

# Condition Monitoring – always a painful experience?

## Patented VIBCODE® offers unmatched simplicity & total trending reliability

It is a pretty fair bet that of the 10,000 or so engineers who read this edition of the plant engineer, 50% or more have at some time considered the merits of condition monitoring of their process plant. Many of these will have taken the plunge and invested in the technology, and sadly a fair percentage of these investors will be disappointed with the results they have had from their investment. It has become an industry joke that many expensive vibration analysis systems, purchased with high hopes have become very expensive door stops.



This need not be so however, vibration analysis, data collection and machine condition monitoring are sound engineering strategies for preventing premature machine failure and plant shut-down. The systems themselves invariably do the job for which they were designed, it is what comes between the system and the process machinery that has all too often cast doubt on the validity of using condition monitoring.

Many factors contribute to the evolution of systems from active to 'door stop'.

- Changes in personnel, frequent changes in designated data collectors leads to errors and mistrust of the data collected.
- Inadequate investment in training, companies are often reluctant to commit to ongoing training of staff each time a person leaves.
- Wrong data being collected from the wrong location, simple errors caused by untrained or uninterested personnel can lead to plant shut down or worse.
- Over complex systems purchased for simple monitoring tasks, over selling and over enthusiastic purchase of systems not suited to plant personnel or process plant.

There is one common link to most of the above problems; the user interface between systems and the machines on plant.

### You only get what you collect

It is a simple problem but so common it is most often overlooked. The data collected is only as good as the person collecting it, the saying 'garbage in - garbage out' is never more apt for data collected by unqualified personnel. This doesn't necessarily mean that routine data collection should be carried out by vibration experts, but it does mean that either the

system used or the person collecting the data can perform key measurement tasks that ensures the data collected is valid and repeatable from one measurement round to another.

Common sense perhaps but this is the rock upon which so many CM systems have floundered in the past. Simple details such as;-

- Is the correct measurement being taken at the correct machine?
- Is the measurement location correct as specified?
- Is the contact between measurement transducer and machine the same as previous measurements?
- Is the correct transducer being used?
- Are the correct measurements specifications set up in the data collector being used?

Common sense tells you that if any of the above are incorrect then the data collect-



ed will inevitably be invalid. At best measurements need to be retaken, at worst major machine problems will be missed, or plant unnecessarily shut down because of false alarms.

But how in the ever changing world of work can you guarantee continuity of labour and therefore reliability of data collection, short of hard wiring all machines back to a central processor? Even if



you can overcome the vagaries of machine location etc. the variations in contact pressure of transducer to measurement location between different personnel makes data collected in this way very difficult to replicate and therefore to rely upon.

Plant critical decisions can often turn on such invalid machine data.

Proper training of personnel is of course very important, but from time to time

The picture above shows data collection using the VIBCODE® encoded stud system.

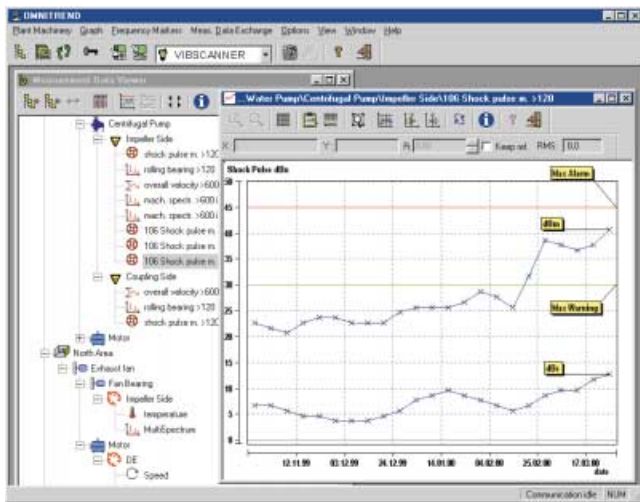
The picture left shows the VIBCODE® encoded stud and code ring.

people leave, they go on vacation, they are away sick. These are the times when the CM regime is most vulnerable and as a consequence error prone.

Manufacturers of CM systems have understood these problems, they have variously used bar code readers, machine measurement studs and even electronic tags to help identify machines. All the solutions work to some degree. The bar code and electronic systems eliminates machine and measurement location error, but does not address the problem of

fixed to virtually any machine in any environment.

When data has been securely collected the process of archiving and trending the machine condition can be undertaken with confidence. It is the latter function 'trending' that will provide the most reliable condition overview of the operating condition of the plant. Snapshot readings taken in isolation can assist in establishing if a machine is operating within reasonable vibration parameters, for example using ISO standard 10816-3 to com-



Typical trend data collected on a rolling element bearing. Upper trend line shows lubrication condition, lower trend line shows overall condition.

consistent measurement contact pressure. Studs on the other hand address this problem but do not solve machine location error. Only one system currently available addresses all of the potential data collection errors.

VIBCODE® developed and patented by PRUFTECHNIK uses an encoded stud which is either glued or screwed to a machine measurement location. The special encoded ring in the stud corresponds to machine data which is down loaded from the data collector PC software for each data collection route. When the measurement transducer is locked on to the stud all machine measurement data is recognised including

- Machine asset number
- Measurement location
- Measurement type and parameters
- Time and date of measurement
- Previous measurement readings
- Preset alarm parameters

Data collection is rendered fool proof, it is impossible to collect incorrect data. Additionally when measurement alarm parameters are exceeded the data collector is triggered to collect vibration spectra automatically for later analysis by the plant expert.

By encoding the measurement stud the location is effectively finger printed with a unique location code, the stud being purely a mechanical component can be

compare the machine condition against ideal. But a snapshot is exactly what it says, it takes no account of long term operating condition, does not include for unusual plant operating conditions and does not take machine age into account.

### **Trend data provides early warning of problems**

A trend graph illustrates very clearly the machine condition, if it is deteriorating over time the trend will show an upward tendency, giving engineering time to schedule machine shut down, order spares and minimise plant shut down disruption. When increasing trends have been identified it is recommended that the frequency of measurements are increased, this will minimise the unexpected machine failure rate and provide a more reliable run to failure estimate of the life of the machine.

If basic rules and common sense is applied to condition monitoring practice, the operation of an effective CM regime will be an enjoyable and profitable experience for everyone.

For information on the VIBCODE® system and other CM products contact

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