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Plant Health Monitoring Services

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IMMUSCO SERVICES DIVISION AT A GLANCE

- CONDITION MONITORING
- TURBO MACHINERY ANALYSIS
- RECIPROCATING MACHINERY ANALYSIS
- PIPING PULSATION VIBRATIONS
- MACHINERY LUBRICATION OIL ANALYSIS
- ENERGY AUDITS
- CONVENTIONAL NDT
- ADVANCED NDT SOLUTIONS
- API INSPECTION AND CERTIFICATION
- REMOTE VIBRATION MONITORING & DIAGNOSTIC SOLUTIONS
- WIRELESS VIBRATION
- QA / QC PROGRAM
- INDUSTRIAL ANALYTICAL SOLUTIONS
- RELIABILITY PLUS SOFTWARE

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CONDITION MONITORING

"Optimize your plant maintenance activities via implementing state of the art Condition monitoring techniques with IMMUSCO"

Industrial stability is driven by the enhanced machinery availability to meet the production targets. IMMUSCO experts help in analyzing the equipment health while in operation to understand and plan the maintenance procedures accordingly. Condition monitoring goes one step ahead in ensuring equipment reliability by timely diagnosing the troublesome machinery for its critical parameters.

CONDITION MONITORING

Condition Monitoring Techniques

IMMUSCO provides complete plant integrity assessment solution via implementing following technologies:

Vibration Analysis

Over the years vibration monitoring and trending has evolved as a prominent source of condition monitoring and fault diagnosis. Every rotating and reciprocating machinery is studied for its baseline acceptable vibration limits upon commissioning and then trended over standard deviations measured in a scheduled vibration data acquisition and monitoring. Plant maintenance activities shift from preventive to proactive by timely addressing the vibration diagnostics, and thus enabling a reliable operation.

CONDITION MONITORING

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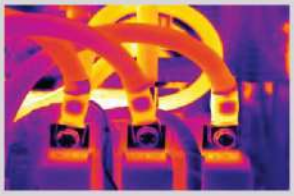
Vibration Diagnostics

With the help of state of the art vibration analyzers and internationally trained professional, IMMUSCO helps in identifying following major issues related to industrial machinery:

Structural looseness
Unbalance
Misalignment
Rotating looseness
Bearing early stage faults Soft Footing
Resonance
Pump cavitation
Flow turbulence

Infrared Thermography



Asset health assessment is performed through temperature data analysis via utilizing world class diverse range of infrared thermal imaging cameras. Changes in temperature of a body is monitored through non-contact thermal imaging, which produced a contoured plot of the captured image with a readable scale of temperature gradients. IRT industrial applications include:

Transformers
Electrical Panels
Heat ducts
Wall seepages
Motors
Circuit breakers

Ultrasonic Acoustic Emission Testing

Pneumatic valves and compressed air/gas supply systems are analyzed for leakages through non-contact leakage detection procedure by utilizing an ultrasonic acoustic signal analyzer. Furthermore, a contact module enables the instrument to measure performance drops in the steam traps and valves.

Field Balancing and Laser Alignment

IMMUSCO's Providers field as well as workshop balancing facilities as per ISO Standard though its qualified inspectors decide this IMMUSCO also perfume Alignment jobs and have specialty in cooling tower balancing and alignment

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TURBO MACHINERY ANALYSIS

"Get your operational gas and steam turbine's health assessed and precisely maintain them with IMMUSCO"

IMMUSCO's specialists can provide the following services for your turbines which cannot be performed through the standard turbine protection systems:

Fault Diagnosis

- Root cause analysis of turbine trip
- Transient analysis

Acceptance Testing

- Start up
- Coast down
- Production state monitoring

Internal Inspection

- Videoscope inspection

Rotor Dynamic Analysis

- ODS (Operational deflection shape)
- Critical speed identification
- Field Balancing

Turbine Oil Health Analysis

- RPVOT (Rotating pressure vessel oxidation test)
- Oil viscosity analysis
- Wear metal analysis

State of the Art Technologies

Videoscope

Oil Health Monitoring Unit

Multi-Channel Transient Vibration Analyzer

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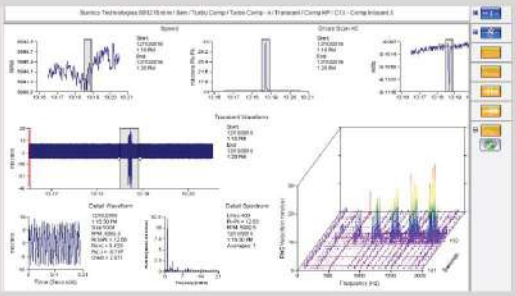


Process Overview

Step 1 – Data collection

- Vibration data is recorded through portable 24- Channel online analyzer connected to turbine's existing data interface system while the turbine is operational.
- For offline turbine unit, internal parts' condition is recorded through in-situ videoscope.
- Samples of turbine's in-service oil are also collected and sent to IMMUSCO's laboratory for analysis.

Step 2 – Analysis

The recorded data is analyzed utilizing computer software, specialized knowledge and experience.

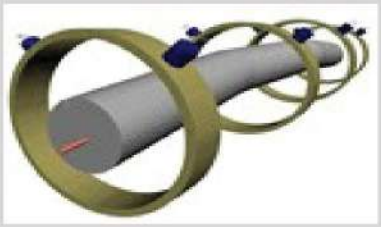
Step 3 – Reporting

A report is accordingly prepared describing your unit's health condition and recommendations.

Analysis Capabilities

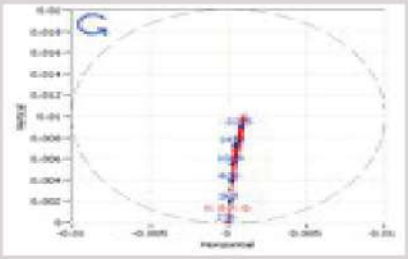
Shaft Animation / ODS

Analysis of your turbine's shaft alignment through live 3D ODS (Operating Deflection Shape)



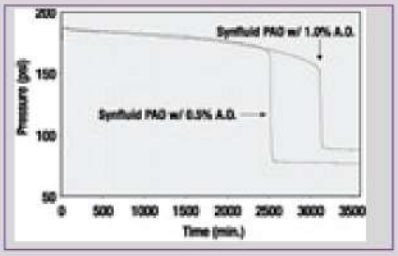
Shaft Center-line Analysis

Transient data captured continuously allows shaft centerline position at various turbine speeds



RPVOT (Rotating pressure vessel oxidation test)

For identifying oxidation stability decay of in-service turbine oils



Videoscope Inspection

To monitor internal parts for wear and tear, without having to dismantle the turbines

Your Problem

Cannot identify the root cause of turbine trip or failure

You wish to verify the condition of a new or repaired turbine unit before acceptance

Cannot determine remaining life of turbine's in-service oil

Our Solution

to identify the root cause such as unbalance, misalignment, IMMUSCO can monitor and record vibration data from your turbine from 24 channels simultaneously, continuously and unattended. Turbine behavior immediately before any trip events can also be captured for thorough study. The recorded data is used bearing rub, etc.

IMMUSCO can determine your turbine unit's internal parts condition, its vibration behavior and confirm the critical speed of resonance, when it's at workshop after repair, when received on site, before installation or after commissioning

As turbine's in-service lubrication oils get oxidized over time, their anti-oxidant levels reduce as part of the deterioration process. We can measure the current anti- oxidant levels in your turbine's in-service oil through the RPVOT test

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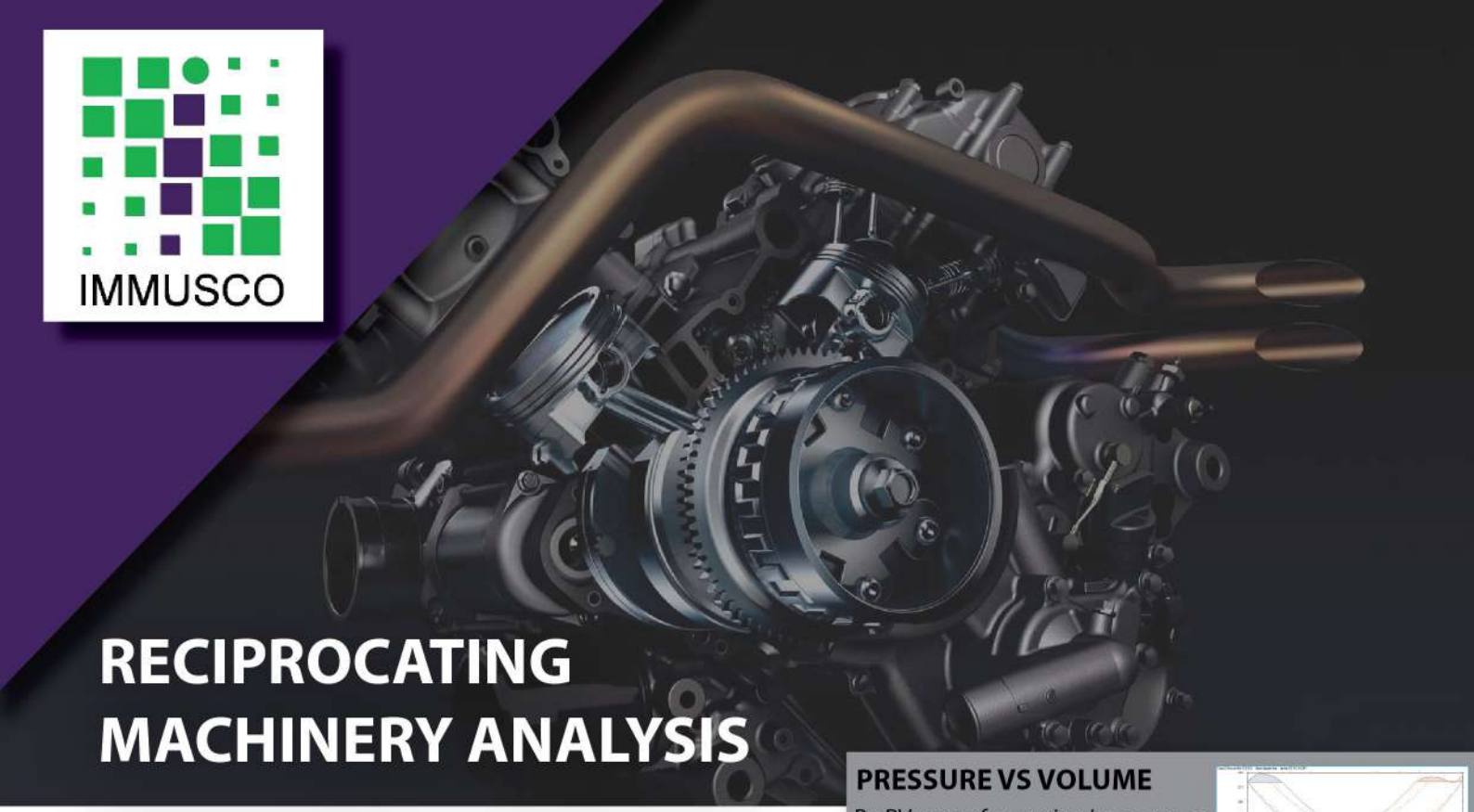


RECIPROCATING MACHINERY ANALYSIS

"Achieve optimal health and performance of your reciprocating compressors and engines with IMMUSCO"

Early stage damage identification in reciprocating machinery for the following faults:

Cylinder Head
- Piston vibration abnormalities
- Piston rod and nut abnormalities

Frame Vibration
- Running gear imbalance
- Loose counter weights

Cylinder Performance
- Peak pressure imbalance
- Energy losses

Main Bearings
- Abnormal temperatures
- Rotor rubs
- Bearing internal wea

Cross Head
- High frequency impacting
- Lower frequency rubs
- Loose shims
- Loose piston lock nuts
- Loose wrist pins

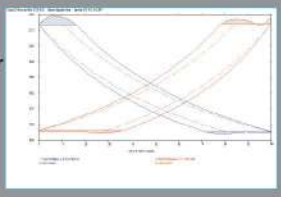
Rod drop / Rod Flex
- Excessive rod movement
- Rod looseness
- Excess vibration
- Rider band wear

State of the Art Technologies

IMMUSCO utilizes Windrock 6320 PA portable analyzers to monitor reciprocating machines through personnel certified from Windrock headquarters in Knoxville, TN, USA.With features found in no other portable devices, Windrock analyzers are designed specifically to evaluate reciprocating compressor and engine performance, assess mechanical condition and protect critical machinery assets.

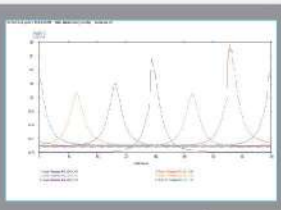
PRESSURE VS VOLUME

By PV curve for engine/compressor actual energy produced and energy losses in the operating cycle could be addressed.



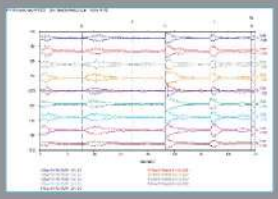
CYLINDR PRESSURE-TIME

By PT curve Peak firing pressure imbalance and Power efficiency could be monitored.



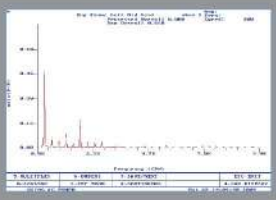
ENGINE SIGNATURE WITH VIBRATION & ULTRASONIC

Vibration and ultrasonic readings correlate with the engine's health.



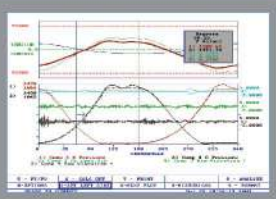
FFT SPECTRUM

An FFT spectrum segregates and displays the effect caused by the combination of different forcing and fault frequencies.



COMPRESSOR ROD LOAD

Compressor rod load is a performance parameter for the reciprocating compressors; and thus provides details about systemefficiency.



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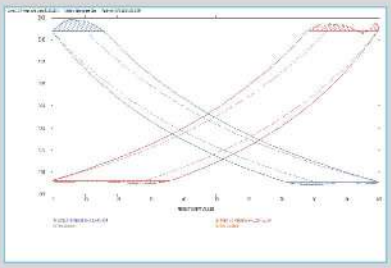
Process Overview

1. Various sensors are mounted on the reciprocating machine to measure varying cylinder pressures, vibration, crankshaft position, ultrasonic emissions and temperatures.
2. The data collected from these sensors is then analyzed for identification and severity of faults / defects, utilizing customized Windrock analysis computer software.
3. Finally, a comprehensive report is prepared which truly reflects machine health condition, performance and maintenance actions required.

Analysis Capabilities

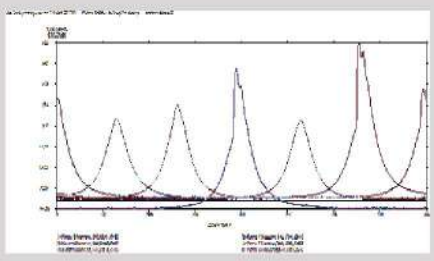
Pressure vs Volume Curve

Real time cylinder pressures and volumes allow analysis of energy being produced and lost



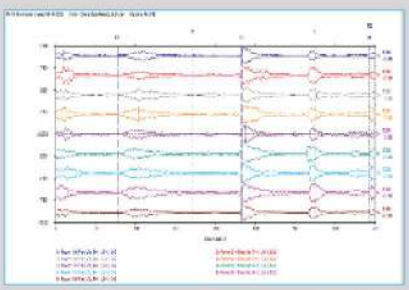
Pressure vs Crank Angle Curve

Toe pressure unbalance / Peak firing pressure unbalance can be studied for each cylinder



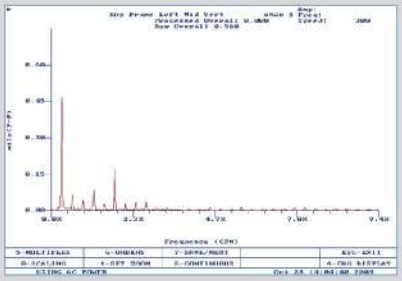
Vibration and Ultrasonic Analysis

Pressure variation with vibration and ultrasound to identify cylinder internal faults



FFT Spectrum Analysis

Analysis of vibration at different frequencies to identify sources and any faults present



Your Problem

Cannot identify the causes of low efficiency of your reciprocating machine and don't know which improvement actions are worth attempting

Cannot determine the condition of your reciprocating machine until it's opened in a shutdown

You have received a new or repaired reciprocating machine and wish to verify its condition before acceptance or commissioning

Our Solution

IMMUSCO can precisely identify the factors influencing your reciprocating equipment's performance. The result reports can be used for recordkeeping, for decision-making and maintenance budget expenditure justification

IMMUSCO can assess the condition of your equipment while it's in operation and identify many areas requiring attention, long before your next planned shutdown. You can accordingly order spare parts and conveniently plan your maintenance activities at an early stage

IMMUSCO can accurately provide your equipment's health condition and performance on paper as an unbiased third party, when it's at workshop, after repair, when received on site, before installation or after commissioning

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PIPING PULSATION VIBRATIONS

"Identify and eliminate Flow induced vibrations (FIV's) – based pulsations andfatigue in piping system with IMMUSCO"

FIV's, because of turbulent flow conditions, are the major cause for undesirable pulsations in pipelines which initiate low cycle fatigue (LCF) phenomenon. Consequently, pipeline systems deteriorate with the passage of time and ultimately resulting in crack initiation / propagation and inappropriate pipelines support.

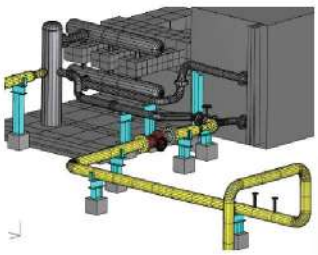
IMMUSCO's specialists can provide the following services by taking measurements on your existing piping system and determine its health condition

Pipe vibration analysis

- Natural mechanical response analysis
- Forced induced vibration (FIV) analysis
- Critical frequency range identification
- ODS (Operational Deflection Shape)

Pipe pulsation analysis

- Acoustic response analysis
- Surge event analysis



State of the Art Technologies

Portable Performance Analyzer

- 4-ch, pulsation analysis
- 4-ch, piping vibration analysis
- 4-ch, dynamic flow analysis
- Reciprocating compressor and engine

Portable Vibration Analyzer

Multi-Channel Analyzer

Simulating Software

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Portable Vibration Analyzer

- Resonance / Modal analysis
- 4-ch, piping vibration analysis
- Dynamic analysis of
- foundation and structure

Multi-Channel Analyzer

- Simulating Software
- Resonance / Modal analysis

Simulating Software

- Operating deflection shape
- (ODS) analysis
- Modal analysis
- Vibro-acoustic analysis
- Structural dynamics & simulation

Process Overview

1. Sensors are temporarily mounted, dynamic pressures are recorded, and vibration amplitude/ phase measurements are noted at multiple locations of pipeline system.
2. Operating Deflection Shape (ODS) analysis is then performed by 3D-Modelling of pipeline systems in ODS software.
3. A comprehensive report is generated, including 3D animations to visualize the system's mechanical behavior along with the guideline on how to improve the piping system's integrity. (e.g. Locations to add or replace piping supports, or any alterations required in the pumps/compressors' operating parameters, etc.)

Your Problem

Cannot verify if the pipe supports added are adequate for long term integrity.

Cannot identify the unsafe operating ranges of your compressors or pumps, which negatively affect the life of adjacent pipework.

Cannot identify sources of high transient vibration or surges in pipes.

Our Solution

Instead of trying to suppress vibration magnitude by simply adding or replacing pipe supports at random locations, it is important to eliminate the cause.
Our experts will analyze your piping system and advice on how to move the forcing vibration frequencies to the safe zone.

IMMUSCO can identify the vibration resonance range in which your pipework's natural frequencies coincide with the nearby forcing frequencies and accordingly recommend which operating ranges of your reciprocating compressor or pump should be avoided.

IMMUSCO can not only measure steady vibration characteristics of your pipework but also record continuous data for extended periods which allows analysis of transient events such as water hammer and other momentary surges.

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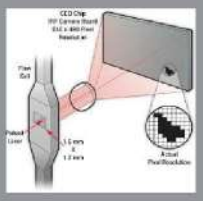
Machinery Lubrication Oil Analysis

Get your machinery lubrication oil analyzed to significantly increase performance and reliability

- Comprehensive machinery lubrication oil analysis.
- Corporate technical support to offer expert advice and troubleshooting.
- ICML certified lubrication consultant to visit on a regular basis.
- Complete reliable range of Oil testing equipment's.
- Training and certification of Machinery Lubrication Analyst from ICML USA.
- Complete Testing of Insolating Oil (Transformer Oil) and other Oils Testing.

Lubricant condition analysis
Chemical and physical property changes including lubricant degradation and additive depletion.

Contamination Analysis
Quantitative and qualitative analysis of substance for system.
(Oil Cleanliness/Water)



Machine Condition Wear Debris Analysis.
Determining the condition of machinery through the examination of the particles generated by wear process.

State-of-the-Art Technologies

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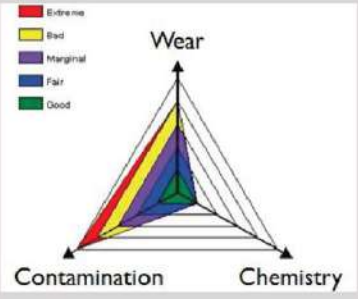
LUBRICATION AUDIT SCOPE

Lubrication audit verify unreliable equipment that may be due to poor lubrication program.

Audit will compare current lubrication practices against "best practices" and document the results and recommendations to assist.

All practices from storage, through dispensing and handling to actual machine application,
Looking at contamination control practices, Staff awareness and attitudes to lubrication,
Oil analysis practices such as sampling, testing and action on feedback.

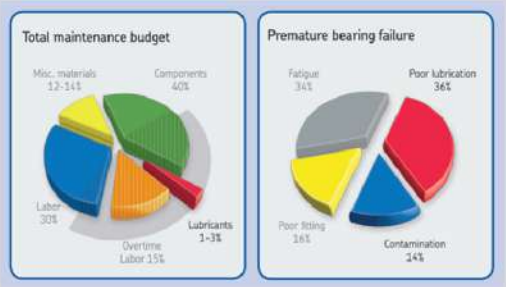
Maintenance expenditure on lubrication,Any immediate and longer-term opportunities for improvement.



Tests	Engine	Hydraulic	Turbine	Comp	Gear
Elemental Analysis	✓	✓	✓	✓	✓
Particle Counting		✓	✓	✓	✓
Viscosity @ 40	✓	✓	✓	✓	✓
Viscosity @ 100	✓	✓	✓	✓	✓
Viscosity Index	✓	✓	✓	✓	✓
Water/Moisture	✓	✓	✓	✓	✓
Color	✓	✓	✓	✓	✓
Appearance	✓	✓	✓	✓	✓
Pour Point	✓	✓	✓	✓	✓
Flash Point	✓	✓	✓	✓	✓
Oxidation	✓	✓	✓	✓	✓
RPVOT			✓		
TAN		✓	✓	✓	✓
Density @ 29.4	✓	✓	✓	✓	✓
Foaming Tendency		✓	✓	✓	✓
TBN	✓				
Alien fluid	✓	✓			
Nitration	✓				
Sulfation	✓				
Soot	✓				
Glycol	✓				
Rust Prevention		✓	✓	✓	✓
Copper Corrosion		✓	✓	✓	✓
Varnish potential			✓		
Ruler Test			✓		

Commercial Benefit:

Lubricants account for less than 1% of the maintenance budget Yet they can impact more than 40% of the maintenance budget.



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ENERGY AUDITS

"Missing out on valuable data from critical points is not an option for wireless monitoring systems."

Achieve profitable cutbacks in utility operational expenditure by assessing and optimizing your energy resources"

Demand Forecasting & Financial Impact

IMMUSCO's expert team of engineers and analysts helps you in addressing areas of improvement, whereby potential monetary savings could be performed. Every consumption resource is evaluated for its performance parameters and KWH ratings. A detailed energy audit facilitates owners in making best judgments about load reductions and operational hours adjustments.

Energy Resource Management

Optimization of energy consumption devices does not necessarily yield appropriate results by merely replacing existing devices with low wattage equipment. Energy resources available to a facility are studied in comparison to globally acknowledged practices and recommended ISO standards. Installed loads and their applications are assessed based on their quality and requirements, and thereby resources management is planned and executed for energy profile optimization

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Energy Inspection

IMMUSCO's certified and professionally trained engineers are well versed in the art of inspection methodologies for energy assessment. State of the art monitoring techniques and world class inspection instruments enable energy auditors to evaluate the consumption patterns and equipment efficiencies in the most reliable way possible.

Lighting

Amongst various types of loads, lightings contribute to a major percentage of energy consumption in a facility. Lighting intensity is measured by the lux meters for studying compliance with the ISO standards depending upon the type of application. Low wattage LED lights replacement opportunities arise by the conclusive decisions made based on monitored results of lumens per unit area.

Air Conditioning & Refrigeration

Highest load consumption equipment in any industry or commercial unit majorly constitute the HVAC systems. Energy impact and performance losses in the air conditioning quality are addressed by monitoring the thermal leaks in supply ducts through infrared temperature monitoring.

Compressed Air & Gases

Pneumatic valves, air regulators and compressed air supply ducts are susceptible to leakages and energy losses. Ultrasonic acoustic monitoring helps in identifying the points that need to be rectified.

Power Quality

Electrical systems and equipment are subjected to catastrophic failures and interrupted communications due to current harmonic distortions. Power analyzers help in addressing the issues related to back currents, reactive power, distorted signals and power factor.

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CONVENTIONAL NON-DESTRUCTIVE TESTING

IMMUSCO HAS AN EXTENSIVE RANGE OF CONVENTIONAL NON DESTRUCTIVE TESTING SOLUTIONS ON SITE.

IMMUSCO Certified Personnel have the skills years of experience to provide top quality Conventional non-destructive testing solutions.

We can help you with

- Right services with complete solutions
- Consultancy
- Trainings

State-of-the-Art Technologies

EPOCH650

45 MG

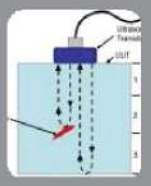
NORTEC 600

EQUATIP 550

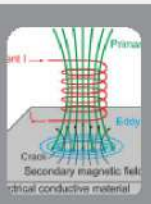
MAGNAFLUX

PARKER MPI

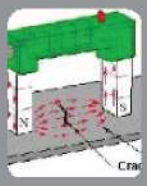
Ultrasonic Testing



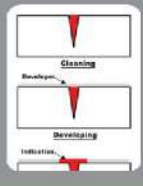
Electromagnetic Testing



Magnetic Testing



Penetrant Testing



Visual Testing

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Inspection Methods

Ultrasonic Testing

- Straight Beam
- Angel Beam
- Thickness monitoring
- Coating Thickness monitoring

Electromagnetic/Eddy Current Testing

- Surface & Subsurface Inspection
- Surface & Subsurface through Coating Inspection
- Conductitivty Measurment
- Sorting of Material
- Wheel Inspection
- Weld inspection
- Rotary bolt hole & Rivets inspection
- Tubing Inspection

Magnetic Particle Testing

- Hand Yoke AC/DC
- Bench Type (Headshot and Central Conductor)
- Dry Visible/Flourescent Inspection Technique
- Wet Visible/Flourescent Inspection Technique

Liquid Penetrant testing

- Dry Visible/Flourescent Inspection Technique
- Wet Visible/Flourescent Inspection Technique
- Water Washable Visible/Flourescent Inspection Technique

Codes & Standards for Advanced NDT
IMMUSCO operates an ISO 9001:2015 Quality management system with full traceability to all aspects of our business.
ASNT-SNT-TC-1A
ASNT CP-189 EN1711

Visual & Optical Testing

- Optical Magnifying Mirrors
- Measurment Guages
- Borescope

Hardness Testing

- Brinell Testing Scale
- Rockwell B & C Testing Scale
- Vicker testing scale

Your Problem

Product Quality Insurance

Shutdown inspection

Pre-service & Material verification

Our Solution

IMMUSCO provides NDT services to Insure that the product is Flawless & manufactured according to all the quality requirments.

Shutdowns are essential activity for the health of plant therefore its maintenance & inspection should insure the quality & safety checks here SUMICO can assist you.

IMMUSCO provides Pre-service & material verification Inspection by using Non Destructive Inspection tools.

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IMMUSCO

Advanced NDT Solutions

IMMUSCO has an extensive range of Advanced Non Destructive Testing solutions

IMMUSCO cerified personnel have the skills and years experience to provide high quality advanced non-destructive testing services

We can help you

- Scientific Solutions
- Consultancy in Advanced NDT
- Inspection Services

State-of-the-Art Technologies

Phased Array Ultrasonic Testing
PAUT has ability to store full inspection record.The visual display of combined A- Scan, B-Scan, C-Scan and S-Scan gives simplified understanding of flaw type and associated dimensions.

TOFD
Time of flight diffraction is differ from usual pulse echo ultrasonics as it relies on diffracted energy instead of reflected energy.This solution best replaces the Radiography.

Eddy Current
This technology is based upon the principles of inducing an electromagnetic field into a part.This solution use for the detection of surface connecting flaws.

Positive Material Identification
X-ray fluorescence spectrometry is a elemental analysis based on the principle that individual atoms ,when excited by external energy source,emit X-Ray photon of a characteristic energy.
The element present can be identified.

Coating Measurment
38DL Plus offer easy to read digital display of coating thickness and dry film thickness measurment.

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Inspection Applications

PAUT & TOFD

- Rapid inspection of weld seam
- ASME B&PV Code Section VIII (Pressure Vessel)
- Complex Geometry Scanning
- ASME B31.3 & B 31.1 (Piping)
- AWS D1.1 (Structure Integrity)
- Corrosion Mapping

Eddy Current Testing

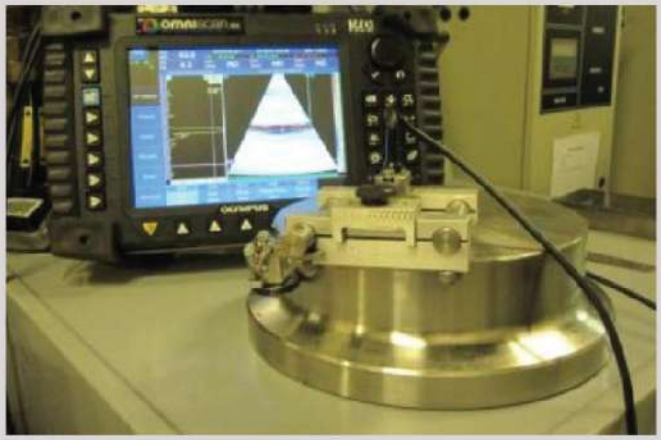
- Magnetic Flux Leakage
- Internal Rotational Inspection Systems
- Near Field Leakage

Tubing and Wire Testing

- Condenser Tube Inspection
- Coating Thickness Measurement
- Weld Inspection
- Crack Detection

Positive Material Identification

- Material Identification
- Material Composition



Codes & Standards for Advanced NDT

IMMUSCO operates an ISO 9001:2015 Quality management system with full traceability to all aspects of our services.

SNT-TC-1A CP-189
EN 1711
ASME B&PV Code Section VIII (Pressure Vessel) ASME B31.1 & B31.3 (Piping)
AWS D1.1 (Structure Integrity)

Commercial Benefits

Your Problem	Our Solution
PAUT over conventional Ultrasonic	IMMUSCO has advanced ultrasinc phased array equipment to inspect large volume of weld and material from a fixed location.The visual display combined A-Scan, B-Scan, C-Scan and S-Scan gives a simplified understanding of flaw type and associated flaw dimensions
TOFD in lie of RT	IMMUSCO use TOFD as an Advanced NDT inspection solution enbles crack size to be measured more accuraly.This technology is a best replacement of Radio-graphic Testing
Health of Heat exchanger and Tubing	IMMUSCO has complete tubing inspection for heat exchanger tubing, Fin fans, Boiler tubing and Internal rotating inspection system.

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IMMUSCO

API Inspection and Certification

API 510 PRESSURE VESSEL

Certification goal is to improve management control of process unit operation, repair, and maintenance; reduce the potential for inspection delays resulting from regulatory requirements; and provide a continued high level of safety through the use of inspectors specialized.

API 570 PIPING

is an inspection code which covers in-service inspection, rating repair, and alteration of metallic and fiberglass-reinforced plastic (FRP) piping systems and their respective pressure relieving devices.

API 653-STORAGE Tanks

Provides the minimum requirements for maintaining the integrity of welded or riveted, non-refrigerated and refrigerated, atmospheric pressure, aboveground storage tanks after they have been placed into service. It only applies to maintaining the integrity of the foundation, bottom, shell, structure, roof, attached appurtenances, and nozzles to the face of the first flange, first threaded joint, or first welding-end connection of the tank.

The API 571 Damage Mechanism

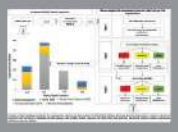
Advanced Corrosion & Materials Professional Certification Preparation Program is designed to enhance the knowledge of corrosion processes among specialized inspectors, corrosion engineers, chemical engineers and other professionals across the entire petrochemical industry.

Life Assessment

Inspector assess the life of equipment based on reaming corrosion allowance.

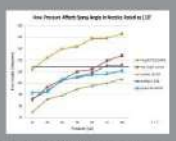
Inspection Frequency

Next inspection plan will depend upon the previous inspection data report.



Project/Construction Management Support

The successful completion of a large scale construction project requires input from highly qualified and experienced personnel.IMMUSCO experts are available for management and support from start to finishing of project as well as maintenance.



Asset Integrity Management

IMMUSCO certified inspectors perform inservice inspection for integrity management for asset to reduce the risk of failure which cost life and money.

Alteration

A physical change to restore the process parameters.

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API 577 Welding Metallurgy

Welding inspection as encountered with fabrication and repair of refinery and chemical plant equipment and piping.

API 580 RISK BASED INSPECTION

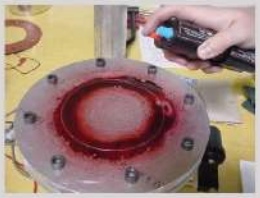
Explains the basic elements for developing, implementing and maintaining a credible risk-based inspection (RBI) program.

API 581 RBI METHODOLOGY

To provide quantitative risk-based inspection (RBI) methods that support the minimum guidelines presented by API RP 580.

Process Overview

1. Ultrasonic Thickness gaging is done to monitor the wall thickness, where there will be reduction is thickness that can easily be detected
2. Corrosion mapping is carried out to verify the material deterioration and corrosion rate keeping the corrosion allowance in record
3. Nondestructive examination is performed to ensure that the material has no flaws in it. Both base material and welding is examined
4. Finally hydrotest witnessing and QA/QC is the final step in the inspection plan and report is prepared which is kept is the record for next inspection plan



Commercial Benefits

Your Problem

If there is any leakage or reduced efficiency of the equipment

Could not identify the type of deterioration or nature of deterioration

Unable to verify the rate of deterioration that can affect the life of the equipment

Our Solution

If there is any evidence of abnormality found in the equipment, then certified API inspector will verify the actual root cause of the occurrence and recommend the suitable remedy

Various parameters i.e process parameters, nature of fluid in the equipment having different chemical composition can be the initiative of the occurrence, where API inspector will conclude the actual cause

IMMUSCO has advance NDT solutions to monitor the health of equipment at very economical cost to meet the costumer's requirements according to international standards

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IMMUSCO

Remote Vibration Monitoring & Diagnosis Solution

IMMUSCO has built up a remote diagnostics service (RDS) that supports the crew remotely, reduces downtime and improves the availability and safety of operations.

Need for 24X7 vibration monitoring for machines

Many industries that are not aware of the criticality of vibration monitoring, practice periodic maintenance. For such sites, it is necessary to create awareness about the importance of predictive maintenance and go for a 24x7 monitoring solution to prevent the breakdown of expensive machines and hence reduce the cost of maintenance.

IMMUSCO Offers Solution

Immusco offers a solution of analyzing asset vibration data after setting up wireless vibration network in plant and retrieving it remotely for analysis. All the data related to vibration and process values of the machines are captured 24x7 at intervals as required by the user. So whenever we request for any data of any time, we will be able to get it. This will give the information of when the alarm had occurred, what was the fault i.e. abnormality in the machine.

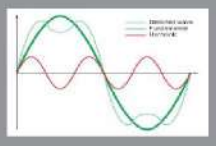
Remote Condition Monitoring Complete Package of Services

- Analyze
- Measurement Configuration
- Alarm

Certified Engineer Analysis
Analysis made by Mobius certified Level-II & Level-III Engineers

High Diagnostic Capabilities

- Good Vibration
- Monitoring
- High Quality
- Spectrum
- Low Noise



Plug & Play

- Very Simple Setup
- No Cable at all
- Increased Security

Vibration Spectrum & Values Availability
Import/export vibration data from anywhere

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IMMUSCO

WIRELESS VIBRATION MONITORING

"Missing out on valuable data from critical points is not an option for wireless monitoring systems."

ASSET RELIABILITY

The age of technological revolution and fast paced industrial development demands performances that are competitive as well as guaranteed. Survival of a business in an inflating consumer market is only possible by ensuring a reliable and safe industrial operation. Modern age concept of reliability encompasses both the operations as well as the machinery involved. Every value adding equipment in any supply chain or a process is considered as a significant asset of a business model, and thus the integrity of these assets is essential for a profitable venture.

VIBRATION DIAGNOSTICS

Over the years vibration monitoring and trending has evolved as a prominent source of condition monitoring and fault diagnosis. Every rotating and reciprocating machinery is studied for its baseline acceptable vibration limits upon commissioning and then trended over standard deviations measured in a scheduled vibration data acquisition and monitoring. Plant maintenance activities shift from preventive to proactive by timely addressing the vibration diagnostics, and thus enabling a reliable operation.

Remote Condition Monitoring
Complete Package of Services

- Analyze
- Measurement Configuration
- Alarm

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High Diagnostic Capabilities

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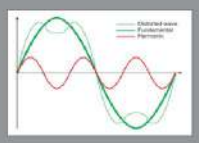

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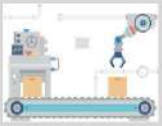
WIRELESS VIBRATION

A successful vibration based condition monitoring program requires data acquisition which is safer, repeatable and accurate. Many complexly designed critical machineries make the process of vibration monitoring quite troublesome and challenging due to physically inaccessible measurement locations.

IMMUSCO's wireless vibration monitoring solutions enable the diagnosis of such assets guaranteed and convenient. Wireless vibration goes a step ahead in diagnostics capabilities by allowing analysts to remotely monitor the data and promptly planning decisive maintenance and repair schedule.

Health Prediction

Wireless monitoring capabilities enable end users to make better judgements about the equipment health status and also verifying the data remotely by external expert analysts for accurate and efficient diagnosis. Inspection becomes easier and viable when the data is readily available and accessible.



Machinery Protection

Wireless vibration data could be trended and alarm protection limits could be set up in conjunction with programmable relays, that enable machinery protection and trip limits in the event of abnormally high trending values. With the help of wireless monitoring, protection parameter setup in a governing control software could be altered and readily adjusted.

Remotely Accessible

Capabilities of remote accessibility saves enough time and manpower by avoiding routine visits on the site to capture vibration data via portable handheld analyzers. Apart from the resources utilization, the data repeatability plays a pivotal role in establishing a higher benchmark for wireless monitoring systems.

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IMMUSCO

QA/QC Program

Quality Assurance and Quality Control solution and consultancy with IMMUSCO to ensure the process cycle quality

Areas under QA/QC Inspection

Construction Material Verification
Construction material plays key role in the complete process cycle, IMMUSCO provides QA/QC services to ensure and verify material Specifications upto the requirements

Material Cutting and Fabrication
IMMUSCO experts witness the whole fabrication operation i.e material cutting, beveling, bending, fit-up and tacking etc, each above step adds quality to the structure according to procedure

Welding and Consumables
Welding consumables are as important as the material itself because welding strength is dependent on the consumables selection and operation parameters, after careful selection of consumables IMMUSCO Welding Inspector monitors the welding operation and parameters

Applicable Code Compliance
To achieve an accurate and quality conscious product it is necessary that all the activities should be according to the code and standards, here IMMUSCO can help you to apply the applicable codes according to the requirements

QA/QC Documentation
Documentation is an important part of any manufacting process, each and every activity should be recorded on paper IMMUSCO provides the compete document from raw

Welding Procedure Specification (WPS)
WPS is a document which contains all the welding parameter

Procedure Qualification Record (PQR)
IMMUSCO helps in qualifying the welding procedure to ensure the sound welding variables

Welder Performance Qualification (WPQ)
Someone cannot think about a solid welding without a qualified welder/welding operator

Documents Review
IMMUSCO provides the services of operation witnessing as well as documents review services is accordance with applicable codes and standards

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Process Overview

1. Ultrasonic Thickness gauging is carried out to check and monitor the raw material thickness according to the fabrication standard.
2. Welding Gauges such as High/Low gauges are used to check the fit-up and bending to ensure the ease of sound welding.
3. Visual welding inspection is carried out to check the visual welding defects with the help of welding gauges.
4. Finally all the parameters are lead down on the paper and QA/QC report is prepared.

Commercial Benefits

Your Problem

For preparation and verification of WPS,PQR,WPQ

Third Party Inspection Services

Facing any problem during the entire manufacturing Cycle

Our Solution

IMMUSCO helps to prepare WPS, PQR, WPQ in accordance with the applicable codes and standards and verify these documents.

Third Party Inspection is a vital and final quality check which verifies all the process steps in accordance with the codes and standards, here IMMUSCO can help you by providing its expertise.

IMMUSCO has experts which provides you technical assistance and consultancy to carry out the process without wasting time and money.

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IMMUSCO

Industrial Analytical solutions

IMMUSCO is uniquely equipped to provide analytical solutions

IMMUSCO's continuous pursuit to innovation drives the portfolio of superior quality measurements and analytical technologies to provide customers with insight across all touch points needed to operate efficiently, safely and with peace of mind.

- Troubleshooting of different systems including O2, CO2, H2, CO Quantity & flow measurement analyzers
- Achieving the best combustion efficiency and long lifespan of combustion.
  process monitoring system by using Patented Air Purifier Technology.
- Emissions Quality Audit as per EPA standards as well as solutions to reduce the pollution content in the emissions.
- Analyzer Calibration and Hot commissioning with process samples.
- Commissioning and Acceptance Testing of analytical systems for newly commissioned projects.
- Design studies for optimum solutions to bring new life to ageing systems.
- Performing engineering bid evaluations of process analyzer quotations to ensure suppliers conform to specifications requirement.
- Generating detailed performance reports
- Trainings on Analytical Technologies which meet the project

Industrail Analytical solutions

Industrail Analytical solutions

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IMMUSCO

Reliability PLUS

RELIABILITY PLUS SOFTWARE

All monitoring data will be recorded in RELIABILITYPLUS SOFTWARE.

"Reliability PLUS" Software will be capable of

i. Maintaining predictive maintenance history of the plant and recording observation from the inspection activity performed at the site.

ii. Development of machine behaviors/trends & maintaining equipment history.

iii. Assigning the Criticality (on the basis of plant dependency and failure frequencies).

v. Generation of Work orders with recording of the Feedback on the work orders.

iv. Identification of failure modes for machine failures, leading to overall maintenance regimes shift.

vi. Progress report of different components, equipment will be shown in form of graphs for quick summary.

vii. No. of possible faults on specific Machine would be indicated.

Fault Chart

Bearing fault Cocked bearing
Looseness Lubrication
Misalignment other
Resonance Soft Foot

Equipment History

Equipment history can be maintained(monthly,weekly etc.) using reliability plus software.

Status Chart

Equipment status can be predicted from normal to minor, minor to modrate or modrate to crtical using status chart.

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IMMUSCO

IMMUSCO Oil Field Equipment

HEAD QUARTER

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Tell # 042-35951774

IMMUSCO

IMMUSCO OPERATION & MAINTENANACE SERVICES

We know there is no substitute of experience when repairs can cost millions per day. IMMUSCOs highly experience team add value to your assets by maintaining them precisely that ensures maintenance budget optimization and minimize production losses by reducing plant down time. IMMUSCO has a vast knowledge and experience to offer services in the operation and maintenance of a wide range of power generation plants (combined cycle plants, diesel plants and other renewable energy plants), cement plants, chemical plants, dairy plants etc.

IMMUSCO OPERATION & MAINTAINANCE SERVICES PORTFOLIO

- Turnkey solution provider for plant shutdowns
- Provide NDT/API inspectors and inspection services during shutdowns
- Civil infrastructure modifications(machine base modifications)
- Pipeline designing and modifications to existing layout
- Manpower supply during shutdowns
- Workshop rotor balancing
- Provide engine and generator overhauling services
- Motor rewinding
- Pump overhauling
- Compressor overhauling Centrifugal compressors Positive Displacements

OUR FIELD SERVICE CAPABILITIES

- Overhaul & Repair on location
- Installations
- Inspections
- Start-up services
- Vibration measurement
- On-site balancing
- Lubrication service
- Laser alignment

OUR IN-HOUSE SERVICE CAPABILITIES

- Overhaul & Repair
- Dynamic balancing
- Reconditioning; all spray, coating and machining works
- Access to extensive test facilities

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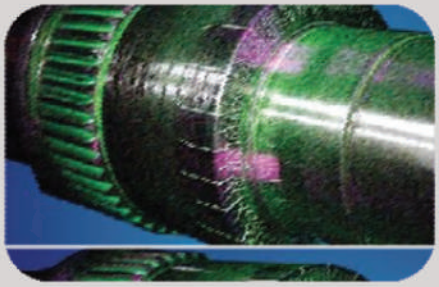
TURNKEY SOLUTIONS

- Civil infrastructure modifications
- Assets Relocation
- Electrical/Mechanical equipment erection jobs
- Hydro jetting services for tanks, heat exchangers, vessels cleaning.



MAN POWER SUPPY

- Designing
- General inspectors
- Riggers
- Labors
- Welders
- Fitters
- Fabricators
- Millwrights

OVERHAULING OF ROTATING EQUIPMENT

- Centrifugal pump (Single stage, Multi Stage)
- Positive displacement pump (Plunger pump, piston pump, diaphragm pump, Gear pump, screw pump, Rotary vein pump, Circumferential pump)

COMPRESSOR OVERHAULING

- Centrifugal Compressor (Horizontal split/ Vertical Split)
- Reciprocating Compressor (Single acting/ Double acting, Lobe Compressor, Screw Compressor, Vein Compressor)
- Overhauling of engine/genset
- Electric motor overhauling
- Electric motor rewinding
- Motor solorun test
- Motor foot inspection

INSTALLATIONS AND COMMISSIONING OF

- Plant static equipment viz heat exchangers, reactors, pressure vessels, furnaces.
- Testing, commissioning and assistance, in startup of process plants.
- Turnkey commissioning and assistance in startup of plants

ACCEPTANCE TESTING AFTER OVERHAUL

- Machine base line data acquisition as per following details
- Driver (Equipment) uncoupled Condition
- Driver & Driven coupled (unloaded & cold)
- Machine warms up
- Machine unloaded after it reaches operating temperature
- Data collection of machine at full load
- Comparison of current data with baseline data

PIPELINE WORK

- Fabrication of pipeline as per isometric design and DPT of weld joints
- Design verifications
- Pipeline erection services as per isometric design
- Modifications to existing piping layout
- Pipeline structural support
- Support calculations
- Induced vibrations (pulsations) study

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