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Maintenance, Reliability and Asset Management - What's the

by Cliff Williams

Over the last few years, we have seen a number of changes in our chosen field. For many years, maintenance was the term used for all stewardship of plant and equipment. Then reliability centered maintenance (RCM) started to take off and this saw the advent of reliability, or to be more correct, the term reliability. There was a plethora of job adverts, articles and presentations at conferences that included the term reliability. The strange thing was that in many cases, the content was no different than when it was called maintenance!

What did start to happen was a drift towards the separation of tasks that needed to be performed under plant and equipment stewardship. Whereas for many years it was the responsibility of maintenance to ensure the best availability by using tools, such as failure analysis, root cause analysis and cost analysis, to identify those areas requiring improvement and then enacting solutions, these things started to become the responsibility of the reliability group. To illustrate, there was one organization looking for 70 reliability engineers across their plants and when asked where they thought they would find these people (as there hadn't been an increase in systematic or accredited training programs in reliability), the response was "probably from the maintenance department." When asked what it was they would be doing, it turns out

it would be many of those things maintenance manages have been doing for years. So for those of us who had been proactive and forward-thinking, there really wasn't much new, but for those who had been stuck in the reactive mode, reliability was the way out. So to define maintenance in one word, it would be: **FUNCTION.**

Maintenance

The advent of reliability certainly heralded a change in one important respect. Organizations came to realize that there was a better way of doing things than simply reacting. The reliability banner seemed to allow

more investment in finding solutions to plant and equipment problems. But one troubling thing at this time was that maintenance was quickly relegated to mean just fixing and doing, and for those of us who had been doing everything, that was now considered reliability. This was a little frustrating, if not insulting.

As with all changes, there were early adopters, some who held the belief that by adopting reliability, they would automatically get better. There was the search for the "silver bullet" and the "one stop solution," but people began to find that reliability didn't come without a great deal of effort. Some organizations started to use statistical modeling to help them with their approach and the term reliability started to become more common in those programs, which, although they helped promote reliability, sometimes they

Maintenance, Reliability and Asset Management

Difference?

took away the need for thought and deep understanding of the issues. Unfortunately, there were still those who did very little different from when they called it maintenance and obviously they saw little improvement.

Those organizations that started to embrace reliability in its truest sense began to understand there was much more to reliability than simply doing maintenance. In fact, they found that maintenance didn't even have the biggest influence on reliability. It came as a shock to find that when they carried out root cause analysis on their disruptions that maintenance was the root cause in a low percentage of cases. They were surprised to find that the inherent design had more influence and when they looked at the consequences of later changes to their process and production, they realized they were, in fact, inducing more failures. This also brought them to the realization that the operation of the equipment was as equally important as the maintenance of the equipment. They discovered that if they ran the equipment out of spec or above rated capability, they were reducing the lifecycle of the plant and equipment. There were organizations that took this to the depth of analysis, where they realized that simple process excursions were reducing the life of the plant and equipment; they understood that after many excursions, although the plant and equipment were returned to service, they were done so with a slightly less capability or life.

Reliability has taken hold of forums, conferences and the marketplace, and has

been the focus over the last few years. Yet it still runs the gamut from doing the same as maintenance to having solid cross-functional reliability groups. Those organizations that have come to realize that if we had to define reliability in a word, it would be: **OUTCOME**.

Design, Maintain, Operate

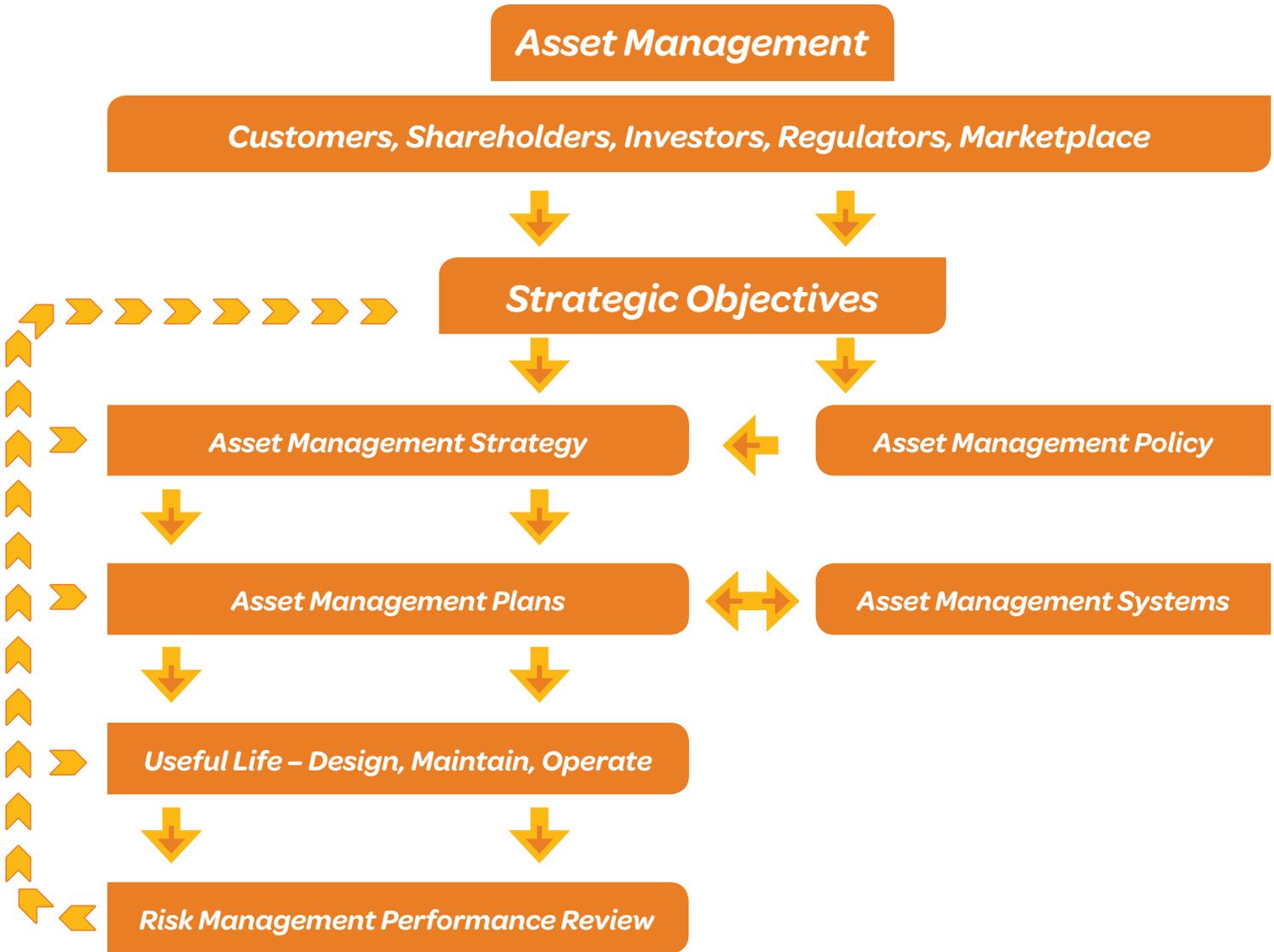
Just when we thought it was safe to go back into the water, that we had an understanding of all things maintenance and reliability, IT happens. The IT being asset management. This is certainly the new kid on the block; for many years, the term asset management was the property of bankers and investment advisors, but sorry that is no longer the case.

In 2004 in the UK, a new standard appeared: PAS55. This standard was born out of several North Sea incidents and some large

failures in UK infrastructures – water, hydro, railways – which had been owned and run by the government for many years, but had now been handed back to the private sector. There was concern that the new owners didn't have a systematic way of managing the assets they acquired, so the Institute of Asset Management and the British Standards Institution developed a standard that would serve as a guide and model. This standard was known as Publicly Available Specification 55 or PAS55 for short. The utilities and others in the UK were required to conform to PAS55 and when electric utility companies apply to the government to increase their charged rates, they would have to demonstrate their compliance with PAS55 before it is allowed. This was the start of asset management as we are beginning to understand it today.

PAS55 was revised in 2008, but one year earlier in 2007, even though PAS55 had seen significant adoption by UK, Australian and European infrastructures, it was realized that it was still a British standard. With no global standard available, the seeds of ISO55000

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were sown. So the question becomes, “What is asset management?” The quickest answer received from those working on the ISO standard was, “It’s not just managing assets!” In

delving deeper, it was found that early adopters seem to be consistent in their belief in what asset management meant, whereas later adopters seemed to have adopted different

slants, with some parts suddenly becoming the focus rather than the holistic approach described by the early adopters.

So what is asset management if it’s not just managing assets? Well, if we look at the definition of an asset in this context (ISO55000 definition): An asset is an item that has potential or actual value to a company. These assets may fall into different classes. They may tangible, which are the products you produce and the equipment you use, or intangible, which encompasses your reputation, image, social conscience, etc., or financial concerns, such as costs, investment and performance.

So from this definition, asset may or may not be a piece of equipment or a facility. Having just got our heads around the idea of viewing equipment not as equipment, but as a means of providing a function in RCM, we

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suddenly find we need to view it as a means of realizing value for the organization. To gain an understanding of what value means, we have to take a step back in the asset management process. At the very top of every organization are groups that will make demands of the organization. They may be customers, investors, shareholders, legislators and even the marketplace that the organization operates in. These demands, current and future, will be used to develop the organization's strategic objectives, or how the organization will operate, where it wants to be in the marketplace and what represents value in this context. The strategic objectives and the defined value drive down through all aspects of the asset management process. In fact, the best definition of asset management may be the one that describes it as the means for enacting the strategic objectives or business plan.

Feeding out of the strategic objectives are the asset management strategy and the asset management policy, with the policy also feeding into the strategy. The policy describes the

This leads to the asset management plan, which gets more specific about the activities that will be carried out to meet the strategic plan. The asset management plan specifies how the management of the general infrastructure of physical assets will be carried out, with clear reference to levels of service, desired outcomes and finite time frame. It details any new investments, any disposal of assets, what level of operation and maintenance is expected, any combining of assets, and what training and education initiatives are required to meet the strategic plan.

Parallel to the asset management plan is the development of asset management systems, required to enable the process to flow to achieve strategic objectives. These asset management systems include strategies and systems to manage asset information, general data and knowledge management. These strategies and systems detail what is to be included, in what format, at what level and where it will be stored. This will ensure consistency and appropriateness of information that relates to the achievement of the strategic objectives. It will also guide the

believe that they in fact contribute, then they will form a solid foundation to build on.

The last part of the asset management process is risk management and performance review and improvement. Taking place here is ongoing risk analysis and performance management based on many criteria, ranging from environmental to operational to regulatory to sustainability to financial to organizational in the context of strategic objectives. The result and impact of these is fed directly back to all levels of the organization, up to the strategic objective level of the organization and into any specific asset management system that might be impacted, and so the process starts again.

You may notice one important part of the asset management process missing and that's typically known as the useful life or lifecycle phase. That's because there is not a great deal of difference to what was presented in the reliability section. We design, acquire, commission, maintain and operate using the same sort of tools and techniques. It is still important that the rights tools and techniques are used to ensure the reliability of the equipment. What has changed is the context in which these things are done – it's done from the realization of value context. We may not simply keep maintaining and operating equipment to extend the life of an asset. We may decide that it is not really a value proposition and replace or dispose of it. Whatever we do, it is done in the context of providing value to the strategic objectives. We are able to do this because there is a clear line of sight from top to bottom. The other change is one that those who operate in the useful life phase will benefit from, as the design and impact of their efforts will be considered in many more parts of the organization and their influence will be far greater than it's ever been.

This article was not meant to explain all the complexities that come with the change to asset management, rather it was meant to demonstrate that maintenance is not reliability or asset management. Maintenance is only part of reliability and reliability is not asset management, it is only part of asset management and asset management is more than managing assets. So to define asset management in one word is difficult, but a two-word definition is: **OPERATING PHILOSOPHY**.

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commitment of the organization to fulfill the strategic objectives and is similar in approach to the safety policy seen in facilities today. The strategy describes what and how it intends to attain based on the policy and strategic objectives, which introduces an important aspect of asset management – line of sight or alignment of purpose.

One of the goals of the asset management process is that everyone in the organization will be able to identify the reason and impact of what they do in relation to the strategic objectives. The only way this is possible is if the thread is maintained through each level of the process. The strategy takes into account current and future demand and the ability of current assets to meet this demand so that any balancing, disposal, or investment of assets can be clearly planned. Coming out of the strategy, there needs to be a strategic plan that describes the framework that will deliver the strategy and include the constraints and criticality of costs, volumes, capabilities, etc.

way information and knowledge is maintained through to the shop floor, again in demonstration of line of sight or alignment of purpose. This is the area where development of systems to ensure correct competencies, ongoing knowledge retention and behavioral norms takes place. Any changes to the organizational structure due to changes in demand or objectives is controlled through asset management systems, as well as ensuring the correct culture is in place to achieve the strategic objectives. An understanding of how an organization needs to behave to allow everyone to contribute to the strategic objectives is critical and will differ from organization to organization. However, if the line of sight or alignment of purpose is maintained, expectations and communications are clear, and all can



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