



Triplex Consultants Limited



Triplex Consultants Ltd. **COMPANY PROFILE**

www.Tripexconsultants.com

2024

HISTORY & CULTURE

Tripex® Consultants Limited was established in 2018 and incorporated in 2023. The Founders, inspired by the dream and desire to shape a better world, put their brains and resources together to setup the company. Tripex® seeks to be an epitome of excellence by offering third-party statutory and voluntary inspections, testing, quality assessment and research services.

In the regions of our operations, we serve a wide range of business sectors including Oil and Gas, manufacturing and fabrication, transport and logistics, small and medium enterprises, non-governmental and policy institutions.



OUR MOTTO



We don't just ensure Quality, we define it.

Innovation meets Excellence, Excellence meets Precision, Precision meets Quality.

OUR MISSION

To be the trusted partner for Inspection, Testing and Economic Research services, contributing to advancement of industries through Research and relentless pursuit of Quality.

OUR VISSION



Our vision is to seamlessly integrate Inspection, Testing and Economic Research to inspire transformative advancements in the engineering and financial sectors.

Beyond limits, Beyond expectations.

OUR VALUES

Our values make our reputation. Through building trust, committing to excellence, accountability, integrity, teamwork and continuous improvement.

ACCOUNTABILITY

At Tripex® Consultants, accountability is not just a word, but a cornerstone of our service ethos reflected in our detailed and unbiased assessments.

Our commitment to integrity drives us to provide accurate and transparent reports, ensuring accountability at every step.

OUR SERVICES

Non-destructive Testing (NDT) is a group of techniques used to evaluate the integrity, quality, and properties of materials, components, and structures without causing damage or altering their physical characteristics. These techniques are essential for ensuring the safety, reliability, and performance of various industrial assets across industries such as aerospace, automotive, manufacturing, construction, oil and gas, and infrastructure.

By employing NDT, companies can identify and address potential issues early, prevent costly failures, optimize maintenance practices, extend the service life of assets, and ensure compliance with regulatory standards and industry requirements. NDT plays a critical role in quality control, risk management, asset management, and safety assurance across various sectors, making it an indispensable tool in modern industry.

Our skilled NDT inspectors offer your unrivalled inspection services in accordance with renowned international standards, such as BS EN, ASME, API, ISO among others. Our inspection services are tailored to meet our client requirements & procedures while meeting the best industry practices and norms.



Conventional NDT

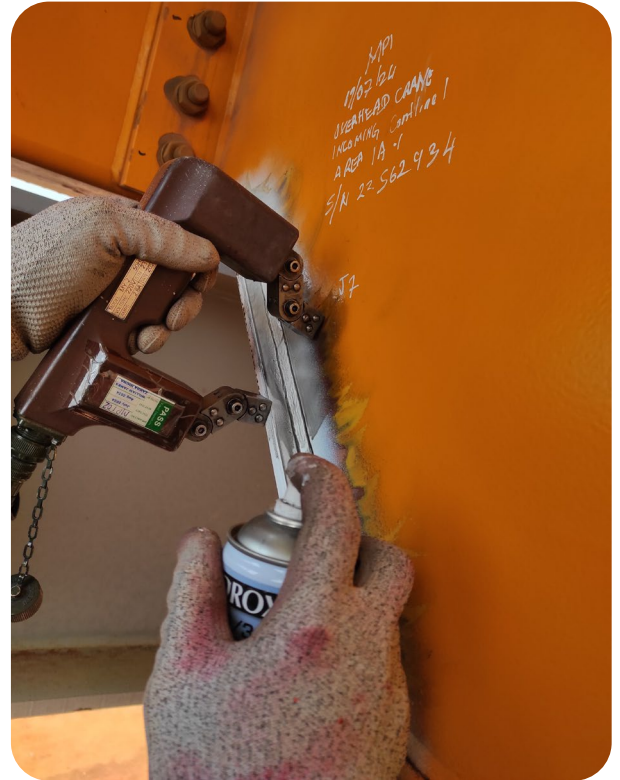
- **Magnetic-particle Testing (MT)**
- **Penetrant Testing (PT)**
- **Ultrasonic Thickness Gauging (UTG)**
- **Visual Testing (VT)**



Magnetic-particle Testing (MT)

Magnetic Particle Inspection (MPI) is a non-destructive testing method used to detect surface and near-surface flaws in ferromagnetic materials. It works by magnetizing the material and applying magnetic particles, typically in the form of a dry powder or a wet suspension, to the surface. If there are any defects present, such as cracks or discontinuities, the magnetic particles will be attracted to and accumulate around these areas, making the flaws visible under proper lighting conditions.

MPI is commonly used in industries such as aerospace, automotive, manufacturing, and construction to ensure the integrity of critical components like welds, castings, and forgings. It is a highly effective technique for identifying defects quickly and accurately, contributing to the safety and reliability of various structures and equipment.



Penetrant Testing (PT)

Penetrant Testing (PT), also

known as Liquid Penetrant Inspection (LPI) or Dye Penetrant Inspection (DPI), is a

non-destructive testing method used to detect surface-breaking defects in non-porous materials. It involves surface preparation of the material being inspected by cleaning to remove any

contaminants that could interfere

with the inspection process. This is followed by application of a Penetrant, a colored liquid penetrant, typically a fluorescent or visible dye. The penetrant is allowed to dwell on the surface for a specified period, allowing it to seep into any surface defects.

Any excess Penetrant is carefully removed after the dwell time, from the surface of the material using a solvent or emulsifier. Finally, a White Developer, usually a dry, powdered substance, is applied to the surface. The developer draws the penetrant out of any defects, causing them to bleed out and become visible against the contrasting background.

The surface is inspected under appropriate lighting conditions, such as ultraviolet (UV) light for fluorescent penetrants or visible light for visible penetrants. Defects will appear as brightly colored indications against the white developer background.



Penetrant Testing is widely used in industries such as aerospace, automotive, manufacturing, and welding to detect surface cracks, porosity, leaks, and other discontinuities in materials such as metals, plastics, ceramics, and composites. It is a versatile and relatively simple inspection method, suitable for both field and laboratory applications, and can detect defects that may not be visible to the naked eye.

While MT can only be applied to ferromagnetic materials, PT can be used on any non-porous or coated material.



Ultrasonic Thickness Gauging (UTG)

Ultrasonic Thickness Gauging (UTG) is a non-destructive testing technique used to measure the thickness of materials, typically metals, but also plastics, composites, and other materials. It works by sending high-frequency sound waves (ultrasonic waves) into the material and measuring the time it takes for the sound waves to travel through the material and reflect back from the opposite surface.

A transducer probe is placed on one side of the material, and a couplant (often a gel or oil) is applied to ensure good acoustic coupling between the probe and the material surface.

The probe generates ultrasonic pulses, which travel through the material. When the ultrasonic waves encounter a change in material density (such as the back surface of the material), they are partially reflected back to the probe. The time it takes for the ultrasonic waves to travel to the back surface and back to the probe is recorded. Using the known velocity of sound in the material and the time-of-flight measurement, the thickness of the material is calculated.

The measured thickness is displayed on the instrument's screen, and it may also be recorded for documentation purposes.



It is a valuable inspection method for detecting thinning or corrosion in materials and helps ensure the safety and reliability of critical infrastructure. UTG is particularly useful for inspecting materials that are difficult to access or inspect visually.

Visual Testing (VT) is a non-destructive testing (NDT) method used to inspect materials and components for surface defects, discontinuities, and other visible imperfections. It is one of the oldest and most commonly used NDT techniques, as it provides immediate results and does not require specialized equipment. Trained inspectors visually examine the surface of the material or component under adequate lighting conditions. They look for indications such as cracks, corrosion, porosity, weld defects, surface irregularities, and other anomalies that may affect the integrity or functionality of the inspected item. Visual inspection can be performed either directly by inspectors who physically inspect the surface of the material or remotely using tools such as borescopes, fiberscopes, or cameras for inspecting areas that are difficult to access. Inspectors may use various inspection aids such as magnifying glasses, mirrors, dye penetrants, and fluorescent or UV lighting to enhance visibility and detect smaller or hidden defects.

While it may not detect subsurface defects, Visual Testing remains an essential and cost-effective method for identifying surface irregularities and defects early in the inspection process.

Advanced NDT

- ✓ **Radiographic testing (RT) and Film Interpretation.**
- ✓ **Ultrasonic Flaw detection.**
- ✓ **Eddy Current Testing**
- ✓ **Magnetic Flux leakage (MFL)**

Radiographic Testing (RT) is a non-destructive testing method used to detect internal defects and evaluate the internal structure of materials. It involves the use of X-rays or gamma rays to penetrate the material being inspected. Radiographic Testing is commonly used in industries such as aerospace, automotive, construction, and manufacturing to assess welds, castings, forgings, and other components for defects such as cracks, voids, inclusions, and porosity.

X-rays or gamma rays are generated by a radiation source (X-ray tube or radioactive isotope) and directed towards the material being inspected. The radiation penetrates the material, and a portion of it is absorbed or attenuated based on the material's density and thickness. A film or digital detector is placed on the opposite side of the material. As the radiation passes through the material, it interacts with the film or detector, resulting in the formation of a latent image.





For film-based radiography, the exposed film is developed using a chemical process to reveal the latent image. For digital radiography, the captured image is processed electronically. Trained technicians interpret the radiographic images to identify and evaluate any indications or anomalies present. This may involve comparing the radiographic image to applicable standards, specifications, or reference images. The findings from the radiographic examination are documented in a report, which may include the location, size, and nature of any detected indications, as well as recommendations for further action if necessary.

Radiographic Testing can provide detailed information about the internal condition of materials, making it a valuable tool for detecting defects that may not be visible to the naked eye. However, it requires specialized equipment and trained personnel to perform safely and effectively. Additionally, radiation safety precautions must be strictly followed to protect personnel and the environment from potential hazards associated with ionizing radiation.

NONCONVENTIONAL NDT INSPECTION TECHNIQUES

EDDY CURRENT INSPECTION (ECT)



coupling between the probe and the material surface. The probe generates ultrasonic pulses, which travel through the material. When the ultrasonic waves encounter a change in material density (such as the back surface of the material), they are partially reflected back to the probe. The time it takes for the ultrasonic waves to travel to the back surface and back to the probe is recorded. Using the known velocity of sound in the material and the time-of-flight measurement, the thickness of the material is calculated. The measured thickness is displayed on the instrument's screen, and it may also be recorded for documentation purposes.

PHASED ARRAY ULTRASONIC TESTING (PAUT)

Phased Array Ultrasonic Testing (PAUT) is an advanced nondestructive examination technique that utilizes a set of ultrasonic testing (UT) probes made up of numerous small elements, each of which is pulsed individually with computer-calculated timing. more complex geometries that are difficult. PAUT can be used for more complex geometric



weld inspections, high thick materials and crack detection. Advantages are, it can be conducted more quickly, used for repeat scans because it has a high degree of repeatability, it is able to create detailed and accurate cross-sections of a part, gives a permanent record, Gives information about lateral position of defect in weld (depth and height), No radiation, higher POD.

PAUT is widely used in Oil & gas, nuclear Industries (Refinery's, Petrochemicals of piping, boilers, pressure vessels, clad material, Storage Tanks, In-service weld inspection including Stress Corrosion Cracking, Complex Geometries – Nozzles, Flanges, Shafts, bolts).

TIME OF FLIGHT DIFFRACTION ULTRASONIC TESTING (TOFD)

Time of Flight Diffraction (TOFD) is a reliable and fastest method of nondestructive ultrasonic testing (UT) used to look for flaws in welds. TOFD uses the time of flight of an ultrasonic pulse to find the location of a reflector. It can also be used for weld overlays and the heat affected zones of other components as well such as piping, pressure vessels, clad material, storage tanks and structural steel. PAUT + TOFD combination is commonly used to inspect pipeline welds. TOFD uses a pair of ultrasonic transducers, one as a transmitter and



the other as a receiver. The low frequency waves propagate at an angle and only diffract back to the receiver if they hit a defect. If this happens, the time it takes for both waves to make it to the receiver can be used to create a complete image of the weld and identify

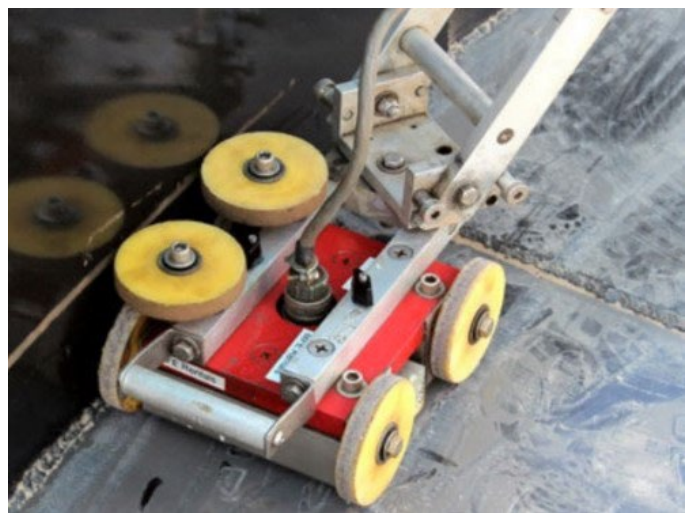
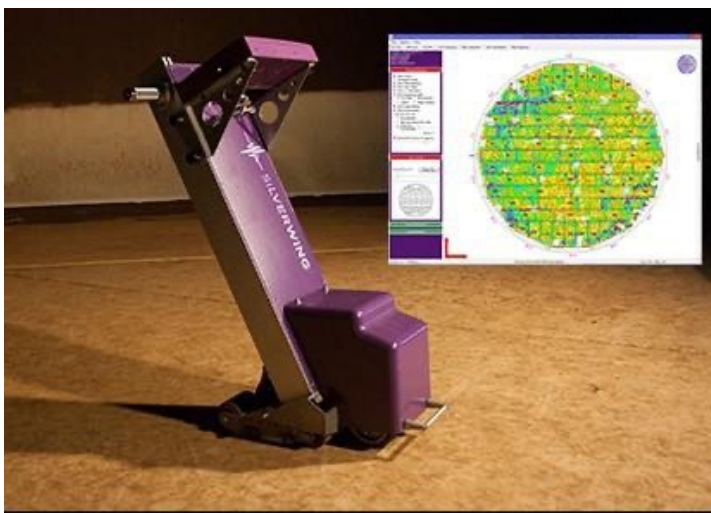
the size and location of the damage. Advantages are, high degree of repeatability, no radiation, higher POD, cost saving, more sensitive, Quick setup, precise sizing. TOFD is widely used in Oil & gas Industry, nuclear, (Refinery's, Petrochemicals of piping, pressure vessels, clad material, In-service weld inspection)

MAGNETIC FLUX LEAKAGE - TANK (MFL)

The Floormap3Di-R is the fastest tank floor scanner/tank bottom inspection system developed by Silverwing, with scanning speeds of up to 1 m/s which is twice the speed of the previous model. The Floormap will improve your inspection efficiency whilst improving accuracy and data quality. The Floormap combines two distinct technologies, MFL and STARS. The introduction of STARS (Surface topology air-gap reluctance sensors) enables the scanner to determine whether there is corrosion on the top side, bottom side or below the surface coating. The improved signal-noise ratio combined with STARS and MFL ensures a more accurate and efficient inspection of coated and thicker plates.

Unlike other manual "stop on defect" systems all the data is captured and stored. This data retention enables tank engineers to compare and review historically pertinent data sets to determine the optimum repair strategy.

The high-resolution sensor heads provide excellent probability of detection down to indications that measure 2mm in diameter. This coupled with advanced signal processing and defect classification tools significantly improves the corrosion detection and sizing capability when compared with



API INSPECTIONS SERVICES

API 653 Storage Tank Inspection

API 653 is a standard published by the American Petroleum Institute (API) that provides guidelines for the inspection, repair, alteration, and reconstruction of aboveground storage tanks (ASTs) used in the petroleum and chemical industries. The standard covers various types of ASTs, including those for storing crude oil, refined products, chemicals, and other liquids.

API 653 tank inspection involves a comprehensive examination of the tank's integrity to ensure safe operation and compliance with regulatory requirements.



API 653 inspection process involves:

1. **Initial Inspection:** A thorough inspection is conducted when the tank is first put into service to establish a baseline condition. This includes checking for any construction defects, such as weld quality and material thickness.
 2. **Routine Inspections:** Regular inspections are performed periodically to monitor the tank's condition and identify any changes or deterioration over time. The frequency of routine inspections is typically determined by factors such as tank size, age, and service conditions.
 3. **External Inspection:** Visual examination of the tank's external surfaces, including the shell, roof, foundation, and appurtenances, to check for signs of corrosion, leakage, or other damage.
 4. **Internal Inspection:** Internal examination of the tank's interior, including the floor, shell, roof, and welds, using various inspection techniques such as ultrasonic testing (UT), magnetic particle testing (MPT), and visual inspection, to detect corrosion, pitting, cracking, and other defects.
 5. **Thickness Measurements:** Ultrasonic thickness measurements are taken at regular intervals around the tank shell and roof to assess the remaining thickness of the material and detect any localized corrosion or thinning.
 6. **Evaluation and Reporting:** Inspection findings are evaluated against API 653 criteria to determine the tank's fitness for continued service. Inspection reports are prepared detailing the condition of the tank, any deficiencies found, and recommendations for repair or maintenance.
 7. **Repair and Maintenance:** Based on the inspection findings, necessary repairs, alterations, or maintenance activities are carried out to address identified deficiencies and ensure the tank's continued integrity and compliance with regulatory requirements.
- API 653 tank inspections are essential for preventing leaks, spills, and failures that could lead to environmental contamination, safety hazards, and costly downtime. Compliance with API 653 standards helps ensure the safe and reliable operation of aboveground storage tanks throughout their service life.

API 570 Pipeline Inspection Services

API 570 is a standard published by the American Petroleum Institute (API) that provides guidelines for the inspection, evaluation, and maintenance of piping systems used in the petroleum refining, chemical processing, and related industries. API 570 covers both metallic and non-metallic piping systems that transport fluids



under pressure. API 570 pipeline inspection involves a systematic evaluation of piping systems to ensure their integrity, reliability, and compliance with regulatory requirements.

API 570 inspection process involves:

- **Scope of Inspection:** Determine the scope of the inspection based on factors such as the type of fluid being transported, operating conditions, piping materials, and regulatory requirements.
- **Inspection Planning:** Develop an inspection plan outlining the specific inspection activities, techniques, and schedule. Consider factors such as the piping system's design, fabrication, installation, service history, and potential degradation mechanisms.



- **Visual Inspection:** Conduct visual examinations of the piping system's external surfaces, supports, hangers, and attachments to identify signs of corrosion, leaks, physical damage, or other abnormalities.
- **Thickness Measurements:** Perform ultrasonic thickness measurements at various locations along the piping system to assess the remaining wall thickness and detect any corrosion or erosion.
- **Non-Destructive Testing (NDT):** Use NDT techniques such as radiographic testing (RT), magnetic particle testing (MPT), liquid penetrant testing (LPT), and ultrasonic testing (UT) to detect and assess defects such as cracks, weld flaws, and material degradation.
- **Fitness for Service (FFS) Assessment:** Evaluate the piping system's fitness for continued service based on API 579/ASME FFS-1, which provides guidelines for assessing the structural integrity of equipment and piping systems.

API 570 pipeline inspection helps ensure the safe and reliable operation of piping systems by identifying and addressing potential integrity issues before they lead to leaks, spills, or catastrophic failures. Compliance with API 570 standards helps minimize risks to personnel, the environment, and assets while maximizing the efficiency and longevity of piping infrastructure.

API 510 Pressure Vessels Inspection Services

API 510 is a standard published by the American Petroleum Institute (API) that provides guidelines for the inspection, repair, alteration, and rerating of pressure vessels used in the petroleum refining, petrochemical, and chemical processing industries. Pressure vessels are containers designed to hold fluids or gases at pressures higher than atmospheric pressure. API 510 pressure vessel inspection involves a thorough examination of pressure vessels to ensure their integrity, reliability, and compliance with regulatory requirements.



API 510 inspection process involves:

Scope of Inspection: Determine the scope of the inspection based on factors such as the type of pressure vessel, design specifications, operating conditions, service history, and regulatory requirements.

Inspection Planning: Develop an inspection plan outlining the specific inspection activities, techniques, and schedule. Consider factors such as the vessel's design, fabrication, installation, materials of construction, and potential degradation mechanisms.

Visual Inspection: Conduct visual examinations of the pressure vessel's external surfaces, welds, attachments, supports, and appurtenances to identify signs of corrosion, leaks, physical damage, or other abnormalities.

Thickness Measurements: Perform ultrasonic thickness measurements at various locations on the pressure vessel to assess the remaining wall thickness and detect any corrosion, erosion, or thinning.

Non-Destructive Testing (NDT): Use NDT techniques such as radiographic testing (RT), magnetic particle testing (MPT), liquid penetrant testing (LPT), and ultrasonic testing (UT) to detect and assess defects such as cracks, weld flaws, and material degradation.

Pressure Testing: Conduct hydrostatic or pneumatic pressure testing to verify the pressure vessel's structural integrity and leak tightness. This may involve filling the vessel with a test fluid and pressurizing it to a specified pressure level while monitoring for any leaks or deformations.

Fitness for Service (FFS) Assessment: Evaluate the pressure vessel's fitness for continued service based on API 579/ASME FFS-1, which provides guidelines for assessing the structural integrity of equipment and piping systems.

Risk-Based Inspection (RBI): Implement a risk-based inspection program to prioritize inspection activities based on factors such as the vessel's design, operating conditions, probability of failure, consequences of failure, and risk mitigation measures.

Reporting and Documentation: Document inspection findings, including the condition of the pressure vessel, any defects or anomalies detected, and recommendations for repair, replacement, or maintenance. Maintain comprehensive records of inspection activities for regulatory compliance and future reference.



API 510 pressure vessel inspection helps ensure the safe and reliable operation of pressure vessels by identifying and addressing potential integrity issues before they lead to leaks, ruptures, or other catastrophic failures. Compliance with API 510 standards helps minimize risks to personnel, the environment, and assets while maximizing the efficiency and longevity of pressure vessel assets.

Coating Inspection

NACE International is a professional organization focused on corrosion control and prevention. NACE provides certification programs and standards for coating and painting inspection in industries such as oil and gas, marine, infrastructure, and manufacturing. NACE coating/painting inspection involves ensuring the quality, durability, and performance of protective coatings applied to structures, equipment, and surfaces to prevent corrosion and degradation.

NACE coating/painting inspection involves:

- 1. Preparation Inspection:** Before coating application, inspectors ensure that surfaces are properly prepared according to specifications. This may involve cleaning, blasting, or other surface preparation methods to remove contaminants, rust, or old coatings.
- 2. Coating Application Inspection:** During coating application, inspectors monitor and verify adherence to coating specifications, including coating thickness, application method (e.g., spray, brush, roller), ambient conditions (e.g., temperature, humidity), and mixing ratios.
- 3. Quality Control Inspection:** Inspectors conduct visual inspections of coated surfaces to detect defects such as bubbles, runs, sags, pinholes, or other imperfections that may compromise coating performance. Non-destructive testing (NDT) techniques such as adhesion testing, holiday (spark) testing, or dry film thickness (DFT) measurement may also be used to assess coating integrity.
- 4. Curing and Drying Inspection:** Inspectors ensure that coated surfaces are allowed to cure or dry properly according to manufacturer recommendations and environmental conditions to achieve optimal coating performance and durability.
- 5. Surface Finish Inspection:** Inspectors assess the final appearance and surface finish of coated surfaces to ensure compliance with aesthetic requirements and standards.
- 6. Documentation and Reporting:** Inspection findings, including coating specifications, surface preparation details, coating application parameters, inspection results, and any deviations or non-conformities, are documented in inspection reports for record-keeping and compliance purposes.

NACE coating/painting inspection helps ensure the quality, performance, and longevity of protective coatings, reducing the risk of corrosion-related failures and extending the service life of structures and equipment. Certified NACE coating inspectors possess specialized knowledge and skills to effectively evaluate coating systems and ensure compliance with industry standards and specifications.



Lifting Equipment Inspections & Certification

Our lifting inspectors are both Government accredited, and LEEA-UK accredited.

At Triplex® Consultants, we specialize in providing comprehensive lifting equipment inspection and certification services to ensure the safety, reliability, and compliance of lifting equipment used across various industries. With a team of highly trained and certified inspectors and engineers, we offer tailored solutions to meet the unique needs of our clients and help them maintain the highest standards of safety and efficiency in their operations.



ensuring they can safely handle the intended loads without failure.

Certification and Compliance:

Our certification services include issuing certificates of compliance and inspection reports documenting the results of our inspections, load tests, and maintenance activities, demonstrating compliance with relevant regulations and standards.

Training and Education: We offer training programs and

workshops to educate operators, maintenance personnel, and safety professionals on proper lifting equipment usage, inspection techniques, and safety protocols, empowering them to effectively manage and maintain lifting equipment.

Our Services Include:

Periodic Inspections:

We conduct thorough inspections of lifting equipment, including cranes, hoists, slings, shackles, and rigging gear, to assess their condition, functionality, and compliance with regulatory requirements and industry standards.

Load Testing: We perform load testing to verify the capacity and structural integrity of lifting equipment under specified load conditions,



Welding Engineering:

Welding engineering and inspection services encapsulate NDT examination services as a critical component of quality integrity test of welded equipment and installations. We offer in-depth evaluation of weld quality and customized NDT solutions tailored to project specifications.

As a Third-party inspection services Company offering independent verification, we ensure that our clients comply with industry standards such as ASME, AWS, API, ISO etc. in their projects

Our services in welding services include:

- Assistance in developing and qualifying Welding Procedure Specifications (WPS).
- Welder Performance Qualification (WPQ) testing and certification.
- Welding Procedures Qualification and certification.

Our welding supervisors have international welding certification from renown bodies such as The Welding Institute (TWI), and American Society for Non-destructive Testing (ASNT) form NDT certification.



Why Choose Us:

- **Expertise:** Our team of experienced and certified inspectors and engineers bring extensive knowledge and expertise in lifting equipment inspection and certification, ensuring the highest level of quality and accuracy in our services.
- **Compliance:** We stay up-to-date with the latest regulations, codes, and standards governing lifting equipment safety and compliance, ensuring our clients meet regulatory requirements and maintain a safe working environment.
- **Customized Solutions:** We understand that each client's needs are unique, which is why we offer customized solutions tailored to their specific requirements, budget, and operational constraints.
- **Reliability:** With a commitment to excellence and professionalism, we strive to deliver reliable, timely, and cost-effective inspection and certification services, helping our clients minimize risks, enhance productivity, and achieve their business goals.
- **Customer Satisfaction:** We prioritize customer satisfaction and aim to build long-term partnerships based on trust, integrity, and superior service delivery.

Trust Tripex® Consultants for all your lifting equipment inspection and certification needs. Contact us today to learn more about our services and how we can support your business.



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