

## NIMDC Main Objectives

The main objectives of "NIMDC" are to maximize plant availability, productivity, profitability and also provide protection against catastrophic failures.

- To increase average time between overhauls.
- To decrease the sudden & unexpected breakdown.
- To check under and over maintenance.
- To avoid necessity of extensive range of inventory.
- To move data not person.
- To protect our personnel and machinery assets.
- To real-time machinery shutdown.
- To provide sustainable "green building" construction.
- To provide eco-friendly technologies for harnessing renewable energy.

## NIMDC Benefits

NIMDC provides the necessary assistance & specialist knowledge needed to make the decisions that affect the efficiency and profitability of the plant. We are always there to help you to run your plant better by:

- Maximizing plant availability.
- Improving product quality.
- Increasing plant safety.
- Reducing plant operating costs.

## Vibration Monitoring

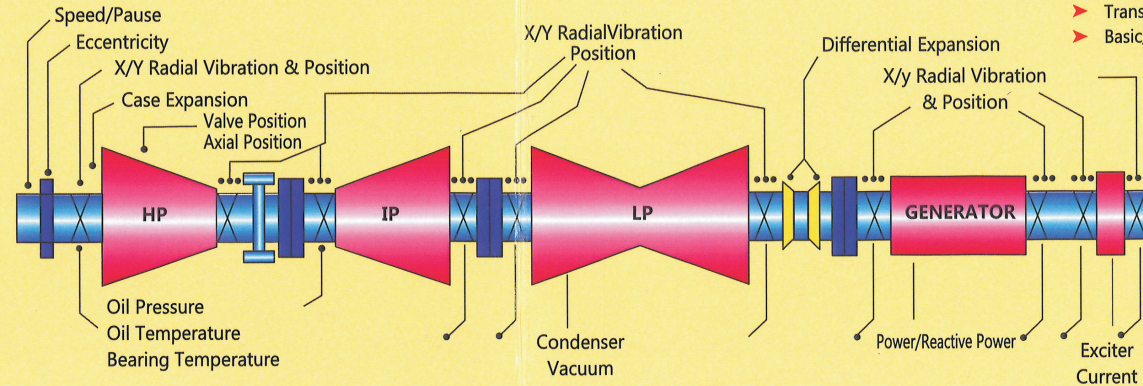
The development of large industrial units with little or no standby capacity and higher level of automation leaves no room for unplanned shutdown. The Predictive Maintenance using vibration monitoring technique has shown very good results in reducing /eliminating unplanned shutdowns.

"Vibration monitoring" is one of the most widely used techniques for determination of health of machine in Condition Monitoring. Each of the characteristics of vibration gives significant information about machinery condition. The amplitude of vibration indicates the condition of machine i.e. how good or bad its health may be, and an increase in the amplitude value signifies deteriorating condition.

## Turbine Monitoring & Diagnostics

The turbine generator is the most critical machine in power and process industries and is used for the generation of electricity.

The cost of repair and the time taken for repairs are very high. It is therefore imperative to monitor these machines and ensure their mechanical reliability so as to avoid incipient fault, resulting in major damages. In order to assess the machine performance and operational characteristics, we can provide assistance in Monitoring & Diagnosis in the most effective manner so as to provide protection against catastrophic failures.



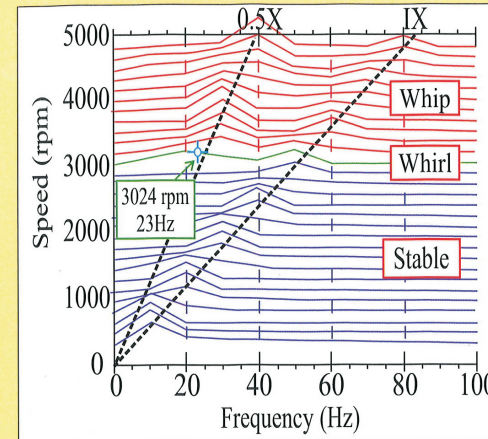
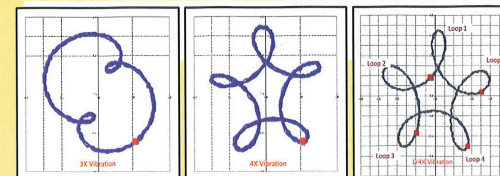
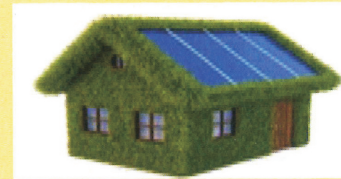
## Setting-up Renewable Energy Power Plants:-

- Solar (CCS & PV)
- Wind,
- Tidal,
- Geothermal,
- Ocean,
- Hydro (Small),
- Biomass,
- Nuclear



## Development Of Infra-structural Facilities

- Technology parks, convention centres & auditorium etc.

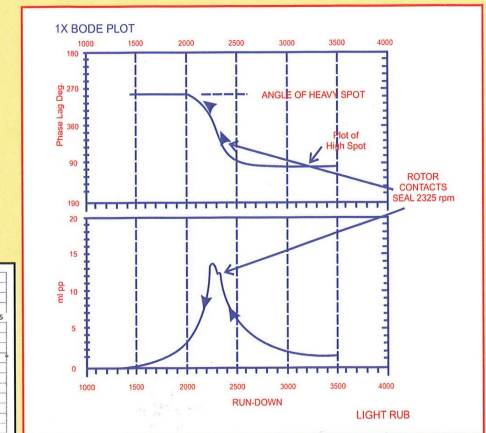


## NIMDC Offers Consultancy Services

- Development of Condition Monitoring System .
- Vibration Monitoring & Diagnostics Services
  - ❖ On-site & Remote-Monitoring & Diagnostics
- Pre & Post Overhaul Assessment
- Balancing of Rotating Machinery
- Bearing Diagnostics -Loading /Unloading (SPM/kurtosis )
- Blade Vibration Monitoring -BVMS
- Identify Natural Frequency & Resonance
- Root Cause Failure Analysis (RCFA).
- Machine Acceptance Testing
- Modal Analysis & ODS Analysis for Structural integrity
- Generator Air Gap Spectrun Analysis
- Visual Monitoring
- Noise Monitoring
- Hot Spot Monitoring Services.
- Wear Debris & Oil monitoring
- Motor Current Signature Analysis (MCSA)
- Transformer Monitoring & Analysis
- Basic/ Advanced training

## Scope of Works

- Steam Turbine Generators
- Gas Turbine Generators
- Hydro Turbine Generators
- Nuclear Turbine Generators
- All Motors / All Exciters
- All Fans /All Pumps/ All Engines
- All Compressors / All Gearboxes
- All Cooling towers
- All Structures / All Foundations



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## Machine Diagnostics Services Methodology

- NIMDC engineers are trained experts to carry out any consultancy project. At the end of the study, an interim report would be submitted highlighting problem areas for immediate action.
- Final report along with collected data, its analysis and detailed observations would be submitted subsequently along with remedial measures.
- Further, a study can also be undertaken on contract basis through periodical visits to monitor condition of machines.

## Instrumentation Capability

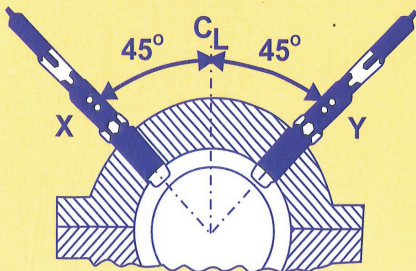
In today's competitive economy, plant personnel are constantly called upon to make rapid decisions about machinery health that impacts profitability for which suitable instruments are required to gather actionable information.

Instruments employed are capable of recording and analyzing shaft & bearing vibrations, various process parameters, steady-state and transient data for the identification of machines' design, engineering, operational and maintenance deficiencies during commissioning and re-commissioning, pre & post overhaul for safe and efficient operations.

When critical machinery shows signs of distress, operating decisions become more complex, one must quickly decide not only what to do but how to do it, in order to minimize down time & maximize overall profitability. It requires rapid access to actionable information for which instruments used by us have the following diagnostic features.

## Special Features of Advanced Vibration Monitoring Instrument

- **Polar & Bode / Nyquist Plots (SAF)**- are useful to document the presence of balance resonance & to determine Synchronous Amplification Factor(s) for assessment of damping in the system. Polar plot (P3) is used to diagnose and detect blade health conditions.



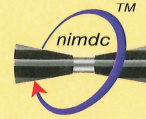
- **Orbit / Time Based Plot**- are used to examine phase lag angle, confirm overall amplitudes, frequency, shape (form) of dynamic motion of the rotor. Interpretations of orbit / time based plots provide insight into the nature of the vibration e.g the presence of steady state preloads (Cocked bearings).
- **Shaft Average Centerline Plot**- is used to track the location of the shaft average centerline with respect to geometrical bearing centerline. With this information one can have reliable information pertaining to what is happening to rotor lift / radial position during startup & shutdown of the machine as well as during thermal abnormality or load changes. With this information one can predict malfunctions such as misalignment, bearing instabilities, effects of preloads, bearing excessive wear, etc.
- **Full Spectrum Plot**- gives more information than is currently available in the standard spectrum plot. The FFT (X&Y) vibration transducer signals (Direct & Quadrature) are useful because vibration components are identified not only in term of frequency & amplitude but also in term of their direction of precession too.
- **DC Gap Voltage Plot** - is used to show changes in gap voltage from a proximity transducer with respect to time or shaft rotative speed to evaluate journal/thrust bearing failure or rotor-to-stator rubs.
- **APHT Plot**- is useful for shaft crack detection, shows variation of phase & amplitude with time. It is essentially a trend plot of phase & amplitude during steady state operations. Shaft crack detection methodology uses this plot as a useful tool to monitor 1X & 2X amplitude & phase.
- **Spectrum Cascade/ Waterfall plots**- are useful to track changes in spectral content during a start-up or coast-down or over a period of time. They show individual frequency spectra as a function of RPM (Cascade) or time (Waterfall).
- **Cepstrum Analysis** - is used to detect defect in the gear boxes to identify cracked, chipped or broken teeth, tooth wear, tooth load, eccentricity, backlash, hunting tooth & misalignment.
- **BVMS & Campbell Diagram** - For Monitoring of Blade lean, tip clearance and blade twist (lapping & flapping.)

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## NITISH INDUSTRIAL MACHINERY DIAGNOSTICS CENTRE PVT. LTD.

{A House of Condition Monitoring, Turbine Troubleshooting & Dynamic Balancing & Renewable Energy}

{ENGINEERING & CONSULTANCY SERVICES & CONTRACTS}

{(CIN): U93090DL2017PTC315656}



## About NIMDC

In today's business environment, proper maintenance of equipment can significantly enhance the availability of power and process industries and can also reduce the overall operating cost, while boosting the productivity. Research shows that loads on mechanical parts are significantly increased as a result of improper maintenance which in turn result in elevated operating temperatures, vibration, noise levels and rates of wear, causing increased energy consumption, reduced operational efficiency and subsequently shortens the life of the machines' components and its associated civil structures- means premature failures.

"NIMDC" aspires to become a renowned "Industrial Machinery Diagnostics Centre" and also become a "world" class company in the shortest possible time. It is fully independent and professionally managed, headed by a technocrat and supported by technical

specialist(s) teams, with expertise in various fields like predictive maintenance, machinery diagnostics services, pre & post overhauling assessment, performance acceptance testing, root cause failure analysis (RCFA), steady-state & transient data analysis, blade vibration monitoring, dynamic balancing of all types of turbine generators, troubleshooting and also resolving design, engineering, operational and maintenance deficiencies etc., by using advanced state-of-the-art-technologies to ensure the optimum availability and reliability of plants and machineries for efficient operation with safety, to the complete satisfaction of the customers.

In addition to this, we are also involved in organizing basic & advanced training courses, conferences & workshops. NIMDC also promotes and provides help in setting up renewable energy power plants such as solar, wind, tidal, geothermal, small hydro, ocean, nuclear and biomass etc., to minimize the "greenhouse effect". NIMDC also provides help in development of infra-structural facilities such as construction of "green building" i.e technology parks, convention centres with quality to cut down energy usage and to improve environment.

## Background

In a developing country like India and other countries too, there has always been a wide gap between demand and supply of energy and will continue for a long time to come even after introduction of energy efficient devices. Also, huge financial investments are required for setting-up new power stations and due to long gestation period the immediate need for power is not even met. Hence, the only remedial and alternative solution is to improve the availability and reliability of already installed units.

## NIMDC M & D Centre

As we know, the availability based tariff is now a reality, which brought the grid discipline and enhances opportunities and provides scope for competition amongst generators. The availability and reliability of rotating machinery are of prime importance in power generation, since any down-time of machines impacts output, productivity and overall profitability. In order to help industries to improve their machines availability, reliability and profitability, **M/s Nitish Industrial Machinery Diagnostics Centre Private Limited** (NIMDC) was incorporated on 6th April 2017 with the motive to reduce risks and increase safety and thereby reduce costs by minimizing the downtime and scheduling maintenance only when it is absolutely essential. "NIMDC" was setup to provide actionable information by ensuring the right people have the right information in time to make the right decisions about the machine's impending troubles, caused by design, engineering, operational & maintenance deficiencies, by using the latest Predictive Maintenance (PdM) techniques and associated advanced instrumentations for providing sustainable solutions, as predictive maintenance is one of the most promising and effective availability enhancement tools. Now, we are in a position to offer comprehensive consultancy services to help monitor, protect and manage your machinery on a plant wide basis through annual monitoring/maintenance contracts or through individual machine monitoring during commissioning, re-commissioning, pre and post overhaul.

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