

Chapter 2

Structure and Activities

Abstract To describe how asset management fits into the structure of an organization and to summarize the activities involved in asset management.
Outcomes After reading this chapter you will know about:

- The link between asset management and business strategy, including the factors involved in business development which impact on asset strategy;
- The role of the Chief Asset Management Officer;
- How the asset management function should be structured;
- The role of asset management groups which have personnel working in particular technical areas;
- The basic knowledge required by asset managers;
- The main activities of asset management;
- Organizational activities which are not part of asset management;
- The need for financial, legal, and engineering support for asset management;
- What is meant by an asset management policy and an example related to ISO 55001;
- An introduction to asset management plans with reference to ISO 55001.

2.1 Business Strategy and Asset Management¹

The purpose of Asset Management is to provide resources and expertise to support the identification, acquisition, in-service support, and disposal of the physical assets required by the organization. The asset strategy must be responsive to and interact with the business strategy.

¹ ISO 55001/2 Clause 4.1 Understanding the organization and its context.
“The organization shall determine issues...that affect... its asset management system”
“Asset management objectives... shall be aligned to... organizational objectives.”

The asset management function must link into the strategic issues deriving from the business situation which will impact on asset management plans. Developments in the business/asset situation typically include the following:

- Trends in demand for product or service.
- Trends in the type or level of product or service required.
- Changes in revenue, costs or profitability, for example, due to competition.
- Opportunities for new business and/or business development
- Technological developments
- Asset capability gaps—gaps in capacity and/or ability in delivering all aspects of the required asset role.
- Timing issues—when the assets are required and what lead times are involved
- Acquisition strategies, supplier options
- Age and remaining life of existing assets
- Regulatory limitations, opportunities, or changes
- Condition of assets—providing adequate service level, reliability, availability?
- Risk factors for availability, capacity, health, safety, and environment issues.
- Business acquisitions.
- Divestment, sale, or phasing out.
- Redeployment of assets.
- Changed operating practices.
- Equipment replacement/leasing decisions.
- Outsourcing or in-sourcing of services or functions.

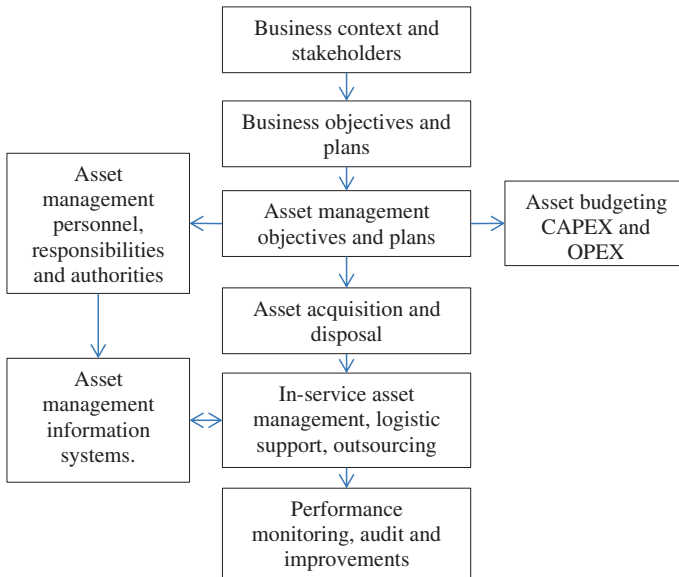
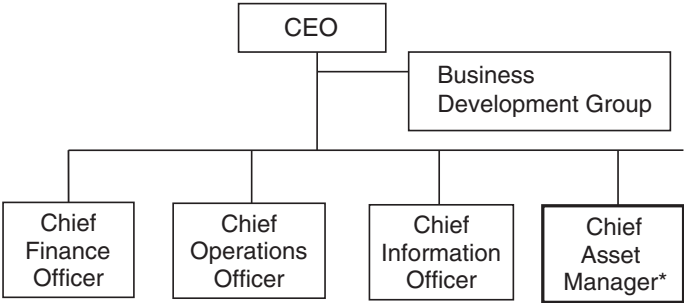


Fig. 2.1 Asset management in the business context



* Title may vary to cover the Asset Management / Engineering / Logistics / Planning functions but representation at ‘Chief’ level is important.

Fig. 2.2 Asset management in the organization

A flowchart of the asset management system in relation to the business context is shown in Fig. 2.1.²

2.2 Asset Management in the Organization

A central asset management function is needed at company level, to provide inputs to asset planning, to take a role in major acquisitions and developments and to be involved in the provision of the systems and facilities needed to support assets throughout their life. Asset management is distinct from operations, and does not usually involve the direct design or building of the assets themselves. The exact terminology and reporting structures may vary from organization to organization. Figure 2.2 shows an example of how the senior level of an organization may look.

2.3 Chief Asset Manager Role³

An essential step toward successful asset management is to recognize asset management as an activity which requires representation at senior level. This is illustrated in Fig. 2.2. The precise title may vary, and what we have referred to here

² Figure 2.1 illustrates the alignment of business and asset management objectives as required in ISO 55001/2 Clause 4.1.

³ ISO 55001 Clause 5.3: “Top management shall assign the responsibility and authority for...

- Ensuring the... effectiveness of the asset management system
- Establishing ... asset management plans
- Reporting on asset management performance....”

as a Chief Asset Manager may have a title which refers to or includes planning, logistics, or engineering. The important thing is that representation at the Chief level allows asset management to play its key role in asset-related decisions and activities. This includes the following responsibilities of the Chief Asset Manager:

- Conveying the asset implications of the organization's business objectives and plans to senior management. This will involve participation by the Chief Asset Manager in the Business Development Group which appears at high level in Fig. 2.2, reporting to the CEO.
- Developing physical plans and financial proposals for asset-related capital and operating expenditure.
- Taking responsibility for the many activities that assets require in an asset intensive organization.

If asset management decisions fall between, on the one hand, senior managers whose background gives them little appreciation of the physical state of the company's assets in relation to needs, and on the other hand, technical personnel who are too junior within the organization, or too inarticulate in business terms to state their case, then financial and operational disasters can follow. The Chief Asset Manager provides a clear single line of authority and ownership for asset management issues. This covers:

- Asset management groups which specialize in dealing with particular families of assets,
- Asset-related financial and administrative staff,
- Maintenance and related technical services,
- Engineering.

2.4 Asset Management in the Organization (2)

The existence of a Chief Asset Manager does not mean that all asset management activity is concentrated at the top level. Operating divisions may have asset managers looking after their own assets, just as they have information technology and accounting staff looking after their own divisional activities in those areas. Asset management skills and awareness⁴ are needed in many roles, and not just by persons who are labeled "Asset Manager." At the risk of some ambiguity, we shall use the term Asset Manager to cover both a person employed *primarily* in asset management activities and a person who uses an asset management approach in tackling issues which are only part of their overall job. However, company-wide issues, policies, strategies, systems, and procedures need to be coordinated from the higher level, and we shall assume the existence of a group which we shall refer

⁴ ISO 55001 Clause 7.3 Awareness: "Persons... shall be aware of...policies...benefits...risks..."

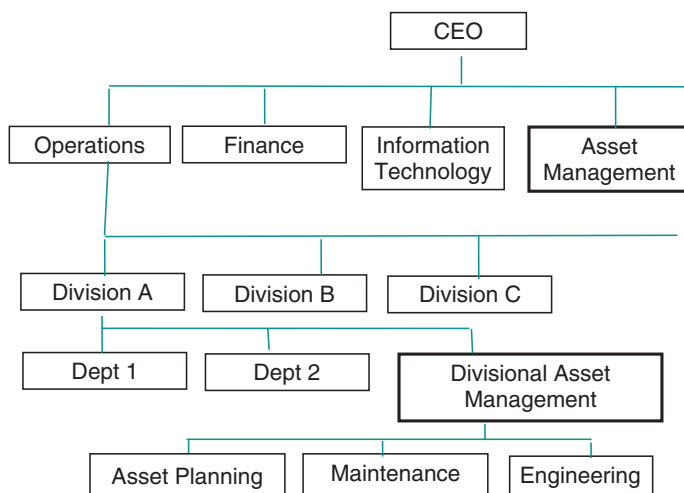


Fig. 2.3 Asset management in the organization (2)

to as the asset management group, recognizing that other names may be used in various organizations. Figure 2.3 illustrates how asset management at the divisional level can combine with asset management at the chief officer level.

2.5 Asset Management Groups

Asset management activities and responsibilities impact on a wide range of roles within an organization and are not confined to a specific department. However, in a large organization, effective asset management will benefit from the existence of recognized asset management personnel with expertise in specific areas. These may be formed into distinct groups, the title of which will depend on the technology and the company structure.

The purpose of an Asset Management Group is to provide resources and expertise to support the identification, acquisition, in-service support, and disposal of a particular group of physical assets required by the organization.

An example in defence is the Australian Defence Materiel Organization. This has divisions managing land, sea, and air assets. Within each division are asset management groups referred to as System Program Offices (SPOs). Each SPO manages a particular group of prime assets, such as a type of ship or aircraft and all the associated subsidiary assets. In a civilian airline, groups will correspond to the main aircraft types, with additional groups for ground handling equipment, sales systems, and operations systems.

An asset management group consists of asset managers with suitable technical backgrounds, with support from personnel in accounting and finance, legal, and

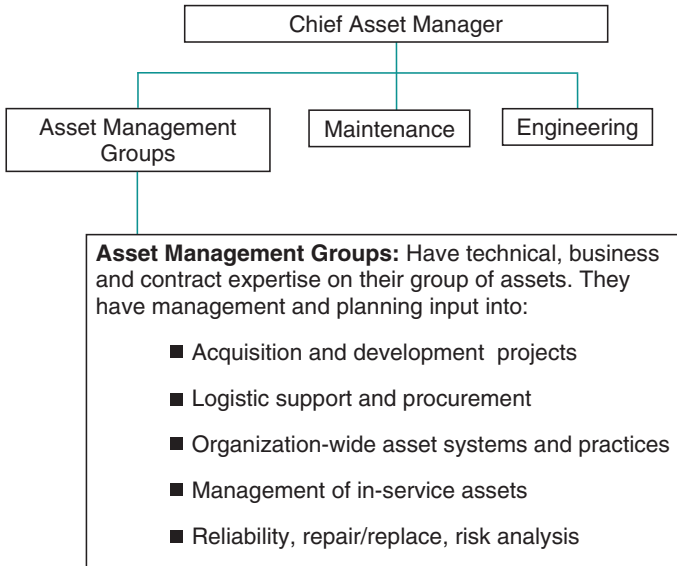


Fig. 2.4 Asset management group structure

contracting roles. Financial, legal, and engineering staff may be colocated to asset management groups from their professional area. For particular projects, teams will be formed with personnel numbers and skills dependent on the content and size of the project. The asset management groups form a basis from which these teams can be formed.

The asset management groups have key roles in acquisition and development decisions, acquisition and development projects, and in creating and managing organization-wide systems for equipment support for new and existing assets.

Figure 2.4 illustrates this structure. An asset management group can involve hundreds of personnel in a large organization. In a smaller organization, the same types of tasks are undertaken and the same types of decisions are made, so that the logic of the processes carries through, even though the tasks may be handled by, say, a works manager, a works engineer, or a maintenance manager in among a range of other commitments.

2.5.1 Asset Management Groups Example

Asset management groups are based around the various major equipment areas operated by a company. Figure 2.5 shows an example of the asset management groups for an electricity transmission company. The company installs and operates transmission lines and substations. There are asset management groups for “substations”

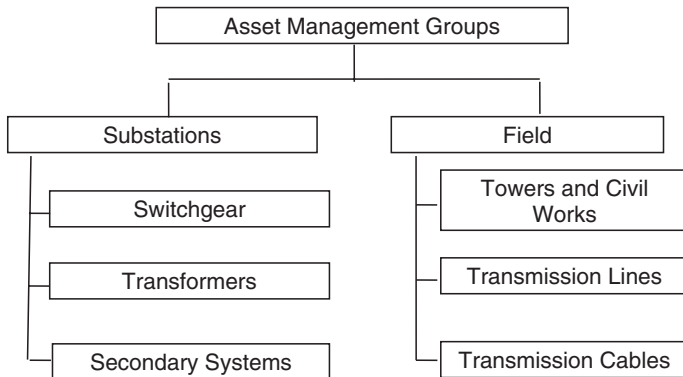


Fig. 2.5 Asset management groups example—electricity transmission

and “field” with subgroups for switchgear, transformers, transmission lines, and so on. Each group is headed by an asset group manager, supported by technical, logistics, financial, and commercial staff with competence in the particular field.

2.6 Integrated Project Teams

An integrated project team is a team which is formed to manage a major project. The team may typically be led from the most closely related asset management group, or from the business development group. The team will draw on asset management personnel, augmented by financial, contract, and engineering specialists as necessary. These specialists may be involved with a particular project team on a full-time or part-time basis depending on the amount of work required. A team may include representatives from stakeholder groups.

Asset management groups often have primary responsibility for projects of a wide range of types. Project teams may bring in staff members from other asset management groups where multiple technologies are involved.

2.7 Asset Knowledge⁵

The management of assets is dependent on knowledge about the organization’s assets. This involves knowledge of the current equipment in terms of its technology, deployment, condition, and business role. It also involves knowledge of

⁵ This section is relevant to ISO 55001/2 Clause 4.3 “Determining the scope of the asset management system.”

Table 2.1 Asset management knowledge

1	What assets have we got
2	Where are they located
3	What is the business significance of our major assets
4	What is the profit and loss position of our major assets
5	What is our asset utilization including peak load and seasonal factors
6	Are there gross imbalances—that is, major shortages, surpluses or misallocations of equipment or personnel
7	What is the condition of each major asset
8	Are reliability or availability issues significant
9	How much longer can specific assets last
10	Are there significant risks
11	Are maintenance costs a significant factor
12	What asset related developments and market opportunities exist
13	What has the market got to offer in terms of assets that we might usefully acquire

potential future developments. Asset managers need to have a practical working knowledge of the major assets at a management level, so as to be able to make sound business decisions. They need to be aware of the assets which constitute elements in any given capability, that is, the array of subsidiary items which are necessary to support particular prime equipment. There is also a requirement for *configuration management*, that is, keeping systematic track of changes to equipment configurations, such as technical upgrades and regulatory compatibilities.

For major items for which future capital decisions are required, it is advisable to list the date and type of the decisions that will be needed. For example, for a truck fleet, we need knowledge of the years of remaining effective life of vehicles, and of the lead time for acquisition of replacements, so that we can plan our replacement strategy sufficiently far in advance. This knowledge, combined with an assessment of the future requirements of the business, and of developments in the types of equipment available from manufacturers, will enable us to make sound and timely decisions within the constraints of business risk. A summary of points of knowledge which an asset manager needs to have is shown in Table 2.1.

2.8 Asset Management Activities

A life cycle diagram is shown in Fig. 2.6, giving more detail than the outline in Chap. 1. We shall use this cycle in considering the various activities of asset management. The main steps in the cycle are as follows:

- Identification of business opportunities or needs
- Asset capability gap analysis and requirements analysis
- Pre-feasibility analysis, physical and financial—options selection

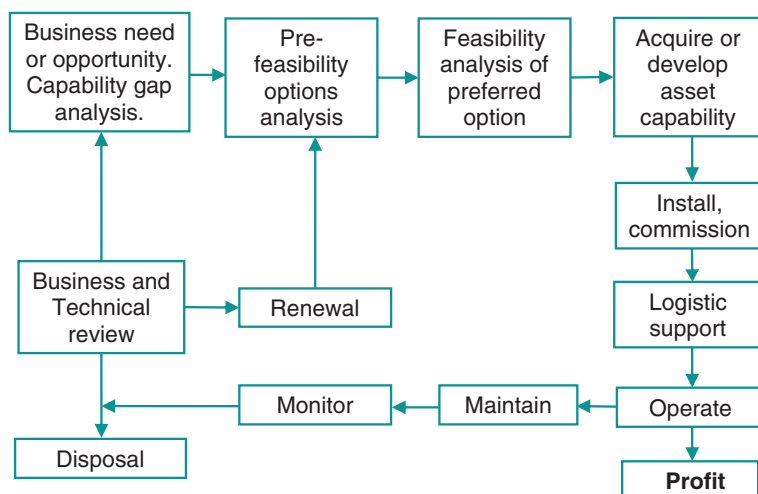


Fig. 2.6 The asset life cycle

- Feasibility planning, physical and financial—for selected option
- Acquisition, development, and implementation
- Operation, maintenance, and logistic support
- Monitor and review
- Disposal.

However, *operations* and direct *maintenance* work are not asset management activities.

2.8.1 Deployed Assets and Asset Fleets

Deployed assets are those currently in-service with the organization. Deployed assets of a given type can be conveniently referred to as the “fleet” of that type of asset. A life cycle diagram such as Fig. 2.6 indicates the cycle through which any particular fleet will pass. However, at any given point in time the deployed assets will consist of numerous fleets of assets of different types and these fleets will be at different stages of their life cycles. Asset management activities are required to work across all the asset fleets currently in-service. The whole picture is therefore more complex than may be inferred from considering any particular fleet in isolation.

The asset management function has a role to play in relation to a substantial number of activities, as shown in Table 2.2 Asset Management Activities. Many of these activities will be considered in detail later in the book.

The following subsections further describe some of the activities of asset managers.

Table 2.2 Asset management activities

1	Input to asset-related aspects of business development at the concept planning stages
2	Input to pre-feasibility and feasibility analysis for asset developments including requirements analysis, input to financial analysis
3	Development of recommendations for acquisitions, process improvements, replacement, refurbishment
4	Preparing business cases for asset-related activities; can include preparing proposals, evaluating proposals, and advising on the preparation of proposals
5	Preparation of asset-related input to Capital Budgets (CAPEX) and Operating Budgets (OPEX)
6	Life cycle costing
7	Management of asset acquisition and/or development projects
8	Development and implementation of logistic support policies
9	Management of introduction into service
10	Setting maintenance policy and procedures, e.g., via reliability centered maintenance
11	Applications of asset-related technology, e.g., new equipment developments, condition monitoring developments
12	Managing asset policies in regard to health, safety, environment, security requirements
13	Managing through life support provision, effectiveness, and audit
14	Maintenance facilities and resources planning and provision
15	Maintenance outsourcing strategy and management
16	Configuration management
17	Input into the selection, implementation, and user support for asset management information systems
18	Technical input into computerized asset management information systems structure and development, including identification and coding
19	Asset register updating
20	Asset renewal/replacement/overhaul policy assessment and decisions
21	Arrange and carry out reliability and availability tests and evaluations
22	Equipment redeployment for asset management reasons
23	Equipment disposal
24	Asset-related special studies
25	Asset implications of changed operating practices.
26	Equipment leasing policy and management
27	Identifying and setting asset-related emergency response strategies
28	Incident reporting systems, fault and failure reporting systems and responses, root cause failure analysis
29	Spare parts management systems and spares control setting including rotatable repair parts policy and management, insurance spares
30	Pilot studies and trials organization and evaluation
31	Liaising with stakeholders on asset-related topics
32	Asset condition assessment and recording
33	Asset valuation
34	Change management

(continued)

Table 2.2 (continued)

35	Decisions on the implementation of modifications and technical improvements
36	Cost–benefit analysis
37	Geographic information systems introduction, implementation
38	Asset physical identification
39	Repair/replace policy and related decisions
40	Level of repair analysis

2.8.2 Capital Items

Asset acquisition plans are to be created and to be reviewed annually, both for asset replacement and as required in the event of business developments. The age and condition of assets is to be monitored and taken into account in planning, so that issues of reliability and risk, and disruptions to business plans are minimized.

Capital expenditure (CAPEX) proposals are to be prepared in accordance with the organization’s standard procedures and timings, and will include a financial and/or cost–benefit analysis and a risk analysis.

2.8.3 In-service Support

A systematic approach to the support of in-service assets is to be established and operated in accordance with the following requirements:

Asset maintenance plans, which may include outsourcing, are to be established and to be documented in the organization’s maintenance management computer system. Plans will be implemented to deliver the required level of service of assets. Asset maintenance plans are to minimize life cycle costs consistent with achieving the outcomes specified.

Asset-related operating expenditure (OPEX) proposals are to be prepared in accordance with the organization’s standard procedures and timings. Procedures for managing the resulting asset management and maintenance operating budgets are to be established and followed.

Risk analysis of asset operations is to be undertaken in accordance with specified procedures. Risk management and mitigation strategies are to be implemented as indicated by the analysis.

The specified information management system is to be used for recording plans, procedures, and work management.

Developments in systems specifications, data structures and applications, such as GPS systems, asset coding, and identification will be undertaken as required.

Reporting procedures for asset-related incidents, failures, or defects and procedures for the analysis and response to these are to be established and intelligently followed.

Definitions and reporting procedures for asset performance indicators are to be created, applied, and monitored.

Other factors to be considered are plans for the longer term; the degree of commitment to in-house repair and logistic support as opposed to use of outsourced support facilities; the use of redundancy to achieve system reliability rather than seeking high reliability of individual items; the degree of coordination between related parts of a supply chain, e.g., electricity generation, transmission, and distribution; maintenance and replacement strategy in regard to run-to-failure, age-based, condition-based, spend-limit-based replacement decisions.

2.9 Asset Management Policy

A policy statement is a statement of the overall aims or principles adopted by an organization. A policy statement provides high level direction, aimed at guiding the business decision-making process.

ISO 55001 requires an organization to state an asset management policy.⁶ The policy is required to provide a basis for setting asset management objectives to include a commitment to meeting asset requirements and a commitment to continuous improvement. Some suggested general points to be covered in the asset management policy statement are shown in Fig. 2.7.

Other policy principles relate to business governance and practice, and may be in the form of references to other relevant documents. An example is procedures for ensuring a transparent choice of suppliers or service providers. However, we may also specify that interests of logistic support allow selection from a limited range of providers. Another example is that work is to be carried out in accordance with relevant legislation, standards and guidelines, including health, safety, and environmental protection. Policies in relation to outsourcing and the retention of specific sets of skills within the organization may be established.

High-level responsibilities may also be established under the Policy heading, for example, the role of the company board in approving and monitoring capital asset acquisition plans and reviewing asset performance.

2.10 Asset Management Plans

A major activity of the asset management group is the development of asset management plans. ISO 55000⁷ defines an Asset Management Plan as:

⁶ ISO 55001 at Clause 5.2 Policy: “Top management shall establish an asset management policy.”

⁷ ISO 55000 Clause 3.3.3 Asset management plan definition.

Our organization has significant investment in plant, equipment, buildings, services and skilled and experienced personnel.

Our policy for managing these assets is to:

- pursue the provision of appropriate assets in support of the development of shareholder value;
- provide resources to ensure the sustainable performance of these assets and of the activities needed to support them;
- integrate asset planning and management with business planning, budgeting and reporting processes;
- adopt a whole-of-life approach to the acquisition, operation, performance, maintenance and disposal of assets;
- comply with legislative and regulatory requirements, including for health, safety and the environment, in the acquisition, operation, risk management, maintenance and disposal of assets;
- proactively pursue world's best performance in all aspects of asset management;
- ensure that the people involved in the management of our assets are appropriately selected, developed and trained;
- apply continuous improvement principles to managing our assets, to operational efficiency and to the enhancement of the skills of our people.

Fig. 2.7 An asset management policy statement

“documented information that specifies the activities, resources and timescales required for an individual asset or a grouping of assets, to achieve the organization's asset management objectives.”

An Asset Management Plan is a plan that involves specifying:

- Activities
- Resources
- Timescales
- Responsibilities

that are required for the asset or group of assets to achieve specified objectives. Plans are based on the maintenance, repair, overhaul and replacement activities and logistic support needed to sustain the assets and to enable them to deliver the expected level of service over a specified timescale.

Details of the asset management planning process for individual assets or groups of assets, and for the creation of consolidated, planning-period based, asset management plans across a portfolio of assets are considered in detail in later chapters.

2.11 Strategic Asset Management Plan (SAMP)

A Strategic Asset Management Plan (SAMP) is a document which describes how asset management is organized and operated within the organization. ISO 55001 states⁸ that organizations “shall develop a SAMP”. The SAMP is also referred to in numerous clauses of the standards. The SAMP will be discussed in detail in a later chapter.

2.12 Policy, Strategy, or Plan?

“I don’t get it,” said Jock to his offsider Veronica as they wandered to the water cooler. “What’s the difference between a policy, a strategy and a plan?”

“Here comes Nick. Maybe he can explain it—he’s sure to have an opinion, even if it’s wrong!” said Veronica.

“Wrong, me?” said Nick, approaching.

“We don’t want any of your World War 2 stuff,” said Veronica.

Nick thought for a minute.

“Okay, let’s try the Punic War,” he said.

“Puny war?” said Jock.

“Punic—between the Romans and the Carthaginians around 200 B.C.” said Nick.

Veronica put on a pained expression.

“Let’s start with Policy,” said Nick. “That’s a statement of an overall aim or principle. The Roman policy was stated by Senator Cato, “Carthage must be destroyed.” An alternative policy might have been for Rome and Carthage to form some kind of Mediterranean Union. But Rome wanted it all, hence the motto *mare nostrum*.”

“I warned you he was a smarty pants,” said Veronica. “Anyway, how do you know that destroying Carthage was a Policy? It might have been an Objective!” (Fig. 2.8).

“Either way, it seems to have worked,” said Jock. “Where was Carthage anyway?”

“It was in North Africa,” said Nick.

“So the Romans had a policy or maybe an objective, but what about a strategy?” said Jock.

“Hannibal, the Carthaginian general, had a strategy based on taking his army around Spain and across the Alps into Italy, aiming to defeat the Romans there,” said Nick.

“I remember the bit about the elephants crossing the Alps,” said Jock. “I read that the climate must have been warmer in those days, otherwise he would never have made it.”

⁸ ISO 55001 Clause 4.4.

Fig. 2.8 Carthage must be destroyed



“The Roman general had a different strategy,” said Nick. “He took his army across the Med. by boat and captured Carthage”.

“It seems that was the best strategy,” said Jock, “but what about a Plan?”

“A plan is more a matter of detail. It’s about the activities, resources and timings needed to put something into practice,” said Nick.

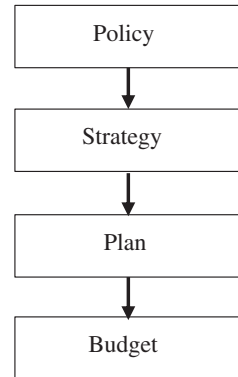
“ISO 55000 talks about a Strategic Asset Management Plan,” said Veronica, switching to a more current issue, “but is it a Strategy or a Plan? What do you reckon?”

“Maybe the guys that wrote this stuff weren’t too particular about the distinctions,” said Jock, leafing through the ISO 55000 documents. “Look at this in ISO 55002 Clause 4.1.1.1. ‘NOTE 2: A strategic asset management plan can be referred to by other names, e.g. an asset management strategy’. So someone must have thought the SAMP was a strategy and not a plan...but then, going down another paragraph it says ‘The links between the organizational plan and the Strategic Asset Management Plan should be two-way, and should be developed through an iterative process’. That sounds like a plan—or maybe just a two-way bet!”

“It looks like we’re going to have to live with some flexibility,” said Nick. “A lot of people just use these terms interchangeably, and any particular document might be a combination of policies, strategies, plans and budgets.”

“Talking about budgets, there’s another thing,” Nick went on. “All this strategy and planning is going to depend on there being a budget to actually do something. The overall picture is in Fig. 2.9. We’ll see more about the budgeting aspect later in the book.”

Fig. 2.9 Policy, strategy, plan and budget



2.13 Exercises

2.13.1 Self-Assessment Quiz 2.1

1. Identify five factors which can affect business strategy and which can then impact on asset management plans.
2. Identify three key responsibilities of a Chief Asset Manager.
3. What is the purpose of an asset management group?
4. Under what circumstances will an integrated project team be formed and what type of persons will be involved in it?
5. Identify six items of asset knowledge relevant to the asset management role.

2.13.2 Self-Assessment Quiz 2.2

1. List six activities in which asset management is commonly involved.
2. Identify three areas of activity where asset management does NOT have a leading role.
3. What is meant by an asset fleet?
4. Identify three topics that an asset management policy should address.
5. What will the asset management plan for an individual asset or group of assets be based on?

2.13.3 Holiday Resort Exercise

The owners of a holiday resort have had a good year, but at times the resort was overcrowded. There are opportunities to develop additional areas for leisure activities and accommodation. Write down half a dozen dot points of factors that they should consider in making plans for the future.

Alternatively, make a similar analysis related to an organization in a field with which you are familiar.

2.14 Solutions to Exercises

2.14.1 Self-Assessment Quiz 2.1 Solution

1. *Identify five factors which can affect business strategy and which can then impact on asset management plans.*
Any five of the dot points in Sect. 2.1.
2. *Identify three key responsibilities of a Chief Asset Manager.*
The three dot points under Sect. 2.3.
3. *What is the purpose of an asset management group?*
The purpose of an Asset Management Group is to provide resources and expertise to support the identification, acquisition, in-service support, and disposal of a particular group of physical assets required by the organization.
4. *Under what circumstances will an integrated project team be formed and what type of persons will be involved in it?*
An integrated project team is a team which is formed to manage a major project. The team may typically be led from the most closely related asset management group, or from the business development group. The team will draw on asset management personnel, augmented by financial, contract, and engineering specialists as necessary.
5. *Identify six items of asset knowledge relevant to the asset management role.*
Any six items from Table 2.1, Asset management knowledge.

2.14.2 Self-Assessment Quiz 2.2 Solution

1. *List six activities in which asset management is commonly involved .*
Any six items from Table 2.2.
2. *Identify three areas of activity where asset management does NOT have a leading role.*
Operations, Equipment design or construction, Maintenance (direct activities).
3. *What is meant by an asset fleet?*
A “fleet” of assets is the deployed assets of any given type.
4. *Identify three topics that an asset management policy should address.*
Any three of the dot points in Fig. 2.7.
5. *What will the asset management plan for an individual asset or group of assets be based on.*
The plan will be based on the life cycle maintenance, repair and overhaul activities, and logistic support needed to sustain the asset and to enable it to deliver the expected level of service over its lifetime.

2.14.3 Holiday Resort Exercise Solution

The owners of a holiday resort have had a good year, but at times the resort was overcrowded. There are opportunities to develop additional areas for accommodation and leisure activities. Write down half a dozen dot points of factors that they should consider in making plans for the future.

- a. History of demand, level, trend, cycles, forecast of customer demand.
- b. Demographic pattern of current and potential customers.
- c. Possible bottlenecks and easy fixes? Access roads, parking, buses, airport.
- d. Site analysis.
- e. Scope for new attractions (e.g., theme parks) with considerations of capacity, accessibility, match to customers' interests.
- f. Scope to develop new accommodation.
- g. Needs for additional utilities and services, e.g., power, access routes, parking, staffing, training, staff accommodation.
- h. Outline of practical options with preliminary financial analysis.
- i. Ranking of best return on investment.
- j. Requirement for government approval and permits if any.
- k. Risks, e.g., Accuracy of demand forecasts; Attitude to expansion of locals, of government; environmental impact, variability of weather; Risk of the unknown!
- l. Competitor analysis.
- m. Marketing required for selected option.

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