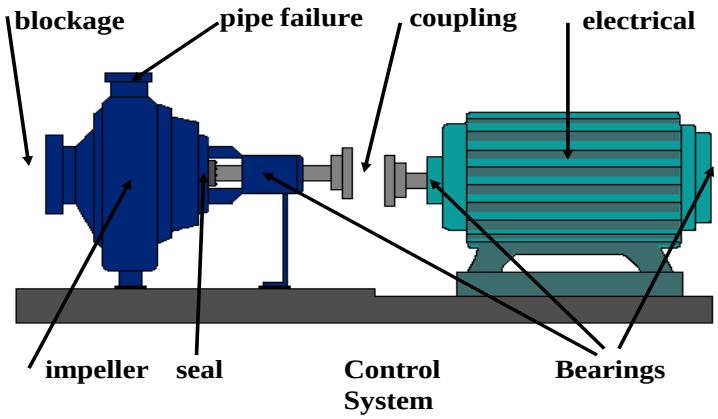
PWW P (+61 8) 9457 6297 E info@plant-wellness-way.com

How Plant Wellness Reduces Failure Rates and Maintenance Costs

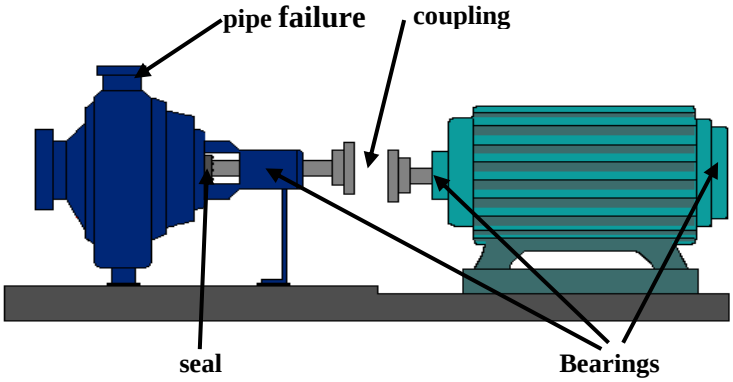
Let a Plant Wellness Way EAM System-of-Reliability End Your Business Risks Forever

The focus of maintenance should be upon maintaining the 'wellbeing' of the plant and equipment. When the task becomes to 'fix the machine,' then maintenance has failed in its basic mission.

Many current maintenance strategies involve significant wasted effort; scheduled intrusive actions on 'healthy' equipment, and condition-based activities based upon "How **might** my machine fail?" An operating asset is a system of various assemblies working as one, all of which **could** fail. The pump set in the image below could fail in as many ways as its assemblies could fail.



When the question is asked, "What failures is my asset/system **actually experiencing**, the answer will be...



...fewer than those that MIGHT happen!!

The maintenance undertaken to care for operating equipment arises from:

1. Core maintenance activities as defined by the equipment design.
2. Core maintenance activities as defined by the operational process the equipment is used in.
3. Additional maintenance activity resulting from premature equipment failure.

Unexpected failures incur other costs or losses—such as lost production, diversion of planned maintenance resources, loss of reputation, penalties for late delivery, etc. The defect and failure true costs are usually very much greater than the actual repair costs of the failure.

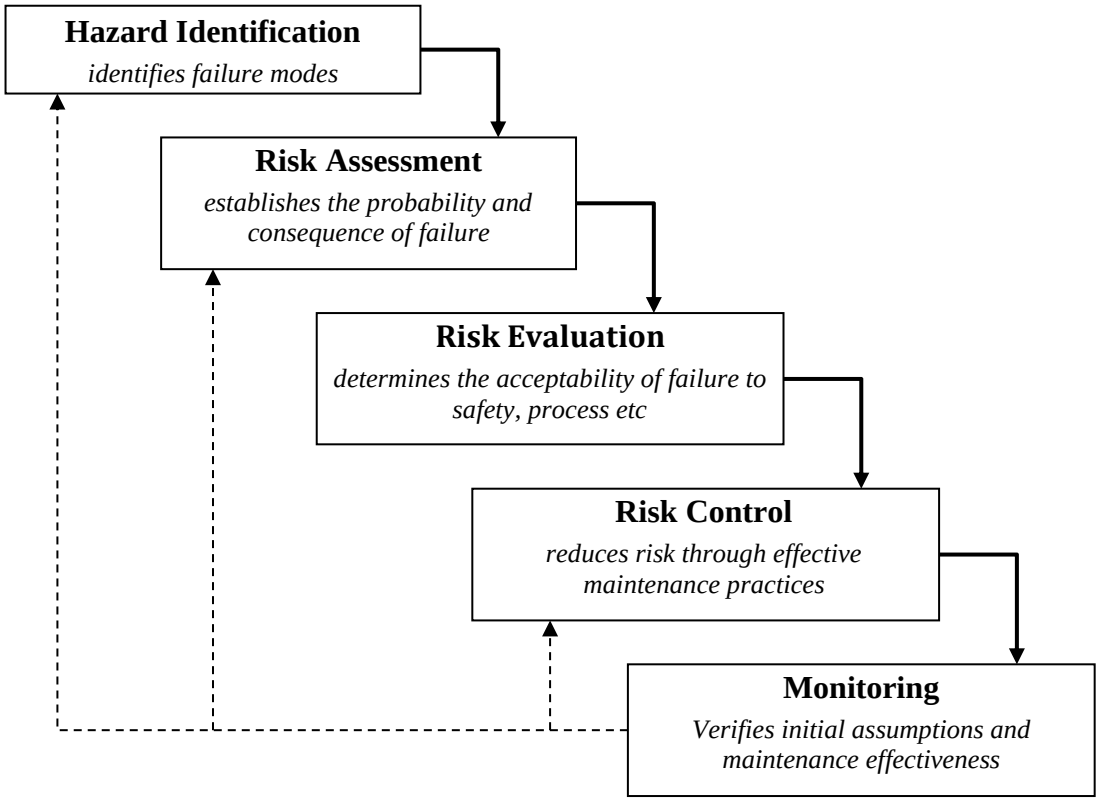
Maintenance is a Risk Control Activity

Risk as applied to maintenance is seen by some as a maintenance methodology in its own right. However, within any other methodology risk and criticality is an essential element and must be considered with regard to the management of safety and commercial risk.

- Risk = Probability x Consequence

The requirement to consider risk/criticality cannot be left undone because the cost of a failure event should it occur may put life and the business in great danger. The expenditure of maintenance dollars on risk management (e.g. condition monitoring, process control, etc) should be directly related to the probability and consequences of failure. This is a very significant decision point in the management of maintenance expenditure!

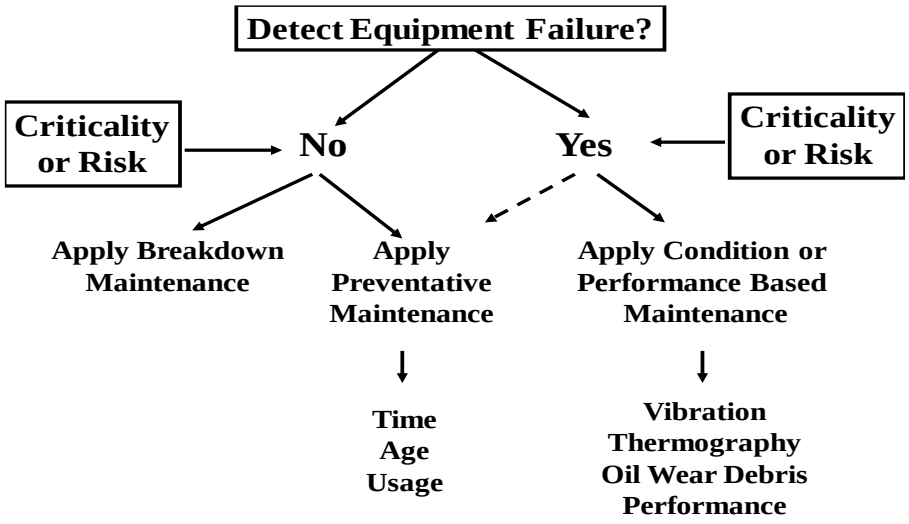
Risk assessment follows a well understood methodology that can be applied to all risk based situations.



The Application of Risk Based Principles to Maintenance

Often reasonable judgements based on experience can be made without the rigour and expense of exhaustive failure modes analysis. Sometimes, however, a formal risk assessment must be made and decisions made based on those outcomes.

The risk review approach commonly taken is to identify the possible ways in which an item of equipment may fail. Then depending on the equipment criticality consider if it is possible to detect and measure the failure process developing (from which the condition monitoring arises), or consider the previous failure history and use 'hindsight' to identify if age or use leads to failure (from which the preventive maintenance arises). Those failures that have no operating, safety or environmental consequences are allowed to run-to-failure and repaired.



The decision tree above is typical of the maintenance activity selection processes generally used across industry. If the answer is NO then depending upon the Criticality or Risk either Planned Preventative or Breakdown Maintenance will be applied.

If the answer is YES and the Criticality justifies it then Condition Based Maintenance will be applied. If the answer is YES but Criticality does not justify it then Planned Preventative or Breakdown Maintenance will be applied.

The approach thus far requires that every item of plant (system, machine, component) be reviewed, criticality considered, and a decision made on the maintenance it will get—Repair-on-Failure, by Scheduled Replacement, or Condition Based failure detection.

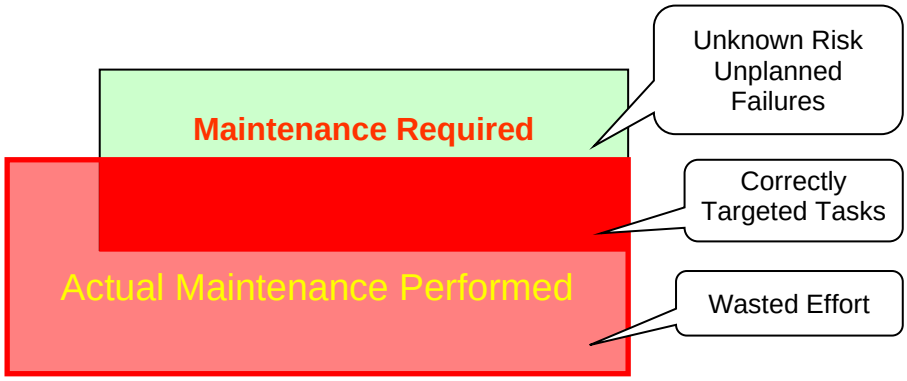
In most operations the maintenance actually performed is aimed at failure detection (condition monitoring) and failure correction (repair before failure). This produces maintenance activities that are focused on the equipment's current condition but these activities are not effective in preventing the maintenance arising in the first place.

The Failure Prevention Focus of Plant Wellness

The Plant Wellness Way takes a different perspective to protecting plant and equipment—it asks what needs to be done with the equipment so that there are no operational risks in the first place? Now the risk assessment is used to identify the necessary risk management that must be introduced throughout the life cycle to ensure the least operational risk when the equipment is in use.

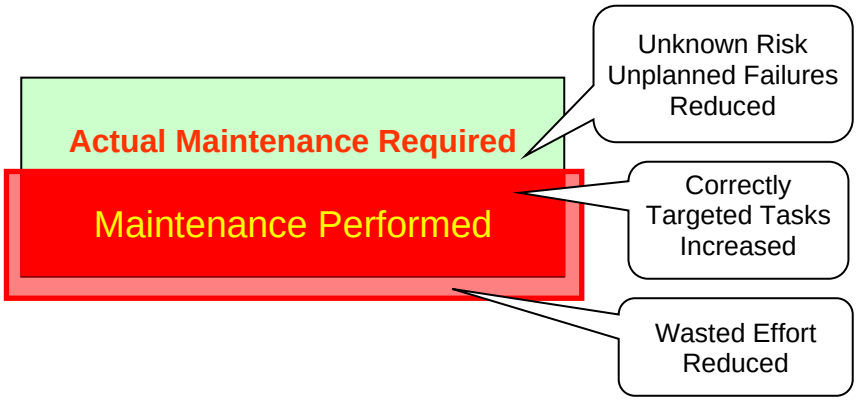
By taking a life cycle risk elimination philosophy we end up doing the right maintenance and operational activities that truly match the risk management required to get outstanding operation plant performance.

Because maintenance strategy developed from the normal approach used in plant and equipment risk analysis primarily focuses on failure correction, the maintenance that is eventually performed and the maintenance activities actually required to prevent risks arising are mismatched.



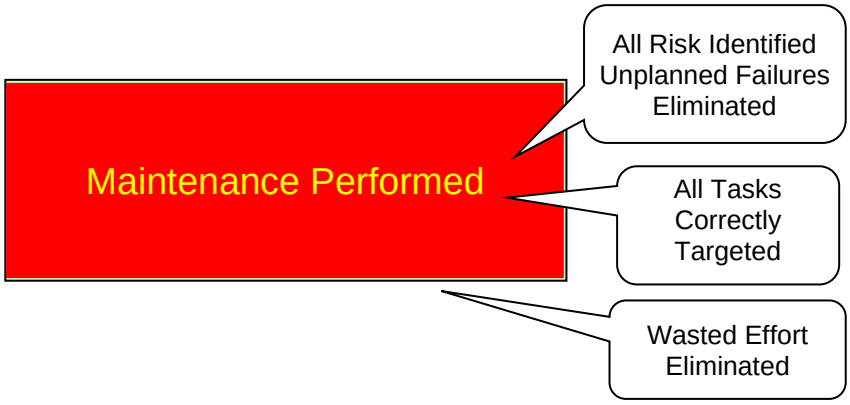
But by targeting on the risks to operating plant and equipment wellbeing...

We can reduce wasted effort.



Then going a stage further and focusing on defect elimination across the life cycle...

We use maintenance to prevent the real operational risks.



My best regards to you,

Mike Sondalini
www.plant-wellness-way.com

Thanks to Peter Brown from Industrial Training Associates for the use of his concepts.