DETERMINING CONDITION BASED ASSET MANAGEMENT STRATEGIES
PART 2 - DECISION MAKING

A friend once said; "We are drowning in data but starving for information". Organisations gather huge amounts of data on assets and their condition but not many are able to effectively turn the data into useful information. This seemingly simple step underpins the basic principles of a Condition Based Asset Management Strategy as it is this information that allows an Asset Manager to make decisions on assets. The challenge is now what to do about it and how to make subtle improvements that allow you to take a step forward in improving your processes.

by Kerry Williams, K-BIK Power Pty Ltd

In the Part 1 of this series of articles I challenged you to look into your organisation and the asset management strategies for condition based maintenance and monitoring. If you did I feel sure you would have found some gaps and that is normal. In fact, there is no perfect solution and we can always find gaps and better ways to do things so don't be surprised.

WHAT MUST BE DONE

Let's take a look at one part of the process I suggested in the last article - the step in the process is "Determine Actions needed on an Asset" and the inputs and outputs to that step as seen in Figure 1 below. The reason for choosing this is simple. No matter how much data you have and how much analysis you do the one common output is a decision on what must be done. That decision may well be anything from "do nothing" to the other end of the spectrum - "replace the asset". Whatever the decision it needs to be based on factual information and have defined outcomes for the asset. The following sections break it down into components and discuss what may happen inside that component of the process to allow the correct decision to be made.

PROCESS INPUTS

To state the obvious; with any decision one must input the right type of information that allows the decision to be made. Additionally, there can only be a limited number of options for any asset decision. When it comes to assets in an electrical network we can limit the options to four general decisions; do nothing, do minor maintenance, do major maintenance or total replacement. Everything you do with an asset will fall in under one of those areas. By looking at what the inputs are we can determine the most appropriate decision for any given circumstance. In the process chart the inputs are the output of "Develop Asset Condition Database and Analysis" and the "Field Feedback". The latter is important as the first hand information from filed staff can guide the Asset Manager to a cost effective decision and may change the priority of the decision. The Condition Database and Analysis step is where an organisation needs to develop a way of storing all the asset condition data, analyse it and provide the decision maker with factual asset condition information. I must point out here that data is not necessarily information and when it comes to network assets you can't have one without the other or you will not be able to confidently make the right decision for the asset.

REVIEW AND IMPROVE THE DATA

The type of data gathered can be basic or very complex and each organisation gathers different levels of data to get the information needed for making decisions. It is important to note that you need to align your data capture with the business drivers and you need to be able to quickly adapt to a changing business environment. This subject is too complex to explore here but it has a simple principle - as your business changes or matures you need to review and improve the data you capture to align it to business objectives or changes in asset management strategies. It does not mean you need to cut back on things, it is more that when there is a business or a market change then your decisions need to change accordingly. An example in the electrical industry would be when the market drivers change from high reliability and capital growth to low growth and moderate reliability, this demands a strategy change to how the asset performance is managed.
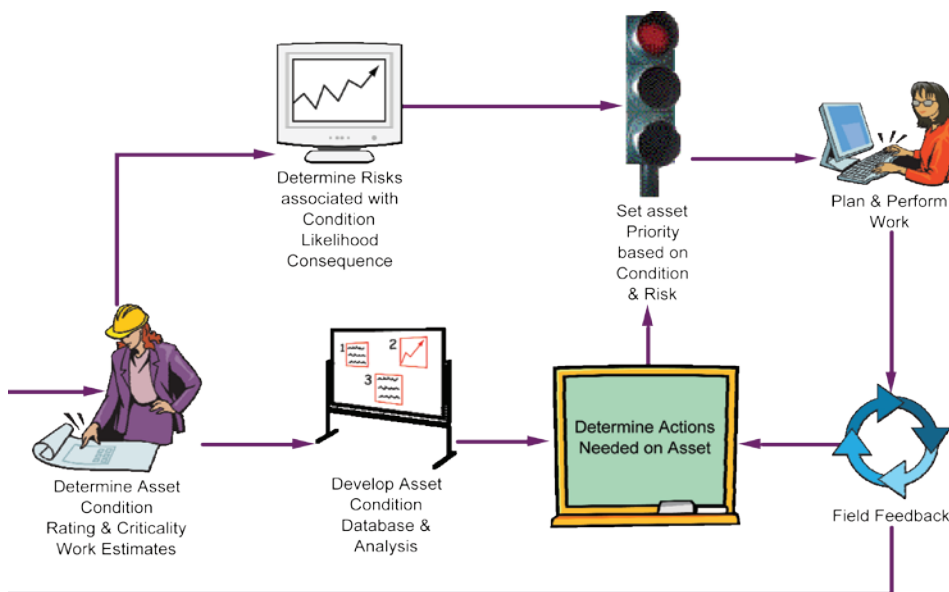

Figure 1 *Extract of "A Typical Asset Management Process using Condition Monitoring and Risk Evaluations"*

WHETHER IT IS ACTUALLY IMPORTANT

As the process input is the information extracted from the data, it would be remiss not to mention the importance of having a robust data analysis methodology. Many organisations tend to use some form of Health Index (HI). This allows them to rank their assets according to the condition. This HI approach allows a quick focus on assets that have a bad or poor HI. Whilst that is a good thing, it needs to be used appropriately as with all captured data - rubbish in = rubbish out. So again assessing the business needs and what data is required to make a specific asset decision can be tricky. Some HI's raise a red flag about a condition that has no fundamental impact on the asset's performance but as the weighting is not balanced in favour of system performance defects over minor functional defects then the asset will show up falsely as in bad condition. Therefore, when setting up a HI consider what is being monitored and whether it is actually important to the real performance of an asset and if left unattended could render that asset as inoperable or would have no impact.

PROCESS OUTPUTS

The key here is to have outputs which are decisions made on a number of assets and their conditions as they are inputs to the setting of the priorities for the assets when mixed with the asset risk profile. It can be somewhat difficult for Asset Managers to make the decisions solely on condition and ignore the risk factor until the next step in the process. If they do not ignore the risk they are likely to subconsciously influence the decision and so the final priority list is not necessarily the optimum. It is difficult to achieve but when done correctly allows the final output to the planners to be in a priority that optimises the maintenance expenditure across all assets.

KEY PERFORMANCE INDICATOR

How to make the right decisions is again very much organisational based, however if the asset has a key performance indicator that if left unattended will eventually have a significant impact on the asset then it must be addressed. This sounds like a contradiction to the above statement of ignoring risk and in some respects that is correct. When it comes to asset condition, there are a number of conditions that seriously impact the system performance and these need to have a weighting higher than those that have little or no impact. As an example on a transformer, the increased tapchanger resistance is far more important than the deteriorated paint finish. So why would you spend a good deal of money painting the unit when it will not change the system performance of the unit? Now if the paint deterioration and some subsequent corrosion was likely to create a substantial oil leak then it may well be increased in priority for correction. Once all those decisions are combined with the asset risk criticality the planners can then see which assets need the highest priorities for correction.

It should also be noted that it is not always possible to address all the major issues that have a high priority. It may also be prudent to allocate funding to address many of the minor issues as these may be quick wins that do not need a lot of labour, planning or outage time and so can be very cost effective to fix. Many utilities are at the mercy of seasonal constrains where outages are very difficult to achieve, this allows those minor low risk, low performance impact issues to be addressed. In short, it is always a delicate balance between condition, risk, availability and cost.

CONCLUSION

As has been mentioned many times in this article the key to making the right decisions on asset maintenance is to have the right information available. The way to have the right information is to have the right condition data to analyse and factual information fed back from the field. I have explored a few basic principles in the process here to give a general overview of the process links. I want to challenge you to look within your organisation and ask the question "Do we have the right information to make decisions that allow us to optimise our OPEX and have a high impact on improving our asset performance?". If you can say yes and clearly show the ability to achieve this then your business has a robust and mature process. If not, then you need to perform a gap analysis and understand where improvements can be made.

In the next article I will dig into determining the asset condition rating and criticality as this under pins the way an Asset Manager makes a decision and how the risks of the assets can be determined. I will have some simple principles to assess asset criticality and how this can be used to determine what you need to monitor.