

ozWatch®

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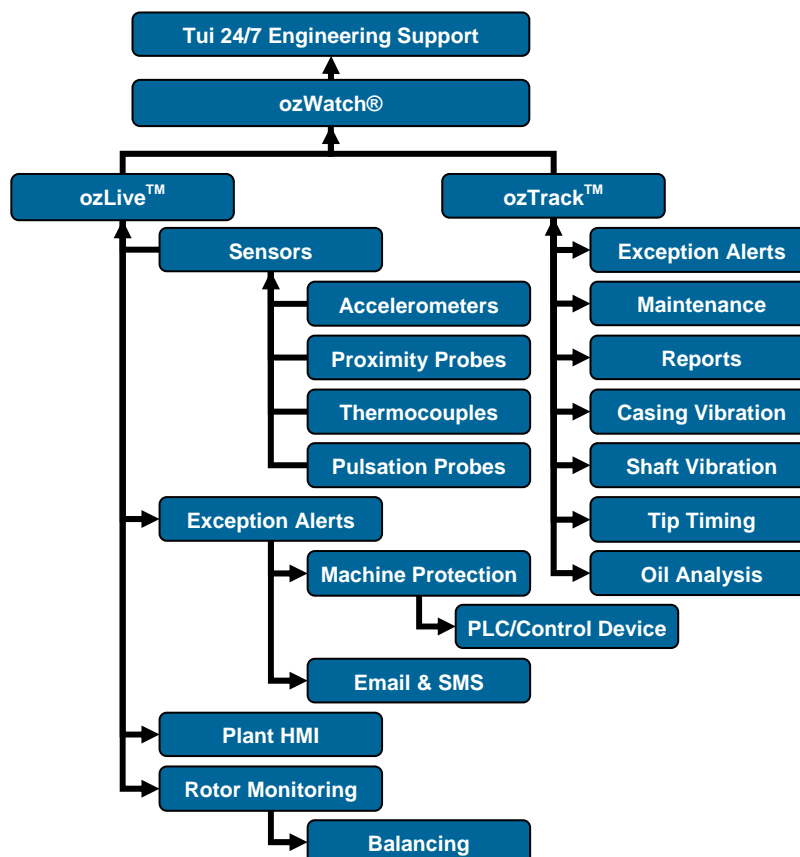
Condition Monitoring Solutions

Improving Reliability through Innovation

1.0 ozWatch® Solution

ozWatch® is a centralised dynamic information system, accessible **anywhere, anytime** that provides continuous assessment of plant condition. ozWatch® is the most cost effective solution available for **Condition Based Management** of rotating machinery.

ozWatch® data flow and function diagram



1.0 ozWatch® Solution (cont)

The ozWatch® package includes hardware, software and remote engineering support:*

- **Data Acquisition Unit (Replacement on Failure)**
- **Accelerometers (Replacement on Failure)**
- **ozTrack web based remote monitoring management software**
- **ozLive web based real-time diagnostics software**
- **Unlimited user accounts for both ozTrack and ozLive**
- **Software upgrades**
- **Hardware upgrades**
- **Monthly Reporting including online report database**
- **Response to ad-hoc alarms**
- **Engineering Support 24/7**

*Conditions Apply

1.1 Services Costs

Service costs are based on “points” which are instruments installed on the machinery that are continuously monitored by the system. Such instrumentation can include:

- Accelerometers
- Proximity Probes / Key Phasers
- Thermocouples
- Dynamic Pressure Transducers
- Acoustic Sensors

The typical service cost is comparable with manual data collection services. Normally each shaft will require a minimum of 3 accelerometers, which are usually provided as part of the ozWatch® package. Other instruments may incur additional cost, however there are no other operating costs.



1.2 Integration of OEM signals

Integration of OEM supplied vibration monitor equipment protection system signals into the Tui Industries ozWatch system can be achieved in most cases. The benefit of this is to have all inputs monitored by one system maintaining time stamp coordination and allowing full information to be viewed remotely by client and Tui Industries engineers. Additionally, diagnostic capabilities are enhanced by the ability to overlay any set of data using the ozTrack and ozLive software regardless of its source. As this capability requires additional DAU channels, processing power, and reporting, each additional parameter is subject to additional fees.



1.3 Rotor Dynamic Monitoring

The ozWatch® system can monitor changes in synchronous vibration and phase angle which may indicate a failing rotor, for example material loss or crack propagation. This can provide an early indication of damage to rotating components and allows a controlled shutdown and inspection to be conducted.

Parameters that can be monitored are:

1X Peak-to-Peak	Δ 1X Peak-to-Peak
1X Phase	Δ 1X Phase
X-Y Phase	Δ X-Y Phase
X-Y Magnitude	Δ X-Y Magnitude

This information can be made available for all shafts monitored by the Tui Industries ozWatch® system. Each additional parameter monitored and reported is subject to additional fees.

1.4 Integration of ozWatch with plant control systems

Integration of ozWatch signals with plant control systems can be achieved in most cases using Ethernet and other communications protocols. The benefit of this is to have all inputs monitored by one system maintaining time stamp coordination and allowing full information to be viewed locally by client engineers. As this capability generally requires additional communications hardware, cabling and DAU processing power, additional cost will be negotiated based on installation and ongoing service requirements.

1.5 Online Balancing

The capabilities of the system are such that it is possible to perform rotor balancing using both locally and remotely available data. Therefore Tui Industries engineers can coordinate remotely with site engineers to perform the balancing process. This enables unplanned and cost effective machinery balancing. Service costs are time based.

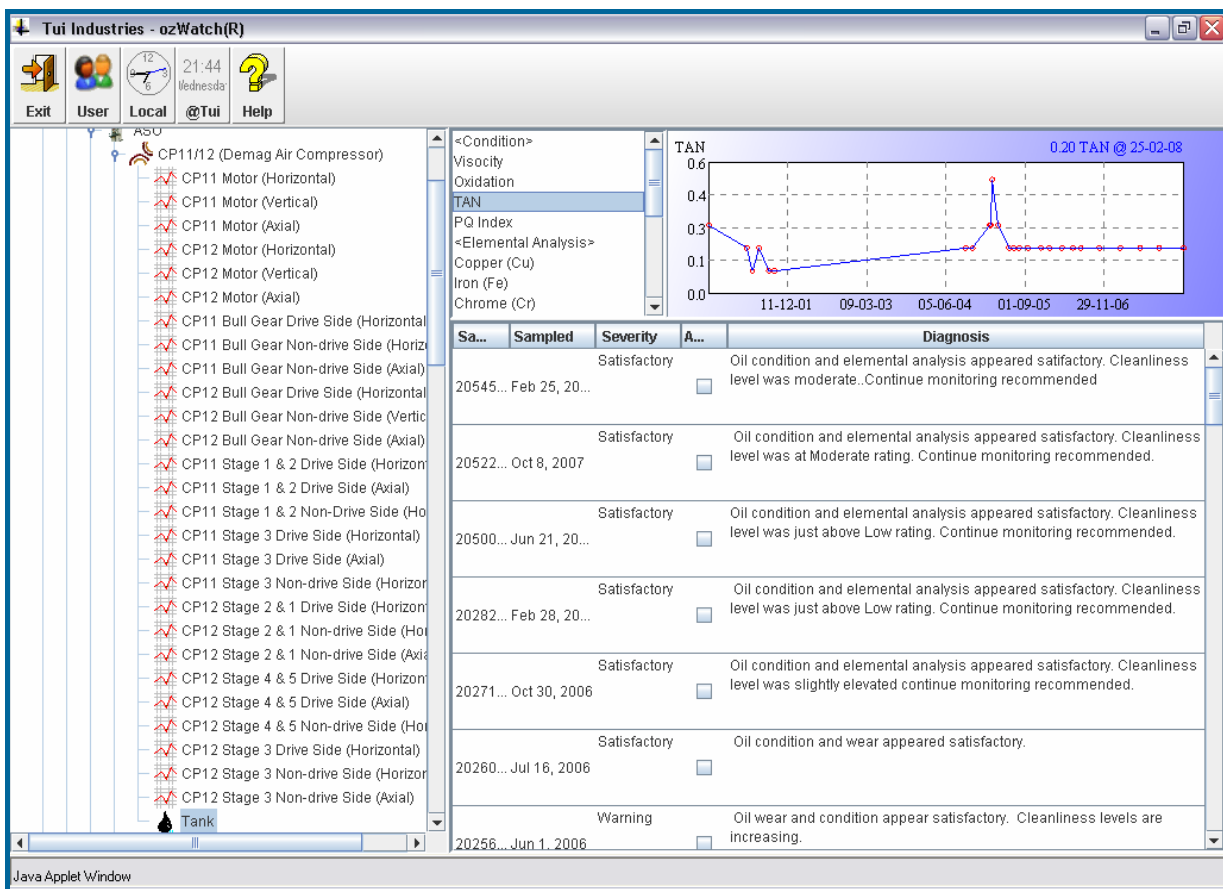
1.6 Oil Analysis

An essential component to any condition monitoring programme, Tui Industries offers a comprehensive oil analysis service with the analysis results recorded and trended in the ozWatch® database. Oil sampled from a closed reservoir will normally provide early indications of impending machinery problems allowing more efficiently arranged maintenance to be performed:

- **Oil condition monitoring indicating if the oil is deteriorating**
- **Contaminant analysis indicating leaking of process products into the oil system**
- **Contaminant analysis indicating poor isolation of the oil from the external environment**

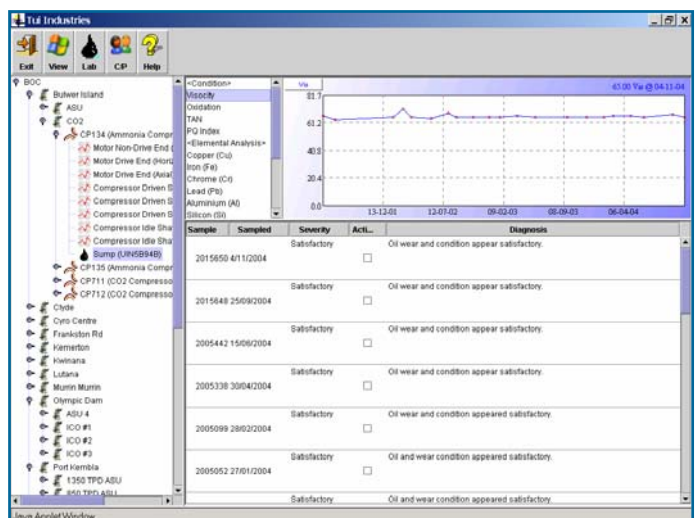
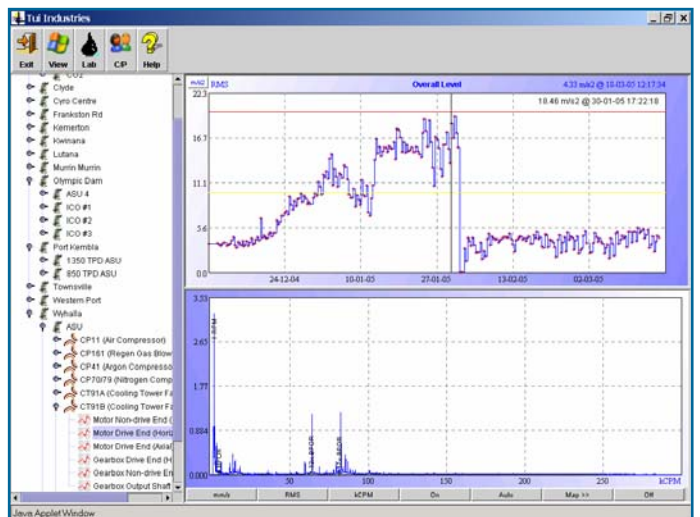
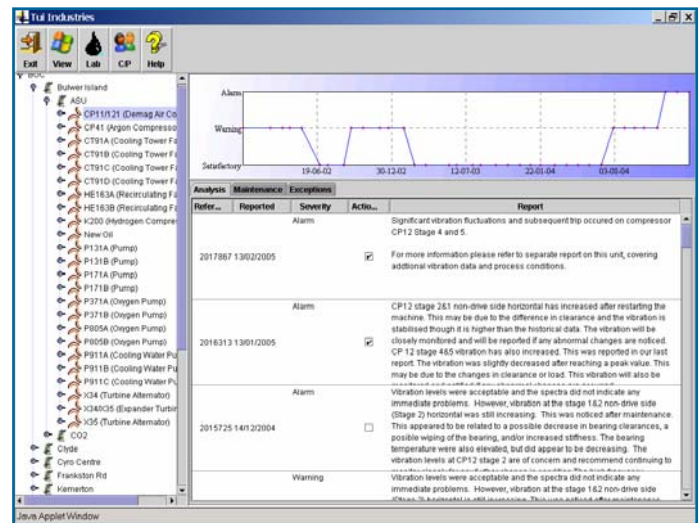
Sample bottles are supplied to each site where client personnel collect oil samples which are sent in to the Tui Industries office for analysis. The results are uploaded into the database where pre-set maximum limits generate exception alerts, all accessible over the internet to the client.

- **Analysis of wear particles allowing the material and wearing action to be identified**



2.0 ozTrack Software

- Web based software, making access available from virtually any computer
- Multi user access
- Secure connections (encryption) to improve security and protection of passwords
- Complete machine history
 - Reports
 - Maintenance
 - Exception (Warnings/Alarms)
- Trends with historical spectral data
 - Acceleration (g's)
 - Velocity (mm/s)
 - Demodulation Readings (gHF)
- Fault frequencies displayed on spectra
- Spectra scaling
 - Fixed/Auto
 - Peak-Peak, Peak, and RMS
 - CPM, Hz
- Spectral map (waterfall)
- Full spectra analysis capabilities
 - Plot zooming
 - Single, harmonic and side band cursors
- Warning and alarming features
 - Overall warning and alarming
 - Spectrum band warning and alarming
- Oil analysis.
 - Historical trends of oil condition
 - Historical trends of elemental analysis



3.0 ozLive™ Software

Web based real-time data and analysis package for fault diagnosis locally and remotely by client or Tui Industries engineers. Multiple parameters can be overlaid for simultaneous analysis purposes, which greatly aids in the fault diagnosis process.

