Wine Conference and Exhibition New Zealand 2008

"Improving Winery Performance"

ABSTRACT

This paper discusses the background to a condition based maintenance strategy and how this can successfully run in the Marlborough area; with its low population, limited industrial development, limited awareness of condition based maintenance practices and...an ever expanding wine industry.

To-days maintenance practices and maintenance theory has been around for thirty years.

- Preventative maintenance, planning and scheduling, work management, CMMS and programmes.
- Predictive maintenance
- Root cause analysis
- Risk potential matrix analysis
- Failure mode effect critical analysis
- Reliability centred maintenance
- Asset life cycle costs
- Reliability condition based maintenance strategy

There are no secrets for modern maintenance practices used worldwide. They are well researched and well known.
Today's Global Reliability Practices are focused on the integration of Computer Maintenance Management Systems (CMMS) and a condition based maintenance strategy.

These maintenance practices and strategies have primarily developed and evolved in the highly industrialised economies, in particularly the American, Japanese and European countries of high populations and industrial resources.

New Zealand has a low population and relatively clustered industrial capacity.

How should the New Zealand wine industry apply these practices and models?

KEYWORDS

Reliability, condition based maintenance, commissioning plant to specification, vibration analysis, laser alignment, thermograph, digital imaging.

AUTHOR DETAILS

W.R. (Bill) Sinclair: Principal of VALAS Ltd, providing engineering services for reliability condition monitoring and condition based maintenance programmes

The Resources

Who we are;

- Population of some 4.2-million.
- 1.6-million are working.
- 1.2-million are working fulltime
- South Island around 1-million of which some 250,000-are working fulltime
- On average we work some 1814-hours each year (top three in the OECD)
- 21st Century economy, a stable democracy, a strong work ethic.... and an almost ideal climate range

The Standards

*..."the **collection** and **interpretation** of data suitable for quantitative assessment of equipment and component condition for the purpose of instituting and conducting condition-based, predictive maintenance programmes"*

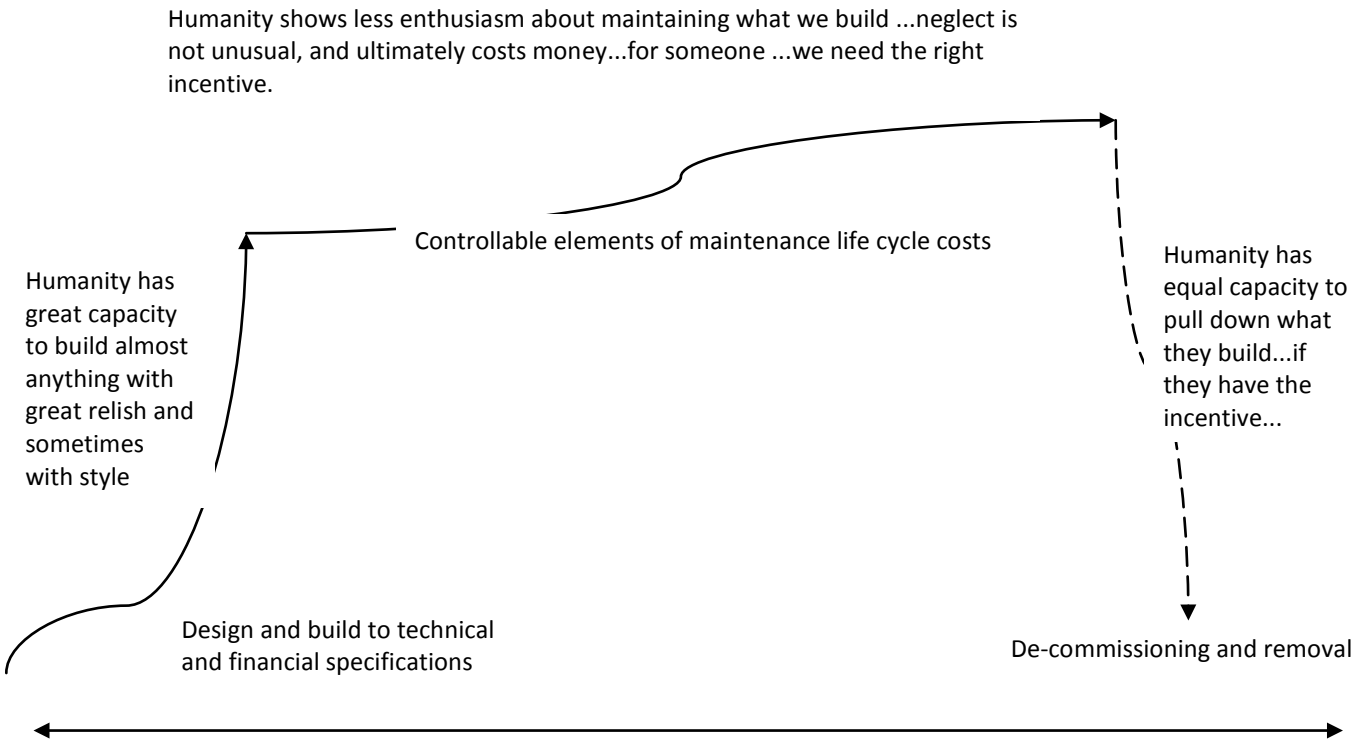
...VDMA, Workgroup on Condition Monitoring, Hannover 2005.
...VDMA, Arbeutskreis zum Gemeinschaftsstand CM auf der Hannover-Messe 2005

..."the basic document which describes the general requirements for evaluating the vibration of various machine types when the vibration measurements are made on non-rotating parts. This pare of ISO 10816....
Part 3: Industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15 000 r/min when measured *in situ*

ISO 10816-3: 1998(E)

"Humour and no PowerPoint is the secret of success. If you want to look at pictures, go to an art gallery"

Daniel Thorniley. 2007



Condition Based Maintenance

Design and Build to Financial and Technical Specification

- Asset commissioning baseline condition data is *critical* to Condition Based Maintenance
- Asset register, asset worth, asset identification, component identification, P&ID's, functional tests
- Commission plant to specification and industry standards (alignment & vibration).
- Performance tests...the list goes on...

Controllable elements of maintenance life cycle costs

- Condition based maintenance
- ...maintenance based on condition *risk* analysis (not time based)
- Non-intrusive data collection to determine machine and structure condition
- Safely look listen and feel
- Vibration analysis
- Lubrication schedules and analysis
- Thermography
- Digital imaging

De-commissioning and removal

- The Resource Management Act

All that happens – comes from the process

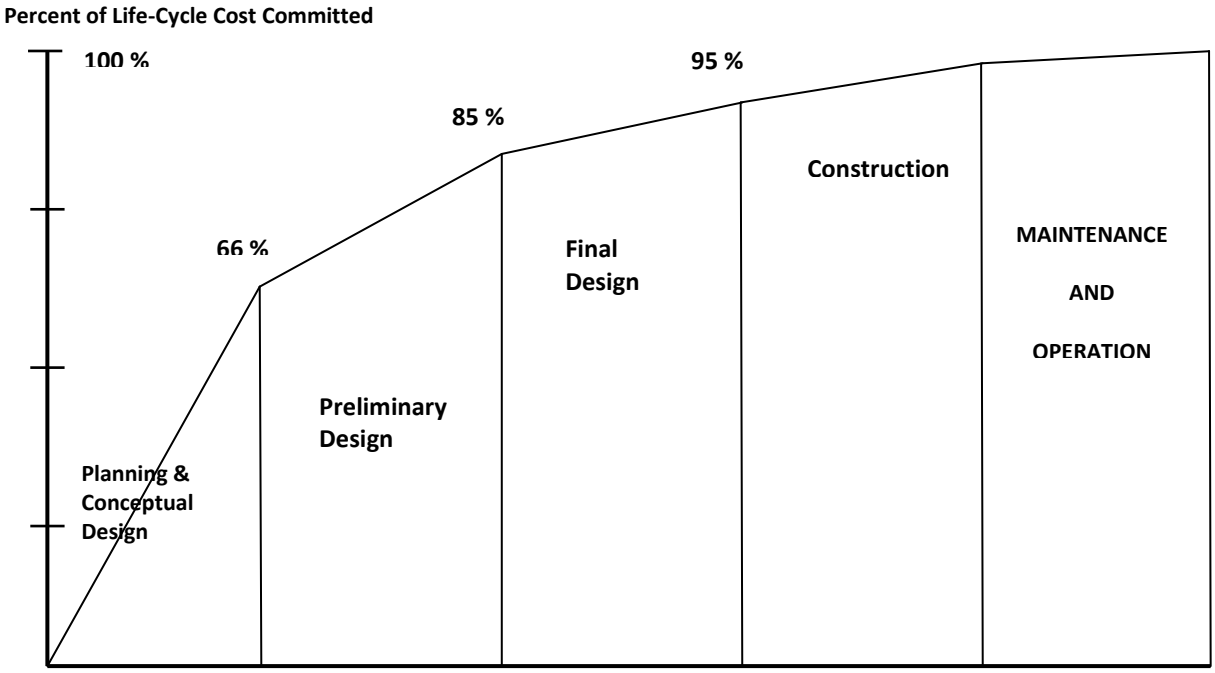
- *The process is perfectly designed to deliver the results you are getting*
- *If you want different results – improve the process*

W. Edwards Deming
"Out of Crises"

From;

"Making Common Sense Common Practice"...third edition by Ron Moore (p.110)

(Models for Manufacturing Excellence)



Life-Cycle Phases

Source: Ben Blanchard, Design and Manage to Life Cycle Cost, MA Press, Forest Grove, OR.

Blanchard; ...while expenditures for plant and equipment occur later in the acquisition process, *most of the Life-Cycle cost is committed at preliminary stages of the design and acquisition process.*

The subsequent design and construction phases (which include the detailed specifications) determine an additional 29% of the life cycle cost, *leaving approximately 5% of the life-cycle cost to be determined by maintenance and operations.*

Further, it was also reported that some 60% to 75% of the life-cycle cost is associated with maintenance and support, with the balance of 25% to 40% being the initial acquisition of the asset.

Moreover, this does not even include the value of lost production from poor design decisions. While this same pattern may not occur for specific operating plants, the point is well taken that design and installation efforts can have a dramatic effect on life-cycle cost, something known intuitively to most of us.

What should this mean in terms of our practices?

Clearly, preliminary design efforts should include *all* the project costs, *not just the initial costs.*

More recent benchmarking efforts, which surveyed some 60 major corporations and some 2,000 large capital projects, have reached similar conclusions regarding typical performance.....

Clearly, the decision to address reliability and life-cycle cost is best made during the *planning and design phase.*
When decisions regarding these issues are made later in the life cycle, the return on investment decreases as plant problems reduce equipment availability and product capacity.

14 Points by Deming

1. Align the aim of maintenance with the greater aims of the company or organization and make sure everyone understands and supports that aim.

2. Adopt a new philosophy of proactive reliability and teach it to your employees, suppliers and customers.

3. *Cease dependence on reactive and time based maintenance.*

4. End the practice of "low bid" purchasing and use total life cycle cost to calculate value. Move to single suppliers for key purchases of products and services.

5. Improve constantly the system of maintenance, planning, scheduling and any other activity. This will improve reliability and productivity will also decrease cost.

6. Institute skills training.

7. Adopt and institute leadership for the management of people, recognizing their different abilities, capabilities, and aspiration. The aim of leadership should be to help people, machines, and gadgets do a better job.

8. Drive out fear. Create a trust-based work environment to foster effective contribution from everyone.

9. Tear down virtual walls between maintenance & operations, maintenance & purchasing and maintenance & management. The entire company is one system and must work as a team to accomplish the aim of the system.

10. Eliminate the "program of the day" for maintenance improvements and tear down posters with catchy slogans that do not match what actually happens on the plant floor. Such exhortations only create adversarial relationships, as the bulk of the causes for low reliability belong to the system and are beyond the power of the workforce.

11. Eliminate management by Key Performance Indicators (KPI).Use them to gain knowledge *but substitute leadership for management by numbers*.

12. Allow people to enjoy their work and take pride in workmanship.

13. Institute a vigorous program of training and self-improvement.

14. Put everyone in charge of change –it is everyone's job.

W. Edwards Deming
Circa.1950-80

Commissioning;

Absolutely critical that pre-commissioning and commissioning baseline data is collected and evaluated against design specifications e.g. performance, hot / cold alignment, vibration spectrum data and analysis and much more...

Commissioning costs (per machine); (disbursements are not included)

<$200 (~ 1% of a medium sized motor-compressor installation)

12-month vintage cycle;

Minimum of 4 x data collection and analysis (more likely 6 x)

Annual Reliability Condition Monitoring (RCM) costs;

<$5000 (large winery (5 + units) $500 to $750 per RCM survey)

The Challenges in Marlborough

- Awareness of condition based maintenance
- Awareness of the resources available

We need more emphasis on “Leadership” and “Common Goals”.

We have small critical mass – not quite the flea on the elephants back – but close?

This is an advantage – use our skills and resources for “Trade”

In October and November 2006, Aberdeen Group and Reliabilityweb.com conducted a study of over 300 companies

• *The study related to importance of service and maintenance activities in asset intensive industries (Answered by maintenance and operational executives)*

KEY BUSINESS VALUE FINDINGS

Nearly half of all survey respondents report the same common challenges in improving asset maintenance including:

• Insufficient data available on asset performance and service history.

• Management does not see maintenance as a top priority

• Disjointed, nonstandard maintenance processes prevail

KEY BUSINESS VALUE FINDINGS

• Best-in-class organizations reap substantially larger benefits from improved maintenance practices than do average and laggard establishments, including:

• Significantly improved asset reliability

• Greater asset uptime and availability

• Lower costs of servicing assets

• Fewer unexpected downtimes and outages

• A higher return in invested capital.

All that happens – comes from the process

- *The process is perfectly designed to deliver the results you are getting*

- *If you want different results – improve the process*

W. Edwards Deming
"Out of Crises"