Condition Monitoring explained

Condition monitoring provides detailed information about the health of plant machinery, alerting maintenance personnel to when components starts to deteriorate so that preventative maintenance can be appropriately scheduled to avoid costly downtime and expensive emergency repairs.

Condition Monitoring:

- ✔ Reduces the size and scale of repairs
- ✔ Reduces downtime (increase uptime)
- ✔ Increases accountability for all cash spent for maintenance
- ✔ Reduces number of repairs
- ✔ Increases equipment's useful life
- ✔ Increases operator, maintenance mechanic and public safety
- ✔ Reduces overtime for responding to emergency breakdown
- ✔ Increases equipment availability
- ✔ Decreases potential exposure to liability
- ✔ Reduces investment to unrequired spare and stand-by units
- ✔ Insures that all spare parts are used in cost effective way
- ✔ Reduces overall maintenance costs through better use of labor and materials
- ✔ Identifies the cause of the problem to effectively tackle it

In FNT we perform Condition Monitoring by our own means or using customer available equipment. We combine Condition Monitoring technologies in order to evaluate machinery condition. As an example the following table presents different techniques which can be combined for several assets Condition Monitoring:

	VA	IR	AE	OA
Pumps & motors	✓		✓	
Fans & blowers	✓		✓	
F.O and Lube Oil Separators	✓			
Compressors	✓			✓
Gearboxes	✓			✓
Turbo	✓			✓
Power generators	✓	✓		✓
Steam traps		✓	✓	
High pressure pipes			✓	
High temperature exhaust volutes		✓		
Electric switchboard, transformers, and junction		✓		

VA: Vibration Analysis **AE: Acoustic Emission & Ultrasound**

IR: Infrared Thermgraphy **OA: Oil Particle Counting and Cleanness Monitoring**

Many of FNT's clients now enjoy the precision level of analysis afforded when two or more condition monitoring technologies - such as Vibration Analysis and Acoustic Emission - are combined.

The benefits of such a sophisticated maintenance strategy are that it can be employed to not only recognise developing faults within a machine, but to identify factors that will cause these faults to develop in the first place.

The following machinery malfunctions can be diagnosed through our Condition Monitoring technology:

- Bearing failures
- Journal bearing oil whirl
- Shaft whip
- Rotor rubbing
- Blade and buckets part breaking off
- Balancing problems
- Misalignment problems
- Motor shaft bend problems and motor or pump shaft crack problems.
- Cocked on shaft misaligned bearings
- Bearing cage deterioration
- Internal looseness of machinery
- External looseness of machinery

- Resonance problems
- Electrical problems of motors (rotor problems, stator, crack of rotor bar, lose iron, phase problems)
- Pump turbulence, cavitation
- Gearbox (spur, helical, planetary) problems, like tooth wear, tooth crack, eccentricity, alignment, backlash.
- Belt mechanism problems, like worn, loose or mismatched belts, belt/sheave misalignment, eccentric sheaves, overload of sheaves.
- Faults in relays.
- Loose connections in panel switchboards.
- Imbalanced loads or corrosion in panel switchboards.
- Imbalance in phases.
- Earth faults
- Steam trap malfunctions
- High pressure pipe or reduction mechanism leakages detection

The bigger picture is that a correlated-technology approach can be utilized to drastically increase machine operating life, productivity and business integrity.

Various options for condition monitoring are available for an application to be chosen.

Patrol Based	**Remote Monitoring**	**On-Line Monitoring**
Data Collection: FNT engineers collect data by using our own equipment	**Data Collection**: Customer collect data	**Data Collection**: Data is collected automatically by customer's condition monitoring system
Data Collection equipment: FNT portable equipment	**Data Collection equipment**: Customer's portable equipment. An option to lease equipment from FNT also exists.	**Data Collection equipment**: Installed on machinery
Data Collection Frequency: Based on schedule and machinery availability	**Data Collection Frequency**: Based on schedule	**Data Collection Frequency**: Configurable based on system criticality and failure mode.
Analysis and Report: FNT delivers the final report 5 days after the survey.	**Analysis and Report**: FNT delivers the final machinery condition report 5 days after receiving of the data	**Analysis and Report**: FNT set up the entire system, configure the ALARM and TRIP settings, analyze persistent Alarm or a Trip issues and delivers machinery condition analysis and report.

Read about FNT Work Process…