



ASSET MANAGEMENT COUNCIL



THE ASSET MANAGEMENT SYSTEM MODEL

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Introduction

An Asset Management System Model is a way of conceptualising what happens when people operate an asset. ISO 55001 specifies a number of requirements for a management system, but does not explain what its elements might be, or how they might interrelate. This Asset Management System Model puts flesh on the skeletal management system outlined by ISO 55001.

You may say that guided by senior management, divisional managers manage an asset, and there are people under their supervision who perform the technical, operational and maintenance tasks required to keep the asset running. And you would be right. Almost.

At the very top of the asset management model are the stakeholders, and it might be useful to start this eBook with a look at who they are and what role they play in the management model presented here.

Then we will examine the other components of the model – leadership, organisational objectives, asset management objectives, monitoring, decision making and risk management. We'll finish with the Organisational Systems Model, which shows how the various management systems within the organisation interrelate.

Asset Management System Model



Stakeholders

Defining stakeholders, the Asset Management Council states: “Stakeholders frame an organisation and determine the needs and constraints on the business.” The definition adds that stakeholders are key to all processes, plans and decisions.

ISO 55000 defines stakeholders as: “A person or organisation that can affect, be affected by, or perceive themselves to be affected by a decision or activity.”



In the case of electricity transmission towers, stakeholders include the land holder on whose property the power company erects the towers, as well as the consumers the network serves. A stakeholder could be a nearby school that fears the health effects of power lines on children. The energy regulator is a stakeholder, as well as the state government and the shareholders who want a steady return on their investment.

Stakeholders are pressure groups, each one lobbying for what they want the asset to deliver.

stakeholders:

“A person or organisation that can affect, be affected by, or perceive themselves to be affected by a decision or activity.”

Leadership, Organisational Objectives and Asset Management Objectives

Top management is responsible for developing the asset management policy and asset management objectives, and for aligning them with the organisational objectives.

Once the stakeholders have determined what value they want extracted from the asset, their decisions need to be implemented. This is where leadership comes in, mediating between the stakeholder desires and the organisation to create a harmonious whole.

First, leadership turns the stakeholder needs into **organisational objectives**, then into asset management objectives. Organisational objectives are sometimes defined broadly – “we want to become the main supplier of electricity to this state within ten years’ time.” Or they can be specific – “we want a 3.2% reduction in Zone 1 maintenance costs by the next quarter.”

Either way, it’s up to management to figure out how to achieve them, which is where asset management objectives come in.

Asset management objectives are laid out in the Strategic Asset Management Plan (SAMP), defined by ISO 55000 as: “Documented information that specifies how organisational objectives are to be converted into asset management objectives, the approach for developing asset management plans, and the role of the asset management system in supporting achievement of the asset management objectives.” [ISO 55000:2014 p14]

As such, asset management objectives are still just that: objectives. The scope of the asset management objectives needs to be confined to activities necessary to manage the assets, and fit in with other asset management objectives. At this stage they do not say how the objective will be attained – that’s the function of the asset management plan.

Of course, objectives must be determined with reference to other objectives within the organisation, such as finance, HR, health and safety. Without proper consultation, it’s possible to set up conflicting objectives that may not be uncovered until they are formulated into a plan and carried out.

The scope of the asset management system can be understood by referring to NSW transmission network **TransGrid’s Asset Management Policy**. After listing TransGrid’s assets, including transmission lines and substations, the policy states:

“The asset management system is focused primarily on the management of the physical network assets as listed above. Other asset types (e.g. financial assets, information assets, human assets) are only considered in so far as they affect the optimal management of the physical network assets.”

broadly

“we want to become the main supplier of electricity to this state within ten years’ time.”

specifically

“we want a 3.2% reduction in Zone 1 maintenance costs by the next quarter.”

TransGrid Asset Management System

Within its asset management system, NSW transmission network TransGrid maintains its:

- Asset management policy.
- Asset management strategy.
- Asset management objectives.
- Asset management plans.
- The activities, processes and organisational structures necessary for their development, implementation and continual improvement.

Performance Monitoring and Improvement

Performance monitoring and improvement is part of every management system, whether it's collating data on KPIs or staff quarterly reviews by an interview panel. In asset management, monitoring and improvement can be of the asset itself – how well it's aligning with the objectives set for it – and also of the management system itself.

ISO 55001 Section 9.1 states:

“The organisation shall evaluate and report on the effectiveness of the processes for managing risks and opportunities. The organisation shall retain appropriate documented information as evidence of the results of monitoring, measurement, analysis and evaluation. The organisation shall ensure that its monitoring and measurement enables it to meet the requirements of [stakeholders].”

Evaluation and improvement of the asset management objectives involves **continuous improvement** and **strategic review**. A strategic review is necessary when it becomes clear that organisational objectives are not going to be met by the asset.

The review may involve changes to policy, processes and management plans, and perhaps even to the objectives themselves. A strategic review could be prompted by the asset nearing the end of its life cycle, by a change in the regulatory system, or by a disruption.

Disruption Case Study: SA Power Network

Most of SA Power Networks' assets were installed between the 1950s and 1980s, with a current average age of about 40 years. Its focus has been on the continuous supply of electricity – repairing fallen lines, monitoring poles and maintaining substations.

However, the electricity industry must now accept that across Australia the grid is now a two-way street. The model where a single generator source supplied power for all is obsolete, thanks to the disruption of solar and wind power and the imminent take up of electric vehicles.

Power networks must now recognise 'uploads' as well as 'downloads', and be agile enough to adapt to the change. South Australia's state-wide blackout in 2016 was a sign that the disruption is challenging the established practices of suppliers, regulators and government.



ISO 55001 states that an organisation must determine:

- What needs to be monitored and measured;
- The methods for monitoring, measurement, analysis and evaluation, as applicable, to ensure valid results;
- When the monitoring and measuring shall be performed; and
- When the results from monitoring and measurement shall be analysed and evaluated.

[ISO 55001 Section 9.1 p8]

Monitoring Compliance with the AM System

It's possible that a management system and the objectives it was set up to achieve may diverge due to changed conditions, new staff or new equipment. The management system should be monitored to make sure it complies with the organisational objectives and whether the decision-making processes are adequate.

Auditing the Management System

Key elements of the management system will be audited every two years and may include interviews with people within the system, a review of the results the system is producing, and a review of the artefacts produced by the system and whether these are defined as a requirement of the system.

Key to monitoring and evaluating an asset management system is the collection of data and its transformation into information. An audit into this data and its processing would therefore include the methodology and techniques for verifying and evaluating the data. For example, if a monthly evaluation is made each Tuesday, but is suddenly switched to a Friday, there could be discrepancies in the figures that are related to the data gathering process itself.

Raw data is meaningless by itself, but whose job is it to compile it into a spreadsheet under headings that can be cross-referenced? The responsibility for transferring data into information useful to others is an important part of management system auditing.

“If the data you need still exists; if you found the data you need; if you understand the data you found; if you trust the data you understand; if you can use the data you trust; someone did a good job of data management.”

— Rex Sanders,
United States Geological Survey,
Santa Cruz

[quoted in <http://researchdata.wisc.edu/education/guides-tutorials-and-courses-for-learning-about-data-management/>]

Decision Making

Making decisions about assets can be frustrating. Stakeholders may request slight variations on each potential solution to a problem before a decision is reached. Requests may be made for the type of variation that requires a data granularity that maintenance may not be able to provide. Time is wasted as a disproportionate amount of effort goes into managing the decision process itself.

Fundamentally, decisions are about four things:

- the context of the decision,
- its objectives,
- alternatives, and
- potential risks.

Naturally, with asset management, the decision also needs to reference the asset management plan objectives that the decision supports.

In asset management, decisions can be broken down into five types:

- 1 Complex decisions that require lots of information and the input of several types of stakeholder. These concern the fundamental questions regarding an asset, such as whether to repair it or replace it.
- 2 Decisions that are either 'yes' or 'no'. For example, whether to switch from one supplier to another on the basis of cost, everything else being equal.
- 3 Where a single of action is recommended, evaluation of it to ascertain whether to implement it or not.
- 4 The decision to further develop one solution among alternatives to gauge its usefulness, or to abandon it.
- 5 Routine internal decisions, such as ordering photocopying paper or establishing a policy around staff leave.

In some organisations, decision making may be left in the hands of individuals, while in others the decision-making processes are group-based.

In cases where individual decision-making dominates, the organisational and asset management objectives are more widely understood and disseminated throughout the organisation. That's because decentralised decision-making means a higher order of agreement on the criteria used to make decisions, which comes from the objectives.

The consequences of decisions must be evaluated in the light of their impact on the organisational and asset management objectives.

Using KPIs to Monitor Decisions

A Key Result Area (KRA) is a result that's needed for the organisation to be successful. It's measured in terms of the KPIs necessary to implement it. So if a KRA is "make orange juice for breakfast" then a KPI is "five oranges were juiced by 6.25am."

If cost, risk and performance are the three KRAs for an asset management system – and an organisation has KPIs associated with each of these areas – then any decision can be assessed by the impact it has on KPIs.

The Woody Point Yacht Club

Objective: The Woody Point Yacht Club committee feels the club is reaching the end of its usefulness to the community. All members are near retirement age, new membership has dwindled, and the club's assets – clubhouse, boats, storage sheds and boat ramp – are in disrepair. Attracting more members is a key organisational objective. A plan is developed, initiatives include establishing links between the club and local schools, and a course for beginners is started. Stories in local media spruik the health benefits and fun of sailing for the whole family.

KRA: A 10% increase in overall membership each year for five years. It's decided that by signing up members under the age of 16, parents and friends will follow and membership will increase.

KPI: After one year there is a 15% increase in members under 16, and a 17% increase in overall membership.



Typically, policies inform the decisions made by an organisation. If the Woody Point Yacht Club policy refused membership to non-adults on the grounds of the insurance risk, then the plan to save the club by recruiting members under 16 would not be tenable. Either the policy or the solution would have to be changed.

It's not always the case that asset management policies will be helpful in making every decision. Other policies can come into play, such as the **AASB 116 standard** from the Australian Accounting Standards Board, which lays out an accounting system for plant, equipment and property.

AASB 116 may be useful in indicating when life cycle cost should be examined and the values that should be included in its calculation. The standard contains specific information about how to record the financial value of an asset, along with rules for how depreciation and impairment should be handled, stating:

“The principal issues in accounting for property, plant and equipment are the recognition of the assets, the determination of their carrying amounts and the depreciation charges and impairment losses to be recognised in relation to them.”

Note that this does not refer to the asset's value, as defined by ISO 55000, but the means by which its cost – in the sense of replacement cost – can be determined.

“The principal issues in accounting for property, plant and equipment are the recognition of the assets, the determination of their carrying amounts and the depreciation charges and impairment losses to be recognised in relation to them.”

Decision Making for Asset Management

A critical question in any organisation is who makes the decisions? The management policy should identify who is responsible for decisions and ensure they are qualified to make them. It does not pay to have the head of HR making decisions about whether or not to renew a government contract, although their input may be sought.

The decision not to start the second unit generator of a power station to compensate for a sudden catastrophic shortfall in renewable energy supplied to the grid is a major one. There could be legal ramifications for the organisation if it breaches its obligations by not firing up the generator.

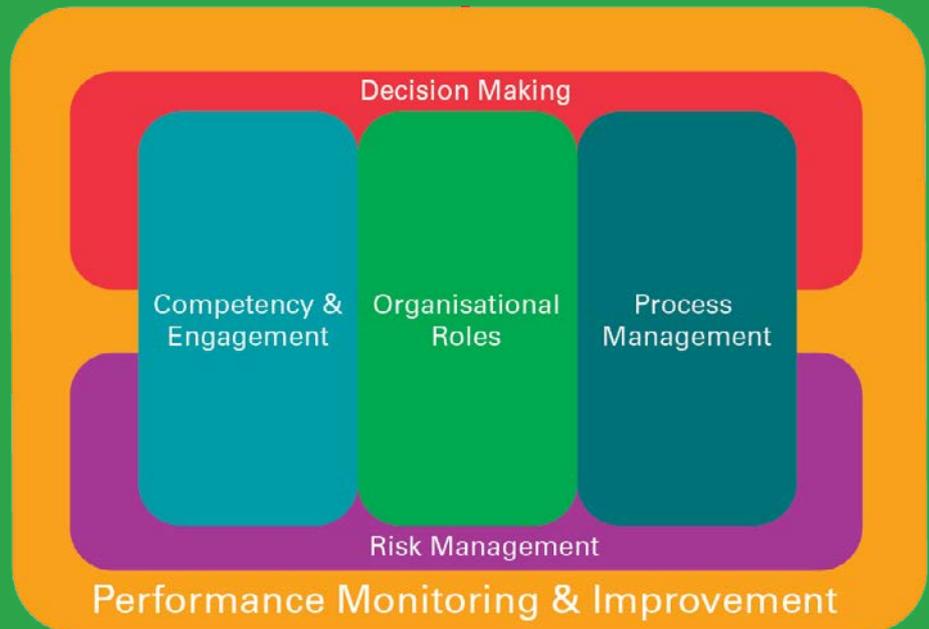
As such, the decision cannot be made by the shift worker operating the plant at the time of crisis. It should be made by a senior management collective in consultation with technical staff and operators, and with reference to regulatory and contractual obligations, all of which must be readily available as part of the organisation's asset management plan.



Process Management, Competency & Engagement and Organisational Roles

It is common in asset management to group process management, competency and engagement and organisational roles together. As shown in the Asset Management Systems Model diagram, the three all feed into decision making.

Process management defines the processes that the organisation is going to follow in order for it to achieve its objectives. It could be a financial process, or a technical process. There may be financial standards that an organisation follows, or systems engineering standards. All these feed into process management.



A process is pointless without a person competent enough to understand and enact it; not only competent, but authorised by the organisation to carry out that role.

All staff will have some level of risk responsibility assigned to them and this risk is not assigned downwards if the staffer is absent, but upwards. If a senior team member is absent, who takes on the decision-making process for them? Who is competent? Who has the authority? Who knows the process? The three elements are constantly referencing each other when a decision is made.

Competence is the ability to apply knowledge and skills to achieve intended results, but no matter how competent staff are, they will not function at their peak unless they are engaged. Staff should be able to see the benefits of the decisions they are making through a transparent chain of acknowledgement. Engaged staff will go that extra mile for the sake of the collective goal.

Risk Management

In ISO 55000, risk management is clearly linked to asset management. But risk management – as illustrated in the model diagram – does not exist in isolation. As with decision making, it's a product of the combination of the core elements of process management, competency and engagement, and organisational roles.

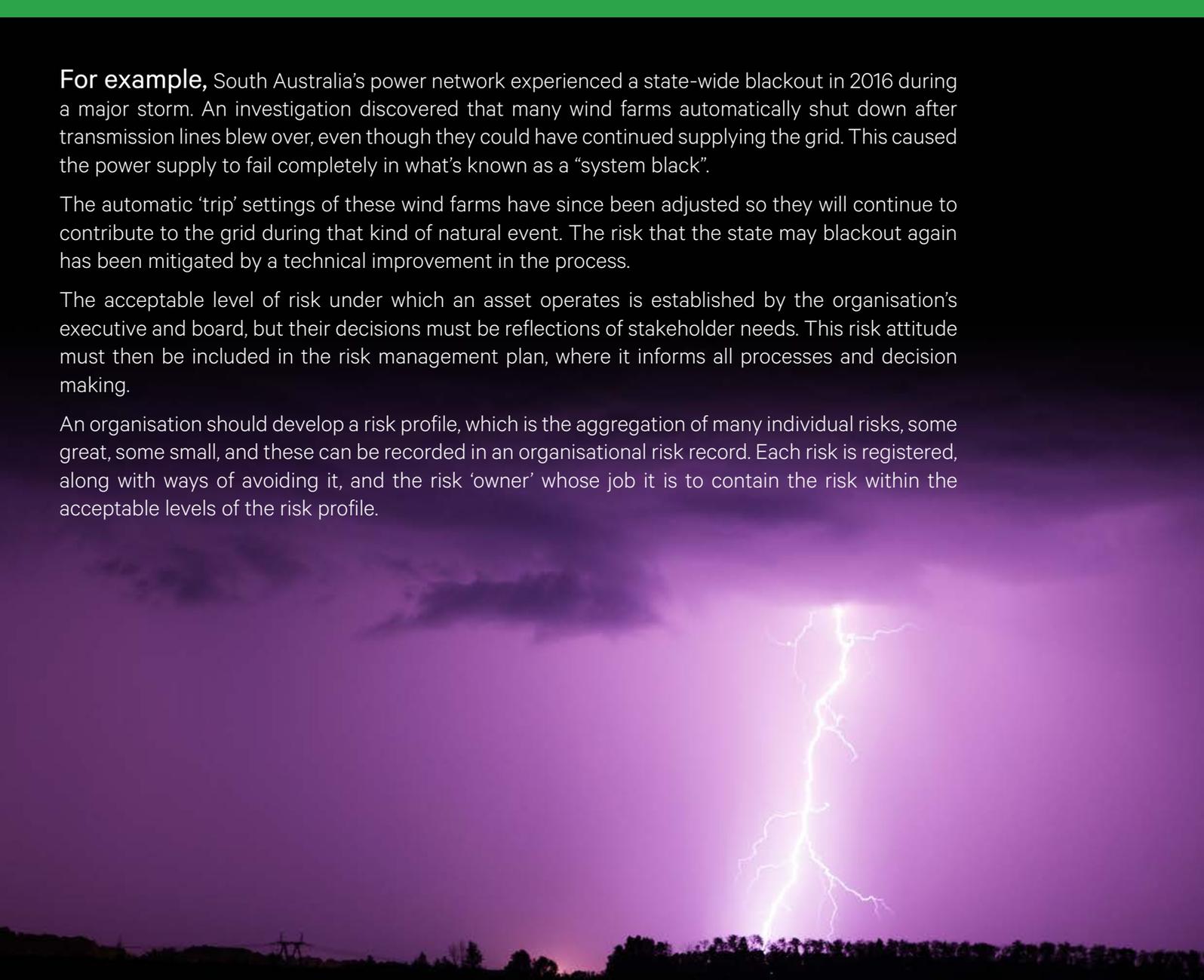
Asset management's purpose is to plan the future of the asset so that the value it provides to stakeholders is sustained. This is achieved by understanding stakeholder needs, understanding the risks associated with the delivery of those needs and developing appropriate mitigation to those risks to deliver safe and reliable performance. Risk management, therefore, provides the decision support processes and tools to deliver and sustain future asset performance.

For example, South Australia's power network experienced a state-wide blackout in 2016 during a major storm. An investigation discovered that many wind farms automatically shut down after transmission lines blew over, even though they could have continued supplying the grid. This caused the power supply to fail completely in what's known as a "system black".

The automatic 'trip' settings of these wind farms have since been adjusted so they will continue to contribute to the grid during that kind of natural event. The risk that the state may blackout again has been mitigated by a technical improvement in the process.

The acceptable level of risk under which an asset operates is established by the organisation's executive and board, but their decisions must be reflections of stakeholder needs. This risk attitude must then be included in the risk management plan, where it informs all processes and decision making.

An organisation should develop a risk profile, which is the aggregation of many individual risks, some great, some small, and these can be recorded in an organisational risk record. Each risk is registered, along with ways of avoiding it, and the risk 'owner' whose job it is to contain the risk within the acceptable levels of the risk profile.



Documents Generated by the Asset Management Systems Model

Stakeholder Decision Criteria: This should be included in the risk management plan and includes senior management-approved decisions that guide decision making throughout the organisation.

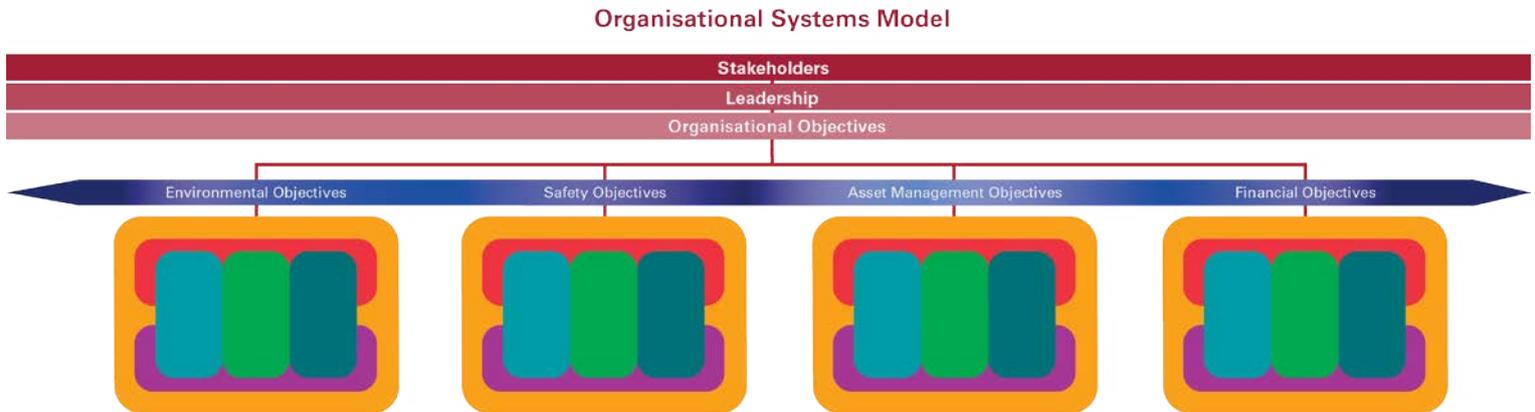
Asset Management Policy: The intentions and direction of an organisation as formally expressed by its top management (ISO 55000)

Strategic Asset Management Plan (SAMP): Information that specifies how organisational objectives are to be converted into asset management objectives, plus the approach for developing asset management plans, and the role of the asset management system in supporting achievement of the asset management objectives. (ISO 55000)

Asset Management Plan: Information specifying the activities, resources and timescales required for an individual asset, or a grouping of assets, to achieve the organisation's asset management objectives. (ISO 55000)

The Organisational Systems Model

The Asset Management Systems Model sits within a larger system, the Organisational Systems Model, which shows the relationship between an organisation's various objectives – financial, health and safety, environmental, community outreach – and the systems they generate. The asset management objectives sit alongside these other objectives.



Within the Organisational Systems Model the individual objectives and their systems must collectively address all organisational objectives, and the strategic plans developed by each, when combined, should form a complete picture of the organisation.





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