
## Quality Condition Monitoring Specialists

# CAPABILITY STATEMENT

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## MISSION STATEMENT

Providing the Highest Quality Condition Monitoring Service to those Clients who Own and/or Operate Equipment for which the Consequences of Failure are High due to the Cost of Equipment Downtime, the Cost of Consequential Damage or the Risk of Injury to Personnel.

## BACKGROUND

Monitek Australia Pty Ltd (Monitek) was formed in 1988 as a specialist condition monitoring company with a focus on pushing the technical limits on Vibration Analysis to achieve superior results. Since commencing operations Monitek has tackled the technically complex end of business and industry, relieving clients of much of the responsibility and cost of equipment maintenance. Monitek has established a commanding position in heavy industry and has historically specialised in variable speed drives, in particular, mining (draglines and shovels), numerous coal preparation plants in NSW and Queensland, as well as the shipping industry, ports, power generation and manufacturing/processing sectors.
Monitek currently has approximately 30 employees servicing the Australian operations. With offices strategically located along the East cost of Australia (Brisbane Head Office, Emerald, Mackay, Middlemount, Singleton, Wollongong and Melbourne) and the United States of America, Monitek is ideally positioned to service clients throughout Australia and internationally.

## CONDITION MONITORING

Condition monitoring empowers the engineer to:

- Avoid breakdown by detecting faults before they become problems
- Maximise productive life by repairing machinery only when necessary
- Focus maintenance personnel on known problems
- Reduce human error through “best guess” repair routines
- Defer maintenance on healthy equipment
- Make better maintenance decisions at every level

## QUALITY

During the 1980s, Bougainville Copper achieved major advances in the success of vibration monitoring as a predictive maintenance tool by pushing the technical envelope. They found that superior data and superior analysis produced superior results beyond their initial expectations.
Monitek was formed on the belief that superior results could be achieved by collecting the highest quality data and analysing it with the best technology available and this remains its core philosophy today.
Monitek continues to focus on the high quality end of the condition monitoring market. We make every effort to ensure that all aspects of our operations utilise the highest quality methods available.

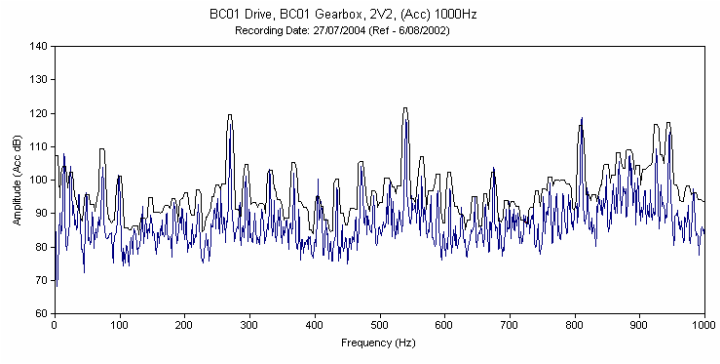
To ensure that we achieve the highest quality possible, we:

- Only utilise drilled and tapped or glued studs using special low loss glues to ensure that vibration data up to 10 kHz is repeatable and representative for every survey.
- Only use accelerometers warranted to 5% accuracy to ensure repeatability of data and accuracy of trend information. With less accurate accelerometers, subsequent readings may bear little correlation with earlier readings due to accelerometer error.
- Utilise only advanced instrumentation and software which we have developed or selected to meet our specific high quality needs.
- Utilise our report writer which provides a consistent reporting format and provides full historic trends for both oil and vibration. The report writer has the ability to drill down to detailed data below the summary level and enables reports to be distributed in electronic PDF format. The report provides identification of faulted components, a prognosis of the condition and relevant maintenance recommendations as opposed to a list of identified vibration frequencies.
- Employ only technicians/engineers with a strong maintenance background who are trained in condition monitoring.
- Ensure continuity by insisting the technician who records the data also analyses it.
- Where practicable, base our condition monitoring technicians/engineers on site to enable rapid response to urgent issues and to develop a familiarity with both the site equipment and personnel.
- Have available senior professionally qualified condition monitoring engineers with many years of experience of vibration analysis to overview and audit work done by our site based technicians.
- Do not use “masking” of data for critical items of equipment. This ensures the technician, rather than the computer, analyses the data. For each survey a fresh review of the vibration levels is undertaken and manually compared with previous surveys. We do not rely on “text book” analysis which sets us apart from our competitors.

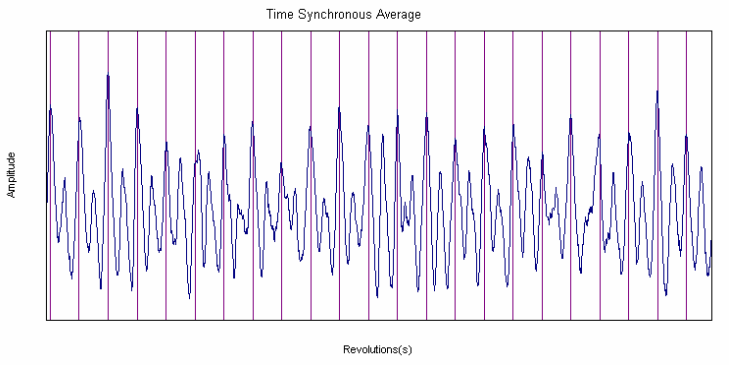
This has sometimes meant that the time taken to collect and analyse the data has been longer and that costs for individual surveys might be greater, but the quality of results is vastly superior and the annual cost of the service can be less because the surveys can be undertaken less frequently.
Furthermore, Monitek firmly believes that where the consequences of failure are high, there is little point undertaking VA surveys unless a high level of confidence can be placed in the results.
Monitek has therefore targeted that area of the market where the costs of failure are high due to personnel safety, cost of downtime or consequential damage. Draglines and shovels and longwall systems in the mining industry and shipping clearly fall into this category.
Monitek developed the technology (VCMAuto) to analyse variable speed drives by recording of real time waveform using our RADAR hardware and until recently was the only provider capable of undertaking true variable speed analysis.
Our software corrects for varying machine speed anywhere in the acceleration / deceleration cycle. The VCMAuto methodology is currently world best practice and ensures Monitek retains its position as a recognised leader in monitoring draglines, shovels and longwall systems.
VCMAuto is designed for high quality analysis compared with other commercially available systems which are more production line oriented.

## VIBRATION ANALYSIS

Monitek's core business is the provision of vibration monitoring, particularly to companies requiring high quality, complex analysis of machines. The key to the technique is the ability to monitor a machine while it is working under normal dynamic stress. The results of the analysis show whether anything is malfunctioning and maintenance personnel are able to make informed and cost effective judgements about the actions that are necessary.



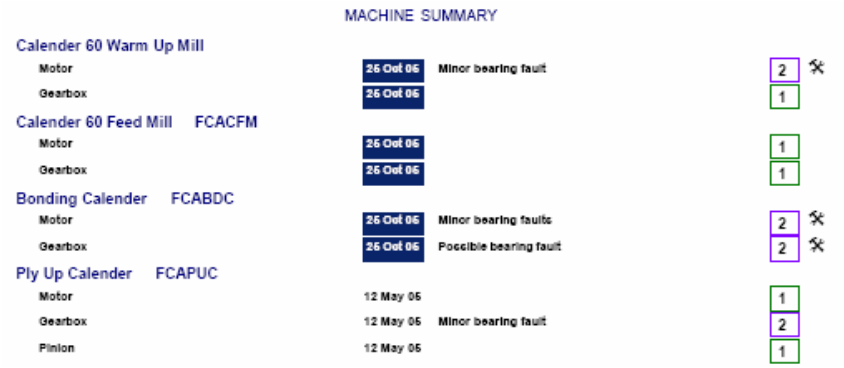

Most importantly, vibration allows Monitek to catch impending failures before they happen and do real damage to the machinery. The information allows for often critical advance timing to plan maintenance that fits in with operational needs. This can and usually does mean large financial savings to the operation.
The work requires the use of sensitive instrumentation and methodology specifically designed to meet the exacting requirements of this field.
During Monitek's many years of practical experience, it has developed its own unique highly sophisticated technology including Time Pause Technology, which has been specifically designed for high rate variable speed, variable load machinery, and an innovative new hardware system which Records, Analyses, Diagnoses and Reports (RADAR).




The principles are founded on performing routine surveys on each machine and using Monitek proprietary software to analyse these surveys to determine if change has occurred, the cause of the change and to determine how long that machine can safely operate before repair or replacement is required.
The techniques identify shaft, bearing and gear problems including race damage, gear spalling, eccentricity, imbalance, misalignment, wear and looseness.
Monitek's approach differs from others in that we regard ourselves firstly as maintenance personnel and secondly as condition monitoring specialists. All employees have considerable hands-on maintenance experience.
Monitek's unique technology enables our staff to perform the analysis and diagnosis on site, or back in the office, using various techniques of spectral comparison, order analysis, time synchronous averaging to name a few. At completion of the analysis, the specialist verbally reports his findings to the client and discusses any anomalies and maintenance fixes. This is also supported with a full report.
The instrumentation used allows high quality real time vibration data to be recorded on site and replayed in the office. This in effect is the same as having the machine working in Monitek's office and allows the maximum flexibility in analysing information.

## MONITOR

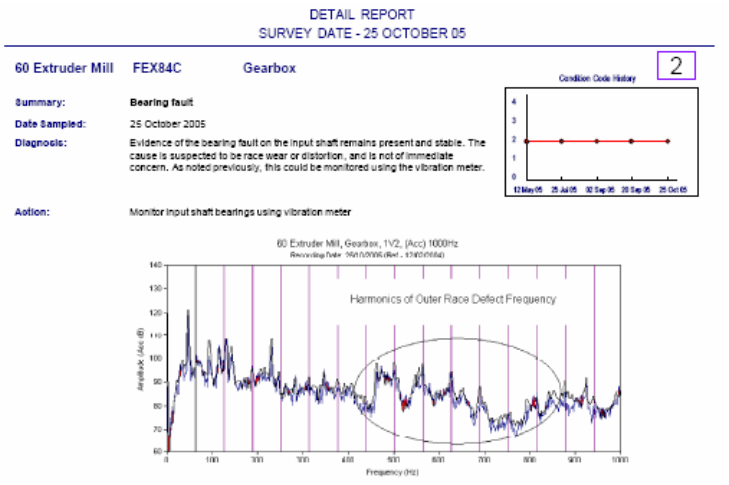
Monitek condition monitoring information is stored and conveyed to our clients using the reporting system within Monitor. The results of all service types, be it vibration, oil, thermography, NDT, etc are referenced to the appropriate equipment and used in conjunction to provide a complete picture of equipment condition.




This program generates reports in electronic (pdf) format which can be easily distributed and disseminated. The report format is flexible and designed to suit the needs of each client. Because all our staff has maintenance experience, information is presented in a 'maintainer- friendly' format.

Reports can be attached to work orders raised in the maintenance system, thereby providing additional information to the person repairing / maintaining the machine. Generally two reports, a summary report and a detailed report, are combined and sent through after any condition monitoring is performed.

The summary report will list every item of plant that is monitored. This report will list when the last survey was completed and provide the condition of the plant, together with a brief description. The condition codes are highlighted in different colours depending on the severity of the problem.

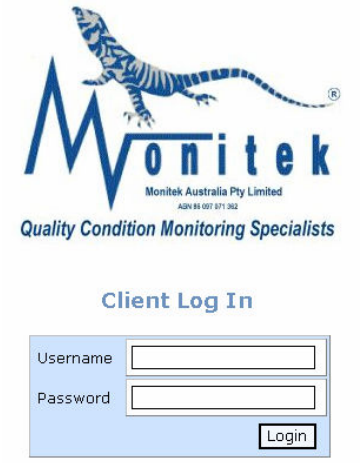



The second part of the survey report provides the detail of the services completed during the reporting period. Thus any piece of plant or equipment whose condition was not acceptable (condition code above 1) will have a detailed report. The detailed report will provide a description of what condition monitoring activity was carried out, what was found and what action is recommended.

The detailed report also contains a trend graph of the machine's condition.

For lubricant analysis and any NDT reports, such as thermography, a picture or graphical representation of what was found will be included in the report. These may also be included in vibration and visual inspection reports.

Our clients can also gain access to their reports via the Internet with personalised logon information allowing them to view information on their plant at any time.



Monitor also has the ability to correctly schedule upcoming work, and to accurately invoice for that work, which ensures a consistent and reliable condition monitoring service.

Machines Due Until — 11 December 2005

| Machine | Service | Last | Freq | Due | O/Due | |
|---|---|---|---|---|---|---|
| **2303 JIG PLANT** | | | | | | |
| Engineer : Wayne Powell | | | Resource : | | | |
| **JG301A Jig Reject Bucket Elevator** | | | | | | |
| Gearbox | VA | 27 Oct 2005 | 6 W | 08 Dec 2005 | -4 W | ☐ |
| **CR301 Secondary Sizer** | | | | | | |
| Motor | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| Gearbox | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| Drive shaft | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| Driven Shaft | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| **CR302 Jig Product Crusher** | | | | | | |
| Motor | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| Gearbox | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| Drive shaft | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |
| Driven Shaft | VA | 11 Sep 2005 | 12 W | 04 Dec 2005 | -3 W | ☐ |

The Scheduling and Contract Performance Report enables us to monitor KPI's such as points surveyed in a given period versus scheduled points and standard deviation of survey intervals and average report turn around time.

CONTRACT PERFORMANCE
GENERATED ON - 11 November 2005

| Plant \ Unit \ Machine Details | | Previous Schedule | Monitored On | Contract Performance | Next Schedule | Current Status |
|---|---|---|---|---|---|---|
| **2301 Rom Coal** | | | | | | |
| **FB101 Feeder Breaker** | | | | | | |
| 1 Motor | Vibe | 06 Sep 05 | 11 Sep 05 | 5 days | 04 Dec 05 | OKAY |
| 2 Gearbox | Vibe | 06 Sep 05 | 11 Sep 05 | 5 days | 04 Dec 05 | OKAY |
| **CV101 Raw Coal Conveyor** | | | | | | |
| 2 Motor | Vibe | 25 Oct 05 | 27 Oct 05 | 2 days | 19 Jan 06 | OKAY |
| 1 Gearbox | Vibe | 25 Oct 05 | 27 Oct 05 | 2 days | 19 Jan 06 | OKAY |
| 3 Head Pulley | Vibe | 25 Oct 05 | 27 Oct 05 | 2 days | 19 Jan 06 | OKAY |
| 2 Upper Bend Pulley | Vibe | 25 Oct 05 | 27 Oct 05 | 2 days | 19 Jan 06 | OKAY |
| 0 Take Up Pulley | Vibe | 25 Mar 01 | | -84 days | 25 Mar 01 | OVERDUE |
| 2 Lower Bend Pulley | Vibe | 25 Oct 05 | 27 Oct 05 | 2 days | 19 Jan 06 | OKAY |
| 2 Tail Pulley | Vibe | 05 Dec 05 | 27 Oct 05 | -39 days | 19 Jan 06 | OKAY |
| **FE101 Belt Feeder** | | | | | | |
| 2 Motor | Vibe | 06 Sep 05 | 12 Sep 05 | 6 days | 05 Dec 05 | OKAY |
| 1 Gearbox | Vibe | 06 Sep 05 | 12 Sep 05 | 6 days | 05 Dec 05 | OKAY |
| 2 Head/Drive Pulley | Vibe | 15 Jun 05 | 14 Jun 05 | -1 days | 06 Sep 05 | OVERDUE |
| 1 Tail Pulley | Vibe | 15 Jun 05 | 14 Jun 05 | -1 days | 06 Sep 05 | OVERDUE |

## ALLIANCE COMPANIES

### Oil Test

Monitek has a close alliance with Oil Test based in Singleton, NSW. This company provides a Wear Debris Analysis service for both oil and grease samples as well as SOAP (Spectrometric Oil Analysis Program) analysis of oils. We work together at a number of sites and provide combined reports to our clients.

SOAP is most suited for determining oil condition, and for analysis of the smaller particles entrained in the oil up to 15µm in size. Spectrometric, Infrared and Particle Count Analysis are a few of the processes conducted. This method is ideal for filtered and clean oil systems such as hydraulics, turbines, and internal combustion engines.

Wear Debris Analysis focuses on the larger particles entrained in the oil or grease (particles in excess of 10 micron). The process requires the sample to be washed, filtered and magnetically separated. The resultant particles are then examined under a microscope to identify their source and morphology. This method is more suited to industrial drives, where the fatigue particles are usually larger, and the oil compartments are often not fine mesh filtered.

## Engineering Testing and Reliability Systems (ETRS)

Monitek also has a close alliance with ETRS for the supply of NDT (non-destructive testing) services. ETRS can provide all noise, thermographic, structural integrity and any other NDT services required.
ETRS provides a complete and integrated range of non-destructive testing, metallurgy, materials, coatings, welding, structural and mechanical engineering services to Australian industry. Their staff has extensive experience in the coal industry and their offices are well located and staffed. Experience covers draglines, shovels and mobile plant, mills, coal preparation plants, longwall equipment, stacker/reclaimers and conveyors.
In the Materials area they have undertaken failure analysis and engineering assessments on a similar range of equipment. Their engineers and material scientists have worked with both the OEMs and mine staff throughout Australia and overseas.
ETRS has laboratories located in Brisbane, Gladstone, Mackay, Newcastle, Maitland, Ravensworth, Sydney, Melbourne and Morwell. Current staff numbers are just under 200.
The combined Vibration and NDT services can be coordinated by either ETRS or Monitek.

We work together with our alliance partners under joint contracts at a number of sites, including Blair Athol, Kestrel and German Creek.

These two alliances enable us to provide the full range of condition monitoring services to our clients.

However, Monitek are equally prepared to work in conjunction with any existing or preferred NDT service provider.

## ADDITIONAL INFORMATION

### Clients
Monitek services clients primarily throughout eastern Australia. An up to date Client list can be provided after contacting our Head Office.

### Client Liaison
By locating employees in close proximity to the site, Monitek is able to develop close working relationships with the maintenance and operations personnel of the client. We strongly believe that by developing partnering arrangements with the site, that a higher quality of service is achievable. If agreed to by the client, we prefer our employees to attend maintenance planning meetings and enter works orders directly into the client's maintenance planning system. Because the same person services the one site, they become known by the client's maintenance workforce and become part of the maintenance team.

### Continuous Review
We recommend an annual review of the frequencies of surveys with a view to optimising the value of the surveys. Our experience from other sites has shown that where a high quality of monitoring is provided, the survey frequency can be extended as some bearing faults are evident up to 6 months prior to failure. This particularly applies to the larger slower speed bearings.

Although the cost per point may be higher, the higher quality of monitoring enables fewer points per bearing to be monitored and at reduced frequencies, thereby resulting in an overall reduction in condition monitoring costs.
We have found from experience that considerable savings can be made from extending the maintenance intervals on machines, extending oil change intervals and extending the OEM recommended change out interval for replaceable components.
Since the commencement of providing condition monitoring services, Monitek has maintained an extensive database of all equipment monitored and machine failures. For most types of equipment, this allows us to develop a history of the typical failure modes of common types of machines.
We believe that a condition monitoring program is continuously evolving. As knowledge is gained on a machine, its operating environment and failure modes, the program should be adjusted to reflect this experience.

**Safety**
Monitek strive to achieve a high standard of safety wherever we operate. Since 1988, Monitek has incurred only one lost time injury. This has been achieved through a high level of safety awareness among all employees, strict adherence to the site safety rules and practices specific to each site and the use of job safety analyses for each new task.

**Monitek's Employees**
Monitek boasts a wealth of experience among its employees who are recruited based on both their maintenance experience and aptitude and their personality fit with a service culture. Our field technicians have all worked as maintenance tradespersons or engineers prior to joining Monitek and have felt a desire to utilise improved technology to address maintenance problems.
In general, we try and recruit high IQ personnel with maintenance experience who may not be suited to supervisory or management roles and whose career paths are therefore truncated in a classic maintenance environment. Working with Monitek provides them with a career progression in a higher level technical role.

**Structure of Pricing Schedule**
Monitek's current contracts are generally based on:

- An annual Lump Sum price for wear debris and vibration surveys based on an agreed program of equipment to be surveyed and frequencies
- Hourly rates for additional adhoc work for vibration, oil and grease analysis and NDT including noise measurement, thermography and structural inspections. An hourly rate for travel time, inclusive of vehicle costs.
- All expenses such as accommodation and meals at cost plus 10%

All Monitek's employees are employed under staff contracts with overtime paid at single time rates. Therefore all work undertaken by Monitek, whether ordinary time or overtime, is charged at a fixed hourly rate.