



ASSET MANAGEMENT COUNCIL



# ASSET MANAGEMENT CONCEPT MODEL

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# Introduction

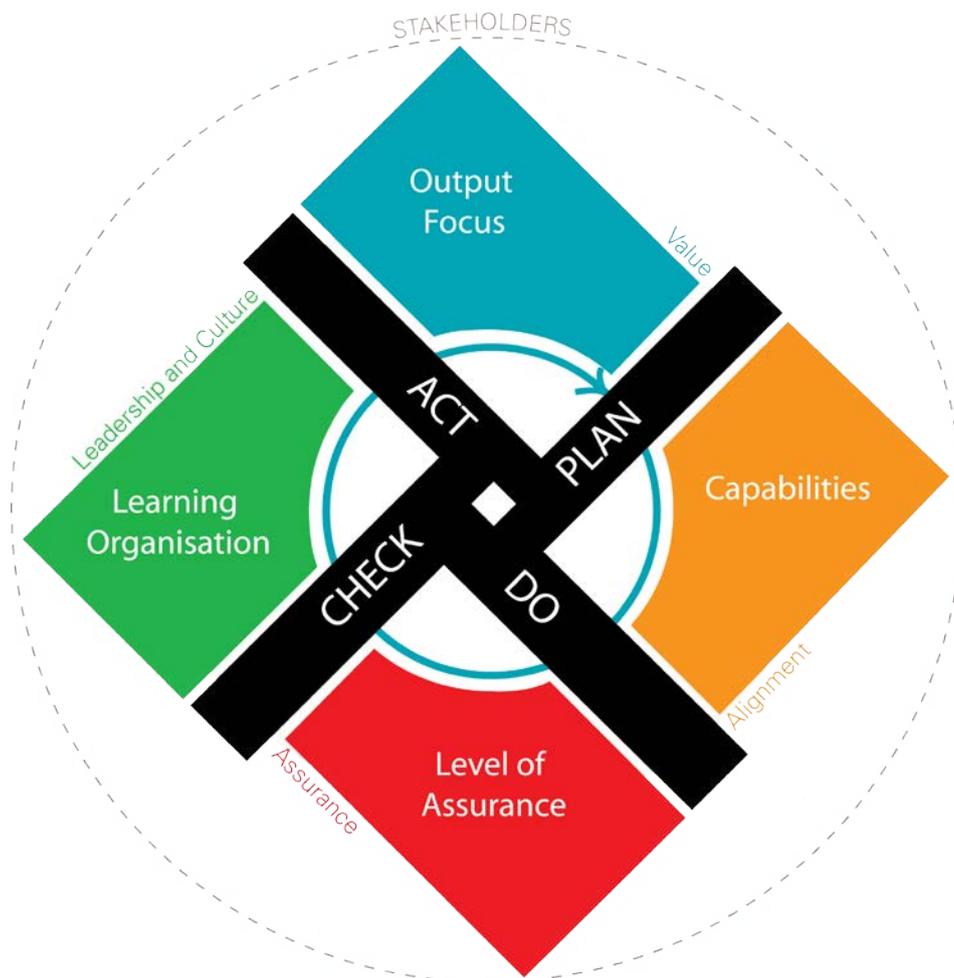
Asset management is more of an art than a science. That's not to say there aren't significant technical elements to it, or that the gathering of data on assets isn't a key factor in AM. But ultimately, someone has to make a decision based on that information, and that's where conceptual models are helpful.

The decisions made by asset managers should reference one important question: What is it that the stakeholders want this asset to do?

If the organisation's board expects a profit of 5.5% annually, and the asset returns 3.2%, then the asset is not realising its full value. If a rail company must deliver 88% of its scheduled services to within five minutes but is managing only 73%, then the asset has failed its stakeholders.

This dependence on stakeholder expectations is the reason the Asset Management Council's Asset Management Concept Model is shown operating within the circle of stakeholders.

## Complete Asset Management Concept Model



The model describes how the complexities of asset management can be broken down into related parts. Although simple in theory, this conceptual model forms the basis of all our complex thinking about asset management.

In this eBook, we'll examine the model's parts and find out more about the processes and principles that it represents, while giving examples from actual asset management cases and hearing from asset management professionals.

# The Plan, Do, Check, Act Model of Process Improvement

The diagram of the Asset Management Concept Model shows four processes as part of an ongoing cycle for improvement – Plan, Do, Check, Act.

Each process is also embedded with a set of principles – Output Focus, Capabilities, Level of Assurance and Learning Organisation.

But first, let's look at the four processes.

These are based on a learning and improvement cycle developed by **Dr Walter Shewhart**. Shewhart is known as the father of statistical quality control and spent his career first at Western Electric from 1918 to 1924, then at Bell Telephone Laboratories.

At Bell, Shewhart altered the production processes to ensure greater economic gains by reducing quality variations in the equipment the labs produced. He identified 'common causes' and 'special causes' of production issues. His control charts laid the statistical foundation upon which modern industry is built, and he called his cycle of process evaluation the Plan, Do, Study, Act (PDSA) cycle, modified here to Plan, Do, Check, Act.

## Plan

In the first step of the cycle, the need for process change is identified. What data indicates a change is required? Is it the age of the plant that's at fault? A lack of maintenance? Poor operational instructions? Information should be drawn from a wide a range of sources and include information from staff, clients and stakeholders.

## Do

The change is made, but the way the change is made is carefully documented in case later on its turns out to be critical in the success or failure of the new process. So if an increase is made to a maintenance routine, there should be some way of explaining how you did it. Did you hire more staff or increase the shifts of current staff?

## Check

Here's where you monitor and review the change. Monitor the progress and effectiveness of the change according to your plan. Are there expected and unexpected changes from the change? Apply the data you collect against the data from before the change was made. What was achieved and learned? What recommendations can you make to management?

## Act

It's crunch time... What will you do with the recommendations from the previous three steps? Adopt them, abandon them, run the PDCA cycle again? If you saw no change, is that because you aren't collecting the right data? If the change worked, how can you improve and refine it? Remember that the Shewhart system calls for continuous improvement of a process until as much variation in outcome is removed as possible.

## Case Study: Putting the PDCA Cycle to the Test

Using a catapult, medieval soldiers are trying to fire a missile at a city wall, with widely variable results. They need more accuracy, and the solution can be found using PDCA.

In the **Plan** phase, a list is made of the factors involved, including the operators, the machine (stability, positioning), the materials used (including the missile), the environment (e.g. wind), and measurements (is someone misreading the distance?)

The men are observed carefully as they operate the catapult. It's noticed that sometimes they wind the spring so tightly that the catapult base shudders wildly on release.

**Do** and **Check** are next: A correction is made to the operators' technique, and the results measured and checked for improvement. The way the method is changed is carefully recorded for future reference, so if a change fails, it won't mistakenly be tried again later.

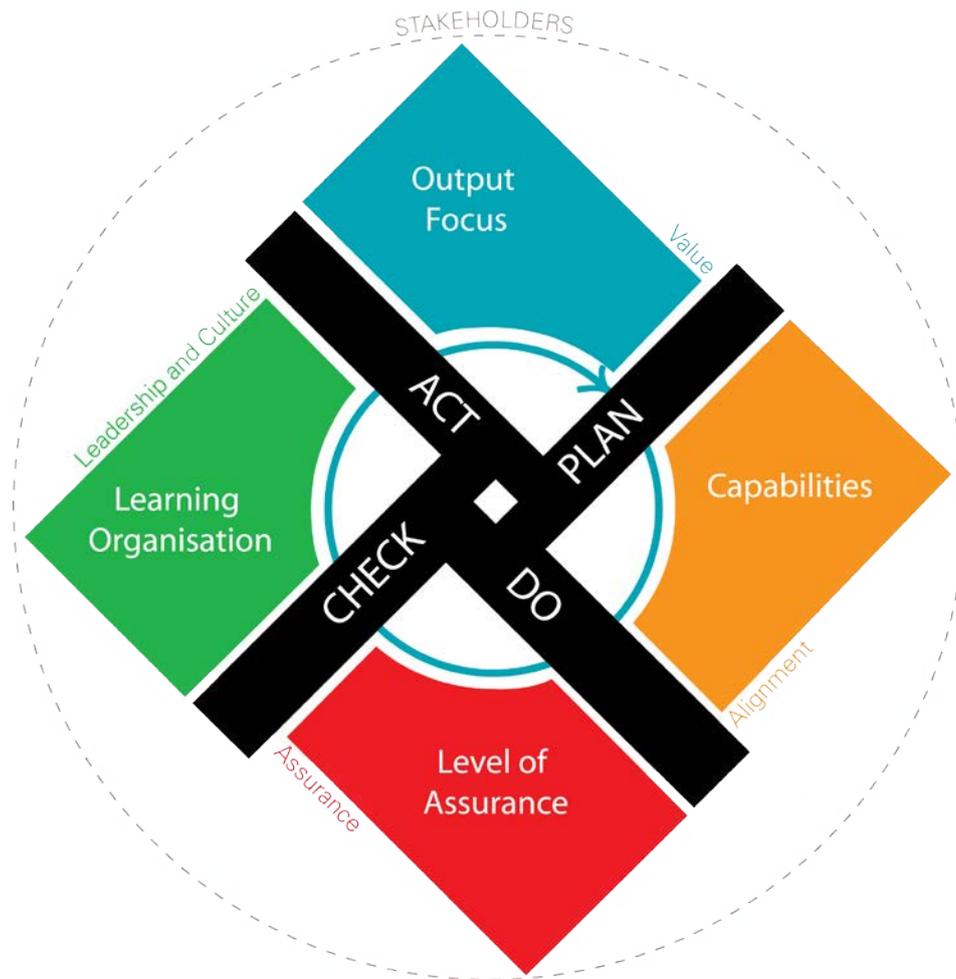
Once the catapult proves it can produce an acceptable pattern of hits, the commanders can **Act**. The catapult operation manual is revised and the army investigates whether this improvement can be applied to other areas of missile projection.

It occurs to the army commanders that once the problem of operator technique has been solved, other changes can be made to improve accuracy – the material used to make the missile, or the stability of the catapult base. This continuous improvement of a process is what smooths out variation until direct hits become the acceptable standard.

It's interesting to note that the lengthiest process of the four was the first, 'Plan'. Too many organisations rush into doing and checking phases before they think through all the ways they can test the system.



# Principles Behind the Asset Management Concept Model



Now that we've examined the processes behind the concept model, let's take a look at the principles. In our medieval example, a catapult was used to fire a missile. But it could also have been used as a battering ram, a makeshift ladder to scale the walls, or as firewood to smoke the enemy out.

An asset is of value only in respect to what its stakeholders require from it, which leads us to principle number one.

## Principle 1: Output Focus

In the Asset Management Concept Model, the output focus answers the question: What is your asset to be used for? The answer may not always be the obvious one.

80% of SA Power Networks' value lies in the poles, powerlines and substations it maintains, assets totalling \$4 billion. But while the network was once a pipe model of business, with power flowing from coal-fired stations to consumers, SA Power Network is facing a disruption fuelled by wind power, solar, and electric vehicles.

The asset is no longer being used for downloads, but has become a kind of internet for energy, with solar-powered customers uploading their surplus energy to the network and downloading what they require. The industry is investing in new ways to make that happen and expansion into areas such as the installation of solar battery arrays and clever switching between grid and self-produced solar power.

The uptake of electric vehicles also disrupts the traditional view of electricity network asset management. When consumers charge their cars at night during peak power consumption, additional strain will be placed on the network.

The output focus of SA Power Network is changing from the single generator model that supplies electricity in one direction across the network to a much richer model. The organisation must pay heed because output focus affects another principle: capabilities.

## Principle 2: Capabilities

A fundamental tenet of the ISO 55000 asset management standard is “Assets exist to provide value to the organisation and its stakeholders.” [ISO 55000:2014, 2.4.2]

This seems obvious – but note that the statement is about the value the asset provides, rather than its intrinsic value. How can an asset’s value and the value it brings to an organisation be different? It’s an important distinction to discern.

Imagine an oil refinery that suddenly has an opportunity to purchase crude oil cheaply from a ship about to arrive at the local port.

The problem is that the refinery’s four storage tanks are already full. There’s nowhere to put the oil coming in, which means the refinery must pay for the ship to store the oil until it can find a way to offload it.

Then someone remembers the storage tanks at the refinery’s old lot in another suburb. About to be sold cheaply for scrap, the tanks haven’t been used in years. An inspection is made and within a couple of days they are ready for use. A valueless asset marked for disposal now has the capability to contribute significantly to the output focus of the refinery. That’s the difference between intrinsic value and capability value.

Capability depends on external things too: operators with the right skills, regular maintenance, instruction manuals and spare parts. For example, in an oil pump pipeline, what would happen if an o-ring fails, and you don’t have a spare? How long will a replacement part take to arrive? Are you contracted to use the overseas OEM or is there a local supplier?

If no one has asked these questions to ensure the capability of the asset, then the first time they are asked could be when a three-dollar piece of rubber is holding up a multi-million-dollar plant.



### Capability of a Sticky Tape Dispenser



**Q: When is a tape dispenser not a tape dispenser?**

**A: When it’s a paperweight.**

Most sticky-tape dispensers have a heavy base for stability. The weight is intrinsic to the work the dispenser is designed to do; otherwise, when you tear off the tape, the dispenser would move around. So the dispenser needs its weight, a serrated cutting edge, and a roll of tape to function. But even without tape and a cutting edge, it could still be used as a paperweight if required. When that happens, the weight becomes the most important feature of the dispenser, which has proved to have a capability beyond its intended design.

## Principle 3: Level of Assurance

The likelihood of an asset failing to do what's asked of it under certain conditions is known as the level of assurance.

The third principle in the Asset Management Concept Model, level of assurance is about risk – the certainty or uncertainty that when X happens, Y will follow. Risk is a key concept in asset management, some would say the most important of all.

Risk in the asset management context can come from many different areas and sometimes all at the same time. Financial markets, failed projects, being subject to legal action, regulatory failures, accidents, natural disasters and human error are all risks that affect the output focus of the asset. In this way, risk is directly linked to the value the asset produces.

An example of factors that affect the bushfire risk level of an electricity network include:

- Substation vandalism and theft.
- Unauthorised climbing on transmission towers.
- Excavators and earth moving machinery operating in the vicinity of high voltage cables.
- Fires under or in proximity to assets.
- Fires started due to maintenance activities.

An asset management plan's level of assurance principle would guide management to counter these risk factors with:

- School visits for electricity safety awareness education.
- Communication with property owners hosting electricity network infrastructure.
- Communication with emergency services
- A 'dial before you dig' 1300 service.
- Infrastructure security patrols.
- Safety warning signage.
- Community consultation.



But what are the costs of a school program or maintaining a dial before you dig service? What about the cost of 24/7 security guards patrolling substations and lines?

At the start of this section we talked about level of assurance existing “under certain conditions.” If an asset manager decides that security patrols and educational material are needed to bring the level of risk in realising the asset's value to an acceptable level, then clearly additional funds will be required.

The conditions have changed, and the board needs to decide where the money is coming from, or if there are other ways of reaching the same outcomes more cheaply.

It's this kind of relationship between cost, risk and outcome that the ISO 55000 asset management standard means when it states: “Asset management involves the balancing of costs, opportunities and risks against the desired performance of assets, to achieve the organisational objectives.” [ISO 55000:2014 2.4.1]

## Principle 4: Learning Organisation

The final principle of the model is the one most affected by workplace culture and management style. It's also the most difficult principle to instil into employees and managers because it's about evolving an ethos, a collection of attitudes and aspirations that transform an asset from a bunch of equipment and processes to something owned by the people who work there.

An organisation whose members are always looking for a way to improve productivity, streamline a procedure or increase the value of the product they are producing is a learning organisation.

Asset management organisations are learning organisations when others in the industry are copying their methods and looking to them for leadership in their field. Being a people-driven process, when an organisation becomes a learning organisation, it follows a series of progressively improving personnel attitudes that can be illustrated by the following comments:

- 1 *"Who cares as long as we don't get caught?"*
- 2 *"Safety is important; we do a lot when there's an accident."*
- 3 *"We have systems in place to manage all hazards."*
- 4 *"We find problems and we work on them."*
- 5 *"This is how we do business around here."*

From apathy to pride, the learning organisation's members begin by regarding the asset as something they have no stake in, to taking ownership of the asset.

A key marker of a learning organisation is transparency, both in the processes and in the decision making. If the maintenance team isn't told that their request for extra stock hasn't been met because there's a cash flow problem or the supplier has closed, they will feel ignored.

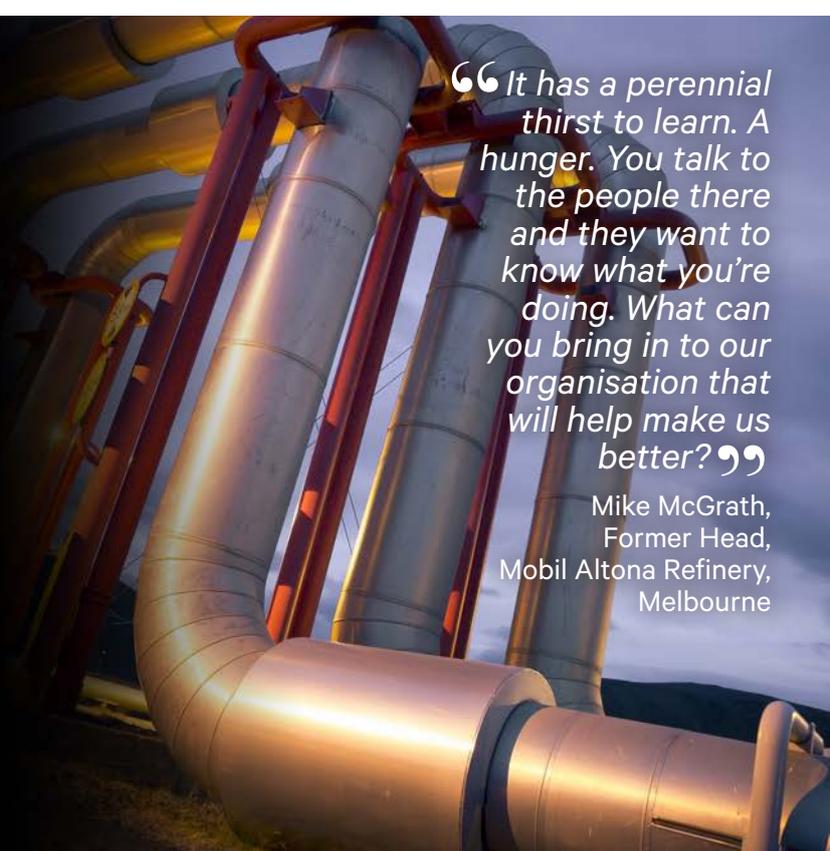
Not everyone in an organisation needs to know everything, of course, but they should know enough to feel that they play an important part in the output focus of the asset. Members of a learning organisation feel they can influence the asset's output by their actions within the parameters of their role.

Mike McGrath is the former head of the Mobil Altona Refinery in Melbourne. When he took over a decade ago, he says the plant was unreliable, had poor safety performance, poor industrial relationships and was losing money. Backed by shareholder investment, McGrath drove team development and instilled pride in the asset by changing the workplace climate. The refinery became a learning organisation.

*"Altona still exhibits one of the characteristics I've noticed in all the high-performing organisations I've seen,"* McGrath says.

*"It has a perennial thirst to learn. A hunger. You talk to the people there and they want to know what you're doing. What can you bring in to our organisation that will help make us better?"*

This desire to improve through learning is the essence of the learning organisation, and the final guiding principle behind the Asset Management Concept Model.



*“It has a perennial thirst to learn. A hunger. You talk to the people there and they want to know what you're doing. What can you bring in to our organisation that will help make us better?”*

Mike McGrath,  
Former Head,  
Mobil Altona Refinery,  
Melbourne



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