

## PREDICTIVE MAINTENANCE AND ENERGY EFFICIENCY



### CONDITION MONITORING

No sensors on motors. Artesis MCM detects the existing and developing electrical and mechanical faults by getting only current and voltage signals and using the motor as a sensor.

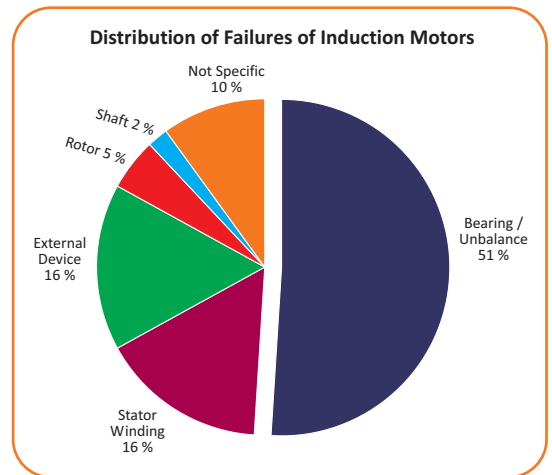
Plant Managers are under greater pressure than ever to get the most out of their assets. As this pressure has translated into increasing goals for Asset Effectiveness, condition monitoring has proved a powerful tool in the pursuit of improved availability, production rate, and quality.

The primary function of condition monitoring is to provide advance warning of faults, so that breakdowns can be avoided, and maintenance interventions can be carried out less frequently without increased risk. It also allows asset life to be extended, while reducing total cost of ownership by driving down maintenance costs.

Now the focus has shifted towards the need to improve Asset Efficiency, both to hold down energy costs and to minimize carbon footprints. In addition to replacing older equipment with new energy-efficient assets, companies are increasingly looking to monitor and manage the performance of the entire asset base. Artesis condition monitoring systems have an increasingly-critical role to play in this area, in addition to their traditional fault-diagnosis function.

Many users are aware of the connection between deteriorating condition and reduced efficiency. Excessive misalignment, voltage imbalance or mechanical unbalance can have serious impact, as can heating caused by bearing or electrical problems. The ability to proactively manage such problems allows condition monitoring to have a direct impact on operating efficiency.

- NASA technology - really clever technology makes it simple to use
- Monitors existing and developing faults
- Maintenance planning information including diagnostics and time to failure
- Monitors equipment for energy efficient operation
- Easy to use
  - Easy to interpret results
  - No need to interpret "wiggly lines"
  - Clear guidance on action required
- Monitors condition of the electric motor as well as the driven equipment
- No sensors on motors



In order to keep costs down, predictive maintenance implemented through condition monitoring becomes more essential than ever. The Artesis system is specifically designed to bring the benefits of predictive maintenance to as many organizations as possible, including many that may have found traditional approaches too complicated or expensive in the past. Its ability to provide information about energy management allows users to benefit from this functionality without having to make major investments in additional equipment.

Getting the most out of your assets involves parallel improvements in both efficiency and effectiveness. Artesis condition monitoring systems now provide benefits that go beyond traditional fault diagnosis to help users deliver in both these critical areas.



## LOOSE FOUNDATION/ COMPONENTS

Mechanical issues such as misalignment, physical looseness and imbalance not only adversely affect a motor's performance and longevity but also its efficiency.

## UNBALANCE/ MISALIGNMENT / COUPLING /BEARING

Correct shaft alignment ensures the smooth, efficient transmission of power from the motor to the driven equipment.

## BELT/ BLADE / TRANSMISSION ELEMENTS/ DRIVEN EQUIPMENT

Efficiency is dependent on pulley size, driven torque, under or over belting, and V belt design and construction. Efficiency deteriorates by as much as 5% over time if slippage occurs

## BEARING

The presence of bearing defects often results in reduced efficiency, or even severe damage, of the motor under consideration

# Use MCMSCADA+ for Condition Monitoring, Predictive Maintenance & Energy Efficiency

EQUIPMENT STATUS		ELECTRICAL VALUES	
Examine	Loose Foundation / Components	Watch	Power Factor 0.54
Examine	Unbalance/Misalignment/Coupling/Bearing	OK	Active Power [kW] 5.5
Examine	Belt/Blade/Trans. Element/Driven Equipment	OK	Reactive Power [kVar] 8.7
OK	Bearing	OK	Vrms [V] 226
OK	Rotor	OK	Irms [A] 15
OK	Loose Windings / Stator / Short Circuit	OK	V Imbalance[%] 0.48
OK	Internal Electrical Fault	OK	I Imbalance[%] 1.8
OK	External Electrical Fault	OK	Frequency [Hz] 50
OK	Other	Watch	THD [%] 11
OK	Line Status	OK	3th Harmonic [%] 0.77
OK	Load Status	OK	5th Harmonic [%] 8.9
OK		OK	7th Harmonic [%] 1.2
OK		OK	9th Harmonic [%] 0.08
OK		OK	11th Harmonic [%] 0.32
OK		OK	13th Harmonic [%] 0.65
EXAMINE 1	There are developing mechanical and/or electrical fault(s) as shown below. Maintenance should be scheduled within three (3) months.	WATCH ELECTRICAL VALUES	Electrical values are outside of their expected range. They should be noted and watched to identify the cause
WORK REQUESTS			
EXAMINE 1: There are developing mechanical and/or electrical fault(s) as shown below. Maintenance should be scheduled within three (3) months.			
1. Looseness / Foundation. Check for loose motor foundation, loose motor components, looseness or excessive tolerances in driven components.			
2. Misalignment / unbalance. Check for Misalignment, unbalance, bearing, coupling, and motor shaft.			
EQUIPMENT INFORMATION		DATABASE (Last Five Hours)	
Equipment Name	Fan	Start Date	02/20/2006 10:00:55
Equipment Type	Fan	End Date	02/20/2006 15:00:55
Nominal Voltage [V]	230	Number of Data Points	12
Nominal Current [A]	30	DATABASE (Full)	
Rotation Spd. [rpm]	1470	Database Range	02/06/2006 - 02/20/2006
MCM Address	253	Number of Data Points	716 (716/716)

## STATOR, ROTOR, INTERNAL ELECTRICAL FAULTS

Heating and increased resistance due to stator, rotor and other electrical faults cause deteriorating conditions and reduced efficiency

## TOTAL HARMONIC DISTORTION

Total Harmonic Distortion causes additional losses on windings and magnetic circuit. Increases Hysteresis (magnetization) losses in steel and iron cores of transformers, motor and magnetic trip units of circuit breaker

## ELECTRICAL VALUES/EXTERNAL ELECTRICAL FAULT

Voltage unbalance, over- and under-voltage, low power factor, undersized conductors, leakage to ground, and poor connections-can account for up to 4% of total plant electrical energy consumption.

## Products



### Motor Condition Monitor (MCM)

Condition Monitoring Unit for 3-phase asynchronous motors

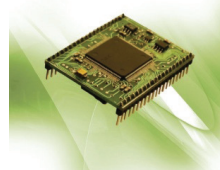
Inverter driven motors (variable speed driven motors) -low voltage and high voltage motors

Line driven motors- low voltage and high voltage motors



### Plant Condition Monitor (PCM)

Condition monitoring unit for low and high voltage generators.



### MCM System on a Card (MCMSoC)

Development software and integrated circuit for OEM and device manufacturers

## SERVICES AVAILABLE

- Scheme Design
- Consultancy
- Installation
- Commissioning
- Technical Support
- Guaranteed Warranty

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