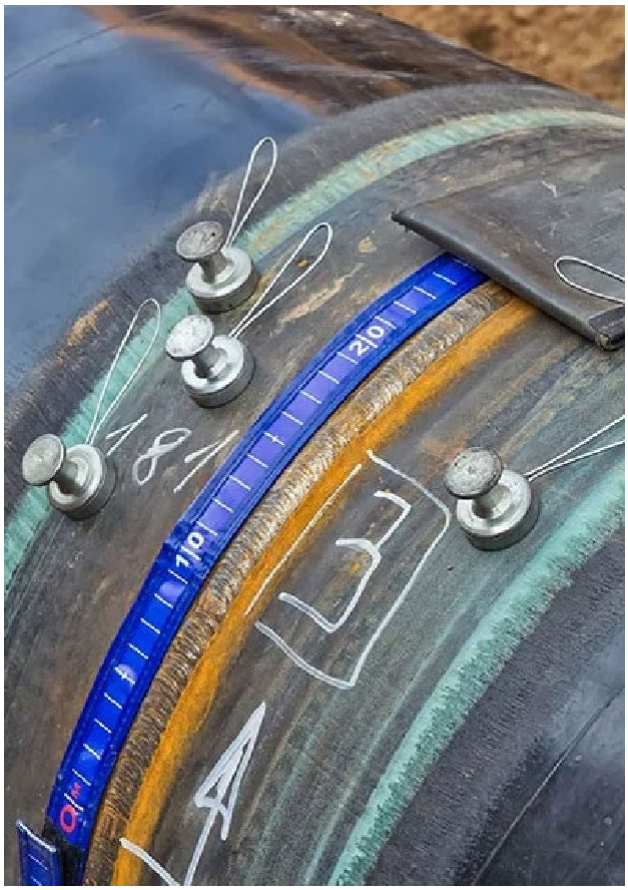
1. CONVENTIONAL NDT SERVICES

A. ULTRASONIC TESTING

Ultrasonic Testing is a method, which utilizes high-frequency sound waves to perform volumetric examinations of materials. Ultrasonic Testing is most commonly used to detect subsurface flaws but in some instances, it can also be used to detect surface flaws as well.

Ultrasonic Testing works by introducing sound waves into the material under test, these waves then propagate through the material. Any discontinuity in the wave path will cause part of the sound wave to be reflected, which is then detected and displayed on the ultrasonic inspection equipment.





B. RADIOGRAPHIC TESTING (X-RAY & GAMMA RAY)

Radiographic Testing (RT) or industrial radiography is a non-destructive testing (NDT) method of inspecting materials for hidden flaws by using the ability of short wavelength electromagnetic radiation (high-energy photons) to penetrate various materials.

Either an X-ray machine or a radioactive source (Ir-192, Co-60 or in rarer cases Cs-137) can be used as a source of photons.

Since the amount of radiation emerging from the opposite side of the material can be detected and measured, variations in this amount (or intensity) of radiation are used to determine the thickness of the composition of the material.

C. X-RAY PIPELINE CRAWLER

A pipeline crawler is an instrument used to detect the quality of welding in long-distance pipelines. The X-ray Pipe Line Crawler is safe, efficient, cost-effective and easy to operate and maintain. The X-ray pipeline crawlers have the advantages of high radiographic quality, high imaging sensitivity, low failure rate and high work efficiency.

The crawlers can be moved in the pipelines with great efficiency as they are controlled and protected from voltage variations.

D. MAGNETIC PARTICLE INSPECTION(MPI)

The magnetic particle inspection method is used to detect surface-breaking flaws (and in some cases subsurface flaws) in ferromagnetic materials.

The object under test is magnetized and an ink or powder containing ferromagnetic particles is applied to the test area. This permits the identification of surface-breaking flaws.

E. LIQUID PENETRANT TESTING (LPT-FLUORESCENT& VISIBLE)

Liquid Penetrant Testing is used to detect surface breaking flaws, which are not restricted to just ferromagnetic materials but all non-porous materials.

The method is based on a liquid penetrant being applied to the test area by using the capillary effect to draw the liquid in any surface-breaking flaws.

Once the excess penetrant has been removed from the test piece a coat of developer is applied to cause the penetrant in any surface-breaking flaws to ‘bleed’ out to the surface allowing for the flaw to be easily identified.

SERVICES I NON-DESTRUCTIVE TESTING

F. BOROSCOPE TESTING (RIGID/CCD- REAL TIME RECORDING)

A boroscope is an optical device consisting of a rigid or flexible tube with an eyepiece on one end and an objective lens on the other linked together by a relay optical system in between.

The optical system is usually surrounded by optical fibres used for the illumination of the remote object. An internal image of the illuminated object is formed by the objective lens and magnified by the eyepiece which presents it to the viewer's eye.

G. VACUUM BOX TESTING

Vacuum box testing is a non-destructive examination used when trying to locate weld seam leaks. A vacuum box and a compressor create a high or low-pressure vacuum while a detergent solution is applied to the test area.

The detergent bubbles make leaks visible within the created pressure envelope. Applications include lap welds, butt welds and shell to annular welds, piping systems and pressure vessels, tank bottoms, ERW
seamed pipe in pipelines, etc.

ADVANTAGES

Provides an immediate indicationof the location of any leaks present & can detect small leaks within a given area.

2. ADVANCED NDT SERVICES

A. PHASED ARRAY ULTRASONIC TESTING (PAUT)

Phased Array Ultrasonic Testing is an advanced method of ultrasonic testing that has several applications in non-destructive testing. Common applications are to noninvasively examine, to find flaws in manufactured materials such as corrosion mapping of pipelines. Single-element (non-phased array) probes, known technically as monolithic probes, emit a beam in a fixed direction.

To test or interrogate a large volume of material, a conventional probe must be physically scanned (moved or turned to and fro) to sweep the beam through the area of interest. In contrast, the beam from a phased array probe can be moved electronically, without moving the probe, and can be swept through a wide volume of material at high speed (for shear wave). To achieve this same coverage using conventional techniques, multiple probes would have to be moved over the component's surface.

The beam in phased array is controllable because a phased array probe is made up of multiple small elements, each of which can be pulsed individually at a computer-calculated timing. The term phased refers to the timing, and the term array refers to the multiple elements. Ultrasonic phased arrays have proven to be a very appropriate inspection technique for weld inspections, especially encoded arrays with linear scanning. The flexibility of phased arrays allows them to be tailored to almost any weld profile and predicted defects.

Phased arrays also have significant advantages over conventional inspection techniques: flexibility, high speed, lower costs (under many conditions), full data storage for auditing and significantly increased productivity (for volume inspections). It allows the inspection of complex geometries with a single probe and scan times are greatly reduced. These capabilities open a series of new possibilities.

For instance, it is possible to quickly vary the angle of the beam to scan a part without moving the probe itself. Phased arrays also allow replacing multiple probes and mechanical components. Inspecting a part with a variable-angle beam also maximizes detection regardless of the defect orientation, while optimizing the signal-to-noise ratio.

BENEFITS OF PHASED ARRAY

1. Software control of beam angle, focal distance and spot size
2. Multiple-angle inspection with a single, small, electronically-controlled
3. Multi-element probe
4. Greater flexibility for the inspection of complex geometry
5. High-speed scans with no moving parts

SERVICES I NON-DESTRUCTIVE TESTING

B. LONG-RANGE ULTRASONIC TESTING (LRUT)

Long-range ultrasonic testing is a rapid way of screening for corrosion in pipelines. The method enables screening of up to 100 meters of pipeline in one test, i.e. 50 meters in both directions. By fitting a ring of transducers around the pipeline, a wave maker device directs low-frequency (20-100 kHz) ultrasonic waves via the transducers, longitudinally into the pipeline wall. The method effectively detects changes in the pipeline's cross-section, enablingit to identify corrosion and other abnormalities. At the same time, this provides the possibility of using welds and flanges as distance references. This highly advanced testing will provide an accurate status report of pipelines in the most effective way.

ADVANTAGES OF LONG-RANGE ULTRASONIC TESTING

1. More than 100 times faster than traditional ultrasonic methods
2. Up to 100 meters screening distance on pipelines above ground
3. Up to 10 meters screening distance on pipelines buried in the ground
4. Possibility to do sub-sea scanning
5. Saves time since there is no need to remove insulation, apart from 1 meter for the transducer ring.
6. Easy to screen wall penetrating pipelines (both built-in and sleeved penetrations

C. AUTOMATED ULTRASONIC TESTING FOR CORROSION MONITORING AND WELD SCAN (P SCAN, C SCAN & B SCAN)

Automated Ultrasonic Testing (AUT) covers a range of ultrasonic inspection techniques using powered, mechanical scanners. Although often used to describe corrosion mapping, AUT encompasses pulse-echo weld inspection, phased array and Time Of Flight Diffraction. Some testing such as 'TOFD' is often carried out using a semi-automated system. In this case, the scanner is operated manually but provides the same encoded position data as a fully automated scanner. The scanners have magnetic wheels that hold them on the vessel. Mild steel tracks clamped to the scan area are used for nonferromagnetic materials or high-temperature scans. The scanners operate with a full range of ultrasonic probes including straight beam, angle beam, tri-element and TOFD. The scanners can be set up with multiple probes including combinations of pulse-echo, straight beam and TOFD. Ultrasonic signals are acquired and evaluated using the versatile 'Tomoview software. This provides multiple views of the ultrasonic data including the raw 'A-scan', C-scan top view and sectional views of the area being inspected.

CORROSION MAPPING

Automated ultrasonic straight beam corrosion mapping, as its name suggests, maps out and measures any flaws in the base material. The scans (0 degree – longitudinal wave) are set up to record thickness data to a specified resolution, typically up to 100 data points per 20 x 20 mm area. This data is plotted to show the top (C-scan), side (B-scan) and end views (D-scan). These views show the position, extent and depth of any defects and allow identification of individual flaws such as pitting as well as a general loss of thickness. The scans will also show laminar defects in the plate including inclusions, plate laminations and blistering.

D. TIME OF FLIGHT DIFFRACTION (TOFD)

Time of flight diffraction (TOFD) is a very sensitive and accurate method for weld defects. When a crack is present, there is diffraction from the tip of the defect. Using the measured time of flight and with the help of simple trigonometry, the depth and width of the crack are analyzed.

E. ACOUSTIC EYE (TUBULAR INSPECTION)

Based on patented Acoustic Pulse Reflectometry (APR) technology, a noninvasive solution overcomes the limitations of many conventional inspection techniques which are slow, giant and limited. Acoustic Pulse Reflectometry (APR) is based on the measurement of one-dimensional acoustic waves propagating in tubes. Any change in the cross-sectional area in the tubular system creates a reflection, which is then recorded and analyzed to detect defects.

An acoustic pulse injected into a semi-infinite straight-walled tube will propagate down the tube without generating any reflections. This pulse can be measured by mounting a small microphone with its front surface flush with the internal tube wall, through a hole in this wall.

The microphone will measure the pulse once only, as it passes over the microphone diaphragm. If however, the pulse encounters a discontinuity in cross-section, a reflection is created. The amplitude and form of the reflection determine the characteristics of the discontinuity. A constriction will create a positive reflection, whereas a dilation (increase in cross-section) will create a negative reflection. Neither of these discontinuities will change the shape of the pulse in their vicinity, but the reflection measured by the microphone will be an attenuated and smeared replica of the impinging pulse, due to propagation losses.

A hole in the tube wall, on the other hand, will create a reflection having a more complicated shape, affected by the size of the hole and the radiation of acoustic energy to the space outside the tube.

SERVICES I NON-DESTRUCTIVE TESTING

F. MAGNETIC FLUX LEAKAGE (MFL) (TANK FLOOR MAPPING/ PIPE SCANNING)

TANK FLOOR MFL SCAN

Tank Floor MFL scanning is a non-destructive examination method, which uses a magnetic field to detect corrosion and pitting in carbon steel. A powerful magnet is scanned close to the surface to 'saturate' the steel with the magnetic field.

The scanner detects the magnetic field "leaks" from the steel where there is corrosion.

Between the scanner bridge magnetic poles, a near-saturation magnetic flux is induced in the material examined.

The scanner sensor detects flux leakage changes when the plate thickness changes. This may indicate the presence of discontinuities, such as pitting and corrosion, on the process and/or soil side.

The scanner is moved over the entire tank bottom. surface to provide the required inspection coverage.

Technicians interpret the scanner display to identify damaged areas and, in some cases, estimate the amount of metal loss.

Thickness losses detected by ultrasound are reported. and mapped in a CAD rendering of the floor.

ADVANTAGES

1. A fast method for inspecting large areas.
2. Minimal set-up time 3.
3. Yields reliable and economic qualitative tank floor assessments. High sensitivity: acceptable sensitivity can be obtained through up to 0.500" of combined steel and coating thickness.

MAGNETIC FLUX LEAKAGE PIPE SCANNING SYSTEM

Magnetic Flux Leakage Pipe Scanning System is an easy-to-use, cost-effective, portable, magnetic flux leakage inspection system for the rapid screening and detection of random internal corrosion in pipe runs and small diameter vessels. The latest magnetic material coupled with unique mechanical designs enables coverage of all pipe diameters from 48mm to 2.4 metres with a limited number of scanning heads.

MAGNETIC FLUX LEAKAGE- INSERVICE INSPECTION

Magnetic flux leakage inspection is not affected by products flowing through the pipe so surveys can be carried out both online and offline and at surface temperatures up to 90°C. The use of Pipe scan, with its high probability of detection to locate the corrosion, coupled with ultrasonic prove up, provides a cost-effective accurate system for the determination of plant integrity.

ADVANTAGES

1. Fast and reliable for pipe and small vessel screening
2. Various scanning heads for multiple pipe sizes
3. Simple to operate.
4. High probability of corrosion detection

G. SURFACE EDDY CURRENT TESTING

Surface Eddy Current Testing is to inspect heat exchangers and condensers in refining, petrochemical and power generation plants. Surface Eddy Current Testing is mainly used to inspect non-ferromagnetic heat exchanger tubes (copper alloys and austenitic stainless steels) for pitting, wear losses, corrosion and erosion damage.

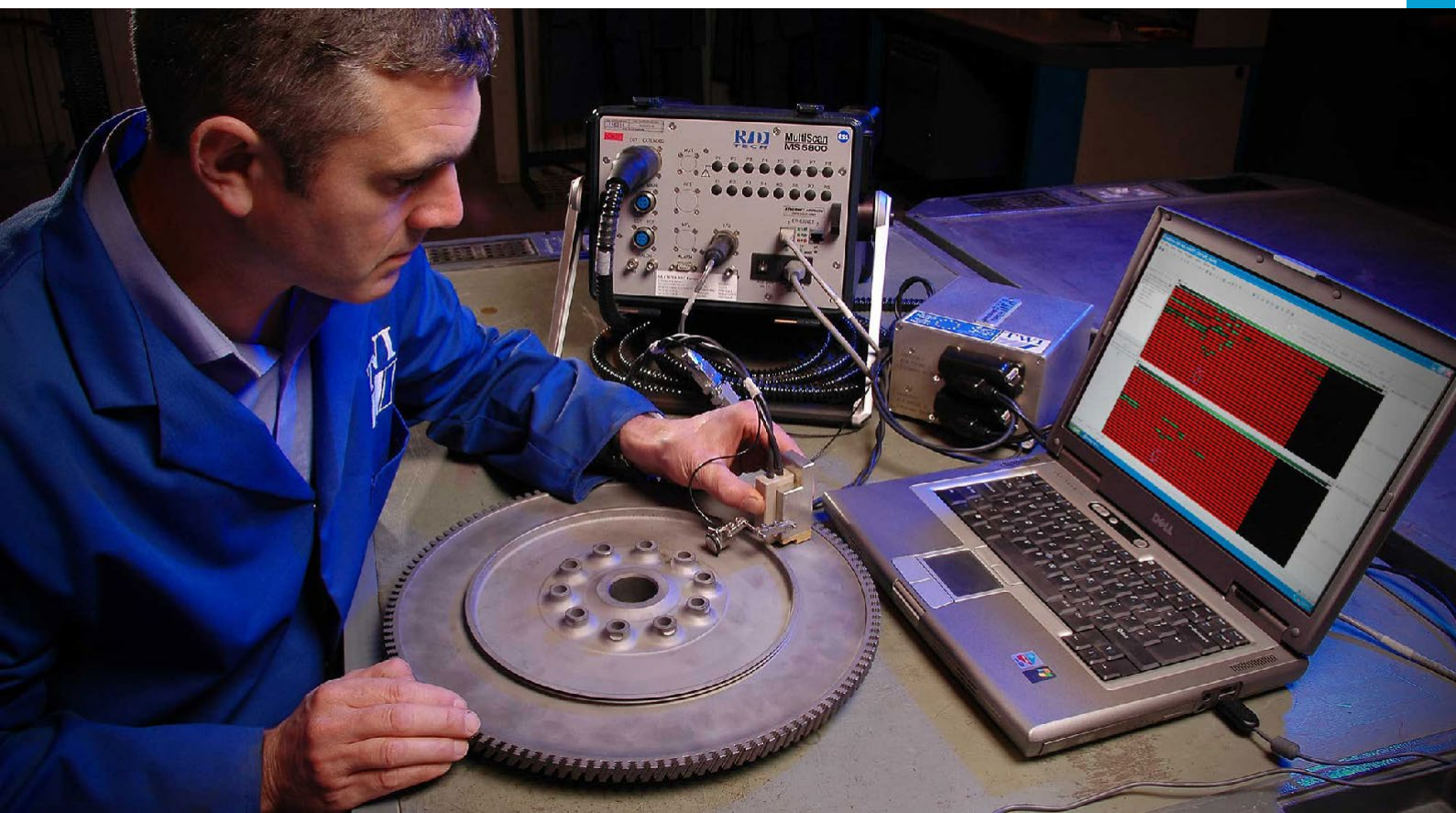
H. EDDY CURRENT TESTING (PULSED & RFET)

Eddy Current Testing (ECT) is used to inspect non-ferrous tubes. It can detect and size cracks, corrosion, erosion and mechanical damage in austenitic stainless tubes and copper alloys. It is widely used in the refining, petrochemical and power generation industries for the inspection of non-ferromagnetic tubes. ECT is a very fast inspection method. A typical inspection rate for a 5-6 meter stainless steel heat exchanger is upto 800 tubes over a 12-hour shift. This depends both on how clean the tubes are and the number of defects or indications needing evaluation.

Remote Field Testing (RFET) is used to readily detect erosion losses in low alloy steels (ferromagnetic) and ferritic stainless steels. Pits, corrosion and mechanical damage can be detected. RFET inspections should be followed by IRIS inspection if shallow pits or general thinning is suspected. One limitation of RFET is that it is not very good for detecting gradual wall loss.

Also, pits smaller than 6% of the tube cross-sectional area cannot be detected. This is because of the low frequencies used for RFET inspection. It is recommended to back up all Remote Field-Testing work with IRIS inspection if shallow pits or general thinning is suspected.

RFET is a relatively fast technique. For example, it is possible to test from 400-420 heat exchanger tubes of 5-6m in length in a 12-hour shift. This depends both on how clean the tubes are and to some extent the number of defects or indications needing evaluation.



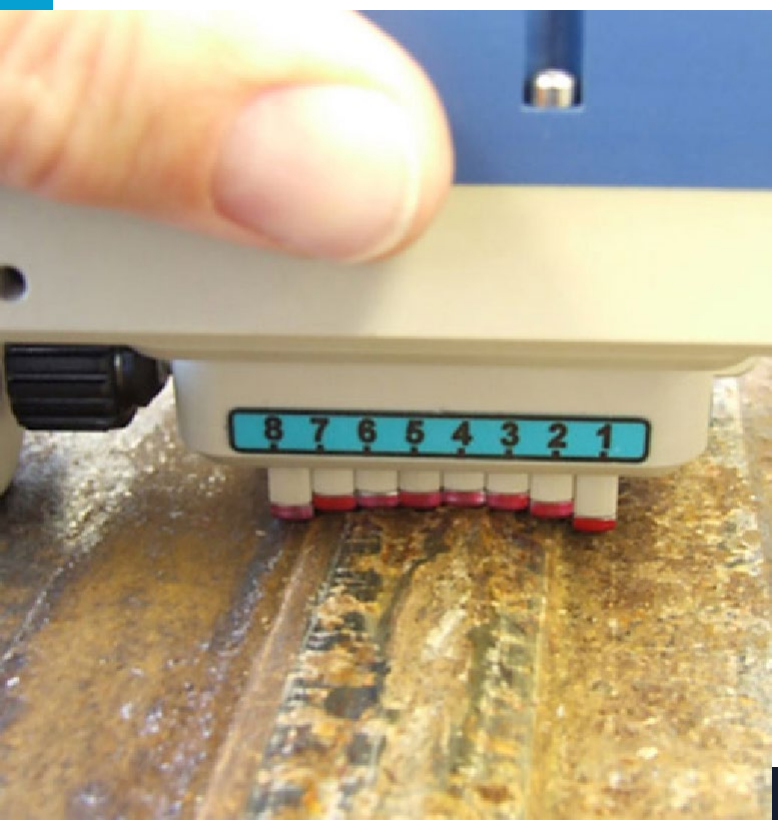
SERVICES I NON-DESTRUCTIVE TESTING

I. INTERNAL ROTARY INSPECTION SYSTEM (IRIS)

IRIS is one of the most recognizable testing methods for tubes. The testing uses an ultrasonic beam scanned around the tube ID by a water-driven turbine probe assembly. This is inserted in each tube and then withdrawn. IRIS is widely used to examine heat exchangers, boilers, and fin fan cooler tubes. It can be applied to ferromagnetic and non-ferromagnetic materials. This technique is very good for detecting and sizing corrosion, erosion, and baffle wear.

J. THERMOGRAPHY TESTING

Thermography is the simplest of all thermal inspection techniques and involves using an infrared camera to look for abnormally hot or cold areas on a component operating under normal conditions. Thermography is a useful technique for the detection of corrosion/ erosion damage in plants operating at elevated temperatures. In addition, it can be used to check for fouling or internal plugging of piping systems and to check the quality of refractory linings. It can also be used for leak detection, composition changes, disbonds in laminates and others.



K. ALTERNATE CURRENT FIELD MEASUREMENT (ACFM)

ACFM is in use worldwide in almost every industrial sector. It is particularly well used for in-service inspection as an alternative to MT / PT. ACFM is ideal for crack detection at welds, and through coatings and has the added advantage of producing crack depth information. Therefore ACFM can provide cost

L. ALTERNATE CURRENT FIELD MEASUREMENT (ACFM)

The introduction of radiograph film digitization into major utilities such as construction, and industrial projects enables the owners of the process/plant/ products to have electronic records in permanent archives.

KEY BENEFITS

1. Eliminates ageing of films, retaining image quality
2. Physical archive storage in computer data cabinets
3. Deliverables are electronic data media with 25-50 years of the data life
4. Full traceability is integral to the system, with tamper-proof designing at each stage
5. Radiographs can be electronically reported and archived
6. Online information on different PCs in different parts of the world
7. Low cost of ownership.

The longevity of the NDE data life ensures that all the information becomes a part of the product life cycle of that entity. With radiograph film digitization solutions, the owners can receive their hardcopy radiographs (x-rays, gamma rays, neutron radiography) and reports as electronic records.

COMPUTED RADIOGRAPHY (CR)

Computed Radiography (CR) provides the digital equivalent of the conventional X-ray film while simultaneously providing the enormous advantages that consumables are virtually eliminated and the time to image is reduced considerably. In addition, digital images can easily be archived and shared freely with other users. It emphasizes the easy workflow and the ability to optimize the images by means of image software, thereby assuring improved analysis. Basically, CR technology is understood to be the digital replacement for film. In conventional X-rays, different resolutions are due to the film type.

In CR the design of the imaging plate, the resolution of the scanner and the high-quality software are combined to achieve incredible performance. It is the careful combination of all three components that makes a state-of-the-art system.

PROFILE RADIOGRAPHY

Profile radiography is a powerful, effective and simple technique for the inspection of piping susceptible to internal and external corrosion. During the inspection, there are situations where it is not possible to cut open the piping or remove the external insulation of the piping for inspection.

In such circumstances, this technique comes handy. This technique was used to inspect the hydrogen reformer outlet pigtail /weldolet for determination of remaining pipe wall thickness, as conventional UT thickness measurement was not possible (due to the geometry of the wallet). This technique was also employed for the CUI (corrosion under insulation) study of insulated piping to detect any deterioration by external corrosion. In both cases, this technique gave excellent results, which were crosschecked with visual findings.

M. ELECTROMAGNETIC ACOUSTIC TRANSDUCERS (EMAT)

EMAT technique provides high-speed non-destructive material analysis via ultrasonic guided wave inspection of the complete circumference and volume of the tubular material. It provides qualitative and not quantitative information on the severity of the corrosion. The advantages of electromagnetic inspection are many like the ability to be used on irregular surfaces, as well as the advantages of ultrasonic testing, such as the ability to detect corrosion. The EMAT probes generate a guided ultrasonic wave in the pipe that travels in the circumferential direction. This wave is sensitive to corrosion losses on both the ID and the OD of the pipe and travels between the transmitting and the receiving EMAT transducer. EMAT provides a 100% volumetric inspection that is fast and repeatable.

N. AERIAL INSPECTION

The safe and cost-effective remote aerial inspections with high-resolution digital photographs help refinery customers to make quality maintenance assessments of their flare tip condition and service life. Usually inspecting tall or otherwise difficult-to-reach structures has traditionally been an expensive exercise requiring cranes, helicopters or rope access work.

Aerial drones can capture high-resolution, high-quality photos and videos of these structures economically. The live video feed from the drone directs aerial operators to capture the exact needs with accurate results. Capturing imagery from infrared cameras or data from other sensors is also a possibility: taking air samples or temperature readings for example.

The unmanned drones are also able to get into areas that would otherwise be too dangerous for live inspection, e.g. close-up on live flame stacks or in proximity to chemical leaks. Likewise, because of their small scale and quiet operation drones can operate close to working sites without disruption.The small size and stability of aerial drones make it possible to conduct internal aerial inspections of sites such as large factories and warehouses and within other confined locations.

MAIN BENEFITS

1. Quick setup and deployment
2. Stress-free inspection from the ground
3. Aerial inspection of multiple locations from a single take-off point
4. Live video feed enables industry experts to make decisions on the fly
5. High-definition pictures capture all the detail, and highlight areas to report and repair
6. Optical and digital zoom is available
7. Save money – An inspection while the asset is still online, 4-6 months before a shutdown, will save you money
8. De-risk planned shutdowns and maintenance – have the information to fully plan and budget shutdowns and turnarounds
9. No plant outage – with the plant able to stay online and operational during the inspection
10. Minimum Health & Safety issues– small, unmanned, battery operated reduce the need for people to be placed in potentially dangerous locations
11. Higher quality information – technical skill to fly close to assets lets operators locate and diagnose problems quickly

SERVICES I NON-DESTRUCTIVE TESTING

3. TRAINING ON NDT & API PLANT INSPECTION

COURSES OFFERED

Hitech has highly qualified personnel dedicated to the sole purpose of training students in the field of Oil and Gas sector. The in-house and external courses offered are but not limited to:

A. NON-DESTRUCTIVE TESTING (NDT) COURSES

The company provides Level I, II Training and Certification as per Recommended Practice SNT - TC-1A (Latest Edition) in the following NDT Methods:

1. Liquid Penetrant Testing
2. Magnetic Particle Testing
3. Ultrasonic Testing
4. Radiographic Testing
5. Visual Testing

B. AMERICAN WELDING SOCIETY (AWS) COURSES

1. AWS-CWI exam preparatory course
2. AWS-SCWI exam preparatory course

C. AMERICAN PETROLEUM INSTITUTE (API) COURSES

1. API 510 (American Petroleum
2. Institute – Pressure Vessel Inspector)
3. API 570 (American Petroleum Institute – Piping Inspector)
4. API 579 (American Petroleum Institute – Fitness For Service)
5. API 580 (American Petroleum Institute – Risk Based Inspection)
6. API 653 (American Petroleum Institute – Aboveground Storage Tank Inspector)

SERVICES I ENGINEERING SERVICES

1. Risk-Based Inspection(RBI)
2. Residual/Remaining Life Assessment (RLA) & Condition Assessments Of Boilers
3. Fitness For Service
4. Failure Investigation Remedial Suggestion

1. RISK-BASED INSPECTION (RBI)

Oil & Gas and Petrochemical industries are constantly facing great pressure to reduce risks and improve safety and environment-related issues. Owners still make a constant effort aiming to reduce production costs and optimize maintenance activities. Modfield, the team have significant experience developing risk-based inspection (RBI) programs on fixed equipment and piping in the hydrocarbon and chemical process industries, and offshore pressure systems.

These programs are based on API RP 580, API RP 581, DNV-RP-G101, and the best engineering practices and client specifications.

The programs are complemented by the implementation of software and technology. RBI should not be used to recommend any inspection when it will not improve knowledge about the damage state. In those cases, where PoF is driving the risk, RBI should point to other mitigation options such as replacement, repair, or other actions that satisfy the risk criteria.

WHAT IS RISK-BASED INSPECTION (RBI)?

Risk-Based Inspection (RBI) is an analysis methodology and process that, as opposed to condition-based inspection, requires qualitative or quantitative assessment of the probability of failure (PoF) and the consequence of failure (CoF) associated with each equipment item, piping circuits included, in a particular process unit.

A properly-implemented RBI program categorizes individual pieces of equipment by their risks and prioritizes inspection efforts based on this categorization. Through an analysis of the probability and consequences of failure associated with each equipment, component or structure, a proper inspection and maintenance programme is then developed.

WHY IS RISK-BASED INSPECTION AND MAINTENANCE IMPORTANT?

RBI is used to identify and understand risk, risk drivers, and where equipment is in its lifecycle. RBI can indicate whether an inspection is needed; however, this requires additional data that is extremely targeted to reduce the underlying uncertainties associated with the risks about the current and future predicted damage state of the equipment.

RBI is crucial for optimizing the operation and maintenance of industrial plants in various industries. It helps you to meet the financial, reliability and regulatory needs of the industry by improving your plant’s performance, availability and safety. It extends the lifetime of your plant by establishing a long-term testing and inspection procedure.

2. RESIDUAL/REMAINING LIFE ASSESSMENT (RLA) & CONDITION ASSESSMENTS OF BOILERS

Evaluating assets remaining life requires in-depth knowledge of the degradation mechanisms and their evolution, considering the operating conditions to which the equipment is subjected. Modfield performs RLA assessments in the most complex markets. In addition to the multi-disciplinary in-house team, Modfield uses advanced analysis and simulation tools to deliver reliable results and superior value to the decision-making process. Predicting the remaining operating life of plant equipment that has been in service for many years isa problem faced by many industries and many power plants. The problem is especially for those companies whose plants have been in service for 15 to 25 years or more. Analysis of reliable data plays an important role in the maintenance decision-making process. The accurate estimation of the residual life of components of equipment and system can be great asset when planning preventive maintenance. To get high operational availability and stability in maintenance for developing life extension of equipment.

WHAT IS RLA?

For the estimation of the residual lifetime the maximum expected lifetime, assuming that the equipment will be operated under the same conditions, has to be found out. The expected lifetime is a function of the operating conditions. In dependence on the average load level, it can get shorter for higher load conditions. The residual lifetime can be defined as the difference between the expected lifetime and the actual age. For general mechanical equipment, the relationship between expected life and load conditions can be described.

CONDITION ASSESSMENT OF BOILER AND IT'S COMPONENTS

RLA is an inspection method/test employed for boilers & heaters, which are in operation for a prolonged period. RLA is a tool for preventive and predictive maintenance. Condition assessment is carried out to arrive at the present state of the condition of the component's property degradation using non – destructive and destructive methods. Condition assessment plays a vital role in the running plant without any interruption and meets increasingly stringent environmental regulations, planned outages, proper maintenance and data collection in new as well as old plants. It is an ongoing procedure rather than a one-time activity.

Evaluating assets remaining life requires in-depth knowledge of the degradation mechanisms and their evolution, considering the operating conditions to which the equipment is subjected. Modfield performs RLA assessments in the most complex markets. In addition to the multi-disciplinary in-house team, Modfield uses advanced analysis and simulation tools to deliver reliable results and superior value to the decision-making process. Predicting the remaining operating life of plant equipment that has been in service for many years isa problem faced by many industries and many power plants. The problem is especially for those companies whose plants have been in service for 15 to 25 years or more. Analysis of reliable data plays an important role in the maintenance decision-making process. The accurate estimation of the residual life of components of equipment and system can be great asset when planning preventive maintenance. To get high operational availability and stability in maintenance for developing life extension of equipment.

APPROACH TO REMAINING LIFE ASSESSMENT

1. Understanding the actual degradation mechanism (High Cycle Fatigue, Low Cycle Fatigue, Thermal Fatigue, Thermo Mechanical Fatigue, Thermal Aging, Wear, Creep, Embitterment, Corrosion)
2. Visual Examination of Physical Properties
3. NDT involving In-situ Metallography, Ultrasonic Testing, Magnetic Particle Inspection, DP Test, and Ferrite Measurement.
4. **Stress analysis:** To know the strength of the material and check ruptures.
5. **Non-Destructive Testing:** To provide an insight into the component's integrity.
6. **Laboratory Testing:** To provide valuable information about the material's soundness.
7. **Judgment of Fitness of the Equipment:** Based on available data.
8. **Suggestions on Repairs:** If required, repair of the equipment is suggested for life extension.
9. **Judgment of Remaining Life Based on Analysis:** Estimates for remaining life are carried out. In addition

3. FITNESS FOR SERVICE

A process, plant, and equipment are often exposed to corrosive environments and/or elevated temperatures. Under these conditions, the material used in the equipment can degrade or age with time. When important equipment such as pressure vessels, piping, and storage tanks become older, the plant operator must decideif they can continue to operate safely and reliably to avoid injuries to personnel and the public, damage to the environment, and cause unexpected shutdowns.

Fitness for service assessment procedures provides the means for the plant operator to make appropriate decisions on established engineering principles. Fitness for service assessment is a multidisciplinary engineering analysis that ensures all process and plant equipment such as pressure vessels, piping, and tanks operate safely and reliably for the desired period of operation and until the next turnaround or planned shutdown occurs in the future.

ASME, API, BS 5500 & other recognized design codes provide rules/guidelines for a general procedure for assessing fitness for service. This assessment procedure evaluates the remaining strength of the equipment in its current state that may have degraded from its original condition. Common degradation mechanisms include corrosion, localized corrosion, pitting and crevice corrosion, hydrogen attack, embrittlement, fatigue, high-temperature creep, and mechanical distortion.

SERVICES I ENGINEERING SERVICES

Fitness-for-service assessments evaluate the structural integrity of components and their suitability for continuous service. Procedures such as BS 7910:2013, API 579/ASME FFS-1, ASME B31G, DNV-OS-F101 and FITNET enable the integrity of critical pressure components and welded structures to be assessed against different failure modes, using a validated engineering approach. Fitness for Service (FFS) is a best practice and standard used by the oil & gas and chemical process industries for in-service equipment to determine its fitness for continued service.

4. FAILURE INVESTIGATION REMEDIAL SUGGESTION

This department is manned by qualified Metallurgists & Mechanical Engineers with a Proven Track record of competence. We regularly undertake mechanical and metallurgical failure investigations of various engineering items required in the Petrochemical industry, Power stations, Refineries, Steel plants etc. The investigation is backed by facilities in our chemical, mechanical and metallurgical laboratories. The scope of work includes detailed testing and results, interpretation and probable cause of failure. We also offer technical solutions for the problem at hand. Residual life assessment of different building structures, equipment and instrument in running the Plant is undertaken by us with conclusive opinion.

A FEW OF THE COMPONENTS INVESTIGATED IN THE RECENT PAST

1. Hydrogen bubble caps are used in refineries.
2. Forged items used in high-tension power transmission lines.
3. Fuel injection nozzles for furnaces.
4. Threaded fasteners.

WE CONDUCT

1. Technical Seminar
2. Awareness Programme
3. Training on Quality Management System ISO 9000 ISO 14000.

SERVICES I CONSULTANCY OF SERVICES

1. Consultancy Of Setting Up Of QA Laboratory
2. Quality Management Consultancy

SERVICES I CONSULTANCY OF SERVICES

1. CONSULTANCY OF SETTING UP OF QA LABORATORY

The knowledge and expertise of our Engineers and Technicians are utilized by many Organizations for setting up of Mechanical, Metallurgical and Calibration Laboratory. We have rendered Consultancy Services for settingup Mechanical, Metallurgical and Chemical Testing in different manufacturing units. Our job include plan layout of the laboratory, selection of instruments, procurement process of instrument, commissioning of theinstruments and trial run of the Laboratory and also providing training to Engineers, Chemists and Technicians.
QUALITY MANAGEMENT CONSULTANCY

2. QUALITY MANAGEMENT CONSULTANCY

Modfield undertake Turnkey Consultancy of ISO 9000 (Quality Management System) and ISO 14000 (Environmental Management System). Our clientele in this field includes the following: Organizations certified under our Consultancy include the following:

CONTACT US NOW

OUR OFFICE

287, Thiruvalluvar Street - 632406.
Puliyanthangal, Ranipet, Tamil Nadu.

OUR OFFICE

CR.NO-1477640, P.O.BOX:415,P.C:112,
Muscat, Sultanate of Oman.

E-MAIL & WEB

admin@modfield.in www.modfield.in

PHONE NUMBER

India Branch Phone : (+91) – 9629615761,9944917576. (+91472 - 244347).
Oman Branch Phone : (+968) – 79048434.